AECOM Imagine it. Delivered.

Sifton Properties Limited

187 Byron Avenue
Environmental Impact Study

Prepared by:

AECOM Canada Ltd.
50 Sportsworld Crossing Road, Suite 290
Kitchener, ON N2P 0A4
Canada

T: 519.650.5313
F: 519.650.3424
www.aecom.com

Prepared for:

Mr. Phillip R. Masschelein
Vice President, Neighbourhood Developments
Sifton Properties Limited
1295 Riverbend Road, Suite 300
London, ON
N6K 0G2

Date: August 2019

Project #: 60571588

Distribution List

# Hard Copies	PDF Required	Association / Company Name
	✓	Sifton Properties Limited
	✓	AECOM Canada Ltd.

Revision History

Rev #	Date	Revised By:	Revision Description

Statement of Qualifications and Limitations

The attached Report (the "Report") has been prepared by AECOM Canada Ltd. ("AECOM") for the benefit of the Client ("Client") in accordance with the agreement between AECOM and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations and conclusions contained in the Report (collectively, the "Information"):

- is subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations");
- represents AECOM's professional judgement in light of the Limitations and industry standards for the preparation of similar reports;
- may be based on information provided to AECOM which has not been independently verified;
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued;
- must be read as a whole and sections thereof should not be read out of such context;
- was prepared for the specific purposes described in the Report and the Agreement; and
- in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time.

AECOM shall be entitled to rely upon the accuracy and completeness of information that was provided to it and has no obligation to update such information. AECOM accepts no responsibility for any events or circumstances that may have occurred since the date on which the Report was prepared and, in the case of subsurface, environmental or geotechnical conditions, is not responsible for any variability in such conditions, geographically or over time.

AECOM agrees that the Report represents its professional judgement as described above and that the Information has been prepared for the specific purpose and use described in the Report and the Agreement, but AECOM makes no other representations, or any guarantees or warranties whatsoever, whether express or implied, with respect to the Report, the Information or any part thereof.

Without in any way limiting the generality of the foregoing, any estimates or opinions regarding probable construction costs or construction schedule provided by AECOM represent AECOM's professional judgement in light of its experience and the knowledge and information available to it at the time of preparation. Since AECOM has no control over market or economic conditions, prices for construction labour, equipment or materials or bidding procedures, AECOM, its directors, officers and employees are not able to, nor do they, make any representations, warranties or guarantees whatsoever, whether express or implied, with respect to such estimates or opinions, or their variance from actual construction costs or schedules, and accept no responsibility for any loss or damage arising therefrom or in any way related thereto. Persons relying on such estimates or opinions do so at their own risk.

Except (1) as agreed to in writing by AECOM and Client; (2) as required by-law; or (3) to the extent used by governmental reviewing agencies for the purpose of obtaining permits or approvals, the Report and the Information may be used and relied upon only by Client.

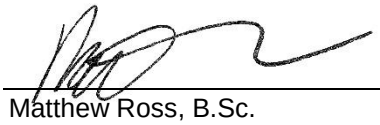
AECOM accepts no responsibility, and denies any liability whatsoever, to parties other than Client who may obtain access to the Report or the Information for any injury, loss or damage suffered by such parties arising from their use of, reliance upon, or decisions or actions based on the Report or any of the Information ("improper use of the Report"), except to the extent those parties have obtained the prior written consent of AECOM to use and rely upon the Report and the Information. Any injury, loss or damages arising from improper use of the Report shall be borne by the party making such use.

This Statement of Qualifications and Limitations is attached to and forms part of the Report and any use of the Report is subject to the terms hereof.

AECOM: 2015-04-13

Authors

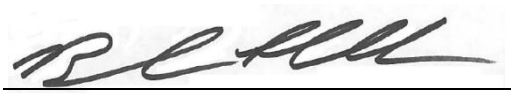
Report Prepared By:



Matthew Ross, B.Sc.
Terrestrial Ecologist
Water & Natural Resources, Environment

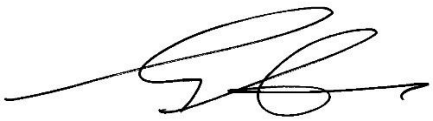
Olivia Butty, B.Sc. Hons.
Aquatic Ecologist
Water & Natural Resources, Environment

Report Reviewed By:



Brandon Holden
Terrestrial Ecologist
Water & Natural Resources, Environment

Mark Pomeroy, B.Sc. (Hons)
Senior Fisheries Biologist
Water & Natural Resources, Environment



Gary Epp, B.Sc.(Hons.),M.Sc., Ph.D
Practice Lead & Senior Ecologist
Water & Natural Resources, Environment

Table of Contents

page

1. Introduction 1
1.1 Land Use Designations 1
1.2 Legislative Requirements 1

2. Background Information Review 5
2.1 Terrain and Drainage 6
2.2 Soils 6
2.3 Agency Consultation 6

3. Natural Heritage Features and Functions 9
3.1 Field Investigations 9
3.2 Aquatic Ecosystems 12
3.2.1 Background 12
3.2.2 Field Investigation Methods 12
3.2.3 Results 12
3.3 Terrestrial Ecosystems 13
3.3.1 Vegetation Communities 13
3.3.1.1 Background 13
3.3.1.2 Field Investigation Methods and Data Analysis 13
3.3.1.3 Results 15
3.3.2 Breeding Birds 18
3.3.2.1 Background 18
3.3.2.2 Field Investigation Methods 19
3.3.2.3 Results 19
3.3.3 Amphibians 20
3.3.3.1 Background 20
3.3.3.2 Field Investigation Methods 21
3.3.3.3 Results 21
3.3.4 Reptiles 22
3.3.4.1 Background 22
3.3.4.2 Field Investigation Methods 22
3.3.4.3 Results 23
3.4 Species at Risk Assessment 24
3.4.1 Background 24
3.4.2 Methods 25
3.4.3 Results 25
3.5 Significant Wildlife Habitat Assessment 26
3.5.1 Background 26
3.5.2 Methods 28
3.5.3 Results 28
3.6 Hydrogeology and Geotechnical Investigations 28

4. Assessment of Significance 29
4.1 Federal 29
4.2 Provincial 29
4.3 Municipal 29
4.4 Conservation Authority Recognized Features 30

5. Proposed Development Plan 31

6. Impact Assessment 33
6.1 Existing Environmental Impacts 33
6.2 Potential Short-term Impacts 33
6.3 Potential Long-term Impacts 34
6.3.1 Direct Impacts 34
6.3.2 Indirect Impacts 36
6.4 Impact Mitigation 38
6.4.1 Avoidance of Impacts 38
6.4.2 Standard Mitigation Measures 38
6.4.3 Compensation 39
6.5 Net Environmental Impacts 39

7. Environmental Management Plan 44
7.1 Natural Heritage Feature Protection 44
7.2 Buffer Zones 44
7.2.1 Buffer Zone Rationale 45
7.2.2 Buffer Zone Management 45
7.3 Construction Restrictions and Mitigation 45
7.4 Species at Risk Management 46
7.5 Environmental Monitoring 47

