Highway 140 Land Holding

Environmental Impact Study

Project Location:

Part Lots 16, 17, 18, 19 Concession 5,
Port Colborne, ON

Prepared for:

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EXECUTIVE SUMMARY

MTE Consultants Inc. (MTE) has been retained by One Forty Development LP (the “Proponent”) to undertake an Environmental Impact Study (EIS) to support proposed development within Part Lots 16, 17, 18, 19 Concession 5 in Port Colborne, Ontario (herein referred to as the Subject Lands).

This EIS describes natural heritage features present within the Subject Lands and documents potential impacts associated with the proposed development on a portion of the Subject Lands. The proposed development addressed in this EIS includes lands identified as the “AK Lands,” an approximately 150-acre parcel located in the northeast portion of the Subject Lands and the area immediately west (approximately 20 acres).

MTE undertook a review of background information as well as field investigations in October 2023 and April through August 2024 to inform existing conditions within the Study Area and the assessment of significance for natural heritage features and functions. Preliminary site alteration has been approved by Niagara Region, the City of Port Colborne, and the Niagara Peninsula Region Conservation Authority (NPCA) within a portion of the AK Lands prior to completion of this EIS based on existing background studies, fall ecological inventories completed in 2023, and a preliminary assessment of headwater drainage features. The existing conditions portion of this report (Sections 1.0 – 6.0) is based on field work undertaken during 2023 and 2024. The assessment of impacts associated with the proposed development within the AK Lands has been undertaken with the understanding that site alteration with the approved boundary has been initiated.

The PPS (2024), *Niagara Region Official Plan* (2024), and the *City of Port Colborne Official Plan* (2017) define key natural heritage features to be considered in terms of the impact and net effects assessment. The proposed development impacts to Other Wetlands, Significant Wildlife Habitat (SWH), Fish Habitat, and Habitat of Endangered or Threatened Species are discussed within Section 8.0, with recommendations provided to mitigate impacts to the natural heritage features. Direct impacts can be mitigated using timing windows and with the implementation of an erosion and sediment control plan. Loss of Confirmed SWH is not anticipated to negatively affect the species using this habitat based on the availability of suitable habitat remaining within the Subject Lands, the buffer between the proposed development and remaining SWH, and the enhancement work to be completed within Confirmed SWH. The loss of suitable habitat for Eastern Meadowlark is being compensated for according to requirements outlined within *Ontario Regulation 830/21*.

Provided the recommendations in this EIS are followed, it is our opinion that the proposed development can proceed.

1.0 INTRODUCTION

MTE Consultants Inc. (MTE) has been retained by One Forty Development LP (the "Proponent") to undertake an Environmental Impact Study (EIS) to support proposed development within Part Lots 16, 17, 18, 19 Concession 5 in Port Colborne, Ontario (herein referred to as the Subject Lands; Figure 1).

In accordance with the Natural Heritage Reference Manual (NHRM; MNR 2010), a Study Area, including the Subject Lands and adjacent lands within 120 m, has been defined for the purposes of evaluating ecological functions (Figure 1).

This EIS describes natural heritage features present within the Subject Lands and documents potential impacts associated with the proposed development on a portion of the Subject Lands. The proposed development addressed in this EIS includes lands identified as the "AK Lands," an approximately 150-acre parcel located in the northeast portion of the Subject Lands and the area immediately west (approximately 20 acres).

Preliminary site alteration has been approved to move forward within a portion of the AK Lands prior to completion of this EIS based on existing background studies, fall ecological inventories completed in 2023, and a preliminary assessment of headwater drainage features. The existing conditions portion of this report (Sections 1.0 – 6.0) is based on field work undertaken during 2023 and 2024. The assessment of impacts associated with the proposed development within the AK Lands has been undertaken with the understanding that site alteration with the approved boundary has been initiated. This is further discussed in Sections 7.0 and 8.0.

1.1 Report Objective

This EIS provides an analysis of ecological constraints and opportunities to ensure the proposed development and site alteration is consistent with the Provincial Planning Statement (PPS; MMAH, 2024), the *Niagara Official Plan* (2024), the *City of Port Colborne Official Plan* (2017), and Niagara Peninsula Conservation Authority (NPCA) policy (i.e., *Ontario Regulation 41/24*). Furthermore, an evaluation of potential impacts to natural heritage features and functions, as well as recommendations for avoidance, mitigation and compensation measures are provided to address potential impacts as a result of the proposed development.

2.0 NATURAL HERITAGE LEGISLATION & POLICY CONTEXT

2.1 Planning Act

The PPS (2024) was issued under the authority of the *Planning Act, 1990* to provide direction to regional and local municipalities on matters of provincial interest related to land use planning and development in support of a comprehensive, integrated and long-term approach to planning. Land use planning decisions made by planning authorities must be consistent with the PPS (2024). With respect to natural heritage features and resources, the PPS defines eight natural heritage features or areas:

- Significant Wetlands;
- Significant Coastal Wetlands;
- Significant Woodlands;
- Significant Valleylands;
- Significant Wildlife Habitat (SWH);

- Significant Areas of Natural and Scientific Interest (ANSIs);
- Fish Habitat; and
- Habitat of Endangered and Threatened Species.

The Subject Lands are located within Ecoregion 7E. No development or site alteration shall be permitted in significant wetlands or significant coastal wetlands. Development and site alteration shall not be permitted in significant woodlands, significant valleylands, SWH, significant ANSIs or coastal wetlands unless it has been demonstrated, through an EIS or like study, that there will be no negative impact to natural heritage features or their ecological functions. As per the PPS (2024), development and site alteration shall not be permitted in habitat of endangered or threatened species, or in fish habitat, except in accordance with provincial and federal legislation.

Furthermore, the PPS (2024) indicates that development and site alteration shall not be permitted on lands adjacent to natural heritage features and areas unless it has been demonstrated that no negative impacts to these features or their ecological functions will occur.

The PPS provides area-specific land use planning policies and functions as a foundation for the development of lower-tier plans consistent with provincial policy. As such, the *Niagara Official Plan* (2024) and the *City of Port Colborne Official Plan* (2017) must be consistent with the PPS and are subject to the regulations of applicable provincial plans.

2.2 Niagara Official Plan (2024)

The *Niagara Official Plan* (2024) provides a long-term, strategic policy planning framework for managing land use planning and growth within Niagara. Natural heritage policies within the Official Plan have been developed pursuant to the *Planning Act* and outline opportunities to enhance the sustainability and resilience of the Region's natural environment. Natural heritage features and functions identified on, and adjacent to, the Subject Lands shall be reviewed in accordance with the natural heritage policies outlined in Section 3.1 of the *Niagara Official Plan* (2024).

2.2.1 Environmental Classifications

As per Schedule C1 (Natural Environment System Overlay and Provincial Natural Heritage Systems) of the *Niagara Official Plan* (2024), components of the Natural Environment System Overlay and Growth Plan area are present within the Subject Lands (Figure 2). Schedule C2 (Natural Environment System – Individual Components and Features) identifies the features overlapping the Subject Lands as "Other Wetlands" and "Non-Provincially Significant Wetlands" which are associated with the Lyons Creek Drain and connecting headwater drainage features. No other mapped features are present within the Subject Lands as per Schedule C2.

2.3 City of Port Colborne Official Plan (2017)

The *City of Port Colborne Official Plan* (2017) has been established to provide planning direction for the long-term protection, conservation, enhancement and management of the natural environment while recognizing that the Welland Canal provides impetus industrial development opportunities. Environmental policies defined within Section 4 (Natural Heritage) of the Official Plan are intended to provide a framework for identifying and protecting significant natural areas while providing opportunities for conservation and remediation, as appropriate. Provisions for the identification, assessment and protection of natural heritage features and associated functions defined within the Official Plan will be reviewed to ensure compliance with municipal regulations.

2.3.1 Land Use Designations

As per *Schedule A* (City Wide Land Use) of the *City of Port Colborne Official Plan* (2017), the Subject Lands are designated as Rural Employment (Figure 3). Rural Employment areas represent lands located in close proximity to the Welland Canal and along Highway 140 that occur outside of the Urban Area Boundary of the City of Port Colbourne. These lands are generally designated for dry industrial use (i.e., minimal water and wastewater requirements).

The adjacent lands, within the Study Area, are designated as a mix of Agricultural, Rural Employment, and Rural.

2.3.2 Environmental Classifications

Schedule B of the City of Port Colborne Official Plan (2017) indicates that the Subject Lands include areas designated as Environmental Protection Area (EPA), Environmental Conservation Area (ECA), Fish Habitat and Stream Corridor.

The EPA identified on the Subject Lands is associated with the main branch of the Lyons Creek Drain and occurs within the NPCA regulation limit. The southeastern portion of the Subject Lands is designated as an ECA.

As per Schedule B2 (Environmental Conservation Area) of the *City of Port Colborne Official Plan* (2017), this area has been further delineated as an Environmental Corridor. As per Section 4.3.1(b) of the Official Plan, “the degree of protection and conservation afforded to the natural features and ecological functions of these areas in large part depends on the areas significance.”

2.4 City of Port Colborne Zoning By-law

Under the City’s *Comprehensive Zoning By-law* (By-law 6575/30/18), the Subject Lands are zoned as a mixture of Heavy Industrial – Holding (HI-46-H) and Industrial Development (ID-47-H) (Figure 3).

2.5 Niagara Peninsula Conservation Authority (NPCA)

The NPCA administers the Prohibited Activities, Exemptions, and Permits regulation, under Ontario Regulation 41/24, pursuant to Section 28 of the Conservation Authorities Act, 1990. Areas within the jurisdiction of the authority are delineated within the “Regulation Limit” and include river or stream valleys, wetlands, shorelines, and hazardous lands.

As per NPCA regulation mapping, some of the drainage features identified on the Subject Lands are located within the regulation limit (Figure 2).

3.0 PHYSICAL ENVIRONMENT

Consideration of the larger ecological matrix contributes to developing a better understanding of potential interactions between abiotic and biotic flows and exchanges. As depicted on Figure 1, the larger local landscape setting surrounding the Subject Lands is composed of a mixture of agricultural and residential use. In terms of potential movement corridors, the primary linkage feature traversing the broader landscape is the Lyons Creek Drain, which provides a contiguous linkage across the Subject Lands.

Surrounding road networks (i.e., Highway 140 and Highway 58A) function as a physical barrier to wildlife movement and may limit abiotic and biotic exchanges from north and east of the Subject Lands.

3.1 Physiography

The Study Area is located within the Great Lakes – St. Lawrence Lowlands physiographic region of southern Ontario. This area is characterized by Clay Plain (Chapman & Putnam 1984).

3.2 Soils & Geology

Surficial geology mapping available through the Ministry of Energy, Northern Development and Mines (2012) indicates that the Study Area is underlain by man-made deposits, which is predominantly composed of fill, sewage lagoon, landfill and urban development. The man-made deposits are underlain by fine-textured glaciolacustrine deposits, which are composed of silt, clay, minor sand and gravel.

3.3 Surface Water Features & Drainage

The Study Area is situated within the Northern Lake Ontario and Niagara River Subwatershed, which forms a component of the larger Great Lakes – St. Lawrence River Watershed. The Subject Lands are bisected by a tributary of the Lyons Creek Drain, which conveys surface flows southwest across the site. Furthermore, the Welland Canal is located on adjacent lands directly west of the Subject Lands.

Surface drainage patterns within the Study Area are generally consistent with local topography. The result of historical fill and drainage channelization has created several drainage features that flow throughout the Subject Lands. These drainage features are discussed further in Section 5.5.

3.4 Hydrogeology

As per Schedule B3 (Vulnerable Aquifer Areas) of the City of Port Colborne Official Plan (2017), the Study Area is not located within a Highly Vulnerable Aquifer. The Significant Groundwater Recharge Area Delineation for the Niagara Peninsula Source Protection Area Figure 3.4 also does not depict the Study Area as within a Source Water Protection Area (NPCA 2009).

4.0 BACKGROUND REVIEW

MTE has conducted a background review to delineate designated natural heritage features and linkage corridors within, and adjacent to, the Study Area. Aerial imagery and existing natural heritage feature mapping available through the *Niagara Official Plan* (2024) and the *City of Port Colborne Official Plan* (2017), Land Information Ontario (LIO) and NPCA regulation mapping has been reviewed to provide insight into the overall character of the Subject Lands. Natural heritage databases have also been reviewed to supplement ecological field investigations.

4.1 Biological Setting

The Study Area occurs within Lake Erie - Lake Ontario Ecoregion 7E, which extends from Lake Ontario to Lake Erie and includes most of the Lake Erie shoreline. Ecoregion 7E is located within the Great Lakes Watershed and is characterized by the mild climate associated with the Deciduous Forest Region.

As per the provincial LIO geographic database (MNRF 2024), the Natural Heritage Information Centre (NHIC) mapping (2024), the *Niagara Official Plan* (2024), and the *City of Port Colborne Official Plan* (2017), designated natural heritage features were identified within the Study Area as shown on Figure 2.

4.2 Background Information

Background resources were reviewed to inform the overall character of the Study Area and to develop baseline data with regards to species and habitat with the potential to occur within the Study Area. Background documents and databases reviewed included:

- Aerial imagery;
- MNRF's NHIC database (2024);
- DFO Aquatic SAR Mapping (2024);
- Bird Studies Canada's Atlas of Breeding Birds of Ontario (2005);
- Ontario Nature's Reptile and Amphibian Atlas (Ontario Nature 2019); and
- Online citizen science databases (e.g., eBird and iNaturalist).

The results of the background review are summarized below. These data assisted in defining targeted ecological field investigations conducted on the Subject Lands as well as level of survey effort. Field investigations are intended to confirm and refine data, as applicable, for features present within the Study Area in order to inform the significance assessment provided in the subsequent sections of this report.

4.2.1 Species Occurrence Data

Species listed as endangered or threatened on the SARO list are legally protected from harm or harassment and their associated habitats are protected from damage or destruction, as per the *ESA* (2007). Species of Conservation Concern (SOCC) include those species listed as Special Concern on the SARO list as well as provincially rare species (i.e., ranked S1 to S3). Provincial conservation status rankings are established by the NHIC based on the number of occurrences in Ontario and are defined as follows:

- S1: critically imperiled; often fewer than 5 occurrences;
- S2: imperiled; often fewer than 20 occurrences;
- S3: vulnerable; often fewer than 80 occurrences;
- S4: apparently secure;
- S5: secure; and
- S?: unranked, or, if following a ranking, rank uncertain (e.g., S3?).

Provincial status rankings do not provide an indication of regional abundance or rarity (i.e., species uncommon in the province may still be locally abundant in some regions).

The NHIC database (2024) was reviewed for records of provincially significant species and/or habitats occurring within the Study Area. Occurrence data is provided for 1 km^2 area squares, with five squares overlapping a portion of the Study Area (17PH4457, 17PH4557, 17PH4657, 17PH4456, and 17PH4556). The Ontario Breeding Bird Atlas (OBBA; 2001-2005 occurrence data) and the Ontario Reptile and Amphibian Atlas contain detailed information regarding the distribution of bird and reptile species in Ontario. Data is presented on 100 km^2 area blocks, with one data squares overlapping the Study Area (17PH45). Online citizen science sources (e.g., iNaturalist and eBird) were also reviewed to identify protected species and SOCC that have the potential to occur within the Study Area.

Critical habitat and distribution data for aquatic species was reviewed through DFO's aquatic SAR mapping (2024) and showed no records for aquatic SAR or critical habitat within the Study Area.

Additional SAR with the potential to occur within the Study Area include Eastern Red Bat (*Lasiurus borealis)*, Little Brown Myotis (*Myotis lucifugus* – END), Northern Hoary Bat (*Lasiurus cinereus*), Northern Myotis (*Myotis septentrionalis* – END), Silver-haired Bat (*Lasionycteris noctivagans*), Tri-colored Bat (*Perimyotis subflavus* – END), American Badger (*Taxidea taxus* – END), and Butternut (*Juglans cinerea* – END). These species are not well represented within background information sources and will therefore be considered on a site-specific basis where suitable habitat is present.

As species records only provide general occurrence data, the final determination of species presence or absence shall be subject to the availability of suitable habitat on the Subject Lands as determined through site-specific field investigations and discussed in Section 6.8. A full screening table is provided in **Appendix A**.

5.0 NATURAL ENVIRONMENT

In consideration of the type and extent of natural heritage features and areas present within the Study Area, field investigations have been conducted on the Subject Lands to evaluate feature significance. Protocol information for each of the field investigations conducted on the Subject Lands is summarized below and discussed in detail in the following sections. Surveys conducted by MTE, as well as weather conditions and date of the survey, are presented in the following sections and summarized in Table 1, below.

- Preliminary Ecological Site Assessment to document existing conditions, confirm the natural heritage features present, and inform field investigations;
- Three-season botanical inventory and vegetation community classification using sampling protocols outlined in the Ecological Land Classification for Southern Ontario (Lee et al., 1998) manual;
- Breeding Bird Surveys following protocols set forth by the Ontario Breeding Bird Atlas (OBBA) participant's guide (OBBA, 2001) for diurnal birds and by the Bobolink Survey Methodology (MNRF, 2011) for protected grassland bird species;
- Anuran Surveys conducted based on the standardized Marsh Monitoring Program (BSC, 2009a) protocols for amphibians, which have been adapted based on professional experience;
- Aquatic Habitat Assessment and Stream Analysis consistent with Ontario Stream Assessment Protocol methodology (Stanfield, 2017); and
- Headwater Drainage Feature Assessment conducted in accordance with Credit Valley Conservation and Toronto and Region Conservation Authority protocols (CVC/TRCA, 2014).

Table 1: Ecological Field Investigations

Survey Type	Date	Time		Temperature (°C)
		Start	End	
Preliminary Ecological Land Classification	October 12, 2023	09:00	16:00	13
Anuran (Amphibian) Survey	April 16, 2024	20:30	23:30	14
Anuran (Amphibian) Survey	May 29, 2024	21:00	23:15	13
Anuran (Amphibian) Survey	June 19, 2024	21:15	23:45	25
Spring Plant Inventory	May 31, 2024	10:00	16:15	16

Survey Type	Date	Time		Temperature (°C)
		Start	End	
Summer Plant Inventory	June 14, 2024	10:00	14:14	20
Fall Plant Inventory	October 12, 2023	09:00	16:00	13
Breeding Bird Survey	May 31, 2024	08:45	10:00	16
Breeding Bird Survey	June 14, 2024	08:14	10:00	20
Breeding Bird Survey	July 4, 2024	08:00	10:00	24
Aquatic Habitat Assessment	August 28, 2024	14:30	16:15	23
Headwater Drainage Feature Assessment	April 16, 2024	12:30	20:00	30
Headwater Drainage Feature Assessment	May 29, 2024	14:30	20:30	19
Headwater Drainage Feature Assessment	August 28, 2024	11:00	14:30	23

5.1 Ecological Land Classification

Ecological Land Classification (ELC) was completed in accordance with the sampling protocols outlined in the Ecological Land Classification for Southern Ontario (Lee et al., 1998) manual. Vegetation communities were sampled, verified and revised, if necessary to determine the provincial and regional significance of features present within the Subject Lands based on the rankings assigned by the NHIC (2024).

Ten vegetation cover types were identified within the Subject Lands, as illustrated on Figure 4 and summarized in Table 2, below. Vegetation communities on the Subject Lands are predominantly composed of cultural meadow. All vegetation communities are ranked secure in Ontario. Maternity roost surveys were completed as part of the preliminary ELC (October 12, 2023) and suitable maternity roost trees were determined to be absent from the Subject Lands.

Field data collection sheets are provided in **Appendix B**.

Table 2: Ecological Land Classification

Community	ELC Code	Description	Area (ha)
1	CUM1	Mineral Cultural Meadow	27.51 ha
2	CUT1	Mineral Cultural Thicket	4.21 ha
3	CUM1/OPEN GROUND	Mineral Cultural Meadow (includes Phragmites Inclusions)	67.08 ha
4	CUT1	Mineral Cultural Thicket	1.48 ha
5	CUW1	Mineral Cultural Woodland	1.72 ha
6	CUT1	Mineral Cultural Thicket	20.62 ha
7	MAM2	Mineral Meadow Marsh	1.78 ha
8	SWT	Swamp Thicket	4.32 ha
9	CUW/SWD	Cultural Woodland/Deciduous Swamp	4.03 ha
10	CUT	Cultural Thicket	2.36 ha
-	-	Agricultural Lands	40.49 ha

Community 1 is classified as a Mineral Cultural Meadow (CUM1) community and is located on the northern portion of the Subject Lands (Figure 4). The canopy for this community is considered to be open (less than 10% coverage) with Silver Maple (*Acer saccharinum*) the dominate canopy species. The understory provides 10-25% coverage and primarily consists of Gray Dogwood (*Cornus racemosa*). The ground layer is dominated by Common Reed (*Phragmites australis*), Goldenrod species (*Solidago* spp.), and grasses.

Community 2 is classified as a Mineral Cultural Thicket (CUT1) community and is located on the northern portion of the Subject Lands, south of Community 1 (Figure 4). The canopy for this community is dominated by Autumn Olive (*Elaeagnus umbellata*) with a ground layer dominated by Goldenrod species and grasses.

Community 3 is classified as a Mineral Cultural Meadow (CUM1) / Open Ground community and is located within the mid-portion of the Subject Lands (Figure 4). This ground layer of this community is dominated by areas of open ground as well as Common Reed, Goldenrod species, and grasses. Existing phragmites inclusions and areas of anthropogenic disturbance (e.g., ATV trails) are also present throughout Community 3.

Community 4 is classified as a Mineral Cultural Thicket (CUT1) community and is located southeast of Community 3 and north of the agricultural lands (Figure 4). The canopy for this community is dominated by Eastern Cottonwood (*Populus deltoides*) with an understory dominated by Common Buckthorn (*Rhamnus cathartica*) and Red-osier Dogwood (*Cornus sericea*).

Community 5 is classified as a Mineral Cultural Woodland (CUW1) community and is located east of Community 4 and northeast of the agricultural lands (Figure 4). The canopy of this community is dominated by Pin Oak (*Quercus palustris*), Bur Oak (*Quercus macrocarpa*), and Silver Maple with an understory dominated by Common Buckthorn and Red-osier Dogwood. The average width of Community 5 is approximately 15 m. Despite being classified as a cultural woodland through ELC, the community does not meet the 40 m minimum width requirement to be identified as a woodland as per the NHRM (2010).

Community 6 is classified as a Mineral Cultural Thicket (CUT1) community and is located within the southwestern portion of the Subject Lands (Figure 4). The canopy of this community is dominated by Eastern Cottonwood with a ground layer of various grass species.

Community 6 can be further subdivided into 6A and 6B given the disparity in canopy cover within the two areas. Both areas meet the requirements of a cultural thicket designation (tree cover <25% and shrub cover >25%) and contain similar species composition; however, the communities are subdivided as Community 6A contains more shrub and tree cover while Community 6B is more open due to more recent disturbances.

Community 7 is classified as a Mineral Meadow Marsh (MAM2) community and is located east of Community 6 and west of the agricultural lands (Figure 4). The canopy of this community is open (10% coverage) with vegetation limited to Silver Maple with some dead Green Ash. Sub-canopy and understory layer vegetation is absent from the community.

Community 8 is classified as a Swamp Thicket (SWT) community and is located within the southwestern portion of the Subject Lands, southeast of community 6 (Figure 4). The canopy of this community is dominated by Silver Maple and White Willow (*Salix alba*) and an understory dominated by willow species and Common Buckthorn.

Community 9 is classified as a Cultural Woodland / Deciduous Swamp (CUW/SWD) mixed community and is located within the southern portion of the Subject Lands, immediately south of the agricultural lands (Figure 4). The canopy for this community is dominated by Silver Maple with an understory dominated by Tartarian Honeysuckle (*Lonicera tatarica*), Red-osier Dogwood, and Riverbank Grape (*Vitis riparia*).

Community 10 is classified as a Mineral Cultural Thicket (CUT1) community and is located south of Community 3 and north of the agricultural lands (Figure 4). The canopy for this community is dominated by Willow species while (*Salix* spp.) the ground layer is dominated by Canada Goldenrod (*Solidago canadensis*).

5.2 Vascular Plants

A three-season botanical inventory was completed to confirm the provincial status of vascular plant species on the Subject Lands. Spring ephemerals were surveyed in April to May while summer and fall flowering periods were captured in June to August and September to October, respectively. The status of all plant species is based on the provincial NHIC database (2022) and the List of Vascular Plants for Ontario's Carolinian Zone (Oldham, 2017).

A total of 113 vascular plant species were identified on the Subject Lands, of which 67 or 59% are native to Ontario and 46 or 41% are introduced species. A full species list is provided in **Appendix B**. All species observed on the Subject Lands are ranked S4 or S5 (apparently secure or secure in Ontario).

Coefficient of Conservatism (CoC) values were applied to species in each vegetation community to assist in the identification of potentially sensitive native plants. CoC values range from 0 to 10 and are assigned based on a species tolerance of disturbance and degree of fidelity to certain ecological parameters (Oldham et al., 1995; Wilhelm and Masters, 1995). Species occurring within a wide range of habitat types are assigned a low CoC value, while species occurring only within a narrow range of habitat parameters are assigned a high CoC value. Pin Oak (*Quercus palustris*) was the only species identified on the Subject Lands that had a high CoC value (of 9).

Floristic Quality Analysis

Floristic quality is generally defined by the mean CoC and the Floristic Quality Index (FQI). This evaluation system provides an assessment of the fundamental character of the site, without relying on ambiguous parameters such as frequency, dominance, physiognomy, or productivity. Floristic quality allows for an objective numerical comparison between two or more natural areas or vegetation community types by evaluating native plant species' tolerance to disturbance and their degree of fidelity to specific habitats. Each native species is assigned a numerical value in order to calculate a mean CoC that may be used to compare the relative quality of natural areas based on species degree of fidelity to a range of ecological parameters (Wilhelm and Ladd, 1988; Wilhelm and Masters, 1995).

Botanical inventories conducted on the Subject Lands were used to inform associated vegetation community assessments using the Southern Ontario Floral Inventory Analysis (SOFIA; Lebedyk 2018). SOFIA assigns quantitative plant community values based on floral inventories to evaluate the ecological significance and natural quality of vegetation communities. Results of the floristic quality analysis are provided in Table 3 for each ELC unit identified on the Subject Lands.

Through SOFIA, the mean CoC of vegetation communities was calculated based on all species observed to provide a measure of floristic quality (Lebedyk, 2018). A mean CoC greater than 3.5 is indicative of a floristic quality characteristic of remnant natural habitats. A mean CoC greater than 4.5 indicates a relatively intact natural area with high floristic quality (Oldham et al., 1995; Wilhelm and Masters, 1995).

The FQI defined through SOFIA is intended to quantify the overall vegetative quality of a community based on the mean CoC and the number of species present (Oldham et al., 1995). A community with a FQI less than 20 is considered to have minimal significance from a natural

quality perspective, while a community with a FQI greater than 20 is of high floristic quality and a community with a FQI greater than 35 is considered to have sufficient conservatism and richness to be floristically important from a provincial perspective (Wilhelm and Ladd, 1988). No mean CoC or FQI values identified for community types on the Subject Lands are higher than the minimum thresholds for moderate floristic quality (i.e., 3.5 and 20, respectively).

Based on the annotated assessment of community conditions determined through SOFIA, all 10 communities were determined to be of poor floristic quality and minimal natural quality. Given the existing plant species composition, it is expected that the ecological value of the natural heritage communities on the landscape is low.

Table 3: Southern Ontario Floral Inventory Analysis (SOFIA) Results

Vegetation Community	Mean CoC	FQI	Native Species	Non-Native Species	Conservative Species (CoC ≥7)
Community 1 Mineral Cultural Meadow (CUM1)	1.25	8.66	26	22	0
Community 2 Mineral Cultural Thicket (CUT1)	1.43	8.45	18	17	1
Community 3 Mineral Cultural Meadow / Open Ground (CUM1/OPEN GROUND)	1.60	6.20	9	6	0
Community 4 Mineral Cultural Thicket (CUT1)	1.62	8.73	15	14	0
Community 5 Mineral Cultural Woodland (CUW1)	2.23	12.39	22	9	2
Community 6 (A & B) Mineral Cultural Thicket (CUT1)	1.00	5.74	19	14	0
Community 7 Mineral Meadow Marsh (MAM2)	1.83	7.78	10	8	1
Community 8 Swamp Thicket (SWT)	2.89	14.70	14	5	4
Community 9 Cultural Woodland/Deciduous Swamp (CUW/SWD)	1.88	10.79	21	12	2
Community 10 Cultural Thicket (CUT)	2.45	10.96	17	3	0

Invasive Species

Invasive species are introduced, or exotic species characterized by high propagation rates and rapid colonization that may be harmful or cause irreparable damage to habitats and ecosystems. The *Invasive Species Act* (2015) explicitly regulates the prevention and management of invasive species in Ontario.

Category 1 species are defined as species that can dominate a site to exclude all other species and remain dominant on the site indefinitely (Urban Forest Associates 2002). These species pose a threat to local biodiversity and the ecological functions of natural areas. Category 1

species are a top priority for invasive species management and should be addressed in accordance with the best management practises outlined by the Ontario Invasive Plant Council (2023). Of the 22 invasive plant species documented on the Subject Lands, 10 are ranked as Category 1 (i.e., Manitoba Maple, Autumn Olive, Glossy Buckthorn, Dame's Rocket, Tartarian Honeysuckle, Purple Loosestrife, Common Reed, Common Buckthorn, Multiflora Rose, and Common Crown-vetch).

5.3 Breeding Birds

Breeding bird surveys were conducted following protocols set forth by Ontario Breeding Bird Atlas participant's guide (OBBA 2001) for diurnal birds, and by the Bobolink Survey Methodology (MNRF, 2011) for protected grassland bird species. Point count stations were established in various habitat types present on the Subject Lands to characterize breeding bird communities (Figure 5). Point count surveys were conducted at least ten days apart between dawn and five hours after dawn during the peak breeding season (i.e., Round 1: May 24 to June 17 and Round 2: June 15 to July 10) when no high winds, heavy fog or precipitation was present. All species within a 100 m radius of the sampling station were recorded during a five-minute period. The number of individuals present, and the highest level of breeding evidence were recorded for all avian species observed. As per the OBBA protocol, surveys are required to be completed between dawn and 5 hours after dawn. MTE completed all surveys within this timeframe (specifically between 08:00 and 10:00).

Open grassland habitats were surveyed in accordance with the Marsh Breeding Bird Program (BSC 2009b) between May 24 and July 10. Point count stations were located within, or adjacent to, marsh bird habitat patches (e.g., marshes, open bogs, or open fens) and species were recorded during a ten-minute survey interval at each station (Figure 5).

Results

A total of 33 breeding bird species were identified throughout the breeding bird surveys conducted on the Subject Lands. Of these species, all are provincially ranked secure (i.e., S5) or apparently common and secure (i.e., S4; NHIC 2022) in Ontario.

Eastern Meadowlark (*Sturnella magna*) is the only species listed as threatened or endangered on the SARO list that was observed on the Subject Lands during the breeding bird surveys. Two potential pairs were identified during the breeding bird surveys near the western edge of Community 6.

5.4 Amphibians

Targeted surveys for calling anurans (i.e., frogs and toads) were completed for suitable habitats (e.g., wetlands, ponds) located on, and immediately adjacent to, the Subject Lands in accordance with the standardized Marsh Monitoring Program (BSC 2009a) protocols for amphibians. Surveys were conducted at least 15 days apart in early spring (i.e., April 16 to April 30), mid-spring (i.e., May 15 to May 31), and late spring (i.e., June 15 to June 30) when nighttime air temperatures exceeded 5°C, 10°C and 17°C, respectively. Each station was surveyed for a total of three minutes and call levels of all amphibians detected within a 100 m radius were recorded. Surveys began no earlier than 30 minutes after sunset and were completed before midnight.

A summary of observations is provided in Table 4, below. Complete data sheets are provided in **Appendix B** and station locations are shown on Figure 5.

Table 4: Amphibian Call Count Survey Results

Station	Survey Round	Species								
		No Amphibians	American Toad	Bullfrog	Chorus Frog	Gray Tree Frog	Green Frog	Northern Leopard Frog	Spring Peeper	Wood Frog
A	1		1-2		2-5					
	2	X								
	3	X								
B	1				1-5					
	2	X								
	3						1-1[1]			
C	1				2-6					
	2	X								
	3	X								
D	1				1-2					
	2	X								
	3	X								
E	1				1-2					
	2	X								
	3	X								
F	1				2-9				1-1[1]	
	2	X								
	3	X								
G	1				1-3[1]					
	2	X								
	3	X								
H	1				1-4					
	2	X								
	3	X								
I	1		2-3		1-3					
	2	X								
	3	X								
J	1				2-3					
	2	X								
	3	X								
K	1				1-4					
	2	X								
	3	X								

Station	Survey Round	Species								
		No Amphibians	American Toad	Bullfrog	Chorus Frog	Gray Tree Frog	Green Frog	Northern Leopard Frog	Spring Peeper	Wood Frog
L	1				2-4					
	2	X								
	3	X								

[1]Indicates calls detected outside of the 100 m radius of the call count station (Figure 5).

A total of four amphibian species (Chorus Frog, American Toad, Green Frog, and Spring Peeper) were detected during amphibian call count surveys on the Subject Lands. One Green Frog was heard during the second survey; all other individuals were heard during the first survey. All amphibian species are provincially ranked secure (i.e., S5) or apparently common (i.e., S4) in Ontario.

5.5 Headwater Drainage Feature Assessment

Under the Evaluation, Classification and Management of Headwater Drainage Features Guidelines, hydrologic features are assessed in three stages: Evaluation (Part 1), whereby the physical and biological characteristics of a feature are determined, Classification (Part 2), which assigns a rating of functional significance to segments of the hydrologic feature, and Management Recommendations (Part 3), wherein a management recommendation is provided based on the flow attributes and functions of the drainage feature. Part 1 was informed through a review of background resources (i.e., hydrology classification, fish habitat classification, riparian classification, and terrestrial habitat classification) as well as site reconnaissance (i.e., feature location, feature type, modifiers and riparian classification) to evaluate the classification criteria applied through Part 2 of the assessment. As per Part 3, management recommendations were assigned to each feature.

Three tributaries (twenty reaches) of the Lyons Creek Drain were identified on the Subject Lands (Figure 5). Assessment locations were defined by the confluence of two distinct drainage lines, and changes in feature type, vegetation, flow or other habitat conditions that may influence the final management recommendation applied to the segment. All tributaries of the drainage system, and associated reaches, identified on the Subject Lands are discussed below. A summary of the HDFA evaluation criteria and final management recommendations assigned to each reach is provided in Table 5.

Table 5: Headwater Drainage Feature Functional Classifications and Management Recommendations

Drainage Feature Segment	STEP 1		STEP 2	STEP 3	STEP 4	Management Recommendation
	Hydrology	Modifiers	Riparian	Fish Habitat	Terrestrial	
H1	Contributing	Fill Accumulation	Valued	Contributing	Limited	**Mitigation**
H1A-S1	Contributing	Fill Accumulation	Valued	Contributing	Limited	**Mitigation**
H1A-S2	Contributing	Fill Accumulation	Valued	Contributing	Limited	**Mitigation**

Drainage Feature Segment	STEP 1		STEP 2	STEP 3	STEP 4	Management Recommendation
	Hydrology	Modifiers	Riparian	Fish Habitat	Terrestrial	
H1B-S1	Contributing	Fill Accumulation	Valued	Contributing	Limited	**Mitigation**
H1B-S1A	Contributing	Fill Accumulation	Valued	Contributing	Limited	**Mitigation**
H1B-S1B	Contributing	Fill Accumulation	Valued	Contributing	Limited	**Mitigation**
H1B-S1C	Contributing	Fill Accumulation	Valued	Contributing	Limited	**Mitigation**
H2S1	Contributing	Fill Accumulation	Important	Contributing	Important	**Protection**
H2S2	Contributing	Fill Accumulation	Important	Contributing	Important	**Protection**
H2S3	Contributing	Fill Accumulation	Valued	Contributing	Contributing	**Mitigation**
H2S3A	Contributing	Fill Accumulation	Valued	Contributing	Contributing	**Mitigation**
H2S3B	Contributing	Fill Accumulation	Valued	Contributing	Limited	**Mitigation**
H2S3C	Contributing	Fill Accumulation	Valued	Contributing	Limited	**Mitigation**
H2S3C1	Contributing	Fill Accumulation	Valued	Contributing	Limited	**Mitigation**
H2S3C2	Contributing	Fill Accumulation	Valued	Contributing	Limited	**Mitigation**
H3	Contributing	Fill Accumulation	Valued	Contributing	Contributing	**Mitigation**
H3S1	Contributing	Fill Accumulation	Valued	Contributing	Limited	**Mitigation**
H3S2	Contributing	Fill Accumulation	Valued	Contributing	Limited	**Mitigation**
H3S3	Contributing	Fill Accumulation	Valued	Contributing	Limited	**Mitigation**
H3S4	Contributing	Fill Accumulation	Valued	Contributing	Contributing	**Mitigation**

As per the NPCA Open Data Portal and confirmed during field investigations, all features on the Subject Lands were assigned a Contributing hydrology classification based on ephemeral flows within the HDFs which is consistent with the intermittent flow regime of the Lyons Creek Drain.

Through the Evaluation, Classification and Management of Headwater Drainage Features Guidelines (CVC/TRCA 2014), ephemeral flow is defined as water that "*flows for a short period of time in response to localized precipitation (e.g., spring freshet or storm events)*." The surface water channel of ephemeral features typically occurs above the local groundwater table, which is consistent with groundwater monitoring results collected through the Phase I and Phase II Environmental Site Assessments (MTE, 2023) (i.e., groundwater was encountered at depths ranging from 12.6 m to 27.5 m).

5.5.1 Headwater Drainage Feature H1

The H1 network is generally comprised of poorly defined surface drainage depressions/swales that convey overland flows in a southeasterly direction towards the Lyons Creek Drain throughout the eastern portion of the Subject Lands. Drainage features have generally been artificially imposed on the landscape as a consequence of the undulating topography associated with the historic deposition of soils excavated from the Welland Canal. Due to the high degree of site alteration, various functional impairments (e.g., invasives plant species monocultures) and limited hydrologic functions were noted.

Feature H1 was characterized as a channelized feature based on the presence of defined banks and evident historic straightening of the channel. Through the NPCA Open Data Portal, H1 was further defined as a constructed, open water ditch with ephemeral flows. The feature originates within the northeastern portion of the Subject Lands and flows south to the confluence of the Lyons Creek Drain. Riparian areas are dominated by “Important” vegetation communities (e.g., cultural thicket); however, the majority of the vegetation communities are fragmented and impacted by historical soil deposition / anthropogenic disturbance and have therefore been assessed as “valued.” Therefore, the feature was assigned a “Mitigation” management recommendation.

H1A-S1 was identified as channelized feature based on the presence of defined banks. H1A-S1 conveys flows in an easterly direction along the northern boundary of the agricultural lands to H1 and was further defined as a constructed, open water agricultural drainage ditch across four sampling locations through the NPCA Open Data Portal. Riparian vegetation was assessed as “valued” as one bank consisted of a mix of meadow and scrubland and the other was dominated by agricultural land. As such, this feature was assigned a “Mitigation” management recommendation.

H1B-S1 was also identified as channelized features based on the presence of defined banks. H1B-S1 conveys flows from the northeastern portion of the Subject Lands in a southeasterly direction to H1. H1B-S1 was further defined as a rural drainage feature with ephemeral flows across seven sampling locations through the NPCA Open Data Portal. Although thicket riparian vegetation is present, this feature was assigned a “Mitigation” management recommendation as the dominant riparian cover type is cultural meadow and cropped lands.

Through the NPCA Open Data Portal, all other HDFs (i.e., H1A-S2, H1B-S1A, H1B-S1B, H1B-S1C) associated with H1 were characterized as rural drainage swales with ephemeral flows. These features predominantly occur within sparsely vegetated cultural meadow communities resulting in a moderate degree of erosion within several of the features. Each of these features were assigned a “Mitigation” management recommendation based on the limited hydrologic and ecological functions associated with each reach.

5.5.2 Headwater Drainage Feature H2

Feature H2 is contiguous with H1A-S1 on the landscape but conveys flows from the western portion of the Subject Lands in a southwesterly direction towards the roadside ditch along Forks Road.

The upstream portion of the feature (i.e., H2S3) is a channelized reach confined between the northern boundary of the agricultural field and the areas of infilling that characterize the northern portion of the Subject Lands. H2S3 was defined as a constructed, open water rural drainage feature with ephemeral flows across five sampling locations through the NPCA Open Data Portal. Although thicket riparian vegetation is present, this feature was assigned a “Mitigation” management recommendation as the dominant riparian cover type is cultural meadow and

cropped lands. Associated drainage features conveying flows to the downstream reach of H2S3 include H2S3A, H2S3B, H2S3C, H2S3C1 and H2S3C2. These features occur within sparsely vegetated meadow habitats where bare soils have resulted in a high degree of erosion and the subsequent entrenchment of several swale features. Each of these features were characterized as rural drainage features with ephemeral flows through the NPCA Open Data Portal and assigned a “Mitigation” management recommendation.

H2S1 and H2S2 were characterized as constructed drainage ditches with ephemeral flows through the NPCA Open Data Portal. Riparian areas of the downstream reaches of H2 (i.e., H2S1 and H2S2) are associated with naturalized wetland vegetation communities including Mineral Meadow Marsh (MAM2) and Swamp Thicket (SWT) ecosites. Wetland vegetation appears to be encroaching on the agricultural lands along the upstream segment of H2S2 and wetland communities associated with the roadside ditch along H2S1 have extended into riparian areas. Adjacent wetland communities are expected to support important riparian and terrestrial habitat functions; as such, H2S1 and H2S2 have been assigned a “Protection” management recommendation.

5.5.3 Headwater Drainage Feature H3

H3 is a constructed channel associated with the access road along the northern rail line that connects Highway 140 to Canal Road and is largely constrained by the tiered topography associated with the rail line corridor. The feature is located south of the access route and flows in a westerly direction across the Subject Lands before discharging into the Welland Canal and the roadside ditch located east of Canal Road. Both culverts at the downstream extent of H3 were observed to be dry, with the perched culvert connecting to the Welland Canal functioning as a migratory barrier to fish movement. The feature was characterized as a constructed, open water ditch with ephemeral flows through the NPCA Open Data Portal and was observed to have various wetland tree species growing within the thalweg of the channel, which would suggest that high water levels are not present within the feature for long periods. Standing water (4 cm depth) was observed within downstream pockets of the reach and Northern Leopard Frog (*Lithobates pipiens*) was heard calling incidentally during the October 19, 2023, field visit. Given that H3 primarily functions as a roadside ditch associated with disturbed areas and meadow habitat, this feature was assigned a “Mitigation” management recommendation.

Overland flows from the adjacent hydro corridor are conveyed to H3 by H3S1, H3S2, H3S3, and H3S4. These features function as ephemeral drainage swales and were characterized as rural drainage through the NPCA Open Data Portal. H3S1 is bisected by an ATV trail crossing and H3S2 appears to be more characteristic of a rill/gully than a drainage swale based on conditions observed in fall 2023. All features were poorly defined and appear to provide limited terrestrial habitat functions. As such, H3S1, H3S2, H3S3, and H3S4 were assigned a “Mitigation” management recommendation.

5.6 Aquatic Habitat Assessment & Stream Analysis

An aquatic habitat assessment and stream analysis consistent with OSAP methodology (Stanfield 2017) was conducted for the main segment of the Lyons Creek Drain flowing through the Subject Lands. Two sampling locations occurred within the Lyons Creek Drain (Figure 5). Representative stream sections were sampled over a 40 m stream length, as per OSAP protocols.

An aquatic habitat assessment was completed within two reaches of the Lyons Creek Drain to evaluate fish habitat availability and the suitability of habitat to support a range of life cycle functions. Aquatic habitat was characterized based on channel morphology, bed and bank

substrate, in-stream and riparian cover, flow condition, movement barriers and the presence of potential critical habitat features. The results of the assessment are outlined in Table 6 and 7.

As per the findings of the aquatic habitat assessment, the portion of Lyons Creek Drain flowing through the Subject Lands was identified as indirect fish habitat due to its intermittent flow regime. The watercourse may provide temporary access for migration during high flow events; however, large portions of the watercourse were dry during the aquatic habitat assessment and no fish were observed within the areas with minimal flow. In addition, the municipal drain provided no habitat features characteristic of quality fish spawning, nursery, or rearing habitat.

Aquatic habitat assessment field notes are provided in **Appendix B**.

Table 6: Aquatic Habitat Station 1 Characteristics

Site Length:	40.5 m	**Average Width:**	1.5 m	**Average Depth:**	35 mm
Flow Regime:	Ephemeral				
Thermal Regime:	Warmwater				
Watercourse Substrate:	Silt and Clay				
Channel Structure:	100% pool (0-100 mm depth)				
Instream Cover:	None				
Aquatic Vegetation:	Cattails				
Bank Stability:	Vulnerable (60%) and eroding (40%)				
Watercourse Shade:	20% (limited bank vegetation, in-stream cattails provide limited shade)				
Land Use(s):	Adjacent Land uses consist of cropland (right and left bank)				
Pollution Sources:	Agricultural Inputs and Sediment Deposition				
Migratory Obstructions:	Upstream culvert dry due to intermittent flow				

Table 7: Aquatic Habitat Station 2 Characteristics

Site Length:	40.5 m	**Average Width:**	1.5 m	**Average Depth:**	35 mm
Flow Regime:	Ephemeral				
Thermal Regime:	Warmwater				
Watercourse Substrate:	Silt and Clay				
Channel Structure:	100% pool (0-100 mm depth)				
Instream Cover:	None				
Aquatic Vegetation:	Cattails				
Bank Stability:	Eroding (50%) and vulnerable (50%)				
Watercourse Shade:	20% (limited bank vegetation, in-stream cattails provide limited shade)				
Land Use(s):	Adjacent Land uses consist of cropland (right and left bank)				
Pollution Sources:	Agricultural Inputs and Sediment Deposition				
Migratory Obstructions:	Upstream culvert dry due to intermittent flow				

5.7 Fish Community Inventory

Fish community sampling was planned for the portion of Lyons Creek Drain found within the Subject Lands in accordance with the standard single pass electrofishing methodology defined within S3.M1 of the OSAP protocol (Stanfield, 2017) and using the electrofishing techniques outlined in S3.M2. Sampling was to be completed as specified within the License to Collect Fish for Scientific Purposes permit (AYGU-2024-FWCA-00698) issued by MNRF; however, sampling did not occur due to insufficient water depth during the survey window.

No fish were observed within the portion of Lyons Creek Drain found within the Subject Lands during the aquatic habitat assessment.

6.0 EVALUATION OF SIGNIFICANCE

In accordance with applicable federal, provincial, municipal and conservation authority regulatory policies, the significance of natural heritage features and ecological functions identified within the Study Area was reviewed to determine the appropriate level of protection to be applied to each feature. To inform subsequent planning stages, features were further reviewed to identify potential constraints and opportunities for proposed development and/or site alteration.

As per the PPS (2024) and the *Niagara Region Official Plan* (2024), the following significant natural heritage features and areas shall be evaluated to assess significance and ecological functions on the landscape to inform the planning process:

- Significant Wetlands;
- Significant Coastal Wetlands;
- Significant Woodlands;
- Significant Valleylands;
- Significant Wildlife Habitat;
- Significant Areas of Natural and Scientific Interest;
- Fish Habitat;
- Habitat of Endangered and Threatened Species;
- Key Hydrologic Areas, Key Hydrologic Features, and Other Important Water Resources
- Supporting Features and Areas; and
- Linkages.

