Long Sault Logistics Village

(PIN: 60138 – 0156,0158, 0162, 0163, 0164)

Environmental Impact Study
For Phase A

Prepared for:

Avenue 31 Capital Inc.
401-222 Somerset Street West
Ottawa, Ontario
K2P 2G3

Prepared by:

Bowfin Environmental Consulting Inc.
168 Montreal Road
Cornwall, Ontario
K6H 1B3

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List of Acronyms and Definitions

ABBO - Atlas of Breeding Birds of Ontario
ANSI – Area of Natural and Scientific Interest
BHA - Butternut Health Assessments
CC - Co-Efficient of Conservation
DBH - Diameter at breast height
DFO – Fisheries and Oceans Canada
EIS – Environmental Impact Study
ELC - Ecological Land Classification
    CUM – Cultural Meadow
    CUT – Cultural Thicket
    FOD – Deciduous Forest
ESA - *Endangered Species Act* (Provincial)
FL – Fork Length
GPS – Global Positioning System
        NAD 83: North American Datum 1983
        UTM: Universal Transverse Mercator
LIO - Land Information Ontario
MMP - Marsh Monitoring Program
NHIC – Natural Heritage Information Centre
NHRM - Natural Heritage Reference Manual
MTO – Ministry of Transportation Ontario
OMNR/MNRF - Ontario Ministry of Natural Resources (old name)
        -Ministry of Natural Resources and Forestry (new name)
OP – Official Plan
OWES - Ontario Wetland Evaluation System
PPS - Provincial Policy Statement
PSW - Provincially Significant Wetland
RRCA - Raisin Region Conservation Authority
SAR - Species at Risk (in this report they refer to species that are provincially or federally listed as endangered or threatened and receive protection under ESA or SARA)
SARA - *Species at Risk Act* (Federal)
SARO - Species at Risk in Ontario
SD&G – Stormont, Dundas, and Glengarry
SWH - Significant Wildlife Habitat
SWHCS – Significant Wildlife Habitat Criteria Schedules for Ecoregion 6E
SWHTG - Significant Wildlife Habitat Technical Guide
TL – Total Length

SRANK DEFINITIONS

S1 Critically Imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.

S2 Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

S3 Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4 Apparently Secure; uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 Secure; Common, widespread, and abundant in the nation or state/province.

? Inexact Numeric Rank—Denotes inexact numeric rank

SNA Not Applicable, A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

S#B Breeding

S#N Non-Breeding

SARA STATUS DEFINITIONS

END Endangered: a wildlife species facing imminent extirpation or extinction.

THR Threatened: a wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.

SC Special Concern, a wildlife species that may become threatened or endangered because of a combination of biological characteristics and identified threats.

SARO STATUS DEFINITIONS

END Endangered: A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's ESA.

THR Threatened: A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.

SC Special concern: A species with characteristics that make it sensitive to human activities or natural events.

Coefficient of Conservatism Ranking Criteria

0 Obligate to ruderal areas.

1 Occurs more frequently in ruderal areas than natural areas.

2 Facultative to ruderal and natural areas.

3 Occurs less frequent in ruderal areas than natural areas.

4 Occurs much more frequently in natural areas than ruderal areas.

5 Obligate to natural areas (quality of area is low).

6 Weak affinity to high-quality natural areas.

7 Moderate affinity to high-quality natural areas.

8 High affinity to high-quality natural areas.

9 Very high affinity to high-quality natural areas.

10 Obligate to high-quality natural areas.

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1.0 INTRODUCTION

Avenue 31 (Capital) Inc., the proponent, is looking at developing the property situated on part of Lots 31-37, Concession 5 in the Township of Cornwall, United Counties of Stormont, Dundas, and Glengarry (SD&G). It is bordered by the railroad to the south, Highway 401 to the north, Moulinette Road to the west and Avonmore Road to the east (Figure 1 and Figure 2). The site is within the settlement area of the Village of Long Sault (Township of South Stormont) and is zoned for Heavy Industrial Development.

The majority of lands were cleared by the others and are now heavily disturbed and at various stages of revegetation. The South Raisin River and three unnamed tributaries to the South Raisin River as well as one Unnamed Drain that flows towards Hoople Bay on the St. Lawrence River are depicted as crossing the site on the Land Information Ontario (LIO) database (Figure 2). The total area of the property is approximately 325 ha. The first phase of development, Phase A, is moving forward through a joint-venture between the proponent and Crews Rail (under the corporation of Camino LVS) is proposing to construct an industrial and logistics village in Long Sault, Ontario. This is a major infrastructure project for Eastern Ontario. The central piece of infrastructure is a large inter-modal rail yard and will include full-length unit train tracks that are connected along 2 km of the existing CN Mainline (Kingston Subdivision).

Bowfin Environmental Consulting Inc. (Bowfin) was retained by the proponent in 2020 to provide the background natural heritage system condition. The review considered natural heritage features that would be protected under the *Planning Act*, *Endangered Species Act*, *Fish and Wildlife Conservation* Act, *Species at Risk* Act, and *Fisheries Act*. A Headwater Drainage Feature and an evaluation of the unevaluated wetlands report were also prepared by Bowfin under separate covers. Bowfin is continuing to work for the joint-venture group and the following is the Environmental Impact Study (EIS) for Phase A. Note that, for the purposes of this report, a large temporary work area has been added to the area of impact for Phase A. This is to provide allowances for cut and fill activities that may be required. At this time, the size and location of the temporary works area is unknown. Other than a butternut inventory, no new field work was undertaken for Phase A. The relevant information from the existing conditions and headwater reports has been included herein. For items such as the woodland impact assessment, wetland evaluation and fisheries concerns, the Site has been treated as a whole to ensure that sufficient size and functions of these features are retained / enhanced even as the entire property is developed.

The Official Plan of the United Counties of SD&G (OP) follows the guidelines set out in the Provincial Policy Statement (PPS) (MMAH, 2014) in which there are several natural features and areas identified as needing protection. These are:

- Significant habitat of Endangered and Threatened Species;

- Significant wetlands;
- Significant woodlands;
- Significant valleylands;
- Significant wildlife habitat;
- Significant Areas of Natural and Scientific Interest; and
- Fish habitat.

These natural heritage features are depicted on Schedules A and B of the OP. Designated Provincially Significant Wetlands (PSWs) are given a land use designation on Schedule A and Constraints Overlays are used to depict identified natural features [Locally Significant Wetlands (LSWs), Areas of Natural and Scientific Interest (ANSIs), wildlife habitats, woodlands and valleylands] on Schedule B. For this project area the applicable schedules are South Stormont Schedules A4 and B4. Note that habitat for Endangered or Threatened Species is not depicted on the OP schedules. Their presence/absence must be determined based on the appropriate provincial methodologies and guidelines. Further, all waterbodies, including those not identified on databases, have the potential to be fish habitat. Finally, during the pre-consultation, the Raisin Region Conservation Authority (RRCA) indicated that the unevaluated wetlands were to be assessed using OWES and that there were coastal wetlands on-site. Again, this was completed and submitted with the Existing Conditions report (Bowfin, 2020). The Wetland Evaluation is now a stand alone document.

The following report provides a summary of our findings and an assessment of the functions and values of the natural features on site. It assesses the features to determine their significance following the applicable guidelines as referred to in the OP. This report provides the findings of the site investigations, relevant to Phase A, assesses natural heritage features functions and values (in Phase A or as a whole, as appropriate), provides avoidance and mitigation measures and identifies where further consultation/permitting is required (i.e. from Fisheries and Oceans Canada (DFO), and/or Ministry of Environment, Conservation and Parks (MECP)). Permit for alterations of watercourses/wetlands will be sought by the proponent from RRCA as a separate process.

Figure 1: General Location of Site

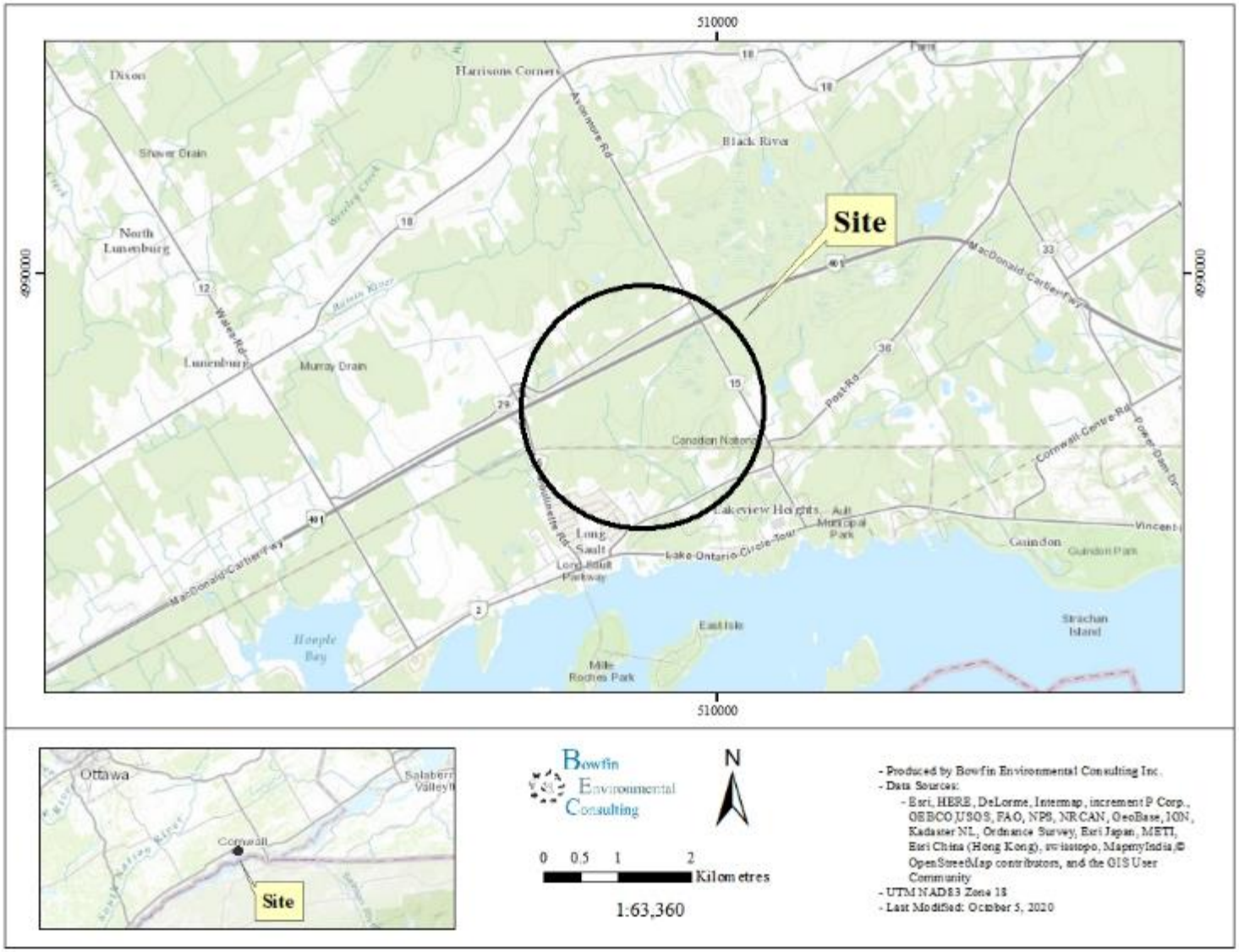


Figure 2: Site Details

2.0 METHODS

2.1 Study Area

For the most part, the OP calls for an evaluation of the subject lands and the adjacent 120 m. This is widened when analysing the potential for species at risk (SAR) as their protected habitats vary with the species being considered.

2.2 Background Review

Where the OP indicated that the features to be considered were those identified on their schedules, these took precedent. Other information collected from outside sources was used to help inform the functions of these features and to identify those not found on the schedules (i.e. Endangered and Threatened species habitat). Outside sources included: Natural Heritage Information Centre (NHIC) database, iNaturalist, Atlas of Breeding Birds of Ontario (ABBO), Fisheries and Oceans Canada (DFO) Aquatic Species at Risk Mapping, Make-a-Map Land Information Ontario (LIO), and LIO databases. Information from personal knowledge and observations of the area for other unrelated projects has also been included as appropriate.

2.3 Field Studies

2.3.1 Habitat Descriptions and General Flora Observations

Habitat mapping was completed through the use of satellite imaging and ground truthed during the field visits. The field studies were completed by systematically cruising the study area. Specific habitat types within the study area, identified during the preliminary mapping exercise were also targeted for community description. Habitat descriptions were based on the appropriate methodologies such as: *Ontario Wetland Evaluation System, Southern Manual* (OWES) for wetland habitats and the *Ecological Land Classification for Southern Ontario* (ELC) for terrestrial habitats.

The MNRF's ELC and OWES definition of wetlands do not match one another. Since wetlands are to be evaluated following OWES, the determination of the presence/absence of wetland habitat was based on the OWES definition of wetland habitat:

> *"Lands that are seasonally or permanently flooded by shallow water as well as lands where the water table is close to the surface; in either case the presence of abundant water has caused the formation of hydric soils and has favoured the dominance of either hydrophytic or water tolerant plants".*

Specific attention was paid to locating species at risk (SAR) or species of conservation value[1] listed as potentially occurring within the study area. If these species were observed, they would be photographed, and their coordinates recorded on a hand-held GPS using NAD83. Plants that could not be identified in the field were collected for a more detailed examination in the laboratory. Nomenclature used in this report follows the Southern Ontario Plant List (Bradley, 2007) for both common and scientific names which are based on Newmaster *et al.* (1998). Authorities for scientific names are given in Newmaster *et al.* (1998).

2.3.2 Butternut Inventory

Butternuts are an endangered species. While the Ministry of Environment, Conservation and Parks (MECP) is now responsible for the *Endangered Species Act* (ESA), they have not provided new guidelines. Previously, the MNRF certified Butternut Health Assessors (BHA) to complete Butternut Health Assessments as per MNRF's guidelines. In 2020, a qualified Butternut Health Assessor (#723) searched for only those individuals that could be considered a Category 3. This was because BHA reports are only valid for a 2-year period and because Category 3s have the largest financial repercussions to a project. In 2021, Bowfin's staff completed an inventory for any butternut, regardless of size, with Phase A lands and their adjacent 50 m (where access was possible). Any individuals noted were marked with white spray paint and flagging tape and numbered sequentially. Their UTMs, using a GPS unit set at NAD83, were recorded and the individual assessed according the BHA protocol. In 2022, additional butternut inventories will be completed where the cut and fill will be required. Additional information on the potential to impact butternuts is provided and discussed in Section 5.

2.3.3 Bird Surveys

Information on bird use of the area was collected through a raptor nest survey, daytime breeding bird surveys and nighttime surveys for eastern whip-poor-will. Note that consideration of the need to complete the SAR least bittern surveys were made, but a review of the habitats, during the first visit, found that the habitat was not suitable for this species. One least bittern survey was completed prior to confirming the lack of suitable habitat.

The raptor nest survey consisted of looking for evidence of nesting (such as stick nests, food caches, whitewashing of branches and foliage, accumulation of feathers/fur or prey remains on the ground or in shrubs as per the *Significant Wildlife Habitat Technical Guide* (SWHTG) Appendix O) as well as the raptors themselves.

The Least Bittern surveys follow the protocols described in the *National Least Bittern Survey Protocol* (Jobin et al. 2010) and require three visits. The visits can take place between early May

[1] "Species of conservation value" are those species listed as S1-S3 or as Special Concern (provincially or federally) or endangered or threatened federal species that are not listed as endangered or threatened provincially.

and mid-July and must be spaced at least 10 days apart. Since the calling of this species decreases after nesting, it is recommended that, in this part of Ontario, the first visit be in early May. The surveys would begin no earlier than 30 minutes before dawn and must be completed by 10 am. They are to take place on days with suitable weather avoiding days with rain, extreme heat (>30°C) or winds exceeding 19 km/h). The station is surveyed for 13 minutes [5 minutes passive, 5 minutes active (playing of the call response broadcast), and 3 minutes passive]. Two least bittern survey points were established (again these were only surveyed following this protocol for the one visit, after which the general daytime breeding bird protocol was followed).

The general daytime breeding bird surveys methods were as follows:

- Two visits were completed for the forest and field habitats and these two visits were a minimum of 15 days apart.
- Surveys began no earlier than 30 minutes after dawn and completed by midday.
- Visits were conducted on days with no rain, little to no wind and good visibility.
- The survey type was point counts.
    - Consisted of 5-min point count stations spaced 300 m apart (or as near as 100 m if needed to obtain information from all habitat types)
    - Point counts consisted of listening and observing over the specified time period and recording the number of birds heard/seen, their sex, location, behaviour and interactions with others; and
    - While walking between points, any additional observations were recorded.
- Birds were identified by sound and/or sight.

Nighttime surveys were completed as per the province's guidelines in 2020. These methods consist of:

- Three surveys to be completed at least 1 week apart between May 18th and June 30th and on nights with appropriate conditions [over 10°C, calm winds (less than 3 on the Beaufort Scale), 50% or more visible moon face illuminated & moon over the horizon].
- Begin at least 30 minutes after sunset and no later than 15 minutes before sunrise
- Completed when the moon is above the horizon
- Point observations consisted of a minimum of 6 minutes/station spaced approx. 500 m apart.

Survey point locations are depicted on Figure 3 and Figure 4.

2.3.4 Incidental Fauna Observations

During the site visit any wildlife observations were recorded. Incidental observations included observations of an individual, its tracks, burrows, feces and/or kill sights.