8. Conclusions 48

9. References 49

List of Figures

Figure 1. Study Area 2
Figure 2. Terrain and Drainage 7
Figure 3. Terrestrial Investigations 10
Figure 4. Aquatic Investigations 11
Figure 5. Ecological Land Classification 16
Figure 6. Species at Risk Habitat and Significant Wildlife Habitat 27
Figure 7. Conceptual Development Plan 32
Figure 8. Assessment of Impacts 35

List of Tables

Table 1. Applicable Legislation and Policies 3
Table 2. Summary of Field Investigations 9
Table 3. Aquatic Species at Risk Records 12
Table 4. Floristic Summary of ELC Communities 15
Table 5. Avian Species at Risk Records 18
Table 6. Breeding Bird Survey Results 19
Table 7. Anuran Call Survey Results 21
Table 8. Significant Reptile Records 22
Table 9. Summary of Snake Cover Board Survey Results 23
Table 10. Summary of Snake Area Search Results 23
Table 11. Summary of Turtle Basking Survey Results 24
Table 12. Candidate and Confirmed Species at Risk Habitat 25
Table 13. Proposed Conditions Annual Water Budget for Subdivision 37
Table 14. Proposed Conditions Annual Discharge 37
Table 15. Environmental Water Balance 37
Table 16. Net Environmental Effects 41

Appendices

Appendix A. Thames Centre Official Plan, Schedule B-1
Appendix B. MNRF Correspondence
Appendix C. UTRCA Correspondence
Appendix D. Aquatic Photographic Log
Appendix E. Middlesex Natural Heritage Systems Study Maps
Appendix F. Plant Species List
Appendix G. Terrestrial Photographic Log
Appendix H. Species at Risk Screening
Appendix I. Significant Wildlife Habitat Screening
Appendix J. Standard Construction Mitigation Measures

1. Introduction

AECOM Canada Ltd. (AECOM) has been retained by Sifton Properties Ltd. to undertake the require investigations to prepare an Environmental Impact Study (DAR) report in support of the proposed 187 Byron Avenue Plan of Subdivision (the Project) located in Dorchester, Ontario. The Project lands are approximately 22 ha in area and are located east of Dorchester Road and south of Byron Avenue, at 187 Byron Avenue, in the municipality of Thames Centre, Ontario (**Figure 1**). The Project lands consist largely of agricultural fields and a residential property.

The following DAR provides a description of existing conditions, the proposed development plan, an assessment of potential impacts, as well as environmental management recommendations. Investigations were conducted on the Project lands, plus accessible lands within 120 m (the Study Area). This report has been prepared in accordance with the requirements of the Thames Center Official Plan, the Middlesex County Official Plan, the Upper Thames River Conservation Authority's Environmental Planning Policy Manual (2006), and is consistent with the Provincial Policy Statement (PPS; 2014), the Natural Heritage Reference Manual (NHRM; 2010), and other relevant provincial and federal legislation, policies and regulations.

1.1 Land Use Designations

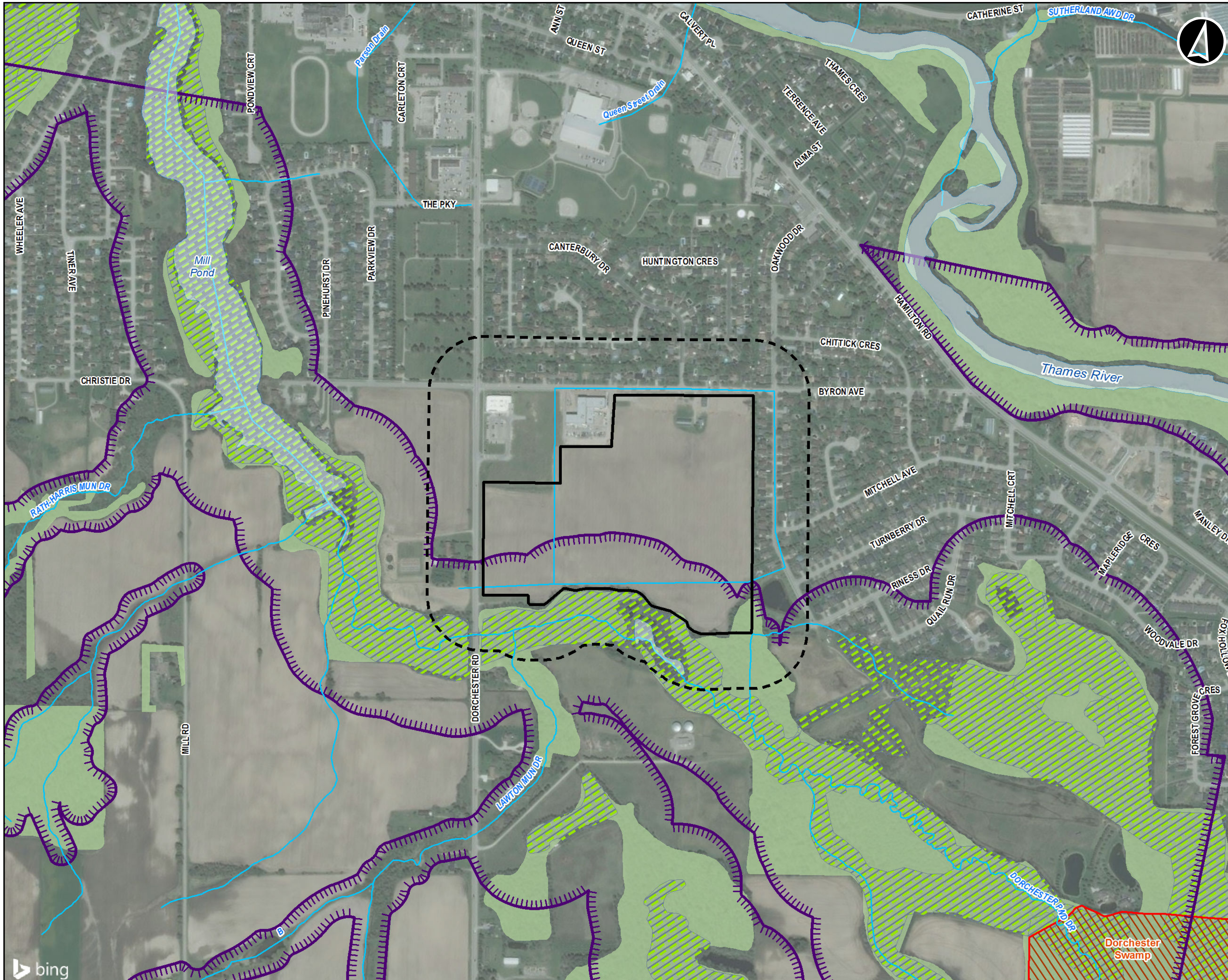
Schedule A – Land Use of the Middlesex Official Plan (2006) identifies the Project lands as an Agricultural Area, with Natural Environment Areas including wetlands to the south of the Project lands. A review of the Ministry of Natural Resources and Forestry (MNRF) online Land Information Ontario (LIO) geospatial data (2018) identifies the wetland as the South Dorchester Swamp Provincially Significant Wetland (PSW). *Schedule C – Natural Heritage Features* of the Middlesex Official Plan (2006) identifies natural heritage features including Significant Woodland adjacent to the south boundary of the Project lands.