Technical guidance provided within the NHRM (MNR, 2010) has been referenced to inform the identification of potentially significant natural areas, and their associated forms and functions on the landscape, as defined within the PPS (2024). The presence or absence of these features within the Study Area is discussed in the following sections.

6.1 Significant Wetlands

In accordance with the PPS (2024), significant wetlands are defined as areas identified as provincially significant by MNRF or their designates, using evaluation criteria established by the province (i.e., Ontario Wetland Evaluation System; MNRF, 2022).

As per the LIO database, no provincially significant wetlands were identified on, or adjacent to, the Subject Lands (MNRF 2021).

Other Wetlands

The *Niagara Official Plan* (2024) also provides mapping which is designated as "Other Wetlands" and included as part of its Natural Environment System. The following criteria is also provided within Table 4-1 of the *Niagara Official Plan* for identifying "Other Wetlands":

- All wetlands that meet an Ecological Land Classification wetland system classification and have not been evaluated to determine provincial significance;
- Wetlands evaluated as non-provincially significant wetlands or non-evaluated wetlands; and
- Wetlands that provide an ecological and hydrological function or only a hydrological function.

The following communities were identified within the Subject Lands and meet the criteria for designation as Other Wetlands:

- Community 7: Mineral Meadow Marsh (1.78 ha);
- Community 8: Swamp Thicket (4.32 ha); and
- Community 9: Cultural Woodland / Deciduous Swamp mix (4.03 ha).

The *Niagara Official Plan* (2024) identifies all wetlands as Key Hydrologic Features that are subject to the policies outlined within Section 3.1.10.

6.2 Significant Coastal Wetlands

As with significant wetlands, significant coastal wetlands are identified by MNRF or their designates and are defined under the NHRM (MNR, 2010) as:

- "*any wetland that is located on one of the Great Lakes or their connecting channels (Lake St. Clair, St. Mary's, St. Clair, Detroit, Niagara and St. Lawrence Rivers); or*
- *any other wetland that is on a tributary to any of the above-specified water bodies and lies, either wholly or in part, downstream of a line located 2 kilometres upstream of the 1:100 year floodline (plus wave run-up) of the large water body to which the tributary is connected*."

No significant coastal wetlands were identified within the Study Area.

6.3 Significant Woodlands

Significant woodlands should be defined and designated by the planning authority in accordance with the evaluation criteria outlined within Section 7.0 of the NHRM (MNR, 2010). Criteria for the designation of significant woodlands include size, shape, proximity to other woodlands or natural features, linkages, species diversity, uncommon characteristics, and economic and social value (per NHRM Table 7-2).

In accordance with the NHRM (MNR 2010), woodland size criteria are defined by the special extent of the woodland relative to the percentage of woodland coverage among the physical sub-units (e.g., watersheds, biophysical regions) within the planning area. Woodland patches with bisecting openings 20 m or less in width are considered part of the same continuous woodland. Furthermore, minimum patch widths may be applied as a size threshold at the

discretion of planning authority when delineating woodlands to exclude relatively narrow linear treed areas such as hedgerows (e.g., a minimum 40 m average width where the size threshold is 4 ha or 60 m width where the size threshold is 10 ha).

No forested communities that require consideration as a Significant Woodland (i.e., FOC, FOD, FOM, SWC, SWD, SWM, CUW or CUP) were identified within the Study Area.

Other Woodlands

The *Niagara Official Plan* (2024) also provides mapping with areas designated as "Other Woodlands," which are included as part of its Natural Environment System. "Other Woodlands" are identified within Table 4-1 of the *Niagara Official Plan* as a terrestrial treed area per ELC methodology with >25 percent tree cover that meet one or more of the following criteria:

- An average minimum width of 40 m and > 0.3 ha, measured to crown edges; or
- Any size abutting (within 20 m) a significant woodland, wetland, or permanent stream.

Community 9: Cultural Woodland / Deciduous Swamp mix (4.03 ha) was identified within the Subject Lands and meets the criteria for designation as Other Woodlands.

6.4 Significant Valleylands

Significant valleylands are defined as natural areas occurring within a valley or other landform depression with flowing or standing water that are "*ecologically important in terms of features, functions, representation or amount, and contributing to the quality and diversity of an identifiable geographic area or natural heritage system*" (MMAH, 2024). Significant valleylands are defined and designated by the planning authority based on the general guidelines for determining valleyland significance that are outlined within Section 8.0 of the NHRM (MNR, 2010). Recommended evaluation criteria for determining valleyland significance include landform prominence, degree of naturalness, community and species diversity, habitat value, linkage functions and restoration potential.

Significant Valleylands are mapped on Schedule B2 of the *City of Port Colborne Official Plan* (2017) and are not mapped as present within the Study Area.

No significant valleylands have been identified by the planning authority within the Study Area.

6.5 Significant Wildlife Habitat

The Significant Wildlife Habitat Technical Guide (MNRF, 2000), Criteria Schedules for Ecoregion 7E (MNRF, 2015) and the NHRM (MNR, 2010) provide technical guidance for the identification and evaluation of SWH in the context of the municipal planning process. Candidate habitat has been evaluated in accordance with ELC Ecosite Codes and habitat criteria defined within the Criteria Schedules for Ecoregion 7E (MNRF, 2015) to identify potential protection areas.

Four categories of SWH are defined within the Criteria Schedules for Ecoregion 7E (MNRF, 2015): Seasonal Concentration Areas of Animals, Rare Vegetation Communities or Specialized Habitat for Wildlife, Habitat for Species of Conservation Concern and Animal Movement Corridors. Based on the results of the SWH assessment and targeted field investigations completed, the following habitat types were identified on or adjacent to, the Subject Lands:

Confirmed Significant Wildlife Habitat (Subject Lands)

- Special Concern and Rare Wildlife Species:
  - Grasshopper Sparrow (Community 1).

Candidate Significant Wildlife Habitat (Adjacent Lands)

- Waterfowl Stopover and Staging Areas (Terrestrial).
- Bat Maternity Colonies.
- Bald Eagle and Osprey Nesting, Foraging, Perching.
- Terrestrial Crayfish.
- Special Concern and Rare Wildlife Species:
    - Eastern Wood-Pewee, Grasshopper Sparrow, Wood Thrush, Mapleleaf Mussel, Snapping Turtle, and Monarch.

A detailed screening of each SWH type with the potential to occur within the Study Area is provided in **Appendix C**.

6.6 Significant Areas of Natural and Scientific Interest

Significant Areas of Natural and Scientific Interest (ANSIs) are identified as provincially significant by MNRF in accordance with evaluation procedures established by the province.

The *Niagara Region Official Plan* (2024) states that identification of both provincial and regional Life Science ANSIs and Earth Science ANSIs is determined by the province and are included within the Natural Environment System designation.

As per Schedule C2 (Natural Environment System: Individual Components and Features) of the *Niagara Official Plan* (2024), no Life Science or Earth Science ANSIs are present within the Study Area.

6.7 Fish Habitat

Fish habitat, as defined under the federal *Fisheries Act*, "*means water frequented by fish and any other areas on which fish depend directly or indirectly to carry out their life processes, including spawning grounds and nursery, rearing, food supply and migration areas*.".

The *Niagara Region Official Plan* (2024) uses the Fisheries Act definition for defining fish habitat and provides the following criteria to determine watercourses that fit this definition within the region:

- Any permanent or intermittent waterbodies excluding constructed offline ponds; or
- Intermittent or ephemeral watercourses, headwater drainage features, and/or shoreline features that provide inputs important for downstream fish habitat and fish habitat in the Great Lakes.

The *Niagara Official Plan* (2024) also identifies all permanent and intermittent streams as Key Hydrologic Features that are subject to the policies outlined within Section 3.1.10.

Based on MTE field investigations, direct fish habitat regulated under the *Fisheries Act* is present within the portion of Lyons Creek Drain located on the Subject Lands; however, it is considered seasonal due to ephemeral flows and poor connectivity downstream and upstream. HDFs and the portion of Lyons Creek Drain within the Subject Lands may also provide some flow and organic matter contributions to downstream fish habitat; however, critical habitat features were not present within the Lyons Creek Drain and upstream fish movement is limited due to ephemeral flow. In addition, there was no channel in some HDFs where flow was limited to overland.

Based on MTE field investigations, the Lyons Creek Drain was assessed as direct fish habitat due to its seasonal availability for fish migration. In consideration of potential biophysical and ecological contributions to downstream fish habitat, the HDFs on the Subject Lands have been evaluated as indirect fish habitat.

6.8 Habitat of Endangered or Threatened Species

Based on background review, three threatened species (Spoon-leaved Moss, Bobolink, and Eastern Meadowlark) with the potential to occur within the Study Area were identified (**Appendix A**). Through ecological field investigations, suitable habitat for Eastern Meadowlark and Bobolink was identified on the Subject Lands, and Eastern Meadowlarks were observed using the habitat. In addition, the presence of woodland communities within the Study Area requires that SAR bat species known to use treed habitats (Eastern Red Bat, Little Brown Myotis, Northern Hoary Bat, Northern Myotis, Silver-haired Bat, and Tri-colored Bat) also be considered.

A comprehensive SAR assessment has been provided in **Appendix A**. Species confirmed or with potential to occur within the Study Area based on the results of ecological field investigations and the availability of suitable habitat are discussed in detail below.

Eastern Meadowlark:

Eastern Meadowlark breeds mostly in moderately tall grasslands (native prairies and savannahs), as well as pastures, hayfields, herbaceous fencerows, roadsides, orchards, airports, shrubby overgrown fields, or other open areas. Eastern Meadowlarks may not be strongly area sensitive (McCracken et al., 2013), however, large tracts of grasslands (5 ha or greater) are preferred over smaller fragments (Herkert 1991, Vickery et al. 1994).

Two potential breeding pairs were observed within the Subject Lands during the 2024 breeding bird surveys in an area identified as suitable Eastern Meadowlark habitat (Figure 5).

Bobolink:

This species was not observed during the 2024 field investigations; however, it is known to use similar habitat to that of Eastern Meadowlark and, as such, there is potential for this species to use suitable grassland habitat within the Subject Lands.

Spoon-leaved Moss:

Spoon-leaved Moss populations are typically located on soil in low-lying areas that are seasonally flooded under trees or shrub thickets. No populations were observed during the field investigations completed in 2024; however, suitable habitat may be present on adjacent lands, within the Study Area.

All other species occurrences detected through the background review were evaluated in the context of the Subject Lands based on the availability of suitable habitat and detailed ecological field investigations. No other threatened or endangered species or associated suitable habitats for these species were detected on, or adjacent to, the Subject Lands.

SAR Bats:

Maternity roost habitat for bats is known to include forests, swamps and woodlands. While the Subject Lands contains swamp and woodland communities, and suitable maternity roost trees were determined to be absent.

6.9 Supporting Features and Areas

The *Niagara Region Official Plan* (2024) defines supporting features and areas as lands that have the potential to be restored (or have been restored), and include:

a. *grasslands, thickets, and meadows that support the ecological functions of adjacent key natural heritage features, key hydrologic features, and/ or natural heritage features and areas;*

b. *valleylands, which includes lands that may have ecological and/or hydrologic functions, that are not significant valleylands, and are not the site of a permanent or intermittent stream that is regulated by the Conservation Authority;*

c. *wildlife habitat that is not considered to be significant wildlife habitat; and*

d. *enhancement areas, which are the subject of Section 3.1.16 of this Plan.*

Cultural thickets and meadows were identified within the Subject Lands and wildlife habitat is present within all communities.

Valleylands consist of natural areas that occur in a valley or other landform depression that has water flowing through or standing for some period of the year and are present in the Subject Lands; however, all valleylands within the Subject Lands are regulated by the NPCA.

Wildlife habitat is present within the Subject Lands within areas where plants, animals and other organisms live, and find adequate amounts of food, water, shelter, and space needed to sustain their populations. All communities within the Subject Lands provide potential wildlife habitat.

Despite the presence of cultural thickets, meadows, and wildlife habitat within the Subject Lands that meet the general definition within *Niagara Region Official Plan* (2024) for consideration as Supporting Features and Areas, all communities were determined to be of poor floristic quality and minimal natural quality through SOFIA analysis. Given the existing plant species composition, it is expected that the ecological value of the natural heritage communities on the landscape is low, and they are therefore unlikely to support ecological functions or provide much opportunity for enhancement.

6.10 Linkages

The *Niagara Region Official Plan* (2024) identifies linkages as an area that provides and maintains ecological connectivity between core areas while supporting a range of processes that enable plants and animals to move among natural heritage features. Mapped linkages include areas with a minimum width of 60 m that connect core areas with a combined area of at least ten hectares and are not present within the Subject Lands.

6.11 Summary of Natural Heritage Features

The PPS (2024), *Niagara Region Official Plan* (2024), and the *City of Port Colborne Official Plan* (2017) define key natural heritage features to be considered in terms of the impact and net effects assessment. Based on the defined natural heritage features, publicly available mapping, and the field investigations outlined within this report, the following ecological components are identified within the Study Area:

- Other Wetlands.
- Other Woodlands.
- Confirmed Significant Wildlife Habitat (Subject Lands):

    - Special Concern and Rare Wildlife Species (Community 1):
        - Grasshopper Sparrow.
- Candidate Significant Wildlife Habitat (Adjacent Lands):
    - Waterfowl Stopover and Staging Areas (Terrestrial).
    - Bat Maternity Colonies.
    - Bald Eagle and Osprey Nesting, Foraging, Perching.
    - Terrestrial Crayfish.
    - Special Concern and Rare Wildlife Species:
        - Eastern Wood-Pewee, Grasshopper Sparrow, Wood Thrush, Mapleleaf Mussel, Snapping Turtle, and Monarch.
- Fish Habitat.
- Suitable Habitat of Endangered and Threatened Species:
    - Bobolink (Subject Lands and Adjacent Lands).
    - Spoon-leaved Moss (Adjacent Lands).
- Confirmed Habitat of Endangered and Threatened Species:
    - Eastern Meadowlark (Subject and Adjacent Lands).

Figure 7 depicts all potential constraints identified on the Subject Lands.

7.0 PROPOSED DEVELOPMENT

The proposed development is within lands identified as the AK Lands, an approximately 150-acre parcel located in the northeast portion of the Subject Lands and the area immediately west (approximately 20 acres).

The proposed development within the AK Lands include a manufacturing facility (approximately 185,806 m^2) with a parking lot that is anticipated to have a minimum of 1,525 parking spaces, three Stormwater Management Facility (SWMF) ponds, and a tank yard with a wastewater treatment plant, water softening building, fire pump house, above ground cooling towers, hydro substations building, gas boiler building, and other ancillary buildings that will be used for outdoor storage and processing. The development proposal for the 20-acre parcel to the west (Part 16 and Part 20) consists of a high voltage electric substation, a SWMF pond, and berms along the outside of the development with a noise wall installed along the top of the berm (Figure 8).

Site alteration was permitted to move forward within a portion of the AK Lands (Figure 9) prior to the completion of this EIS based on correspondence with the City of Port Colborne, the Niagara Region, and the NPCA. In accordance with Niagara Official Plan Policy 3.1.18.2, natural heritage features and key hydrologic features within the Site Alteration Permit Approved Boundary illustrated on Figure 9 that were disturbed in advance of this EIS do not require restoration.

In addition, Ontario Regulation (*O. Reg.*) *830/21* outlines an exemption from the *ESA* (2007), which was utilized for an area within the development footprint that was previously assessed as potential SAR habitat. This exemption, along with the payment of a conservation charge, was used to allow for site alteration to move forward in advance of the completion of this EIS.

8.0 IMPACTS & MITIGATION RECOMMENDATIONS

In accordance with provincial standards, potential impacts, predicted effects, mitigation and enhancement measures associated with the proposed development and/or site alteration should be assessed through an EIS, or like study, prepared to the satisfaction of the municipality and appropriate conservation authority. The impact assessment and mitigation measures presented herein shall address the requirements of the PPS (2024) to ensure that the test of no negative impacts to natural heritage features and areas or their ecological functions is demonstrated. Potential impacts to the natural heritage features and environmental functions that occur on, and adjacent to, the proposed development area have been evaluated over the short and long term to ensure that proposed avoidance and/or mitigation strategies will contribute to the sustainability and resiliency of a diverse ecosystem over the long term.

As discussed in Sections 1.0 and 7.0, site alteration within a portion of the AK Lands was permitted prior to completion of this impact assessment. As such, this assessment of impacts has been undertaken with the understanding that site alteration with the approved boundary has been initiated.
The predominant natural heritage features present on, and adjacent to, the proposed development area includes Other Wetlands, Significant Wildlife Habitat, Fish Habitat, and Habitat of Endangered and Threatened Species.

Potential impacts of proposed development and/or site alteration on ecological features and functions shall be reviewed in the context of direct and indirect impacts with a summary of general recommended mitigation and restoration strategies provided below.

8.1 Direct Impacts

Direct impacts associated with the proposed limit of development are reviewed in the following section. Potential effects on the the viability and integrity of natural heritage features and associated ecological functions within the proposed development area and its adjacent lands (120 m) have been evaluated over the short and long term.

8.1.1 Other Wetlands

As per the *Niagara Region Official Plan* (2024), Community 7 (Mineral Meadow Marsh) is identified as Other Wetland and is present within the proposed development area. Furthermore, all wetlands outside of the settlement areas are defined as key hydrologic features and therefore require a 30-metre-wide vegetation protection zone as per Policy 3.1.9.2.

As per Policies outlined within 3.1.10 (Key Hydrologic Areas, Key Hydrologic Features, and Other Important Water Resources), development or site alteration shall not have negative impacts on key hydrologic areas, their hydrologic functions, interaction between key hydrologic areas and other components of the natural environment system, or natural hydrologic characteristics. If there is potential for negative impacts to groundwater quality or quantity, the completion of a subwatershed study or a hydrological evaluation is required prior to development being permitted (Policy 3.1.10.7). Furthermore, large-scale development may be permitted within a key hydrologic area where it is determined that the quality and quantity of water will be protected and/or enhanced (Policy 3.1.10.8).

Community 7 (Mineral Meadow Marsh) was determined to be of poor floristic quality and minimal natural quality with an open canopy (<10% canopy cover). The portion of Community 7 proposed for removal is a small projection of the community that is surrounded by disturbed areas within Community 3 and a *Phragmites* inclusion.

The proposed development is not anticipated to negatively affect wetland function of Community 7 as SWMF No. 2 (i.e., the southwestern SWMF pond) will include a 450 mm pipe to convey outflows from the pond to the drain with excess conveyance capacity of the pipe directed straight to the Welland Canal as outlined within the Stormwater Management Report (Stantec, 2025) completed as part of the proposed development.

Given the existing plant species composition and the lack of amphibian call counts, it is expected that the ecological value of Community 7 on the landscape is low. Given that flows will be maintained downstream post-development, the removal of the portion of the feature within the AK Lands is not expected to have a significant impact on the natural heritage landscape or hydrologic functions while the adjacent features will be protected from the proposed development provided sediment and erosion control mitigation measures are followed (Section 8.2.1). In accordance with Niagara Official Plan Policy 3.1.9.5.6 b) iii), no negative impact on the ecological function of Community 7 will be achieved through restoration and seeding within areas of temporary disturbance associated with previously approved earthwork activities.

8.1.2 Significant Wildlife Habitat

As discussed above, the following SWH was identified within the Subject Lands:

Confirmed Significant Wildlife Habitat (Subject Lands)

- Special Concern and Rare Wildlife Species:
  - Grasshopper Sparrow (Community 1).

Timing windows provided in Section 8.2.2 will mitigate direct impacts to Grasshopper Sparrow.

Within the AK Lands, a portion of Community 1 providing SWH will be retained (Figure 9). Per Niagara Official Plan Policy 3.1.9.8.2, given the variable function of SWH, the width of required minimum buffers to SWH is to be established through an EIS. The areas within the Site Alteration Permit Approved Boundary immediately east and south of Community 1 will require temporary disturbance and will be restored and seeded according to the Landscape Plan (under separate cover). East of Community 1, the restored area between the Site Alteration Permit Boundary and the proposed development is approximately 17.7 m. Per the Landscape Plan, this 17.7 meters includes a Significant Wildlife Habitat Buffer of approximately 8 m to be seeded and unmaintained, with a row of coniferous trees to act as a barrier between the buffer and proposed development. South of Community 1, the restored area between Site Alteration Permit Boundary and the proposed development is approximately 36.1 m. Per the Landscape Plan, this 36.1 meters includes a Significant Wildlife Habitat Buffer of (minimum) 20 m to be seeded and unmaintained, with a row of coniferous trees to act as a barrier between the buffer and proposed development.

Furthermore, temporary disturbance associated with the previously approved earthwork activities west of the SWMF are identified as North Existing Drainage Ditch on the Landscape Plan and are to be restored and seeded according to the Landscape Plan. In total, enhancement areas are approximately 2.61 ha. Given the pre-disturbance plant species composition, it is expected that seeding areas of temporary disturbance will improve the overall condition of the restored portion of Community 1.

It is anticipated that that these restored areas, functioning to provide buffers and enhancement, will result in no net negative impact to the SWH provided by Community 1.

Invasive species management, soil preparation, and appropriate seeding composition and rates will be necessary to enhance the remaining Grasshopper Sparrow habitat within Community 1.

Additional text and recommendations to enhance habitat within Community 1 are provided below.

Invasive Species Management

Several priority species from the Ontario Invasive Species Council Plan have been identified within the AK Lands and proposed enhancement areas with the most dominant species being Phragmites. Management of invasive Phragmites should be completed following Best Management Practices, such as those published by Ontario Invasive Plant Council, with high prolific seed producers prioritized. Invasive species control and removal should be completed prior to earthworks to prepare the enhancement area for seeding (e.g., decompaction and topsoil addition).

Decompaction

The soils within the proposed restoration area are recommended to be decompacted prior to any restoration activities. Decompaction breaks up the soil which improved water flow, aeration, nutrient accessibility, root grows, and microsite availability (Natural Resources Canada, 2017). Methods of decompaction depend on the soil composition of the site, and the access of machinery into the site. Methods may include tilling with a rototiller, chisel plow or backhoe, or excavation and replacement with uncompacted soils (TRCA, 2012). Moisture levels and temperatures can influence the machinery appropriate for the site. Additionally, prairie grasses and flowers germinate and establish better when seeded in a bed of lose, well-drained soil.

Topsoil Depths

Areas identified as North Existing Drainage Ditch and Significant Wildlife Habitat Buffer will be restored with 150 mm depth screened topsoil in accordance with the Landscape Plan.

Seeding

Seed mixes have been recommended based on their suitability to the local soil, moisture, and light conditions of the site, and their compatibility with the adjacent vegetation communities.

The recommended seed mixtures for the enhancement area are: Quality Seeds Canada's Custom Native Stabilizer and Pollinator Seed Mix and Ontario Seed Company's Seasonally Flooded Native Seed Mix (**Table 1**), or an approved equivalent. Areas seeded with the Flooded Native Seed Mix will be overseeded with an application of Blue Vervain, New England Aster, Black-Eyed Susan, Spotted Joe-Pye Weed, and Swamp Milkweed. The recommended seed mix for the buffer area is Quality Seeds Canada's Custom Native Stabilizer and Pollinator Seed Mix. These seed mixes are ideal for the required drain restoration as well as meadow habitat creation due to their diversity and quick establishment, while providing wildlife food and cover.

These mixes are recommended to be sown at a ratio of 25 kg/ha. Nurse crop seed [Annual Rye (*Lolium multiflorum*) or Oats (*Avena sativa*)] should be added to the native seed blend at a rate of 22-25 kg/ha to help prevent soil erosion and seed movement, reduce weed competition, and provide shelter for targeted species' seed during the establishment period.

Seed mix species lists and additional seeding notes are provided in the Landscape Plan.

Recommendation 1: Earthworks and proposed vegetation removals in proximity to an identified natural heritage feature have the potential to mobilize sediment into the adjacent natural heritage feature. Erosion and sediment control measures should be installed and monitored throughout construction to mitigate potential impacts. Additional details regarding ESC recommendations are provided in Section 8.2.1.

Recommendation 2: Scarify or de-compact existing soils within restoration areas.

Recommendation 3: Soil decompaction activities should be undertaken in dry conditions.

Recommendation 4: Decompaction equipment, timing, and depth must be planned accordingly to avoid damaging or destabilizing subsoils.

Recommendation 5: Topsoil should restored in accordance with the Landscape Plan.

Recommendation 6: Nurse crop seed [Oats (*Avena sativa*)] should be added to native seed blend at a rate of 22-25 kg/ha to help prevent soil erosion and seed movement, reduce weed competition, and provide shelter for targeted species' seeds during the establishment period.

Recommendation 7: Native seeding should be done in the fall (approximately October 15 – November 15) to allow for natural stratification. If this timing is not possible, seeds can also be sown in early spring (e.g. April); however, this may cause seeds to remain dormant and not germinate until the following spring.

Recommendation 8: This EIS should be read in conjunction with the Landscape Plan. A Restoration and Monitoring Plan has been developed to address the enhancement and buffer areas and forms part of the Landscape Plan.

8.1.3 Fish Habitat

Fish habitat within the proposed development area is limited to the HDFs with fish habitat that was characterized as contributing (i.e., indirect) through the HDFA. The proposed development is not anticipated to negatively impact fish habitat if flows are maintained downstream given that the primary impact of indirect fish habitat is the supply of nutrients and/or food downstream. As per the HDFA, all HDFs within the proposed development area were recommended for "mitigation" which includes the recommendation to maintain on-site and outlet flows.

As outlined within the Stormwater Management Plan (Stantec, 2025), outlet structures for SWMF ponds are designed to maintain baseflow to downstream drainage features without exceeding existing target flow rates. Therefore, fish habitat located downstream is not anticipated to be impacted by the proposed development provided that standard erosion and sediment control (ESC) measures are adhered to.

Recommendation 9: Earthworks and proposed vegetation removals in proximity of an identified headwater drainage feature have the potential to mobilize sediment into downstream habitats and impact fish and fish habitat. Erosion and sediment control measures should be installed and monitored throughout construction to mitigate potential impacts to fish and fish habitat downstream. Additional details regarding ESC recommendations are provided in Section 8.2.1.

8.1.4 Habitat of Endangered or Threatened Species

Habitat for two species (Eastern Meadowlark and Bobolink) protected under the provincial *ESA* (2007) was identified within the proposed limit of development (Figure 9). As per the PPS (2024), permit development or site alteration is not permitted within the critical habitat of endangered species and threatened species except in accordance with provincial and federal requirements.

Subsection 13 (1) of Ontario Regulation (*O. Reg.*) *830/21* outlines an exemption from the *Endangered Species Act, 2007* whereas an activity that is likely to damage or destroy Eastern Meadowlark and/or Bobolink habitat less than 30 ha is not considered to be in contravention of the *Endangered Species* Act, 2007 provided the following conditions are met:

> *13. (1) Clause 9 (1) (a) and subsection 10 (1) of the Act do not apply to a person who, while carrying out an activity described in subsection (3), kills, harms, harasses, captures or takes a bobolink or an eastern meadowlark, or damages or destroys its habitat, if the size of the*

area of habitat of bobolinks or eastern meadowlarks that is damaged or destroyed by the activity is equal to or less than 30 hectares and,

(a) the person satisfies all of the conditions set out in section 14; or

(b) the person,

(i) pays a species conservation charge to the Species at Risk Conservation Trust in accordance with paragraph 5 of subsection 20.3 (1) of the Act and Ontario Regulation 829/21 (Species Conservation Charges) made under the Act, and

(ii) satisfies the conditions in paragraphs 1 to 4 of section 14. O. Reg. 830/21, s. 37 (5).

The proponent has moved forward with the exemption outlined in Section 13. (1) (b) that includes the requirement to complete the submission of a Notice of Activity form, mitigation measures (outlined within Section 15 of *O. Reg. 830/21*), and the completion of an Eastern Meadowlark and Bobolink Management Plan.

The area of impact to Bobolink and Eastern Meadowlark habitat that has been registered is 3.906 ha. A Notice of Activity form has been submitted, and Confirmation of Registration was received February 12, 2025. Receipt of payment to the Species at Risk Conservation Trust was received February 27, 2025. A copy of the Bobolink and Easten Meadowlark Habitat Management Plan is included in **Appendix D**.

Spoon-leaved Moss was identified as potentially having suitable habitat within the Study Area; however, no suitable habitat is present within the proposed development area or its adjacent lands. No other threatened or endangered species or associated suitable habitats for these species were detected on, or adjacent to, the proposed development area.

Recommendation 10: Follow the requirements outlined within the *Ontario Regulation 830/21* exemption for Eastern Meadowlark and Bobolink habitat impact which includes the submission of a Notice of Activity form, mitigation measures outlined within Section 15 of *Ontario Regulation 830/21*, and implementation of the Eastern Meadowlark and Bobolink Management Plan.

8.2 Indirect Impacts & Mitigation

Indirect impacts include potential adverse effects on the biophysical environment that may occur as a result of proposed development. This may include erosion from the work area and associated sedimentation into natural features, accidental spills, impacts to migratory birds, and the introduction of exotic and/or invasive plant species. Each of these are discussed in the following sections.

8.2.1 Sediment and Erosion Control Measures

The most critical time for the protection of natural heritage features is during the construction phase. For all works, and especially those within 30 m of adjacent natural heritage features, an ESC Plan will be required to contain ground disturbances on site and to protect adjacent natural heritage features identified in this report from sediment transport and potential sedimentation.

Recommendation 11:

A multi-barrier approach for sediment and erosion control should be used for this development and contained within a project-specific ESC Plan. Prior to works on site, robust sediment and erosion control fencing should be installed in areas immediately adjacent to natural features and across low-lying areas prone to receiving overland runoff. The fencing will act as a barrier to keep construction equipment and spills away from vulnerable natural areas and features where sediment loading has the potential to negatively impact fish and wildlife habitat.

Recommendation 12:

During construction, the lands between the sediment and erosion control fencing must be maintained. The fencing should remain in place until construction is complete and the remainder of the natural areas to remain are stabilized and/or naturalized.

Recommendation 13:

Sediment and erosion control fencing should be inspected prior to construction to ensure it has been installed correctly and during construction to ensure that the fencing is being maintained and is functioning properly. Any issues that are identified are to be resolved in the same day.

Recommendation 14:

Sediment and erosion control fencing must be installed according to the Guidelines for Erosion and Sediment Control for Urban Construction Sites (TRCA 2019) and the applicable standards established in the Ontario Provincial Standard Specification/Ontario Provincial Standard Drawings (OPSS/OPSD) documents.

Recommendation 15:

Sediment and erosion control fencing should not be removed until adequate re-vegetation and site stabilization has occurred. Additional re-vegetation plantings and/or time for vegetation to establish may be required; however, two growing seasons are typically sufficient to stabilize most sites.

Recommendation 16:

Re-seed all disturbed areas as soon as possible to maximize erosion protection and to minimize the establishment of invasive species, which may spread to the adjacent natural features.

8.2.2 Migratory Birds & Wildlife

Recommendation 17:

The removal of Milkweed plants should be completed outside of the active breeding season (i.e., June 1 to September 30) to avoid any direct impacts to Monarch life stages. Where clearing activities must proceed within this window, Milkweed plants should be inspected prior to removal. Where caterpillars or larvae are detected, Milkweed plants should be transplanted, under the direction of a qualified professional.

Recommendation 18:

As per the *MBCA* (1994), it is recommended that any vegetation removals occur outside of the migratory breeding bird season (i.e., April 1 to August 31). If this window cannot be avoided, nest searches to determine the presence or absence of nesting birds or breeding habitat should be conducted until clearing is complete, or until August 31, whichever comes first.

Recommendation 19:

Advise workers of potential encounters with wildlife during construction. If an animal enters the work site, work at that location will stop and the animal should be permitted to leave un-harassed. If there are repeat observations of wildlife in the work area, barrier fencing (e.g., silt fence) may be needed to direct wildlife away from active construction and toward natural areas.

8.2.3 Invasive Species Management

Recommendation 20:

Invasive species management should be completed using best management practices (Ontario Invasive Plant Council 2023) for communities retained.

9.0 CONCLUSIONS

MTE was retained by One Forty Development LP to undertake an EIS to support proposed development within the Subject Lands. This EIS determines and defines natural heritage features present within the Subject Lands and documents potential impacts associated with the proposed development within the AK Lands.

Site alteration was permitted to move forward within a portion of the AK Lands prior to completion of this EIS. As such, the existing conditions portion of this report is based on field work undertaken during 2023 and 2024, while the assessment of impacts associated with the proposed development within the AK Lands has been undertaken with the understanding that site alteration with the approved boundary has been initiated.

The PPS (2024), *Niagara Region Official Plan* (2024), and the *City of Port Colborne Official Plan* (2017) define key natural heritage features to be considered in terms of the impact and net effects assessment. The proposed development impacts to Other Wetlands, Significant Wildlife Habitat, Fish Habitat, and Habitat of Endangered or Threatened Species are discussed within Section 8.0 with recommendations provided to mitigate impacts to the natural heritage features.

Impacts to Eastern Meadowlark habitat were addressed in accordance with the *ESA* (2007) through the submission of a Notice of Activity form, mitigation measures outlined within Section 15 of *Ontario Regulation 830/21*, and the creation of an Eastern Meadowlark and Bobolink Management Plan for the proposed development area. Provided the recommendations in this EIS are followed; it is our opinion that the proposed development can proceed.

MTE seeks comments from the City of Port Colborne, the Niagara Region, and the NPCA with respect to the contents of the EIS. Formal comments can be submitted in writing to MTE of behalf of the client. Should you wish to clarify any questions or require additional information as part of the review of this EIS, do not hesitate to contact us.

All of which is respectfully submitted,

MTE Consultants Inc.

Digitally signed by
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10.0 REFERENCES

Barnett, PJ., Cowan, WR. and Henry, A.P. 1981. Quaternary Geology of Ontario, Southern Sheet; Ontario Geological Survey, Map 2556.

Bird Studies Canada (BSC). 2005. Ontario Breeding Bird Atlas (2001-2005). NatureCounts. Retrieved from https://www.birdscanada.org/birdmon/default/searchquery.jsp?

Bird Studies Canada (BSC). 2009a. Marsh Monitoring Program Participant's Handbook for Surveying Amphibians. Bird Studies Canada in cooperation with Environment Canada and U.S. Environmental Protection Agency. February 2009.

Bird Studies Canada (BSC). 2009b. Marsh Monitoring Program Participant's Handbook for Surveying Marsh Birds.

Cadman, M.D., Sutherland, D.A., Beck, G.G., Lepage, D. and Couturier, A.R. (Eds.). 2007. Atlas of the Breeding Birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature. Toronto, Ontario.

Cadman, M.D., H.J. Dewar, and D.A. Welsh. 1998. The Ontario Forest Bird Monitoring Program (1987-1997): Goals, methods and species trends observed. Technical Report Series No. 325, Canadian Wildlife Service.

Canadensys. 2020. Database of Vascular Plants of Canada (VASCAN). Retrieved from https://data.canadensys.net/vascan/search?lang=en

Chapman, L.J. and D. F. Putnam, 1984. The Physiography of Southern Ontario, 3rd Edition. Ontario Geological Survey, Special Volume. Ontario Ministry of Natural Resources. 270pp.

City of Port Colborne. 2017. City of Port Colborne Official Plan.

Conservation Authorities Act, R.S.O. 1990, c. C.27

Credit Valley Conservation and Toronto and Region Conservation Authority (CVC/TRCA). 2014. Evaluation, Classification and Management of Headwater Drainage Features Guidelines. January 2014. 26 pp.

Dreimanis, A., 1964. Pleistocene Geology of the St. Thomas Area (West Half), Southern Ontario. Preliminary Geological Map No. 238. Ontario Department of Mines.

eBird. 2021. Ontario eBird Hotspot Data Map. Retrieved from https://ebird.org/hotspots?env.minX=-95.155986&env.minY=41.708293&env.maxX=-74.345974&env.maxY=56.869721&yr=all&m=

Endangered Species Act, 2007, S.O. 2007, c. 6

Fish and Wildlife Conservation Act, 1997, S.O. 1997, c. 41

Fisheries Act, R.S.C., 1985, c. F-14

Fisheries and Oceans Canada (DFO). 2023. Fish and Fish Habitat Protection Program, August 2019. Request a Review of Your Project Near Water: Step 3. Check if Your Project Needs A Review. Retrieved from http://www.dfo-mpo.gc.ca/pnw-ppe/reviews-revues/request-review-demande-d-examen-003-eng.html

Fisheries and Oceans Canada (DFO) 2019. Fish and Fish Habitat Protection Policy Statement, August 2019. 36 pp.

Fisheries and Ocean Canada (DFO). 2019. Aquatic Species at Risk Map. Retrieved from https://www.dfompo.gc.ca/species-especes/sara-lep/map-carte/index-eng.html

Government of Ontario. n.d. Wildlife Values Area (Dataset). Retrieved from https://open.canada.ca/data/en/dataset/88591622-4001-456a-adfb-cfa34dbc9004

Hewitt D. F. 1972. Paleozoic Geology of Southern Ontario, Ontario Div. Mines, GR105, Map 2254.

iNaturalist. 2024. Observations Map. Retrieved from https://www.inaturalist.org/observations

Invasive Species Act, 2015, S.O. 2015, c. 22

Lebedyk, D. 2018. Southern Ontario Floral Inventory Analysis (SOFIA). Version 2.51. Essex Region Conservation Authority. Essex, ON.

Lee, H.T., W.D. Bakowsky, J. Riley, J. Bowles, M. Puddister, P. Uhlig, and S. McMurray. 1998. Ecological Land Classification for Southern Ontario: First Approximation and its Application. Ontario Ministry of Natural Resources, Southcentral Science Section, Science Development and Transfer Branch. Field Guide FG.

McLaren, M. A., Konze, K., & Twiss, M. 1998. Wildlife monitoring programs and inventory techniques for Ontario. South Porcupine: Ontario Ministry of Natural Resources - Boreal Science Section.

Migratory Birds Convention Act, 1994, S.C. 1994, c. 22

Ministry of Environment, Conservation and Parks (MECP). 2022. Bats & Treed Habitats - Maternity Roost Surveys. [Unpublished document].

Ministry of Environment, Conservation and Parks (MECP). 2022. Species at Risk Bats Survey Note. [Unpublished document].

Ministry of Environment, Conservation and Parks (MECP). 2021. Use of Buildings by Species at Risk Bats Survey Methodology. [Unpublished document].

Ministry of Natural Resources and Forestry (MNRF). 2017. Survey Protocol for Species at Risk Bats in Treed Habitats – Little Brown Myotis, Northern Myotis & Tri-colored Bat. April 2017. 12 pp.

Ministry of Natural Resources and Forestry (MNRF). 2016. Survey Protocol for Ontario's Species at Risk Snakes. Peterborough: MNRF Species Conservation Policy Branch.

Ministry of Natural Resources and Forestry (MNRF). 2015. Survey Protocol for Blanding's Turtle (*Emydoidea blandingii*) in Ontario. Peterborough: Queen's Printer for Ontario.

Ministry of Natural Resources and Forestry. (MNRF). 2015. Significant Wildlife Habitat Criteria Schedule B Ecoregion 7E. 40pp. January 2015.

Ministry of Natural Resources and Forestry (MNRF). 2011. Bats and Bat Habitats: Guidelines for Wind Power Projects. Queen's Printer for Ontario.

Ministry of Energy, Northern Developments, and Mining. 2017. OGSEarth - Southern Ontario Surficial Geology. Retrieved from https://www.geologyontario.mndm.gov.on.ca/ogsearth.html#surficial-geology

Ministry of Natural Resources and Forestry (MNRF). 2022. Ontario Wetland Evaluation System (OWES) Southern Manual. Queen’s Printer for Ontario. Fourth Edition.

Ministry of Natural Resources and Forestry (MNRF). 2021. Land Information Ontario (LIO) mapping. Ontario GeoHub. Retrieved from https://geohub.lio.gov.on.ca/

Ministry of Municipal Affairs and Housing (MMAH). 2024. Provincial Planning Statement. King's Printer for Ontario, 2024. Retrieved from https://www.ontario.ca/files/2024-08/mmah-provincial-planning-statement-en-2024-08-19.pdf

Natural Heritage Information Centre (NHIC). 2023. Make a Map: Natural Heritage Areas. Retrieved from https://www.lioapplications.lrc.gov.on.ca/Natural_Heritage/index.html?viewer=Natural_Heritage.Natural_Heritage&locale=en-CA

Natural Heritage Information Centre (NHIC). 2024. All Species Lists. Retrieved from https://www.ontario.ca/page/get-natural-heritage-information

NatureServe. 2021. NatureServe Explorer. Retrieved from https://explorer.natureserve.org/Search

Niagara Region. 2024. Niagara Region Official Plan.

Oldham, M.J. 2017. List of Vascular Plants of Ontario's Carolinian Zone (Ecoregion 7E). Carolinian Canada and Ontario Ministry of Natural Resources and Forestry. Peterborough, ON. 132 pp.

Oldham, M.J., and Brinker, S.R. 2009. Rare Vascular Plants of Ontario, Fourth Edition. Natural Heritage Information Centre, Ontario Ministry of Natural Resources. Peterborough, Ontario. 188 pp.

Oldham, M.J., Bakowsky, W.D., and Sutherland, D.A. 1995. Floristic Quality Assessment System for Southern Ontario. Prepared for Ontario Ministry of Natural Resources, Peterborough, Ontario. December 1995. 69 pp.

Ontario Breeding Bird Atlas (OBBA). 2001. Ontario Breeding Bird Atlas Guide for Participants. Atlas Management Board, Federation of Ontario Naturalists, Don Mills.

Ontario Invasive Plant Council. 2023. Best Management Practices. Retrieved from https://www.ontarioinvasiveplants.ca/resources/best-management-practices/

Ontario Ministry of Agriculture, Food and Rural Affairs (OMAFRA). 2020. AgMaps. Retrieved from https://www.lioapplications.lrc.gov.on.ca/AgMaps/Index.html?viewer=AgMaps.AgMaps&locale=en-CA

Ontario Ministry of Municipal Affairs and Housing (MMAH). 2024. Provincial Planning Statement. Ontario Ministry of Municipal Affairs, Toronto, Ontario.

Ontario Ministry of Natural Resources (MNR). 2000. Significant Wildlife Habitat Technical Guide. October 2000. 151 pp.

Ontario Nature. 2019. Ontario Reptile and Amphibian Atlas. Retrieved from https://www.ontarioinsects.org/herp/

Partner's in Flight (PIF). 2016. Species of Continental Concern Watch List. March 2016. Retrieved from https://partnersinflight.org/resources/pif-watch-list-table-2016/

Reznicek, A. A., Voss, E. G. and Walters, B. S. 2011. MICHIGAN FLORA ONLINE. University of Michigan. Web. Retrieved from https://michiganflora.net/species.aspx?id=2799

Species at Risk Act, 2023, S.C. 2002, c. 29

Species at Risk in Ontario (SARO) List, Ontario Regulation 230/08. 2007 (Consolidated 2018). Retrieved from https://www.ontario.ca/laws/regulation/080230

Stanfield, L. Editor. 2017. Ontario Stream Assessment Protocol. Version 10 – 2017. Fisheries Policy Section. Ontario Ministry of Natural Resources. Peterborough, Ontario. 26 pp. 548 pp.

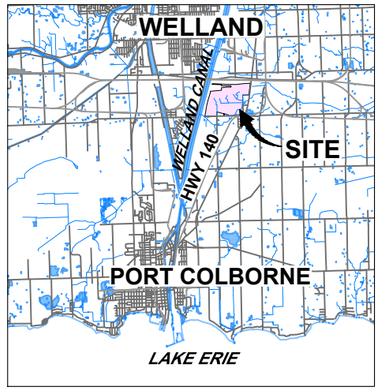
Toronto and Region Conservation Authority (TRCA). 2019. Erosion and Sediment Control Guide for Urban Construction. 236 pp.

Urban Forest Association Inc. 2002. Invasive Exotic Species Ranking for Southern Ontario. 7 pp. Retrieved from http://chapter.ser.org/ontario/files/2012/08/exotics.pdf

Wilhelm, G.S. and D. Ladd. 1988. Natural Area Assessment in the Chicago Region. The Morton Arboretum. Lisle, Illinois.

Wilhelm, G.S. and L.A. Masters. 1995. Floristic Quality Assessment in the Chicago Region and Application Computer Programs. The Morton Arboretum. Lisle, Illinois 60532.

Figures



KEY PLAN (nts)

LEGEND

- SUBJECT SITE
- STUDY AREA (120m Buffer from Subject Site)

REFERENCES

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ENVIRONMENTAL IMPACT STUDY
HIGHWAY 140 LAND HOLDING
PORT COLBORNE, ONTARIO

TITLE
PROJECT LOCATION

Drawn	Scale	Figure
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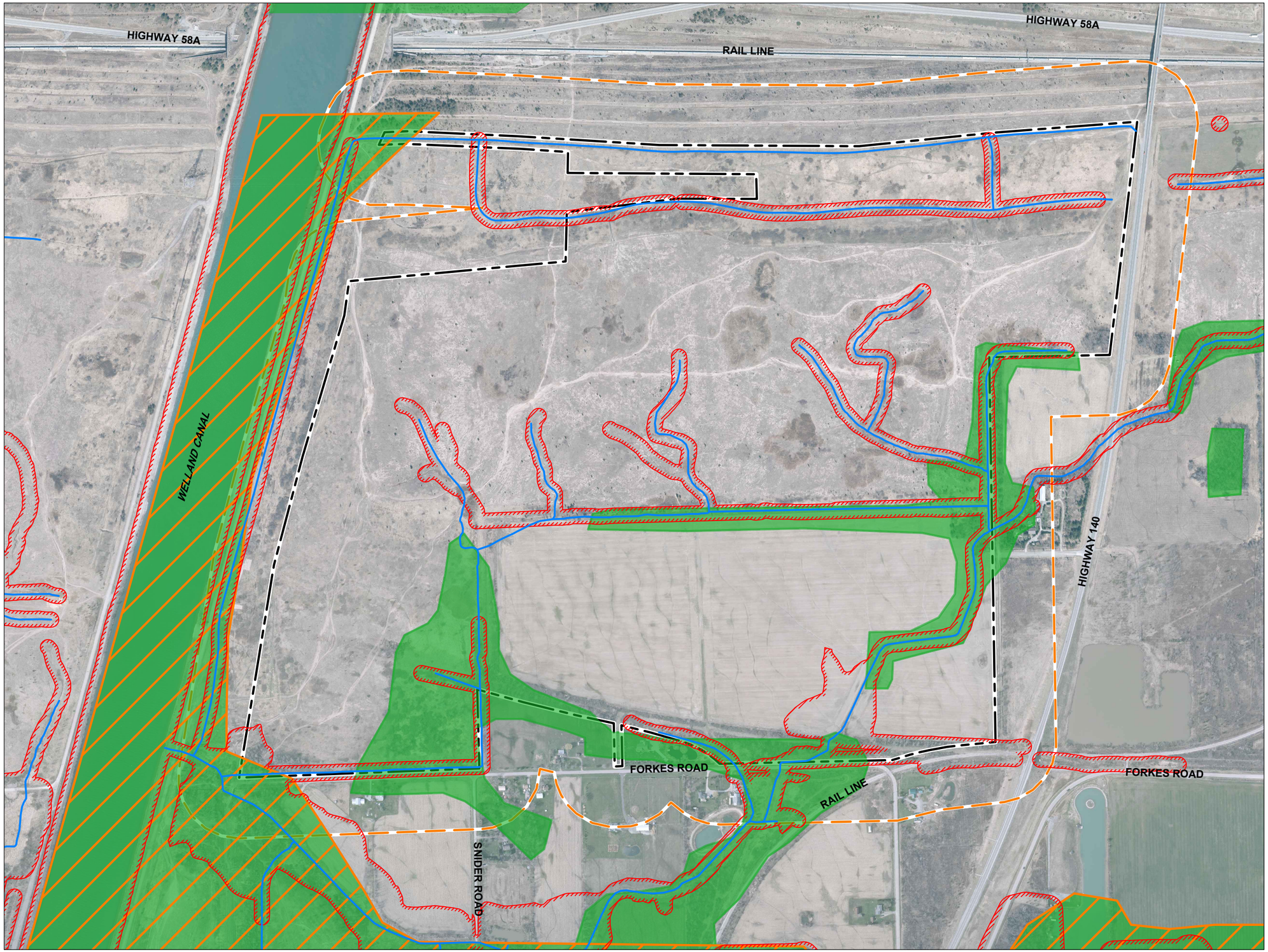
Checked	Project No. 53689-101	
Date 2024-12-17	Rev No. 0	



N

LEGEND

- SUBJECT SITE
- STUDY AREA (120m Buffer from Subject Site)
- WATERCOURSE (LIO)
- NPCA REGULATED LAND
- NATURAL ENVIRONMENT SYSTEM OVERLAY
- GROWTH PLAN NATURAL HERITAGE SYSTEM

REFERENCES

NIAGARA OFFICIAL PLAN, SCHEDULE C-1, NATURAL ENVIRONMENT SYSTEM OVERLAY AND PROVINCIAL NATURAL HERITAGE SYSTEMS, MAY 2024; AND NIAGARA PENINSULA CONSERVATION AUTHORITY (NPCA), APPROXIMATED REGULATION LANDS, OPEN DATA SET, AS OF OCTOBER 27 - 2023.