Figure 3: Location of Daytime Breeding Bird Surveys

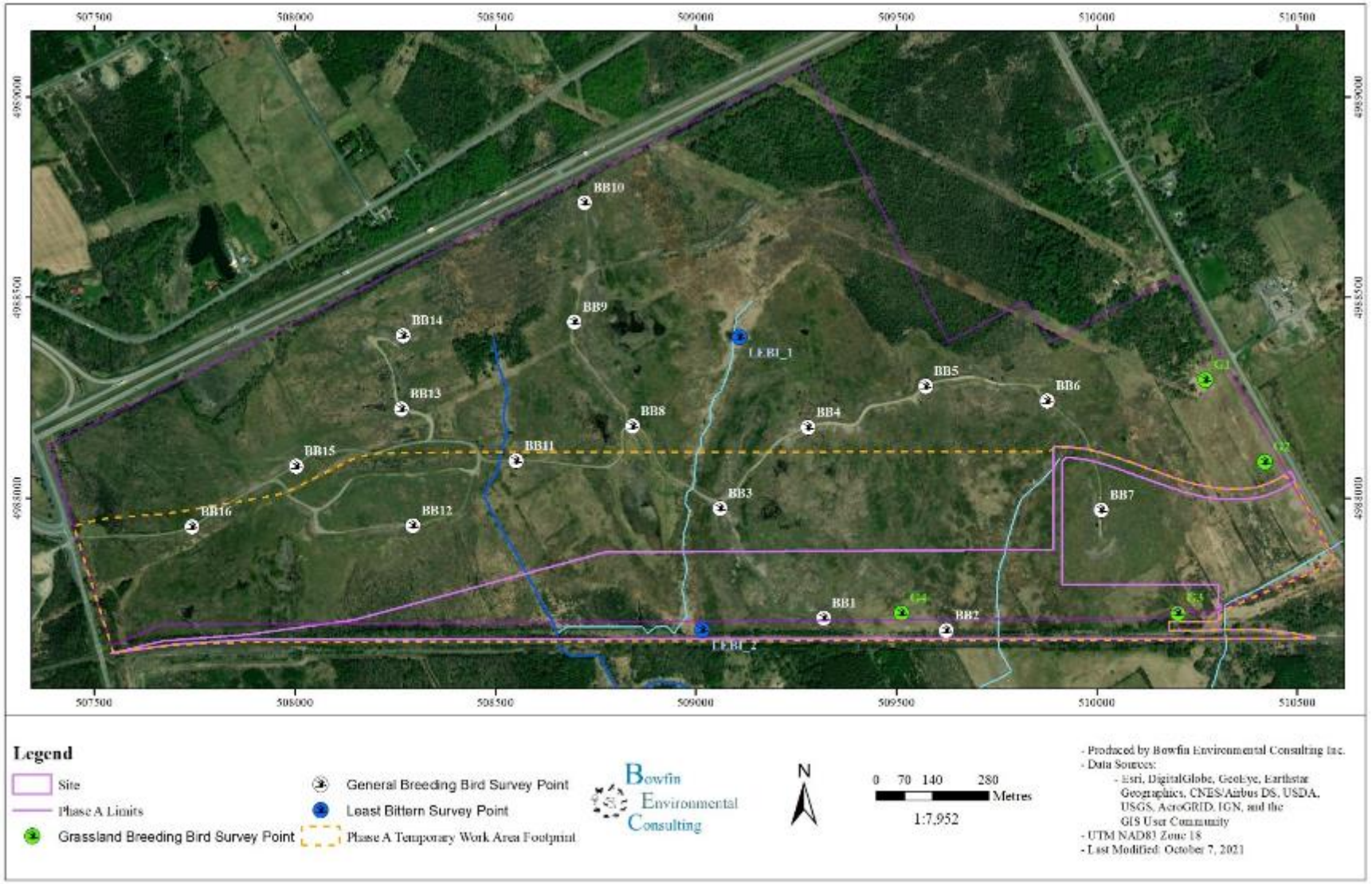


Figure 4: Eastern Whip-poor-will Survey Points

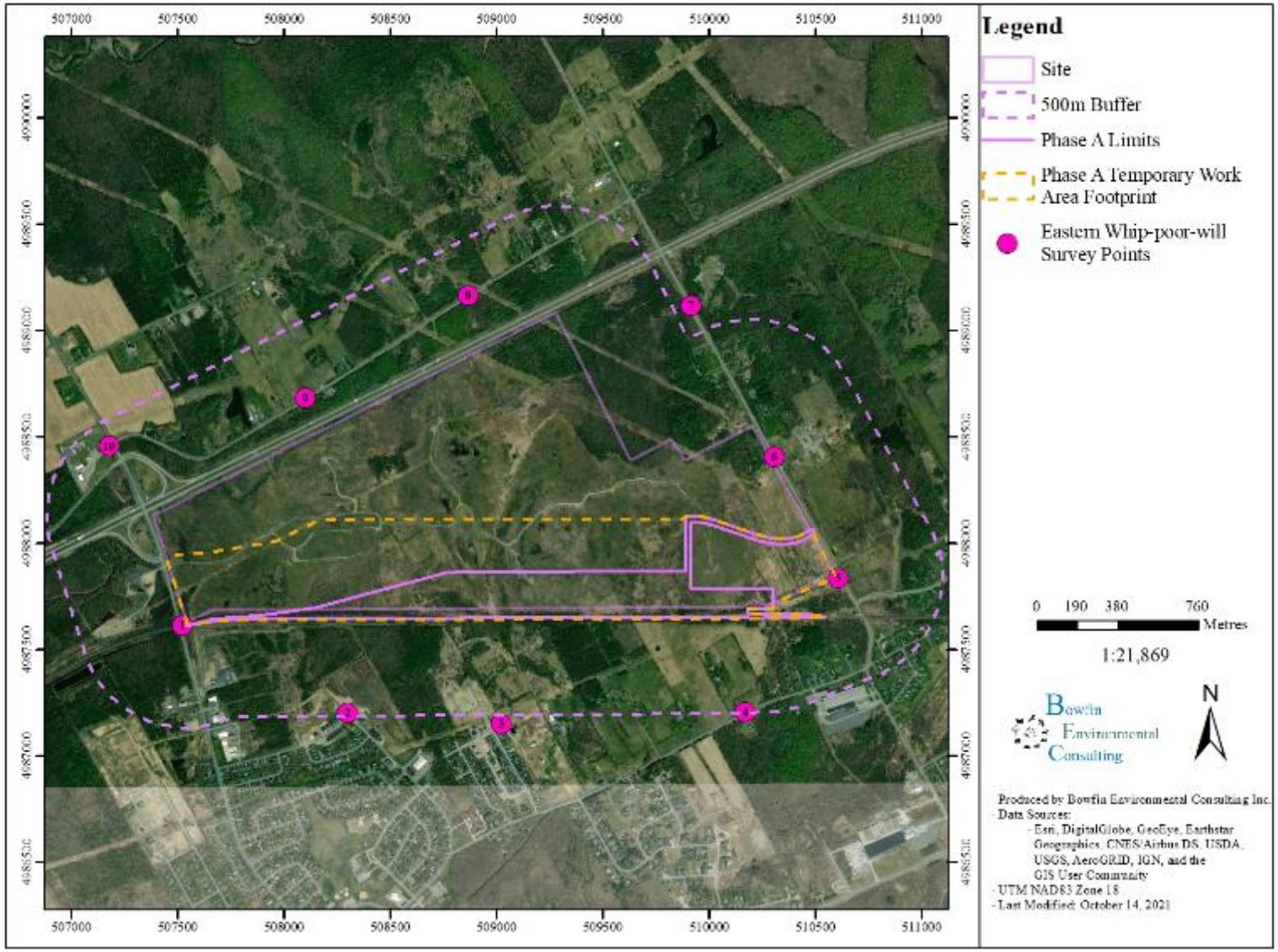
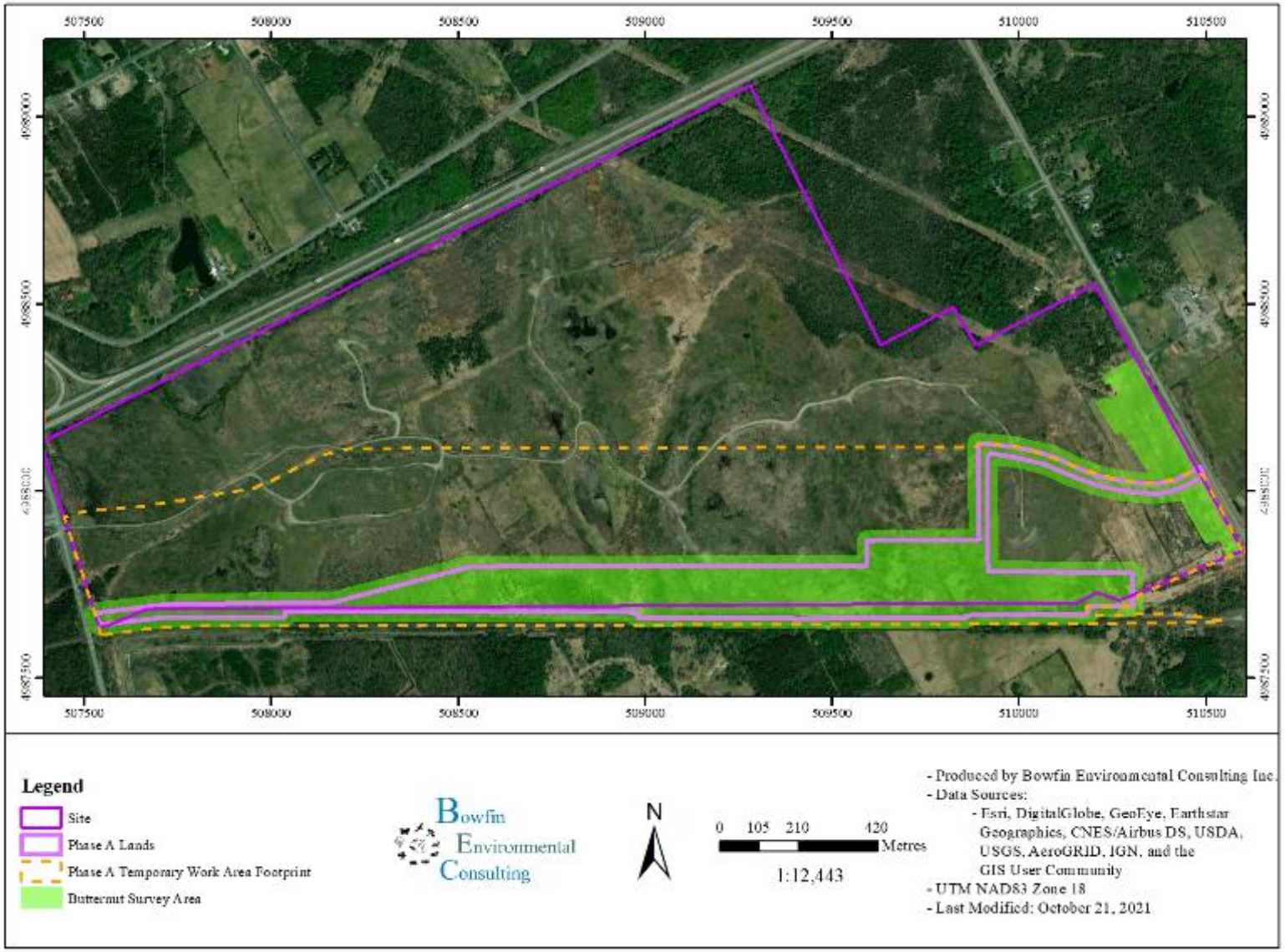


Figure 5: Butternut Survey Area



3.0 BACKGROUND REVIEW

3.1 Location

The property is situated between Highway 401, the railroad, Moulinette Road and Avonmore Road. It includes parts of Lots 31-37, Concession 5 in the Township of Cornwall. The nearest populated area is Long Sault, situated roughly 0.7 km to the south. The property's land use includes Urban Settlement Area, Special Land Use Area and Special Land Use District. The area of interest for Phase A extends along the entire width (east to west) side of the property, south of the existing access road.

3.2 Natural Heritage Features

The schedules of the OP indicated that there were five watercourses that traversed the site, and all were considered potential fish habitat, it also depicted significant woodland and unevaluated wetlands. All other features identified on background mapping were situated more than 120 m away. It is noted that in this OP, significant wildlife habitat, valleylands and ANSIs are those identified on the schedules. Since none were identified, these are not discussed any further.

The Headwater Drainage Features report identified three additional watercourses, agricultural drains. They were confirmed not to provide fish or amphibian habitat.

Table 1: Summary of Available Background Information on the Identified Natural Features (PSW, Woodlands, Valleylands, ANSIs, ESA, SWH, and Fish Habitat)

Natural Heritage Feature	Present within Area to be Developed	Present within 120 m of Area to be Developed	Additional Notes
Provincially Significant Wetlands (PSW)	No		Black River Swamp (0.8 km to the NE). Lakeview Marsh (1.8 km to SE) Hoople Creek Wetland (3.0 km to SW)
Unevaluated Wetlands (including potential coastal wetlands)	Yes these were evaluated as part of the existing conditions at the request of RRCA and found to be not significant.	n/a	none

Natural Heritage Feature	Present within Area to be Developed	Present within 120 m of Area to be Developed	Additional Notes
Areas of Natural and Scientific Interest (ANSIs)	No		None within 5 km of the site
Habitats or species designated by ESA (Provincial)	No known occurrences		
Significant Woodlands	OP schedules identified woodland onsite.		Nearest woodland offsite is 170 m to the SW
Significant Valleylands	No		none
Significant Wildlife Habitat (SWH)	None on the OP		none
Fish Habitat	Five candidate fish habitat features were identified on OP and three Agricultural Drains were found during the headwater assessment. Bowfin's work on the Agricultural Drains indicate that these are not direct fish habitat. There is existing fish community available for the South Raisin River / Unidentified Drain 1 (LIO used the same data for both of these features), and Unnamed Drain 3.		Additional information on the fish habitat is provided in Section 3.2.2 A full Headwater Drainage Features Assessment Report has been prepared as a separate document. A request for review was submitted to DFO in 2021.

Sources of background information: OP (SDG), Google Satellite Imaging, Bowfin's Headwater Drainage Assessment Report (2020)

Figure 6: Official Plan Schedule A4a (Long Sault Urban Settlement Area)

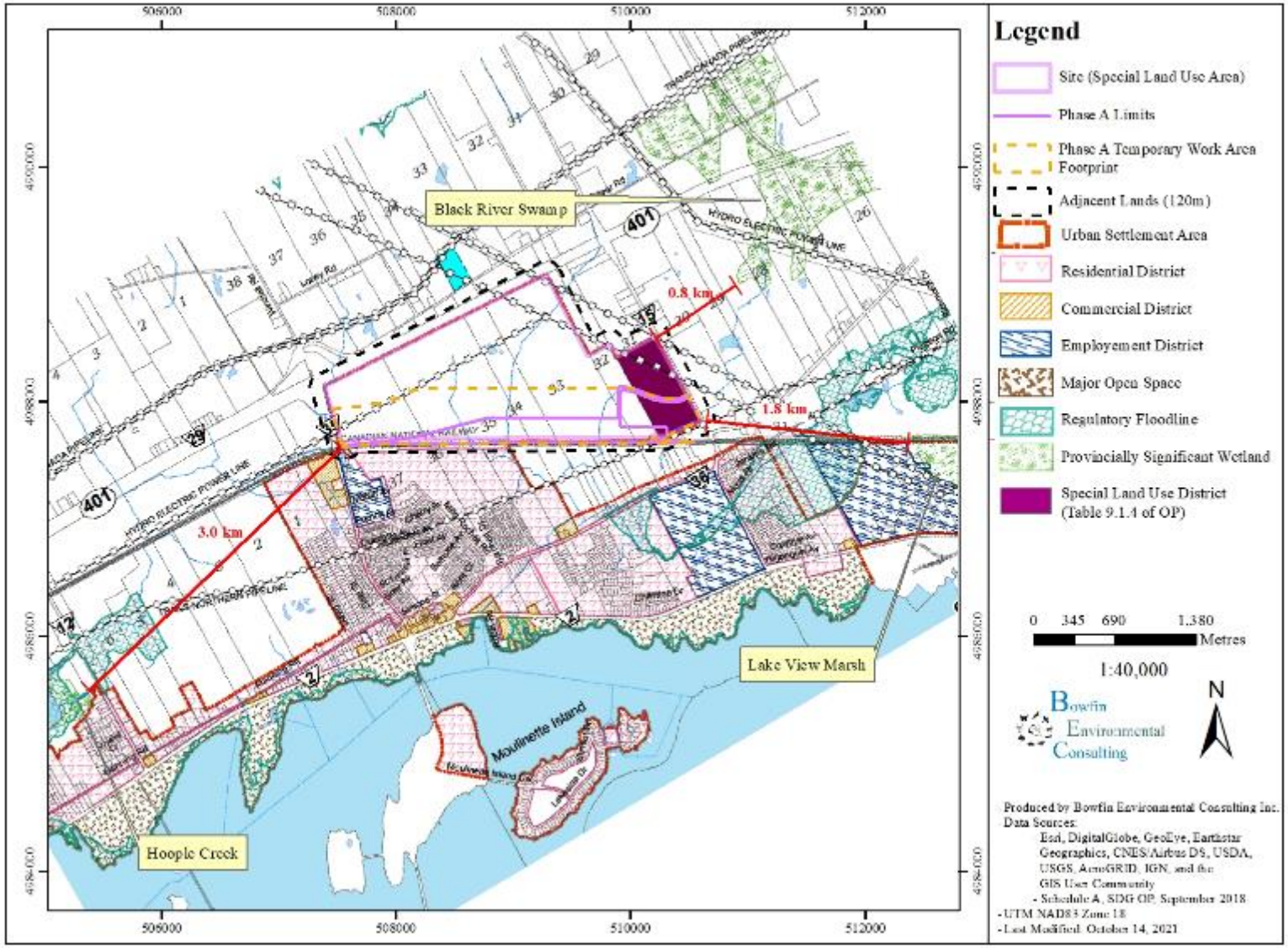
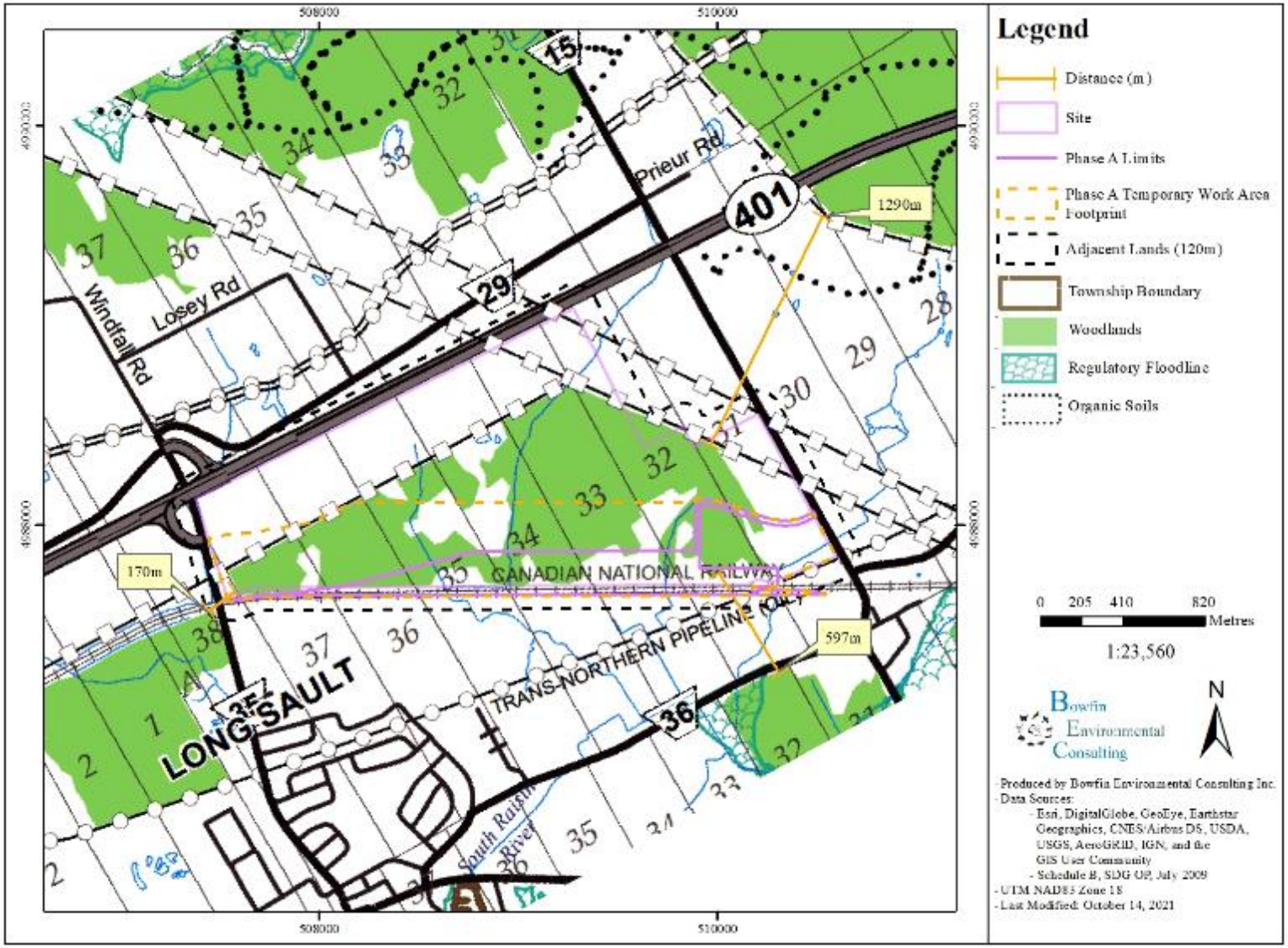


Figure 7: Official Plan Schedule B4 (Township of South Stormont)



4.0 SITE INVESTIGATION RESULTS

4.1 Site Investigation Dates and Purpose

As mentioned above, several site visits were undertaken. A summary of the dates, times, ambient conditions, and purpose for the visits from 2020-2021 are provided in Table 2. The vegetation communities (terrestrial followed by wetlands) are described in section 4.2, after which are the results from the terrestrial species-specific surveys. Section 4.4 provides a summary of the fish habitat and community surveys.

Table 2: Summary of Dates and Times of Site Investigations

Date	Time (h)	Staff	Air Temperature (Min-Max) °C	Cloud Cover (%) Beaufort Wind Scale [Descriptor (scale)]	Moon Visibility (%)	Purpose
May 11, 2020	1000-1430	M. Lavictoire	8.0 (1.2-10.2)	Overcast Wind: light breeze (2), changing to light air (1)	n/a	- Initial Visit/HDF
May 12, 2020	0900-1200	M. Lavictoire	5.0-6.0 (-2.8-7.8)	Clear skies Wind: light breeze (2) changing to gentle breeze (3)	n/a	- Initial Visit/HDF
May 20, 2020	0800-1245 2000-2100	M. Lavictoire	12.0-19.0 (6.0-23.5)	Clear skies Wind: light air (1) changing to calm (0)	n/a	- Amphibian survey - HDF delineation - HDF Flow Visit -Initial visit
May 27, 2020	1600-1800	M. Lavictoire	36.0 (19.0-34.8)	Partly cloudy Wind: light breeze (2) to gentle breeze (3)	n/a	- Fish Community Sampling
May 28, 2020	0600-1045 0745-1015	C. Fontaine M. Lavictoire	21.0-29.0 (19.5-30.0)	Partially cloudy changing to cloudy Wind: light breeze (2) changing to calm (0)	n/a	- Fish Community Sampling - Breeding Bird Survey
June 2, 2020	0800-1040	M. Lavictoire	8.0-14.0 (7.8-15.3)	Overcast Wind: light air (1)	n/a	- Grassland Bird Survey
June 3, 2020	2100-2230	C. Fontaine	13.0-15.0 (13.0-17.0)	Partially cloudy changing to clear skies Wind: calm (0)	96.2	- Eastern Whip-Poor-Will Survey
June 5, 2020	2100-2230	C. Fontaine	20.0-23.0 (14.0-30.0)	Partially cloudy Wind: light air (1)	99.5	- Eastern Whip-Poor-Will Survey
June 6, 2020	2100-2130	S. Lafrance A. Yates	22.0 (17.0-27.0)	Clear skies Wind: light air (1)	n/a	- Amphibian Survey

Date	Time (h)	Staff	Air Temperature (Min-Max) °C	Cloud Cover (%) Beaufort Wind Scale [Descriptor (scale)]	Moon Visibility (%)	Purpose
June 10, 2020	0630-1000	M. Lavictoire	15.0-18.0 (14.1-28.9)	Partially cloudy Wind: light air (1) changing to gentle breeze (3)	n/a	- Grassland Bird Survey - Vegetation Description
June 18, 2020	2115-2230 2100-2130	M. Lavictoire S. Lafrance A. Yates	23.0-18.0 (13.2-31.8)	Clear skies Wind: calm (0) changing to light air (1)	n/a	- Amphibian Survey
June 23, 2020	0550-1025	M. Lavictoire	18.0-29.0 (19.4-30.4)	Cloudy changing to partially cloudy Wind: calm (0) changing to light breeze (2)	n/a	- Breeding Bird Survey
June 30, 2020	2230-2315	S. Lafrance A. Yates	21.0 (18.4-26.9)	Clear skies Wind: calm (0)	79.5	- Eastern Whip-Poor-Will Survey
July 10, 2020	0800-0845	S. Lafrance	24.0 (21.2-36.4)	Clear skies Wind: calm (0)	n/a	- HDF Flow Visit
July 18, 2020	0720-1015	M. Lavictoire	21.0-25.0 (17.2-31.9)	Partially cloudy Wind: light air (1) changing to light breeze (2)	n/a	- Vegetation Description
July 21, 2020	0745-1200	M. Lavictoire	19.0 (17.3-25.8)	Cloudy Wind: light air (1) changing to light breeze (2)	n/a	- Vegetation Description
August 20, 2020	0645-0945	C. Fontaine	11.0-15.0 (10.0-19.4)	Partially cloudy Wind: calm (0) changing to light air (1)	n/a	- Butternut Assessment
August 24, 2020	0900-1130	C. Fontaine	21.0-26.0 (18.0-28.4)	Overcast Wind: light air (1) changing to light breeze (2)	n/a	- Butternut Assessment
August 25, 2020	0630-0915	C. Fontaine	23.0 (19.8-22.8)	Overcast Wind: light breeze (2) changing to gentle breeze (3)	n/a	- Butternut Assessment
August 31, 2020	0830-1315 0900-1130	C. Fontaine M. Lavictoire	14.0-19.0 (9.7-21.5)	Clear skies Wind: calm (0) changing to light breeze (2)	n/a	- Fish Habitat Description - Vegetation Description
September 2, 2020	0830-1145	M. Lavictoire	21.0 (19.2-26.1)	Overcast Wind: gentle breeze (3) changing to moderate breeze (4)	n/a	- Vegetation Description