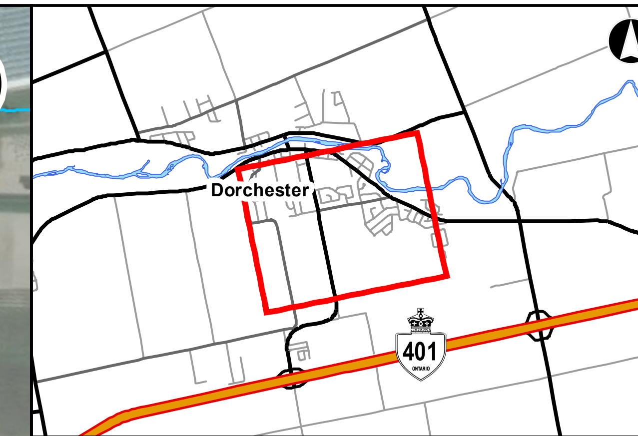
Schedule A – Land Use Plan of the Municipality of Thames Centre Official Plan identifies the presence of Natural Areas and Protection Areas immediately south of the Project lands. *Schedule B-1 Land Use Plan* for the Dorchester Settlement Area further identifies Environmental Areas and Protection Areas within the southeast corner of the Project lands. Appendix I of Municipality of Thames Centre Official Plan also identifies natural heritage features south of the Project lands including the PSW.

An aerial view showing the Project lands and surrounding land uses, including Natural Heritage Features, is shown on **Figure 1**. The Thames Centre Official Plan, Schedule B-1 is provided in **Appendix A**.

1.2 Legislative Requirements

The proposed development requires the consideration of federal, provincial, regional and local policies, legislation and regulations with an overview provided in **Table 1**.





Legend

- Watercourse
- Waterbody (LIO, 2018)
- Wooded Area (LIO,
- Evaluated Wetland - Provincially Significant Wetland (LIO, 2018)
- Provincially Significant Life Science ANSI (LIO, 2018)
- UTRCA Regulation Limit[1]
- Subject Lands

Notes:
[1]UTRCA Regulation Limit digitized using a Regulation Limit map created by the UTRCA on October 25, 2017 and December 4, 2017.

0 70 140 280 420 560
Metres

187 Byron Avenue
Environmental Impact Study

Subject Property

Nov 27, 2018	1:8,000 * when printed 11"x17"	Datum: NAD83 UTM zone 17N Source: MNRF, MMAH, AECOM Bing Image: © 2018 Microsoft Corporation © 2018 DigitalGlobe ©CNES (2018) Distribution Airbus DS
P#: 60571588	V#: 001	**Figure 1**

AECOM

This drawing has been prepared for the use of AECOM's client and may not be used, reproduced or relied upon by third parties, except as agreed by AECOM and its client, as required by law or for use by governmental reviewing agencies. AECOM accepts no responsibility, and denies any liability whatsoever, to any

Table 1. Applicable Legislation and Policies

Level of Governance	Legislation	Policies/Regulations	Guidelines	Applicability to the Project lands
Federal	Fisheries Act	Fish Habitat Protection Policy Statement	Measures to Avoid Harm, end of pipe screen guidelines (as they relate to potential pumping during construction)	The Fisheries Act was amended in 2019 and focuses on preventing Harmful Alteration, Disruption, or Destruction (HADD) of fish habitat . However, certain provisions (such as S.35) are not in force until a date to be determined by the Governor in Council. Until this date is determined, provisions, policies and guidelines under the 2012 *Fisheries Act* will be followed regarding impact assessment and determining DFO review requirements.
	Migratory Bird Convention Act	Regulations Respecting the Protection of Migratory Birds	N/A	The Migratory Bird Convention Act affords protection to birds and their nests as listed under Article 1 of the Migratory Birds Convention.
	Species at Risk Act	Regulations respecting categories of species at risk (SAR)	N/A	Only applicable on federal lands or lands where federal permitting is being issued. For this project, it would apply to federally listed aquatic SAR.
Provincial	Planning Act	Provincial Policy Statement (2014)	Natural Heritage Reference Manual (MNRF 2010) Significant Wildlife Habitat Technical Guide (OMNR 2000) Ecoregion Criterion Schedule 7E (MNRF 2015)	The PPS, NHIC, SWH Technical Guide and Ecoregion Criterion Schedules outline protection of Natural Heritage Features within Ontario including Significant Wetlands, Woodlands and Wildlife Habitat.
	Conservation Authorities Act	Ontario Regulation 157/06	Upper Thames River Conservation Authority Policies for the Development, Interference, with Wetlands and Alterations to Shorelines and Water Courses. Environmental Impact Study Guidelines and Submission Standards for Wetlands	The Study Area falls within the Upper Thames River Conservation Authority (UTRCA) regulation limits. As such, any proposed development application will require review and input from the UTRCA.
	Fish and Wildlife Conservation Act	N/A	N/A	Affords protection for some species of birds, amphibians, reptiles and mammals in Ontario.
	Endangered Species Act	Ontario Regulation 242/08 Ontario Regulation 230/08	N/A	The ESA and its associated regulations list Species at Risk within Ontario and afford individual and habitat protection for species listed as Threatened or Endangered.
Municipal	Middlesex	Section 2.3.10	Appendix C of the OP – A	Schedule A identifies the presence of Natural

Level of Governance	Legislation	Policies/Regulations	Guidelines	Applicability to the Project lands
	County Official Plan	Natural Heritage Features Section 3.4 Natural Environment Areas	Guideline for Environmental Impact Studys (2007)	Environmental Areas immediately adjacent to the south boundary of the Project lands. These features preclude development. Development within 120 m of these features requires the completion of a Environmental Impact Study (DAR). Development applications within or adjacent to Natural Heritage Features as shown on Schedule C will require the submission of a DAR.
	Municipality Of Thames Centre Official Plan	Section 3.2 Natural Heritage Features and Natural Hazard Areas		As per Table 1 of the OP, where development occurs within 120 m of a PSW, a DAR is required to demonstrate there will be no negative impacts on the features or their function. Similarly, any development within 50 meters of a Significant Woodland or Significant Valleylands requires a DAR to demonstrate no negative impacts to the feature or its function. Section 3.2.3.1 of the OP outlines DAR Requirements for the Municipality of Thames Centre.

2. Background Information Review

A review of background information was completed to identify known natural heritage features, as well as flora and fauna within the Study Area. The following online databases and faunal atlases were reviewed for the Study Area:

- MNRF's Make-a-Map: Natural Heritage Areas application (NHIC);
- MNRF Land Information Ontario (LIO) geospatial database information;
- Fisheries and Oceans Canada (DFO) Aquatic Species at Risk mapping;
- Ministry of Agriculture, Food and Rural Affairs' online mapping tool;
- Ontario Breeding Bird Atlas (Bird Studies Canada, et al. 2006),
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2015),
- MNRF Fish records;
- UTRCA Fish records; and
- Atlas of the Mammals of Ontario (Dobbyn 1994).