NOTES

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HIGHWAY 140 LAND HOLDING
PORT COLBORNE, ONTARIO

TITLE
NIAGARA REGION NATURAL HERITAGE AND NPCA REGULATION LIMITS MAPPING

Drawn	Scale	Figure
DCH	1:7,500	2
Checked	Project No. 53689-101	
Date 2024-12-17	Rev No. 0	

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Plot Date: December 17, 2024 - 7:33 PM

LEGEND

- SUBJECT SITE
- STUDY AREA (120m Buffer from Subject Site)
- EPA
- MUNICIPAL BOUNDARY
- RURAL
- RURAL EMPLOYMENT
- SPECIAL STUDY AREA
- URBAN RESIDENTIAL

REFERENCES

PORT COLBORNE, OFFICIAL PLAN, SCHEDULE A: CITY-WIDE LAND USE, AUGUST 202.

NOTES

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HIGHWAY 140 LAND HOLDING
PORT COLBORNE, ONTARIO

TITLE
PORT COLBORNE NATURAL HERITAGE AND LAND USE

Drawn	Scale	Figure
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Checked	Project No. 53689-101	
Date 2024-12-17	Rev No. 0	

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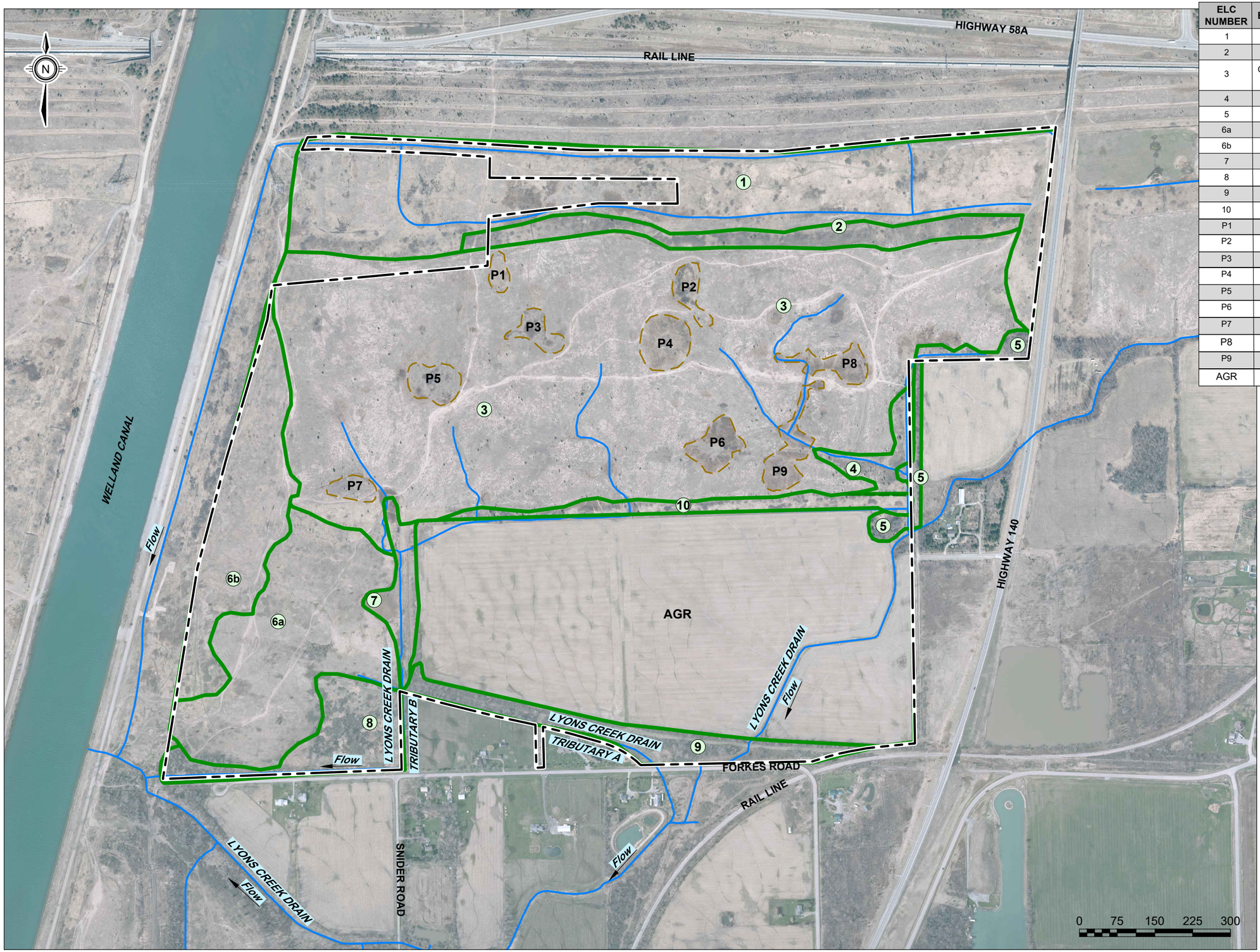

ELC NUMBER	ELC CODE	Description
1	CUM1	Mineral Cultural Meadow (27.29ha)
2	CUT1	Mineral Cultural Thicket (4.21ha)
3	CUM1/OPEN GROUND	Mineral Cultural Meadow (67.08ha)
4	CUT1	Mineral Cultural Thicket (1.48ha)
5	CUW1	Mineral Cultural Woodland (1.72ha)
6a	CUT1	Mineral Cultural Thicket (7.91ha)
6b	CUT1	Mineral Cultural Thicket (12.84ha)
7	MAM2	Mineral Meadow Marsh (1.78ha)
8	SWT	Swamp Thicket (4.32ha)
9	CUW/SWD	Cultural Woodland/ Deciduous Swamp (4.03ha)
10	CUT	Cultural Thicket (2.36ha)
P1		Phragmites Inclusions (0.25ha)
P2		Phragmites Inclusions (0.49ha)
P3		Phragmites Inclusions (0.49ha)
P4		Phragmites Inclusions (0.92ha)
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P6		Phragmites Inclusions (0.76ha)
P7		Phragmites Inclusions (0.38ha)
P8		Phragmites Inclusions (0.66ha)
P9		Phragmites Inclusions (0.93ha)
AGR		Agricultural Land (40.49ha)

LEGEND

- SUBJECT SITE
- 1 VEGETATION COMMUNITY
- VEGETATION COMMUNITY (Phragmites Inclusions)
- WATERCOURSE (LIO)

REFERENCES

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HIGHWAY 140 LAND HOLDING
PORT COLBORNE, ONTARIO

TITLE
ECOLOGICAL LAND CLASSIFICATION

Drawn	Scale	Figure
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Checked	Project No. 53689-101	
Date 2025-04-07	Rev No. 0	

CAD: P:\P\53689\101\04-ECOLOGY\2_PROD\53689-101-EIS1.4.DWG

Plot Date: April 7, 2025 - 9:52 AM

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2	CUT1	Mineral Cultural Thicket (4.21ha)
3	CUM1/OPEN GROUND	Mineral Cultural Meadow (67.08ha)
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P8		Phragmites Inclusions (0.66ha)
P9		Phragmites Inclusions (0.93ha)
AGR		Agricultural Land (40.49ha)

LEGEND

- SUBJECT SITE
- (1) VEGETATION COMMUNITY
- VEGETATION COMMUNITY (Phragmites Inclusions)
- WATERCOURSE (LIO)
- AMPHIBIAN BREEDING SURVEY STATION (location, viewing direction, and 100m radius shown)
- BIRD SURVEY STATION
- EASTERN MEADOWLARK
- AQUATIC HABITAT ASSESSMENT

REFERENCES

SOUTHWESTERN ONTARIO ORTHOPHOTOGRAPHY PROJECT (2020), SOURCE: DATA PROVIDED BY ONTARIO MINISTRY OF NATURAL RESOURCES AND FORESTRY, © COPYRIGHT: 2024 KING'S PRINTER OF ONTARIO, ALL RIGHTS RESERVED; AND LAND INFORMATION ONTARIO (LIO), WATER NETWORK.

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HIGHWAY 140 LAND HOLDING
PORT COLBORNE, ONTARIO

TITLE
FIELD INVESTIGATIONS

Drawn	Scale	Figure
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Checked	Project No. 53689-101	
Date 2025-04-07	Rev No. 0	

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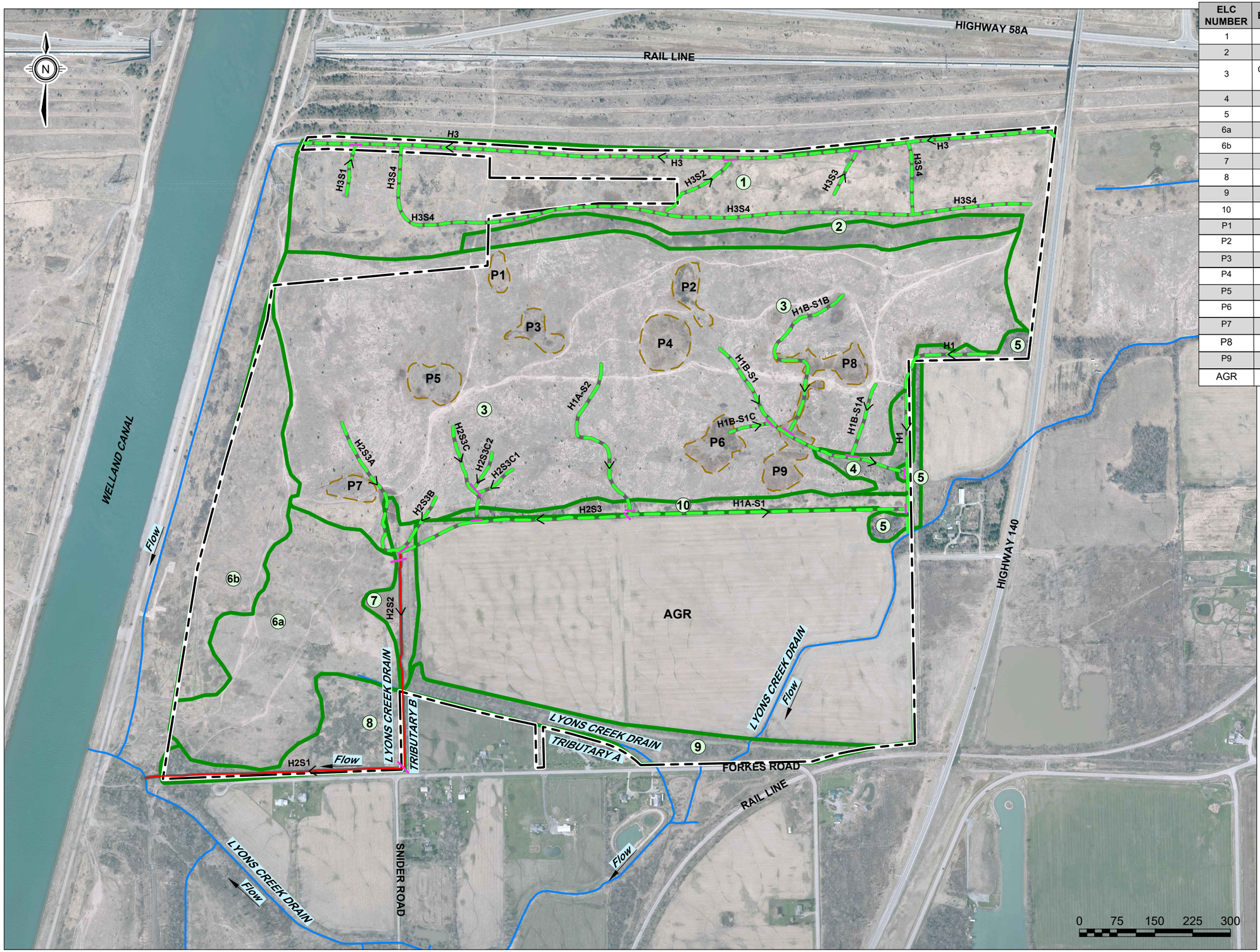

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P8		Phragmites Inclusions (0.66ha)
P9		Phragmites Inclusions (0.93ha)
AGR		Agricultural Land (40.49ha)

LEGEND

- SUBJECT SITE
- VEGETATION COMMUNITY
- VEGETATION COMMUNITY (Phragmites Inclusions)
- WATERCOURSE (LIO)
- MITIGATION
- PROTECTION
- REACH BREAK
- FLOW DIRECTION

REFERENCES

SOUTHWESTERN ONTARIO ORTHOPHOTOGRAPHY PROJECT (2020), SOURCE: DATA PROVIDED BY ONTARIO MINISTRY OF NATURAL RESOURCES AND FORESTRY, © COPYRIGHT: 2024 KING'S PRINTER OF ONTARIO, ALL RIGHTS RESERVED; AND LAND INFORMATION ONTARIO (LIO), WATER NETWORK.

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PROJECT
ENVIRONMENTAL IMPACT STUDY
HIGHWAY 140 LAND HOLDING
PORT COLBORNE, ONTARIO

TITLE
HEADWATER DRAINAGE FEATURES

Drawn	Scale	Figure
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Date 2025-04-07	Rev No. 0	

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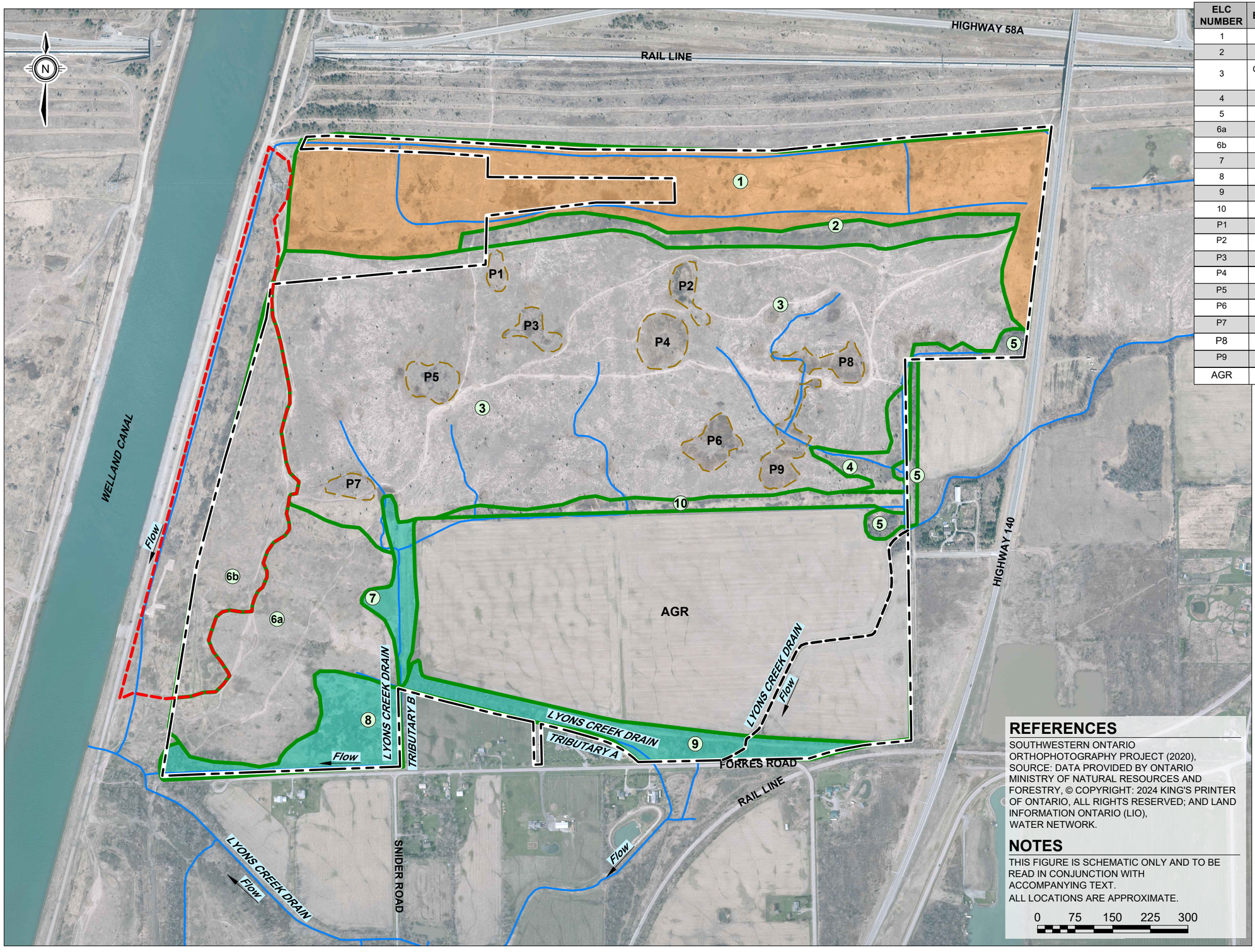

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P8		Phragmites Inclusions (0.66ha)
P9		Phragmites Inclusions (0.93ha)
AGR		Agricultural Land (40.49ha)

LEGEND

- SUBJECT SITE
- VEGETATION COMMUNITY
- VEGETATION COMMUNITY (Phragmites Inclusions)
- WATERCOURSE (LIO)
- WETLAND
- CONFIRMED SIGNIFICANT WILDLIFE HABITAT
- HABITAT OF ENDANGERED OR THREATENED SPECIES
- DIRECT FISH HABITAT

REFERENCES

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0 75 150 225 300

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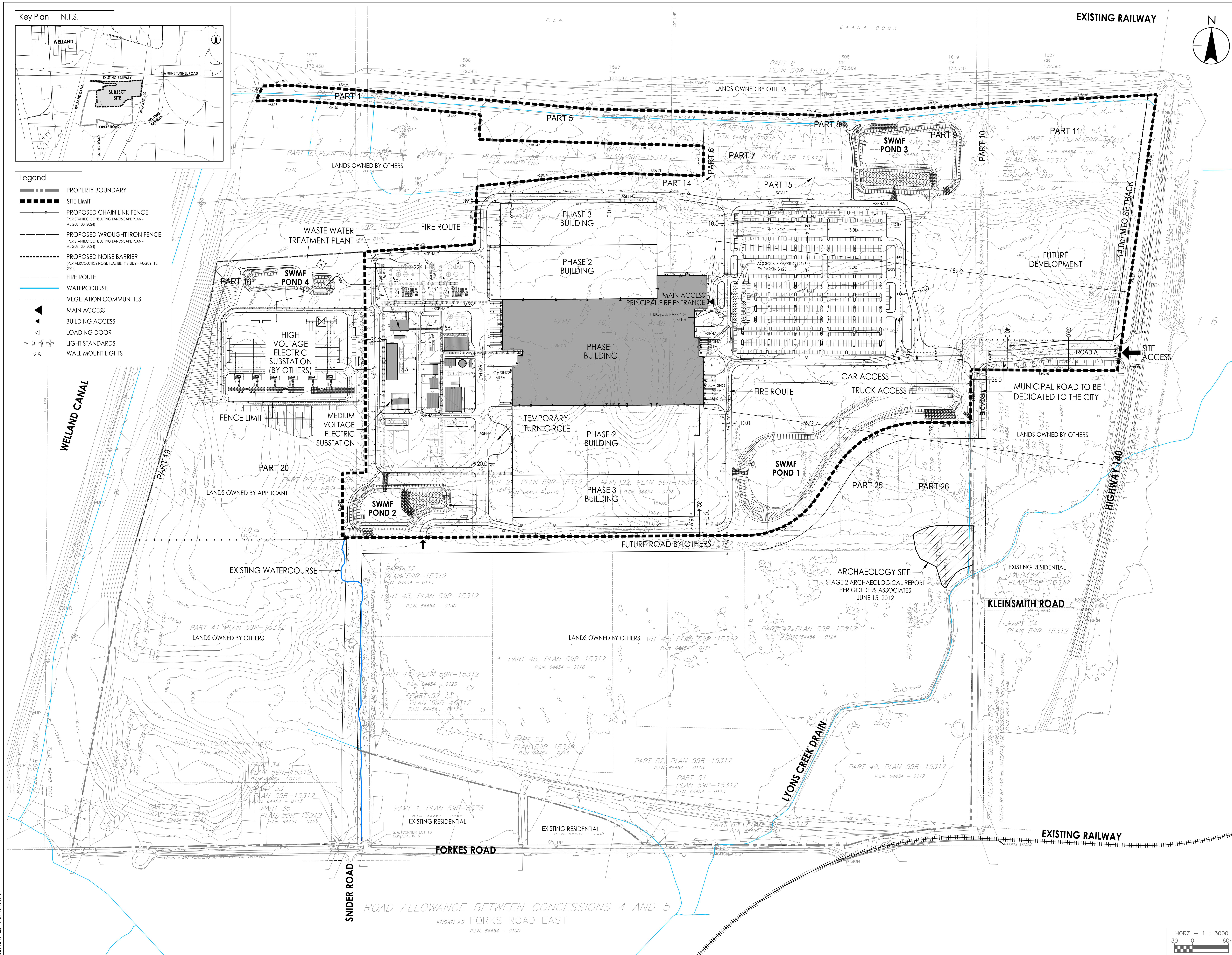
PROJECT

ENVIRONMENTAL IMPACT STUDY
HIGHWAY 140 LAND HOLDING
PORT COLBORNE, ONTARIO

TITLE

NATURAL HERITAGE FEATURES

Drawn: DCH	Scale: 1:7,500	Figure: 7
Checked:	Project No.: 53689-101	
Date: 2025-04-07	Rev No.: 0	



Stantec

Stantec
400-1305 Riverbend Road
London ON N6K 0J5
Tel. 519-645-2007
www.stantec.com

Liability Note

The Contractor shall verify and be responsible for all dimensions. DO NOT scale the drawing - any errors or omissions shall be reported to Stantec without delay.

Design Data

Proposed Zone:	Heavy Industrial with Special Provisions (HI___)	
Site Area (m²)	74.446 ha / 183.96 ac	
Gross Floor Area Phase 1 Phase 2 Phase 3 Total	 ±650,000 ft² / ±60,387 m² ±700,000 ft² / ±65,032 m² ±650,000 ft² / ±60,387 m² ±2,000,000 ft² / ±185,806 m²	
Zone Provisions	**Requirement**	**Proposed**
Minimum Lot Frontage	30 m	464.07 m (Hwy 140)
Minimum Front Yard	7.5 m	444.4 m
Minimum Front Yard abutting a Residential or Agricultural Zone	15 m	N/A
Minimum Side Yard	10% of lot frontage or 3m, whichever is less = 3m	North = 32.6 m South = 32.4 m
Minimum Side Yard abutting a Residential or Agricultural Zone	15 m	N/A
Minimum Interior Side Yard abutting a Railroad or Hydro Right-of-Way	1.5 m	32.6 m
Minimum Rear Yard	8 m	35.2 m
Maximum Building Height	15 m	35 m *
Maximum Building Height abutting a Residential Zone	8 m	35 m *
Minimum Parking - Total On Site (Includes EV and Accessible Parking)	1 space per 100 square metres GFA = 1,859	1,525 *
Minimum Accessibility Parking (Local Zoning Requirement)	2% of required parking = 38	27 * Included in total
Minimum Accessibility Parking (Provincial Requirement)	11 Spaces + 1% of required parking = 27	
Minimum Bicycle Parking	1 space per 1,000 square metres of GFA = 186	30 * (outdoor only)
EV Parking	N/A	25 Included in total
Loading Spaces	Located in an interior side yard or rear yard	Loading spaces permitted in all yards *
Outside Storage	Permitted only in the rear and interior side yards	Outside storage to be permitted in all yards*
The gross floor area of the permitted accessory use(s) shall not exceed 15% of the total gross floor area of the principal use(s) on the lot	15%	20% *
Parking Landscaped Open Space within Parking Areas	10% of the parking area	Landscaped Open Space within parking areas and/or within 10m of paved area to equal 10% *

* SPECIAL PROVISIONS APPROVED THROUGH MUNICIPAL ZONING ORDER, ONTARIO REGULATION #337/24
** GARBAGE TO BE PRIVATE PICKUP

		By	Appd	YYYY.MM.DD
8	FOR SITE PLAN APPROVAL - SUBMISSION 2	RT	BB	2024.12.13
7	80% CD	RT	BB	2024.11.29
6	50% CD	RT	BB	2024.08.30
5	100% DD	RT	BB	2024.07.26
4	80% DD	RT	BB	2024.06.28
3	FOR SITE PLAN APPROVAL - SUBMISSION 1	RT	BB	2024.06.18

Issued/Revision

Permit/Seal

LICENSED PROFESSIONAL ENGINEER
2024.12.13
D. VUCETIC
100209129
PROVINCE OF ONTARIO

Client/Project Logo

AsahiKASEI

Client/Project
MANUFACTURING FACILITY

PROJECT EAGLE
5088 HIGHWAY 140

PORT COLBORNE, ON
CANADA

Title
SITE PLAN
DECEMBER 13, 2024

Project No. 161500301

Scale 1:3000

Revision

Drawing No. **SP-101**

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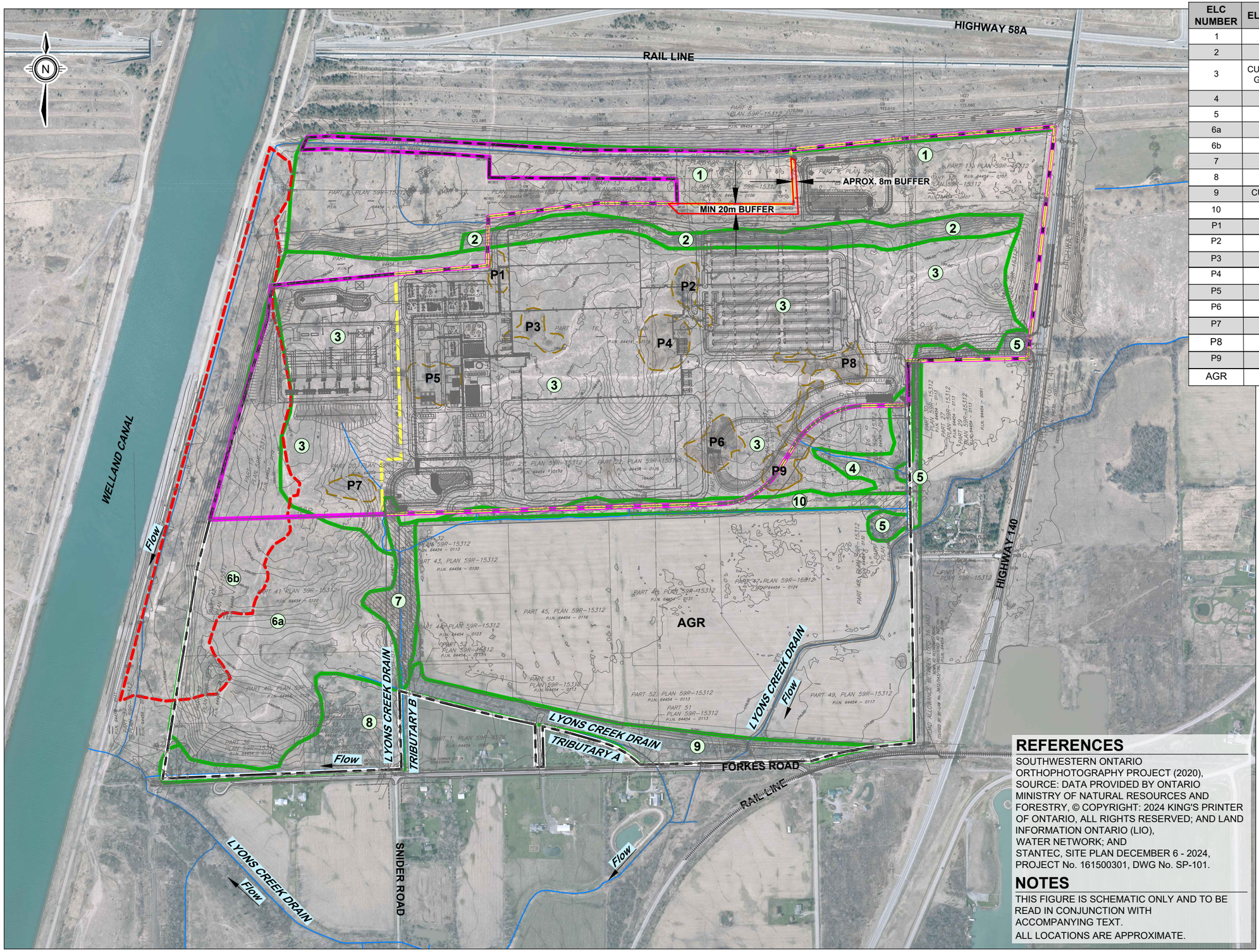
Plot Date: June 23, 2025 - 9:04 AM



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P9		Phragmites Inclusions (0.93ha)
AGR		Agricultural Land (40.49ha)

LEGEND

- SUBJECT SITE
- AK LANDS
- SITE ALTERATION PERMIT APPROVED BOUNDARY PERMIT # PLPER202301267(A)
- (1) VEGETATION COMMUNITY
- VEGETATION COMMUNITY (Phragmites Inclusions)
- WATERCOURSE (LIO)
- HABITAT OF ENDANGERED OR THREATENED SPECIES
- SIGNIFICANT WILDLIFE HABITAT BUFFER

0 75 150 225 300

REFERENCES

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NOTES

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Engineers, Scientists, Surveyors

PROJECT
ENVIRONMENTAL IMPACT STUDY
HIGHWAY 140 LAND HOLDING
PORT COLBORNE, ONTARIO

TITLE
DEVELOPMENT OVERLAY

Drawn: DCH	Scale: 1:7,500	Figure: 9
Checked:	Project No.: 53689-101	
Date: 2025-06-23	Rev No.: 0	

Appendix A

Species at Risk Screening

Threatened or Endangered Species

Common Name	SARO	Habitat Requirements and Range	Habitat on Subject Lands?	Habitat on Adjacent Lands?	Rationale
Spoon-leaved Moss *Bryoandersonia illecebra*	THR	Most populations are located on soil in low-lying areas that are seasonally flooded under trees or shrub thickets. Range: Restricted to a few sites in southern Ontario – Elgin, Essex and Welland counties, and the Niagara region.	No	**Potential**	The Subject Lands contain areas that are seasonally flooded under trees and shrub thickets. Potential habitat may be present within the Adjacent Lands. This species was not observed within the Subject Lands during targeted field investigations.
Acadian Flycatcher *Empidonax virescens*	END	Typically found in mature, interior forest habitat within shady forest ravines with American Beech or Eastern hemlock. Nest placement near the tip of a lower limb on a tree, often over water. Nest often looks messy and scraggly. Range: Nests only in southwestern Ontario, mostly in large forest and forested ravines near the shore of Lake Erie.	No	No	The Study Area does not contain suitable mature, interior forest habitat within shady forest ravines to provide suitable habitat for this species. This species was not observed within the Subject Lands during targeted field investigations.
Bank Swallow *Riparia riparia*	THR	Nests in natural and disturbed settings where there are vertical faces in silt and sand deposits. Many found along rivers and lakes, but also in active sand and gravel pits. Range: Found across southern Ontario, sparse in northern Ontario. Largest populations found along Lake Erie and Lake Ontario shorelines, and along the Saugeen River.	No	No	The Study Area does not contain vertical faces in silt and sand deposits to provide suitable habitat for this species. This species was not observed within the Subject Lands during targeted field investigations.
Bobolink *Dolichonyx oryzivorus*	THR	Found in large, open expansive grasslands with dense ground cover; hayfields, meadows or fallow fields, marshes. Grasslands size requirements have been reported to range from 5 ha to 50 ha depending on the study (MNR, n.d.). Range: Widely distributed throughout most of the province south of the boreal forest. May be found in the north where suitable habitat exists.	**Yes**	**Potential**	The Subject Lands contain suitable large, open meadows that provide suitable habitat for this species. Though not observed in 2024, this species has been observed within the Subject Lands during previous field investigations completed in 2012 (MMM Group Ltd., 2012). The Adjacent Lands also likely support potential habitat for this species. This species was not observed within the Subject Lands during targeted 2024 field investigations.
Chimney Swift *Chaetura pelagica*	THR	Found in urban and rural areas near buildings. Nest and roosts in hollow trees, crevices of rock cliffs and, most commonly, in unlined chimneys. Suitable sites are reused annually. Range: Estimated 7500 breeding individuals in Ontario; most widely distributed in the Carolinian south and southwest.	No	No	The Study Area does not provide suitable unlined chimneys to habitat for this species. This species was not observed within the Subject Lands during targeted field investigations.
Eastern Meadowlark *Sturnella magna*	THR	Breeds mostly in moderately tall grasslands (native prairies and savannahs), also pastures, hayfields, herbaceous fencerows, roadsides, orchards, airports, shrubby overgrown fields, or other open areas. Eastern Meadowlarks may not be strongly area-sensitive (McCracken et al. 2013), however large tracts of grasslands (5 ha or greater) are preferred over smaller fragments (Herkert 1991, Vickery et al. 1994). Range: Primarily found south of the Canadian Shield, but also inhabits Lake Nipissing, Timiskaming, and Lake of Woods areas.	**Yes**	**Yes**	The Subject Lands contain suitable large, open meadows that are confirmed habitat for this species. The Adjacent Lands also contain suitable habitat for this species. This species was observed along the border of the Subject Lands during targeted field investigations.
Eastern Whip-poor-will *Antrostomus vociferus*	THR	Prefers semi-open or patchy dry forests with clearings, such as barrens or regenerating forests, but can also be found in wide-open spaces or dense forests associated with pine and oak. Requires an undisturbed area 50 to 1000ha to maintain breeding population. Range: Fragmented populations in the central Great Lakes region, reaching up to Lake Superior.	No	No	The Study Area does not contain dry forest habitat with clearings or dense forests associated with pine and oak to provide suitable habitat for this species. This species was not observed within the Subject Lands during targeted field investigations.
Henslow's Sparrow *Ammodramus henslowii*	END	Nests only in moist to wet multi-year fallow fields of primarily tall grasses interspersed with tall herbaceous plants or shrubs. Distribution is extremely low and unpredictable in most of southern Ontario; no confirmed breeding was documented in the second Ontario Breeding Bird Atlas (2001-2005; Cadman et al. 2008). Adults infrequently observed as they remain below thatch. Range: Breeds in southern Ontario.	No	No	The Study Area contains tall grasses and field habitat. However, previous studies have concluded that the grass density/ composition is not suitable for this species (MMM Group Ltd, 2012) and the findings were confirmed to still be relevant during our field investigations. This species was not observed within the Subject Lands during targeted field investigations.

Threatened or Endangered Species

Common Name	SARO	Habitat Requirements and Range	Habitat on Subject Lands?	Habitat on Adjacent Lands?	Rationale
Least Bittern *Ixobrychus exilis*	THR	Found in large marshes (> 5ha) or marshy borders of lakes, ponds, streams, ditches with dense emergent vegetation of cattails, bulrush, and sedges. Nests in primarily in cattails, 10m from open water. Range: Majority of the 1500 Canadian pairs found south of the Canadian Shield in central, eastern, and southern Ontario.	No	No	The Study Area does not contain suitable large marsh habitat to provide habitat for this species. This species was not observed within the Subject Lands during targeted field investigations.
Red-headed Woodpecker *Melanerpes erythrocephalus*	END	Found in a variety of habitats, including oak and beech forests, forest edges, orchards, pastures, riparian forests, roadsides, etc. Uncommon in Ontario, elsewhere within its range often found in parks, golf courses, and cemeteries with dead trees for perching and nesting. Range: Across southern Ontario; widespread but rare.	No	No	The Study Area does not provide suitable forested habitat for this species. This species was not observed within the Subject Lands during targeted field investigations.
Blanding's Turtle *Emydoidea blandingii*	THR	Lives in shallow water, usually large wetlands, and shallow lakes with lots of water vegetation – darkly coloured water with high productivity, but also observed in clear waters. Sometimes hundreds of meters from water when finding a new nesting site or mate. Nestings sites are open habitats with low vegetation cover and high sun exposure, with sand, organic soil, gravel, cobblestone substrates. Overwinters in substrate beneath standing permanent or temporary water bodies, can overwinter in relatively shallow water (7cm).Can make long-distance overland movements between wetlands. Range: Great Lakes/St. Lawrence population primarily in southern Ontario. (4E,5E,6E,7E).	No	No	The Study Area does not contain suitable wetland or shallow lake habitat to provide suitable habitat for this species. This species was not observed within the Subject Lands; however, targeted field investigations did not occur.
Eastern Red Bat *Lasiurus borealis*	END	Roosts in foliage of coniferous and deciduous trees and shrubs typically prefer tall trees at least the height of the canopy; however, will use shrubs and trees greater than 5 m. Foraging habitat includes both forested and unforested habitat (COSEWIC, 2023).	No	**Potential**	The Subject Lands does not contain woodland with suitable maternity roosting trees or other features that could be used for roosting. The adjacent lands may contain suitable roosting habitat for this species This species was not observed within the Subject Lands; however, targeted field investigations did not occur.
Little Brown Myotis *Myotis lucifugus*	END	Little Brown Myotis roosts in caves, quarries, tunnels, hollow trees, or buildings. Little Brown Myotis typically prefer buildings or building-associated features for maternity roosting rather than natural features (Gerson, 1984; Humphrey & Fotherby, 2019). This species hibernates in humid caves and forages in wetlands and forest edges. Range: Widespread across southern Ontario.	No	**Potential**	
Northern Hoary Bat *Lasiurus cinereus*	END	Roosts in foliage of coniferous and deciduous trees and shrubs typically prefer tall trees at least the height of the canopy; however, will use shrubs and trees greater than 5 m. Foraging habitat includes open wetlands, grasslands and fields with some trees (COSEWIC, 2023).	No	**Potential**	
Northern Myotis *Myotis septentrionalis*	END	Roosts in houses, manmade structures, but prefers hollow trees or under loose bark. Hunts in forests. Range: Throughout forested areas in southern Ontario.	No	**Potential**	
Silver-haired Bat *Lasionycteris noctivagans*	END	Roosts in coniferous and deciduous tree cavities and under bark. May occasionally roost in buildings (COSEWIC, 2023).	No	**Potential**	
Tricolored Bat *Perimyotis subflavus*	END	Roosts in older forests and occasionally barns/structures. Hibernate in damp, draft-free caves. Hunt over water and along streams in a forest.	No	**Potential**	

Special Concern Species

Common Name	Habitat Requirements	Habitat on Subject Lands?	Habitat on Adjacent Lands?	Rationale
Swamp Rose-mallow *Hibiscus moscheutos*	Restricted to shoreline marshes, found in deep-water cattail marshes and meadow marshes. Also in open wet woods, thickets, spoil banks, and drainage ditches. Range: Lake Erie and Lake St. Clair in Carolinian and Great Lakes forest regions.	No	No	The Study Area does not contain coastal wetlands to provide suitable habitat for this species. This species was not observed within the Subject Lands during targeted field investigations.
Barn Swallow *Hirundo rustica*	Barn Swallows are typically found nesting in close association with human rural settlements, such as in old sheds, barns, and under bridges or culverts. This species forages for aerial insects in open habitats including grassy fields, pastures, agricultural fields and farms, lake and river shorelines, wetlands, and clearings. Range: Throughout southern Ontario and as far north as Hudson Bay.	No	No	The Study Area does not provide suitable structures to provide nesting habitat for this species. This species was not observed within the Subject Lands during targeted field investigations.
Eastern Wood-Pewee *Contopus virens*	Lives in mid-canopy layer of forest clearings and the edges of deciduous and mixed forests. Abundant in middle-aged forests with little understory. Range: Found across most of southern and central Ontario.	No	**Yes**	The Subject Lands do not provide suitable forested habitat for this species. However, the Babion Woods area of the Adjacent Lands contains suitable habitat for this species and was confirmed habitat for this species according to 2012 studies (MMM Group Ltd. 2012). This species was not observed within the Subject Lands during targeted field investigations.
Grasshopper Sparrow *Ammodramus savannarum*	Lives in open grasslands with well-drained sandy soil. Nests in hayfields and pastures, preferring areas with sparse vegetation. Range: Southern Ontario, occasionally the Canadian Shield.	**Yes**	**Potential**	The Subject Lands contain suitable grassland habitat for this species. The grassland and pasture habitat within the Adjacent Lands may also provide suitable habitat for this species. This species was observed within the Subject Lands during targeted field investigations.
Wood Thrush *Hylocichla mustelina*	Lives in mature deciduous and mixed forests, seeking moist stands with well-developed undergrowth. Prefer large forests but will use smaller. Range: Across southern Ontario, less common up north to Lake Superior.	No	**Yes**	The Subject Lands do not provide suitable forested habitat for this species. However, the Babion Woods area of the Adjacent Lands contains suitable habitat for this species and was confirmed habitat for this species according to 2012 studies (MMM Group Ltd. 2012). This species was not observed within the Subject Lands during targeted field investigations.
Mapleleaf Mussel *Quadrula quadrula*	Found in medium to large rivers with packed sand, gravel, or clay and mud bottoms, and slow to moderate currents. Range: Several large rivers that drain into Lake St. Clair and Lake Erie; Sydenham, Ausable, Grand, Thames and Welland Rivers. (The fish host of the Mapleleaf is the Channel catfish. Presence of the fish host is one of the key features determining whether the body of water can support a healthy mussel population).	No	**Potential**	The Subject Lands do not provide suitable medium to large rivers to support habitat for this species. The Welland Canal located to the west in the Adjacent Lands may provide suitable habitat. Targeted surveys were not conducted for this species.
Snapping Turtle *Chelydra serpentina*	Spend most of their time in water, preferring shallow waters to hide in soft mud and leaf litter. Nest in gravelly or sandy areas along streams, taking advantage of man-made structures for nesting sites, including roads, dams, and aggregate pits. Range: Limited to southern part of Ontario.	No	**Potential**	The Subject Lands do not provide suitable habitat for this species. However, suitable habitat may be present within the area of the Welland Canal located within the Adjacent Lands. Targeted surveys were not conducted for this species.
Monarch *Danaus plexippus*	Caterpillars confined to areas with milkweed. Adults use diverse habitats with a variety of wildflowers. Range: Most abundant in southern Ontario. During migration, thousands can be seen along the north shores of Lakes Ontario and Erie.	**Yes**	**Potential**	The Subject Lands provide suitable habitat for this species. The Adjacent Lands may also provide suitable habitat for this species. Targeted surveys were not conducted for this species.

References

Ministry of the Environment, Conservation and Parks. (2018, July 12). *Species at risk in Ontario.* Government of Ontario. Retrieved from Species at risk in Ontario | ontario.ca.

Ministry of Mines, Ministry of Northern Development, and Ministry of Natural Resources and Forestry. (Updated: 2020, August 20). *Appendix G: Wildlife habitat matrices and habitat descriptions for rare vascular plants.* Government of Ontario. Retrieved from 1 Significant wildlife habitat technical guide: Appendix G: Wildlife habitat matrices and habitat descriptions for rare vascular plants | Ontario.ca

Environment and Climate Change Canada (ECCC). (Updated: 2021, February 2). *Species at risk public registry.* Government of Canada. Retrieved from Species at risk public registry - Canada.ca

Ministry of Natural Resources (MNR). n.d. General Habitat Description for the Bobolink (Dolichonyx oryzivorus). Retrieved from https://files.ontario.ca/environment-and-energy/species-at-risk/mnr_sar_ghd_bblnk_en.pdf

Gerson, H. 1984. Habitat Management Guidelines for Bats of Ontario. Ontario Ministry of Natural Resources. 42 pp.

Humphrey, C. and Fotherby, H. 2019. Recovery Strategy for the Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*) and Tri-colored Bat (*Perimyotis subflavus*) in Ontario. Ontario Recovery Strategy Series. Prepared by the Ministry of the Environment, Conservation and Parks, Peterborough, Ontario. vii + 35 pp. + Appendix. Adoption of the Recovery Strategy for the Little Brown Myotis (*Myotis lucifugus*), the Northern Myotis (*Myotis septentrionalis*), and the Tricolored Bat (*Perimyotis subflavus*) in Canada (Environment and Climate Change Canada 2018).