Date	Time (h)	Staff	Air Temperature (Min-Max) °C	Cloud Cover (%) Beaufort Wind Scale [Descriptor (scale)]	Moon Visibility (%)	Purpose
September 5, 2020	0915-?	M. Lavictoire	15.0 (8.9-20.5)	Clear skies Wind: gentle breeze (3)	n/a	- Vegetation Description
September 11, 2020	0800-1130	M. Lavictoire	11.0 (8.9-17.0)	Overcast Wind: light breeze (2)	n/a	- Vegetation Description
September 12, 2020	0830-1110	M. Lavictoire	9.0 (4.7-20.3)	Partially cloudy Wind: light air (1)	n/a	- Vegetation Description
Sept. 25. 2020	1000-1200	M. Lavictoire	12.0 (9.5-18.0)	Overcast Wind: light air (1)	n/a	- Vegetation Description
June 1, 2021	1010-1300	M. Lavictoire, S. Lafrance, J. Malcolm A. Quinsey	18.0 (12.0-24.0)	Clear skies Wind: gentle breeze (3)	n/a	-Butternut Survey
June 2, 2021	0800-1200	S. Lafrance, J. Malcolm A. Quinsey	18.0 (15.0-27.0)	Clear skies Wind: light breeze (2)	n/a	-Butternut Survey
June 4, 2021	0800-1200	S. Lafrance, J. Malcolm A. Quinsey	18.0-24.0 (15.0-26.0)	Clear skies Wind: light breeze (2) changing to light air (1)	n/a	-Butternut Survey
June 7, 2021	0800-1200	S. Lafrance, J. Malcolm A. Quinsey	24.0-30.0 (20.5-33.0)	Clear skies Wind: light breeze (2) changing to gentle breeze (3)	n/a	-Butternut Survey
June 10, 2021	0900-1320	M. Lavictoire	17.0 (12.5-23.5)	Partially Cloudy Wind: light breeze	n/a	-Butternut Assessment

M. Lavictoire – Michelle (Nunas) Lavictoire – B. Sc. Wildlife Resources and M.Sc. Natural Resources
C. Fontaine - Cody Fontaine - Fisheries and Wildlife Technologist
S. Lafrance – Sophie Lafrance – B.Sc. Biology and graduate diploma in Ecosystem Restoration
A. Yates – Abby Yates – B.Sc. Env. Ecology
J. Malcolm – Coop Placement (BA. Environmental Studies
A. Quinsey – Al Quinsey – B.Sc. Environmental Biology

*Min-Max Temp Taken From: Environment Canada. National Climate Data and Information Archive. Cornwall. Available http://climate.weatheroffice.gc.ca/ [October 15, 2021]

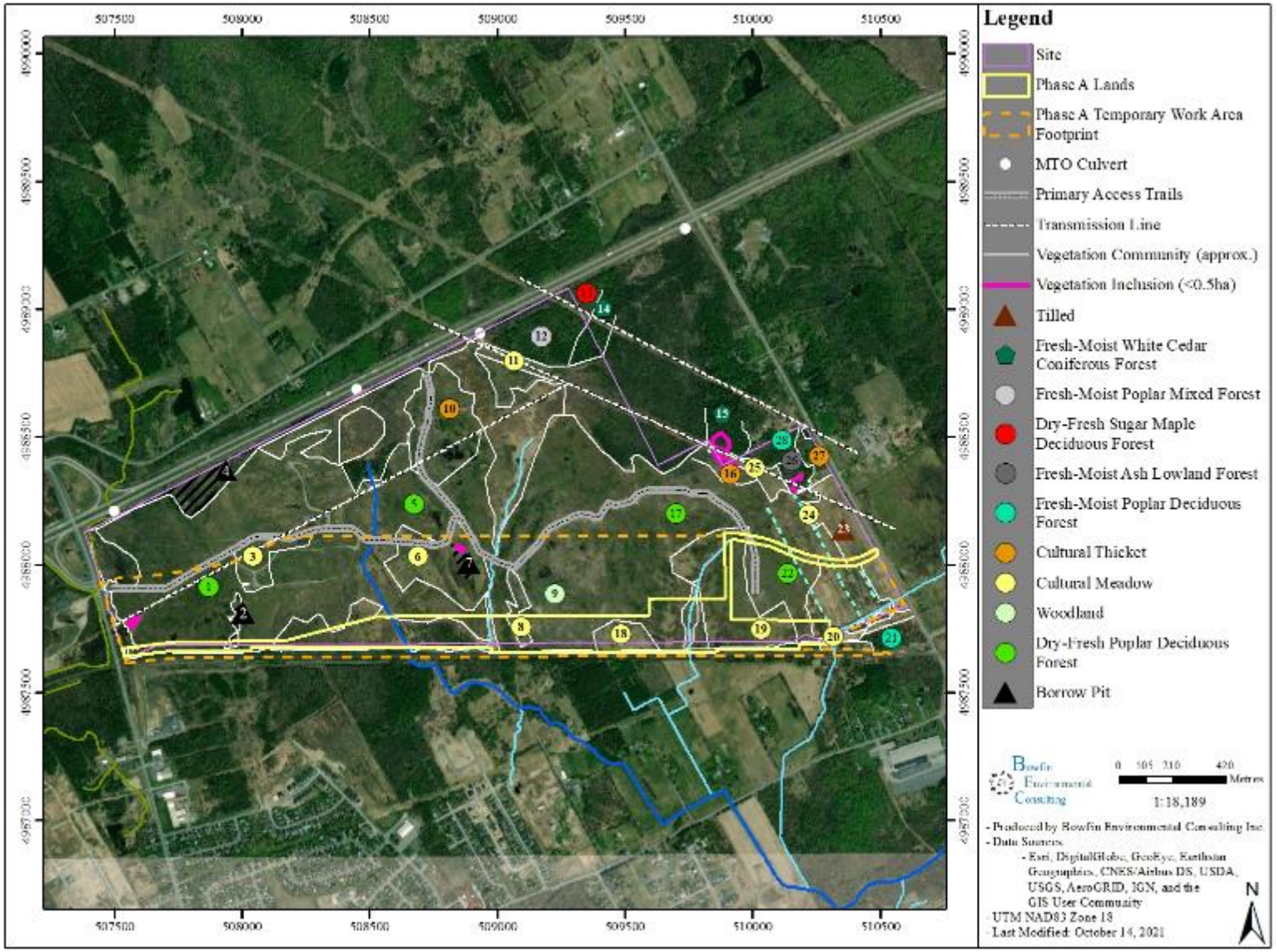
4.2 Vegetation Communities

The site is crossed by three transmission line corridors; two parallel to one another in the northeast corner and one across the entire site in an east-west direction. There are also several trails and access roads throughout the site, evidence of a historical agricultural use (rock walls, fallow fields), and evidence of excavation/creation of borrow pits. Under the existing conditions, almost the entire site was cleared. While the vegetation is now re-naturalizing, the landscape remains heavily impacted by ruts and slash (Figure 2).

The site was visited multiple times during various seasons in 2020, and the vegetation communities described. The adjacent lands to the north of Highway 401, west of Moulinette Road, and south of the railroad were not accessed. These are fully separated from the project, private lands and will not be impacted directly. Any potential to indirectly impact features are discussed in Section 5.0, based on the interpretation of the habitats from available imagery.

Since there is a lack of recent imagery for this site and because of the site has re-vegetated into a patchwork of communities, it was often not possible to accurately depict the estimate the boundaries of the cultural thickets, regenerating deciduous forest communities and cultural meadows. Only the wetland communities were delineated (see section 4.2.2), with a hand-held GPS. This was completed as part of the assessment of the wetland's significance. In addition to the disturbances identified above, much of the site is heavily disturbed by the recent clearing with ruts and slash throughout. Because of the recent and historical disturbances some of the communities were very small (much less than the 0.5 ha minimum size) and some did not fit the traditional ELC types. The best fit was applied. Those vegetation communities that are in the area of interest for Phase A are described below along with the dominant plants and a representative photograph. Inclusions are described at the end of the nearest community.

Figure 8: Upland Vegetation Communities



4.2.1 Upland Habitats

This section describes the active agricultural lands, cultural meadows, cultural thickets, woodland, deciduous forests, mixed forests coniferous forests, and borrow pits. The topography consisted of one with many large hills (for the area). Section 4.2.2 describes the wetland communities.

Agricultural Lands (Community 23)

The only active agricultural field was the recently tilled lands on the east side of the site, next to Avonmore Road.

Photo 1: Looking at the edge of the tilled field (Community 23) (September 11, 2020)

Cultural Meadows

Cultural meadows are those areas where the woody vegetation is less than 25% cover. There were several cultural meadows identified on Figure 8. Three that were disturbed by the clearing of vegetation and contained areas with ruts and slash are all labelled as Communities 3, 6 and 8. Two areas are under the northwest-southeast transmission lines (Communities 11 and portion of 25). The remainder appear to have previously been agricultural (Communities 18, 19, 20, and 24). All were dominated by broadleaf species (as opposed to grasses).

Communities 3, 6 and 8 were situated in the centre of the site and near one of the access roads. The dominant layer was the ground layer which provided 80% cover and was variable. Most often the common species were one or more of: bird's-foot trefoil, white sweet-clover, black-eyed susan, ox-eyed daisy, Canada goldenrod, late goldenrod, purple clover, grasses, strawberry, wild parsnip, black medick, sow thistle, New England aster, common mullein and/or bedstraw. These areas had less than 20% woody vegetation which consisted typically of young deciduous trees (trembling aspen, green ash, basswood, bitternut hickory, ironwood) or single individuals or patches of shrubs (common buckthorn, red-osier dogwood, honeysuckle and gray dogwood).

Photo 2: Looking the cultural meadow of Community 3 (August 31, 2020)

Community 18 and 19 were both next to the railroad in areas that are likely old agricultural fields. Their vegetation was very similar consisting of timothy, bird's-foot trefoil, smooth brome, late goldenrod, quack grass, cow vetch, wild parsnip, ox-eyed daisy, purple clover and wild carrot. The woody vegetation (<10%) included hawthorn, honeysuckle, common buckthorn, nannyberry, green ash and gray dogwood. Sometimes the gray dogwood was present in patches.

Photo 3: Cultural meadow of Community 18 (June 23, 2020)

Community 20 was a small meadow situated between the tall shrub swamp and deciduous forests near the Unnamed Drain 3. This community was strongly vegetated by goldenrods with some reed canary grass and stinging nettle.

Photo 4: Cultural meadow of Community 20 (September 25, 2020)

The remaining cultural meadow communities were near the northwest-southeast transmission lines and do not form part of the area of interest for Phase A.

Cultural Thicket (Communities 10, 16, and 27)

Cultural thickets are areas with less than 25% tree cover (of any size) and more than 25% shrub species cover. There were three communities categorized as cultural thickets and included patches of cultural meadows.

The largest thicket was Community 10 on the north side, in the centre of the site. This was the only community within the area of interest for Phase A. It was between a marsh and a tall shrub swamp community and was impacted by the east-west transmission line. The woody vegetation was strongly dominated by red raspberry and, where present, could form up to 50% of the cover. There were a few young green ash. The ground cover (85%) included Canada and late goldenrods, sow thistle, strawberry, common mullein, wild carrot, Canada thistle, and grass-leaved goldenrod. This community was strongly impacted by ruts and slash.

Photo 5: Looking at the cultural meadow/thicket (Community 10) (August 31, 2020)

Cultural Woodland (Community 9)

Cultural woodlands have trees species (of any age) that provide more than 35% but less than 60% cover. Only one portion of the regenerating cleared lands consisted of a woodland and it did not fit with any of the types in the ELC. This community is not delineated from the Dry-Fresh Poplar Deciduous Forest on Figure 8 because it could not be distinguished on the imagery. This community (13) was in the middle of the site. It was situated on a hill and had an upper layer (2-3 m tall; 20-50% cover) vegetated with a variety of green ash, Manitoba maple, basswood along with some bitternut hickory and/or bur oak. The lower layer (1 m tall; 5-50% cover) included red raspberry, common buckthorn, and green ash along with areas that had black cherry, basswood, and gray dogwood. The ground vegetation (80% cover) included late goldenrod, grasses, wild parsnip, common mullein along with common burdock, cow vetch, Canada thistle, strawberry, and buttercup.

Photo 6: Cultural woodland (Community 9) (June 10, 2020)

Deciduous Forests

Deciduous forest are those with less than 25% cover by coniferous trees and more than 60% cover by trees in general (any size). The only deciduous forest community in the disturbed area was the Dry-Fresh Poplar Deciduous Forest that covered the majority of the cleared lands. Other forests in the study area were all situated on the east side of the site and consisted of Fresh-Moist Poplar Deciduous Forest, Fresh-Moist Ash Lowland Forest, and Dry-Fresh Sugar Maple Deciduous Forest.

Dry-Fresh Poplar Deciduous Forest Type (FOD3-1) (Communities 1, 5, 17, and 22)

The majority of the site consisted of regenerating poplars, usually trembling aspen but some areas of largetooth aspen. All of the areas were heavily impacted by the clearing with ruts and slash. The upper layer (1-3 m tall; 50-80% cover) was vegetated sometimes almost exclusively with trembling aspen. Eastern cottonwood, largetooth aspen, green ash, red maple, American elm were represented to a lesser extent. The lower layer (<1 m tall; 10% cover) included red raspberry, young Basswood, green ash and trembling aspen. The ground vegetation (15-50% cover) included strawberry, bracken fern, daisy fleabane, late goldenrod, black-eyed susan, strangling dogvane (an invasive species), and poison ivy.

Photo 7: Regenerating Poplar Deciduous Forest (Community 01) (June 10, 2020)

Inclusion to Community 1

There was a coniferous forest inclusion south of the access road and near the east-west transmission line and Moulinette Road. It was dominated by the canopy layer (6-8 m tall; 90% cover) vegetated by balsam fir, easter white cedar with some white birch. The ground layer (5-

30% cover) included wild sarsaparilla, asters, baneberry, Canada mayflower, grasses, regenerating bur oak, Basswood, and bitternut hickory.

Photo 8: Inclusion consisting of a remnant coniferous forest near Moulinette Road (September 12, 2020)

Fresh-Moist Poplar Deciduous Forest Type (communities 21, and 28)

These two communities were situated on the side slopes of small hills, and both were disturbed by linear development (pipeline and railroad near Community 21 and transmission lines for Community 28). Community 28 is outside of the area of interest for this phase.

Community 21, near Avonmore Road, was entirely offsite, and in the adjacent lands. It was situated south from the tall shrub swamp along the Unnamed Drain 3. After a narrow transition of gray dogwood with hawthorn upland thicket the vegetation became one of a Fresh-Moist Poplar Deciduous Forest Type. Its canopy layer was 6-10 m tall and provided 60% cover. The dominant species was trembling aspen (15-35 cm diameter) with a few green ashes (15 cm diameter). The sub-canopy (2-4 m; 30%) consisted of green ash and some gray dogwood. The understory (<1 m; 30% cover) included young green ash, bur oak and common buckthorn. The ground cover (up to 60%) was mostly dwarf raspberry, hog peanut, sensitive fern, Virginia creeper and riverbank grape. There were many downed trees.

Photo 9: Looking at the edge of the fresh-moist poplar deciduous forest (Community 21) (September 25, 2020)

Mixed Forest

There was one community, Fresh-Moist Poplar Mixed Forest Type (Community 12), that was considered a mixed forest. Mixed forests still include more than 60% cover by tree species (any size) but include a mix of coniferous and deciduous species. A minimum of 25% relative cover must be provided by either coniferous or deciduous species to be considered mixed.

Fresh-Moist Poplar Mixed Forest Type (Community 12)

Situated within the right-of-way (RoW) of the transmission lines in the northeast corner of the subject lands and continuing offsite was a fresh-moist mixed forest with variable vegetation communities. The community was on a side slope. While some areas had few conifers, others were almost pure balsam fir, as such the mixed forest designation was applied. Within the portion of the community accessed, the canopy layer was 10-12 m tall and provided 50-60% cover. The most common species were trembling aspen and green ash followed by white spruce, white birch and red maple. The sub-canopy (6-8 m; 50-70% cover) included green ash, sugar maple, balsam fir, and American elm. The understory (1-2 m; 10% cover) included green ash, gray dogwood, trembling aspen, Basswood and glossy hawthorn. The ground cover (0.5 m; 10-40%) varied from areas of mostly common buckthorn regeneration and strawberry to those with bitternut hickory, common buckthorn, bur oak, and Basswood regeneration with wild sarsaparilla, and strawberry. Downed trees were noted throughout.

Photo 10: Mixed Forest (Community 12) (September 02, 2020)

Remnant Forests

Remnant woodland remaining along the edge of the Highway 401 consisted primarily of deciduous trees (largetooth aspen, Basswood, green ash, trembling aspen) with some balsam fir, eastern white cedar, American elm, and white birch. Younger (1-4 m tall) bitternut hickory and sugar maple along with species listed above were also present. The ground layer varied along the length but included: grasses, wild sarsaparilla, bracken fern, common dandelion, late goldenrod and horsetail. Strangling dogvane, an invasive species, was present in areas.

Along the railroad corridor and Moulinette Road, the trees included trembling aspen, white ash, staghorn sumac, American elm, eastern white cedars and bur oak.

Borrow Pits

Three artificially created communities were present on the site (Communities 2, 4 and 7). There were three areas identified as borrow pits based on the excavation of soils, ramps into communities, berms around and, in some, throughout the community. The disturbances created cultural communities but because the excavation depth was not consistent, the vegetation was highly variable and no one community type would describe these. Communities 2 and 7 area within the area of interest for Phase A. They were situated: on the south side of the east-west transmission line (next to railroad) (Community 2), and in the centre of the site off of the main access road (Community 7). All were fully isolated (not hydrologically connected because of the berms). The substrate within the borrow pits sometimes included exposed rocks (gravelly). For the most part, these areas were vegetated with a combination of marsh species and meadow

species intermixed with treed areas (on berms). Both communities 2 and 7 showed disturbances from ATV's and ruts from larger machinery. The vegetation of the three communities is described below.

Community 2 consisted of a mixture of cultural meadow and marsh habitat, divided by vegetated berms and the access ramp. The edge of this borrow pit was ringed with trembling aspen, eastern white cedar, white ash, white spruce, common buckthorn and green ash. The deeper excavated areas were vegetated almost exclusively with narrow-leaved cattails. The cultural meadows had white sweet-clover and bird's-foot trefoil with small patch of eastern white cedar.

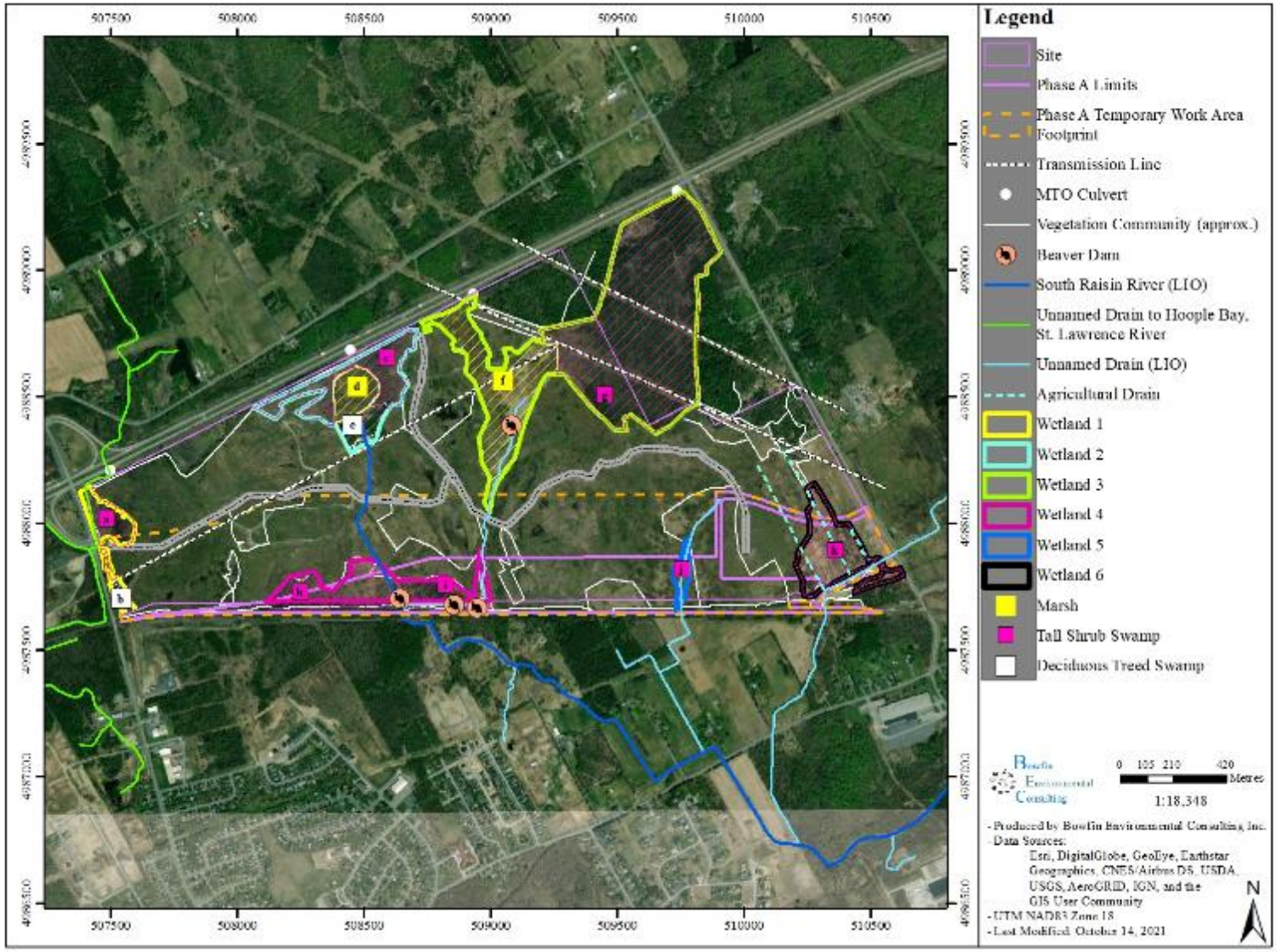
Photo 11: Looking at from north to south across the borrow pit (Community 02) (August 31, 2020)

Photo 12: The cattail pocket on the south end of the borrow pit (Community 02) (August 31, 2020)

Community 7 had a small (0.006 ha) area with some cottongrass to small to meet any tests of significance. This area was the result of having excavated to a sufficient depth to allow groundwater to percolate into the site (iron staining noted). The overall community was dominated species typical of disturbed habitats. Much of the wetter area was mostly scouring rush. There were also common reed (invasive species), purple loosestrife (invasive species), rush, and in other portions of pit (not excavated as deeply) black-eyed susan, viper bugloss, bird's-foot trefoil, white sweet-clover and common yarrow, and bladder campion. There was 1% eastern white cedar and some regenerating eastern cottonwood.