Additional studies and reports reviewed for relevant information include:

Dorchester Property Natural Heritage Due Diligence Report (Draft; AECOM 2018) - AECOM previously prepared the Dorchester Property Natural Heritage Due Diligence Report which provided a review of available background information, a preliminary Species at Risk (SAR) screening and habitat assessment, as well as high-level description of terrestrial and aquatic features within the Project lands. This information was used to inform a summary of preliminary constraints to development and provided a summary of additional studies required to meet applicable federal, provincial and municipal policies.

Middlesex Natural Heritage System Study (2014) - Completed in 2014 by the Upper Thames River Conservation Authority (UTRCA), in cooperation with Ausable Bayfield Conservation Authority, St. Clair Region Conservation Authority, Lower Thames Valley Conservation Authority and Kettle Creek Conservation Authority, the Middlesex Natural Heritage Systems Study (MNHSS) was developed to provide a landscape level assessment of the natural heritage features and functions within Middlesex County. The MNHSS is a science based study that uses high quality ortho-imagery and Geographic Information System (GIS) modeling to identify natural vegetation patches that are considered to be ecologically important at the County level (MNHSS 2016). The methods outlined in the report are intended to establish a local approach to identifying the terrestrial Natural Heritage System as required by the natural heritage policies of the PPS. The study identifies natural heritage features within Middlesex County and assesses their 'ecological importance' based on a defined set of criteria as outlined in Table 9 of the MNHSS (2014). Ecological important features include patches which meet the definition of provincial Significance as defined by the PPS including Significant Woodlands, Significant Valleylands, Fish Habitat, PSW's and Areas of Natural and Scientific Interest (ANSI). The definition of ecological importance also extends to natural features such as meadows, thickets, regionally significant ANSI's, evaluated and unevaluated wetlands, and connected vegetation features which are identified as providing unique set of ecological services.

Methods outlined in the MNHSS (2014) were utilized to assist in the identification of natural heritage features as well as determine their ecological importance or Significance within the Study Area.

2017 Upper Thames River Conservation Authority Watershed Report Card -The Study Area is located in the Thames River Watershed and the jurisdiction of the UTRCA. The Thames River watershed is situated in the agricultural heartland of southwestern Ontario in close proximity to Lakes Huron, St. Clair and Erie. The river is 273 km long and drains some 5,825 square kilometres of land, making it the second largest watershed in southwestern Ontario.

The 2017 Report Card identifies that the Study Area falls within the Dorchester Corridor subwatershed. According to the Dorchester Corridor Report Card, the watershed occupies 137 sq. km of land which is comprised of 66% agricultural, 23% natural cover, 10% urban, 2% aggregates and 1% water. There are 45 fish species and 17 freshwater mussels recorded within the watershed, with specific gamefish including Smallmouth Bass (*Micropterus dolomieu*), Largemouth Bass (*Micropterus salmoides*), Northern Pike (*Esox lucius*), Brook Trout (*Salvelinus fontinalis*) and Brown Trout (*Salmo trutta*). The Report Card identifies two fish SAR recorded within the watershed, Black Redhorse (*Moxostoma duquesnei*) and Silver Shiner (*Notropis photogenis*) and four SAR mussel species. The report card only lists two of the four species of mussels: including Rainbow (*Villosa iris*) and Wavy-rayed Lampmussel (*Lampsilis fasciola*).

2.1 Terrain and Drainage

The Study Area is located within the Dorchester Corridor Subwatershed and slopes gently towards the southern portion of the Study Area where the Dorchester Pond Drain (also known as Dorchester Creek), Lawton Drains and the South Dorchester Swamp PSW are located south of the Project lands boundary (**Figure 1**). The highest elevation occurs at the northwest corner of the Study Area and gently slopes towards the lowest points at the South Dorchester Swamp PSW. Roadside and on-site drainage is split between an existing 600 mm CSP centerline culvert and partial flow into the South Dorchester Swamp PSW, as well as the Dorchester Pond Drain. Cultivated agricultural lands are present throughout the majority of the Project lands. Terrain and drainage features within the Study Area are shown on **Figure 2**.

2.2 Soils

According to Middlesex County soils data (Hagerty and Kingston 1992), the following soil associations are noted for the site and surrounding area:

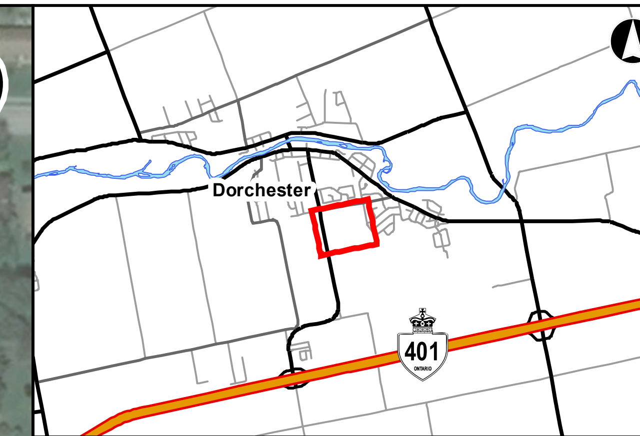
- The Wattford Association – Drainage is well to imperfect to poor. Textures range between fine sandy loam, very fine sandy loam and very fine sand. Parent material is deep glaciolacustrine sands.

Most slopes are mapped as less than 5% which was also observed during site investigations. In general, soils for this region are predominantly grey-brown podzols (Chapman and Putnam 1984).

2.3 Agency Consultation

Information requests were submitted to the MNRF Aylmer District Office and the UTRCA requesting additional relevant information that may not be included in publically accessible databases. On May 22nd, 2018 an information request was sent to the Aylmer District MNRF requesting the following information:

- Presence of Natural Areas (Environmentally Sensitive Areas, PSW, ANSI, Provincial Parks, Conservation Reserves and Wildlife Management Areas);
- Natural Area Reports;
- SAR Occurrences and potential to occur;
- Rare Species Occurrences;
- In-water Timing Restrictions;
- Important Commercial or Recreation Fisheries;
- Water Quantity or Quality Data;
- Groundwater Discharge Areas;
- Watercourse Names, Thermal and Flow Regimes;
- Fish Habitat Sensitivity;
- Habitat Information and Location;



Legend

- Inferred Surface Flow
- Contour
- Watercourse
- Subject Lands

0 20 40 80 120 160
Metres

187 Byron Avenue
Environmental Impact Study

Terrain and Drainage

Nov 27, 2018	1:2,500 * when printed 11"x17"	Datum: NAD83 UTM zone 17N Source: MNRF, MMAH, AECOM Bing Image: © 2018 Microsoft Corporation © 2018 DigitalGlobe ©CNES (2018) Distribution Airbus DS
P#: 60571588	V#: 001	**Figure 2**

AECOM

- Fisheries Management Objectives or plans;
- Fish Community Records;
- Benthic Invertebrate data;
- Known fish spawning;
- Aboriginal Fisheries; and,
- Significant Wildlife Habitat or wildlife use of the area.