Appendix B

Field Sheets

Floral Inventory (2023-10-12, 2024-05-31, 2024-06-14)																		
1	2	3	4	5	6	7	8	9	10	Scientific Name	Common Name	CW	COSEWIC	SARO	SRank	NG	Type	Invasive
				X		X		X	X	*Acer negundo*	Manitoba Maple	0.0			S5	X	TR	Y
								X		*Acer platanoides*	Norway Maple	5.0			SE5	IX	TR	Y
								X		*Acer saccharinum*	Silver Maple	-3.0			S5	X	TR	
X										*Achillea millefolium*	Common Yarrow	3.0			SE		FO	
					X	X		X		*Agrostemma githago var. githago*	Common Corncockle	3.0			SE3		FO	
X	X		X			X		X		*Agrostis stolonifera*	Creeping Bentgrass	-3.0			SE5	IC	GR	
					X					*Ambrosia trifida*	Great Ragweed	0.0			S5	C	FO	
X	X		X							*Arctium minus*	Common Burdock	3.0			SE5	IC	FO	
				X			X		X	*Asclepias incarnata*	Swamp Milkweed	-5.0			S5	C	FO	
				X	X			X		*Asclepias syriaca*	Common Milkweed	5.0			S5	C	FO	
					X					*Bidens frondosa*	Devil's Beggarticks	-3.0			S5	C	FO	
X	X			X	X					*Bromus inermis*	Smooth Brome	5.0			SE5	IC	GR	Y
							X			*Carex aquatilis*	Water Sedge	-5.0			S5	R	SE	
X										*Carex aurea*	Golden Sedge	-3.0			S5	U	SE	
			X							*Carex bebbii*	Bebb's Sedge	-5.0			S5	C	SE	
						X				*Carex blanda*	Woodland Sedge	0.0			S5	C	SE	
			X							*Carex crinita*	Fringed Sedge	-5.0			S5	C	SE	
				X						*Carex cristatella*	Crested Sedge	-3.0			S5	U	SE	
						X			X	*Carex lupulina*	Hop Sedge	-5.0			S5	C	SE	
				X						*Carex tenera*	Tender Sedge	0.0			S5	C	SE	
X			X	X	X	X		X	X	*Carex vulpinoidea*	Fox Sedge	-5.0			S5	C	SE	
X	X				X				X	*Centaurea jacea*	Brown Knapweed	5.0			SE5	IU	FO	
				X			X			*Cephalanthus occidentalis*	Eastern Buttonbush	-5.0			S5	C	SH	
X	X	X			X					*Cichorium intybus*	Chicory	3.0			SE5	IC	FO	
X	X	X	X	X	X		X			*Cornus racemosa*	Gray Dogwood	0.0			S5	C	SH	
			X		X	X	X	X		*Cornus sericea*	Red-osier Dogwood	-3.0			S5	U	SH	
				X			X	X		*Crataegus crus-galli*	Cockspur Hawthorn	0.0			S4	C	SH	
X		X						X		*Dactylis glomerata*	Orchard Grass	3.0			SE5	IC	GR	
X	X									*Daucus carota*	Wild Carrot	5.0			SE5	IC	FO	
				X			X			*Dipsacus fullonum*	Common Teasel	3.0			SE5	IC	FO	Y
					X					*Echinochloa crus-galli*	Large Barnyard Grass	-3.0			SE5	IC	GR	
	X									*Elaeagnus angustifolia*	Russian Olive	3.0			SE3	IR	SH	Y
	X	X				X				*Elaeagnus umbellata*	Autumn Olive	3.0			SE3	IU	SH	Y
			X						X	*Eleocharis obtusa*	Blunt Spikerush	-5.0			S5	C	SE	
					X					*Elymus repens*	Creeping Wildrye	3.0			SE5	IC	GR	
									X	*Equisetum arvense*	Field Horsetail	0.0			S5	C	FE	
								X		*Erigeron annuus*	Annual Fleabane	3.0			S5	C	FO	
X	X				X					*Euthamia graminifolia*	Grass-leaved Goldenrod	0.0			S5	C	FO	
X				X	X			X		*Festuca rubra*	Red Fescue	3.0			S5		GR	
		X								*Festuca trachyphylla*	Hard Fescue	5.0			SE4	IR	GR	
X		X								*Fragaria virginiana*	Wild Strawberry	3.0			S5		FO	
X	X		X				X			*Frangula alnus*	Glossy Buckthorn	0.0			SE5	IC	SH	Y
				X						*Fraxinus americana*	White Ash	3.0			S4	C	TR	
X			X		X	X	X	X	X	*Fraxinus pennsylvanica*	Green Ash	-3.0			S4	C	TR	
	X									*Galium aparine*	Cleavers	3.0			S5	C	FO	
							X			*Geum aleppicum*	Yellow Avens	0.0			S5	C	FO	
				X						*Geum canadense*	White Avens	0.0			S5	C	FO	
				X						*Glyceria striata*	Fowl Mannagrass	-5.0			S5	C	GR	
			X				X	X		*Hesperis matronalis*	Dame's Rocket	3.0			SE5	IX	FO	Y
X		X								*Hieracium vulgatum*	Common Hawkweed	5.0			SE2?	IR	FO	
			X							*Hypericum perforatum*	Common St. John's-wort	5.0			SE5	IC	FO	Y
X	X									*Inula helenium*	Elecampane	3.0			SE5	IC	FO	
			X							*Juncus canadensis*	Canada Rush	-5.0			S5	R	RU	
				X		X			X	*Juncus effusus*	Soft Rush	-5.0			S5		RU	
			X		X					*Juncus tenuis*	Path Rush	0.0			S5	C	RU	

Floral Inventory (2023-10-12, 2024-05-31, 2024-06-14)																		
1	2	3	4	5	6	7	8	9	10	Scientific Name	Common Name	CW	COSEWIC	SARO	SRank	NG	Type	Invasive
X										*Juncus torreyi*	Torrey's Rush	-3.0			S5	U	RU	
X	X	X			X			X		*Juniperus virginiana*	Eastern Red Cedar	3.0			S5	C	TR	
X					X	X				*Leucanthemum vulgare*	Oxeye Daisy	5.0			SE5	IC	FO	
			X	X				X		*Ligustrum vulgare*	European Privet	3.0			SE5	IC	SH	Y
								X		*Lonicera tatarica*	Tartarian Honeysuckle	3.0			SE5	IC	SH	Y
X			X		X					*Lotus corniculatus*	Garden Bird's-foot Trefoil	3.0			SE5	IC	FO	Y
						X				*Lysimachia nummularia*	Creeping Jennie	-3.0			SE5	IC	FO	Y
			X			X			X	*Lythrum salicaria*	Purple Loosestrife	-5.0			SE5	IC	FO	Y
			X	X				X		*Malus pumila*	Common Apple	5.0			SE4	IC	SH	
X										*Medicago lupulina*	Black Medic	3.0			SE5	IC	FO	
					X					*Medicago sativa*	Alfalfa	5.0			SE5		FO	
		X								*Melilotus officinalis*	Yellow Sweet-clover	3.0			SE5	IC	FO	Y
X										*Oenothera biennis*	Common Evening Primrose	3.0			S5	C	FO	
								X		*Parthenocissus vitacea*	Thicket Creeper	3.0			S5	C	VW	
X	X			X	X		X			*Phalaris arundinacea*	Reed Canary Grass	-3.0			S5	C	GR	Y
					X					*Phleum pratense*	Common Timothy	3.0			SE5	IC	GR	
X	X			X	X		X		X	*Phragmites australis*	Common Reed	-3.0			S4?		GR	Y
	X									*Pilosella officinarum*	Mouse-ear Hawkweed	5.0			SE5	IR	FO	
X										*Plantago major*	Common Plantain	3.0			SE5	IC	FO	
								X		*Poa palustris*	Fowl Bluegrass	-3.0			S5	C	GR	
X					X					*Poa pratensis*	Kentucky Bluegrass	3.0			S5		GR	
X	X		X					X		*Populus deltoides*	Eastern Cottonwood	0.0			S5		TR	
	X									*Potentilla recta*	Sulphur Cinquefoil	5.0			SE5	IC	FO	
								X		*Prunus avium*	Sweet Cherry	5.0			SE4	IC	TR	
X	X		X	X	X	X				*Pyrus communis*	Common Pear	5.0			SE4	IC	SH	
				X		X	X			*Quercus bicolor*	Swamp White Oak	-3.0			S4	C	TR	
X	X		X							*Quercus macrocarpa*	Bur Oak	3.0			S5	U	TR	
				X			X	X		*Quercus palustris*	Pin Oak	-3.0			S4	C	TR	
X	X		X	X	X	X	X	X		*Rhamnus cathartica*	Common Buckthorn	0.0			SE5	IC	SH	Y
X	X		X					X		*Rhus typhina*	Staghorn Sumac	3.0			S5	C	SH	
	X									*Rosa multiflora*	Multiflora Rose	3.0			SE5	IC	SH	Y
X				X						*Rumex crispus*	Curly Dock	0.0			SE5	IC	FO	
							X	X	X	*Salix alba*	White Willow	-3.0			SE4	IU	TR	
									X	*Salix amygdaloides*	Peach-leaved Willow	-3.0			S5	C	TR	
									X	*Salix bebbiana*	Bebb's Willow	-3.0			S5	C	SH	
X	X	X	X		X		X	X	X	*Salix discolor*	Pussy Willow	-3.0			S5	C	SH	
X						X			X	*Salix interior*	Sandbar Willow	-3.0			S5	C	SH	
X		X			X					*Schoenoplectus tabernaemontani*	Soft-stemmed Bulrush	-5.0			S5	C	SE	
X	X			X					X	*Scirpus atrovirens*	Dark-green Bulrush	-5.0			S5	C	SE	
X	X		X	X	X					*Securigera varia*	Common Crown-vetch	5.0			SE5	IU	FO	Y
X	X									*Sisyrinchium montanum*	Strict Blue-eyed-grass	0.0			S5	C	FO	
X	X		X						X	*Solidago canadensis*	Canada Goldenrod	3.0			S5		FO	
X	X	X								*Solidago nemoralis*	Gray-stemmed Goldenrod	5.0			S5		FO	
					X					*Sonchus asper*	Prickly Sow-thistle	3.0			SE5	IC	FO	
				X		X		X	X	*Spiraea alba*	White Meadowsweet	-3.0			S5	C	SH	
X	X	X			X					*Symphyotrichum ericoides*	White Heath Aster	3.0			S5		FO	
X	X	X			X					*Symphyotrichum novae-angliae*	New England Aster	-3.0			S5	C	FO	
		X			X					*Symphyotrichum pilosum*	White Heath Aster	3.0			S5		FO	
								X		*Toxicodendron radicans*	Poison Ivy	0.0			S5		VW	
X			X							*Trifolium pratense*	Red Clover	3.0			SE5	IX	FO	
X	X			X				X		*Typha angustifolia*	Narrow-leaved Cattail	-5.0			SE5	IC	FO	Y
									X	*Typha latifolia*	Broad-leaved Cattail	-5.0			S5	C	FO	
			X	X				X		*Ulmus americana*	American Elm	-3.0			S5	C	TR	
							X			*Urtica dioica*	Stinging Nettle	0.0			S5		FO	
	X							X		*Viburnum recognitum*	Smooth Arrowwood	0.0			S4	C	SH	

Floral Inventory (2023-10-12, 2024-05-31, 2024-06-14)																		
1	2	3	4	5	6	7	8	9	10	Scientific Name	Common Name	CW	COSEWIC	SARO	SRank	NG	Type	Invasive
X			X							*Vicia cracca*	Tufted Vetch	5.0			SE5	IC	VI	Y
				X				X		*Vitis riparia*	Riverbank Grape	0.0			S5	C	VW	
X	X									*Xanthium strumarium*	Rough Cocklebur	0.0			S5	C	FO	

GENERAL SITE INFORMATION FIELD SHEET

Project: 53689-101
Date: April 16/24 Project Manager:
Collector(s): VS + EB Visit #:
Time started: 12:30 Time finished: Combined collectors' hours:
☐ NHIC List ☐ MNR EO's ☐ none ☐ not provided to collector

WEATHER CONDITIONS				
Temp.	Wind:	5 km/h	Cloud Cover (%)	Precipitation
16°C	Direction:	W	30	Today: NO Yesterday: NO

WIND SCALE	
0	Calm
1	Smoke Drifts
2	Wind Felt on Face
3	Leaves in constant motion
4	Wind raises dust and paper
5	Small trees sway
6	Large branches sway
7	Lots of resistance when walking into
8	Limbs breaking off trees

DATA FOCUS

☐	Birds 1__ 2__ Mig__	☐	ELC's	☐	Dripline/Tree Survey
☐	Mammals	☐	Floral V__ S__ A_	☑	Aquatic - Physical
☐	Amphibians 1_ 2_ 3_	☐	Wetland	☐	Aquatic - Biological
☐	Reptiles	☐	Butternut (BHA)	☐	Faunal Habitat
☐	Inverterbrates	☐	other SAR	☐	Other - see notes

FEATURES (with GPS co-ordinates where applicable)	Mapped UTM	Follow-up Req'd Yes	No	Who
Man-made Structures: ☐ None observed				
Yes No				
☐ ☐ Barns/Footings/Wells/other(list)				
☐ ☐ Rock Piles				
☐ ☐ Garbage				
Natural Vegetation: ☐ None observed				
☐ ☐ Fallen Logs outside woods (#'s)				
☐ ☐ Brush Piles				
☐ ☐ Snags (raptor perch)				
☐ ☐ Tree Cavities (nesting)				
☐ ☐ Sentinel Trees				
☐ ☐ Butternut Identified				
☐ ☐ Mast Trees (6E) ☐ Berry Shrubs (6E)				
Wildlife Features: ☐ None observed				
☐ ☐ Waterfowl nesting (large #'s, # of species)				
☐ ☐ Exposed Banks (nesting swallows)				
☐ ☐ Stick Nests				
☐ ☐ Animal Burrows (>10cm)				
☐ ☐ Heronry				
☐ ☐ Crayfish mounds				
☐ ☐ Sand/gravel on site				
☐ ☐ Marsh/open country/shrub				
☐ ☐ Winter Deer yards				
☐ ☐ Corridor from pond to woods (ampibian movement)				
☐ ☐ Bat corridor (shorelines, escarpments)				
☐ ☐ Bat hibernacula (caves, mines, crevices, etc.)				
Aquatic Features:				
☐ ☐ Perm. pond in woodland ☐ emergents/submergents/logs ☐ temp.				
☐ ☐ Perm. pond in open ☐ emergents/submergents/logs ☐ temp.				
☐ ☐ Water in woodland ☐ pools ☐ flowing ☐ dry				
☐ ☐ Waterways flowing dry pools				
☐ natural stream ☐ ☐ ☐				
☐ swale ☐ ☐ ☐ ☐ None observed				
☐ open drain ☐ ☐ ☐				
☐ Seeps/Springs ☐ ☐ ☐				

Incidental Observations/Notes:

HDFA visit #1 and Frog surveys
- heard Great Horned? Owl along North Drain (HB)

Graphic ☐ Attached or Name L:\ENV\Biological Services\Templates\MTE NENV_General Field Sheet Checked by Project Manager ☐ Date:

AMPHIBIAN MONITORING FIELD SHEET

Project: 53689-101
Date: April 16/24 Project Manager: HK
Collector(s): VS + ER Visit #: 1

WEATHER CONDITIONS						WIND SCALE	
Temp.	Wind:	14km/h	Cloud Cover (%)	Precipitation		0	Calm
14°C	Direction:	NE	90	☑ None/Dry ☐ Drizzle ☐ Damp/Fog ☐ Rain		1	Smoke Drifts
						2	Wind Felt on Face
CALL LEVEL CODES						3	Leaves in constant motion
Code 1: Calls not simultaneous, number of individuals can be accurately counted						4	Wind raises dust and paper
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							

Reference Site: ☑ No ☐ Yes UTM

Station 1

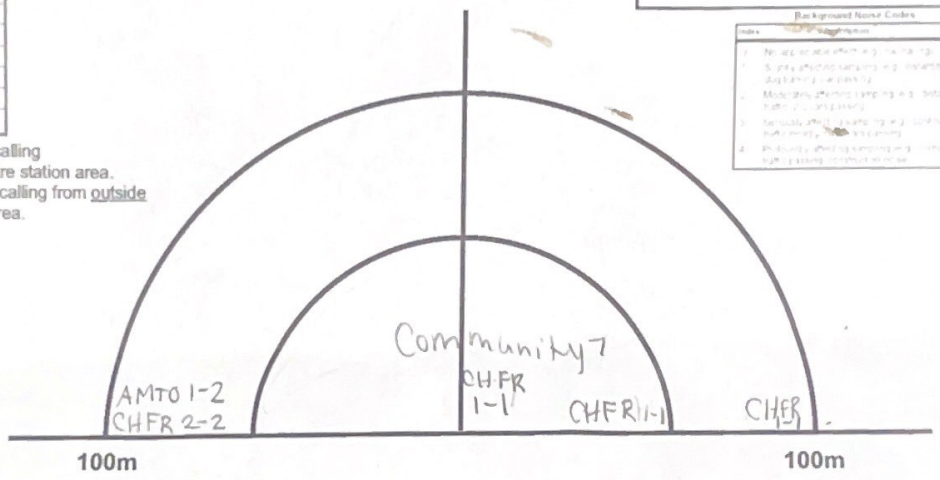
Species	In*	Out**
AMTO	✓	
BCFR		
BULL		
CHFR	✓	
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station: 17T 644800 4756655
W 270°

Station Start Time (24 hr): 20:30

Background Noise Code (1-4): 2



Station 2

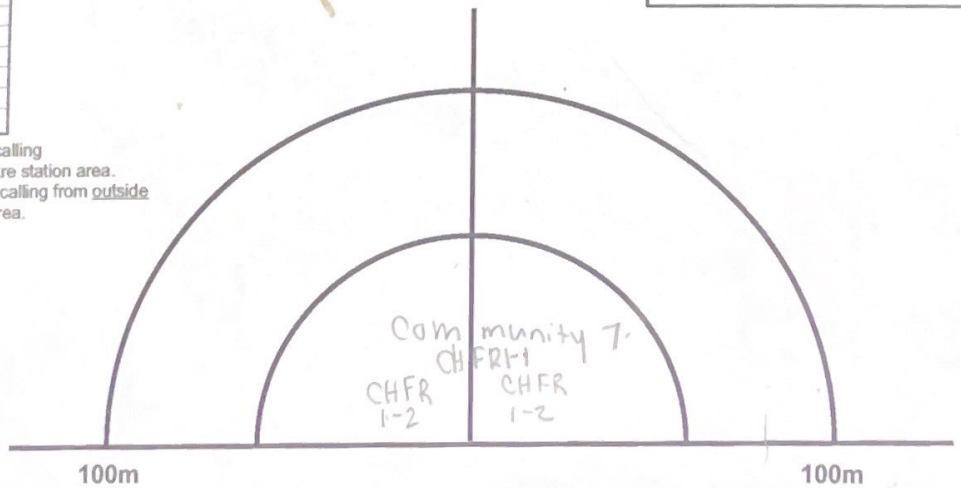
Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR	✓	
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station: 17T 644807 4756825
2
NW 313°

Station Start Time (24 hr): 20:45

Background Noise Code (1-4): 2



AMPHIBIAN MONITORING FIELD SHEET

Project: 53689-101
Date: April 16/24
Collector(s): WFER
Project Manager: HK
Visit #: 1

WEATHER CONDITIONS					
Temp.	Wind:	14 km/h	Cloud Cover (%)	Precipitation	WIND SCALE
14°C	Direction: NE		90	Normal/Dry ☐ Drizzle ☐ Fog ☐ Rain	0 Calm 1 Smoke Drifts 2 Wind Felt on Face 3 Leaves in constant motion 4 Wind raises dust and paper

CALL LEVEL CODES

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

Reference Site: ☐ No ☐ Yes UTM

Station: 3

17 644989 4756841

N 0°

Station Start Time (24 hr): 20:53

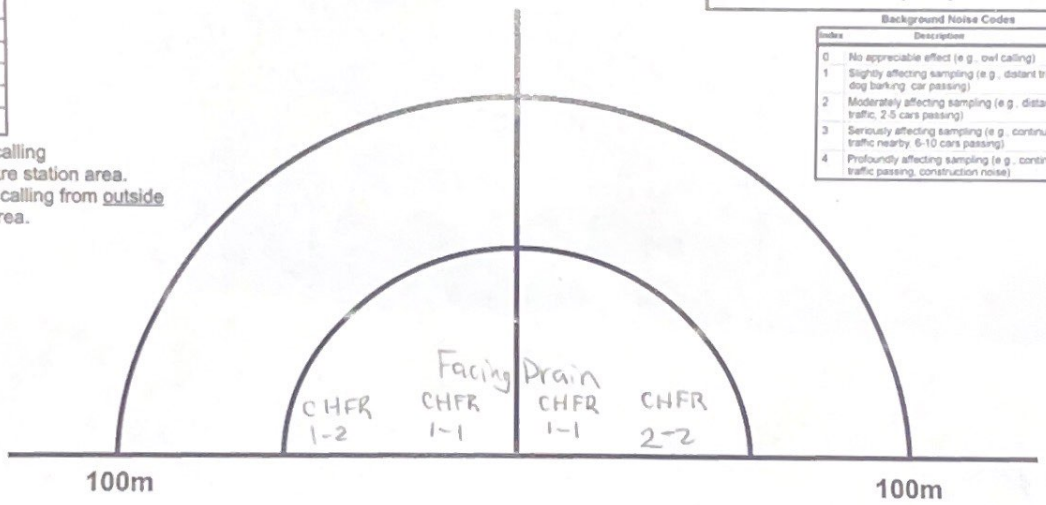
Background Noise Code (1-4): 3

Background Noise Codes

Index	Description
0	No appreciable effect (e.g., owl calling)
1	Slightly affecting sampling (e.g., distant traffic, dog barking, car passing)
2	Moderately affecting sampling (e.g., distant traffic, 2-5 cars passing)
3	Seriously affecting sampling (e.g., continuous traffic nearby, 6-10 cars passing)
4	Profoundly affecting sampling (e.g., continuous traffic passing, construction noise)

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR	✓	
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.



Station: 4

17 645437 4757001

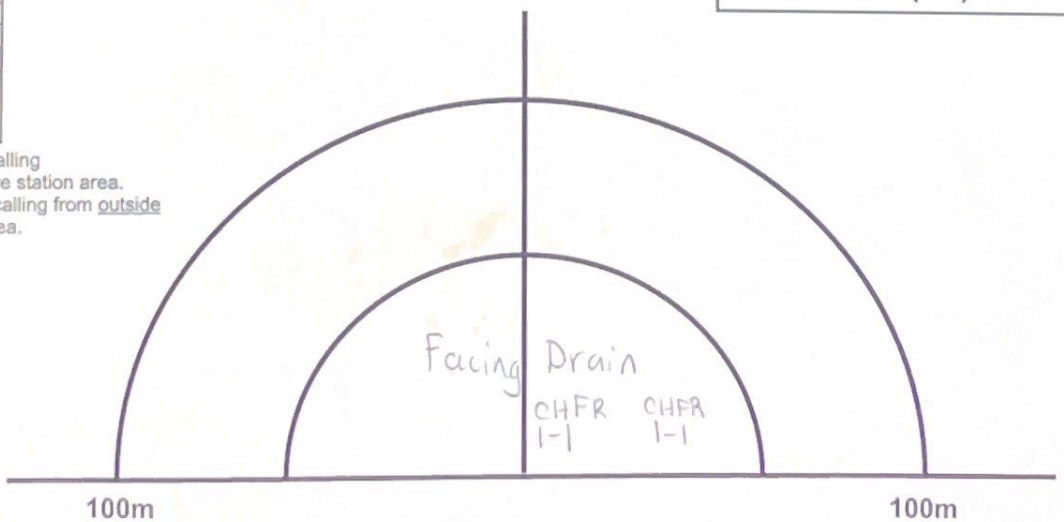
N 347°

Station Start Time (24 hr): 21:06

Background Noise Code (1-4): 3

Species	In*	Out**
AMTO		
BCFR		
BULL	✓	
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.



AMPHIBIAN MONITORING FIELD SHEET

Project: 53689-101
Date: April 16/24
Collector(s): VS + ER
Project Manager: HK
Visit #: 1

WEATHER CONDITIONS					
Temp.	Wind:	14 Km/h	Cloud Cover (%)	Precipitation	
14°c	Direction:	NE	90	☑ None/Dry ☐ Drizzle ☐ Damp/Fog ☐ Rain	

WIND SCALE	
0	Calm
1	Smoke Drifts
2	Wind Felt on Face
3	Leaves in constant motion
4	Wind raises dust and paper

CALL LEVEL CODES

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

Reference Site: ☑ No ☐ Yes UTM

Station: 17 645739 4857013 5

Species	In*	Out**
AMTO		
BCFR		
BULL	✓	
CHFR	✓	
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

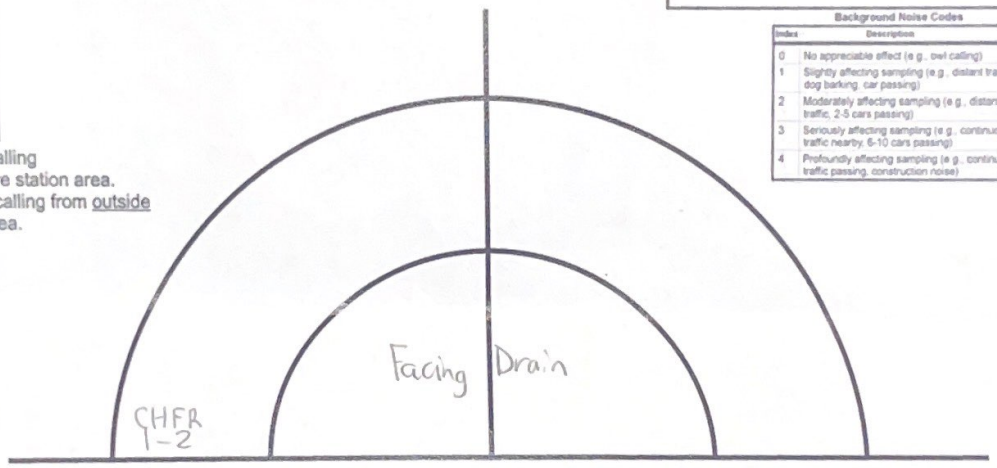
N 14°

Station Start Time (24 hr): 21:16

Background Noise Code (1-4): 3

Background Noise Codes

Index	Description
0	No appreciable effect (e.g., owl calling)
1	Slightly affecting sampling (e.g., distant traffic, dog barking, car passing)
2	Moderately affecting sampling (e.g., distant traffic, 2-5 cars passing)
3	Seriously affecting sampling (e.g., continuous traffic nearby, 6-10 cars passing)
4	Profoundly affecting sampling (e.g., continuous traffic passing, construction noise)



Station: 17 645837 4856886 6

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR	✓	
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		✓
WOFR		

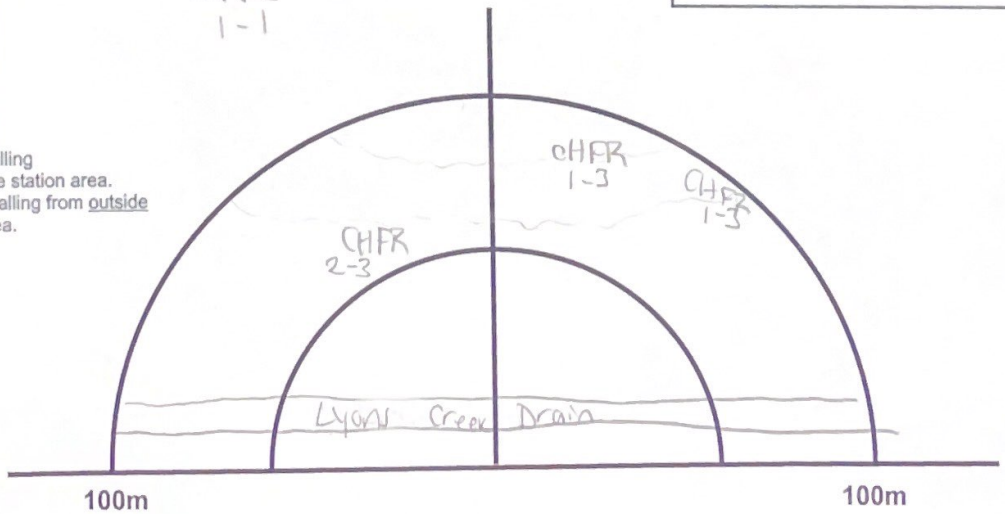
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

E 106°

SPPE 1-1

Station Start Time (24 hr): 21:26

Background Noise Code (1-4): 3



AMPHIBIAN MONITORING FIELD SHEET

Project: 535299-01
Date: April 26/24
Collector(s): VE + ER
Project Manager: HK
Visit #: 1

WEATHER CONDITIONS						WIND SCALE	
Temp.	Wind:	4km/h	Cloud Cover (%)	Precipitation		0	Calm
14°C	Direction:	NE	90	☑ None/Dry ☐ Damp/Fog	☐ Drizzle ☐ Rain	1	Smoke Drifts
						2	☑ Wind Felt on Face
						3	Leaves in constant motion
						4	Wind raises dust and paper

CALL LEVEL CODES

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

Reference Site: ☑ No ☐ Yes UTM

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		✓
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station: 17 645609 4756654
7

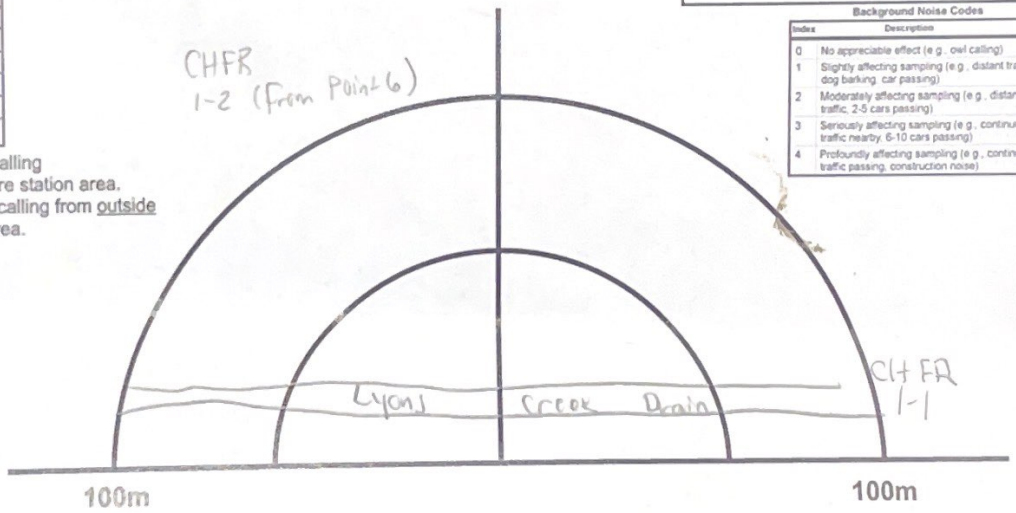
SE 140°

Station Start Time (24 hr): 21:38

Background Noise Code (1-4): 3

Background Noise Codes

Index	Description
0	No appreciable effect (e.g., owl calling)
1	Slightly affecting sampling (e.g., distant traffic, dog barking, car passing)
2	Moderately affecting sampling (e.g., distant traffic, 2-5 cars passing)
3	Seriously affecting sampling (e.g., continuous traffic nearby, 6-10 cars passing)
4	Profoundly affecting sampling (e.g., continuous traffic passing, construction noise)



Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR	✓	
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

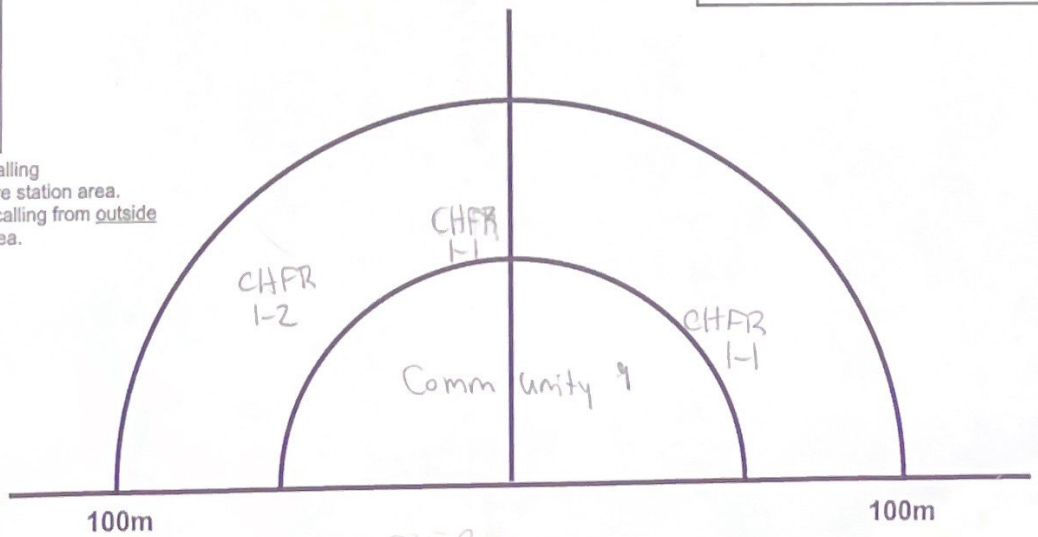
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station: 17 645431 4756507
8

N 13°

Station Start Time (24 hr): 21:52

Background Noise Code (1-4): 3



AMPHIBIAN MONITORING FIELD SHEET

Project: 53689-10
Date: April 17/24
Collector(s): VS + EB
Project Manager: HK
Visit #: 1

WEATHER CONDITIONS						WIND SCALE	
Temp.	Wind:	14 Km/h	Cloud Cover (%)	Precipitation		0	Calm
4°C	Direction:	NE	90	☑ None/Dry ☐ Damp/Fog	☐ Drizzle ☐ Rain	1	Smoke Drifts
						2	Wind Felt on Face
						3	Leaves in constant motion
						4	Wind raises dust and paper

CALL LEVEL CODES

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

Reference Site: ☑ No ☐ Yes UTM

Station: 17 644690 4756491 9

Species	In*	Out**
AMTO	✓	
BCFR		
BULL		
CHFR	✓	
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

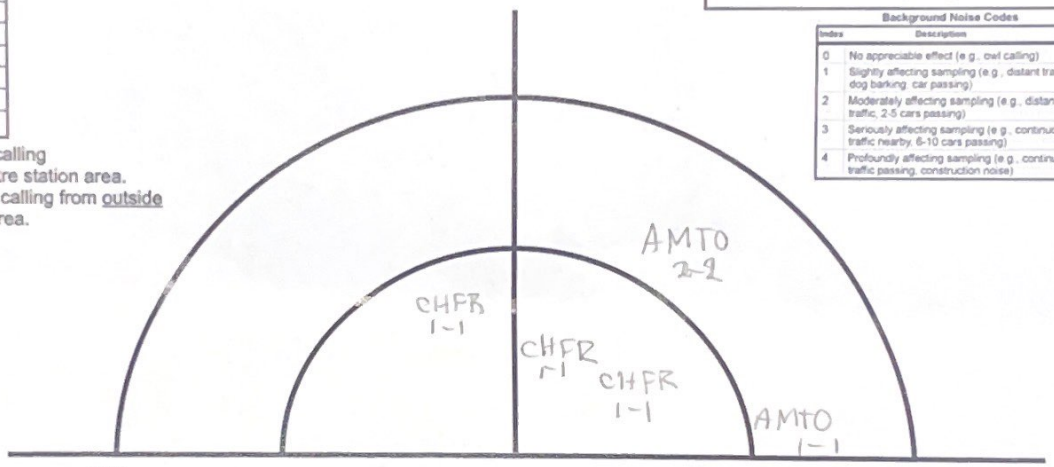
N 25°

Station Start Time (24 hr): 22:05

Background Noise Code (1-4): 2

Background Noise Codes

Index	Description
0	No appreciable effect (e.g., owl calling)
1	Slightly affecting sampling (e.g., distant traffic, dog barking, car passing)
2	Moderately affecting sampling (e.g., distant traffic, 2-5 cars passing)
3	Seriously affecting sampling (e.g., continuous traffic nearby, 6-10 cars passing)
4	Profoundly affecting sampling (e.g., continuous traffic passing, construction noise)



Station: 17 645112 4757728 10

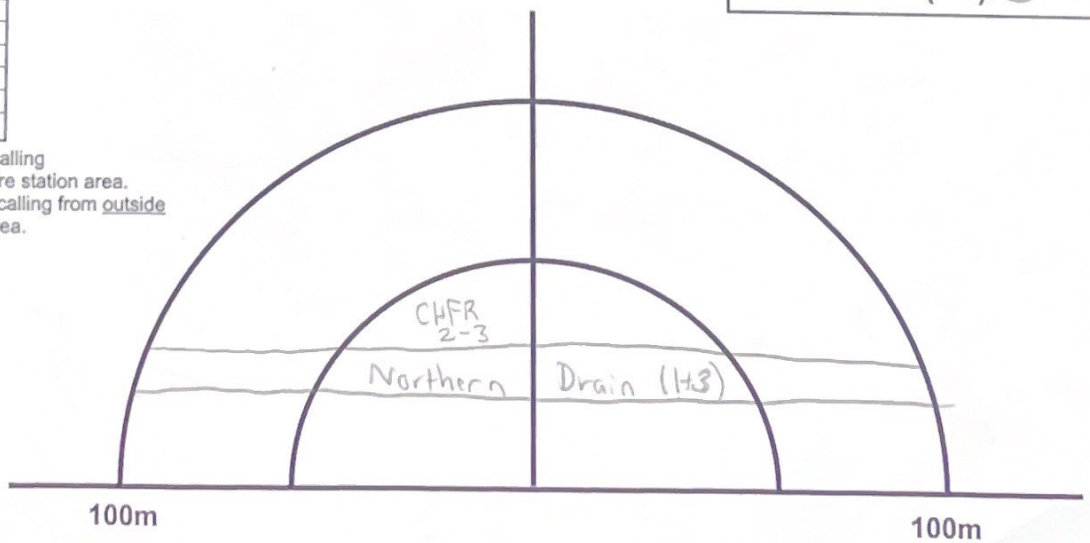
Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR	✓	
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

S 160°

Station Start Time (24 hr): 22:25

Background Noise Code (1-4): 3



AMPHIBIAN MONITORING FIELD SHEET

Project: 53689-101
Date: April 6/2024
Collector(s): VS, ER
Project Manager: HK
Visit #: 1

WEATHER CONDITIONS					
Temp.	Wind:	11 Km/h	Cloud Cover (%)	Precipitation	
14°C	Direction:	NE	90	☑ None/Dry ☐ Drizzle ☐ Damp/Fog ☐ Rain	

WIND SCALE	
0	Calm
1	Smoke Drifts
2	Wind Felt on Face
3	Leaves in constant motion
4	Wind raises dust and paper

CALL LEVEL CODES

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

Reference Site: ☑ No ☐ Yes UTM

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR	✓	
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station: 17 645309 4757727
ID

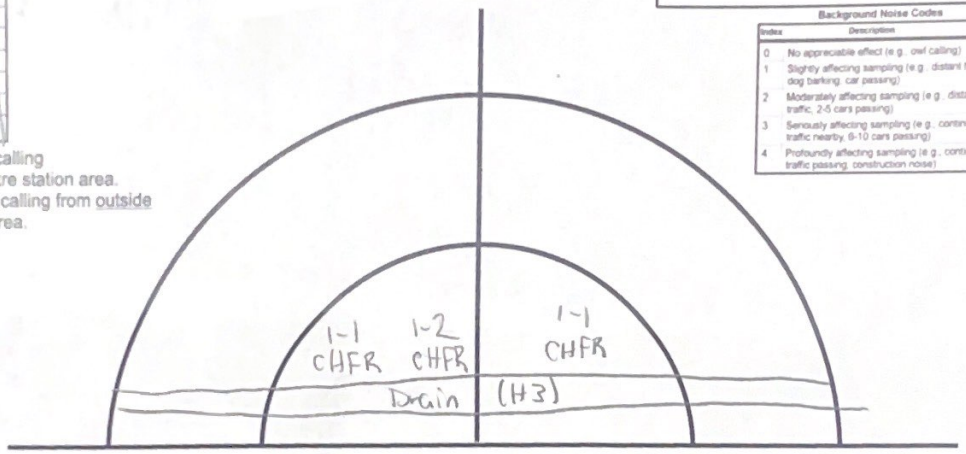
S 192°

Station Start Time (24 hr): 22:37

Background Noise Code (1-4): 3

Background Noise Codes

Index	Description
0	No appreciable effect (e.g., owl calling)
1	Slightly affecting sampling (e.g., distant traffic, dog barking, car passing)
2	Moderately affecting sampling (e.g., distant traffic, 2-5 cars passing)
3	Seriously affecting sampling (e.g., continuous traffic nearby, 6-10 cars passing)
4	Profoundly affecting sampling (e.g., continuous traffic passing, construction noise)



Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR	✓	
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

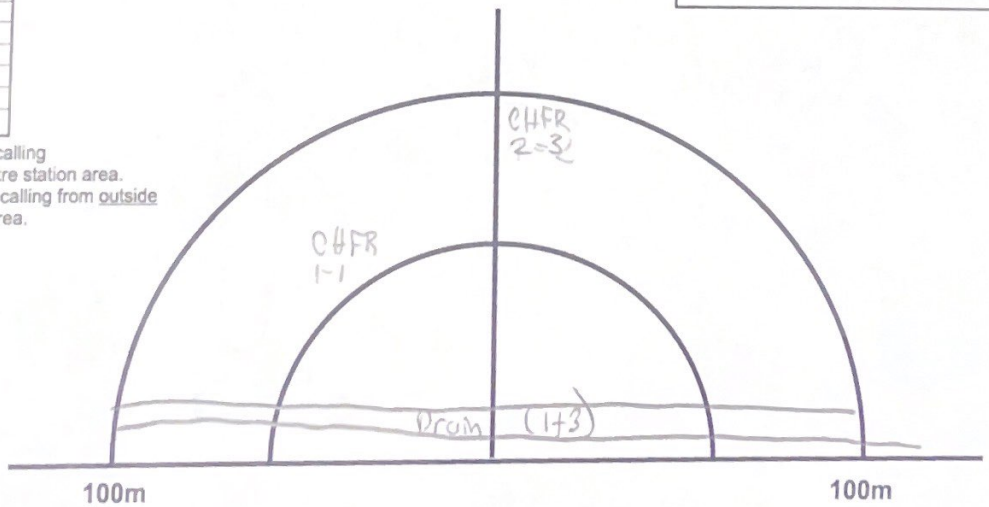
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station: 17 644970 4757743
12

S 177°

Station Start Time (24 hr): 22:47

Background Noise Code (1-4): 3



GENERAL SITE INFORMATION FIELD SHEET

Project: Port Colborne
Date: June 19/24 Project Manager:
Collector(s): VS + [illegible] Visit #:
Time started: 9pm Time finished: 12:30 Combined collectors' hours: 6
☐ NHIC List ☐ MNR EO's ☐ none ☐ not provided to collector

WEATHER CONDITIONS				
Temp.	Wind:	9km/h	Cloud Cover (%)	Precipitation
29°C	Direction:	SW	30	Today: No Yesterday: No

WIND SCALE	
0	Calm
1	Smoke Drifts
2	Wind Felt on Face
3	Leaves in constant motion
4	Wind raises dust and paper
5	Small trees sway
6	Large branches sway
7	Lots of resistance when walking into
8	Limbs breaking off trees

DATA FOCUS							
☐	Birds 1__ 2__ Mig__	☐	ELC's	☐	Dripline/Tree Survey		
☐	Mammals	☐	Floral V__ S__ A_	☐	Aquatic - Physical		
☑	Amphibians 1_ 2_ 3_	☐	Wetland	☐	Aquatic - Biological		
☐	Reptiles	☐	Butternut (BHA)	☐	Faunal Habitat		
☐	Inverterbrates	☐	other SAR	☐	Other - see notes		

FEATURES (with GPS co-ordinates where applicable)			Mapped	Follow-up Req'd		
			UTM	Yes	No	Who
Man-made Structures:		☐ None observed				
Yes	No					
☐	☐	Barns/Footings/Wells/other(list)				
☐	☐	Rock Piles				
☐	☐	Garbage				
Natural Vegetation:		☐ None observed				
☐	☐	Fallen Logs outside woods (#'s)				
☐	☐	Brush Piles				
☐	☐	Snags (raptor perch)				
☐	☐	Tree Cavities (nesting)				
☐	☐	Sentinel Trees				
☐	☐	Butternut Identified				
☐	☐	Mast Trees (6E) ☐ Berry Shrubs (6E)				
Wildlife Features:		☐ None observed				
☐	☐	Waterfowl nesting (large #'s, # of species)				
☐	☐	Exposed Banks (nesting swallows)				
☐	☐	Stick Nests				
☐	☐	Animal Burrows (>10cm)				
☐	☐	Heronry				
☐	☐	Crayfish mounds				
☐	☐	Sand/gravel on site				
☐	☐	Marsh/open country/shrub				
☐	☐	Winter Deer yards				
☐	☐	Corridor from pond to woods (ampibian movement)				
☐	☐	Bat corridor (shorelines, escarpments)				
☐	☐	Bat hibernacula (caves, mines, crevices, etc.)				
Aquatic Features:						
☐	☐	Perm. pond in woodland ☐ emergents/submergents/logs ☐ temp.				
☐	☐	Perm. pond in open ☐ emergents/submergents/logs ☐ temp.				
☐	☐	Water in woodland ☐ pools ☐ flowing ☐ dry				
☐	☐	Waterways flowing dry pools				
	☐	natural stream ☐ ☐ ☐				
	☐	swale ☐ ☐ ☐ ☐ None observed				
	☐	open drain ☐ ☐ ☐				
	☐	Seeps/Springs ☐ ☐ ☐				

Incidental Observations/Notes:

June frog visit

Incidentals:
- deceased Dekay's Brown Snake
- heard Woodcock
- Leopard frog observed but not calling 17T 645686 4757733
- Green Frog observed but not calling 17T 645874 4757751
- 3 Leopard Frogs observed but not calling 17T 645974 4757751

Graphic ☐ Attached or Name C:\ENV\Biological Services\Templates\MTE NEHV_General Field Sheet Checked by Project Manager ☐ Date:

AMPHIBIAN MONITORING FIELD SHEET

MTE

Project: Port Colborne
Date: June 19/24
Collector(s): VS + CG
Project Manager:
Visit #:

WEATHER CONDITIONS				
Temp.	Wind:	5km/h	Cloud Cover (%)	Precipitation
26°C	Direction:	S	80	[x] None/Dry [ ] Drizzle [ ] Damp/Fog [ ] Rain

WIND SCALE	
0	Calm
1 (circled)	Smoke Drifts
2	Wind Felt on Face
3	Leaves in constant motion
4	Wind raises dust and paper

CALL LEVEL CODES

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

Reference Site: [ ] No [ ] Yes UTM

Station: 1 — 17 644902 4756791

Facing: W

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

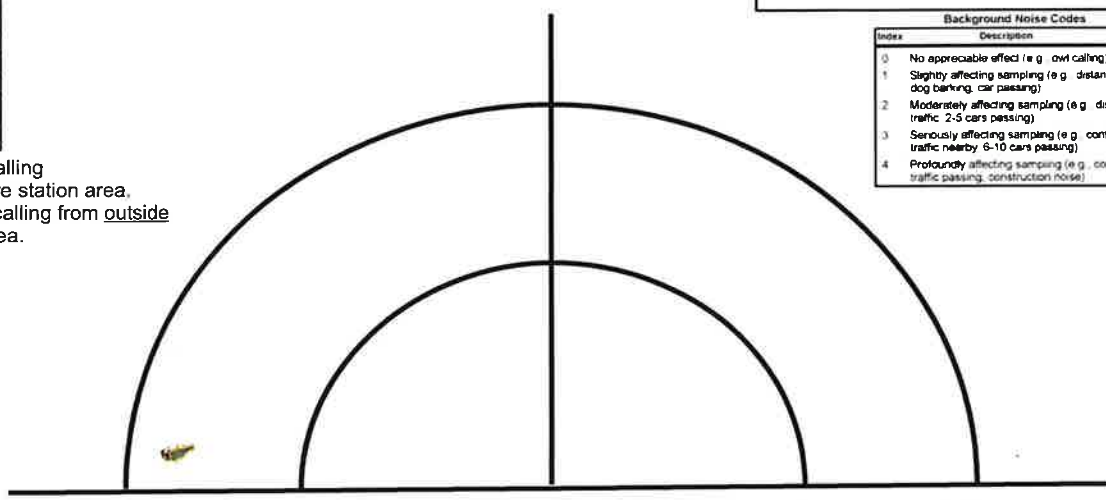
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station Start Time (24 hr): 22:26

Background Noise Code (1-4): 1

Background Noise Codes

Index	Description
0	No appreciable effect (e.g. owl calling)
1	Slightly affecting sampling (e.g. distant traffic, dog barking, car passing)
2	Moderately affecting sampling (e.g. distant traffic, 2-5 cars passing)
3	Seriously affecting sampling (e.g. continuous traffic nearby, 6-10 cars passing)
4	Profoundly affecting sampling (e.g. continuous traffic passing, construction noise)