Photo 13: Looking at the borrow pit (Community 07) (July 18, 2020)

Figure 9: Wetland Communities



4.2.2 Wetland Communities

Unlike the ELC used for descriptions of the upland communities, the OWES describes wetlands based on function. As such, areas that are vegetated by tree species that are 6 m or less in height are called shrub swamps. On this site, many of the trees in the wetlands were just below 6 m and as such were labelled as tall shrub swamp. Wetland communities are then described based on the number of layers. To be listed, the layer must provide 25% or more in cover. The species compositions within those layers can be variable within the same community. Marsh, tall shrub swamp and deciduous swamps were all found within the site. These community are grouped in six wetlands; Wetland 1 was part of the Hoople Creek Watershed and Wetlands 2-6 were part of the Raisin River Watershed. The communities are described for each wetlands below.

Hoople Creek Watershed

Wetland 1

This small (3.2 ha) wetland was situated along Moulinette Road and receives flow from Highway 401 culvert. It was heavily disturbed by Moulinette, the access road, the east-west transmission and by clearing activities. There were two wetland communities: Communities "a" and "b." Community "a" contained a variety of habitats but each community was too small to be delineated (<0.5 ha). Overall it was considered to be a tall shrub swamp with areas of marsh habitat. These were vegetated with lakebank sedge, cattails and/or common reed. On the north side of the access road, the community began with a very small patch of tall shrub swamp with a single layer consisting of green ash (<6 m tall). Later it transitioned to one represented by speckled alder, willows, green ash, and black ash. Still further north the community changed to one dominated by Freeman's maple, green ash and American elm (all <6 m) and here a second layer, ground cover, was added. The ground cover layer was vegetated with sensitive fern and swamp milkweed. To the south of the access road, this community was also two layered: tall shrub (green ash, silver maple, white birch, speckled alder, and narrow-leaved meadowsweet), and ground cover (sensitive fern, strawberry, dwarf raspberry, Canada and late goldenrods, and purple loosestrife).

Community "b" was a deciduous treed swamp with three layers: deciduous trees (green ash), tall shrubs (speckled alder, green ahs, trembling aspen, narrow-leaved meadowsweet) and ground cover (sensitive fern and late goldenrod).

Photo 14: Looking at a portion of the tall shrub swamp next to Moulinette Road (Community a) (June 10, 2020)

Photo 15: deciduous swamp along Moulinette Road (Community b) (September 12, 2020)

Raisin River Watershed

Wetland 2

Wetland 2 was to the south of Highway 401 with a total size of 11.5 ha. While it received water from Highway 401, there were no channels within the wetland itself. This wetland is not in the area of interest for Phase A and has been excluded from this report.

Wetland 3

To the east of Wetland 2, was wetland 3. The total size of the wetland was 50.4 ha. Two large communities were found here: a marsh (community "f") and a tall shrub swamp (community "g"). The origin of Unnamed Drain 1 began within this community and continued south towards the access road. Only community "f" was present within the area of interest for Phase A.

Portions of community "f" was disturbed by the clearing activities and ruts and slash were present. Other areas were traversed by the transmission lines. There were some patches of tall shrub swamp throughout, but to be delineated these patches would need to be 0.5 ha in size. Other sections were almost exclusively vegetated with common reed (an invasive species that offers little habitat). Overall, the community is listed a two layered marsh: robust emergent (cattails and common reed) and ground cover (purple loosestrife, sensitive fern). Portions of this community included standing dead (not large enough to create a community or layer).

Photo 16: Looking at the east side of marsh (Community f) (September 02, 2020)

Photo 17: Looking at the west side of marsh (Community f) (August 31, 2020)

Wetland 4

This wetland was a tall shrub swamp situated along the railroad, and through which flowed the South Raisin River and Unnamed Drain 1. Its total size was 8.0 ha. Beaver dams were present, and one that created a small, shallow beaver pond (dry by late summer). The wetland contained two tall shrub swamp communities ("h" and "i"). Both were heavily disturbed by ruts and slash.

On the west side, Community "h" contained three layers: tall shrubs (black ash, red maple, willows, green ash and white ash), ground cover (boneset, Canada goldenrod, and swamp milkweed), and robust emergent (broad-leaved cattail and reed canary grass).

Community "i" was the east side overall this was a tall shrub swamp with two layers: tall shrubs (specked alder, green ash and red-osier dogwood) and robust emergent (narrow-leaved cattail, reed canary grass, and broad-leaved cattail). There were also purple loosestrife but not sufficient to be considered a layer.

Photo 18: Looking at tall shrub swamp (Community h) (July 21, 2020)

Photo 19: Looking at cattail section within Community I (too small to be its own community) (July 18, 2020)

Photo 20: Looking at the tall shrub swamp (Community i) (July 18, 2020)

Wetland 5

A small (1.0 ha) Community 15 was situated along the Unnamed Drain 2. This drain could not be distinguished, and image interpretation suggests that the access road for the northwest to southwest transmission lines may have altered the flow pattern at some point. The area was very narrow, and the vegetation impacted by edge effect. This area consisted of a two layer wetland: tall shrubs (slender willow, gray dogwood, trembling aspen and narrow-leaved meadowsweet) and ground cover (water hemlock, purple loosestrife, late goldenrod, spotted joe-pye weed, cow vetch, boneset, and wild parsnip). There were also a few reed canary grass and cattails but neither provided the minimum requirements for an additional layer.

Photo 21: Looking at the tall shrub swamp (Community j) (July 18, 2020)

Wetland 6

This wetland consisted of an old agricultural field that regenerated into tall shrub swamp. The total size was 7.3 ha. Three Agricultural Drains (labelled as 1-3) flowed north to south into Unnamed Drain 3. The single community (community "k") was present on both sides of the Unnamed Drain 3. The vegetation was variable but overall consisted of a tall shrub swamp with three wetland layers: tall shrub (slender and pussy willow, gray dogwood), robust emergent (common reed), and ground cover (purple-stemmed aster, spotted joe-pye weed and purple loosestrife). There was also small inclusions of marsh (almost entirely common reed) encountered but these were too small to form a separate community.

Photo 22: Common reed patch within the tall shrub swamp (part of Community k) (September 25, 2020)

4.3 Terrestrial Species-Specific Surveys

4.3.1 Breeding Birds

Daytime Breeding Bird

The breeding bird surveys included two visits in the general habitats and three for the meadows. All visits took place in the early morning, as per the various protocols listed in Section 2, and on days with appropriate weather conditions. As noted, the least bittern protocol was only completed during the first visit. It was noted that the site conditions were not suitable for this species, while the survey points continued to be monitored during subsequent visits, the playback tape and longer monitoring periods were not conducted.

As the vegetation grew, it was noted that none of the meadow habitat offered high quality grassland habitat since they were all dominated by broadleaf species (as opposed to grasses). Regardless, this survey was completed fully because of suitable habitats in adjacent lands. No bobolinks or eastern meadowlarks were heard or observed on-site. One male eastern meadowlark was heard calling periodically on June 23, 2020, from the other side of Avonmore Road. He was too far to observe with binoculars.

The following information is for the entire property.

The site provided habitat for many common breeding birds. A total of 51 species were recorded during the daytime breeding bird visits. Of these some were only found offsite [vesper sparrow and eastern meadowlark on the other side of Avonmore Road, ovenbird on the other side of Highway 401, pileated woodpecker, black-and-white warbler, veery and wood thrush on the other side of railroad tracks, osprey (nest) on the tower of the parallel transmission line (the Osprey nest is depicted on Figure 10)]. Most of the observations consisted of calling males, though some foraging individuals and females were noted. Confirmed nesting of Canada goose was noted (pair with young observed in beaver pond near railroad), tree swallows in the marsh of Wetland 3 and killdeer (and their young) along the access road on the west side of Wetland 2. Species with probable nests on-site were: mallard, northern harrier (pair frequently seen on-site, no nest was found on site and no young were observed), alder flycatcher, black-capped chickadee, house wren, gray catbird, yellow warbler, chestnut-sided warbler, common yellowthroat, song sparrow, swamp sparrow (nest may be offsite), red-winged blackbird, common grackle and American goldfish. A female wild turkey was flushed from meadow habitat, but no young were ever encountered.

The only species of conservation value was the wood thrush (special concern provincially; the SARA designation of threatened only applies to federal lands). The individual was in the adjacent forests (other side of the railroad) and there was no suitable nesting habitat on-site.

Table 3: List of Birds Observed during Breeding Bird Surveys (On and Off-site)

Common Name	Scientific Name	SRank	ESA Reg. 230/08 SARO List Status	SARA Schedule 1 List of Wildlife SAR Status)
Canada Goose	*Branta canadensis*	S5		
Mallard	*Anas platyrhynchos*	S5		
Wild Turkey	*Meleagris gallopava*	S5		
Turkey Vulture	*Cathartes aura*	S5B		
Osprey	*Pandion haliaetus*	S5B		
Northern Harrier	*Circus cyaneus*	S4B		
Merlin	*Falco columbarius*	S5B		
Killdeer	*Charadrius vociferus*	S5B, S5N		
Common Snipe	*Gallinago delicata*	S5B		
American Woodcock	*Scolopax minor*	S4B		
Ring-billed Gull	*Larus delawarensis*	S5B, S4N		
Mourning Dove	*Zenaida macroura*	S5		
Northern Flicker	*Colaptes auratus*	S4B		
Pileated Woodpecker	*Dryocopus pileatus*	S5		

Common Name	Scientific Name	SRank	ESA Reg. 230/08 SARO List Status	SARA Schedule 1 List of Wildlife SAR Status)
Alder Flycatcher	*Empidonax alnorum*	S5B		
Great Crested Flycatcher	*Myiarchus crinitus*	S4B		
Eastern Kingbird	*Tyrannus tyrannus*	S4B		
Warbling Vireo	*Vireo gilvus*	S5B		
Red-eyed Vireo	*Vireo olivaceus*	S5B		
Blue Jay	*Cyanocitta cristata*	S5		
American Crow	*Corvus brachyrhynchos*	S5B		
Tree Swallow	*Tachycineta bicolor*	S4B		
Black-capped Chickadee	*Poecile atricapilla*	S5		
House Wren	*Troglodytes aedon*	S5B		
Veery	*Catharus fuscescens*	S4B		
Wood Thrush	*Hylocichla mustelina*	S4B	SC	THR
American Robin	*Turdus migratorius*	S5B		
Gray Catbird	*Dumetella carolinensis*	S4B		
Cedar Waxwing	*Bombycilla cedrorum*	S5B		
Yellow Warbler	*Dendroica petechia*	S5B		
Chestnut-sided Warbler	*Dendroica pensylvanica*	S5B		
Black-and-white Warbler	*Mniotilta varia*	S5B		
Ovenbird	*Seiurus aurocapillus*	S4B		
Northern Waterthrush	*Seiurus noveboracensis*	S5B		
Mourning Warbler	*Oporornis philadelphia*	S4B		
Common Yellowthroat	*Geothlypis trichas*	S5B		
Chipping Sparrow	*Spizella passerina*	S5B		
Field Sparrow	*Spizella pusilla*	S4B		
Vesper Sparrow	*Pooecetes gramineus*	S4B		
Song Sparrow	*Melospiza melodia*	S5B		
Swamp Sparrow	*Melospiza georgiana*	S5B		
White-throated Sparrow	*Zonotrichia albicollis*	S5B		
Northern Cardinal	*Cardinalis cardinalis*	S5		
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	S4B		
Indigo Bunting	*Passerina cyanea*	S4B		
Red-winged Blackbird	*Agelaius phoeniceus*	S4		
Eastern Meadowlark	*Sturnella magna*	S4B	THR	THR
Common Grackle	*Quiscalus quiscula*	S5B		
Baltimore Oriole	*Icterus galbula*	S4B		
House Finch	*Carpodacus mexicanus*	SNA		
American Goldfinch	*Carduelis tristis*	S5B		

SRANK DEFINITIONS

S4 Apparently Secure; uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 Secure; Common, widespread, and abundant in the nation or state/province.

S#B Breeding
S#N Non-Breeding

SARA STATUS DEFINITIONS

THR Threatened: a wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.

SARO STATUS DEFINITIONS

THR Threatened: A species that is at risk of becoming endangered in Ontario if limiting factors are not

Nighttime Surveys

Three nighttime surveys were completed for eastern whip-poor-wills. The surveys were completed on nights with appropriate conditions and following the current guidelines. No eastern whip-poor-wills were heard or observed.

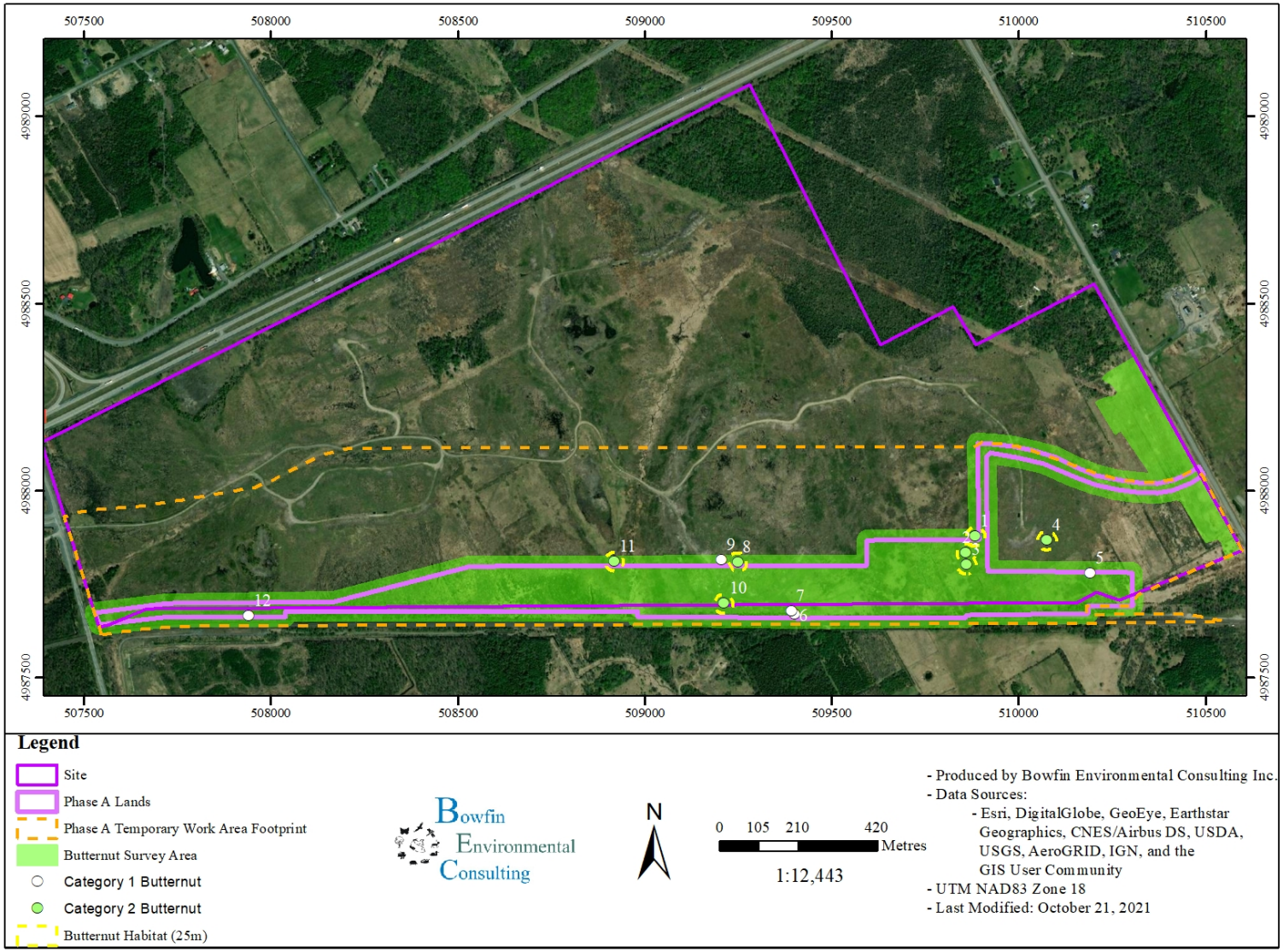
4.3.2 Butternuts

The butternut inventory was completed on days with appropriate weather conditions and during the butternut assessment period. As mentioned in Section 2, the survey for butternuts in 2020 included the whole property but focused on the larger individuals which could potentially be classed as Category 3s. Three visits were made between August 20-25, 2020, and no large butternuts were found. In 2021, the focus was on finding butternuts of any size, but only in or within 50 m of the area for Phase A. Another four visits were made from June 1-10, 2021. During which 12 individuals were found (Figure 10). Of these, five were evaluated as Category 1, and seven were Category 2.

4.3.3 Incidentals

During the site investigations, evidence of the presence of or observations of individuals were noted. This section also includes a few additional bird species which were not found on-site during the breeding bird survey period. Also included herein are the frog species noted during the amphibian surveys completed as part of the Headwater Drainage Assessment Report. It was noted that most frogs were calling from ruts during the May visit and that there were few frogs calling outside of the two main amphibian wetlands [Wetland 3 and it is thought Wetland 4 (Wetland 4 was not as easily accessed at night and there was a large amount of ruts in the adjacent habitat in which frogs could also be calling, frogs were noted as calling from within the ruts in other locations)] during the June visit. The incidental observations included a total of fifteen species: American toad, gray treefrog, spring peeper, wood frog, northern leopard frog, green frog, snapping turtle, eastern garter snake, ruffed grouse, American bittern, red-tailed hawk, cooper's hawk, common raven, beaver (dams), and white-tailed deer. All are common species. The snapping turtle was observed crossing the access road. Note that amphibian surveys completed within 250 m of this site during April 2018, for an unrelated project, did not identify any other frog species.

Figure 10: Location of Butternuts



4.4 Fish Habitat and Fish Communities

4.4.1 Background Information on Fish Habitat

As shown on Figure 11, the background review and the Headwater Drainage Feature Assessment Report identified eight potential features of which only seven were present:

- Unnamed Drain to Hoople Bay
- South Raisin River
- Unnamed Drain 1 (merges with South Raisin River along edge of site)
- Unnamed Drain 2 (**no channel present** and is not fish habitat)
- Unnamed Drain 3 (originates from the northeast side of Avonmore Road)
- Three agricultural drains that flow into Unnamed Drain 3.

All seven existing features are headwaters. There was no nearby information available on the Unnamed Drain to Hoople Bay's classification or its fish community. The remaining six features drain into the South Raisin River. The South Raisin River flows far to the east of the site and doesn't actually reach the St. Lawrence River until Lancaster (to the east of Cornwall). Information was available for the South Raisin River, Unnamed Drain 1 and Unnamed Drain 3. They are all classed as DFO E in the LIO databases. Class E signifies that the drain has been sampled and that sensitive species (native species that are either listed as endangered, threatened, special concern or have intolerance to poor environmental conditions). In this case, species intolerance to poor environmental conditions would be the trigger for the E classification.

Fish community information for these features is available from the Aquatic Resource Area (ARA) data on LIO. The available information does not distinguish between what has been labelled herein as South Raisin River and Unnamed Drain 1. LIO identified 10 species as occurring in these. All are common warm to cool water forage fish (Table 4). Further downstream, to the south of the railroad, information collected by Bowfin for another unrelated project found eight species; all common warm to cool water fish species (central mudminnow, brassy minnow, northern redbelly dace, fathead, creek chub, white sucker, brook stickleback, and johnny darter). Information on LIO for a larger downstream reach list is expanded to include 26 species. That list contains sportfish and pan fish (northern pike, pumpkinseed, rock bass, and yellow perch) as well as the invasive species round goby. Those species are likely to be present within this site, more likely to be restricted to the habitats found much further downstream. There was potential pike spawning habitat on site, but they have note been recorded in this section of these channels.

There is no community information for the Unnamed Drain 2. And as mentioned, no watercourse was present on site.

The Unnamed Drain 3 has community information listing 10 common species consisting mostly of forage fish species with the exception of the pan fish pumpkinseed.

No species at risk or of conservation value were listed in the LIO databases or on the DFO Aquatic Species at Risk Map (accessed October 1, 2020).