On November 6th, 2017 an information request was sent to Christine Creighton at the UTRCA requesting the following information with regards to the nearby Boardwalk at Mill Pond project:

- Presence of additional Natural Areas (PSW, ANSI, Provincial Parks, Conservation Reserves and Wildlife Management Areas);
- Natural Area reports or wetland evaluation records;
- SAR records or occurrences;
- Rare species records or occurrences (locally and provincially rare);
- Significant Wildlife Habitat or wildlife use of the area;
- Commercial, recreational or Aboriginal fisheries;
- Groundwater discharge areas;
- Watercourse names, thermal and flow regimes;
- Significant fish habitat information (i.e., spawning, migration, etc.) and location;
- Fish community records; and
- Benthic invertebrate data.

Spencer McDonald of the UTRCA responded on November 27th, 2017 and provided additional natural heritage data pertaining to the Study Area. On July 19th, 2018 an email response was received from Emilee Hines from the MNRF. Copies of agency correspondence from the MNRF and UTRCA can be found in **Appendix B** and **Appendix C**, respectively.

3. Natural Heritage Features and Functions

The following section describes the existing natural heritage features and their associated ecological functions for the Study Area based on a review of background information, agency correspondence and ecological field investigations.

3.1 Field Investigations

Field investigations for the Study Area were intended to provide an inventory of ecological features, as well as local flora and fauna. Field investigations included aquatic habitat assessments, vegetation community (i.e. Ecological Land Classification) delineation, floral species inventories, snake cover board surveys, vernal pool surveys, breeding bird surveys and anuran call surveys. **Table 2** summarizes the field investigations completed for the Study Area.

Table 2. Summary of Field Investigations

Field Survey	Date	Investigators
Amphibian Call Surveys	April 24, 2018 May 24, 2018 June 28, 2018	Emily McNaughton and Nataliya Simonova Emily McNaughton and Adam McClelland Emily McNaughton and Paul Adams
Aquatic Habitat Assessments	June 26, 2018	Olivia Butty and Brian McGill
Snake Cover Board and Area Searches	May 1, 2018 June 8, 2018 June 14, 2018 June 26, 2018 July 5, 2018 July 10, 2018	Matthew Ross and Adam McClelland Matthew Ross and Nataliya Simonova Matthew Ross and Edyta Ratajczyk Matthew Ross and Emily McNaughton Matthew Ross and Edyta Ratajczyk Adam McClelland and Brandon Holden
Breeding Bird Surveys	June 8, 2018 June 26, 2018	Matthew Ross and Nataliya Simonova Matthew Ross and Emily McNaughton
Ecological Land Classification	November 10, 2017 June 8, 2018 July 10, 208	Tom Shorney and Adam McClelland Matthew Ross and Nataliya Simonova Adam McClelland and Brandon Holden
Floral Inventory	November 10, 2017 June 8, 2018 July 10, 2018	Tom Shorney and Adam McClelland Matthew Ross and Nataliya Simonova Adam McClelland and Brandon Holden
Significant Wildlife Habitat Survey	November 10, 2017 May 1, 2018 July 10, 2018	Tom Shorney and Adam McClelland Matthew Ross and Adam McClelland Adam McClelland and Brandon Holden

Survey locations for aquatic and terrestrial investigations can be found on **Figure 3** and **Figure 4** respectively.

BYRON AVE
OAKWOOD DR
MITCHELL AVE
DORCHESTER RD
CUM1-1
Winter Wheat
Byron Ave. Drain 2012
FOM2-1
FOD7
FOD7
SWT3-5
FOD7
SWT3-5
FOM5-2
SWD4-1
DORCHESTER PND DR
LAWTON MUN DR
bing
Dorchester
401
Legend
Terrestrial Investigation
Amphibian Breeding Stations
Breeding Bird Stations
Snake Cover Board
Turtle Vantage Point
Watercourse
Subject Lands
ELC Community
Agricultural Field: Winter Wheat Crop
CUM1-1 - Dry - Moist Old Field Meadow Type
FOD7 - Fresh - Moist Lowland Deciduous Forest Ecosite
FOM2-1 - Dry - Fresh White Pine - Oak Mixed Forest Type
FOM5-2 - Dry - Fresh Poplar Mixed Forest Type
SWD4-1 - Willow Mineral Deciduous Swamp Type
SWT3-5 - Red-osier Organic Thicket Swamp Type
0 20 40 80 120 160
Metres

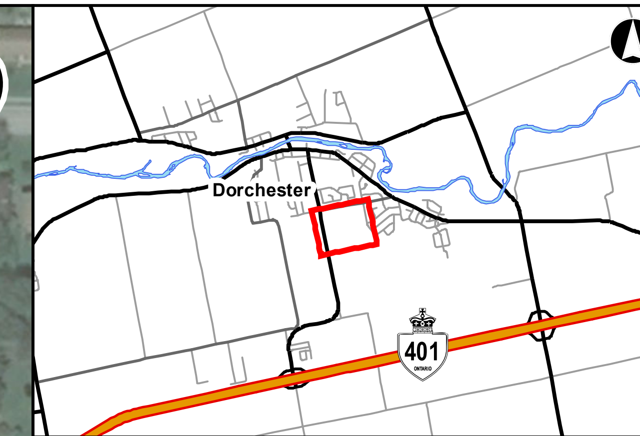
187 Byron Avenue
Environmental Impact Study

Terrestrial Investigations

Nov 26, 2018	1:2,500 * when printed 11"x17"	Datum: NAD83 UTM zone 17N Source: MNRF, MMAH, AECOM Bing Image: © 2018 Microsoft Corporation © 2018 DigitalGlobe ©CNES (2018) Distribution Airbus DS
P#: 60571588	V#: 001	**Figure 3**

AECOM

Map location: \\cakcn1fp001\data\Projects\60571588 187 Byron\900-CAD_GIS\900 - Work\GIS
Date Saved: 11/26/2018 4:08:50 PM User Name: amalia.walker



Legend

- Overland Flow
- Watercourse Flow
- Contour
- Watercourse
- Subject Lands

0 20 40 80 120 160
Metres

187 Byron Avenue Environmental Impact Study

Aquatic Investigation

Nov 29, 2018	1:2,500 * when printed 11"x17"	Datum: NAD83 UTM zone 17N Source: MNRF, MMAH, AECOM Bing Image: © 2018 Microsoft Corporation © 2018 DigitalGlobe ©CNES (2018) Distribution Airbus DS
P#: 60571588	V#: 001	
AECOM		**Figure 4**

3.2 Aquatic Ecosystems

3.2.1 Background

Fish records provided by the UTRCA for 2010 sampling in Dorchester Creek east of Dorchester Road indicate the presence of several gamefish: Black Crappie (*Pomoxis nigromaculatus*), Bluegill (*Lepomis macrochirus*), Largemouth Bass, and Northern Pike; UTRCA benthic invertebrate sampling from the same site in 2015 resulted in a Family Biotic Index (FBI) of 5.29 which indicates "fair" water quality and stream health.

A review of DFO aquatic SAR Mapping and MNRF's NHIC database indicate that no aquatic SAR have been identified within the Project lands Four SAR are known to occur within the vicinity of the Project lands. Wavy-Rayed Lampmussel (SC) has been recorded in Dorchester Mill Pond approximately 500 m downstream (west) of the Subject Lands and Wavy-Rayed Lampmussel, Rainbow, Rayed Bean, and Round Pigtoe have been recorded approximately 1.8 km downstream of the Subject Lands in the Thames River (**Table 3**).