100m Facing Thicket – No frogs 100m

Station: 2 — 17T 644913 4756975

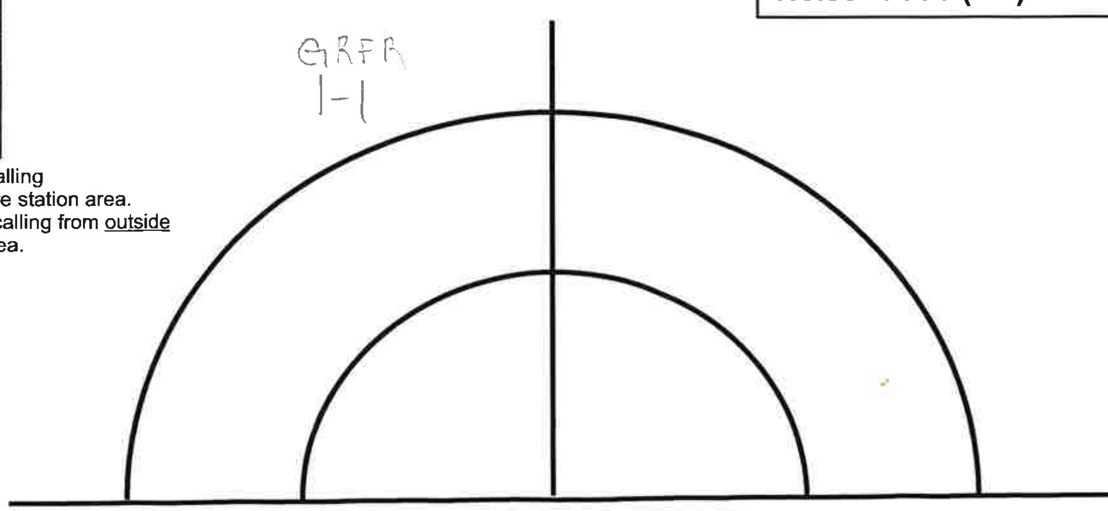
Facing: NW

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		X
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station Start Time (24 hr): 22:33

Background Noise Code (1-4): 2



100m Facing Drain/water 100m

AMPHIBIAN MONITORING FIELD SHEET

Project: Port Colborne
Date: June 19/24 Project Manager:
Collector(s): VS + CG Visit #:

WEATHER CONDITIONS							WIND SCALE
Temp.	Wind:	5km/h	Cloud Cover (%)	Precipitation			0 Calm
25°C	Direction:	S	80	☑ None/Dry	☐ Drizzle		1 Smoke Drifts
				☐ Damp/Fog	☐ Rain		2 Wind Felt on Face
CALL LEVEL CODES							3 Leaves in constant motion
Code 1: Calls not simultaneous, number of individuals can be accurately counted							4 Wind raises dust and paper
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							

Reference Site: ☐ No ☐ Yes UTM

Station 3

Station: 17T 645084 4756987

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

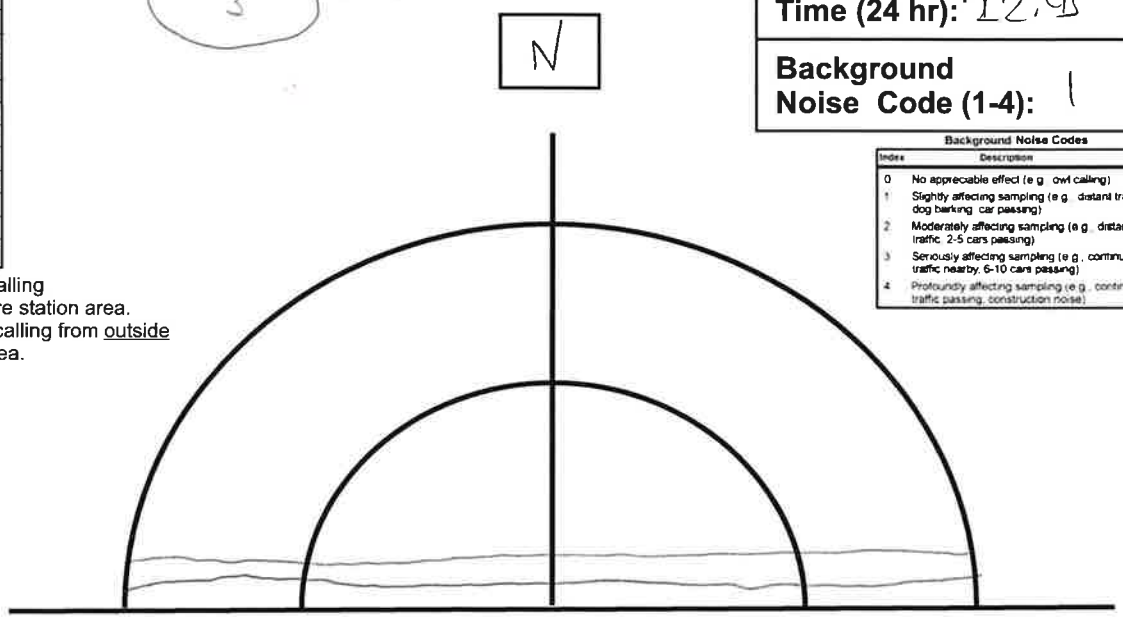
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station Start Time (24 hr): 12:48

Background Noise Code (1-4): 1

Background Noise Codes

Index	Description
0	No appreciable effect (e.g. owl calling)
1	Slightly affecting sampling (e.g. distant traffic, dog barking, car passing)
2	Moderately affecting sampling (e.g. distant traffic, 2-5 cars passing)
3	Seriously affecting sampling (e.g., continuous traffic nearby, 6-10 cars passing)
4	Profoundly affecting sampling (e.g., continuous traffic passing, construction noise)



Station 4

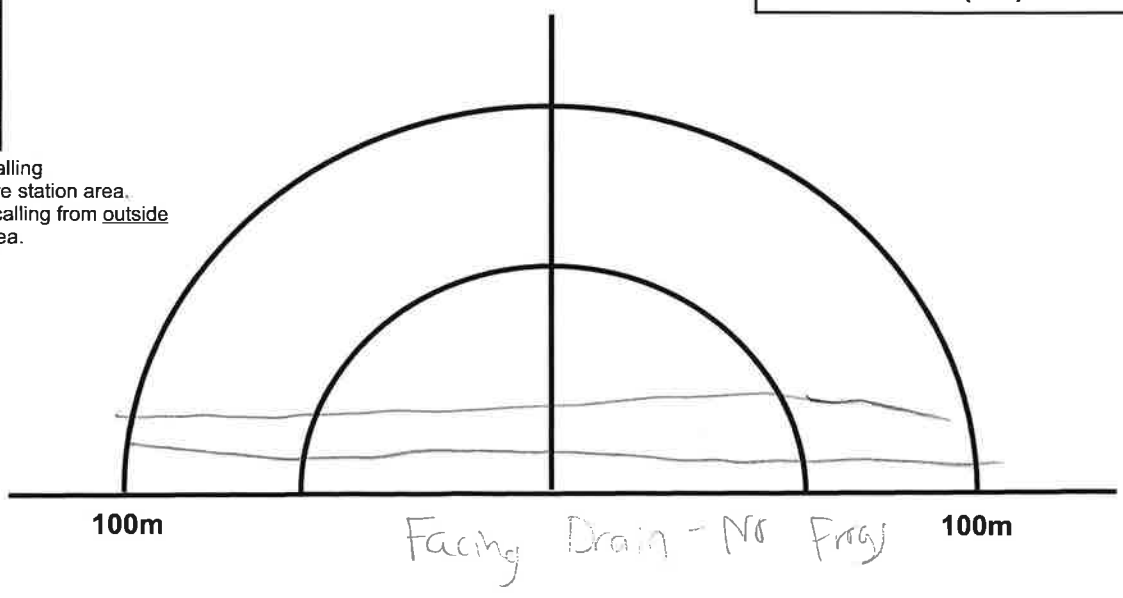
Station: 17T 645431 4756999

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station Start Time (24 hr): 22:53

Background Noise Code (1-4): 1



AMPHIBIAN MONITORING FIELD SHEET

Project: Port Colborne
Date: June 19/24
Collector(s): VS + CG
Project Manager:
Visit #:

WEATHER CONDITIONS						WIND SCALE	
Temp.	Wind:	16 km/h	Cloud Cover (%)	Precipitation		0	Calm
25°C	Direction:	S	85	☑ None/Dry ☐ Drizzle ☐ Damp/Fog ☐ Rain		1	Smoke Drifts
						2	Wind Felt on Face
						3	Leaves in constant motion
						4	Wind raises dust and paper

CALL LEVEL CODES

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

Reference Site: ☐ No ☐ Yes UTM

Station: 5

17T 645740 4757009

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

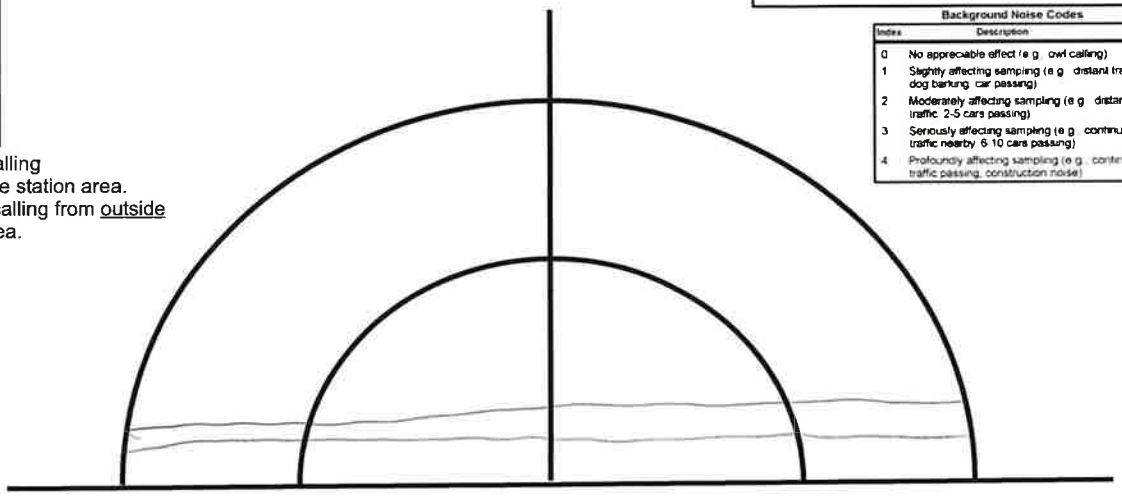
N

Station Start Time (24 hr): 23:04

Background Noise Code (1-4): 1

Background Noise Codes

Index	Description
0	No appreciable effect (e.g. owl calling)
1	Slightly affecting sampling (e.g. distant traffic, dog barking, car passing)
2	Moderately affecting sampling (e.g. distant traffic, 2-5 cars passing)
3	Seriously affecting sampling (e.g. continuous traffic nearby, 6-10 cars passing)
4	Profoundly affecting sampling (e.g. continuous traffic passing, construction noise)



100m — Facing Drain - No Frogs — 100m

Station: 6

17T 645840 4756883

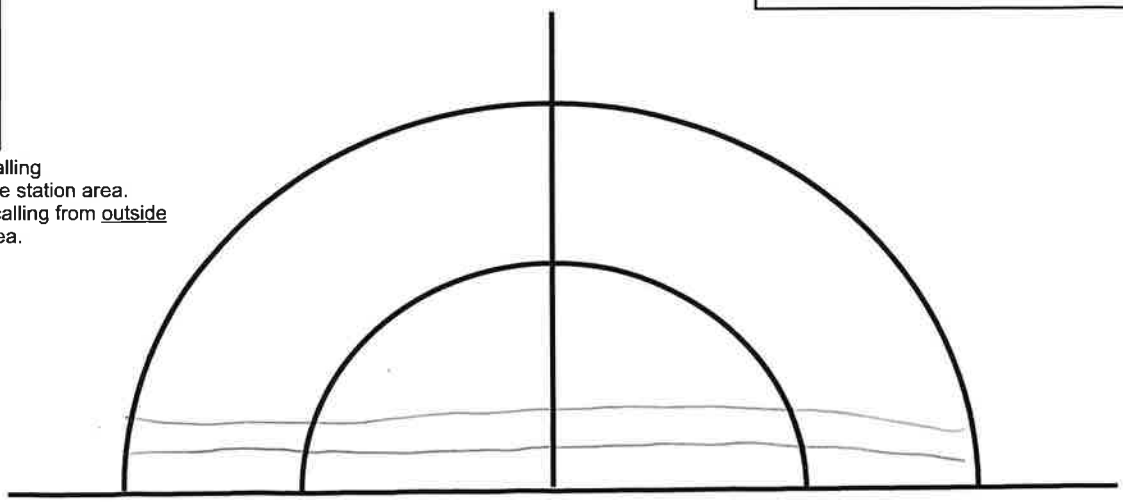
Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

E

Station Start Time (24 hr): 23:12

Background Noise Code (1-4): 2



100m — Facing Lyons Creek Drain - No Frogs — 100m

AMPHIBIAN MONITORING FIELD SHEET

Project: Port Colborne
Date: June 19/20
Collector(s): VS - CG
Project Manager:
Visit #:

WEATHER CONDITIONS					
Temp.	Wind:	4 Km/h	Cloud Cover (%)	Precipitation	
24°C	Direction:	S	80	☑ None/Dry ☐ Drizzle ☐ Damp/Fog ☐ Rain	

	WIND SCALE
0	Calm
(1)	Smoke Drifts
2	Wind Felt on Face
3	Leaves in constant motion
4	Wind raises dust and paper

CALL LEVEL CODES

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

Reference Site: ☐ No ☐ Yes UTM

Station: 7

17T 645611 4756650

SE

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

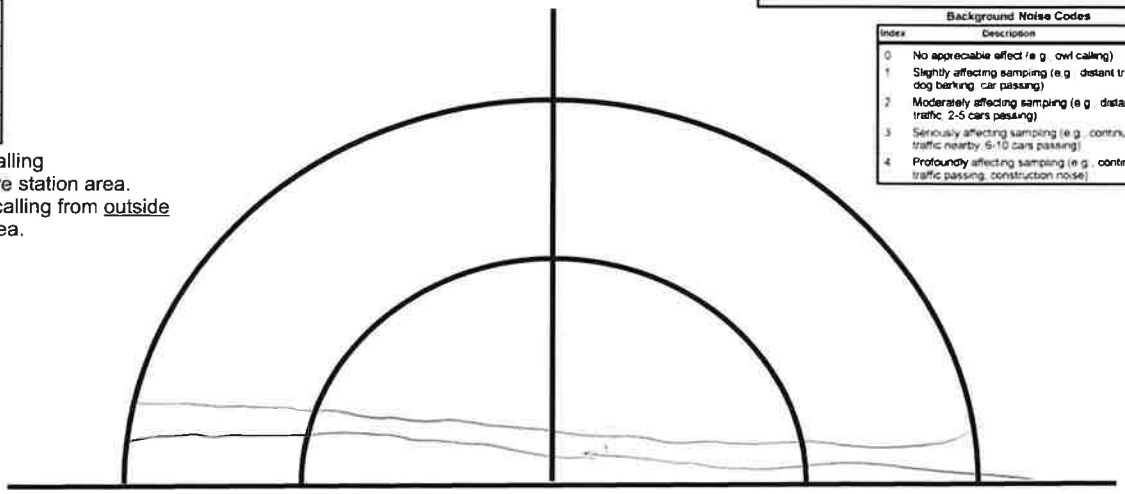
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station Start Time (24 hr): 23:24

Background Noise Code (1-4): 2

Background Noise Codes

Index	Description
0	No appreciable effect (e.g. owl calling)
1	Slightly affecting sampling (e.g. distant traffic, dog barking, car passing)
2	Moderately affecting sampling (e.g. distant traffic, 2-5 cars passing)
3	Seriously affecting sampling (e.g. continuous traffic nearby, 6-10 cars passing)
4	Profoundly affecting sampling (e.g. continuous traffic passing, construction noise)



Station: 8

17T 645437 4756508

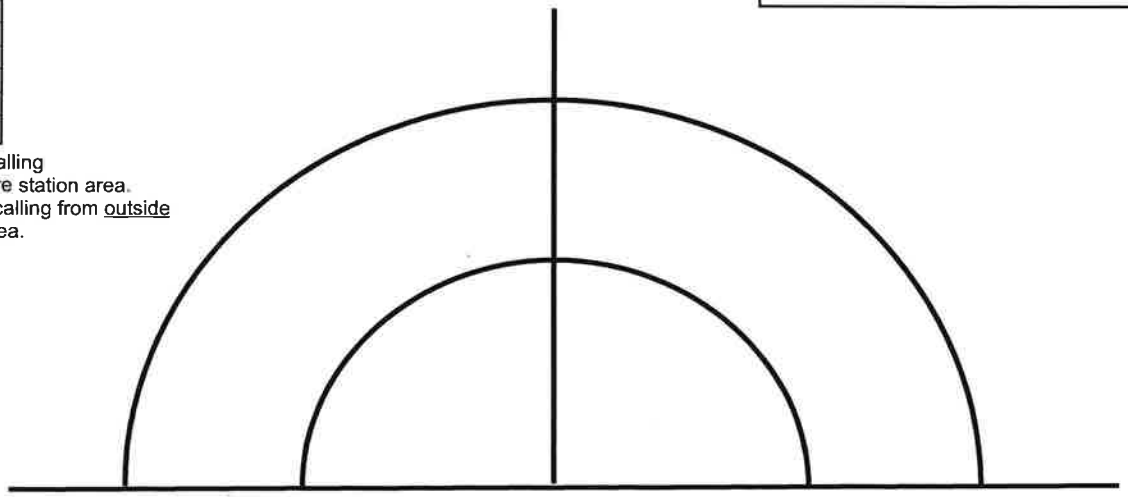
N

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station Start Time (24 hr): 23:36

Background Noise Code (1-4): 1



AMPHIBIAN MONITORING FIELD SHEET

Project: Port Colborne
Date: June 19/24
Collector(s): YS + EG
Project Manager:
Visit #:

WEATHER CONDITIONS					
Temp.	Wind:		Cloud Cover (%)	Precipitation	
28	Direction:	SW	40	☑ None/Dry ☐ Drizzle ☐ Damp/Fog ☐ Rain	

	WIND SCALE
0	Calm
1	Smoke Drifts
(2)	Wind Felt on Face
3	Leaves in constant motion
4	Wind raises dust and paper

CALL LEVEL CODES

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

Reference Site: ☐ No ☐ Yes UTM

Station 10

Station: 17 645715 4757735

Species	In*	Out**
AMTO		
BCFR		
BULL		I
CHFR		
CGTR		I
FOTO		I
GRTR		I
GRFR		I
MIFR		I
NLFR		I
PIFR		I
SPPE		I
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

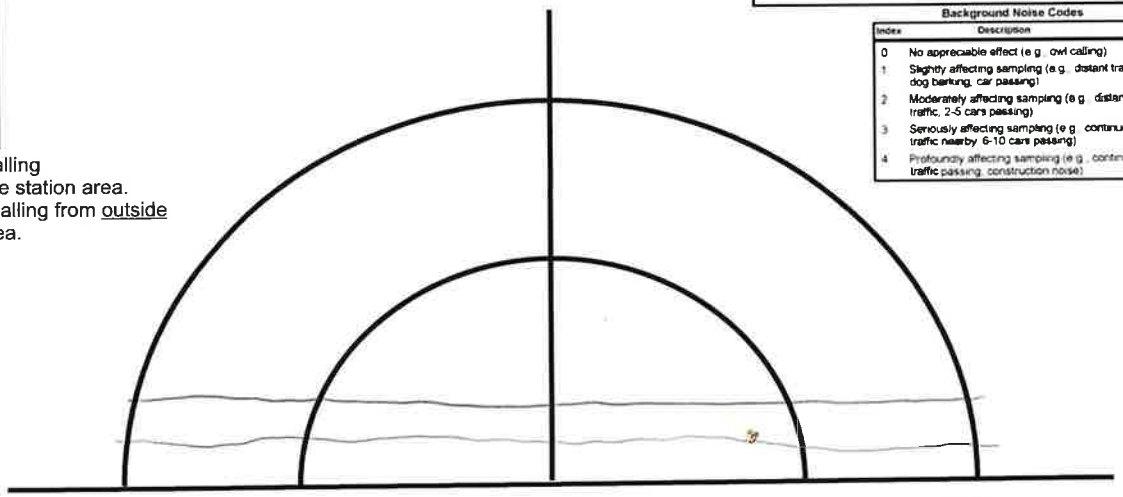
S

Station Start Time (24 hr): 21:53

Background Noise Code (1-4): 2

Background Noise Codes

Index	Description
0	No appreciable effect (e.g., owl calling)
1	Slightly affecting sampling (e.g., distant traffic, dog barking, car passing)
2	Moderately affecting sampling (e.g., distant traffic, 2-5 cars passing)
3	Seriously affecting sampling (e.g., continuous traffic nearby 6-10 cars passing)
4	Profoundly affecting sampling (e.g., continuous traffic passing, construction noise)



Facing Drain - No Frogs

Station 9

Station: 17T 644685 4756483

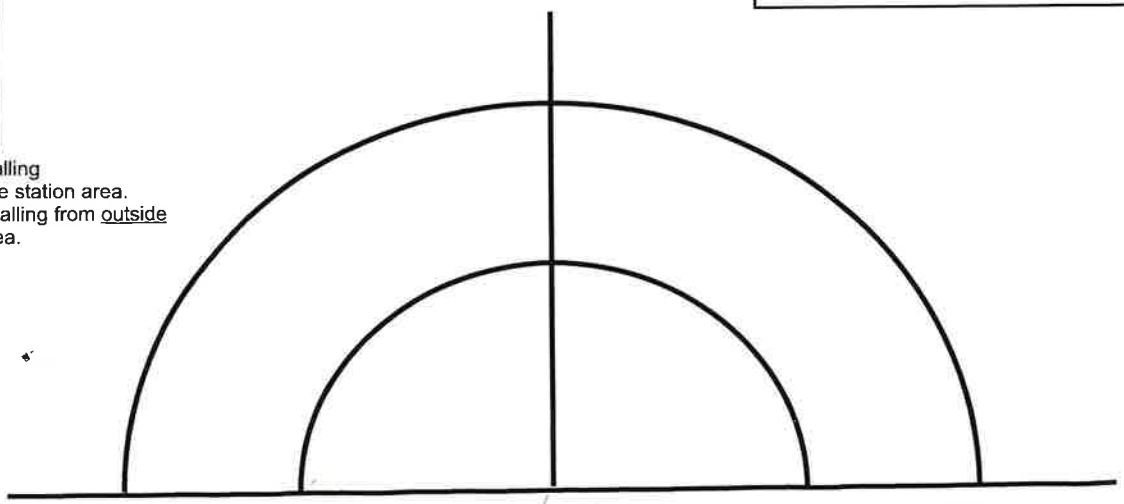
Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR	I	
FOTO		
GRTR		
GRFR		
MIFR	I	
NLFR		
PIFR	I	
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

N

Station Start Time (24 hr): 23:46

Background Noise Code (1-4): 1



Facing drain / thicket - No Frogs

AMPHIBIAN MONITORING FIELD SHEET

Project: Port Colborne
Date: June 19/24
Collector(s): Ys + CG
Project Manager:
Visit #:

WEATHER CONDITIONS					
Temp.	Wind:	7 Km/h	Cloud Cover (%)	Precipitation	
28 °C	Direction:	SW	40	☑ None/Dry ☐ Drizzle ☐ Damp/Fog ☐ Rain	

	WIND SCALE
0	Calm
1	Smoke Drifts
2	Wind Felt on Face
3	Leaves in constant motion
4	Wind raises dust and paper

CALL LEVEL CODES

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

Reference Site: ☐ No ☐ Yes UTM

Station: 12

17T 644967 4757743

Species	In*	Out**
AMTO	1	
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

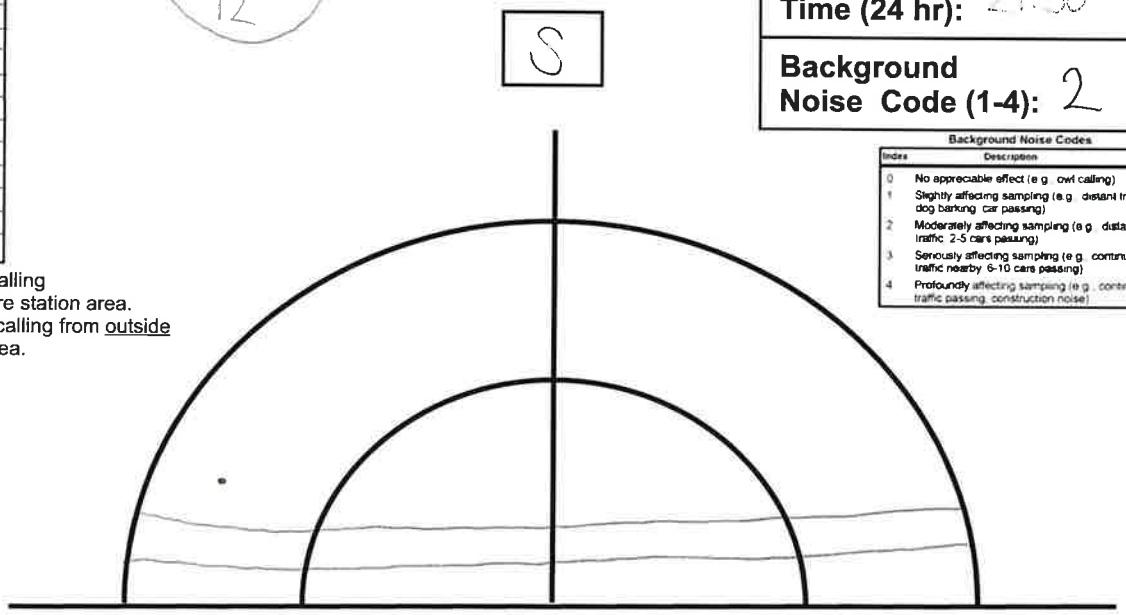
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station Start Time (24 hr): 21:30

Background Noise Code (1-4): 2

Background Noise Codes

Index	Description
0	No appreciable effect (e.g. owl calling)
1	Slightly affecting sampling (e.g. distant traffic, dog barking, car passing)
2	Moderately affecting sampling (e.g. distant traffic, 2-5 cars passing)
3	Seriously affecting sampling (e.g. continuous traffic nearby, 6-10 cars passing)
4	Profoundly affecting sampling (e.g. continuous traffic passing, construction noise)



Station: 11

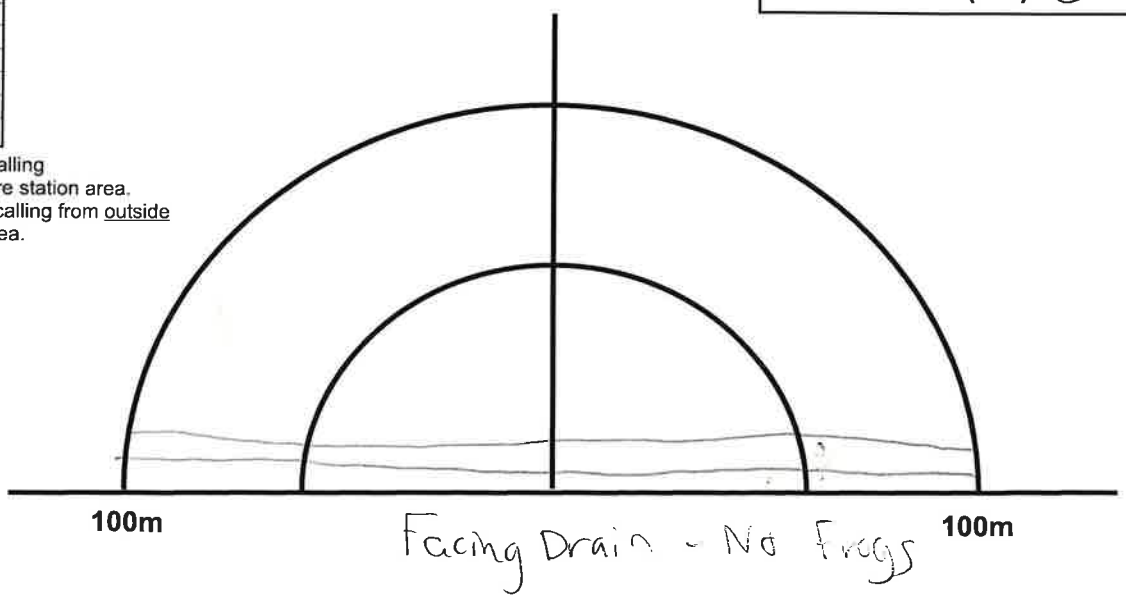
17T 645310 4757726

Species	In*	Out**
AMTO		1
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station Start Time (24 hr): 21:40

Background Noise Code (1-4): 3



AMPHIBIAN MONITORING FIELD SHEET

Project: 53689-101 Port Colborne
Date: May 29/2021 Project Manager: HK
Collector(s): VS AA Visit #:

WEATHER CONDITIONS					
Temp.	Wind: <8km		Cloud Cover (%)	Precipitation	
13°C	Direction: W		15	☒ None/Dry ☐ Drizzle ☐ Damp/Fog ☐ Rain	

WIND SCALE	
0	Calm
1	Smoke Drifts
2	Wind Felt on Face
3	Leaves in constant motion
4	Wind raises dust and paper

CALL LEVEL CODES

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

Reference Site: ☐ No ☐ Yes UTM

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station: 10 175°

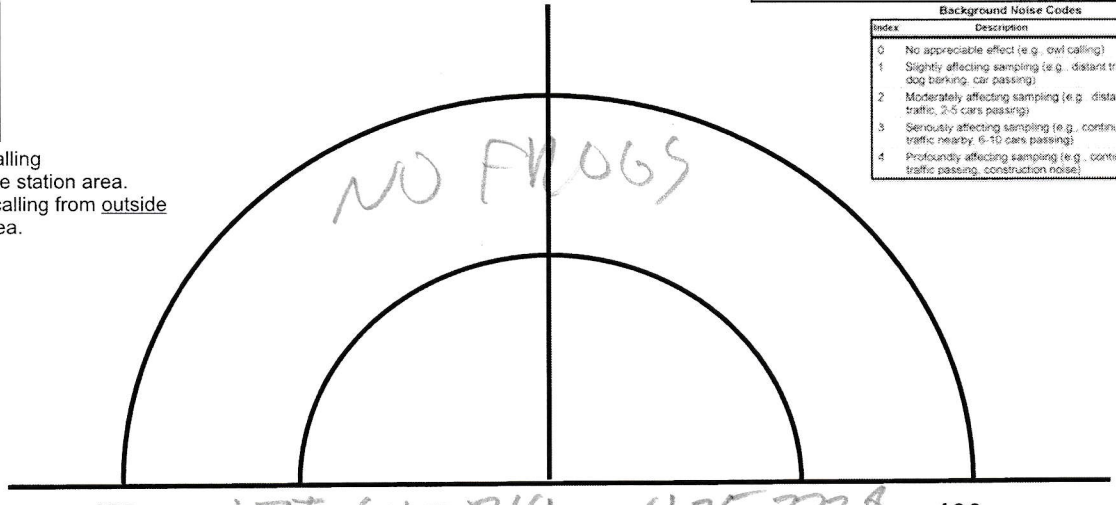
S

Station Start Time (24 hr): 9:32

Background Noise Code (1-4): 1

Background Noise Codes

Index	Description
0	No appreciable effect (e.g., owl calling)
1	Slightly affecting sampling (e.g., distant traffic, dog barking, car passing)
2	Moderately affecting sampling (e.g., distant traffic, 2-5 cars passing)
3	Seriously affecting sampling (e.g., continuous traffic nearby, 6-10 cars passing)
4	Profoundly affecting sampling (e.g., continuous traffic passing, construction noise)



Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

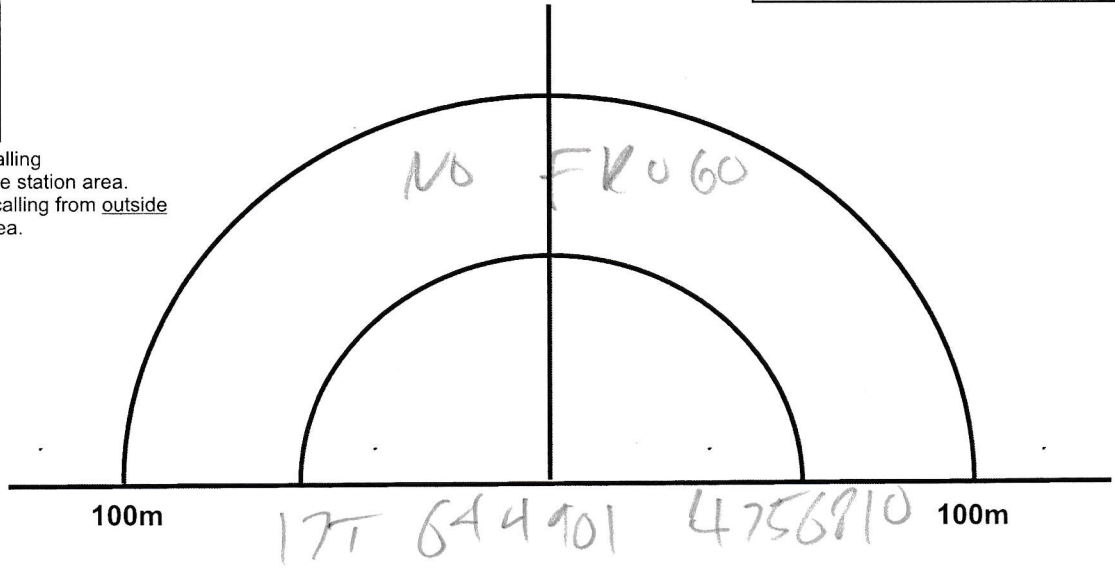
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station: ~~01~~

W

Station Start Time (24 hr): 10:02

Background Noise Code (1-4): 1



AMPHIBIAN MONITORING FIELD SHEET

Project: 53689-101 Port Colborne
Date: May 29 2024 Project Manager: HR
Collector(s): VS AA Visit #:

WEATHER CONDITIONS					
Temp.	Wind: <8KM		Cloud Cover (%)	Precipitation	
13	Direction: W		10	☒ None/Dry ☐ Drizzle ☐ Damp/Fog ☐ Rain	

	WIND SCALE
0	Calm
1	Smoke Drifts
2	Wind Felt on Face
3	Leaves in constant motion
4	Wind raises dust and paper

CALL LEVEL CODES

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

Reference Site: ☐ No ☐ Yes UTM

Station: 2

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

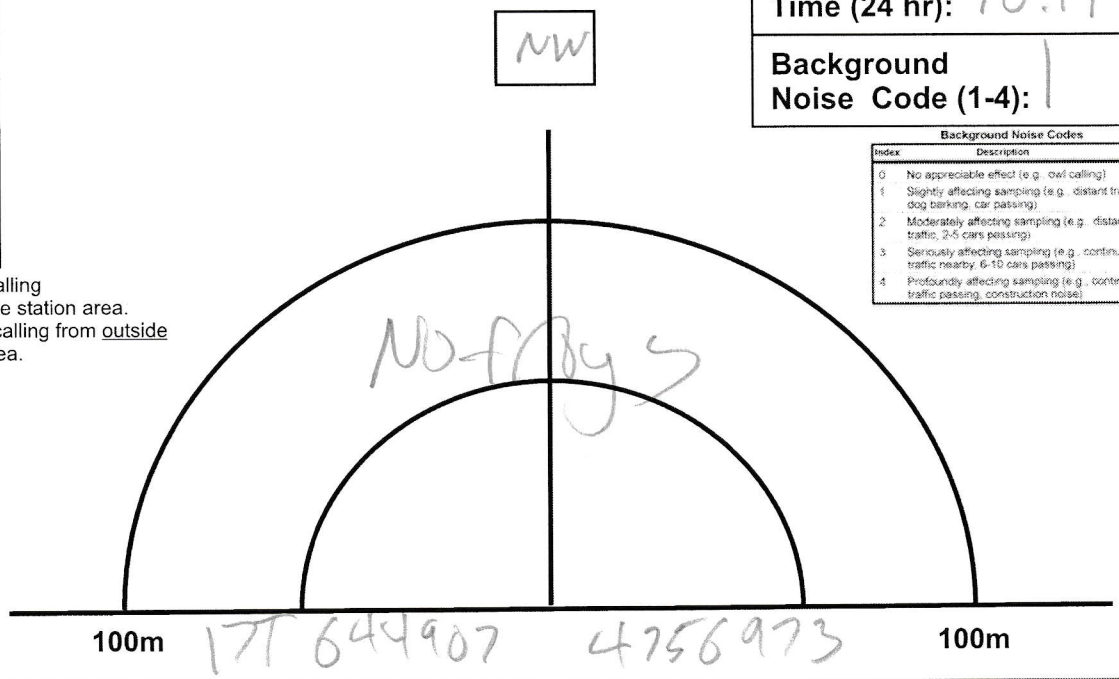
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station Start Time (24 hr): 10:11

Background Noise Code (1-4): 1

Background Noise Codes

Index	Description
0	No appreciable effect (e.g., owl calling)
1	Slightly affecting sampling (e.g., distant traffic, dog barking, car passing)
2	Moderately affecting sampling (e.g., distant traffic, 2-5 cars passing)
3	Seriously affecting sampling (e.g., continuous traffic nearby, 6-10 cars passing)
4	Profoundly affecting sampling (e.g., continuous traffic passing, construction noise)



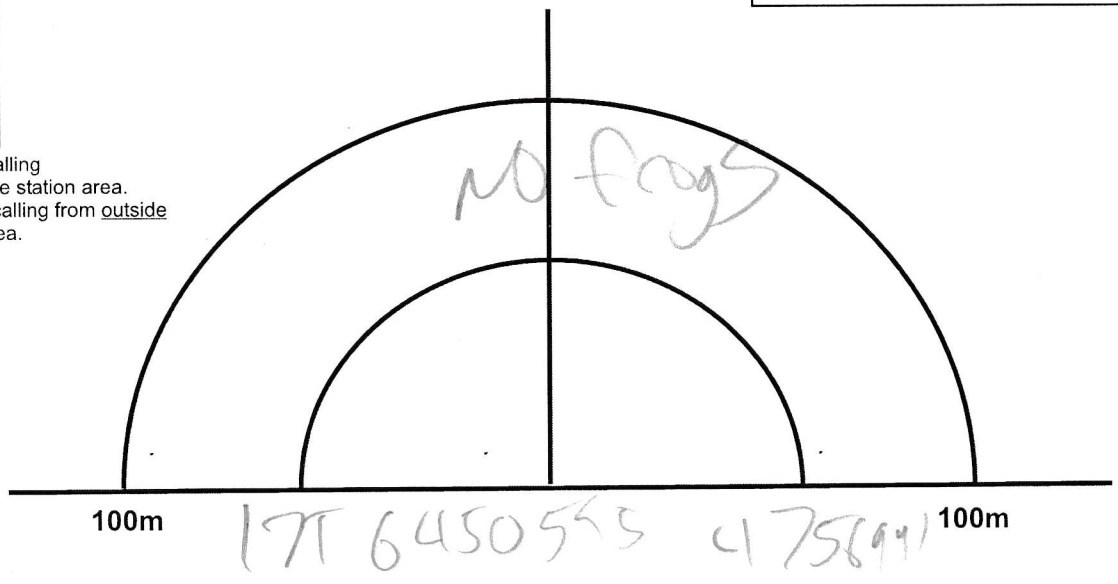
Station: 3

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station Start Time (24 hr): 10:17

Background Noise Code (1-4): 1



AMPHIBIAN MONITORING FIELD SHEET

Project: 53689-101 Port Colborne
Date: May 29 - 2024 Project Manager: HK
Collector(s): VS AA Visit #:

WEATHER CONDITIONS					
Temp.	Wind: <3km		Cloud Cover (%)	Precipitation	
13	Direction: W		10	☐ None/Dry ☐ Drizzle ☐ Damp/Fog ☐ Rain	

	WIND SCALE
0	Calm
1	Smoke Drifts
2	Wind Felt on Face
3	Leaves in constant motion
4	Wind raises dust and paper

CALL LEVEL CODES

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

Reference Site: ☐ No ☐ Yes UTM

Station: 4

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

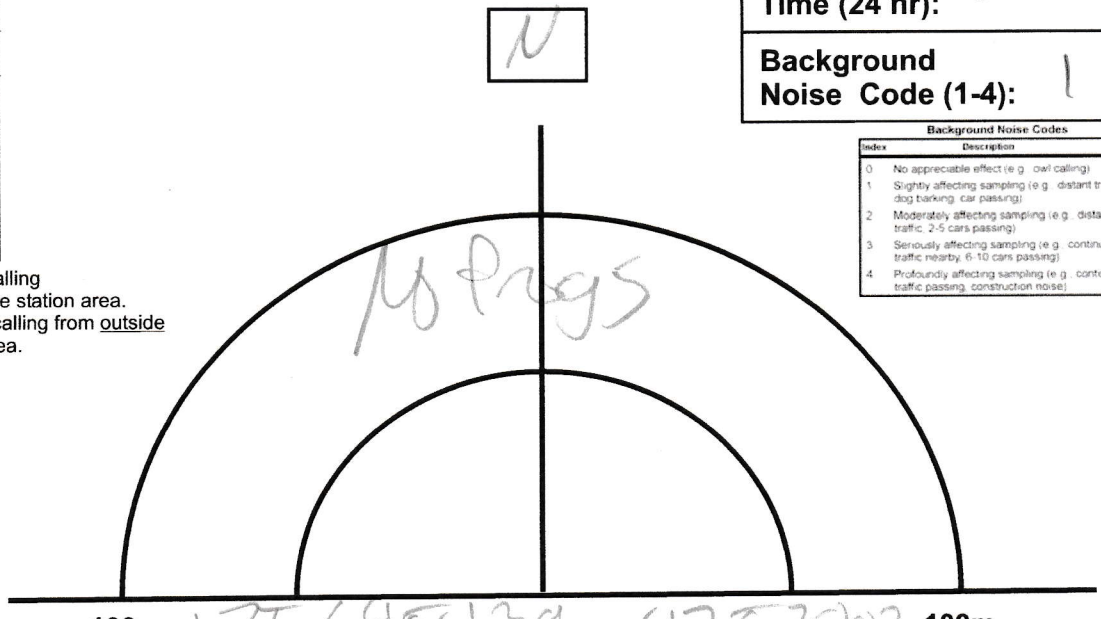
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station Start Time (24 hr): 10:27

Background Noise Code (1-4): 1

Background Noise Codes

Index	Description
0	No appreciable effect (e.g., owl calling)
1	Slightly affecting sampling (e.g., distant traffic, dog barking, car passing)
2	Moderately affecting sampling (e.g., distant traffic, 2-5 cars passing)
3	Seriously affecting sampling (e.g., continuous traffic nearby, 6-10 cars passing)
4	Profoundly affecting sampling (e.g., continuous traffic passing, construction noise)



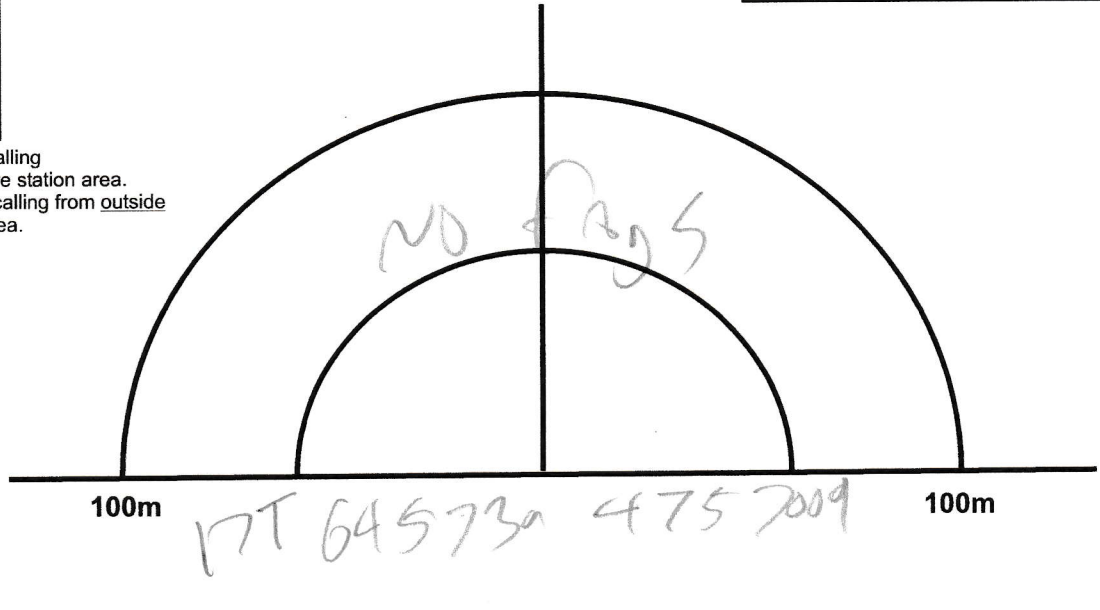
Station: 5

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station Start Time (24 hr): 10:35

Background Noise Code (1-4): 1



AMPHIBIAN MONITORING FIELD SHEET

Project: 53689-101 Port Colborne
Date: May 29 2024 Project Manager: HK
Collector(s): VS AA Visit #:

WEATHER CONDITIONS					
Temp.	Wind: 23 Km		Cloud Cover (%)	Precipitation	
13	Direction: W		10	☒ None/Dry ☐ Drizzle ☐ Damp/Fog ☐ Rain	

WIND SCALE	
0	Calm
1	Smoke Drifts
2	Wind Felt on Face
3	Leaves in constant motion
4	Wind raises dust and paper

CALL LEVEL CODES

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

Reference Site: ☐ No ☐ Yes UTM

Station: 6

S E

Station Start Time (24 hr): 10:41

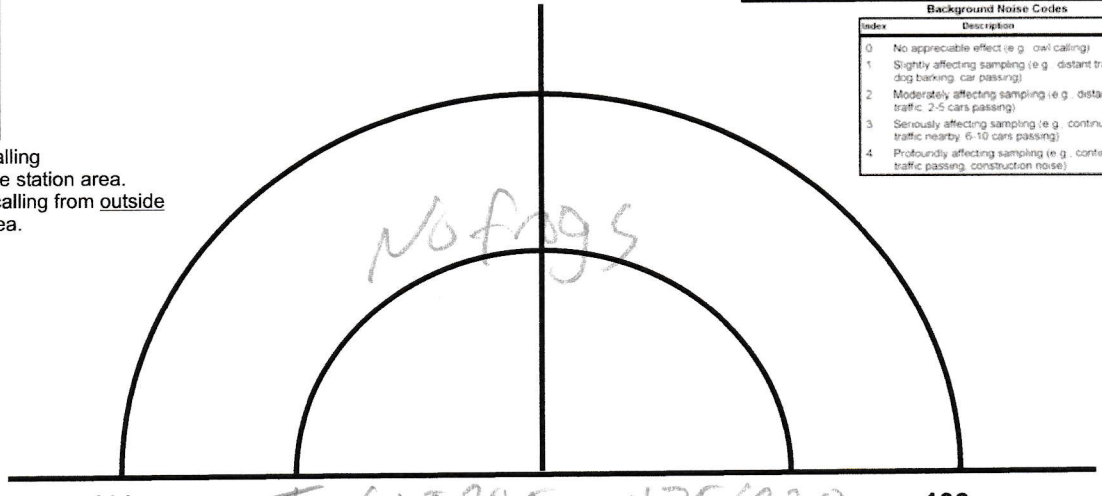
Background Noise Code (1-4): 1

Background Noise Codes

Index	Description
0	No appreciable effect (e.g., owl calling)
1	Slightly affecting sampling (e.g., distant traffic, dog barking, car passing)
2	Moderately affecting sampling (e.g., distant traffic, 2-5 cars passing)
3	Seriously affecting sampling (e.g., continuous traffic nearby, 6-10 cars passing)
4	Profoundly affecting sampling (e.g., continuous traffic passing, construction noise)

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.