Table 4: Background Fish Community Information from LIO Databases

Species Name	Scientific Name	Trophic Class	Thermal Regime	SRank	ESA Reg. 230/08 SARO List Status	SARA Schedule 1 List of Wildlife SAR Status	South Raisin River / Unnamed Drain 1 (onsite)	Unnamed Drain 3	South Raisin River (D/S)	References
Northern Pike	Esox lucius	carnivore	cool	S5	No Status	No Status			Y	LIO, 2018
Central Mudminnow	*Umbra limi*	invertivore	cool	S5	No Status	No Status	Y	Y	Y	LIO, 2018; Bowfin, 2018
Spotfin Shiner	Cyprinella spiloptera	invertivore/ herbivore	warm	S4	No Status	No Status			Y	LIO, 2018
Common Carp	Cyprinus carpio	invertivore/ detritivore	warm	SNA	No Status	No Status			Y	LIO, 2018
Brassy Minnow	*Hybognathus hankinsoni*	planktivore/ detritivore	cool	S5	No Status	No Status		Y		LIO, 2018
Common Shiner	Luxilus cornutus	invertivore	cool	S5	No Status	No Status			Y	LIO, 2018
Golden Shiner	Notemigonus crysoleucas	invertivore/herbivore	cool	S5	No Status	No Status			Y	LIO, 2018
Blacknose Shiner	Notropis heterolepis	invertivore/ herbivore	cool	S5	No Status	No Status			Y	LIO, 2018
Sand Shiner	*Notropis stramineus*	invertivore/ detritivore	warm	S4	No Status	No Status	Y			LIO, 2018
Northern Redbelly Dace	*Chrosomus eos*	invertivore/ planktivore	cool	S5	No Status	No Status	Y		Y	LIO, 2018; Bowfin, 2018
Finescale Dace	*Chrosomus neogaeus*	Invertivore/planktivore	cool	S5	No Status	No Status	Y	Y		LIO, 2018
Bluntnose Minnow	*Pimephales notatus*	detritivore	warm	S5	No Status	No Status	Y		Y	LIO, 2018

Species Name	Scientific Name	Trophic Class	Thermal Regime	SRank	ESA Reg. 230/08 SARO List Status	SARA Schedule 1 List of Wildlife SAR Status	South Raisin River / Unnamed Drain 1 (onsite)	Unnamed Drain 3	South Raisin River (D/S)	References
Fathead Minnow	Pimephales promelas	detritivore/ invertivore	warm	S5	No Status	No Status			Y	Bowfin , 2018
Creek Chub	*Semotilus atromaculatus*	invertivore/ carnivore	cool	S5	No Status	No Status	Y	Y	Y	LIO, 2018; Bowfin, 2018
White Sucker	*Catostomus commersonii*	invertivore/ detritivore	cool	S5	No Status	No Status	Y	Y	Y	LIO, 2018; Bowfin, 2018
Brown Bullhead	*Ameiurus nebulosus*	invertivore/ herbivore/ carnivore	warm	S5	No Status	No Status		Y	Y	LIO, 2018
Tadpole Madtom	Noturus gyrinus	invertivore/ planktivore	warm	S4	No Status	No Status			Y	LIO, 2018
Banded Killifish	*Fundulus diaphanus*	invertivore/ planktivore	cool	S5	No Status	No Status		Y	Y	LIO, 2018
Brook Stickleback	*Culaea inconstans*	planktivore/ invertivore	cool	S5	No Status	No Status	Y	Y	Y	LIO, 2018; Bowfin, 2018
Rock Bass	Ambloplites rupestris	invertivore/carnivore	cool	S5	No Status	No Status			Y	LIO, 2018
Pumpkinseed	*Lepomis gibbosus*	invertivore/ carnivore	warm	S5	No Status	No Status		Y	Y	LIO, 2018
Largemouth Bass	Micropterus salmoides	invertivore/ carnivore	warm	S5	No Status	No Status			Y	LIO, 2018
Iowa darter	*Etheostoma exile*	invertivore	cool	S5	No Status	No Status	Y	Y	Y	LIO, 2018
Fantail Darter	Etheostoma flabellare	invertivore	cool	S4	No Status	No Status			Y	LIO, 2018

Species Name	Scientific Name	Trophic Class	Thermal Regime	SRank	ESA Reg. 230/08 SARO List Status	SARA Schedule 1 List of Wildlife SAR Status	South Raisin River / Unnamed Drain 1 (onsite)	Unnamed Drain 3	South Raisin River (D/S)	References
Johnny Darter	*Etheostoma nigrum*	invertivore	cool	S5	No Status	No Status	Y		Y	LIO, 2018; Bowfin, 2018
Tessellated Darter	*Etheostoma olmstedi*	invertivore	cool	S4	No Status	No Status				LIO, 2018
Yellow Perch	Perca flavescens	invertivore/ carnivore	cool	S5	No Status	No Status			Y	LIO, 2018
Logperch	Percina caprodes	invertivore	warm	S5	No Status	No Status			Y	LIO, 2018
Round Goby	Neogobius melanostomus	invertivore	cool	SNA	No Status	No Status			Y	LIO, 2018
Number of Species							**10**	**10**	**25**	
Y	Represents a species present in the respective watercourse									

(DFO, 2019; Bowfin, 2018; Eakins, 2018; LIO, 2018; MNRF, 2017; MTO, 2006)

Status Updated: October 2, 2018

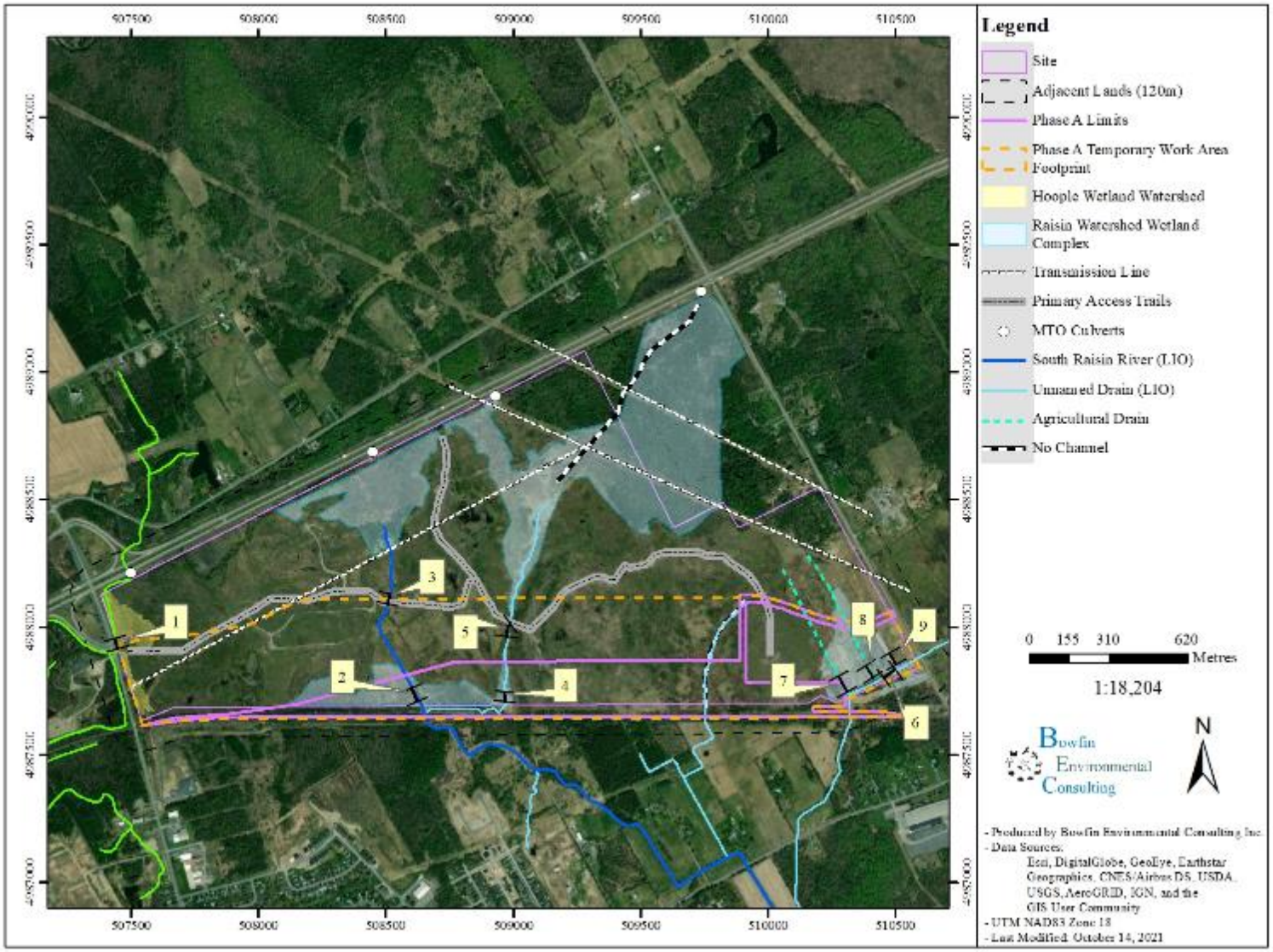
SRANK DEFINITIONS

S4 Apparently Secure, Uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 Secure, Common, widespread, and abundant in the nation or state/province.

SNA Not Applicable, A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

Figure 11: Fish Habitat and Community Sampling Stations



4.4.2 Fish Habitat and Community Information Collected

The eight (including photographs of the culvert where Unnamed Drain 2 would outlet to) are described below.

Unnamed Drain to Hoople Bay on the St. Lawrence River

The Unnamed Drain to Hoople Bay is situated on the far west side of the site. This feature is approximately 5.9 km long from its origin to Hoople Bay. The origin is roughly 0.8 km upstream of this site. Within the site, the feature consists of the east road ditch for Moulinette Road. Further downstream the feature parallels the Highway 401 before continuing to Hoople Bay. The amount of water present in the portion on-site is likely greatly influenced by the Highway 401 water catchment area. There is no riparian habitat on the west side, but the lands on-site consist of a wetland (Figure 9). The culvert under Moulinette Road appeared to be properly installed. Note that the downstream side was on a quarry and not accessed. One station was established.

Station 1

Station 1 began at the upstream end of the culvert under Moulinette Road and was 52 m in length. The average channel width was 3.1 m and the average bankfull height 27 cm. The average spring wetted width and depth were 0.8 m and 6 cm, respectively. The station was dry during the summer visit.

The substrate consisted entirely of fines and the stream morphology was a glide. The in-water cover throughout the station was provided by aquatic vegetation (broad and narrow-leaved cattails, reed canary grass, purple loosestrife, and common reed). No signs of erosion were noted.

The tops of the banks were fully vegetated on the east bank and gravel/roadway along the west bank. The most common species were reed canary grass, goldenrod, common burdock, wild red raspberry, staghorn sumac, American elm, ash and willows. The station had moderate canopy cover throughout.

Baited minnow traps were set between the access road and the culvert under Moulinette Road overnight on May 27, 2020. A total of 14 fish brook stickleback were captured (size range: 33-59 mm) in the minnow trap closest to the cross-culvert under Moulinette Road. None were captured in the trap placed further upstream. No sampling took place during the summer as the station was dry (August 31, 2020).

Photo 23: Unnamed Drain to Hoople Bay (May 11, 2020)

Photo 24: Station 1 looking upstream from downstream (August 31, 2020)

South Raisin River

Moving to the east, the next feature is the South Raisin River. While there is a Highway 401 culvert leading towards this channel, any water from the highway is intercepted by a swamp that does not contain any defined channels (Wetland 2). The headwater feature began near the east-west transmission line and travelled south through the disturbed lands to the CN railroad. The South Raisin River travels over 45 km before it reaches the North Raisin River. The portion of the headwaters on the site represents the first 0.8 km of this long watercourse. The culvert under the railroad is well positioned and does not pose a barrier to fish movement. A beaver dam at the downstream end, within 20 m of the railroad, is a temporary barrier to movement outside of the spring freshet. Portions of this feature was heavily impacted by the clearing activities and access roads, with a culvert in poor shape under the main access road, and ruts and slash in the channel. The channel was seasonal. As will be noted herein, fish present in a pool just upstream of the access road demonstrated that movement must be possible during the freshet.

This feature has been divided into two reaches (a and b) because of the disturbances to the riparian habitat and to the feature itself. The downstream section labelled as “a” is a defined natural feature through the wetland and “b” is the area heavily disturbed by ruts and slash.

Station 2

Station 2 began 7.0 m upstream of the confluence with Unnamed Drain 1 and was 43 m in length. A beaver dam was situated on the downstream end and acted as a temporary/seasonal barrier to fish movement.

The average channel width was 1.1 m and the average bankfull height 12 cm. The average wetted width and depth in the spring were 0.9 m and 10 cm, respectively. The station was dry during the summer visit.

The substrate consisted entirely of fines and the stream morphology was a glide. The in-water cover throughout the station was provided by aquatic vegetation (reed canary grass, purple loosestrife and narrow-leaved cattail). No signs of erosion were noted. The tops of the banks were fully vegetated. The most common species were: reed canary grass, goldenrod and slender willow. There was no canopy cover.

Photo 25: South Branch Raisin, reach “a” (May 11, 2020)

Photo 26: Station 2 looking downstream from downstream (August 31, 2020)

Station 3

Station 3 began 465 m upstream of the confluence with Unnamed Drain 1 and was 51 m in length. The average channel width was 2.7 m and the average bankfull height 29 cm. There was a beaver dam or earth barrier upstream of the access road that created a shallow pool during the spring. This pool was also dry later.

The substrate consisted mostly of fines with some gravel and cobble. The morphology was a glide along the station, and a pool upstream of the beaver dam. The in-water cover throughout the station was provided by aquatic and terrestrial vegetation (reed canary grass, grasses, purple loosestrife, goldenrod species and wild parsnip). Areas containing small woody debris (slash) was also present. No signs of erosion were noted.

The tops of the banks were fully vegetated. The most common species were: goldenrod species, reed canary grass, wild parsnip, glossy buckthorn, willow species, American elm and ash species. There was little to no canopy cover.

Baited minnow traps were set in the pool upstream of the access road and below the culvert of the access road on May 27, 2020. Fish were captured in the pool upstream of the access road. No fish were captured in the pool below the culvert under the access road (Photo 3). Eight fish represented by two species were captured: 7 northern redbelly daces (size range: 37-50 mm), and 1 brook stickleback (size range: 51 mm). No sampling took place during the summer as the station was dry (August 31, 2020).

Photo 27: Culvert at access road (May 27, 2020)

Photo 28: South Branch Raisin, reach “b” (May 11, 2020)

Photo 29: Station 3 looking upstream from downstream (August 31, 2020)

Unnamed Drain 1

Unnamed Drain 1 is a tributary to the South Raisin River. Background mapping shows this feature to be 2.6 km long, beginning 0.3 km upstream of Highway 401 and merging with the South Raisin River just upstream of the culvert under the railroad. Investigations completed for this project found that the actual channel was closer to 1.2 km long, originating inside of the wetland found on the northeast side of the site (Wetland 3). Like the South Raisin River, any flow that this feature receives from the Highway 401 catchment, or upstream areas, is absorbed by the large wetland. There were several beaver dams on this feature. The first ones encountered were in Wetland 3, near the access road. The larger one was near the railroad which created a pond (in Wetland 4). While the pond remained wet longer than the rest of the feature, it too was dry by the end of August.

Also, like the South Raisin River, this feature is separated in sections because of the habitat differences. There are three distinct reaches on site; 1a and c are part of wetlands, and 1b is disturbed by ruts and slash between the two wetlands.

Station 4

Station 4 began 330 m upstream of the confluence of the South Raisin River and was 46 m in length. The average channel width was 2.5 m and the average bankfull height 24 cm. The average wetted width and depth in the spring were 0.6 m and 5 cm, respectively. The station, including the beaver pond, was dry during the summer visit.

The substrate consisted entirely of fines and the morphology was a glide. The beaver dams present, just below station 4, created pool habitat in the spring. The station was choked with aquatic and terrestrial vegetation. The species providing the in-water cover throughout the station were reed canary grass, spotted joe-pye weed, broad-leaved cattail, goldenrod and reed canary grass. No signs of erosion were noted.

The tops of the banks were fully vegetated. The most common species were: goldenrod, reed canary grass, glossy buckthorn, American elm and ash. There was little to no canopy cover.

The beaver pond was sampled with four baited minnow traps on May 27, 2020. A total of 11 fish were captured representing 5 species: central mudminnow, northern redbelly dace, fathead minnow, creek chub, and brook stickleback (Table 5). No sampling took place during the summer as the station was dry (August 31, 2020).

Table 5: Summary of Fish Captured at Station 4

Species Name	Scientific Name	Station 1 May 27, 2020 No. of fish (size range, mm)
Central Mudminnow	*Umbra limi*	6 (30-72)
Northern Redbelly Dace	*Chrosomus eos*	1 (62)
Fathead Minnow	*Pimephales promelas*	1 (48)
Creek Chub	*Semotilus atromaculatus*	2 (62-86)
Brook Stickleback	*Culaea inconstans*	1 (42)
	Effort	**Minnow Traps**
	Total No. Species	**5**
	Total No. Individuals	**11**

Photo 30: Unnamed Drain 1a (May 11, 2020)

Photo 31: Station 4 looking upstream from the downstream end (August 31, 2020)

Station 5

Station 5 was located just downstream of the access road, beginning roughly 600 m upstream of the confluence of the South Raisin River. The station was 54 m in length. The average channel width was 3.1 m and the average bankfull height 22 cm. Apart from a few instances of pooling with the ruts, the site was dry during the summer. The smaller pool on the downstream end of the access road had 27 cm of water on May 28, 2020.

Additional information from the wetland channel upstream of this site (reach c) provided the following water level information recorded on May 28, 2020. The average wetted widths and depths were 0.8 m and 6 cm, respectively. The pool situated just upstream of the access road culvert had a maximum pool depth of 90 cm.

The substrate consisted mostly of fines with some gravel and cobble. The in-water cover throughout the station was provided by aquatic vegetation and terrestrial vegetation (narrow-leaved cattail, purple loosestrife, reed canary grass, sedges, sensitive fern and cardinal flower). Areas containing large and small woody debris, slash, was also present. No signs of erosion were noted but the channel was impacted by the ruts.

The tops of the banks were fully vegetated. The most common species were: reed canary grass, goldenrod, wild carrot, glossy buckthorn, common buckthorn, willow, American elm and ash. There was little to no canopy cover.

Station 5 was not sampled due to poor channel conditions during the spring and it being dry in the summer (August 31, 2020). However, the pools on either side of the access road were sampled with baited minnow traps on May 27, 2020, and the natural channel in the wetland above was dip netted (also in May). The minnow traps (2) catch consisted of 17 fish were captured representing 4 species: central mudminnow, fathead minnow, creek chub, and brook stickleback. The dip netting (along a section of about 40 m) netted 9 fish representing 3 species: central mudminnow, finescale dace, and brook stickleback.

Table 6: Summary of Catch from Station 5 (May 27, 2021)

Species Name	Scientific Name	May 27, 2020 Pools by the Access Road No. of fish (size range, mm)	May 27, 2020 Station 5 No. of fish (size range, mm)
Central Mudminnow	*Umbra limi*	5 (55-75)	3 (44-55)
Finescale Dace	*Chrosomus eos*	n/a	1 (35)
Fathead Minnow	*Pimephales promelas*	1 (42)	n/a
Creek Chub	*Semotilus atromaculatus*	6 (38-136)	n/a
Brook Stickleback	*Culaea inconstans*	5 (29-50)	5 (30-43)
	Effort	2 Minnow Traps	Dip netting for a length of 40 m
	Total No. Species	**4**	**3**
	Total No. Individuals	**17**	**9**

Photo 32: Unnamed Drain 1c (May 11, 2020)

Photo 33: Unnamed Drain 1b (May 11, 2020)

Photo 34: Station 5 (in section 1b) looking upstream from the downstream end (August 31, 2020)

Unnamed Drain 2

While the background mapping suggests that there is an Unnamed Drain 2, no channel could be found within the wetland on site or at the upstream end. Review of the imagery suggests that the water from upstream may be blocked by the access road for the twin transmission lines. The culvert at the railroad is on a steep incline preventing fish access during all but perhaps the early spring. The culvert's water line suggests that it is submerged during floods. This feature does not provide fish habitat. It is noted that a central mudminnow was in the pooled water next to this culvert. There are hills on either side and this pooled water is isolated and consists of a quad trail.

Photo 35: Culvert Under Railroad at Headwater Feature 2 (May 27, 2020)

Unnamed Drain 3

Unnamed Drain 3 originates on the other side of Avonmore Road from what appears to be a small sand pit (about 720 m from the site). The total length of the feature is 1.8 km, and it flows into the South Raisin River, 1.1 km downstream of the railroad. The portion on-site is 0.4 km long and consisted of a channelized drain. The culvert under the railroad was well-positioned and did not represent a barrier to fish movement. The feature was seasonal.

Station 6

Station 6 was located 100 m west of where it crossed Avonmore Road and was 58 m in length. The average channel width was 3.7 m and the average bankfull height 27 cm. The average wetted width and depths in the spring were 3.2 m and 9 cm, respectively. The site was dry by summer.

The substrate consisted entirely of fines and the stream morphology was a glide. The in-water cover throughout the station was provided by aquatic and terrestrial vegetation (reed canary grass, sedges, purple loosestrife, spotted joe-pye weed, goldenrod species and cow vetch). The aquatic vegetation was hummocky within the station causing the channel to flow around the mounds. No signs of erosion were noted.

The tops of the banks were fully vegetated however, on the left bank the vegetation was recently cut creating an 8 m wide path running parallel along much of the station. The most common species were: grasses, reed canary grass, goldenrod, cow vetch and slender willow. There was no canopy cover.

During the May 28, 2020, visit, the station was dip netted over an area of approximately 186 m^2. Three 3 fish were captured representing 2 species: central mudminnow (size: 61 mm) and brook stickleback (size range: 38-40 mm). No sampling took place during the summer as the station was dry (August 31, 2020).

Photo 36: Unnamed Drain 3 (May 12, 2020)

Photo 37: Station 6 looking upstream from downstream (August 31, 2020)

Agricultural Drains

The last three features are dug agricultural drains that flow south into Unnamed Drain 3. None provided fish habitat, at any time of the year.

Agricultural Drain 1

Agricultural Drain 1 is on the west side and is 564 m long and well-connected to Unnamed Drain 3 on the downstream end. A blocked culvert, for an old farm crossing, further upstream, at reach 1b, would be a barrier to fish passage but no fish were ever found in the channel. The channel was seasonal, and portions were already dry by May 12, 2020.

Station 7

Station 7 began 5 m upstream of the confluence of Unnamed Drain 3 and was 75 m in length. The average channel width was 3.6 m and the average bankfull height 27 cm. The average springtime wetted width and depths in the spring were 1.5 m and 10 cm, respectively. The site was dry by summer.

The substrate consisted entirely of fines and the stream morphology was a glide. The upstream half of the station was heavily choked with common reed and slender willow. The in-water cover throughout the station was provided by aquatic vegetation (common reed, sedges, reed canary grass, spotted joe-pye weed, purple loosestrife and slender willow). The aquatic vegetation was hummocky within the station causing the channel to flow around the mounds. No signs of erosion were noted.