Table 3. Aquatic Species at Risk Records

Common Name	Scientific Name	S-Rank	ESA Status
Rainbow	*Villosa iris*	S2S3	END
Rayed Bean	*Villosa fabalis*	S1	END
Round Pigtoe	*Pleurobema sintoxia*	S1	END
Wavy-rayed Lampmussel	*Lampsilis fasciola*	S1	SC

3.2.2 Field Investigation Methods

Field investigations were completed for Dorchester Pond Drain on June 26th, 2018. Detailed aquatic habitat assessments were carried out on a 100 m section of Dorchester Pond Drain on either side of Dorchester Road. Data collection during field investigations within each of these features included:

- Characterization of surrounding natural features and land uses (i.e. wetland, agriculture, etc.);
- Channel dimensions, substrate composition, channel morphology and bank stability;
- Stream morphology dimensions including:
  - Runs - typically deep, fast moving water with little to no turbulence of water;
  - Riffles - shallow, fast moving water typically running over rocks; riffles providing areas of high oxygenation;
  - Flats - low flowing water with a smooth un-agitated surface;
  - Pools - are described as deep pockets of slow moving water that provide ideal habitat for fish;
- Substrate composition (i.e. clay, silt, sand, gravel, cobble, rock, boulder, muck and detritus);
- Indicators of water quality; water clarity, water colour, presence and type of macrophytes and algal growth, evidence of runoff; and
- Basic field parameters such as pollution sources (i.e. tile drain discharges, other piped discharges and road runoff).

3.2.3 Results

The assessed section of Dorchester Pond Drain flowed through forest, adjacent to agricultural lands. At the time of assessment, the mean wetted width was 2.0 m with a mean wetted depth of 0.3 m upstream of the culvert, and the

mean wetted width was 4.7 m with a mean wetted depth of 0.35 m downstream of the culvert. The substrate, in order of predominance, consisted of silt, sand, gravel, clay and muck. In-stream cover was provided by cobble, aquatic vegetation, woody debris and overhanging terrestrial vegetation. Riparian vegetation along the assessed reach was primarily deciduous trees and shrubs. A number of cyprinids, including *Notropis sp.*, of varying age classes were observed downstream of the culvert at Dorchester Road. Aquatic habitat was non-limiting with no critical habitat identified throughout the assessed reach.

Aquatic features assessed during field investigations are shown on **Figure 3**. Representative photographs are provided in **Appendix D**.

3.3 Terrestrial Ecosystems

3.3.1 Vegetation Communities

3.3.1.1 Background

Prior to field investigations review of existing information was completed to gain an understanding of existing conditions within the Study Area and inform field investigations. Background data review included information obtained from the online NHIC database, agency correspondence, and relevant documentation background documents (**Section 1.3**).

The South Dorchester Swamp PSW occurs within the Study Area but outside the Project lands. Schedule C of the Middlesex OP (2006), as well as Appendix 1-5 of the MNHSS (2014), identify Significant Woodlands south of the Project lands.

3.3.1.2 Field Investigation Methods and Data Analysis

Vegetation Community Classification and Delineation – Each vegetation community within the Study Area was assessed and classified into Ecological Land Classification (ELC) using MNRF guidelines (Lee et al. 1998). This system provides a standard for comparing similar communities across Ontario and classifies vegetation communities through the completion of a multilayer (canopy, sub-canopy, ground cover) vegetation inventory. A summary of disturbance factors, community conditions, plant species list and representative photographs were also recorded for each community. The plant list was established through the completion of a three season floral species inventory completed in the summer and fall of 2017, as well as the spring of 2018. Where wetland communities were encountered, the wetland boundary delineation was refined using the 50/50 rule (i.e. 50% of plants comprised of wetland plant species and 50% were comprised of upland plant species) as per MNRF Wetland Evaluation Guidelines for Southern Ontario (MNRF 2013).

Variables captured in the field were used to determine numerous indices which provide insight into the vegetation community quality and sensitivity. The variables included species richness (i.e. the number of species within a community), Co-efficient of Conservatism (CC), Floristic Quality Index (FQI), Weediness Index and Wetness Index. These three parameters are intended to be used together in order to assign an ecological community sensitivity ranking based on plant species composition. The ranking is not intended to provide a measure of the overall value of a community, but rather reflects the sensitivity of the community to disturbance based on the grouping of plants present within the community. The following provides a summary of the parameters used to assess community sensitivity:

Coefficient of Conservatism
These values range from 0 (low) to 10 (high), and are based on species tolerance to disturbance and fidelity to a specific habitat. Vegetation species and community sensitivity were assessed through the application of CC values, assigned to each native species in southern Ontario (Oldham *et al*. 1995). The

occurrence of species with a CC of 9 or 10 can be indicators of undisturbed habitats such as mature forests, fens or bogs. General habitat values associated with CC values are:

0 – 3 Species found in a wide variety of communities including disturbed sites.
4 – 6 Species associated with a specific community, but tolerate moderate disturbance.
7 – 8 Species associated with a community in an advanced successional stage, tolerant of minor disturbances.
9 – 10 Species with a high degree of fidelity to a narrow range of ecological parameters.

Floristic Quality Index

The floristic quality of an area is reflected in the mean value of CC. The FQI is an indication of native vegetation quality for a vegetation community area. The following summarizes the FQI rankings:

1-19 Indicates low vegetative quality.
20-35 Indicates high vegetative quality and high quality aquatic resources.
> 35 Indicate "Natural Area" quality.

$$FQI = \text{mean CC} \times \sqrt{N}$$

Where $\sqrt{N}$ is the square root of the number of native species observed.

Weediness Index

The sensitivity of natural areas can be assessed through application of the Weediness Index. The Weediness Index quantifies the potential invasiveness of non-native plants. In combination with the percentage of non-native plants, this value can be used as an indicator of disturbance. Values ranging from -1 (low) to -3 (high) have been assigned to most non-native species based on the potential impact each species can have in natural areas:

(-1) Little or no impact on natural areas (most non-native plants fall into this category).
(-2) Occasional impacts on natural areas; generally infrequent or localized.
(-3) Major potential impacts on natural areas; very invasive.

Wetness Index

All plants in southern Ontario have been assigned a wetland category, based on the designations developed for use by the United States Fish and Wildlife Service. Plants are designated into the following categories:

OBL (Obligate Wetland) occurs almost always in wetlands under natural conditions (estimated >99% probability).
FACW (Facultative Wetland) usually occurs in wetlands, but occasionally found in non-wetlands (estimated 67-99% probability).
FAC (Facultative) equally likely to occur in wetlands or non-wetlands (estimated 34-66% probability).
FACU (Facultative Upland) occasionally occurs in wetlands, but usually occurs in non-wetlands (estimated 1-33% probability).
UPL (Upland) occurs almost never in wetlands under natural conditions (estimated <1% probability).