UTM 645845 4756980

Station: 7

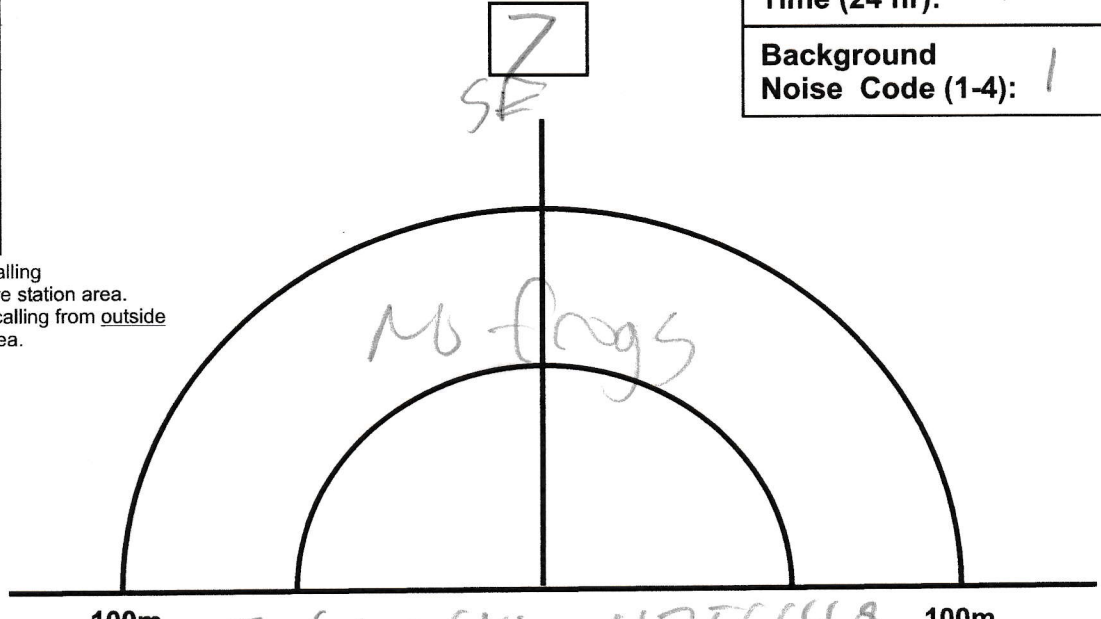
S E

Station Start Time (24 hr): 10:51

Background Noise Code (1-4): 1

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.



UTM 645614 4756148

AMPHIBIAN MONITORING FIELD SHEET

Project: 53689-101 Port Colborne
Date: May 29 2024 Project Manager: AK
Collector(s): VS AA Visit #:

WEATHER CONDITIONS					
Temp.	Wind: <3KM		Cloud Cover (%)	Precipitation	
13	Direction: W		10	☐ None/Dry ☐ Drizzle ☐ Damp/Fog ☐ Rain	

	WIND SCALE
0	Calm
1	Smoke Drifts
2	Wind Felt on Face
3	Leaves in constant motion
4	Wind raises dust and paper

CALL LEVEL CODES

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

Reference Site: ☐ No ☐ Yes UTM

Station: 8

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

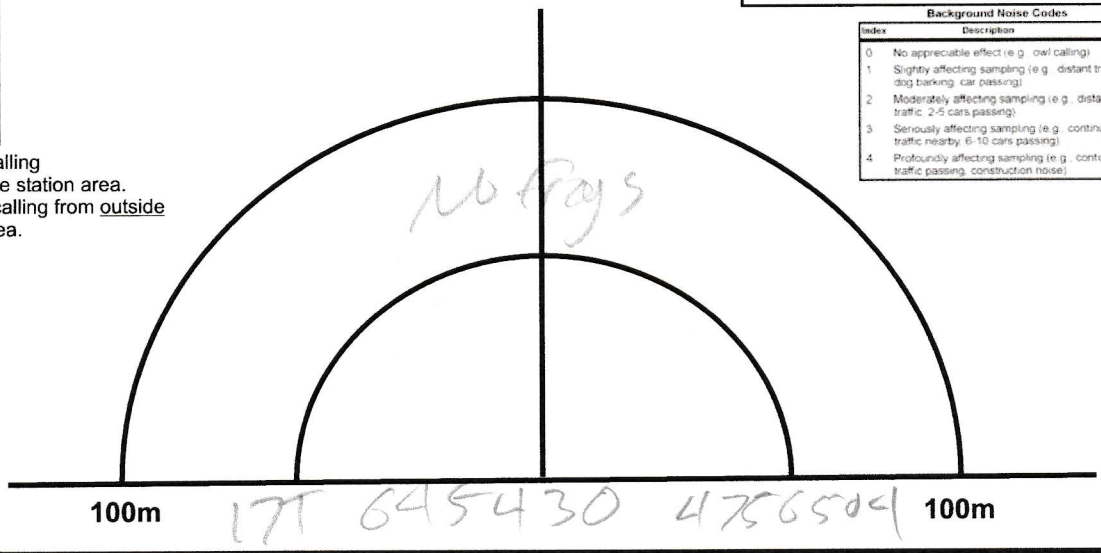
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station Start Time (24 hr): 11:02

Background Noise Code (1-4): 1

Background Noise Codes

Index	Description
0	No appreciable effect (e.g., owl calling)
1	Slightly affecting sampling (e.g., distant traffic, dog barking, car passing)
2	Moderately affecting sampling (e.g., distant traffic, 2-5 cars passing)
3	Seriously affecting sampling (e.g., continuous traffic nearby, 6-10 cars passing)
4	Profoundly affecting sampling (e.g., continuous traffic passing, construction noise)



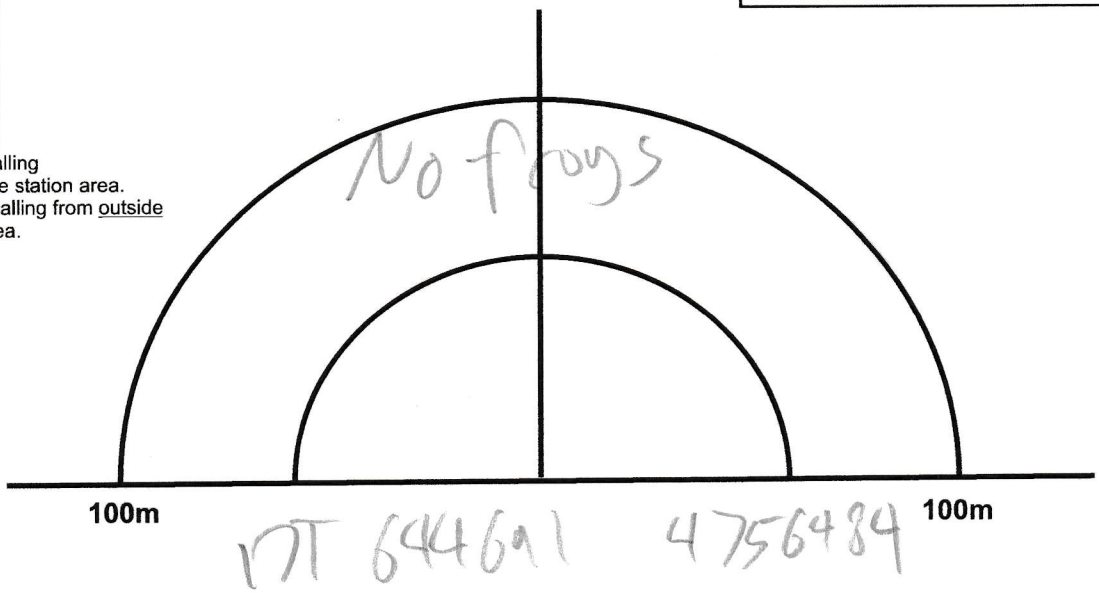
Station: 9

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station Start Time (24 hr): 11:10

Background Noise Code (1-4): 1



53689-101

AMPHIBIAN MONITORING FIELD SHEET

Project: Port Colborne
Date: May 29 2024
Collector(s): VS AA
Project Manager: HK
Visit #:

WEATHER CONDITIONS					
Temp.	Wind:		Cloud Cover (%)	Precipitation	
17	Direction: 9km W		15	☒ None/Dry ☐ Drizzle ☐ Damp/Fog ☐ Rain	

	WIND SCALE
0	Calm
1	Smoke Drifts
2	Wind Felt on Face
3	Leaves in constant motion
4	Wind raises dust and paper

CALL LEVEL CODES

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

Reference Site: ☐ No ☐ Yes UTM

Station: 12

175°

S

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

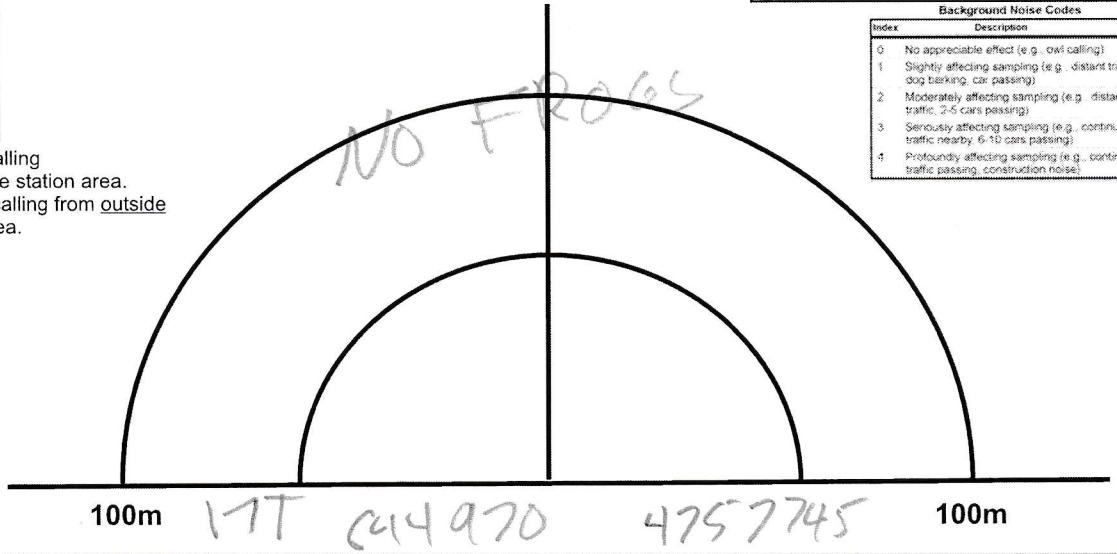
* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station Start Time (24 hr): 9:14 PM

Background Noise Code (1-4): 1

Background Noise Codes

Index	Description
0	No appreciable effect (e.g., owl calling)
1	Slightly affecting sampling (e.g., distant traffic, dog barking, car passing)
2	Moderately affecting sampling (e.g., distant traffic, 2-5 cars passing)
3	Seriously affecting sampling (e.g., continuous traffic nearby, 6-10 cars passing)
4	Profoundly affecting sampling (e.g., continuous traffic passing, construction noise)



17T 614970 4757745

Station: 11

175°

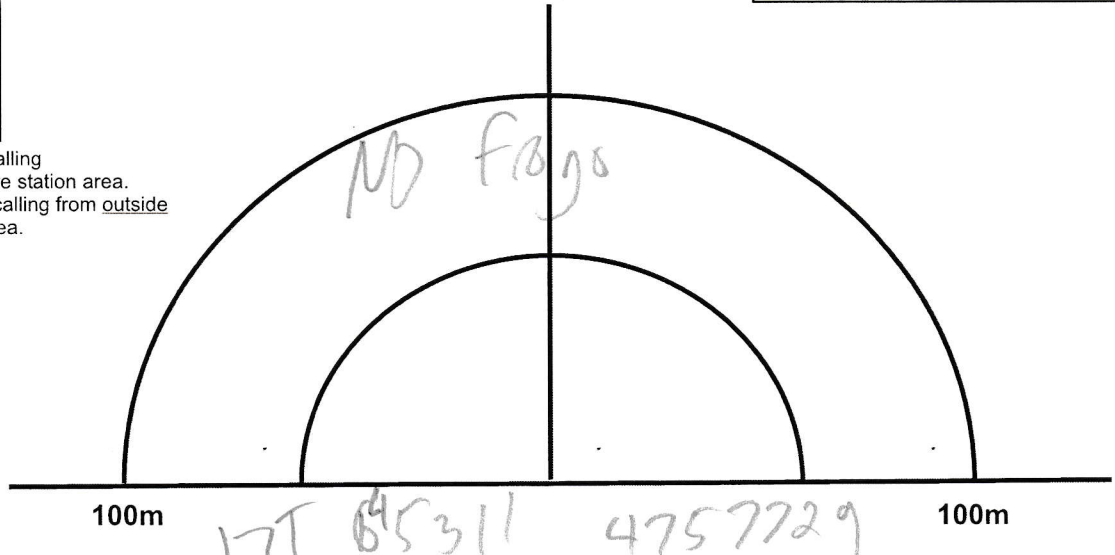
S

Species	In*	Out**
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		
WOFR		

* Check if species is calling from inside 100-metre station area.
** Check if species is calling from outside 100-metre station area.

Station Start Time (24 hr): 9:22

Background Noise Code (1-4): 1



17T 615311 4757729

Port Colborne HDFA

Visit 1

H3

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 20240416 Project #: Port Colborne Recorder/Crew: VS + EP

Stream Name: Stream Code: Site Code: H3 (Upstream) Point 1

Site Limits: ~~Upstream~~ 17 WP# 616149 E Field Assessment: ☑ Sample 1 Unconnected HDF: 1

~~Downstream~~ WP# 4757771 N ☐ Sample 2 ☐ Not connected to downstream network

Direction of Assessment: ☐ Upstream → ☐ Downstream ☐ Sample 3

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☑ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☐ Defined Natural Channel (1) ☐ No Defined Feature (4) ☑ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☑ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☑ Wetland(6) ☐ Forest (7)
(Willow sp. / phrag)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☑ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☑ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☑ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☑ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 5 Elevation (cm): Gradient (°): 1

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☑ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☑ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 530 Bankfull Depth (mm) 4.6

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank m Right Bank m Total width m

Surface Flow Method ☐ Perched Culvert (1) ☑ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
1.6	35 28 40	0 0 0			

No Flow

Sediment Transport

Adjacent ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024/04/10 Project #: Port Colborne Field Assessment: ☒ Sample # 1 ☐ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# ~ Perched Height (mm): ~ Jumping Height (mm): ~
WP# ~ Perched Height (mm): ~ Jumping Height (mm): ~

Groundwater Indicators ☒ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other: ~

Fish Collection ☐ Absent ☐ Present Comment: ~

WP#	Photo #	Code	Category	Description

Additional Notes:

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☒ Feature Vegetation ☐ Riparian Vegetation

Trigger ☐ Other: Comments

Point Data Category: Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B Seepage area - measure or estimate length of bank where seepage occurs
C Watercress - estimate total surface area occupied
D Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F Beaver dam - measure perched height and jumping height
G Manmade dam - measure perched height and jumping height
H Other barrier to fish movement
I Potential contamination source (storm sewer outlet or industrial discharge pipe).
J Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O Fish observed during non-fish sampling activities
P Potential nutrient source
Q Dredging of channel
R Offline pond
S Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024/04/16 Project #: Port Colborne Recorder/Crew: VS + ER

Stream Name: Stream Code: Site Code: H3 Point 2

Site Limits: ~~Upstream~~ ~~Downstream~~ 17T WP# 645639E WP# 4775721N Field Assessment: ☒ Sample 1 ☐ Sample 2 ☐ Sample 3 Unconnected HDF: ☐ Not connected to downstream network

Direction of Assessment: ☒ Upstream → ☐ Downstream

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☒ Baseflow (3)

Flow Condition ☐ Dry (1) ☒ Standing Water (2) ☐ Interstitial Flow (3) ☐ Minimal Flow (4) ☐ Substantial Flow (5)

Feature Type ☐ Defined Natural Channel (1) ☐ Channelized or Constrained (2) ☐ Multi-thread (3) ☐ No Defined Feature (4) ☐ Tiled Feature (5) ☐ Wetland (6) ☒ Swale (7) ☐ Roadside Ditch (8) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☒ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☒ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☒ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☒ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☒ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☒ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☒ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☒ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 5 Elevation (cm): Gradient (%): 1

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☒	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☒	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☒ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☒ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 5.5m Bankfull Depth (mm): 960 mm

Entrenchment Total: ☐ >40 m ☒ <40 m Left Bank m Right Bank m Total width m

Surface Flow Method ☐ Perched Culvert (1) ☒ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
1.8	170 155 165	0 0 0			

NO FLOW

Sediment Transport

Adjacent ☒ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☒ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☒ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024/04/16 Project #: Port Colborne Field Assessment: ☑ Sample # 1 ☐ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# — Perched Height (mm): — Jumping Height (mm): —
WP# — Perched Height (mm): — Jumping Height (mm): —

Groundwater Indicators: ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:
Fish Collection: ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Confluence w H3 - S3 Feature

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☑ Feature Vegetation ☐ Riparian Vegetation
Trigger ☐ Other: Comments

Point Data Category: Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B Seepage area - measure or estimate length of bank where seepage occurs
C Watercress - estimate total surface area occupied
D Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F Beaver dam - measure perched height and jumping height
G Manmade dam - measure perched height and jumping height
H Other barrier to fish movement
I Potential contamination source (storm sewer outlet or industrial discharge pipe).
J Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O Fish observed during non-fish sampling activities
P Potential nutrient source
Q Dredging of channel
R Offline pond
S Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024/04/16 Project # Port Colborne Recorder/Crew: VS + ER

Stream Name: Stream Code Site Code: H3 Point 3

Site Limits: Upstream WP# 645481E

Downstream WP# 4757718 N

Field Assessment: ☑ Sample 1 ☐ Sample 2 ☐ Sample 3

Unconnected HDF: ☐ Not connected to downstream network

Direction of Assessment: ☑ Upstream → ☐ Downstream

Flow Influence
☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition
☐ Dry (1) ☑ Interstitial Flow (3) ☐ Substantial Flow (5)
☐ Standing Water (2) ☐ Minimal Flow (4)

Feature Type
☐ Defined Natural Channel (1) ☐ No Defined Feature (4) ☐ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☑ Wetland (6) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☑ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☑ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☑ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☑ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 5 — — Elevation (cm): — — — Gradient (%): 1

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☑ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☑ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 5.9 Bankfull Depth (mm) 1280

Entrenchment Total: ☐ >40 m ☐ <40 m Left Bank m Right Bank m Total width m

Surface Flow Method ☐ Perched Culvert (1) ☑ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
1.7	160 151 139	0 0 0 No Flow	—	—	—

Sediment Transport

Adjacent ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☐ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm): — — — — —

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024/04/16 Project #: Port Colburne Field Assessment: ☑ Sample # 1 ☐ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# — Perched Height (mm) — Jumping Height (mm) —
WP# — Perched Height (mm) — Jumping Height (mm) —

Groundwater Indicators: ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection: ☑ Absent ☐ Present Comment —

WP#	Photo #	Code	Category	Description

Additional Notes:

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☑ Feature Vegetation ☐ Riparian Vegetation

Trigger ☐ Other: Comments

Point Data Category: Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 20240411 Project #: Port Colborne Recorder/Crew: VS + ER

Stream Name: Stream Code: Site Code: HS Point 4

Site Limits: ~~Upstream~~ WP# 641774E Field Assessment: ☒ Sample 1 Unconnected HDF:

~~Downstream~~ ITT WP# 4757748 ☐ Sample 2 ☐ Not connected to

Direction of Assessment: ☒ Upstream → ☐ Downstream ☐ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☒ Baseflow (3)

Flow Condition ☐ Dry (1) ☒ Interstitial Flow (3) ☐ Substantial Flow (5)
☐ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☐ Defined Natural Channel (1) ☐ No Defined Feature (4) ☒ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☒ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☒ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☒ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☒ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☒ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☒ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☒ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☒ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 5 Elevation (cm) : Gradient (%): 1

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☒	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☒	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☒ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☒ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 7.8 Bankfull Depth (mm) 1.34

Entrenchment Total: ☐ >40 m ☒ <40 m Left Bank m Right Bank m Total width m

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☒ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
1.47	132 130 156			1 1 1	7.1 6.2 6.5

Sediment Transport

Adjacent ☒ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☒ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☒ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Pg. 2 of 2

Date: yyyy/mm/dd 2024/04/16 Project #: Port colborne Field Assessment: ☑ Sample # 1 ☐ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements WP# — Perched Height (mm) Jumping Height (mm)
WP# — Perched Height (mm) Jumping Height (mm)

Groundwater Indicators ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

- Tire track disturbance straight through feature from ATV use

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☑ Feature Vegetation ☐ Riparian Vegetation

Trigger ☐ Other: Comments

Point Data	Ongoing and Active (1)	Historic Evidence (2)	Reported but No Evidence (3)
Category	No Evidence (4)	Unknown (5)	

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 20240416 Project #: Port Colborne Recorder/Crew: VS + EP

Stream Name: Stream Code Site Code: H3 (Downstream) Pond

Site Limits: Upstream 17 WP# 649627 E Field Assessment: ☑ Sample 1 Unconnected HDF: 5

Downstream WP# 4757740 N ☐ Sample 2 ☐ Not connected to downstream network

Direction of Assessment: ☑ Upstream → ☐ Downstream ☐ Sample 3

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☐ Standing Water (2) ☑ Minimal Flow (4)

Feature Type ☐ Defined Natural Channel (1) ☐ No Defined Feature (4) ☑ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☑ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☑ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☑ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☑ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☑ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☑ Forest (7)
	Right Bank	☑ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☑ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 5 Elevation (cm) : Gradient (%): 1

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☑ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☑ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 6.2 Bankfull Depth (mm): 1025

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank m Right Bank m Total width m

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm)	Hydraulic head (mm)	Volume (L)	Distance (m)	Time (s)
	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3
1.8	60 58 55			1 1 1	6.9 5.7 8.2

Sediment Transport

Adjacent ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Date: yyyy/mm/dd | Project #: | Unconstrained Headwater Drainage Feature Assessment | Pg. 2 of 2

Field Assessment: ☑ Sample # 1 ☐ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# | Perched Height (mm): | Jumping Height (mm):
WP# | Perched Height (mm): | Jumping Height (mm):

Groundwater Indicators: ☐ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection: ☐ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

- Flow through Culvert that connects directly to the Wetland Canal.

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☐ Feature Vegetation ☐ Riparian Vegetation

Trigger ☑ Other: Comments: Downstream Point

Point Data Category: Ongoing and Active (1) | Historic Evidence (2) | Reported but No Evidence (3) | No Evidence (4) | Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Port Colborne HDFA

Visit 1

H2S1

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 20240416 Project #: Port Colborne Recorder/Crew: VS + ER

Stream Name: Stream Code: Site Code: H251 (Upstream) Point 1

Site Limits: Upstream WP# 644880 E Field Assessment: ☐ Sample 1 Unconnected HDF: 1

Downstream WP# 4756504 N ☐ Sample 2 ☐ Not connected to

Direction of Assessment: ☑ Upstream → ☐ Downstream ☐ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☑ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☐ Defined Natural Channel (1) ☐ No Defined Feature (4) ☑ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☑ Meadow (4) (Phragmites) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☑ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☑ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☑ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 5 Elevation (cm) : Gradient (°): 1°

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☐	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☐	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☑ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☑ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 2.3 Bankfull Depth (mm) 530

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank m Right Bank m Total width m

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
1.0	54 55 40	0 0 0			

NO Flow

Sediment Transport

Adjacent ☐ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☐ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☐ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2018/04/16 Project #: Port Colborne Field Assessment: ☑ Sample # 1 ☐ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# — Perched Height (mm): Jumping Height (mm):
WP# — Perched Height (mm): Jumping Height (mm):

Groundwater Indicators: ☐ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection: ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☑ Feature Vegetation ☐ Riparian Vegetation

Trigger ☐ Other: Comments

Point Data Category: Ongoing and Active (1); Historic Evidence (2); Reported but No Evidence (3); No Evidence (4); Unknown (5)

POINT DATA KEY:

A Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B Seepage area - measure or estimate length of bank where seepage occurs
C Watercress - estimate total surface area occupied
D Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F Beaver dam - measure perched height and jumping height
G Manmade dam - measure perched height and jumping height
H Other barrier to fish movement
I Potential contamination source (storm sewer outlet or industrial discharge pipe).
J Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O Fish observed during non-fish sampling activities
P Potential nutrient source
Q Dredging of channel
R Offline pond
S Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024/04/16 Project #: Point Colborne Recorder/Crew: VS + ER

Stream Name: Stream Code: Site Code: 17251 - Point 2

Site Limits: Upstream 17 WP# 644720 E Field Assessment: ☑ Sample 1 Unconnected HDF:

Downstream WP# 4756497 N ☐ Sample 2 ☐ Not connected to

Direction of Assessment: ☑ Upstream → ☐ Downstream ☐ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☑ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☑ Defined Natural Channel (1) ☐ No Defined Feature (4) ☐ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☑ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☑ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☑ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 5 — — Elevation (cm): — — — Gradient (°): —

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☑ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☑ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 2.3 Bankfull Depth (mm) 460

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank — m Right Bank — m Total width — m

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
1.9	133 125 145	0 0 0	—	—	—
		No Flow			

Sediment Transport

Adjacent ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm): — — — — —

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd | Project #: | Field Assessment: ☐ Sample # 1 ☐ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# | Perched Height (mm): | Jumping Height (mm):
WP# | Perched Height (mm): | Jumping Height (mm):

Groundwater Indicators: ☐ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection: ☐ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

- Drainage Culvert that crosses Forker Rd located at 17T 644513mE 4756481mN

Site Break Trigger: ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☒ Feature Vegetation ☐ Riparian Vegetation
☐ Other: Comments

Point Data Category: Ongoing and Active (1) | Historic Evidence (2) | Reported but No Evidence (3) | No Evidence (4) | Unknown (5)

POINT DATA KEY:

A Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B Seepage area - measure or estimate length of bank where seepage occurs
C Watercress - estimate total surface area occupied
D Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F Beaver dam - measure perched height and jumping height
G Manmade dam - measure perched height and jumping height
H Other barrier to fish movement
I Potential contamination source (storm sewer outlet or industrial discharge pipe).
J Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O Fish observed during non-fish sampling activities
P Potential nutrient source
Q Dredging of channel
R Offline pond
S Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2016/04/16 Project #: Port Colborne Recorder/Crew: VS + EB

Stream Name: Stream Code: Site Code: HZ51 Point 3

Site Limits: Upstream 17 WP# 644420 E Field Assessment: ☑ Sample 1 Unconnected HDF:

Downstream WP# 4756482 N ☐ Sample 2 ☐ Not connected to

Direction of Assessment: ☑ Upstream → ☐ Downstream ☐ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☑ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☐ Defined Natural Channel (1) ☐ No Defined Feature (4) ☐ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☑ Wetland (6) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☑ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☑ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☑ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 5 Elevation (cm): Gradient (%): 1

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☑ > 60% Extreme (4)

Width Measurement ☑ Can't Measure (1) ☐ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): -99 Not safe to measure Bankfull Depth (mm) 680

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank m Right Bank m Total width m

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
-99	170 80 190	Can't measure safely			

Not Safe to measure

Sediment Transport

Adjacent ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Date: yyyy/mm/dd 2024 09 16 Project #: Port Colborne

Unconstrained Headwater Drainage Feature Assessment

Field Assessment: ☐ Sample # 1 ☐ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# — Perched Height (mm): Jumping Height (mm):
WP# — Perched Height (mm): Jumping Height (mm):

Groundwater Indicators: ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection: ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☑ Feature Vegetation ☐ Riparian Vegetation

Trigger ☐ Other: Comments

Point Data Category: Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B Seepage area - measure or estimate length of bank where seepage occurs
C Watercress - estimate total surface area occupied
D Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F Beaver dam - measure perched height and jumping height
G Manmade dam - measure perched height and jumping height
H Other barrier to fish movement
I Potential contamination source (storm sewer outlet or industrial discharge pipe).
J Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O Fish observed during non-fish sampling activities
P Potential nutrient source
Q Dredging of channel
R Offline pond
S Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 20240416 Project #: Recorder/Crew: VS + ED

Stream Name: Stream Code: Site Code: H251 (downstream Point

Site Limits: Upstream WP# 644362 E Field Assessment: ☑ Sample 1 Unconnected HDF: 4

Downstream WP# 475648 N ☐ Sample 2 ☐ Not connected to

Direction of Assessment: ☐ Upstream ☐ Downstream ☐ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☐ Standing Water (2) ☑ Minimal Flow (4)

Feature Type ☑ Defined Natural Channel (1) ☐ No Defined Feature (4) ☐ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☑ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☑ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 5 — — Elevation (cm): — — — Gradient (°): 2

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☑ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☑ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 3 Bankfull Depth (mm) 390

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank — m Right Bank — m Total width — m

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
1.5	95 150 90	1 10 10	—	—	—

Sediment Transport

Adjacent ☐ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm): — — — — —

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Date: yyyy/mm/dd | Project #: | Field Assessment: ☑ Sample # 1 ☐ Sample # 2 ☐ Sample # 3

Unconstrained Headwater Drainage Feature Assessment

POINT FEATURE DATA

Fish Barrier Measurements: WP# | Perched Height (mm): | Jumping Height (mm):
WP# | Perched Height (mm): | Jumping Height (mm):

Groundwater Indicators: ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection: ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

- Downstream point at Confluence w Linn Creek Drain

Site Break ☐ Feature Type ☑ Feature Modifier ☐ Flow Conditions ☐ Feature Vegetation ☐ Riparian Vegetation

Trigger ☐ Other: Comments

Point Data Category: Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Port Colborne HDFA

Visit 1

H253

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024/04/16 Project #: Port Colborne Recorder/Crew: VS + EB

Stream Name: Stream Code: Site Code: H253 (Upstream) Paint 1

Site Limits: Upstream 17 WP# 645220 E Field Assessment: ☑ Sample 1 Unconnected HDF:

Downstream WP# 4756856 N ☐ Sample 2 ☐ Not connected to

Direction of Assessment: ☑ Upstream → ☐ Downstream ☐ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☑ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☐ Defined Natural Channel (1) ☐ No Defined Feature (4) ☑ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☑ Wetland(6) ☐ Forest (7)
Phrag

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☑ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 5 Elevation (cm): Gradient (°): 1

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☐	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☐	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☑ > 60% Extreme (4)

Width Measurement ☑ Can't Measure (1) ☐ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): Bankfull Depth (mm):

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank m Right Bank m Total width m

Surface Flow Method ☐ Perched Culvert (1) ☑ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm)	Hydraulic head (mm)	Volume (L)	Distance (m)	Time (s)
	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3
445	45 50 51	0 0 0			

Sediment Transport

Adjacent ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☑ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☐ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 20240416 Project #: Port Colborne Field Assessment: ☑ Sample # 1 ☐ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# ____ Perched Height (mm): ____ Jumping Height (mm): ____
WP# ____ Perched Height (mm): ____ Jumping Height (mm): ____

Groundwater Indicators ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other: ____

Fish Collection ☑ Absent ☐ Present Comment: ____

WP#	Photo #	Code	Category	Description

Additional Notes:

Site Break Trigger ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☐ Feature Vegetation ☐ Riparian Vegetation ☑ Other: Comments Upstream Point

Point Data Category: Ongoing and Active (1); Historic Evidence (2); Reported but No Evidence (3); No Evidence (4); Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024/04/10 Project #: Port Colborne Recorder/Crew: VS + ER

Stream Name: Stream Code: Site Code: H253 (Downstream Point

Site Limits: Upstream 17 WP# 695023 E Field Assessment: ☑ Sample 1 Unconnected HDF: 2

Downstream WP# 4756994 N ☐ Sample 2 ☐ Not connected to

Direction of Assessment: ☑ Upstream → ☐ Downstream ☐ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☑ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☐ Defined Natural Channel (1) ☑ No Defined Feature (4) ☐ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☑ Scrubland (5) ☑ Wetland(6) ☐ Forest (7)

Riparian Vegetation Both (Phrag + Willow sp.)

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☑ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 5 Elevation (cm) : Gradient (°): 1

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☑ > 60% Extreme (4)

Width Measurement ☑ Can't Measure (1) ☐ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): Bankfull Depth (mm)

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank m Right Bank m Total width m

Surface Flow Method ☐ Perched Culvert (1) ☑ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm)	Hydraulic head (mm)	Volume (L)	Distance (m)	Time (s)
	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3
1.5	10 & 10	0 0 0			
		No Flow			

Sediment Transport

Adjacent ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024/04/16 Project #: Port Colborne Field Assessment: ☑ Sample # 1 ☐ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# ____ Perched Height (mm): ____ Jumping Height (mm): ____

WP# ____ Perched Height (mm): ____ Jumping Height (mm): ____

Groundwater Indicators ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other: ____

Fish Collection ☑ Absent ☐ Present Comment: ____

WP#	Photo #	Code	Category	Description

Additional Notes:

Site Break ☐ Feature Type ☑ Feature Modifier ☐ Flow Conditions ☐ Feature Vegetation ☐ Riparian Vegetation

Trigger ☑ Other: Comments Downstream Point

Point Data Category	Ongoing and Active (1)	Historic Evidence (2)	Reported but No Evidence (3)
	No Evidence (4)	Unknown (5)	

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Port Colborne HDFA

Visit 1

H2S2

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024/04/16 Project #: Port Colborne Recorder/Crew: VS ; ER

Stream Name: Stream Code: Site Code: H252 Point 1 (Upstream)

Site Limits: Upstream WP# 647851 E Field Assessment: ☐ Sample 1 Unconnected HDF:

Downstream 17 WP# 647698 N ☐ Sample 2 ☐ Not connected to

☐ Sample 3 downstream network

Direction of Assessment: ☐ Upstream ☑ Downstream

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☑ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☐ Defined Natural Channel (1) ☑ No Defined Feature (4) ☐ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☑ Wetland (6) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☑ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☑ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☑ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☑ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☑ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☑ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 5 Elevation (cm): Gradient (°): 1°

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☐	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☐	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☑ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☐ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): Bankfull Depth (mm):

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank m Right Bank m Total width m

Surface Flow Method ☐ Perched Culvert (1) ☑ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
21.3	45 50 60	0 0 0			

Sediment Transport

Adjacent ☐ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☐ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024/04/16 Project #: Port Colborne Field Assessment: ☑ Sample # 1 ☐ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# — Perched Height (mm): Jumping Height (mm):
WP# — Perched Height (mm): Jumping Height (mm):

Groundwater Indicators: ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection: ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

- Upstream feature fed by phragmites patch

Site Break: ☑ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☐ Feature Vegetation ☐ Riparian Vegetation

Trigger: ☐ Other: Comments:

Point Data Category: Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B Seepage area - measure or estimate length of bank where seepage occurs
C Watercress - estimate total surface area occupied
D Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F Beaver dam - measure perched height and jumping height
G Manmade dam - measure perched height and jumping height
H Other barrier to fish movement
I Potential contamination source (storm sewer outlet or industrial discharge pipe).
J Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O Fish observed during non-fish sampling activities
P Potential nutrient source
Q Dredging of channel
R Offline pond
S Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024/04/16 Project #: Port Colborne Recorder/Crew: VS + ER

Stream Name: Stream Code: Site Code: HZ52 Point 2

Site Limits: Upstream WP# Downstream WP# Field Assessment: ☐ Sample 1 ☐ Sample 2 ☐ Sample 3 Unconnected HDF: ☐ Not connected to downstream network

Direction of Assessment: ☐ Upstream ☐ Downstream

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☑ Standing Water (2) ☐ Interstitial Flow (3) ☐ Minimal Flow (4) ☐ Substantial Flow (5)

Feature Type ☐ Defined Natural Channel (1) ☐ Channelized or Constrained (2) ☐ Multi-thread (3) ☑ No Defined Feature (4) ☐ Tiled Feature (5) ☐ Wetland (6) ☐ Swale (7) ☐ Roadside Ditch (8) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☑ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☑ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 5 — — — Elevation (cm): — — — Gradient (%): 1

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☑ > 60% Extreme (4)

Width Measurement ☑ Can't Measure (1) ☐ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): — Bankfull Depth (mm): —

Entrenchment Total: ☐ >40 m ☐ <40 m Left Bank m Right Bank m Total width m

Surface Flow Method ☐ Perched Culvert (1) ☑ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
5	20 30 25	0 0 0	—	—	—

standing water

Sediment Transport

Adjacent ☐ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☐ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm): — — — — —

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024/04/16 Project #: Port Colborne Field Assessment: ☑ Sample # 1 ☐ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# — Perched Height (mm): Jumping Height (mm):
WP# — Perched Height (mm): Jumping Height (mm):

Groundwater Indicators ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:
Fish Collection ☐ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☑ Feature Vegetation ☐ Riparian Vegetation
Trigger ☐ Other: Comments

Point Data Category: Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B Seepage area - measure or estimate length of bank where seepage occurs
C Watercress - estimate total surface area occupied
D Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F Beaver dam - measure perched height and jumping height
G Manmade dam - measure perched height and jumping height
H Other barrier to fish movement
I Potential contamination source (storm sewer outlet or industrial discharge pipe).
J Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O Fish observed during non-fish sampling activities
P Potential nutrient source
Q Dredging of channel
R Offline pond
S Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2 0 2 4 0 4 1 6 | Project #: Port Colborne | Recorder/Crew: VS + ER

Stream Name: | Stream Code: | Site Code: H252 Point 3

Site Limits: Upstream WP# 644820 E | Downstream 17 WP# 4756666 N

Field Assessment: ☐ Sample 1 ☐ Sample 2 ☐ Sample 3

Unconnected HDF: ☐ Not connected to downstream network

Direction of Assessment: ☐ Upstream ☑ Downstream

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☑ Standing Water (2) ☐ Interstitial Flow (3) ☐ Minimal Flow (4) ☐ Substantial Flow (5)

Feature Type ☑ Defined Natural Channel (1) ☐ Channelized or Constrained (2) ☐ Multi-thread (3) ☐ No Defined Feature (4) ☐ Tiled Feature (5) ☐ Wetland (6) ☐ Swale (7) ☐ Roadside Ditch (8) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☑ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

		None (1)	Lawn (2)	Cropped (3)	Meadow (4)	Scrubland (5)	Wetland (6)	Forest (7)
0 - 1.5 m	Left Bank	☐	☐	☐	☐	☑	☐	☐
	Right Bank	☐	☐	☐	☐	☑	☐	☐
1.5 - 10 m	Left Bank	☐	☐	☐	☐	☑	☐	☐
	Right Bank	☐	☐	☐	☐	☑	☐	☐
10 - 30 m	Left Bank	☐	☐	☐	☐	☑	☐	☐
	Right Bank	☐	☐	☐	☐	☑	☐	☐

Channel Gradient (S4.M7) ☐ Visual (1) ☑ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 5 | Elevation (cm): | Gradient (%): 1

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☑ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☑ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 1.8 | Bankfull Depth (mm): 355

Entrenchment Total: ☐ >40 m ☑ <40 m | Left Bank: m | Right Bank: m | Total width: m

Surface Flow Method ☐ Perched Culvert (1) ☑ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
1.4	121 90 89	0 0 0			

Sediment Transport

Adjacent	☑ None (1)	☐ Rill (2)	☐ Rill and Gully (3)	☐ Gully (4)	☐ Outlet Scour (5)	
	☐ Sheet Erosion (6)	☐ Instream Bank Erosion (7)	☐ Other (8)			
Feature	☑ None (1)	☐ Rill (2)	☐ Rill and Gully (3)	☐ Gully (4)	☐ Outlet Scour (5)	
	☐ Sheet Erosion (6)	☐ Instream Bank Erosion (7)	☐ Other (8)			

Sediment Deposition Measures (mm):

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024/04/10 Project #: Port Colborne Field Assessment: ☑ Sample # 1 ☐ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# — Perched Height (mm): Jumping Height (mm):
WP# ~ Perched Height (mm): Jumping Height (mm):

Groundwater Indicators ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection ☐ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

- Split reach of main feature

Site Break ☐ Feature Type ☑ Feature Modifier ☐ Flow Conditions ☐ Feature Vegetation ☐ Riparian Vegetation

Trigger ☑ Other: Comments Split

Point Data Category: Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024/04/16 Project #: Port Colborne Recorder/Crew: VS + ER

Stream Name: Stream Code: Site Code: H252 (Downtream) Point

Site Limits: Upstream WP# Downstream 17 WP# Field Assessment: ☑ Sample 1 ☐ Sample 2 ☐ Sample 3 Unconnected HDF: 4 ☐ Not connected to downstream network

Direction of Assessment: ☐ Upstream ☑ Downstream

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☐ Standing Water (2) ☐ Interstitial Flow (3) ☐ Minimal Flow (4) ☐ Substantial Flow (5)

Feature Type ☐ Defined Natural Channel (1) ☐ Channelized or Constrained (2) ☑ Multi-thread (3) ☐ No Defined Feature (4) ☐ Tiled Feature (5) ☐ Wetland (6) ☑ Swale (7) ☐ Roadside Ditch (8) ☐ Pond (9)

Feature Vegetation ☑ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☑ Wetland (6) Phrag.	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☑ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☑ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☑ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☑ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 5 — — Elevation (cm): — — — Gradient (%): 1

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐

Feature Roughness ☑ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☑ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 1.75 Bankfull Depth (mm) 900

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank — m Right Bank — m Total width — m

Surface Flow Method ☐ Perched Culvert (1) ☑ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm)	Hydraulic head (mm)	Volume (L)	Distance (m)	Time (s)
	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3
0.86	35 20 4	0 0 0	—	—	—

Sediment Transport

Adjacent ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm): — — — — —

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2021/04/12 Project #: Port Colborne Field Assessment: ☑ Sample # 1 ☐ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# — Perched Height (mm): Jumping Height (mm):
WP# Perched Height (mm): Jumping Height (mm):

Groundwater Indicators: ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection: ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

- Confluence @ H251
- Pipe from Adjacent Residential home drain into feature (see Photo)

Site Break ☐ Feature Type ☑ Feature Modifier ☐ Flow Conditions ☐ Feature Vegetation ☐ Riparian Vegetation

Trigger ☐ Other: Comments

Point Data Category: Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Port Colborne HDFA

Visit 1

H1A-S1

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024/04/16 Project #: Port Colborne Recorder/Crew: VS + ER

Stream Name: Stream Code: Site Code: HA-S1 (Upstream Point 1)

Site Limits: Upstream WP# E

Downstream 17 WP# N

Direction of Assessment: ☑ Upstream → ☐ Downstream

Field Assessment: ☑ Sample 1 ☐ Sample 2 ☐ Sample 3

Unconnected HDF: ☐ Not connected to downstream network

Flow Influence
☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition
☐ Dry (1) ☑ Standing Water (2) ☐ Interstitial Flow (3) ☐ Minimal Flow (4) ☐ Substantial Flow (5)

Feature Type
☐ Defined Natural Channel (1) ☐ Channelized or Constrained (2) ☐ Multi-thread (3) ☐ No Defined Feature (4) ☐ Tiled Feature (5) ☐ Wetland (6) ☑ Swale (7) ☐ Roadside Ditch (8) ☐ Pond (9)

Feature Vegetation
☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☑ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

		None (1)	Lawn (2)	Cropped (3)	Meadow (4)	Scrubland (5)	Wetland (6)	Forest (7)
0 - 1.5 m	Left Bank	☐	☐	☐	☐	☑	☐	☐
	Right Bank	☐	☐	☐	☑	☐	☐	☐
1.5 - 10 m	Left Bank	☑ (Construction)	☐	☐	☐	☐	☐	☐
	Right Bank	☐	☐	☑ (construction)	☐	☐	☐	☐
10 - 30 m	Left Bank	☑	☐	☐	☐	☐	☐	☐
	Right Bank	☐	☐	☑	☐	☐	☐	☐

Channel Gradient (S4.M7) ☐ Visual (1) ☑ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 5 Elevation (cm): Gradient (°): 1

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☑ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☐ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 8.64 Bankfull Depth (mm): 350

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank: m Right Bank: m Total width: m

Surface Flow Method ☐ Perched Culvert (1) ☑ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
7.7	550 45	0 0 0 (No flow)			

Sediment Transport

Adjacent: ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature: ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024/04/16 Project #: Port Colborne Field Assessment: ☑ Sample # 1 ☐ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# — Perched Height (mm): Jumping Height (mm):
WP# — Perched Height (mm): Jumping Height (mm):

Groundwater Indicators: ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection: ☐ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☑ Feature Vegetation ☐ Riparian Vegetation

Trigger ☐ Other: Comments

Point Data Category	Ongoing and Active (1)	Historic Evidence (2)	Reported but No Evidence (3)
	No Evidence (4)	Unknown (5)	

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 20240416 Project #: Port Colborne Recorder/Crew: VS + ER

Stream Name: Stream Code Site Code: HIA-S1 Point 2

Site Limits: Upstream 17 WP# 645534 E Field Assessment: ☑ Sample 1 Unconnected HDF:

Downstream WP# 4756863 N ☐ Sample 2 ☐ Not connected to

Direction of Assessment: ☑ Upstream → ☐ Downstream ☐ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☑ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☐ Defined Natural Channel (1) ☐ No Defined Feature (4) ☑ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☑ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☑ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 5 Elevation (cm) : Gradient (°):

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☑ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☑ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 5.5 Bankfull Depth (mm) 60

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank m Right Bank m Total width m

Surface Flow Method ☐ Perched Culvert (1) ☑ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
9.9	105 95 70	0 0 0			

Sediment Transport

Adjacent ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024 04 19 Project #: Port Colborne Field Assessment: ☑ Sample # 1 ☐ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# — Perched Height (mm): Jumping Height (mm):
WP# — Perched Height (mm) Jumping Height (mm):

Groundwater Indicators ☐ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:
Fish Collection ☐ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☑ Feature Vegetation ☐ Riparian Vegetation
Trigger ☐ Other: Comments

Point Data Category: Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B Seepage area - measure or estimate length of bank where seepage occurs
C Watercress - estimate total surface area occupied
D Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F Beaver dam - measure perched height and jumping height
G Manmade dam - measure perched height and jumping height
H Other barrier to fish movement
I Potential contamination source (storm sewer outlet or industrial discharge pipe).
J Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O Fish observed during non-fish sampling activities
P Potential nutrient source
Q Dredging of channel
R Offline pond
S Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 20240416 Project #: Port Colborne Recorder/Crew: VS + ER

Stream Name: Stream Code: Site Code: HA-S1 (Downstream) PO int 3

Site Limits: Upstream WP# 645870 E Field Assessment: ☐ Sample 1 Unconnected HDF:

Downstream 17 WP# 4755019 N ☐ Sample 2 ☐ Not connected to

Direction of Assessment: ☑ Upstream → ☐ Downstream ☐ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☑ Interstitial Flow (3) ☐ Substantial Flow (5)
☐ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☐ Defined Natural Channel (1) ☐ No Defined Feature (4) ☑ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☑ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☑ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☑ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☑ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 5 Elevation (cm): Gradient (%): 1

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☑ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☑ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 6.1 Bankfull Depth (mm) 680

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank m Right Bank m Total width m

Surface Flow Method ☐ Perched Culvert (1) ☑ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
3.23	13 15 62	0 0 0			

Sediment Transport

Adjacent	☑ None (1)	☐ Rill (2)	☐ Rill and Gully (3)	☐ Gully (4)	☐ Outlet Scour (5)	
	☐ Sheet Erosion (6)	☐ Instream Bank Erosion (7)	☐ Other (8)			
Feature	☑ None (1)	☐ Rill (2)	☐ Rill and Gully (3)	☐ Gully (4)	☐ Outlet Scour (5)	
	☐ Sheet Erosion (6)	☐ Instream Bank Erosion (7)	☐ Other (8)			

Sediment Deposition Measures (mm):

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2019/04/16 Project #: Port Colborne Field Assessment: ☑ Sample # 1 ☐ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# ~~—~~ Perched Height (mm): ~~—~~ Jumping Height (mm): ~~—~~