The tops of the banks were fully vegetated. The most common species were reed canary grass and slender willow. The shrubs covered the entire channel providing full shade.

During the May 28, 2020, visit, the entire length of the headwater feature (including Station 7) was dip netted. No fish were captured or observed. No sampling took place during the summer as the station was dry (August 31, 2020).

Photo 38: Agricultural Drain 1a, looking upstream from near mouth (May 20, 2020)

Photo 39: Agricultural Drain 1b, looking upstream (May 20, 2020)

Agricultural Drain 2

Agricultural Drain 2 is in the middle and is 567 m long and also well-connected to Unnamed Drain 3 on the downstream end. This one also had a blockage on the downstream end of reach 2b that would be a barrier to fish, but again no fish were ever caught in this feature. This channel was seasonal, and portions were already dry by May 12, 2020.

Station 8

Station 8 began 5 m upstream of the confluence of Unnamed Drain 3 and was 60 m in length. The average channel width was 3.2 m and the average bankfull height 23 cm. The average springtime wetted width and depths in the spring were 1.5 m and 10 cm, respectively. The site was dry by summer.

The substrate consisted entirely of fines and the stream morphology was a glide. The upstream half of the station was heavily choked with common reed and slender willow. The in-water cover throughout the station was provided by aquatic vegetation (common reed, sedges, reed canary grass, spotted joe-pye weed, purple loosestrife and slender willow). The aquatic vegetation was hummocky within the station causing the channel to flow around the mounds.

The tops of the banks were fully vegetated. The most common species were: reed canary grass and slender willow. There was good canopy cover throughout.

During the May 28, 2020, visit, the entire length of the headwater feature (including Station 8) was dip netted. No fish were captured or observed. No sampling took place during the summer as the station was dry (August 31, 2020).

Photo 40: Agricultural Drain 2a, looking upstream from near mouth (May 20, 2020)

Photo 41: Station 8 (Agr 2a) looking upstream from downstream (August 31, 2020)

Photo 42: Agricultural Drain 2b, looking upstream (May 20, 2020)

Agricultural Drain 3

Agricultural Drain 3 was on the east side and was blocked at its downstream end. This short 142 m long drain was not connected to Unnamed Drain 3 and was seasonal.

Station 9

Station 9 began 5 m upstream of the confluence of Unnamed Drain 3 and was 58 m in length. The average channel width was 3.2 m and the average bankfull height 15 cm. The feature was dry during both the spring and summer visits.

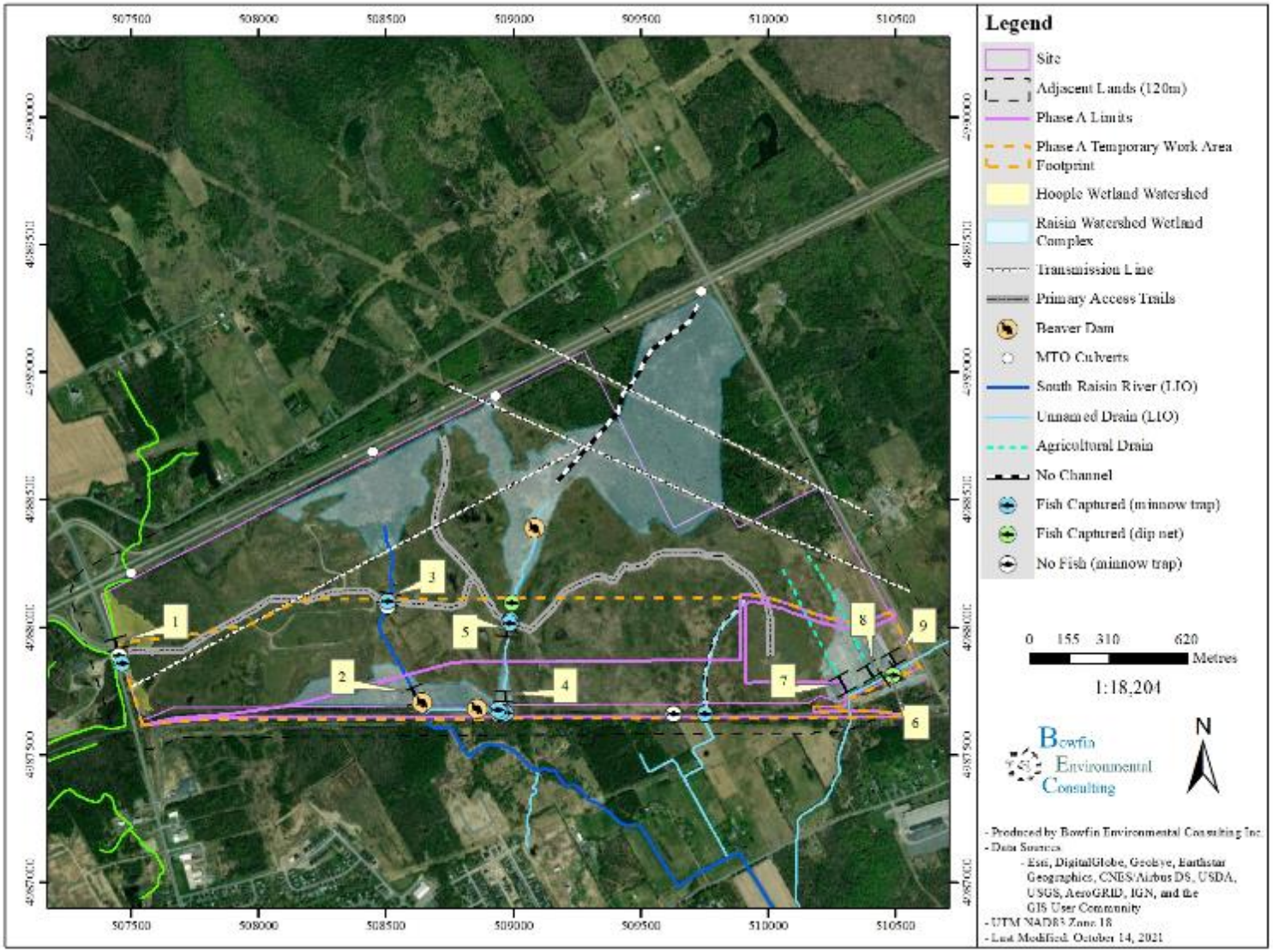
The substrate consisted entirely of fines and the stream morphology was a glide. The station was heavily choked with common reed and slender willow. The in-water cover throughout the station was provided by aquatic vegetation (common reed, sedges, reed canary grass, purple loosestrife and slender willow). No signs of erosion were noted.

The surrounding area was vegetated on the west side and consisted of reed canary grass and slender willow. The east side was tilled. The dense willows provided full shade.

No sampling took place on either of the May 28 or August 31, 2020, visits as the station was dry.

Photo 43: Station 9 looking upstream from downstream (May 28, 2020)

Figure 12: Fish Habitat and Community Descriptions



5.0 ANALYSIS OF POTENTIAL TO IMPACT THE NATURAL HERITAGE FEATURES

The following section looks at the identified or potential natural features and the results from the field investigations to assess whether the feature is present and if present, whether it is significant based on the OP, or the *Natural Heritage Reference Manual* (OMNR, 2010), as applicable.

As mentioned above, the OP indicated that four types of natural heritage features were not present in or within 120 m of the site:

- No PSWs
- No significant valleyland
- Significant Wildlife Habitat
- No ANSIs

Features identified as present or requiring further investigations were:

- Endangered and Threatened species/habitats
- Unevaluated wetlands (including coastal)
- Woodlands
- Fish habitat

The following summarises these items based on the appropriate criteria and the field investigations results. For those that were deemed present, their significance was assessed.

5.1 Review of Project Activities

The Phase A development will require the clearing of vegetation, cut and fill operations, re-alignment of watercourses, and construction of access roads, railyard and its supporting facilities.

5.2 Impact Assessment Methods

The purpose of the EIS is to identify natural features, and provide guidance in the form of avoidance, mitigation or enhancement measures. For those features which may be negatively impacted, mitigation measures and, where appropriate, the next steps for offsetting measures are recommended. The Provincial Policy Statement describes a negative impact as:

> *"a) in regard to policy 2.2, degradation to the quality and quantity of water, sensitive surface water features and sensitive ground water features, and their related hydrologic functions, due to single, multiple or successive development or site alteration activities;*
> *c) in regard to fish habitat, any permanent alteration to, or destruction of fish habitat, except where, in conjunction with the appropriate authorities, it has been authorized under the Fisheries Act;*

d) in regard to other natural heritage features and areas, degradation that threatens the health and integrity of the natural features or ecological functions for which an area is identified due to single, multiple or successive development or site alteration activities."

The significance of the potential impacts is measured using four different criteria:

1. Area affected may be:
    a. local in extent signifying that the impacts will be localized within the project area
    b. regional signifying that the impacts may extend beyond the immediate project area.

2. Nature of Impact:
    a. negative or positive
    b. direct or indirect

3. Duration of the impact may be rated as:
    a. short term (construction phase, 1-2 years)
    b. medium term (3-7years)
    c. long term (>7 years).
    d. permanent

4. Magnitude of the impact may be:
    a. negligible signifying that the impact is not noticeable
    b. minor signifying that the project's impacts are perceivable and require mitigation
    c. moderate signifying that the project's impacts are perceivable and require mitigation as well as monitoring and/or compensation
    d. major signifying that the project's impacts would destroy the environmental component within the project area.

5. Likelihood
    a. Whether an impact is likely to occur is described.

5.3 Evaluation of Potential Impacts

5.3.1 Endangered and Threatened Species

Terrestrial and wetland Endangered and Threatened Species at Risk, on private land, are protected under provincial *Endangered Species Act* (ESA). It is noted that bird species protected under the *Species at Risk Act* (SARA) are protected by the *Migratory Bird Convention Act* (MBCA) on private lands. Fish (fish and mussels) Endangered and Threatened species are protected in all watercourses under ESA and SARA.

Within this report, the acronym SAR refers to only Endangered or Threatened species. Special Concern species do not receive protection from ESA or SARA.

A list of potential Endangered and Threatened species was compiled using various sources. The NHIC database provides information available to the public on those SAR documented as occurring within the general area. It should be noted that not all information for all species is available to the public. Furthermore, the absence of a recording does not necessarily indicate that the species is absent from the area. The purpose of the NHIC database is to serve as a guide to help determine the potential species which may occur within the project area. The background review included looking at the list of birds observed as part of the Atlas of Breeding Birds of Ontario (ABBO) and any SAR species listed on these lists were considered as potentially occurring within the subject lands. Added to this list were species that based on personal experience, often occur within the general area. The resulting list includes 13 SAR: 8 birds (least bittern, eastern whip-poor-will, chimney swift, loggerhead shrike, bank swallow, barn swallow, bobolink, and eastern meadowlark), 4 mammals (little brown myotis, northern myotis, eastern small-footed myotis, and the tri-colored bat), and 1 plant (butternut) (Table 7).

NOTE: The ESA has now been transferred to the Ministry of Environment, Conservation and Parks (MECP) (as of April 1, 2019). To date MECP has not authored new protocols. References to dealing with MNRF have been left in this report as they authored the most recent protocols for these species.

Table 7: Summary of Potential Endangered and Threatened Species

Common Name/ Population	Scientific Name	SRank	ESA Reg. 230/08 SARO List Status	SARA Schedule 1 List of Wildlife SAR Status	Preferred Habitat	Reference	MECP Guidelines/Triggers for Review	Brought Forward (Yes/No)
BIRDS								
Least Bittern	*Ixobrychus exilis*	S4B	THR	THR	Freshwater marshes, ditches, creeks, rivers and lakes with tall emergent vegetation.	COSEWIC 2009b	No suitable habitat present on or adjacent to the site. One Least Bittern breeding bird visit was under taken (as per this species' survey protocol) plus two additional daytime breeding bird visits. None were observed.	No
Eastern Whip-poor-will	*Caprimulgus vociferus*	S4B	THR	THR	Rock or sand barrens with scattered trees, savannahs, old burns or other disturbed sites in a state of early to mid-forest succession, or open conifer plantations	COSEWIC 2009c	Surveys completed as per Eastern Whip-poor-will protocol. No individuals within 500 m. It is further noted that Bowfin has completed surveys for Eastern Whip-poor-will in other parts of SDG and has yet to identify its presence.	No
Chimney Swift	*Chaetura pelagica*	S4B, S4N	THR	THR	Cities, towns, villages, rural, and wooded areas. When selecting trees, they prefer those that are >50 cm in diameter and that are within 1 km of waterbodies.	COSEWIC 2007	Three daytime breeding bird visits were undertaken along with multiple other visits to the site. This species is easily identified when present; it is very vocal and forages often. No individuals observed in 2020 No structures present within the Site or within Adjacent Lands. No large trees within the Site.	No
Loggerhead Shrike	*Lanius ludovicianu*	S2B	END	END	Loggerhead shrike is a small songbird that prefers pasturelands and shrubland with dense trees and shrubs and elevated perches. This species requires approximately 2.7 to 47 ha of suitable	COSEWIC,2014 Environment Canada 2015	Our experience working with MNRF Kemptville previously was that loggerhead shrike surveys were only required when large tracks of hawthorn dominated thickets were present. This	No

Common Name/ Population	Scientific Name	SRank	ESA Reg. 230/08 SARO List Status	SARA Schedule 1 List of Wildlife SAR Status	Preferred Habitat	Reference	MECP Guidelines/Triggers for Review	Brought Forward (Yes/No)
					habitat depending on the density of shrubs, dense trees, and elevated perches within the habitat		site contained primarily regeneration deciduous forest, cultural thicket and meadow, but no concentrations of species with thorns were found. No loggerhead shrikes or signs of their presence were observed during the breeding bird surveys or other visits.	
Bank Swallow	*Riparia riparia*	S4B	THR	THR	Areas with vertical banks, including riverbanks, lake and ocean bluffs, aggregate pits, road cuts, and stock piles of soil. Sand-silt substrates are preferred for excavating nest burrows.	COSEWIC 2013a	Breeding bird surveys completed. No individuals observed in 2020. No suitable nesting habitat is present.	No
Barn Swallow	*Hirundo rustica*	S4B	THR	THR	Nest in artificial structures, including barns and other outbuildings, garages, houses, bridges, and road culverts.	COSEWIC 2011a	Breeding bird surveys completed. No individuals observed in 2020 No structures are present on the site.	Yes
Bobolink	*Dolichonyx oryzivorus*	S4B	THR	THR	Primarily in forage crops, and grassland habitat.	COSEWIC 2010	Grassland breeding bird surveys completed as per the protocol for this species. No individuals observed in 2020. No grasslands on site.	No*
Eastern Meadowlark	*Sturnella magna*	S4B	THR	THR	Fields, meadows and prairies.	COSEWIC 2011b	Grassland breeding bird surveys completed as per the protocol for this species. No individuals observed in 2020. No grasslands on site.	No*
MAMMALS								
Little Brown Myotis	*Myotis lucifugus*	S4	END	END	Buildings, attics, roof crevices and loose bark on trees or under bridges. Always roost near waterbodies.	Eder 2002	MECP recommends the use of avoidance timing window for clearing of trees (>10 cm in diameter) if this can be accomplished then no impacts.	Yes
Northern Myotis/Northern Long-eared Bat	*Myotis septentrionalis*	S3	END	END	Older (late successional or primary forests) with large interior habitat.	Menzel et al. 2002, Broders et al. 2006, SWH		

Common Name/ Population	Scientific Name	SRank	ESA Reg. 230/08 SARO List Status	SARA Schedule 1 List of Wildlife SAR Status	Preferred Habitat	Reference	MECP Guidelines/Triggers for Review	Brought Forward (Yes/No)
						6E Ecoregion Criterion Schedule		
Eastern Small-footed Myotis	*Myotis leibii*	S2S3	END	No Status	Found within deciduous or coniferous forests in hilly areas.	Eder 2002		
Tri-colored Bat	*Perimyotis subflavus*	S3?	END	END	Prefers shrub habitat or open woodland near water.	Eder 2002		
PLANTS								
Butternut	*Juglans cinerea*	S3?	END	END	Variety of sites, grows best on well-drained fertile soils in shallow valleys and on gradual slopes	COSEWIC 2003	Butternut inventory was completed, and several individuals identified. Information on the BHA is provided below.	Yes

Status updated: September 23, 2021

SRANK DEFINITIONS

S1 Critically Imperiled, Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.

S2 Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

S3 Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

S4 Apparently Secure; uncommon but not rare; some cause for long-term concern due to declines or other factors.

S5 Secure; Common, widespread, and abundant in the nation or state/province.

? Inexact Numeric Rank—Denotes inexact numeric rank

SNA Not Applicable, A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

S#B Breeding

S#N Non-Breeding

SARA STATUS DEFINITIONS

END Endangered: a wildlife species facing imminent extirpation or extinction.

THR Threatened: a wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.

SARO STATUS DEFINITIONS

SC Special Concern: A species with characteristics that make it sensitive to human activities or natural events.

END Endangered: A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's ESA.

THR Threatened: A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.

Bats

The potential SAR bats within the general area are: little brown myotis, northern myotis, eastern small-footed myotis and tri-colored bat. There are three types of habitats required by bats: hibernation, maternity sites and day-roost sites. The latter is not considered critical habitat.

These four bat species prefer to hibernate in caves or mines. They can hibernate in buildings but that is rare for these species (COSEWIC, 2013a). No caves, buildings, or mines were present.

The northern myotis tends to prefer larger expanses of older forests (late successional or primary forests) and chose maternity sites in snags that are in the mid-stage of decay. They prefer habitat with intact interior habitat and is shown to be negatively correlated with edge habitat (Menzel et al., 2002; Broders et al., 2006; Yates et al., 2006; OMNRF, 2015). This habitat is absent.

The recovery strategy for the eastern small-footed myotis indicates that the preferred maternity habitat of this species consists of open rock habitats and that it rarely uses old buildings as roosting/maternity sites (Humphrey, 2017). There was no suitable rocky habitat present. Based on this information, this species' maternity sites are considered absent.

The Atlas of Mammals of Ontario (Dobbyn, 1994) suggests that the tri-colored bat is not present within this part of Ontario however, the NatureServe mapping in the COSSARO (2015) includes all of southeastern Ontario. There are no recent sightings of this species documented in SD&G. Based on this information, this species is considered to have a very low potential of occurring.

This leaves only the little brown myotis as potentially using the study area for maternity sites. No cavity searches have been conducted at this time. MECP has indicated that for this area, habitat is not a limiting factor and that provided that avoidance measures can be implemented, that there would be no contravention of ESA. Avoidance measures of following the appropriate timing window for clearing of trees > 10 cm in diameter will be recommended. This will avoid impacting bats during their active season.

Plants

Butternuts

Butternut is listed as an endangered species federally signifying that it is at risk of becoming Extinct or Extirpated in Ontario and in Canada. Butternut is a shade intolerant species that is often found along edge habitats on rich, moist, well-drained loams or well-drained gravels (COESWIC, 2003). The butternut is threatened by a canker for which there is no known control (COESWIC, 2003).

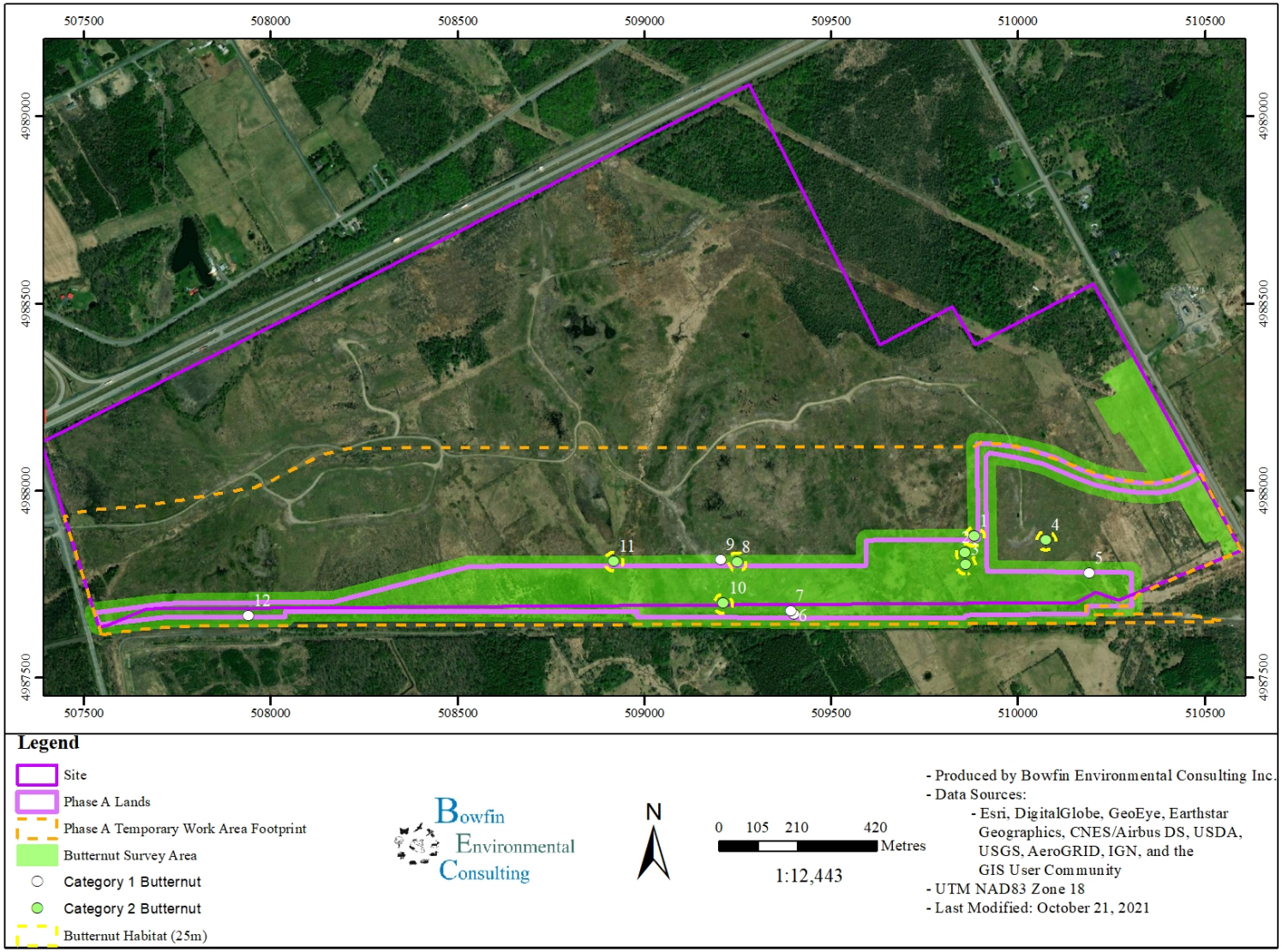
The butternuts were assessed based on the amount of canker (the disease which is killing the species), their size and health, as per the MNRF BHA protocol. This method classes the individual trees as one of three categories:

Category 1 are those that are heavily infected to the point that they are not expected to survive.
Category 2 may have some canker but are still considered healthy.
Category 3 are the same as Category 2, but these are larger individuals situated near heavily cankered trees and province believes that some may be showing immunity to the disease.