Further refinement of the Facultative categories are denoted by a "+" or "-" to express exaggerated tendencies for those species. The "+" denotes a greater estimated probability occurring in wetlands than species in the general indicator category, but a lesser probability than species occurring in the next higher category. The "-" denotes a lesser estimated probability of occurring in wetlands than species in the general

indicator category, but a greater probability than species occurring in the next lower general category. Each wetland category has been assigned a numerical value to facilitate the quantification of the wetness index. These categories are further defined in the glossary of **Appendix F.**

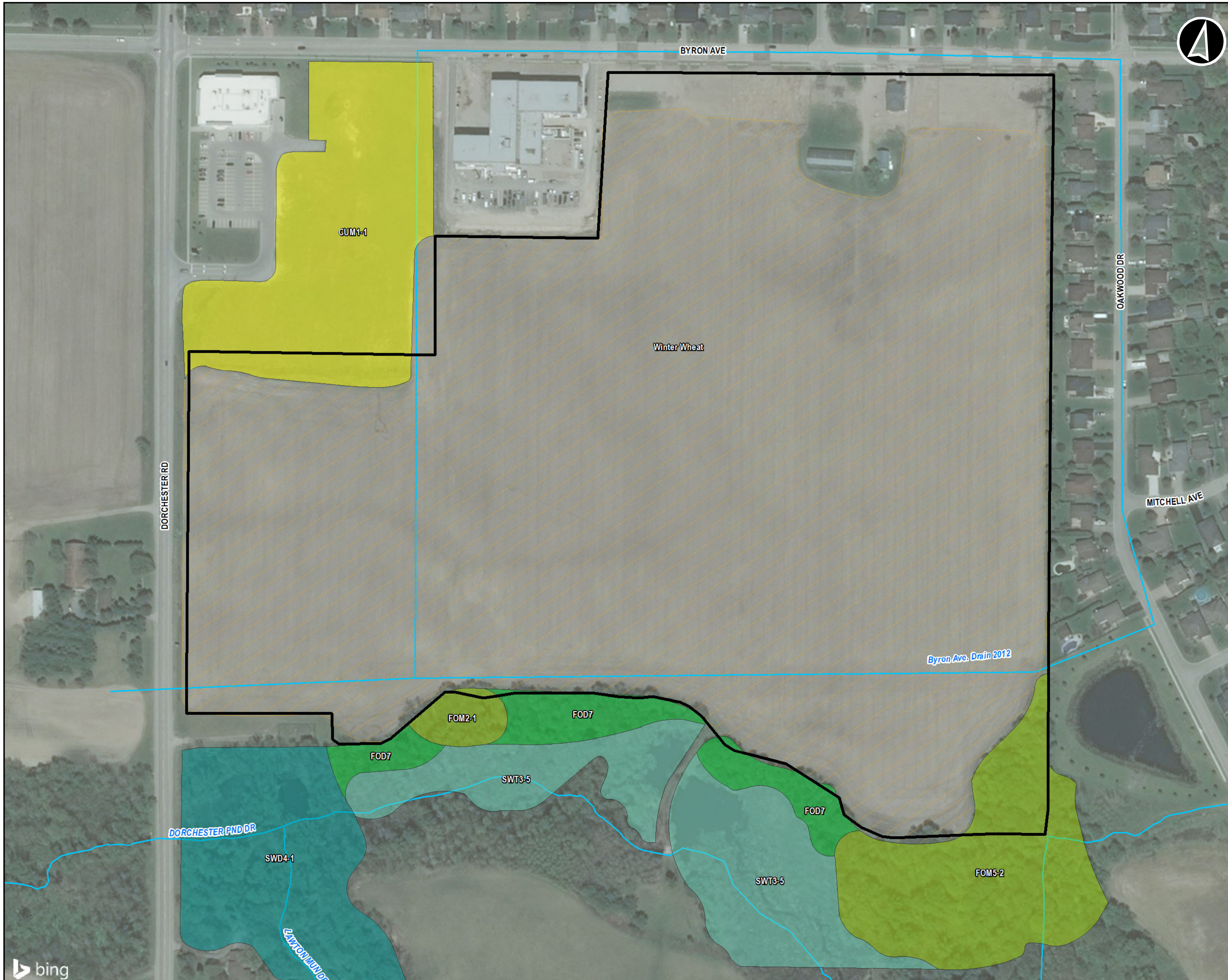
3.3.1.3 Results

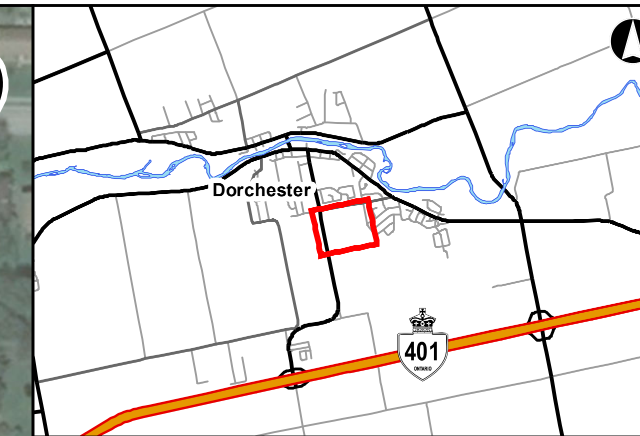
The Project lands consist predominately of agricultural fields planted with row crop. Natural features observed during field investigations were limited to the forested ravine directly south of the Project lands along Dorchester Pond Drain. Six vegetation communities were delineated within the Study Area including Willow Mineral Deciduous Swamp (SWD4-1), Dry-Fresh White Pine-Oak Mixed Forest (FOM2-1), Red-osier Dogwood Organic Thicket Swamp (SWT3-5), Dry-Fresh Poplar Mixed Forest (FOM5-2), Fresh-Moist Lowland Deciduous Forest (FOD7) and Dry-Moist Old Field Meadow Type (CUM1-1) and are shown on **Figure 5**. A brief description of these communities is provided below. A summary of the floristic assessment for each vegetation community is provided in **Table 4**.

Table 4. Floristic Summary of ELC Communities

ELC Community	Provincial Ranking	Area (ha) within the Study Area	Total # of Species			CC	CW	WEED	FQI
			Total	Native	Exotic				
Entire Patch	**N/A**	**29.18**	**155**	**111**	**44**	**3.46**	**0.48**	**-1.84**	**36.45**
Agricultural Field (Winter Wheat)	N/A	20.13	-	-	-	-	-	-	-
CUM1-1: Dry-Moist Old Field Meadow Type	N/A	2.4	40	18	22	1.28	1.66	-1.77	5.42
FOD7: Fresh-Moist Lowland Deciduous Forest	N/A	0.79	74	52	22	3.31	1.64	-1.91	23.85
FOM2-1: Dry-Fresh White Pine-Oak Mixed Forest Type	S5	0.20	43	35	8	3.54	1.57	-2.63	20.96
FOM5-2: Dry-Fresh Poplar Mixed Forest Type	S5	1.81	49	43	6	3.37	0.84	-2.50	22.11
SWD4-1: Willow Mineral Deciduous Swamp Type	S4	1.8	48	35	13	3.11	-0.27	-2.15	18.42
SWT3-5: Red-osier Dogwood Organic Thicket Swamp Type	S5	2.05	68	50	18	3.12	-1.20	-2.00	22.06