WP# ~~—~~ Perched Height (mm): ~~—~~ Jumping Height (mm): ~~—~~

Groundwater Indicators ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

- Highly disturbed can see tire tracks through feature

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☐ Feature Vegetation. ☐ Riparian Vegetation

Trigger ☑ Other: Comments Downstream Extent

Point Data Category: Ongoing and Active (1); Historic Evidence (2); Reported but No Evidence (3); No Evidence (4); Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Port Colborne HDFA

Visit 2

H3

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 20240529 Project #: 53699-101 Recorder/Crew: VS + AA

Stream Name: Stream Code: Site Code: H3 Point 1

Site Limits: Upstream WP# 646149 Field Assessment: ☐ Sample 1 Unconnected HDF:

Downstream 17 WP# 4757767 ☒ Sample 2 ☐ Not connected to

Direction of Assessment: ☒ Upstream → ☐ Downstream ☐ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☒ Baseflow (3)

Flow Condition ☒ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☐ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☐ Defined Natural Channel (1) ☐ No Defined Feature (4) ☒ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☒ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☒ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☒ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☒ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☒ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☒ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☒ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☒ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 1 — — Elevation (cm): 30 — — Gradient (%): —

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☒	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☒	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☒ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☒ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 4.7 Bankfull Depth (mm) 520

Entrenchment Total: ☐ >40 m ☒ <40 m Left Bank — m Right Bank — m Total width — m

Surface Flow Method ☐ Perched Culvert (1) ☒ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
No water	No water	No Water	—	—	—

Sediment Transport

Adjacent ☒ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☒ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm): — — — — —

☒ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

yyyy/mm/dd

Unconstrained Headwater Drainage Feature Assessment

Date: 20240529 Project #: 53689-101 Field Assessment: ☐ Sample # 1 ☑ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# — Perched Height (mm): Jumping Height (mm):

WP# Perched Height (mm): Jumping Height (mm):

Groundwater Indicators ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☑ Feature Vegetation ☐ Riparian Vegetation

Trigger ☐ Other: Comments

Point Data Category: Ongoing and Active (1); Historic Evidence (2); Reported but No Evidence (3); No Evidence (4); Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 20240529 Project #: 53689-101 Recorder/Crew: VS + AA

Stream Name: Stream Code: Site Code: H3 Point 2

Site Limits: Upstream WP#

Downstream WP#

Direction of Assessment: ☒ Upstream → ☐ Downstream

Field Assessment: ☐ Sample 1 ☑ Sample 2 ☐ Sample 3

Unconnected HDF: ☐ Not connected to downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☑ Standing Water (2) ☐ Interstitial Flow (3) ☐ Minimal Flow (4) ☐ Substantial Flow (5)

Feature Type ☐ Defined Natural Channel (1) ☐ Channelized or Constrained (2) ☐ Multi-thread (3) ☐ No Defined Feature (4) ☐ Tiled Feature (5) ☐ Wetland (6) ☑ Swale (7) ☐ Roadside Ditch (8) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☑ Wetland(6) ☐ Forest (7)

Riparian Vegetation

		None (1)	Lawn (2)	Cropped (3)	Meadow (4)	Scrubland (5)	Wetland (6)	Forest (7)
0 - 1.5 m	Left Bank	☐	☐	☐	☑	☐	☐	☐
	Right Bank	☐	☐	☐	☑	☐	☐	☐
1.5 - 10 m	Left Bank	☐	☐	☐	☑	☐	☐	☐
	Right Bank	☐	☐	☐	☑	☐	☐	☐
10 - 30 m	Left Bank	☐	☐	☐	☐	☐	☐	☐
	Right Bank	☑	☐	☐	☑	☐	☐	☐

Channel Gradient (S4.M7) ☐ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 1 — — Elevation (cm): 50 — — Gradient (%): —

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☑ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☑ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 5.25 Bankfull Depth (mm): 450

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank — m Right Bank — m Total width — m

Surface Flow Method ☐ Perched Culvert (1) ☑ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
1.6	35 35 30	No Flow	—	—	—

Sediment Transport

Adjacent Feature: ☐ None (1) ☑ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature: ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm): — — — — —

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date (yyyymmdd): 20240529 Project #: 53685-10 Field Assessment ☐ Sample # 1 ☑ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements WP#: — Perched Height (mm): Jumping Height (mm):
WP#: — Perched Height (mm): Jumping Height (mm):

Groundwater Indicators ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other

Fish Collection ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Swale w/ phrag + wetland grasses

Site Break Trigger ☐ Feature Type ☐ Feature Modifier ☑ Flow Conditions ☑ Feature Vegetation ☐ Riparian Vegetation
☐ Other: Comments

Point Data Category	Ongoing and Active (1)	Historic Evidence (2)	Reported but No Evidence (3)
	No Evidence (4)	Unknown (5)	

POINT DATA KEY:

A Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B Seepage area - measure or estimate length of bank where seepage occurs
C Watercress - estimate total surface area occupied
D Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F Beaver dam - measure perched height and jumping height
G Manmade dam - measure perched height and jumping height
H Other barrier to fish movement
I Potential contamination source (storm sewer outlet or industrial discharge pipe).
J Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O Fish observed during non-fish sampling activities
P Potential nutrient source
Q Dredging of channel
R Offline pond
S Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024 05 29 Project #: 53689-101 Recorder/Crew: VS + BA

Stream Name: — Stream Code: — Site Code: H3 Point 3

Site Limits: Upstream WP# Downstream WP#

Direction of Assessment: ☐ Upstream ☐ Downstream

Field Assessment: ☐ Sample 1 ☑ Sample 2 ☐ Sample 3

Unconnected HDF: ☐ Not connected to downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☐ Baseflow (3)

Flow Condition ☐ Dry (1) ☑ Standing Water (2) ☐ Interstitial Flow (3) ☐ Minimal Flow (4) ☐ Substantial Flow (5)

Feature Type ☐ Defined Natural Channel (1) ☐ Channelized or Constrained (2) ☐ Multi-thread (3) ☐ No Defined Feature (4) ☐ Tiled Feature (5) ☐ Wetland (6) ☑ Swale (7) ☐ Roadside Ditch (8) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☑ Wetland(6) ☐ Forest (7)

Riparian Vegetation

		None (1)	Lawn (2)	Cropped (3)	Meadow (4)	Scrubland (5)	Wetland (6)	Forest (7)
0 - 1.5 m	Left Bank	☐	☐	☐	☑	☐	☐	☐
	Right Bank	☐	☐	☐	☑	☐	☐	☐
1.5 - 10 m	Left Bank	☐	☐	☐	☑	☐	☐	☐
	Right Bank	☐	☐	☐	☑	☐	☐	☐
10 - 30 m	Left Bank	☐	☐	☐	☑	☐	☐	☐
	Right Bank	☑	☐	☐	☐	☐	☐	☐

Channel Gradient (S4.M7) ☑ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 1.0 — — Elevation (cm): 30 — — Gradient (°): —

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☑ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☑ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 3.6 Bankfull Depth (mm) 53

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank — m Right Bank — m Total width — m

Surface Flow Method ☐ Perched Culvert (1) ☑ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm)			Hydraulic head (mm)			Volume (L)			Distance (m)			Time (s)		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
1.0	50	40	30	Standing Water			—								

Sediment Transport

Adjacent Feature

	None (1)	Rill (2)	Rill and Gully (3)	Gully (4)	Outlet Scour (5)
Adjacent	☐	☑	☑	☐	☐
Feature	☑	☐	☐	☐	☐

	Sheet Erosion (6)	Instream Bank Erosion (7)	Other (8)
Adjacent	☐	☐	☐
Feature	☐	☐	☐

See photos

Sediment Deposition Measures (mm): — — — — —

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 20240529 Project #: 53689-101 Field Assessment: ☐ Sample # 1 ☑ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# ~ Perched Height (mm): Jumping Height (mm):
WP# – Perched Height (mm): Jumping Height (mm):

Groundwater Indicators: ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:
Fish Collection: ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Site Break: ☐ Feature Type ☐ Feature Modifier ☑ Flow Conditions ☐ Feature Vegetation ☐ Riparian Vegetation
Trigger: ☐ Other: Comments: Less water

Point Data Category: Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B Seepage area - measure or estimate length of bank where seepage occurs
C Watercress - estimate total surface area occupied
D Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F Beaver dam - measure perched height and jumping height
G Manmade dam - measure perched height and jumping height
H Other barrier to fish movement
I Potential contamination source (storm sewer outlet or industrial discharge pipe).
J Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O Fish observed during non-fish sampling activities
P Potential nutrient source
Q Dredging of channel
R Offline pond
S Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 20240429 Project #: 53689-101 Recorder/Crew: VS + GA

Stream Name: Stream Code: Site Code: HS Point 4

Site Limits: Upstream WP# 6447666 Downstream 17 WP# 4757709

Field Assessment: ☐ Sample 1 ☒ Sample 2 ☐ Sample 3

Unconnected HDF: ☐ Not connected to downstream network

Direction of Assessment: ☒ Upstream → ☐ Downstream

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☒ Baseflow (3)

Flow Condition ☐ Dry (1) ☒ Standing Water (2) ☐ Interstitial Flow (3) ☐ Minimal Flow (4) ☐ Substantial Flow (5)

Feature Type ☐ Defined Natural Channel (1) ☐ Channelized or Constrained (2) ☐ Multi-thread (3) ☐ No Defined Feature (4) ☐ Tiled Feature (5) ☐ Wetland (6) ☒ Swale (7) ☐ Roadside Ditch (8) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☒ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☒ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☒ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☒ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☒ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☒ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☒ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☒ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 1 — — Elevation (cm): 35 — — Gradient (%): —

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☒	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☒	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☒ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☒ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 4.0 Bankfull Depth (mm): 540

Entrenchment Total: ☐ >40 m ☒ <40 m Left Bank — m Right Bank — m Total width — m

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
1.4	25 35 30	Standing Water	—	—	—

Sediment Transport

Adjacent ☐ None (1) ☐ Rill (2) ☒ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☒ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm): — — — — —

☒ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 20240529 Project #: 53489-101 Field Assessment: ☐ Sample # 1 ☑ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# — Perched Height (mm): Jumping Height (mm):
WP# — Perched Height (mm): Jumping Height (mm):

Groundwater Indicators ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:
Fish Collection ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

ATV tracks through reach
- redefining feature

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☑ Feature Vegetation ☐ Riparian Vegetation
Trigger ☐ Other: Comments Meadow Veg

Point Data Category: Ongoing and Active (1); Historic Evidence (2); Reported but No Evidence (3); No Evidence (4); Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024/05/29 Project #: 5368 9-101 Recorder/Crew: VS + AA

Stream Name: Stream Code: Site Code: H3 point 5

Site Limits: Upstream WP# 6446836 Field Assessment: ☐ Sample 1 Unconnected HDF:

Downstream 17 WP# 4757748 ☑ Sample 2 ☐ Not connected to

Direction of Assessment: ☐ Upstream → ☐ Downstream ☐ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☑ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☐ Defined Natural Channel (1) ☐ No Defined Feature (4) ☑ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☑ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☑ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 1 — — Elevation (cm): 15 — — Gradient (%): —

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☑ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☐ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 3.4 Bankfull Depth (mm) 550

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank — m Right Bank — m Total width — m

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
1.2	70 40 60	Standing Water	—	—	—

Sediment Transport

Adjacent ☐ None (1) ☑ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm): — — — — —

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

yyyy/mm/dd

Unconstrained Headwater Drainage Feature Assessment

Date: 2024 05 29 Project #: 5368-101 Field Assessment: ☐ Sample # 1 ☑ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# — Perched Height (mm): Jumping Height (mm):
WP# — Perched Height (mm): Jumping Height (mm):

Groundwater Indicators ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Heavy ATV use within feature
- directly connected to the Welland Canal

Site Break ☐ Feature Type ☑ Feature Modifier ☐ Flow Conditions ☐ Feature Vegetation ☐ Riparian Vegetation

Trigger ☐ Other: Comments: D - Downstream extent - Culvert to Welland canal

Point Data Category: Ongoing and Active (1) | Historic Evidence (2) | Reported but No Evidence (3) | No Evidence (4) | Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Port Colborne HDFA

Visit 2

H1A-S1

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024/05/29 Project #: 53689-101 Recorder/Crew: VS + AH

Stream Name: — Stream Code: — Site Code: H1a-S1 Point 1

Site Limits: Upstream WP# 645352 Field Assessment: ☐ Sample 1 Unconnected HDF:

Downstream 17 WP# 645-1002 ☑ Sample 2 ☐ Not connected to

Direction of Assessment: ☐ Upstream → ☐ Downstream ☐ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☐ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☐ Defined Natural Channel (1) ☐ No Defined Feature (4) ☐ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☑ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☑ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☑ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☑ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 1 — — Elevation (cm): 10 — — Gradient (°): —

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☐	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☑ Can't Measure (1) ☐ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): — Bankfull Depth (mm): —

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank — m Right Bank — m Total width — m

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
7.2	10 16 20	—	—	—	—

Sediment Transport

Adjacent ☐ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☐ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm): — — — — —

☐ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 20240529 Project #: 536849-101 Field Assessment: ☐ Sample # 1 ☑ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# ____ Perched Height (mm): ____ Jumping Height (mm): ____

WP# ____ Perched Height (mm): ____ Jumping Height (mm): ____

Groundwater Indicators ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other: ____

Fish Collection ☑ Absent ☐ Present Comment: ____

WP#	Photo #	Code	Category	Description

Additional Notes:

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☑ Feature Vegetation ☐ Riparian Vegetation

Trigger ☐ Other: Comments ____

Point Data Category: Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024/05/29 Project #: 53659-101 Recorder/Crew: VS + AA

Stream Name: — Stream Code: — Site Code: WIA-S1 Point 2

Site Limits: Upstream WP# 6454441 Downstream WP# 475-10616 Field Assessment: ☐ Sample 1 ☑ Sample 2 ☐ Sample 3 Unconnected HDF: ☐ Not connected to downstream network

Direction of Assessment: ☐ Upstream → ☐ Downstream

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☐ Baseflow (3)

Flow Condition ☐ Dry (1) ☑ Standing Water (2) ☐ Interstitial Flow (3) ☐ Minimal Flow (4) ☐ Substantial Flow (5)

Feature Type ☐ Defined Natural Channel (1) ☐ Channelized or Constrained (2) ☐ Multi-thread (3) ☐ No Defined Feature (4) ☐ Tiled Feature (5) ☐ Wetland (6) ☐ Swale (7) ☐ Roadside Ditch (8) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☑ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 1 — — Elevation (cm): 10 — — Gradient (°): —

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☑ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☑ Can't Measure (1) ☐ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): — Bankfull Depth (mm): —

Entrenchment Total: ☐ >40 m ☐ <40 m Left Bank — m Right Bank — m Total width — m

Surface Flow Method ☐ Perched Culvert (1) ☑ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
5.5	30 35 20	Standing Water	—	—	—

Sediment Transport

Adjacent ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm): — — — — —

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024/05/20 Project #: 536x9-101 Field Assessment: ☐ Sample # 1 ☐ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# — Perched Height (mm): Jumping Height (mm):
WP# — Perched Height (mm): Jumping Height (mm):

Groundwater Indicators ☐ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection ☐ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Site Break ☐ Feature Type ☐ Feature Modifier ☑ Flow Conditions ☐ Feature Vegetation ☐ Riparian Vegetation

Trigger ☐ Other: Comments Dry or Water

Point Data Category			
	Ongoing and Active (1)	Historic Evidence (2)	Reported but No Evidence (3)
	No Evidence (4)	Unknown (5)	

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024/05/20 Project #: 536 Recorder/Crew: VS + AA

Stream Name: Stream Code: Site Code: HIA-S1 Point 3

Site Limits: Upstream WP# Downstream WP# Field Assessment: ☐ Sample 1 ☑ Sample 2 ☐ Sample 3 Unconnected HDF: ☑ Not connected to downstream network

Direction of Assessment: ☐ Upstream ☐ Downstream

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☐ Baseflow (3)

Flow Condition ☐ Dry (1) ☐ Standing Water (2) ☑ Interstitial Flow (3) ☐ Minimal Flow (4) ☐ Substantial Flow (5)

Feature Type ☐ Defined Natural Channel (1) ☐ Channelized or Constrained (2) ☐ Multi-thread (3) ☐ No Defined Feature (4) ☐ Tiled Feature (5) ☐ Wetland (6) ☑ Swale (7) ☐ Roadside Ditch (8) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☑ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

		None (1)	Lawn (2)	Cropped (3)	Meadow (4)	Scrubland (5)	Wetland (6)	Forest (7)
0 - 1.5 m	Left Bank	☐	☑	☐	☐	☐	☐	☐
	Right Bank	☐	☑	☐	☐	☐	☐	☐
1.5 - 10 m	Left Bank	☐	☐	☐	☐	☑	☐	☐
	Right Bank	☐	☐	☐	☐	☑	☐	☐
10 - 30 m	Left Bank	☐	☐	☐	☐	☑	☐	☐
	Right Bank	☐	☐	☐	☐	☑	☐	☐

Channel Gradient (S4.M7) ☑ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 1 — — Elevation (cm): 30 — — Gradient (°): —

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☐	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☐	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☑ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 6.5 Bankfull Depth (mm) 600

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank — m Right Bank — m Total width — m

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm)	Hydraulic head (mm)	Volume (L)	Distance (m)	Time (s)
	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3
2	100	Standing Water	—	—	—

Sediment Transport

Adjacent ☐ None (1) ☑ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☐ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☑ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm): — — — — —

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd | Project #: | Field Assessment: ☐ Sample # 1 ☐ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# | Perched Height (mm): | Jumping Height (mm):
WP# | Perched Height (mm): | Jumping Height (mm):

Groundwater Indicators: ☐ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection: ☐ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Not directly connected downstream
- Some dry spots breaking up feature

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☐ Feature Vegetation ☐ Riparian Vegetation

Trigger ☐ Other: Comments

Point Data Category			
	Ongoing and Active (1)	Historic Evidence (2)	Reported but No Evidence (3)
	No Evidence (4)	Unknown (5)	

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Port Colborne HDFA

Visit 2

H253

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024/05/29 Project #: 53684-101 Recorder/Crew: VS + AA

Stream Name: Stream Code: Site Code: H253 Point 1

Site Limits: Upstream WP# 6645320 Field Assessment: ☐ Sample 1 Unconnected HDF:

Downstream 17 WP# 47566999 ☑ Sample 2 ☑ Not connected to

Direction of Assessment: ☐ Upstream ☑ Downstream ☐ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☑ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☐ Defined Natural Channel (1) ☐ No Defined Feature (4) ☑ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☑ Wetland(6) ☐ Forest (7)

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Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 1 — — Elevation (cm): 10 — — Gradient (°): —

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☑ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☑ Can't Measure (1) ☐ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): — Bankfull Depth (mm): —

Entrenchment Total: ☐ >40 m ☐ <40 m Left Bank — m Right Bank — m Total width — m

Surface Flow Method ☐ Perched Culvert (1) ☑ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
4	80 50 50	standing water	—	—	—

Sediment Transport

Adjacent ☐ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☑ Sheet Erosion (6) (farm field) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm): — — — — —

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2021/05/26 Project #: 5368-101 Field Assessment: ☐ Sample # 1 ☑ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# ~ Perched Height (mm): Jumping Height (mm):
WP# ~ Perched Height (mm): Jumping Height (mm):

Groundwater Indicators ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:
Fish Collection ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Site Break ☐ Feature Type ☐ Feature Modifier ☑ Flow Conditions ☑ Feature Vegetation ☐ Riparian Vegetation
Trigger ☐ Other: Comments Wetland + Standing water

Point Data Category: Ongoing and Active (1); Historic Evidence (2); Reported but No Evidence (3); No Evidence (4); Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2019/05/29 Project #: 53689-101 Recorder/Crew: VS + AA

Stream Name: Stream Code: Site Code: H2 S3 Point 2

Site Limits: Upstream WP# 6450 23 Field Assessment: ☐ Sample 1 Unconnected HDF:

Downstream 17 WP# 4756940 ☑ Sample 2 ☐ Not connected to

Direction of Assessment: ☐ Upstream ← ☑ Downstream ☐ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☑ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☐ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☐ Defined Natural Channel (1) ☐ No Defined Feature (4) ☑ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☑ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☑ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 1 Elevation (cm): 30 Gradient (°):

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☑ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☑ Can't Measure (1) ☐ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): Bankfull Depth (mm)

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank m Right Bank m Total width m

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm)	Hydraulic head (mm)	Volume (L)	Distance (m)	Time (s)
	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3
Dry					

Sediment Transport

Adjacent ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 20240529 Project #: SCCSG-101 Field Assessment: ☐ Sample # 1 ☑ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# ___ Perched Height (mm): ___ Jumping Height (mm): ___

WP# ___ Perched Height (mm): ___ Jumping Height (mm): ___

Groundwater Indicators ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other: ___

Fish Collection ☑ Absent ☐ Present Comment: ___

WP#	Photo #	Code	Category	Description

Additional Notes:

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☐ Feature Vegetation ☐ Riparian Vegetation

Trigger ☑ Other: Comments DS point

Point Data Category: Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Port Colborne HDFA

Visit 2

H281

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 20240529 Project #: 53689-101 Recorder/Crew: VA + AA

Stream Name: Stream Code: Site Code: H251 Point 1

Site Limits: Upstream WP# 6744885

Downstream 17 WP# 4756504

Field Assessment: ☐ Sample 1 ☑ Sample 2 ☐ Sample 3

Unconnected HDF: ☐ Not connected to downstream network

Direction of Assessment: ☐ Upstream ← ☑ Downstream

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☑ Standing Water (2) ☐ Interstitial Flow (3) ☐ Minimal Flow (4) ☐ Substantial Flow (5)

Feature Type ☑ Defined Natural Channel (1) ☐ Channelized or Constrained (2) ☐ Multi-thread (3) ☐ No Defined Feature (4) ☐ Tiled Feature (5) ☐ Wetland (6) ☐ Swale (7) ☐ Roadside Ditch (8) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☑ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☑ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☑ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 1 Elevation (cm): 30 Gradient (°):

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☑ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☑ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 2 Bankfull Depth (mm) 400

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank m Right Bank m Total width m

Surface Flow Method ☐ Perched Culvert (1) ☑ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
1.0	30 20 10	0 0 0 No Flow			

Sediment Transport

Adjacent ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

yyyy/mm/dd

Unconstrained Headwater Drainage Feature Assessment

Date: 2024 05 29 Project #: 55689-101 Field Assessment: ☐ Sample # 1 ☑ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# ____ Perched Height (mm): ____ Jumping Height (mm): ____

WP# ____ Perched Height (mm): ____ Jumping Height (mm): ____

Groundwater Indicators ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other: ____

Fish Collection ☑ Absent ☐ Present Comment: ____

WP#	Photo #	Code	Category	Description

Additional Notes:

Site Break ☐ Feature Type ☐ Feature Modifier ☑ Flow Conditions ☐ Feature Vegetation ☐ Riparian Vegetation

Trigger ☑ Other: Comments Less flow

Point Data Category: Ongoing and Active (1) | Historic Evidence (2) | Reported but No Evidence (3) | No Evidence (4) | Unknown (5)

POINT DATA KEY:

A Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B Seepage area - measure or estimate length of bank where seepage occurs
C Watercress - estimate total surface area occupied
D Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F Beaver dam - measure perched height and jumping height
G Manmade dam - measure perched height and jumping height
H Other barrier to fish movement
I Potential contamination source (storm sewer outlet or industrial discharge pipe).
J Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O Fish observed during non-fish sampling activities
P Potential nutrient source
Q Dredging of channel
R Offline pond
S Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024/05/29 Project #: 53689-101 Recorder/Crew: VS + AA

Stream Name: Stream Code: Site Code: H251 Point 2

Site Limits: Upstream WP# 6644724 E Field Assessment: ☐ Sample 1 Unconnected HDF:

Downstream WP# 4756496 N ☑ Sample 2 ☐ Not connected to downstream network

Direction of Assessment: ☐ Upstream ☑ Downstream ☐ Sample 3

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☐ Standing Water (2) ☑ Minimal Flow (4)

Feature Type ☐ Defined Natural Channel (1) ☐ No Defined Feature (4) ☐ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☑ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☑ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☑ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): Elevation (cm): 20 Gradient (%):

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☑ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☑ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 2.5 Bankfull Depth (mm) 370

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank m Right Bank m Total width m

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☑ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm)			Hydraulic head (mm)			Volume (L)			Distance (m)			Time (s)		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
1.3	40	50	30							0.5	0.3	0.2	7.2	11.6	11.2

Sediment Transport

Adjacent ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024/05/29 Project #: Port Colborne Field Assessment: ☐ Sample # 1 ☑ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# ~ Perched Height (mm): ~ Jumping Height (mm): ~

WP# ~ Perched Height (mm): ~ Jumping Height (mm): ~

Groundwater Indicators ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☑ Feature Vegetation ☐ Riparian Vegetation

Trigger ☑ Other: Comments No Veg

Point Data Category: Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024/05/29 Project #: 53698-101 Recorder/Crew: VS + AR

Stream Name: Stream Code: Site Code: H251 Point 3

Site Limits: Upstream WP# 644422 E Field Assessment: ☐ Sample 1 Unconnected HDF:

Downstream WP# 4756483 ☐ Sample 2 ☐ Not connected to

Direction of Assessment: ☐ Upstream ☒ Downstream ☐ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☒ Baseflow (3)

Flow Condition ☐ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☒ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☐ Defined Natural Channel (1) ☐ No Defined Feature (4) ☐ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☒ Wetland (6) ☒ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☒ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☒ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☒ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☒ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☒ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☒ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☒ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☒ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): — — — Elevation (cm): 10 — — Gradient (%): —

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (2-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☐	☒	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☒	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☒ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☒ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 5.25 Bankfull Depth (mm) 590

Entrenchment Total: ☐ >40 m ☒ <40 m Left Bank — m Right Bank — m Total width — m

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
4.2	100 60 80				

Standing Water

Sediment Transport

Adjacent ☒ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☒ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm): — — — — —

☒ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024 05 29 Project #: Port Colborne Field Assessment: ☐ Sample # 1 ☑ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# ~~—~~ Perched Height (mm): ~~—~~ Jumping Height (mm): ~~—~~

WP# ~~—~~ Perched Height (mm): ~~—~~ Jumping Height (mm): ~~—~~

Groundwater Indicators ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection ☐ Absent ☐ Present Comment: ~~—~~

WP#	Photo #	Code	Category	Description

Additional Notes:

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☑ Feature Vegetation ☐ Riparian Vegetation

Trigger ☑ Other: Comments: wetland

Point Data Category: Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2014/05/29 Project #: 58689-101 Recorder/Crew: VJ + AA

Stream Name: — Stream Code: — Site Code: H251 Point 4

Site Limits: Upstream WP# 644368 E Field Assessment: ☐ Sample 1 Unconnected HDF:

Downstream 17T WP# 4756485 ☑ Sample 2 ☐ Not connected to

Direction of Assessment: ☐ Upstream → ☐ Downstream ☐ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☐ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☑ Defined Natural Channel (1) ☐ No Defined Feature (4) ☐ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☑ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☑ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): — — — Elevation (cm): 50 — — Gradient (°): —

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☑ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☑ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 2.5 Bankfull Depth (mm) 460

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank — m Right Bank — m Total width — m

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☑ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
0.87	70 50 30	—	—	0.3 0.3 0.3	1.7 1.3 1.2

Sediment Transport

Adjacent ☐ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm): — — — — —

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024/05/29 Project #: Port Colborne Field Assessment: ☐ Sample # 1 ☑ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# ~ Perched Height (mm): ~ Jumping Height (mm): ~
WP# Perched Height (mm): Jumping Height (mm):

Groundwater Indicators ☐ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:
Fish Collection ☐ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☐ Feature Vegetation ☐ Riparian Vegetation
Trigger ☐ Other: Comments

Point Data Category: Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B Seepage area - measure or estimate length of bank where seepage occurs
C Watercress - estimate total surface area occupied
D Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F Beaver dam - measure perched height and jumping height
G Manmade dam - measure perched height and jumping height
H Other barrier to fish movement
I Potential contamination source (storm sewer outlet or industrial discharge pipe).
J Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O Fish observed during non-fish sampling activities
P Potential nutrient source
Q Dredging of channel
R Offline pond
S Other

Port Colborne HDFA

Visit 2

H252

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2021/09/29 Project #: 5365-101 Recorder/Crew: VS + AA

Stream Name: — Stream Code: — Site Code: H252 Point 1

Site Limits: Upstream WP# 6445859 Field Assessment: ☐ Sample 1 Unconnected HDF:

Downstream WP# 4468482 ☐ Sample 2 ☐ Not connected to

Direction of Assessment: ☐ Upstream ☒ Downstream ☐ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☒ Baseflow (3)

Flow Condition ☐ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☒ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☐ Defined Natural Channel (1) ☒ No Defined Feature (4) ☐ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☒ Wetland(6) ☐ Forest (7)

Riparian Vegetation (phragmites)

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☒ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☒ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☒ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☒ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☒ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☒ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☒ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 1 — — Elevation (cm): 20 — — Gradient (°): —

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☒	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☒	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☒ Can't Measure (1) ☐ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): — Bankfull Depth (mm): —

Entrenchment Total: ☐ >40 m ☒ <40 m Left Bank — m Right Bank — m Total width — m

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
5	30 65 45	Standing Water	—	—	—

Sediment Transport

Adjacent ☒ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☒ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm): — — — — —

☐ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024/05/29 Project #: 53689-101 Field Assessment: ☐ Sample # 1 ☑ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# ~~—~~ Perched Height (mm): Jumping Height (mm):
WP# ~~—~~ Perched Height (mm): Jumping Height (mm):

Groundwater Indicators ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection ☐ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Site Break ☑ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☐ Feature Vegetation ☐ Riparian Vegetation

Trigger ☐ Other: Comments wetland (phrag)

Point Data Category: Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B Seepage area - measure or estimate length of bank where seepage occurs
C Watercress - estimate total surface area occupied
D Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F Beaver dam - measure perched height and jumping height
G Manmade dam - measure perched height and jumping height
H Other barrier to fish movement
I Potential contamination source (storm sewer outlet or industrial discharge pipe).
J Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O Fish observed during non-fish sampling activities
P Potential nutrient source
Q Dredging of channel
R Offline pond
S Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2019/05/29 Project #: 53684-101 Recorder/Crew: VS + AA

Stream Name: Stream Code: Site Code: H252 Point 2

Site Limits: Upstream WP#

Downstream WP#

Direction of Assessment: ☐ Upstream ☑ Downstream

Field Assessment: ☐ Sample 1 ☐ Sample 2 ☐ Sample 3

Unconnected HDF: ☐ Not connected to downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☐ Baseflow (3)

Flow Condition ☐ Dry (1) ☑ Standing Water (2) ☐ Interstitial Flow (3) ☐ Minimal Flow (4) ☐ Substantial Flow (5)

Feature Type ☐ Defined Natural Channel (1) ☐ Channelized or Constrained (2) ☐ Multi-thread (3) ☑ No Defined Feature (4) ☐ Tiled Feature (5) ☐ Wetland (6) ☐ Swale (7) ☐ Roadside Ditch (8) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☑ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☑ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 1 Elevation (cm): 30 Gradient (%):

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☑ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☐ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): Bankfull Depth (mm):

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank m Right Bank m Total width m

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm)			Hydraulic head (mm)			Volume (L)			Distance (m)			Time (s)		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
3	20	10	10	Standing Water											

Sediment Transport

Adjacent ☐ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☐ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024 05 29 Project #: 53689-107 Field Assessment: ☐ Sample # 1 ☑ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# — Perched Height (mm): Jumping Height (mm):
WP# — Perched Height (mm): Jumping Height (mm):

Groundwater Indicators ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Turns into a meadow area

Site Break ☑ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☐ Feature Vegetation ☐ Riparian Vegetation

Trigger ☐ Other: Comments No defined feature

Point Data Category: Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 20240529 Project #: 5368-101 Recorder/Crew: VS + AA

Stream Name: Stream Code: Site Code: H252 Point 3

Site Limits: Upstream WP# 644807 Downstream 17 WP# 4751666

Field Assessment: ☐ Sample 1 ☑ Sample 2 ☐ Sample 3

Unconnected HDF: ☐ Not connected to downstream network

Direction of Assessment: ☐ Upstream ☑ Downstream

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☑ Standing Water (2) ☐ Interstitial Flow (3) ☐ Minimal Flow (4) ☐ Substantial Flow (5)

Feature Type ☑ Defined Natural Channel (1) ☐ Channelized or Constrained (2) ☐ Multi-thread (3) ☐ No Defined Feature (4) ☐ Tiled Feature (5) ☐ Wetland (6) ☐ Swale (7) ☐ Roadside Ditch (8) ☐ Pond (9)

Feature Vegetation ☑ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☑ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 1 Elevation (cm): 0 Gradient (%):

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☐	☐	☐	☐	☐	☐

Feature Roughness ☑ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☑ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 2.5 Bankfull Depth (mm) 200

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank m Right Bank m Total width m

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
1.5	70 40 40	No flow			

Sediment Transport

Adjacent ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024/05/29 Project #: 5368-101 Field Assessment: ☐ Sample # 1 ☑ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# — Perched Height (mm): Jumping Height (mm):
WP# — Perched Height (mm): Jumping Height (mm):

Groundwater Indicators: ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection: ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Very thick brush - lots of Dogwood, Willow, Grape Vine, Virginia creeper

Site Break ☐ Feature Type ☑ Feature Modifier ☐ Flow Conditions ☐ Feature Vegetation ☐ Riparian Vegetation

Trigger ☑ Other: Comments: Confluence w adjacent stream

Point Data Category: Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024/05/29 Project #: 53689-101 Recorder/Crew: VS + AA

Stream Name: — Stream Code: — Site Code: H252 Point 4

Site Limits: Upstream WP# 6944865 Field Assessment: ☐ Sample 1 Unconnected HDF:

Downstream 17 WP# 6945037 ☐ Sample 2 ☐ Not connected to

Direction of Assessment: ☐ Upstream ← ☑ Downstream ☐ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☐ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☐ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☑ Defined Natural Channel (1) ☐ No Defined Feature (4) ☐ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☑ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): 1 — — Elevation (cm): 10 — — Gradient (°): —

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☑	☐	☐	☐	☐	☐

Feature Roughness ☑ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☑ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 1.4 Bankfull Depth (mm) 290

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank — m Right Bank — m Total width — m

Surface Flow Method ☐ Perched Culvert (1) ☑ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm) 1 2 3	Hydraulic head (mm) 1 2 3	Volume (L) 1 2 3	Distance (m) 1 2 3	Time (s) 1 2 3
0.8	40 20 20	very little FLW			

Sediment Transport

Adjacent ☐ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm): — — — — —

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024 05 30 Project #: 53685-101 Field Assessment: ☐ Sample # 1 ☑ Sample # 2 ☐ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# — Perched Height (mm): Jumping Height (mm):
WP# — Perched Height (mm): Jumping Height (mm):

Groundwater Indicators: ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection: ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Site Break Trigger: ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☐ Feature Vegetation ☐ Riparian Vegetation ☑ Other: Comments: DS Point

Point Data Category: Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

GENERAL SITE INFORMATION FIELD SHEET

Project: 53689-101 Port Colborne
Date: August 28, 2024 Project Manager: _____
Collector(s): VS + DN Visit #: _____
Time started: 11:00 Time finished: 16:15 Combined collectors' hours: _____
☐ NHIC List ☐ MNR EO's ☐ none ☐ not provided to collector

WEATHER CONDITIONS				
Temp.	Wind:	12km/h	Cloud Cover (%)	Precipitation
23°C	Direction:	SW	95	Today: No Yesterday: Yes

WIND SCALE	
0	Calm
1	Smoke Drifts
2	Wind Felt on Face
3	Leaves in constant motion
4	Wind raises dust and paper
5	Small trees sway
6	Large branches sway
7	Lots of resistance when walking into
8	Limbs breaking off trees

DATA FOCUS

☐	Birds 1__ 2__ Mig__	☐	ELC's	☐	Dripline/Tree Survey
☐	Mammals	☐	Floral V__ S__ A_	☑	Aquatic - Physical
☐	Amphibians 1_ 2_ 3_	☐	Wetland	☑	Aquatic - Biological
☐	Reptiles	☐	Butternut (BHA)	☐	Faunal Habitat
☐	Inverterbrates	☐	other SAR	☐	Other - see notes

FEATURES (with GPS co-ordinates where applicable)	Mapped UTM	Follow-up Req'd Yes	No	Who
Man-made Structures: ☐ None observed				
Yes No				
☐ ☑ Barns/Footings/Wells/other(list)				
☐ ☑ Rock Piles				
☐ ☑ Garbage				
Natural Vegetation: ☐ None observed				
☐ ☑ Fallen Logs outside woods (#'s)				
☐ ☑ Brush Piles				
☐ ☑ Snags (raptor perch)				
☐ ☑ Tree Cavities (nesting)				
☐ ☑ Sentinel Trees				
☐ ☑ Butternut Identified				
☐ ☑ Mast Trees (6E) ☐ Berry Shrubs (6E)				
Wildlife Features: ☐ None observed				
☐ ☑ Waterfowl nesting (large #'s, # of species)				
☐ ☑ Exposed Banks (nesting swallows)				
☐ ☑ Stick Nests				
☐ ☑ Animal Burrows (>10cm)				
☐ ☑ Heronry				
☐ ☑ Crayfish mounds				
☐ ☑ Sand/gravel on site				
☐ ☑ Marsh/open country/shrub				
☐ ☑ Winter Deer yards				
☐ ☑ Corridor from pond to woods (ampibian movement)				
☐ ☑ Bat corridor (shorelines, escarpments)				
☐ ☑ Bat hibernacula (caves, mines, crevices, etc.)				
Aquatic Features:				
☐ ☐ Perm. pond in woodland ☐ emergents/submergents/logs ☐ temp.				
☐ ☐ Perm. pond in open ☐ emergents/submergents/logs ☐ temp.				
☐ ☐ Water in woodland ☐ pools ☐ flowing ☐ dry				
☑ ☐ Waterways flowing dry pools				
☐ natural stream ☐ ☐ ☐				
☐ swale ☐ ☐ ☐ ☐ None observed				
☐ open drain ☐ ☐ ☑				
☐ Seeps/Springs ☐ ☐ ☐				

Incidental Observations/Notes:

HDFA3+ AHA Visit

Graphic ☐ Attached or Name L:\ENV\Biological Services\Templates\MTE NEnv_General Field Sheet Checked by Project Manager ☐ Date: _____

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 20240828 Project #: 536 9-141 Recorder/Crew: VJ + DN

Stream Name: Stream Code: H251 Site Code: Beach 1

Site Limits: ~~Upstream~~ 17 WP# 644881

Downstream WP# 4756499

Field Assessment: ☐ Sample 1 ☐ Sample 2 ☑ Sample 3

Unconnected HDF: ☑ Not connected to downstream network

Direction of Assessment: ☐ Upstream ← ☑ Downstream

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☑ Dry (1) ☐ Standing Water (2) ☐ Interstitial Flow (3) ☐ Minimal Flow (4) ☐ Substantial Flow (5)

Feature Type ☑ Defined Natural Channel (1) ☐ Channelized or Constrained (2) ☐ Multi-thread (3) ☐ No Defined Feature (4) ☐ Tiled Feature (5) ☐ Wetland (6) ☐ Swale (7) ☐ Roadside Ditch (8) ☑ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☑ Meadow (4) ☐ Scrubland (5) ☑ Wetland(6) ☐ Forest (7)

Riparian Vegetation

Both observed (Wetland most prominent)

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☑ None (1) Road	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☑ Other (5) ☐ LiDAR (6)

Distance (m): Elevation (cm): Gradient (°):

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☑ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☑ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 3.0 Bankfull Depth (mm) 640

Entrenchment Total: ☑ >40 m ☐ <40 m Left Bank m Right Bank m Total width m

Not entrenched

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4) ☑ Dry

Wetted Width (m)	Wetted Depth (mm)	Hydraulic head (mm)	Volume (L)	Distance (m)	Time (s)
Dry	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3

Sediment Transport

Adjacent ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5) ☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 20240828 Project #: 53689-101 Field Assessment: ☐ Sample # 1 ☐ Sample # 2 ☑ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# ~ Perched Height (mm): ~ Jumping Height (mm): ~

WP# ~ Perched Height (mm): ~ Jumping Height (mm): ~

Groundwater Indicators ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Feature is dry

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☑ Feature Vegetation ☐ Riparian Vegetation

Trigger ☐ Other: Comments

Point Data Category	Ongoing and Active (1)	Historic Evidence (2)	Reported but No Evidence (3)
	No Evidence (4)	Unknown (5)	

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Unconstrained Headwater Drainage Feature Assessment

Port Colborne

Date (yyyy/mm/dd): 2024/08/28 Project #: 53689-101 Recorder/Crew: VS + DN

Stream Name: Stream Code: H251 Site Code: Reach 2

Site Limits: ~~Upstream~~ WP# 644721 Field Assessment: ☐ Sample 1 Unconnected HDF:

Downstream 17 WP# 475644195 ☑ Sample 2 ☐ Not connected to

Direction of Assessment: ☐ Upstream ☑ Downstream ☑ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☑ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☐ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☑ Defined Natural Channel (1) ☐ No Defined Feature (4) ☐ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☑ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☑ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☑ Other (5) ☐ LiDAR (6)

Distance (m): Elevation (cm): Gradient (%):

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☐	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☑ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☑ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 3.36 Bankfull Depth (mm) 880

Entrenchment Total: ☐ >40 m ☑ <40 m Left Bank 3.2 m Right Bank 11.5 m Total width 14.7 m

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4) ☑ None

Wetted Width (m)	Wetted Depth (mm)	Hydraulic head (mm)	Volume (L)	Distance (m)	Time (s)
Dry	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3

Sediment Transport

Adjacent ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024 08 28 Project #: 53689-101 Field Assessment: ☐ Sample # 1 ☐ Sample # 2 ☑ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# — Perched Height (mm): Jumping Height (mm):
WP# — Perched Height (mm): Jumping Height (mm):

Groundwater Indicators ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Feature is dry

Site Break Trigger ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☑ Feature Vegetation ☐ Riparian Vegetation ☐ Other: Comments

Point Data Category Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B Seepage area - measure or estimate length of bank where seepage occurs
C Watercress - estimate total surface area occupied
D Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F Beaver dam - measure perched height and jumping height
G Manmade dam - measure perched height and jumping height
H Other barrier to fish movement
I Potential contamination source (storm sewer outlet or industrial discharge pipe).
J Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O Fish observed during non-fish sampling activities
P Potential nutrient source
Q Dredging of channel
R Offline pond
S Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024/06/28 Project #: 53649-101 Recorder/Crew: VS + DN

Stream Name: Stream Code: H25-1 + -3 Site Code: Reach 3

Site Limits: Upstream WP# 6744418 Field Assessment: ☐ Sample 1 Unconnected HDF:

Downstream 17 WP# 4756486 ☐ Sample 2 ☑ Not connected to

Direction of Assessment: ☐ Upstream ☑ Downstream ☑ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☑ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☐ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☐ Defined Natural Channel (1) ☐ No Defined Feature (4) ☐ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☑ Wetland (6) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☑ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☑ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☑ Other (5) (none) ☐ LiDAR (6)

Distance (m): Elevation (cm): Gradient (%):

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☐	☐	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☑ > 60% Extreme (4)

Width Measurement ☑ Can't Measure (1) ☐ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): Dry Bankfull Depth (mm) Dry

Entrenchment Total: ☑ >40 m ☐ <40 m Left Bank m Right Bank m Total width m
Not entrenched

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm)	Hydraulic head (mm)	Volume (L)	Distance (m)	Time (s)
Dry	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3

Sediment Transport

Adjacent ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024/08/28 Project #: 5368-401 Field Assessment: ☐ Sample # 1 ☐ Sample # 2 ☒ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# — Perched Height (mm): Jumping Height (mm):
WP# — Perched Height (mm): Jumping Height (mm):

Groundwater Indicators: ☒ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:
Fish Collection: ☒ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Wetland feature dry

Site Break Trigger: ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☒ Feature Vegetation ☐ Riparian Vegetation
☒ Other: Comments: Wetland veg

Point Data Category: Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Downstream Extent

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024/08/22 Project #: 53684-100 Recorder/Crew: VS + DN

Stream Name: Stream Code: H251 Site Code: Reach 4

Site Limits: Upstream WP# 644369 Field Assessment: ☐ Sample 1 Unconnected HDF:

Downstream 17 WP# 475683 ☐ Sample 2 ☐ Not connected to

Direction of Assessment: ☐ Upstream ← ☑ Downstream ☑ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☑ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☐ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☑ Defined Natural Channel (1) ☐ No Defined Feature (4) ☐ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☑ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☑ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☐ Other (5) ☐ LiDAR (6)

Distance (m): Elevation (cm): Gradient (°):

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐

Feature Roughness ☑ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☑ Can't Measure (1) ☐ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): Bankfull Depth (mm)

Entrenchment Total: ☑ >40 m ☐ <40 m Left Bank m Right Bank m Total width m

Not entrenched

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4) ☑ Dry

Wetted Width (m)	Wetted Depth (mm)	Hydraulic head (mm)	Volume (L)	Distance (m)	Time (s)
Dry	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3

Sediment Transport

Adjacent ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024/08/29 Project #: 5368-101 Field Assessment: ☐ Sample # 1 ☐ Sample # 2 ☒ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# ~ Perched Height (mm): ~ Jumping Height (mm): ~

WP# ~ Perched Height (mm): ~ Jumping Height (mm): ~

Groundwater Indicators ☒ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection ☒ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Feature is dry

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☒ Feature Vegetation ☐ Riparian Vegetation

Trigger ☐ Other: Comments

Point Data Category Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 20240828 Project #: 5368-101 Recorder/Crew: VS + DN

Stream Name: Stream Code: H252 Site Code: Reach 1

Site Limits: Upstream WP# 6446858 Field Assessment: ☐ Sample 1 Unconnected HDF:

Downstream 17 WP# 4756981 ☐ Sample 2 ☑ Not connected to

Direction of Assessment: ☐ Upstream ☑ Downstream ☑ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☑ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☐ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☐ Defined Natural Channel (1) ☑ No Defined Feature (4) ☐ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☑ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☑ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	**Left Bank**	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	**Left Bank**	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	**Left Bank**	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☑ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☑ Other (5) ☐ LiDAR (6)

Distance (m): Elevation (cm): Gradient (%):

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☑ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☑ Can't Measure (1) ☐ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): Bankfull Depth (mm)

Entrenchment Total: ☑ >40 m ☐ <40 m Left Bank m Right Bank m Total width m

Not entrenched

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm)	Hydraulic head (mm)	Volume (L)	Distance (m)	Time (s)
Dry	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3

Sediment Transport

Adjacent ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 20240828 Project #: 53689-101 Field Assessment: ☐ Sample # 1 ☐ Sample # 2 ☑ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# — Perched Height (mm): Jumping Height (mm):
WP# — Perched Height (mm): Jumping Height (mm):

Groundwater Indicators: ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection: ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Entire reach is dry

Site Break: ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☑ Feature Vegetation ☐ Riparian Vegetation

Trigger: ☐ Other: Comments

Point Data Category			
	Ongoing and Active (1)	Historic Evidence (2)	Reported but No Evidence (3)
	No Evidence (4)	Unknown (5)	

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024/08/28 Project #: 53689-1d Recorder/Crew: VS + DN

Stream Name: Stream Code: H252 Site Code: Reach 2

Site Limits: Upstream WP# 644867 Field Assessment: ☐ Sample 1 Unconnected HDF:

Downstream WP# 675169 ☐ Sample 2 ☑ Not connected to

Direction of Assessment: ☐ Upstream ☑ Downstream ☑ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☐ Baseflow (3)

Flow Condition ☑ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☐ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☐ Defined Natural Channel (1) ☑ No Defined Feature (4) ☐ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	**Left Bank**	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	**Left Bank**	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	**Left Bank**	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☑ Other (5) ☐ LiDAR (6)

Distance (m): Elevation (cm): Gradient (°):

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☑ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☑ Can't Measure (1) ☐ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): Bankfull Depth (mm)

Entrenchment Total: ☑ >40 m ☐ <40 m Left Bank m Right Bank m Total width m

Not entrenched

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm)	Hydraulic head (mm)	Volume (L)	Distance (m)	Time (s)
Dry	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3