During which 12 individuals were found (Figure 10). These were classed as Category 1s (five individuals) and Category 2s (seven individuals). The 25 m surrounding an individual is protected unless the appropriate steps take place (Figure 13). Note that since fewer than 10 individuals would be impacted, a 25 m buffer is appropriate. The BHA report was submitted to MECP June 14, 2021, and the mandatory 30-day period has passed. The seven Category 2s will be registered on-line.

Note that Butternut inventories are good for 2-years (in this case until June 10, 2023).

Figure 13: Butternut Habitat



SAR Mitigation Measures

General:

- Endangered and Threatened species are protected and cannot be harmed, harassed, or killed and in some cases their habitats are also protected. These individuals will only be handled by qualified person and only if the individual is in imminent threat of harm. An authorization under the ESA 2007 would be required to handle individuals that are not in imminent threat of harm.
- If a SAR enters the work area during the construction period, any work that may harm the individual is to stop immediately and the supervisor will be contacted. No work will continue until the individual has left the area.
- Should an individual be harmed or killed then work will stop, and the Ministry of Environment, Conservation and Parks (MECP) will be contacted immediately.
- Educate staff and contractors on the potential for SAR to be in the area and their significance.
- Mitigation measures listed elsewhere in this report are also applicable to this section.
- If a SAR is encountered, this information will be provided to the Natural Heritage Information Centre (Report rare species (animals and plants) | Ontario.ca)

SAR Birds: No species at risk birds were observed during the breeding bird period. The potential for Barn Swallows is related to the culverts under the railroad and these would not be impacted by this project.

- No impacts to federal SAR bird nests, or their eggs is permitted under the federal *Species at Risk Act*. If a federally listed bird species at risk nest is encountered, then work must stop until the young have fledged. If the nest/young have been harmed, then Environment Canada must be notified immediately for guidance.
- No impacts to provincial SAR bird nests or their eggs is permitted under the provincial *Endangered Species Act*. If a provincially listed bird species at risk is encountered, then work must stop and MECP contacted (sarontario@ontario.ca).
- Should a nest be discovered, stop all work that may disturb the birds (i.e. that cause the adults to fly off the nest) and contact a biologist or MECP or Environment Canada, as appropriate for the species.
- It is recommended that the buildings be removed outside of the breeding bird period (April 5 to August 28) unless surveys have been completed 2-days prior to confirm lack of active nests.

Area	Nature	Duration	Magnitude
Local	Negative Direct	Permanent (removal of individual trees)	Unlikely to occur

Bats: Most of the trees to be cleared are smaller than the minimum 10 cm diameter at breast height and as such, do not provide bat habitat.

- Educate contractors by informing them that most bats in Ontario are protected.
- **Remove trees (>10 cm in diameter) between October 1 and March 31 (Bat active season is currently assumed to be April 1 to September 30).** If this is not possible, conduct exit survey prior to cutting them down. If the exit survey identifies bats, contact MECP or biologist for additional guidance. Note that there are other species that are also protected by this timing window. Additional measures would be required to ensure that they are not impacted (see turtles (above) and other (below)).

Area	Nature	Duration	Magnitude
n/a	n/a	n/a	None – no removal of trees is proposed

Plants: The information on the butternuts was submitted to MECP on June 14, 2021, and those seven that are Category 2s will be registered on-line.

Mitigation Measures:

Avoidance/Mitigation Measures for Butternuts:

- Additional butternut inventories (and as required assessment) will be required prior to any cut and fill activity outside of the area surveyed (Figure 5). It is recommended that these be spaced to ensure that they are completed within 2-years of the area being cleared.
- The current BHA is valid until June 11, 2023.
- Category 2s: No work within 25 m of the eighteen individuals until they have been registered on-line (Notice of Butternut Impact) and a confirmation has been received or a permit under SAR. The BHA was submitted on June 14, 2021.
- Until the measure above has been met, establish a 25 m buffer around the Category 2s and protect the buffer with fencing (i.e. snow fencing). And workers should be informed that this individual and its buffer is protected (Figure 13).
- Should additional butternuts be identified, not included in the original BHA, then these will need to be assessed and the appropriate actions taken.

Area	Nature	Duration	Magnitude
Local	Negative Direct	Permanent	Seven category 2s will be removed and offsetting as per the ESA requirements completed.

5.3.2 Unevaluated Wetlands

The OP protects Provincially Significant Wetlands (PSWs) and adjacent lands. It also allows for a request to evaluate unevaluated wetlands. No PSWs were present but RRCA requested that the unevaluated wetlands be assessed. This was completed in 2020 and the result circulated with RRCA. There six wetlands identified within the property. Of these one (wetland 1) was in the Hoople Watershed and the other five were in the Raisin River watershed. Again, the site was cleared and extremely disturbed. This affected the delineation of the wetland habitats and communities, as the ruts were often vegetated with wetland species. In addition, the wetlands, which weren't impacted by the clearing, have been physically impacted by the three transmission lines and the pipeline that cross the site/adjacent lands. Finally, the wetlands all receive water directly from Highway 401 which is anticipated to be high in salt. Invasive species common reed and purple loosestrife were common, and in some areas the common reed created monocultures.

For a wetland to be deemed significant, it requires a score of 600 or more than 200 in either the Biological or Special Features components. These complexes did not meet these requirements. (Hoople had a score of 263 and the Raisin complex of 390).

Wetlands do not need to be brought forward to the impact assessment. However, it is noted that the proponent is interested in retaining some of the wetlands to the north of the property. These are outside of the area of interest for Phase A.

5.3.3 Significant Woodlands

Methods

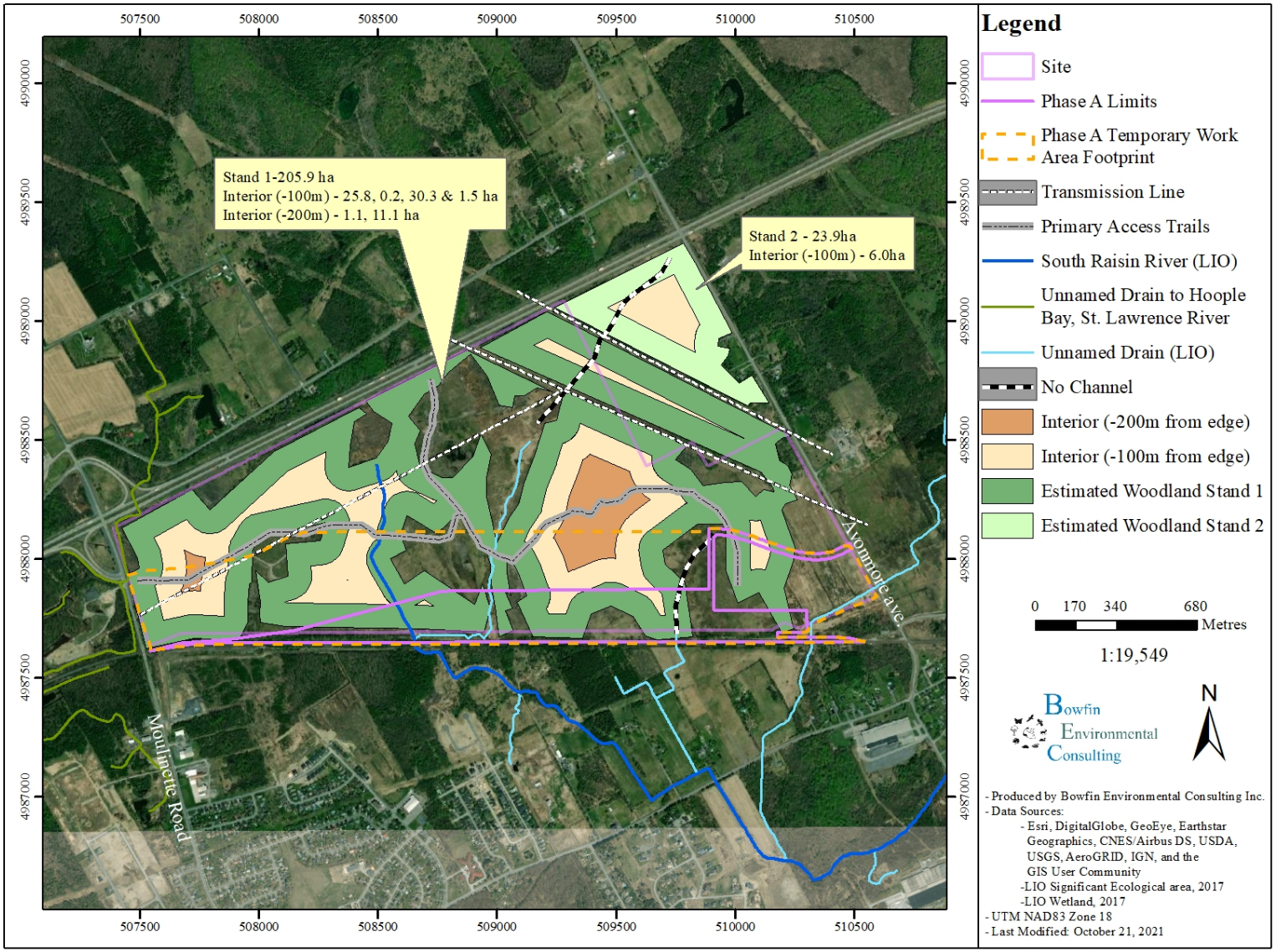
The PPS does not permit development in significant woodlands south and east of the Canadian Shield unless it has been demonstrated that there will be no negative impacts on the natural features or the ecological functions. The OP has identified the significant woodlands as only being those to the south of the east-west transmission line. The field investigations found that the potential for significant woodlands also included lands to the north of this corridor. The figure below identifies the extent of the potentially significant woodlands following the NHRM (OMNR, 2010), which is what is referred to in the OP. It is noted that due to the heavily

disturbed nature of this site, the exact delineation of the woodlands versus cultural thickets and meadows was difficult. It is anticipated, that if anything, there maybe be less woodlands than indicated herein. There was a narrow, but wider than 20 m, area under the transmission lines that does not seem to be maintained which would connect the woodlands on site to the first patch under the transmission line into one stand. A second stand was noted on the east side of the second of the two parallel transmission lines. The entire corridor for that line appeared to be maintained.

The NHRM defines a woodland as a treed area, woodlot or forested area. For the purposes of this report, a woodland included any community that was described as a treed swamp (deciduous, coniferous or mixed), tall shrub or low shrub swamp composed of tree species, woodland or forest (regardless of tree size).

The determination of significance is based on the criteria presented in the NHRM (OMNR, 2010): size, ecological function, uncommon characteristics and economical and social functional values. Note that the study area is located within the Raisin River watershed which has an approximate forest cover of 37-40% (for the Hoople Creek and Raisin River watersheds, respectively) (RRCA, 2017). If the woodland meets any one of these criteria, then it is deemed to be significant, and the functions identified should be maintained.

Figure 14: Delineation of Woodland (based on PPS and satellite imaging)



Results

Woodland Size

The stand that is partially on-site, is 205.9 ha in size (Figure 14). Based on the forest cover of approximately of 37-40% for this area, any forest stand that is ≥50 ha should be considered significant. The stand is considered significant in terms of size. Following the removal of the woodlands for the area of interest for Phase A, the stand would still be over 50 ha in size (124 ha) and would continue to meet the minimum size requirement.

Ecological Functions Criteria

This criterion is based on five factors. The forest stand meets the criteria for proximity to other significant natural heritage features (fish habitat) and water protection (Table 8). The value of the woodland in its existing condition at protecting fish habitat and water protection is limited. The whole site is highly disturbed, and many ruts cross through the watercourses.

While woodland interior is present, in discussions with MNRF on other projects, the value of the interior habitat should be evaluated on the existing conditions and functions. Since the woodland interior is too young to provide any value, its loss through future development would not affect the current function.

Uncommon Characteristics

This criterion refers to woodland stands that are considered uncommon based on the composition, cover type, age or structure. Based on the information available in the *Significant Wildlife Habitat Technical Guide Appendix M* there are no rare plant communities found within the woodlands. This criterion is not significant.

Economic and Social Functional Values

This site is not known to have a significant economic or social function. It is on mostly private lands and the majority of the site does not provide suitable walking (heavily rutted and slash throughout) for social or economic functions.

Table 8: Presence/Absence of Woodland Ecological Functions

Factor	Comments/Rational	Meets Minimum Requirements Current	Meets Minimum Requirements After Phase A
Woodland interior (includes all forest located at least 100 m from the woodland's perimeter) Minimum size – 8 ha	There were two interior habitats consisting of areas that were more than 8 ha (±30.3 ha and 25.8 ha), they will be reduced to 13.2 ha and 9.3 ha. These interior habitats however consist of young saplings and provide no ecological function. They will be removed. They are also fragmented by the three transmission lines, and access roads.	No	No
Proximity to other woodlands or other significant natural heritage features	There are several channels that pass through the woodlands, which while heavily impacted do provide seasonal fish habitat. It is noted that under current conditions, these are creating fish traps.	Yes	Yes
Linkages	The stand does not provide a link to two or more habitats.	No	No
Water protection	There are several channels that pass through the woodlands, which while heavily impacted do provide seasonal fish habitat. It is noted that under current conditions, this woodland does not likely provide any water protection for most of the site. It is heavily impacted by ruts, slash etc.	Yes	Yes
Woodland diversity	These stands did not contain any declining natural communities or a high variety of native diversity through composition or terrain. The majority of the site consisted of regenerating poplar or green ash.	No	No

Woodland Summary

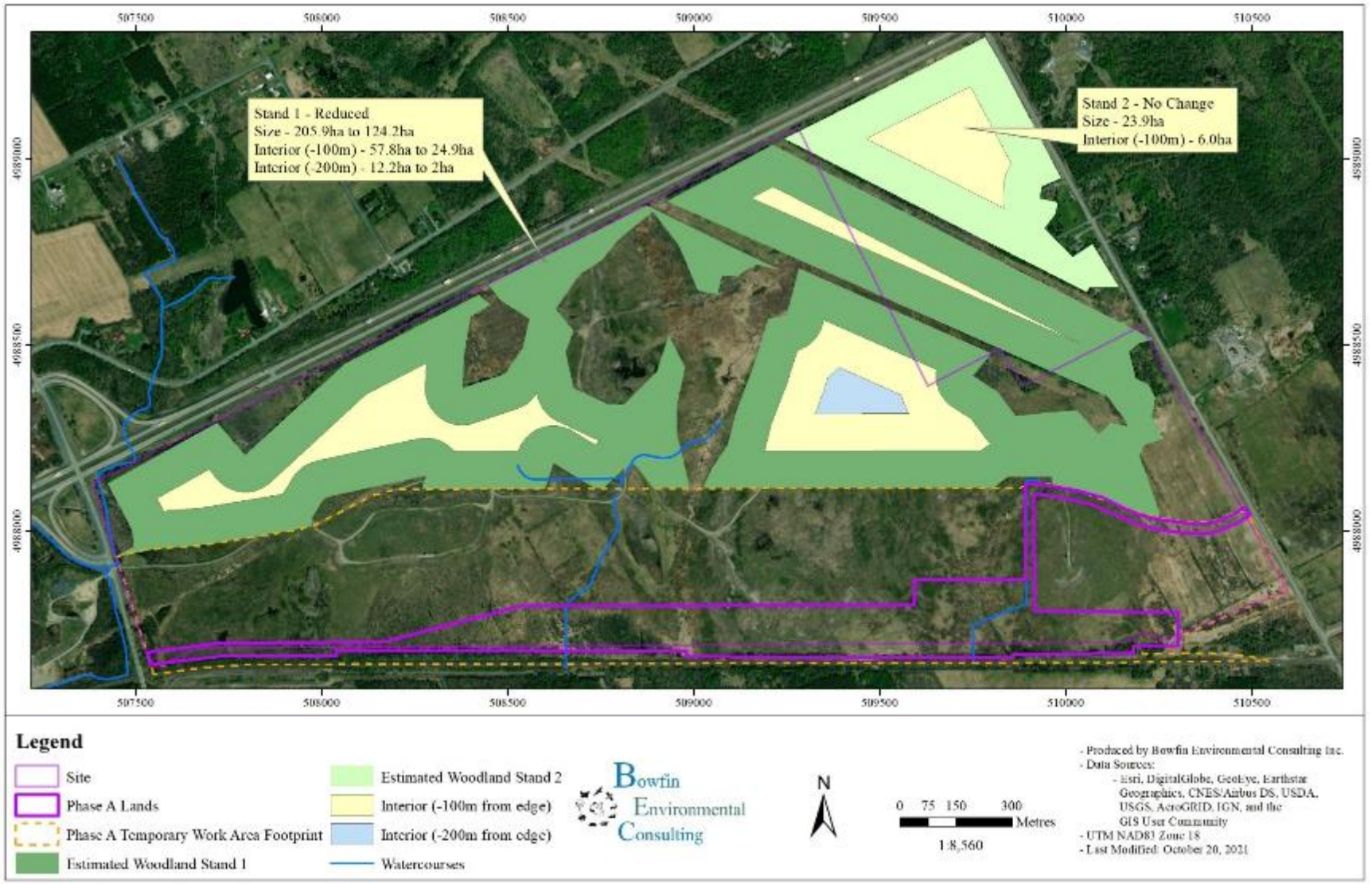
The woodland stand is considered significant in terms of size, and ecological functions [proximity to other significant natural heritage features (fish habitat) and water protection]. Again it is noted that the clearing activities have impacted the function of the existing woodland in water protection (ruts). Impacts to the woodland must ensure that these three functions are protected.

Woodland Mitigation Measures

The policies do not provide a set buffer needed for the protection of the woodland. Factors such as impacts to soil, erosion etc. should be considered.

- Since, much of this area is already impacted, the only buffer needed would be to prevent impacting the health of the individual trees on the edge of the woodland to be maintained. For the most part these are regenerating trees and little buffer width is needed. To protect the woodland outside of the area of interest for Phase A, no clearing of vegetation to occur within the drip lines of the remaining trees.
- Timing of the clearing of vegetation is to follow the guidelines set out for wildlife protection in other sections.

Figure 15: Delineation of Woodland (based on PPS and satellite imaging)

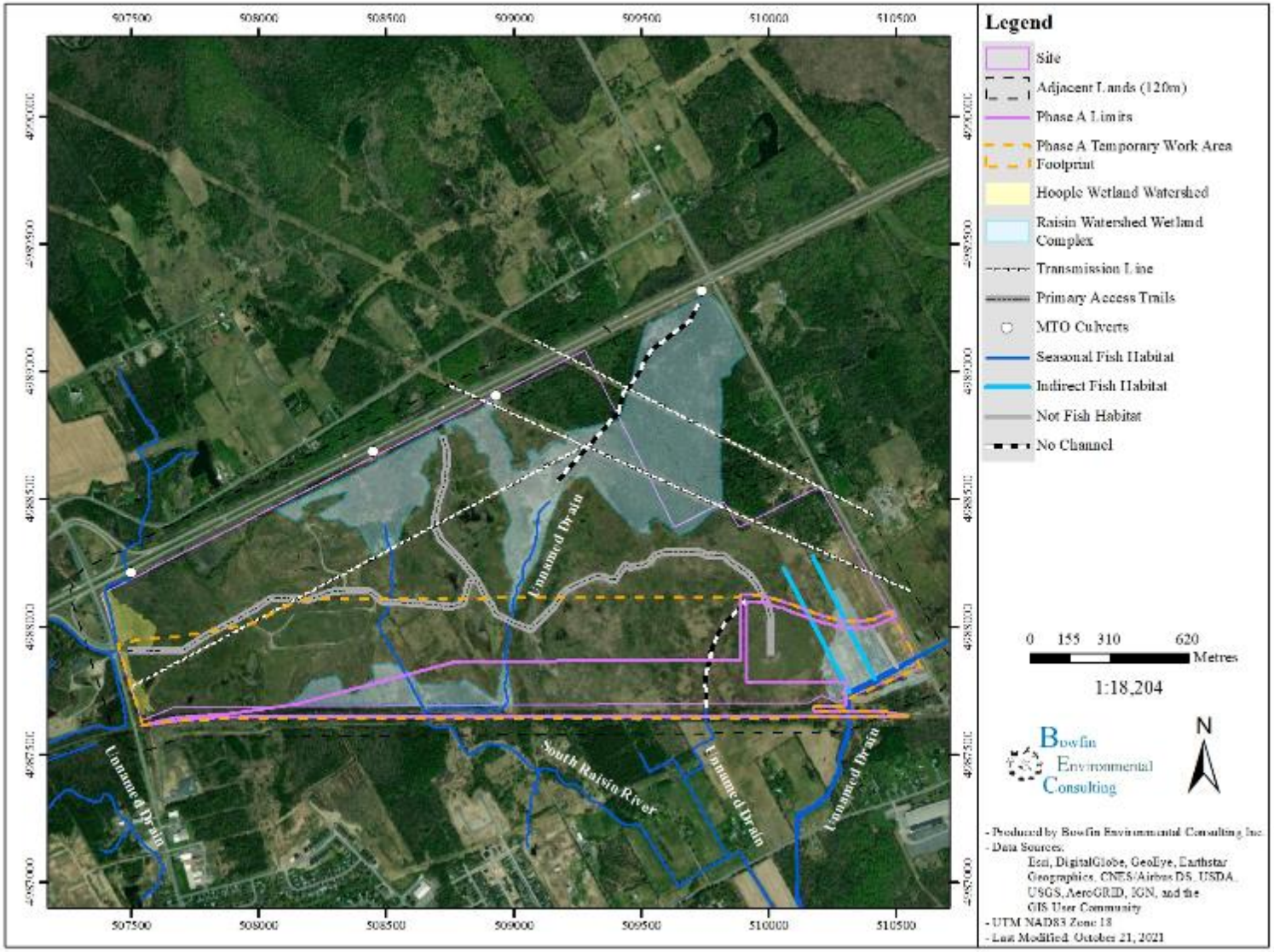


5.3.4 Fish Habitat

This EIS provided a summary of all channels, those that provided direct, indirect or no fish habitat. This site included five watercourses that were identified on the OP schedules as well as three headwater drainage features for a total of eight potential features. Of these, four were confirmed to provide seasonal fish habitat: Unnamed Drain to Hoople Bay, South Raisin River, Unnamed Drain 1 and Unnamed Drain 3. The Agricultural Drains 1 and 2 were indirect fish habitat and Agricultural Drain 3 was Not Fish habitat. This information was also circulated to the RRCA in the Existing Conditions and Headwater Drainage Feature reports in 2020.