Sediment Transport

Adjacent ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☑ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024 08 28 Project #: 5368A-01 Field Assessment: ☐ Sample # 1 ☐ Sample # 2 ☒ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# — Perched Height (mm): Jumping Height (mm):
WP# Perched Height (mm): Jumping Height (mm):

Groundwater Indicators ☒ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection ☒ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Feature is dry

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☐ Feature Vegetation ☐ Riparian Vegetation

Trigger ☐ Other: Comments

Point Data Category: Ongoing and Active (1); Historic Evidence (2); Reported but No Evidence (3); No Evidence (4); Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024/08/28 Project #: 53689-101 Recorder/Crew: VS + DN

Stream Name: Stream Code: 1252 Site Code: Reach 3

Site Limits: Upstream WP# 644881 Field Assessment: ☐ Sample 1 Unconnected HDF:

Downstream (7) WP# 475686 ☐ Sample 2 ☑ Not connected to

Direction of Assessment: ☐ Upstream ☑ Downstream ☑ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☑ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☐ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☐ Defined Natural Channel (1) ☑ No Defined Feature (4) ☐ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☐ None (1) ☑ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☑ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☑ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☑ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☑ Other (5) ☐ LiDAR (6)

Distance (m): Elevation (cm): Gradient (%):

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐

Feature Roughness ☐ < 10% Minimal (1) ☑ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☑ Can't Measure (1) ☐ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): Bankfull Depth (mm)

Entrenchment Total: ☑ >40 m ☐ <40 m Left Bank m Right Bank m Total width m

Not entrenched

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm)	Hydraulic head (mm)	Volume (L)	Distance (m)	Time (s)
Dry	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3

Sediment Transport

Adjacent ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☐ None (1) ☐ Minimal: < 5 mm (2) ☑ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024/08/21 Project #: 53689-101 Field Assessment: ☐ Sample # 1 ☐ Sample # 2 ☑ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# — Perched Height (mm): Jumping Height (mm):
WP# — Perched Height (mm): Jumping Height (mm):

Groundwater Indicators ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Feature is dry

Site Break ☑ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☐ Feature Vegetation ☐ Riparian Vegetation

Trigger ☐ Other: Comments

Point Data Category Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Downstream Extent

Unconstrained Headwater Drainage Feature Assessment

Date (yyyy/mm/dd): 2024/08/28 Project #: 53689-101 Recorder/Crew: VS + DN

Stream Name: Stream Code: H252 Site Code: Reach 4

Site Limits: ~~Upstream~~ WP# 6448 85 Field Assessment: ☐ Sample 1 Unconnected HDF:

Downstream 17 WP# 4756500 ☐ Sample 2 ☑ Not connected to

Direction of Assessment: ☐ Upstream ☑ Downstream ☑ Sample 3 downstream network

Flow Influence ☐ Freshet (1) ☐ Spate (2) ☑ Baseflow (3)

Flow Condition ☑ Dry (1) ☐ Interstitial Flow (3) ☐ Substantial Flow (5)
☐ Standing Water (2) ☐ Minimal Flow (4)

Feature Type ☑ Defined Natural Channel (1) ☐ No Defined Feature (4) ☐ Swale (7)
☐ Channelized or Constrained (2) ☐ Tiled Feature (5) ☐ Roadside Ditch (8)
☐ Multi-thread (3) ☐ Wetland (6) ☐ Pond (9)

Feature Vegetation ☑ None (1) ☐ Lawn (2) ☐ Cropped (3) ☐ Meadow (4) ☐ Scrubland (5) ☐ Wetland(6) ☐ Forest (7)

Riparian Vegetation

0 - 1.5 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
1.5 - 10 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☑ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
10 - 30 m	Left Bank	☐ None (1)	☐ Lawn (2)	☐ Cropped (3)	☑ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)
	Right Bank	☑ None (1)	☐ Lawn (2)	☐ Cropped (3)	☐ Meadow (4)	☐ Scrubland (5)	☐ Wetland (6)	☐ Forest (7)

Channel Gradient (S4.M7) ☐ Visual (1) ☐ Clinometer (2) ☐ Laser Level (3) ☐ Survey Level (4) ☑ Other (5) ☐ LiDAR (6)

Distance (m): Elevation (cm): Gradient (°):

	Clay (Hard Pan)	Silt	Sand (0.06-2 mm)	Gravel (22-66 mm)	Cobble (67-249 mm)	Boulder (250 mm)	Bedrock
Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐
Sub-Dominant Substrate (S2.M3)	☑	☐	☐	☐	☐	☐	☐

Feature Roughness ☑ < 10% Minimal (1) ☐ 10 - 40% Moderate (2) ☐ 40 - 60% High (3) ☐ > 60% Extreme (4)

Width Measurement ☐ Can't Measure (1) ☑ Bankfull (2) ☐ Mean Width (3) ☐ Estimated (4) ☐ GIS (5) ☐ Measure/GIS (6)

Channel Dimensions Feature Width (m): 2.38 Bankfull Depth (mm) 400

Entrenchment Total: ☑ >40 m ☐ <40 m Left Bank m Right Bank m Total width m
Not Entrenched

Surface Flow Method ☐ Perched Culvert (1) ☐ Hydraulic Head (2) ☐ Distance by Time (3) ☐ Estimated (4)

Wetted Width (m)	Wetted Depth (mm)	Hydraulic head (mm)	Volume (L)	Distance (m)	Time (s)
Dry	1 2 3	1 2 3	1 2 3	1 2 3	1 2 3

Sediment Transport

Adjacent ☑ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Feature ☐ None (1) ☐ Rill (2) ☐ Rill and Gully (3) ☐ Gully (4) ☐ Outlet Scour (5)
☐ Sheet Erosion (6) ☐ Instream Bank Erosion (7) ☐ Other (8)

Sediment Deposition Measures (mm):

☐ None (1) ☐ Minimal: < 5 mm (2) ☐ Moderate: 5-30 mm (3) ☐ Substantial: 31-80 mm (4) ☐ Extensive: > 80 mm (5)

Unconstrained Headwater Drainage Feature Assessment

Date: yyyy/mm/dd 2024 08 28 Project #: 53629-101 Field Assessment: ☐ Sample # 1 ☐ Sample # 2 ☑ Sample # 3

POINT FEATURE DATA

Fish Barrier Measurements: WP# ~~—~~ Perched Height (mm): Jumping Height (mm):

WP# ~ Perched Height (mm): Jumping Height (mm):

Groundwater Indicators ☑ None ☐ Watercress ☐ Seepage ☐ Bubbling ☐ Stained ☐ Other:

Fish Collection ☑ Absent ☐ Present Comment:

WP#	Photo #	Code	Category	Description

Additional Notes:

Feature is dry

Site Break ☐ Feature Type ☐ Feature Modifier ☐ Flow Conditions ☐ Feature Vegetation ☐ Riparian Vegetation

Trigger ☐ Other: Comments

Point Data Category Ongoing and Active (1) Historic Evidence (2) Reported but No Evidence (3) No Evidence (4) Unknown (5)

POINT DATA KEY:

A	Spring/upwelling - estimate <0.5 l/sec or >0.5 l/sec; measure temp
B	Seepage area - measure or estimate length of bank where seepage occurs
C	Watercress - estimate total surface area occupied
D	Outlet (tile or other) - record flow status as per feature flow. Estimate volume <0.5 l/sec or >0.5 l/sec. Measure temperature.
E	Inlet (tile or other) - record flow status as per feature flow. Estimate volume to be <0.5 l/sec or >0.5 l/sec.
F	Beaver dam - measure perched height and jumping height
G	Manmade dam - measure perched height and jumping height
H	Other barrier to fish movement
I	Potential contamination source (storm sewer outlet or industrial discharge pipe).
J	Channel hardening - indicated by rip-rap, armour stone, or gabion baskets.
K	Culvert - note type, size and whether or not perched. If perched record perched height and jumping height.
L	Flow transition point D/S - flow condition changes from dry to standing water, independent of segment break
M	Flow transition point M/S- flow condition changes from minimal to substantial surface flow, independent of segment break
N	Flow transition point D-S/IF- flow condition changes from dry/standing water to interstitial flow, independent of segment break
O	Fish observed during non-fish sampling activities
P	Potential nutrient source
Q	Dredging of channel
R	Offline pond
S	Other

Appendix C

Significant Wildlife Habitat Screening

ELC Communities:

- Subject Lands: Mineral Cultural Meadow (CUM1), Mineral Cultural Thicket (CUT1), Mineral Cultural Woodland (CUW1), Mineral Meadow Marsh (MAM2), Swamp Thicket (SWT), and Cultural Woodland/Deciduous Swamp (CUW/SWD)

Wildlife Habitat	ELC Codes Triggers	Additional Habitat Criteria	Candidate SWH	SWH Defining Criteria	SWH Determination	
					Subject Lands	Adjacent Lands
Waterfowl Stopover and Staging Areas (Terrestrial)	CUM1 and CUT1	• Large fields with abundant sheet water in spring may be available within the CUM1 habitat.	**Yes**	Studies carried out and verified presence of an annual concentration of any listed species, evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • Any mixed species aggregations of 100 or more individuals required. • The flooded field ecosite habitat plus a 100-300m radius, dependent on local site conditions and adjacent land use is the significant wildlife habitat. • Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates). **Headwater drainage features were prominent within the Subject Lands and, along with elevation changes throughout the property, prevented the accumulation of standing water within the Subject Lands. Adjacent lands contain open areas that were not investigated in detail and may provide Waterfowl Stopover and Staging Areas (Terrestrial) SWH.**	None	**Remains Candidate**
Waterfowl Stopover and Staging Areas (Aquatic)	SWD	• No watercourses large enough to support aquatic staging area are present within the Site.	No	N/A	None	None
Shorebird Migratory Stopover Area	MAM2	• No beach areas, bars, seasonally flooded, muddy and un-vegetated shoreline habitat available within the Study Area.	No	N/A	None	None
Raptor Wintering Area	SWD	• No forest ELC codes present, so no combination of forest and fields >20 ha present. • No large rivers or lakes near forest communities to support Bald Eagle SWH.	No	N/A	None	None
Bat Hibernacula	-	• No suitable features present.	No	N/A	None	None
Bat Maternity Colonies	SWD	• Suitable habitat may be present within the Cultural Woodland / Deciduous Swamp.	**Yes**	Maternity Colonies with confirmed use by; • >10 Big Brown Bats • >5 Adult Female Silver-haired Bats • The area of the habitat includes the entire woodland or a forest stand ELC Ecosite or an Ecoelement containing the maternity colonies. • Evaluation methods for maternity colonies should be conducted following methods outlined in the “Bats and Bat Habitats: Guidelines for Wind Power Projects” **The Cultural Woodland / Deciduous Swamp was evaluated during the field investigations and lacked suitable maternity roosting trees. Adjacent lands contain woodland that were not investigated in detail and may contain bat maternity colonies.**	None	**Remains Candidate**
Turtle Wintering Areas	SWT, SWD, and MAM2	• No suitable over-wintering sites (permanent water bodies, large wetlands, bogs, fens, etc.) with adequate depth for overwintering within the Study Area.	No	N/A	None	None

Wildlife Habitat	ELC Codes Triggers	Additional Habitat Criteria	Candidate SWH	SWH Defining Criteria	SWH Determination	
					Subject Lands	Adjacent Lands
Reptile Hibernaculum	All other than really wet	• No features indicative of hibernation sites (bedrock fissures, rock piles, burrows) present within the Site.	No	N/A	None	None
Colonially-Nesting Bird Breeding Habitat (Bank/Cliff)	CUM1 and CUT1	• No exposed soil banks, cliff faces, sandy hills, borrow pits, steep slopes, or other suitable habitat present.	No	N/A	None	None
Colonially-Nesting Bird Breeding Habitat (Trees/Shrubs)	SWD	• No heron nesting sites/colonies present based on LIO mapping (wildlife values area map). • No suitable wetland present within the Study Area.	No	N/A	None	None
Colonially-Nesting Bird Breeding Habitat (Ground)	CUT1 & CUM1	• No islands or peninsulas are present within the Study Area. • No nesting sites for Ring-billed Gull or Herring Gull identified in the area by LIO wildlife values area mapping. • The Study Area is outside of the habitat range for Brewer's Blackbird.	No	N/A	None	None
Migratory Butterfly Stopover Areas	CUM1 and CUT1	• Study Area is >5 km from Lake Ontario and Lake Erie. Criteria not met.	No	N/A	None	None
Land Bird Migratory Stopover Areas	SWD	• Study Area is >5 km from Lake Ontario and Lake Erie. Criteria not met.	No	N/A	None	None
Deer Winter Congregation Areas	SWD	• No woodlots >100 ha in size. • No White-tailed Deer wintering areas identified in the area by LIO wildlife values area mapping.	No	N/A	None	None

Rare Vegetation Communities

Wildlife Habitat	ELC Codes Triggers	Additional Habitat Criteria	Candidate SWH	SWH Defining Criteria	SWH Determination	
					Subject Lands	Adjacent Lands
Cliffs and Talus Slopes	-	Not present.	No	N/A	None	None
Sand Barren	-	Not present.	No	N/A	None	None
Alvar	-	Not present.	No	N/A	None	None
Old Growth Forest	SWD	Not present.	No	N/A	None	None
Savannah	-	Not present.	No	N/A	None	None
Tallgrass Prairie	-	Not present.	No	N/A	None	None
Other Rare Vegetation	-	Not present.	No	N/A	None	None

Specialized Habitats of Wildlife considered SWH

Wildlife Habitat	ELC Codes Triggers	Additional Habitat Criteria	Candidate SWH	SWH Defining Criteria	SWH Determination	
					Subject Lands	Adjacent Lands
Waterfowl Nesting Area	SWT, MAM2, and SWD	• Wetland habitat may be large enough to support waterfowl nesting area.	**Yes**	Studies confirmed: • Presence of 3 or more nesting pairs for listed species excluding Mallards, or; • Presence of 10 or more nesting pairs for listed species including Mallards. • Any active nesting site of an American Black Duck is considered significant. • Nesting studies should be completed during the spring breeding season (April-June). Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. • A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120 m from the wetland and will provide enough habitat for waterfowl to successfully nest. **None of the indicator waterfowl species listed were observed during breeding bird surveys; therefore, Waterfowl Nesting Area SWH is not considered present within the Subject Lands. No wetlands were identified within the adjacent lands through desktop review.**	None	None
Bald Eagle and Osprey Nesting, Foraging, Perching	SWD	• No Osprey feeding or resting areas identified on LIO wildlife values mapping.	**Yes**	Studies confirm the use of these nests by: • One or more active Osprey or Bald Eagle nests in an area. • Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH. • For an Osprey, the active nest and a 300 m radius around the nest or the contiguous woodland stand is the SWH, maintaining undisturbed shorelines with large trees within this area is important. • For a Bald Eagle the active nest and a 400-800 m radius around the nest is the SWH. Area of the habitat from 400-800m is dependent on site lines from the nest to the development and inclusion of perching and foraging habitat. • To be significant a site must be used annually. When found inactive, the site must be known to be inactive for >3 years or suspected of not being used for >5 years before being considered not significant. • Observational studies to determine nest site use, perching sites and foraging areas need to be done from early March to mid-August. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. **No Bald Eagle or Osprey were observed during breeding bird surveys; therefore, the SWD community is not considered to be used for Bald Eagle or Osprey nesting, foraging, or perching. Adjacent lands were not investigated in detail and may provide suitable nesting, foraging, and/or perching for Bald Eagle and Osprey**	None	**Remains Candidate**
Woodland Raptor Nesting Habitat	CUW/SWD	• No natural or conifer plantation woodlands/forest stands >30ha with >4ha of interior habitat within the Site.	No	N/A	None	None
Turtle Nesting Areas	-	• No areas with exposed mineral soils were observed adjacent to wetland.	No	N/A	None	None

Specialized Habitats of Wildlife considered SWH

Wildlife Habitat	ELC Codes Triggers	Additional Habitat Criteria	Candidate SWH	SWH Defining Criteria	SWH Determination	
					Subject Lands	Adjacent Lands
Springs and Seeps	-	• No seeps or springs observed within the Site.	No	N/A	None	None
Amphibian Breeding Habitat (Woodland)	CUW/SWD	• Breeding habitat may be available within Cultural Woodland / Deciduous Swamp.	**Yes**	Studies confirm; • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog species with at least 20 individuals (adults or eggs masses) or 2 or more of the listed frog species with Call Level Code 3. • A combination of observational study and call count surveys will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands. • The habitat is the wetland area plus a 230m radius of woodland area. If a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is to be included in the habitat. **Studies did not identify any newt/salamander species or the minimum call counts required for SWH. No wetlands were identified within the adjacent lands through desktop review.**	None	None
Amphibian Breeding Habitat (Wetlands)	SWT and MAM2	• Wetlands located >120m from woodland ecosites are present within the Subject Lands.	**Yes**	Studies confirm: • Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/toad species with at least 20 individuals • (adults or eggs masses) or 2 or more of the listed frog/toad species with Call Level Codes of 3. or; Wetland with confirmed breeding Bullfrogs are significant. • The ELC ecosite wetland area and the shoreline are the SWH. • A combination of observational study and call count surveys will be required during the spring (March-June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands. **Studies did not identify any newt/salamander species or the minimum call counts required for SWH. No wetlands were identified within the adjacent lands through desktop review.**	None	None
Woodland Area-Sensitive Bird Breeding Habitat	CUW/SWD	• No large mature (>60yrs old) forest stands or woodlots >30 ha are present within or adjacent to the Site.	No	N/A	None	None

Wildlife Habitat	ELC Codes Triggers	Candidate Habitat Criteria	Candidate SWH	SWH Defining Criteria	SWH Determination	
					Subject Lands	Adjacent Lands
Marsh Breeding Bird Habitat	MAM2, SWT, and CUM1	• Suitable wetland habitat may be present for Marsh Breeding Birds.	**Yes**	Studies confirm: • Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or breeding by any combination of 4 or more of the listed species. • Note: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH. • Area of the ELC ecosite is the SWH. • Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. **No Sedge Wren, Marsh Wren, Black Tern, Trumpeter Swan, Green Heron, or Yellow Rail were observed during breeding bird surveys.**	None	None
Open Country Bird Breeding Habitat	CUM1	• Community 3 (CUM1/Open Ground) is >30 ha.	**Yes**	Field studies confirm: • Presence of nesting or breeding of 2 or more of the listed species. • A field with 1 or more breeding Short-eared Owls is to be considered SWH. • The area of SWH is the contiguous ELC ecosite field areas. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories. • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. **Presence of nesting or breeding for two or more of the listed species was not identified within Community 3.**	None	None
Shrub/Early Successional Bird Breeding Habitat	CUT1, CUW1, and CUW/SWD	• A large field succeeding to shrub and thicket habitats >10 ha in size is present (CUT1).	**Yes**	Field Studies confirm: • Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species. • A habitat with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered SWH. • The area of the SWH is the contiguous ELC Ecosite field/thicket area. • Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”. **Two indicator species (Brown Thrasher and Clay-colored Sparrow) and two common species (Field Sparrow and Willow Flycatcher) were observed within Community 6 during breeding bird surveys; however, presence of nesting or breeding was not confirmed for any of these four species.**	None	None
Terrestrial Crayfish	MAM2, SWT, and SWD	• Suitable habitat is present within the Subject Lands. • No chimneys or individuals observed within the Subject Lands.	**Yes**	Studies Confirm: • Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable meadow marsh, swamp or moist terrestrial sites. • Area of ELC ecosite or an eco-element area of meadow marsh or swamp within the larger ecosite area is the SWH. • Surveys should be done April to August in temporary or permanent water. Note the presence of burrows or chimneys are often the only indicator of presence, observance or collection of individuals is very difficult. **No chimneys or individuals were observed within the Subject Lands throughout field investigations (including HDFA’s and Aquatic Habitat Assessment).**	None	**Remains Candidate**

Habitats of Species of Conservation Concern Considered SWH

Wildlife Habitat	ELC Codes Triggers	Candidate Habitat Criteria	Candidate SWH	SWH Defining Criteria	SWH Determination	
					Subject Lands	Adjacent Lands
Special Concern and Rare Wildlife Species	-	• NHIC identified several Special Concern or rare species as potentially present within the Study Area. These include Swamp Rose-mallow, Barn Swallow, Eastern Wood-Pewee, Grasshopper Sparrow, Wood Thrush, Mapleleaf Mussel, Snapping Turtle, and Monarch.	**Yes**	Studies Confirm: • Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. • The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat or foraging habitat. **Grasshopper Sparrow was observed within Community 1 during targeted surveys. Community 1 is 27.51 ha in total. Grasshopper Sparrow prefers large grassland habitats but may nest in habitats as small as 10 ha.** **No other Special Concern or rare wildlife species were observed within the Subject Lands during MTE's field investigations.** **Suitable habitat may exist within the adjacent lands for Eastern Wood-Pewee, Grasshopper Sparrow, Wood Thrush, Mapleleaf Mussel, Snapping Turtle, and Monarch.**	**Confirmed** Community 1: • Grasshopper Sparrow	**Remains Candidate for:** • Eastern Wood-Pewee • Grasshopper Sparrow • Wood Thrush • Mapleleaf Mussel • Snapping Turtle • Monarch

SWH Exceptions

Wildlife Habitat	ELC Codes Triggers*	Additional Habitat Criteria	Candidate SWH	SWH Defining Criteria	SWH Determination	
					Subject Lands	Adjacent Lands
Amphibian Movement Corridors	-	- Movement corridors are determined when there is confirmed amphibian breeding habitat in wetlands which is yet to be determined.	No	N/A	None	None

Wildlife Habitat	Ecosites	Habitat Criteria and Information	Candidate SWH	SWH Defining Criteria	SWH Determination	
					Subject Lands	Adjacent Lands
Bat Migratory Stopover Area	No triggers	• The site is not near Long Point.	No	N/A	None	None

Appendix D

Eastern Meadowlark and Bobolink Management Plan

5088 Highway 140 Manufacturing Facility

Bobolink and Eastern Meadowlark Management Plan

Project Location:

5088 Highway 140
Port Colborne, ON
(Lots 16, 17, 18 and 19, Concession 5)

Prepared for:

Asahi Kasei Plastics North America Inc.
810 E Van Riper Road
Fowlerville, MI 48836
United States

Prepared by:

MTE Consultants Inc.
123 St. George Street
London, ON N6A 3A1

March 7, 2025

MTE File No.: 61120_001

Engineers, Scientists, Surveyors.

Contents

Figures

Appendices

1.0 INTRODUCTION

MTE Consultants Inc. (MTE) has been retained by Asahi Kasei Plastics North America, Inc. to complete a Bobolink and Eastern Meadowlark Management Plan in support of proposed industrial development on the property located at 5088 Highway 140 in Port Colborne, Ontario (herein referred to as the Subject Lands; **Figure 1**). The proposed building envelope includes an approximately 150-acre parcel located in the northeastern portion of the property as well as an approximately 20-acre parcel located immediately west (i.e., a portion of Lots 16, 17, 18, 19, Concession 5).

Field investigations undertaken by MTE in 2024 confirmed breeding habitat for Eastern Meadowlark (*Sturnella magna*) and Bobolink (*Dolichonyx oryzivorus*) within targeted grassland habitats on the Subject Lands. Suitable habitat polygons were determined based on the suitability of underlying Ecological Land Classification (ELC) ecosites identified through 2024 field investigations (**Figure 2**).

As per *Ontario Regulation* (*O. Reg.*) *830/21*, impacts to Bobolink and Eastern Meadowlark (listed as Threatened in Ontario) habitat must be registered using the Ministry of Environment, Conservation and Parks (MECP) online Notice of Activity (NOA) Form under the *Endangered Species Act, 2007 (ESA*; Consolidated 2021) before any work commences that will damage, destroy or modify breeding habitat used by these species. Where an activity is eligible for a conditional exemption under the *ESA* (2007), it may be addressed through a payment into the Species at Risk Conservation Fund to support protection and recovery activities for eligible species, in lieu of other requirements that would provide a benefit to these species. The amount payable to the Species at Risk Conservation Fund is calculated based on the proposed area of impact and shall be accompanied by a Bobolink and Eastern Meadowlark Management Plan, wherein measures to minimize or avoid adverse effects to these species shall be defined.

1.1 Purpose

In accordance with Section 23.6 of *O. Reg. 242/08* of the *ESA* (2007), suitable habitat for Bobolink and Eastern Meadowlark on the Subject Lands has been addressed through the NOA registration process. The NOA contains information pertaining to proposed impacts to Eastern Meadowlark and Bobolink habitat on the Subject Lands, including:

- A statement identifying and describing the activity that will be undertaken;
- A description of how the activity will impact Eastern Meadowlark and Bobolink habitat, including the area of suitable habitat damaged or destroyed;
- Mitigation measures required to minimize the adverse effects of the activity on Eastern Meadowlark or Bobolink and their habitat; and
- The proposed start and end dates for the activity.

Confirmation of Registration and a Species Conservation Charge Selection Confirmation (M-102-9569882814) was received on February 12, 2025. Per the Species Conservation Charge Selection Confirmation, payment to the Species at Risk Conservation Fund must be made through the Species Conservation Action Agency on or before the earlier of:

a) the day before the day the person first engages in a charge-related activity exempted under the regulation that would otherwise be prohibited under section 9 or 10 of the Act; or

b) the day that is 30 days after the day the notice is submitted.

Confirmation of payment provided on February 27, 2025, has been received by the proponent.

As part of the NOA and registration of activities under *O. Reg. 242/08*, a Bobolink and Eastern Meadowlark Management Plan is required to identify measures to minimize or avoid adverse effects to protected species. The Management Plan shall be prepared pursuant to the requirements defined within Section 16 of *O. Reg. 830/21* prior to the commencement of any activity that would damage or destroy the habitat of Bobolink or Eastern Meadowlark. The Management Plan must be retained for five years following development and must be provided to MECP within 14 days, if requested.

1.2 Project Activity

Proposed development of the 150-acre parcel located on the northeastern portion of the Subject Lands includes an approximately 185,806 m^2 manufacturing facility, associated parking areas (i.e., minimum of 1,525 parking spaces), three Stormwater Management Facility (SWMF) ponds and a tank yard containing a wastewater treatment plant, water softening building, fire pump house, above ground cooling towers, hydro substations building, gas boiler building, and other ancillary buildings that will be used for outdoor storage and processing. Development on the 20-acre parcel to the west shall consist of a high voltage electric substation, a SWMF pond, and berms along the development boundary with a noise abatement barrier installed atop of the berm.

Earthworks associated with proposed development activities are anticipated to commence on March 15, 2025, and be completed no later than April 30, 2025. Grading is required to level undulating topography throughout the site created as a result of historic fill deposits.

A total of 3.906 ha of suitable Eastern Meadowlark and Bobolink habitat (**Figure 3**) located within Ecoregion 7E will be removed to facilitate proposed grading activities and construction.

1.3 Eligibility for Exemption

Per the exemptions defined under Subsection 13(1) of *O. Reg. 830/21* of the *ESA* (2007) with regards to Bobolink and Eastern Meadowlark:

> *Clause 9 (1) (a) and subsection 10 (1) of the Act do not apply to a person who, while carrying out an activity described in subsection (3), kills, harms, harasses, captures or takes a bobolink or an eastern meadowlark, or damages or destroys its habitat, if the size of the area of habitat of bobolinks or eastern meadowlarks that is damaged or destroyed by the activity is equal to or less than 30 hectares and,*
>
> *(a) the person satisfies all of the conditions set out in section 14; or*
>
> *(b)* ***the person,***
>
> ***(i) pays a species conservation charge to the Species at Risk Conservation Trust in accordance with paragraph 5 of subsection 20.3 (1) of the Act and Ontario Regulation 829/21 (Species Conservation Charges) made under the Act, and***
>
> ***(ii) satisfies the conditions in paragraphs 1 to 4 of section 14. O. Reg. 830/21, s. 37 (5).***

Per the Site Plan (January 2025), the proposed area of impact includes 3.906 ha of Bobolink and Eastern Meadowlark habitat. As proposed habitat removals on the Subject Lands are less than 30 ha in area, the project is eligible for exemption under Subsection 13(1) of *O. Reg. 830/21* and shall fulfil the conditions defined under Subsection 13(1)(b).

In order to satisfy conditions defined within Section 14 of *O. Reg. 830/21*, prior to the commencement of the activity, mitigation measures outlined under Section 15 must be implemented to minimize adverse effects and a Management Plan must be prepared in accordance with Section 16.

This document will serve as the Bobolink and Eastern Meadowlark Management Plan and has been prepared in accordance with Section 16 of *O. Reg. 830/21*. Upon commencement of the activity, daily monitoring will be conducted in accordance with the Monitoring Form provided in **Appendix A**. The Monitoring Form will provide an overview of the mitigation strategies implemented to minimize adverse effects on Eastern Meadowlark and Bobolink, including any species encounters. The Management Plan and Monitoring Forms are to be retained for a minimum of five years from the date of habitat removal and must be available for submission to MECP within 14 days of a documentation request.

2.0 MITIGATION

In accordance with Subsection 14 (2) of *O. Reg. 830/21*, the following mitigation measures must be implemented to minimize the adverse effects of the activity on the Bobolink, Eastern Meadowlark, and their associated habitat:

- No grading or earthworks shall occur between May 1 and July 31 in any area that is likely to damage or destroy the habitat of Eastern Meadowlark and Bobolink;
- Prior to the initiation of works on site, a qualified biologist shall provide training to the contractor(s) for the identification of Eastern Meadowlark and Bobolink. In addition, the biologist will review proper handling procedures and/or steps to take if an individual is observed during construction works. A Species at Risk identification factsheet will be provided to individuals on-site as part of this training;
- No wildlife, including Protected Species, should be handled, harassed, or moved unless they are in immediate danger. If an animal enters the work site, work at that location should stop and the animal permitted to leave without being harassed;
- Prior to the initiation of works on site, robust sediment and erosion control fencing will be installed around the limits of earthworks to protect adjacent suitable Eastern Meadowlark and Bobolink habitat. The fence will act as a barrier to keep construction equipment and soil away from vegetation to remain and prevent erosion and sedimentation of the adjacent habitat. Sediment and erosion control fencing will be installed according to the to the Guidelines for Erosion and Sediment Control for Urban Construction Sites (OMNR 1987) and the applicable standards established by the Ontario Provincial Standard Specification/Ontario Provincial Standard Drawings (OPSS/OPSD) documents;
- Sediment and erosion control fencing must be inspected by a qualified biologist prior to proposed earthworks to ensure it was installed correctly and as per this plan;
- Sediment and erosion control fencing should be inspected daily by the Contractor (or a representative thereof) throughout construction, including prior to and after significant rain events, to ensure that the fencing is being maintained and functioning properly. Any issues that are identified must be resolved as quickly as possible, ideally the same day;
- Sediment and erosion control fencing should not be removed until adequate re-vegetation and site stabilization in areas of temporary disturbance has occurred. All areas of temporary disturbance should be re-seeded as soon as possible to maximize erosion protection and to minimize the propagation of populations of invasive species, which may spread to adjacent features. Additional plantings and/or growing seasons may be required for vegetation to establish; however, two growing seasons are typically sufficient to stabilize most sites;

- Equipment should be cleaned prior to arrival on site to protect adjacent Eastern Meadowlark and Bobolink habitat. All components should be inspected and cleaned including tires, undercarriage, and any part of the equipment that may transport invasive seeds to the site;
- To prevent accidental impacts to adjacent Eastern Meadowlark and Bobolink habitat, site access to the Subject Lands during the proposed earthwork activities should be limited to access points outside of the suitable habitat area with all equipment movement restricted to the limit of proposed earthworks activities; and
- In addition, all equipment left/stored over-night, if any, should be kept within the limit of proposed earthworks activities and outside of Eastern Meadowlark and Bobolink habitat.

3.0 CONCLUSION

It is the responsibility of Asahi Kasei Plastics North America, Inc. to ensure that the activity does not contravene the *ESA* (2007) and to fulfill all conditions of the conditional exemption, including adhering to the recommendations provided within this Management Plan. Updates to the Management Plan may be required if there is a change, error or omission in the administrative information provided within the NOA and to include a description of the mitigation measures undertaken through implementation of the Management Plan.

All of which is respectfully submitted,

MTE Consultants Inc.

Digitally signed by Megan Rochon
DN: cn=Megan Rochon, c=CA, o=MTE Consultants Inc., email=meganrochon1@gmail.com
Date: 2025.03.13 10:20:50 -04'00'

Heather Kime, B.Sc. (Hons)
13-Mar-25

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Ecologist
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Heather Kime
Senior Terrestrial Ecologist
548-886-1023
hkime@mte85.com

MAR:jmm
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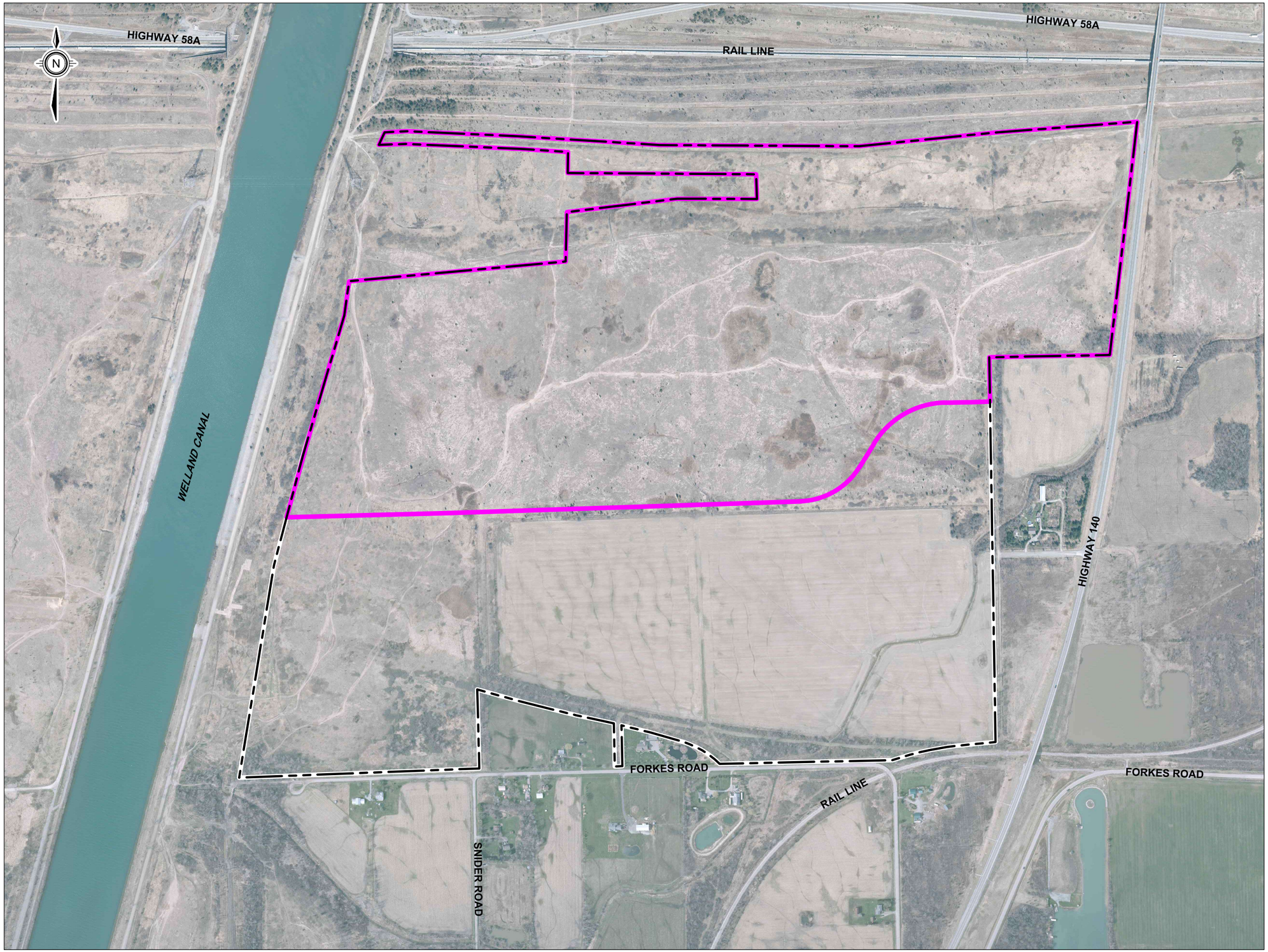
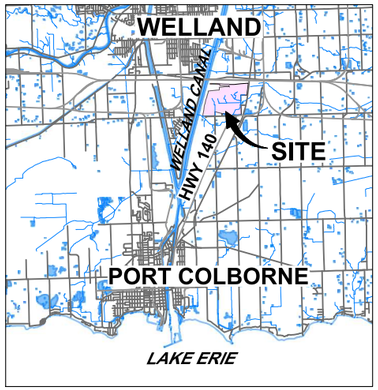
Figures





KEY PLAN (nts)

LEGEND

- SUBJECT LANDS
- BUILDING ENVELOPE

REFERENCES

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NOTES

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ALL LOCATIONS ARE APPROXIMATE.

0 75 150 225 300

MTE
Engineers, Scientists, Surveyors

PROJECT
HABITAT MANAGEMENT PLAN
HIGHWAY 140 LAND HOLDING
PORT COLBORNE, ONTARIO

TITLE
PROJECT LOCATION

Drawn	Scale	Figure
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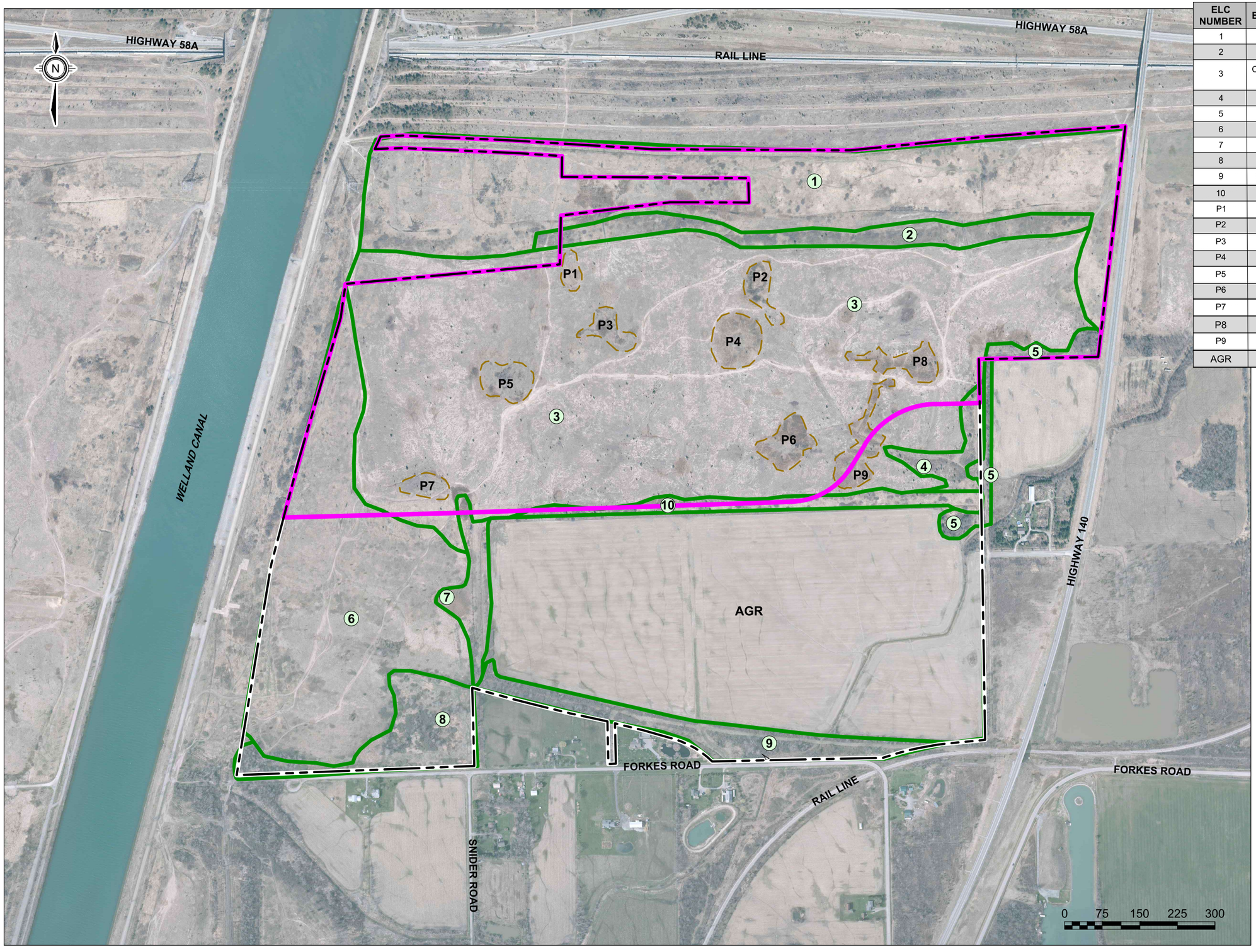
Checked	Project No. 61120_001	
Date 2025-03-06	Rev No. 0	



ELC NUMBER	ELC CODE	Description
1	CUM1	Mineral Cultural Meadow (27.51ha)
2	CUT1	Mineral Cultural Thicket (4.21ha)
3	CUM1/OPEN GROUND	Mineral Cultural Meadow (67.08ha)
4	CUT1	Mineral Cultural Thicket (1.48ha)
5	CUW1	Mineral Cultural Woodland (1.72ha)
6	CUT1	Mineral Cultural Thicket (20.62ha)
7	MAM2	Mineral Meadow Marsh (1.78ha)
8	SWT	Swamp Thicket (4.32ha)
9	CUW/SWD	Cultural Woodland/ Deciduous Swamp (4.03ha)
10	CUT	Cultural Thicket (2.36ha)
P1		Phragmites Inclusions (0.25ha)
P2		Phragmites Inclusions (0.49ha)
P3		Phragmites Inclusions (0.49ha)
P4		Phragmites Inclusions (0.92ha)
P5		Phragmites Inclusions(0.69ha)
P6		Phragmites Inclusions (0.76ha)
P7		Phragmites Inclusions (0.38ha)
P8		Phragmites Inclusions (0.66ha)
P9		Phragmites Inclusions (0.93ha)
AGR		Agricultural Land (40.49ha)

LEGEND

- SUBJECT LANDS
- BUILDING ENVELOPE
- (1) VEGETATION COMMUNITY
- VEGETATION COMMUNITY (Phragmites Inclusions)

REFERENCES

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PROJECT
HABITAT MANAGEMENT PLAN
HIGHWAY 140 LAND HOLDING
PORT COLBORNE, ONTARIO

TITLE
VEGETATION COMMUNITIES

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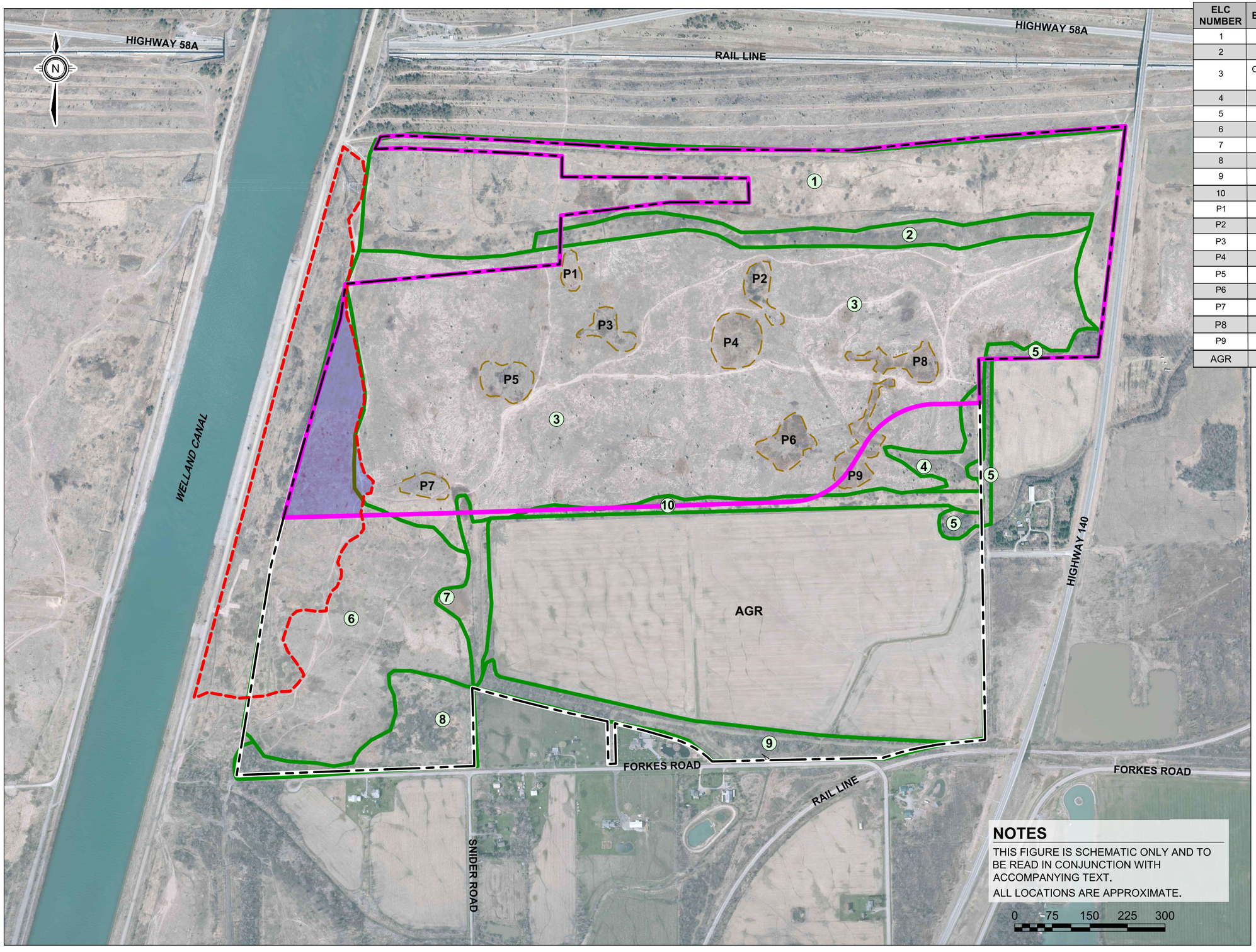

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P8		Phragmites Inclusions (0.66ha)
P9		Phragmites Inclusions (0.93ha)
AGR		Agricultural Land (40.49ha)

LEGEND

- SUBJECT LANDS
- BUILDING ENVELOPE
- VEGETATION COMMUNITY
- VEGETATION COMMUNITY (Phragmites Inclusions)
- HABITAT OF ENDANGERED OR THREATENED SPECIES
- BOBOLINK AND EASTERN MEADOWLARK HABITAT (3.906 HA)

REFERENCES

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PROJECT
HABITAT MANAGEMENT PLAN
HIGHWAY 140 LAND HOLDING
PORT COLBORNE, ONTARIO

TITLE
BOBOLINK AND EASTERN MEADOWLARK HABITAT

Drawn	Scale	Figure
DCH	1:7,500	3
Checked	Project No. 61120_001	
Date 2025-03-06	Rev No. 0	

Plot Date: March 6, 2025 - 11:16 AM

Appendix A

Monitoring Form

Eastern Meadowlark and Bobolink Monitoring Form – General Information

Date	Time	Weather	Temp (°C)	Fence Check	Additional Mitigation Req'd	SAR On-Site	Additional Mitigation Completed
				Y / N	Y / N	Y / N	
				Y / N	Y / N	Y / N	
				Y / N	Y / N	Y / N	
				Y / N	Y / N	Y / N	
				Y / N	Y / N	Y / N	
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