The PPS states that development will not take place within fish habitat unless provincial and federal requirements are met (PPS, 2020). The NHRM species that the minimum natural vegetation buffer to fish habitat can be reduced from 30 m to 15 m for warm water systems and to 20 m for cool water systems. The warm water buffer would apply in this situation. A Request for Review was submitted to Fisheries and Oceans Canada (DFO) for their input of both Phase A and for the property overall. The following provides the outline of the impacts of Phase A and recommended mitigation measures at this time. Additional measures may be required following discussions with DFO and RRCA.

Figure 16: Fish Habitat Classification



General Concepts for Site:

- The watershed boundaries will be respected. No change to the amount of water flowing to the Lake St. Lawrence (Unnamed Tributary to Hoople) or to the Raisin River Watershed (all other channels on site).
- The water originating from the MTO culverts on Highway 401 needs to be accommodated.
- There will be no change in the amount of flow reaching each of the culverts under the railroad. This will ensure that the fish habitat downstream of the railroad is not impacted.
- Since there was no defined channel on Site for the Unnamed Drain 2, one option being considered is urbanizing this area and piping the flow to the railroad culvert.
- It is anticipated that the three Agricultural Drains will be removed but their contributing flow will continue to reach Unnamed Drain 3 (future submission).

Impacts associated with Phase A:

1. The lower portions of the South Raisin and of the Unnamed Tributary 1 will be realigned into a single combined new channel. In the future, the upstream portion of these channels may also be realigned (Table 9).
2. Four culverts will be installed on this new combined channel (Table 10) (locations shown on accompanying drawing).

The next steps are summarized in Table 11 and the preliminary assessment of impacts to fish and fish habitat are discussed below.

Table 9: Summary of Changes to Channels Associated with Phase A

	South Raisin River (Watercourse F)		Unnamed Drain 1 (Watercourse E)	
Existing	Length removed as part of Phase A = 593 m. Total length impacted is 800 m. Channel width 1.1 m	880 m^2 (652 m^2 in Phase A study area, see accompanying drawing)	Length 996 m and channel width 2.8 m	2789 m^2
Proposed	Length 310 m, 1:2 year wetted width 3.3-5.7 m (note this length is only the portion in Phase A, see	Will form part of a future road ditch and may be designed to not be fish habitat. Note if this is designed not to be fish habitat, then it will impact	Length 945 m, 1:2 year wetted width 3.3-5.7 m	5007 m^2

	South Raisin River (Watercourse F)		Unnamed Drain 1 (Watercourse E)
	accompanying drawings)	the entire length of this watercourse.	

Table 10: Summary of Proposed Culverts (see accompanying drawing for locations)

Culvert	Length (m)	Width (m)	Height (m)	Estimated Velocities (1:2 Year)	Max. Distance (50% White Sucker 380 mm) (SPOT)
Culvert 4 -Downstream (near CN)	51	12.2	0.5	1.0 m/s	26 m
Culvert 3	75	12.2	0.5	0.9 m/s	35 m
Culvert 2	35	12.2	0.5	1.0 m/s	26 m
Culvert 1 – Street A	32	12.2	0.5	0.8 m/s	50 m

Table 11: Summary of Fish Habitat, and Timing of Works, Activities and Undertakings

Feature	Classification	Fish Species Caught	Comments	Works, Activities, Undertakings		Next Steps
				Phase A	Future Phases	
Unnamed Drain to Hoople	Seasonal Fish Habitat (road ditch)	Brook Stickleback	Moulinette Road ditch	None	Unknown	TBD
South Raisin River / Watercourse F	Seasonal Fish Habitat	Northern Redbelly Dace Brook Stickleback	Heavily impacted by clearing (even within some of the wetland)	Lower portion to become road ditch (not fish habitat) This will indirectly result in the loss of the upstream fish habitat.	Upper portion may be realigned to new single channel with Unnamed Drain 1/ Watercourse E	Discussion with DFO on loss of headwaters (see preliminary analysis below (Section 5))
Unnamed Drain 1 / Watercourse E	Seasonal Fish Habitat	Central Mudminnow, Northern Redbelly Dace, Fathead Minnow, Creek Chub, Brook Stickleback	Middle portion is heavily impacted by clearing	Lower portion to be realigned into new channel with four new culverts. Calculated velocities at 1:2 levels are fast, but it is anticipated that this would be short duration	Upper portion may be realigned to new single channel with South Raisin River /Watercourse F if culvert velocities do not negate this being habitat	Discussion with DFO on value of habitat and proposed realignments/culverts (see preliminary analysis below (Section 5))
Unnamed Drain 2 / Watercourse D	On-Site - Not Fish Habitat	n/a (in quad trails – one Central Mudminnow)	There was no defined channel on-site and the culvert appears to be broken under the railroad track. The quad trail parallel to the	To be piped	n/a	Confirmation of assessment with DFO (see preliminary analysis below (Section 5))

Feature	Classification	Fish Species Caught	Comments	Works, Activities, Undertakings Phase A	Works, Activities, Undertakings Future Phases	Next Steps
			track had ponded water but was isolated due to hills on either side.			
Unnamed Drain 3	Seasonal Fish Habitat	Central Mudminnow Brook Stickleback	No comments	None	TBD	Overall concept plan to be discussed with DFO
Agricultural Drain 1	Indirect Fish Habitat	None	Narrow, channel agricultural channel that is connected but offers little contributing flows	None	TBD	Overall concept plan to be discussed with DFO
Agricultural Drain 2	Indirect Fish Habitat	None	Narrow, channel agricultural channel that is connected but offers little contributing flows	None	TBD	Overall concept plan to be discussed with DFO
Agricultural Drain 3	Not Fish Habitat	None	Narrow, channel agricultural channel that is NOT connected	None	TBD	Overall concept plan to be discussed with DFO

Avoidance

The site is also constrained by several existing elements:

- The industrial and logistics village will be built around the railway yard and inter-modal staging area. The grading of the rail yard and storage and transfer area have a very low tolerance and must be kept at approximately less than <0.5-1% grade change.
- The existing grade of the CN tracks must be maintained at less than a 1% change, including a switch that must match existing at the eastern and western end of the side-track lines.
- The CN engineering standards dictate the cover that the rail lines must maintain over culvert crossings, which further constrains the grading design.
- The existing culverts crossing the CN mainline to the south
- The alignment and grade of the natural watercourses and drainage ditches through the site (including a wetland area that the developer is working on maintaining as a naturalized area)
- The existing culvert's crossing Highway 401 on the north side of the site
- There is an at-grade crossing at Avonmore Rd., which must match exactly with existing rail lines and road grades.

Effort was made to improve the potential for fish passage through the proposed new culverts, the velocities remain higher than preferred for the lengths. Because of the constraints listed above, it is unlikely that a solution can be found for these culverts for water volumes estimated for the 1: 2 year.

Preliminary Mitigation Measures

Planning

- Follow the DFO guidelines in their Standard Code of Practice for temporary cofferdams and end-of-pipe.
- Construct and stabilize the new channels prior to the decommissioning of the existing channels.
- Site instruction will be provided to contractor to highlight that the channel provides fish habitat.
- Clearly demarcate work areas within the riparian habitat in the field.
- All in-water works to occur during the in-water work window (July 1 to March 14, inclusive).
- Erosion and sediment control measures will be installed prior to the clearing of vegetation within 30 m of a watercourse.

- No in-water work will begin until the area has been isolated with measures deemed appropriate by the contract administrator or proponent. These measures must also be sufficient to allow for dewatering and a fish salvage (see below) and to prevent fish from entering the work area.
- The work in the channel is to be completed in the dry.
- Suspend activities that cause muddy environments during periods of heavy rains.
- Minimize clearing of woody vegetation (few woody individuals are present). Where possible, cut the shrubs down (instead of grubbing).
- All or portions of the riparian corridor will be naturalized with native vegetation.

Erosion and Sediment Control

- An erosion and sediment control plan will be developed by contractor and implemented prior to any work within 30 m of the watercourse.
    - Provide regular maintenance to the erosion and sediment control measures during construction. Contractor shall be responsible for ensuring that the erosion and sediment control measures are maintained and will monitor the water clarity downstream of the work site throughout the day and during rain events. Water quality is to meet the *Canadian Water Quality Guidelines for the Protection of Aquatic Life*. Monitoring for visible plumes outside of the work area is to be undertaken.
    - At a minimum, the erosion and sediment control plan will include the installation of sediment fencing along the top of banks where vegetation clearing and/or soil disturbance will occur within 30 m of any channel prior to the removal of vegetation. And the installation of a turbidity curtain downstream.
    - Additional materials (*i.e.* rip rap, filter cloth and silt fencing) will be readily available in case they are needed promptly for erosion and/or sediment control.
- Construction of cofferdam dams can create a plume. As such, appropriate measures should be put in place such as placing rock for the cofferdam within a turbidity curtain that isolates just the area where the cofferdam is being built.
- Note that the meter bags can often split when being removed as such it is preferred that gravel be used for metre bags.
- Any stockpiles of soil or fill material will be stored as far as possible from the channel and protected by silt fencing (minimum 30 m).
- The erosion control measures will not be removed until the bank is stabilized (<20% bare soil).
- All equipment working within 30 m of the water will be well maintained, clean and free of leaks.
- The work within the channels will be completed in the dry.

- Water from dewatering will be treated prior to returning it to the system (i.e. straw bale settling ponds covered by geotextiles or sediment sock on the end of hose and situated on top of well vegetated slopes).
- Water from bypass will be released in such a way as to prevent erosion or the transportation of suspended sediments downstream. Note that if this water is taken from upstream of the work area and is the same quality as the receiving waterbody on the downstream side, then it can be released directly into the system (see additional notes under fish and fish habitat protection)
- Where banks/riparian area (area within 30 m of channel) have been stabilized by seeding and/or planting, monitor the revegetation to ensure that the vegetation becomes fully established.
- Any riprap will consist of clean rock free of fines.

Fish and Fish Habitat Protection

- All material introduced for the temporary measures will be fully removed from the water at the completion of the work.
- The methods, sequencing and cofferdam design need to be determined once the project proceeds further in design.
- Fish (and other aquatic fauna) will be salvaged from the isolated channel by a qualified biologist/technologist. The salvage will need to be repeated if the work area becomes flooded.
- Dewatering of water in areas that may contain fish will be completed from hoses placed in fish baskets or covered with clean wash rock or other such method to prevent fish impingement and entrainment. Note that the screens that come on the hoses are not enough to prevent fish from harm.
- Monitor the end of pump frequently for ensure that all fish protection measures are functioning.
- Minimize the size of temporary in-water work areas.
- Bypass flow will be required. The amount of flow bypass should be sufficient to maintain the habitats upstream and downstream of the site (i.e. similar to what would be passed through the culvert). The DFO Standard Code of Practice for End-of-Pipe should be followed to ensure that fish do not become impinged or entrained.
- Installation of rock protection will not impede fish from passing through culverts.

Contaminant and Spill Management

- All equipment working in or near the water should be well maintained, clean and free of leaks. Maintenance on construction equipment such as refueling, oil changes or lubrication would only be permitted in designated area located at a minimum of 30 m from the shoreline in an area where sediment erosion control measures and all

precautions have been made to prevent oil, grease, antifreeze or other materials from inadvertently entering the ground or the surface water flow.

- Emergency spill kits will be located on site. The crew will be fully trained on the use of clean-up materials to minimize impacts of any accidental spills. The area would be monitored for leakage and in the unlikely event of a minor spillage the project manager would halt the activity and corrective measures would be implemented.
- If a spill occurs:
    - Stop all work
    - Spills are to be immediately reported to the MOECC Spills Action Centre (1800 268-6060). Note that under the *Fisheries Act* deleterious substance includes sediments.
    - Clean-up measures are to be appropriate and are not to result in further harm to fish/fish habitat.
    - Sediment-laden water will be removed and disposed of appropriately.
- No construction debris will be allowed to enter the watercourse.
- Following the completion of construction, all construction materials will be removed from site.

Residual/Net Impact

The proposed works and design have not been finalized for the full development of the property. At this time, the proponent has initiated discussions with DFO and RRCA for the overall Site and then for the Phase A. It is acknowledged, that the current culvert designs may pose an issue for fish passage during 1:2 flows.

5.3.5 Other

The measures outlined above serve to protect the identified or potentially present endangered or threatened species. However, there are also some other items that should be mentioned.

1. Almost all birds in Ontario are protected by either MBCA or FWCA.
2. Most reptiles are protected by the FWCA

Mitigation Measures:

- The only species not protected are: American crow, brown-headed cowbird, common grackle, house sparrow, red-winged blackbird, and starling. It is prohibited to destroy or disturb an active nest of other birds, or to take or handle nests, eggs, or nestlings. In this part of Ontario, the current standard nesting period is between April 5th to August 28th. Outside of this timing window, it is considered unlikely that birds would be nesting. Note, there are some birds (birds of prey, herons etc.) that do begin nesting earlier in the

year. It should also be noted, that if an active nest is present before or after the above dates that it is still protected. These dates only serve as a guideline.

- During construction, there is a potential for suitable habitat for ground nesting birds (i.e. killdeer) to be created. These include bare soil or gravel areas. Perform regular walks of the cleared areas looking for ground nesters. If any are present, the contact a biologist for guidance.
- Work during the daytime hours to prevent light disturbances.
- Ensure that all equipment have the appropriate mufflers to reduce noise disturbances.
- If a turtle nest is suspected, then flag a 10 m buffer to protect the nest. Contact MECP (for SAR) and MNRF (all other species).

5.3.6 Accidents and Malfunctions

Although the likelihood of accidents and malfunctions occurring would be minimized by following the mitigation measures outlined below, should accidents and/or malfunctions occur they have the possibility of presenting serious impacts and require consideration.

Contaminant and Spill Management

See fisheries section above.

6.0 CONCLUSION

The proponent is applying for Site Plan Control approval for Phase A of a multi-phase logistics village. The property is situated on part of Lots 31-37, Concession 5 in the Township of Cornwall, SD&G. The total area of the property is approximately 325 ha. The first phase of development, Phase A, is moving forward and is a major infrastructure project for Eastern Ontario. The central piece of infrastructure is a large inter-modal rail yard and will include full-length unit train tracks that are connected along 2 km of the existing CN Mainline (Kingston Subdivision). While the current Site Plan Application is for Phase A, the proponent has presented an overall concept plan, that includes incorporating the overall site topography and drainage. Through the Urban Design on the project, they have identified incorporating various opportunities and constraints, including the natural features. This is to allow a holistic approach for the natural features, one that results in the protection of the better features on site and an overall gain to the ecological functions.

The majority of lands were cleared by the others and are heavily disturbed and at various stages of revegetation. The Existing Conditions Report and Headwater Drainage Features Reports (Bowfin, 2020) were provided for review in 2020 and identified the presence of wetlands, woodlands and fish habitat. The wetlands were evaluated by Bowfin (certified OWES) and found not to be significant. The results of the various SAR surveys identified the presence of

Butternuts and the potential for bats. **The BHA was submitted, and the butternuts will be registered on-line, and the appropriate offsetting measures undertaken**.

To protect the bats, no tree that is >10 cm in diameter (dbh) will be removed during the bat active season (April 1 to September 30). Further the removal of any vegetation will be avoided between April 5 and August 28, to avoid potential contraventions to the MBCA.

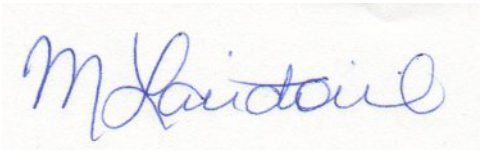
The potential impacts to fish and fish habitat are being reviewed by DFO and final decisions on avoidance and mitigation measures will be determined through that process.

Concurrent with the Site Plan application for Phase A, an application for "FOR DEVELOPMENT, INTERFERENCE WITH WETLANDS AND ALTERATIONS TO SHORELINES AND WATERCOURSES" will also be made to the Raisin River Conservation Authority by the proponent.

While additional consultations with DFO and RRCA are required for the alterations to fish habitat and wetland, it is our professional opinion that all other impacts were assessed and can be mitigated through the use of common mitigation measures. With respect to the fish and fish habitat, the previously heavily disturbed nature of the site and its location as headwaters suggests that adequate on site offsets can be found. It is anticipated that through on-going discussions with DFO and RRCA solutions can be identified to ensure that there is no net negative impacts to the natural environment as a result of the development of the items included within this report.

I trust that this report will meet your requirements. Should you have any questions or comments, please contact the undersigned.

Sincerely,



Michelle Lavictoire, Biologist

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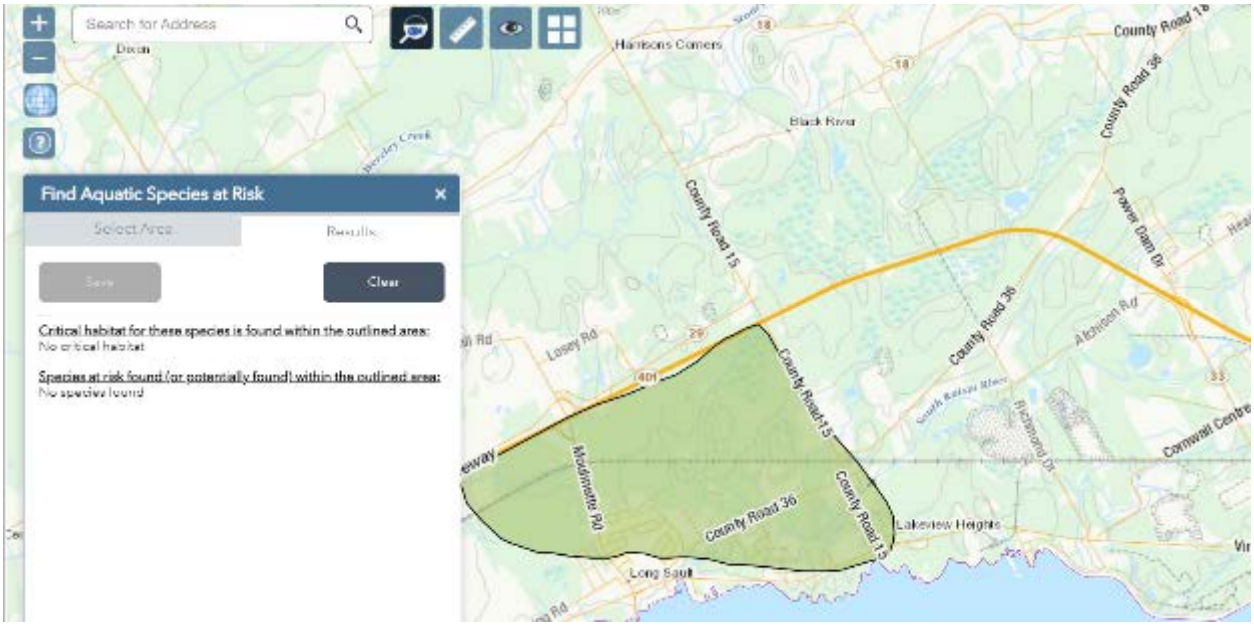
Appendix A: Additional Information for Fisheries Assessment



Please see below for the preliminary cross section length, width, and areas for the proposed Watercourse E alignment. The stations included in the table below correspond with the Watercourse E alignment shown in the figure circulated on Wednesday. Please note that the information shown below is preliminary and is subject to change during the detailed channel design process in the future.

Cross Section Geometry	Start Station	End Station	Length (m)	Wetted Width (m)	Area (m^2)
3:1	0+000	0+045	45	3.3	148.5
1:10	0+045	0+090	45	4.65	209.3
3:1	0+090	0+110	20	3.3	66.0
1:10	0+110	0+130	20	4.65	93.0
3:1	0+130	0+150	20	3.3	66.0
1:10	0+150	0+210	60	4.65	279.0
3:1	0+210	0+245	35	3.3	115.5
1:10	0+245	0+290	45	4.65	209.3
3:1	0+290	0+350.68	60.68	3.3	200.2
Culvert #1	0+350.68	0+382.79	32.11	12.2	391.7
3:1	0+382.79	0+415	32.21	3.84	123.7
1:10	0+415	0+420	5	5.62	28.1
3:1	0+420	0+460	40	3.84	153.6

Cross Section Geometry	Start Station	End Station	Length (m)	Wetted Width (m)	Area (m^2)
1:10	0+460	0+490	30	5.62	168.6
3:1	0+490	0+555	65	3.84	249.6
1:10	0+555	0+580	25	5.62	140.5
3:1	0+580	0+625	45	3.84	172.8
1:10	0+625	0+670	45	5.62	252.9
3:1	0+670	0+780	110	3.84	422.4
1:10	0+780	0+788.68	8.68	5.62	48.8
Culvert #2	0+788.68	0+811.49	22.81	12.2	278.3
3:1	0+811.49	0+827.94	16.45	3.84	63.2
Culvert #3	0+827.94	0+878.05	50.11	12.2	611.3
3:1	0+878.05	0+891.5	13.45	3.84	51.6
Culvert #4	0+891.5	0+922.81	31.31	12.2	382.0
3:1	0+922.81	0+944	21.19	3.84	81.4