Dry-Moist Old Field Meadow Type (CUM1-1) –The dominant species observed within the herbaceous layer included Kentucky bluegrass (*Poa pratensis*), tall goldenrod (*Solidago altissima*) and Canada goldenrod (*Solidago canadensis*). Other species within the herbaceous layer included awnless brome (*Bromus inermis*), quack grass (*Elymus repens*) Ox-eye daisy (*Leucanthemum vulgare*), Chicory (*Cichorium intybus*), Philadelphia fleabane (*Erigeron philadelphicus*), Canada thistle (*Cirsium arvense*), field hawkweed (*Hieracium caespitosum*), prickly lettuce (*Lactuca serriola*), common dandelion (*Taraxacum officinale*), common goatsbeard (*Tragopogon pratensis*) garlic mustard (*Alliaria petiolata*), common milkweed (*Asclepias syriaca*), wild carrot (*Daucus carota*), black medick (*Medicago lupulina*), white sweet-clover (*Melilotus alba*), english plantain (*Plantago lanceolata*), common cinquefoil (*Potentilla simplex*), red clover (*Trifolium pretense*), curly-leaf dock (*Rumex crispus*), bouncing bet (*Saponaria officinalis*), bladder campion (*Silene vugaris*), common mullein (*Verbascum Thapsus*), bird's-foot trefoil (*Lotus corniculatus*) and Daisy Fleabane (*Erigeron annus*). The tree and shrub layers were sparse only occupying 10% of the community, and included Manitoba maple (*Acer negundo*), balsam poplar (*Populus balsamifera*) and willow species (*Salix sp*.).





Legend

- Watercourse
- Subject Lands

ELC Community

- Agricultural Field: Winter Wheat
- CUM1-1 - Dry - Moist Old Field Meadow
- FOD7 - Fresh - Moist Lowland Deciduous Forest Ecosite
- FOM2-1 - Dry - Fresh White Pine - Oak Mixed Forest Type
- FOM5-2 - Dry - Fresh Poplar Mixed Forest
- SWD4-1 - Willow Mineral Deciduous Swamp
- SWT3-5 - Red-osier Organic Thicket Swamp

0 20 40 80 120 160
Metres

187 Byron Avenue
Environmental Impact Study

Ecological Land Classification

Nov 26, 2018	1:2,500 * when printed 11"x17"	Datum: NAD83 UTM zone 17N Source: MNRF, MMAH, AECOM Bing Image: © 2018 Microsoft Corporation © 2018 DigitalGlobe ©CNES (2018) Distribution Airbus DS
P#: 60571588	V#: 001	Figure 5

AECOM

Date Saved: 11/26/2018 4:07:52 PM User Name: amalia.walker

Fresh-Moist Lowland Deciduous Forest Type (FOD7) – The Fresh-Moist Lowland Deciduous Forest Type is present within the forested ravine along the southern boundary of the Project lands. The canopy layer consisted of predominantly of Manitoba maple, common hackberry (*Celtis occidentalis*), with black walnut (*Juglans nigra*), black cherry (*Prunus serotina*), balsam poplar, bur oak (*Quercus macrocarpa*) basswood (*Tilia americana*), green ash (*Fraxinus pennsylvanica*) and trembling aspen (*Populus tremuloides).* The shrub layer consisted of chokecherry (*Prunus viginiana*), common buckthorn (*Rhamnus cathartica*), gray dogwood (*Cornus racemosa*), silky dogwood (*Cornus amomum*), large-fruited thorn (*Crataegus punctata*). Other species within the shrub layer included staghorn sumac (*Rhus hirta),* tartarian honeysuckle (*Lonicera tartarica*), thicket creeper (*Parthenocissus inserta*), red currant (*Ribes rubrum*), and riverbank grape (*Vitis riparia*). The herbaceous layer consisted of fowl meadow grass (*Poa palustris*), cleavers (*Galium aparine*), herb robert (*Geranium robertianum*), may apple (*Podophyllum peltatum*), jack-in-the-pulpit (*Arisaema triphyllum*), field pennycress (*Thlaspi arvense*), tall buttercup (*Ranunculus acris*), garlic mustard (*Alliaria petiolata*), enchanter's nightshade (*Circaea lutetiana*), spotted jewelweed (*Impatiens capensis*) Canada goldenrod (*Solidago canadensis*), tall goldenrod and grass-leaved goldenrod (*Euthamia graminifolia),* with rare occurrences of field hawkweed, common burdock (*Arctium minus*), common dandelion, white baneberry (*Actaea pachypoda*), Canada anemone (*Anemone canadensis*), wild cucumber (*Echinocystis lobata*), spotted geranium (*Geranium maculatum*), common plantain (*Plantago major*), yellow violet (*Viola pubescens*), bladder campion, bouncing bet, false solomon's seal (*Maianthemum racemosum*), orchard grass (*Dactylis glomerata*), Kentucky bluegrass, sensitive fern (*Onoclea sensibilis*), graceful sedge (*Carex gracillima*), tussock sedge (*Carex stricta*), rosy sedge (*Carex rosea*), and drooping wood sedge (*Carex arctata*).

Dry-Fresh White Pine-Oak Mixed Forest Type (FOM2-1) – The Dry-Fresh White Pine-Oak Mixed Forest Type is located within the forested ravine immediately south of the Project lands. The canopy layer was dominated by white pine (*Pinus strobus*) and bur oak*,* red oak (*Quercus rubra*), Manitoba maple, Norway maple (*Acer platanoides*), black walnut, balsam poplar, and black cherry. The shrub layer consisted of chokecherry, common buckthorn, alternate leaved dogwood (*Cornus alternifolia*), gray dogwood, silky dogwood, tartarian honeysuckle, nannyberry (*Viburnum lentago*), black elderberry (*Sambcus nigra*), multiflora rose (*Rosa multiflora*), red currant, staghorn sumac, and common raspberry (*Rubus idaeus).* The herbaceous layer was comprised of enchanter's nightshade, garlic mustard, bracken fern (*Pteridium aquilinum*), cleavers, spotted geranium, herb Robert, spotted jewelweed, may apple, jack-in-the-pulpit, wild lily-of-the-valley (*Maianthemum canadense*), early meadow rue (*Thalictrum dioicum*), wild cucumber, tall goldenrod, skunk cabbage and common burdock.

Dry-Fresh Poplar Mixed Forest Type (FOM5-2) – The Dry-Fresh Poplar Mixed Forest Type is located within and adjacent to the southeast portion of the Project lands. The canopy layer was dominated by white pine (*Pinus strobus*), sugar maple (*Acer saccharum*) trembling aspen, black cherry (*Prunus serotina),* and bur oak, with some Manitoba maple, silver maple (*Acer saccharinum*) and green ash. The shrub layer consisted of common buckthorn, chokecherry, gray dogwood, common raspberry*,* tartarian honeysuckle, large-fruited thorn, thicket creeper, black raspberry (*Rubus occidentalis*), red currant, prickly gooseberry (*Ribes cynosbati*), common blackberry (*Rubus allegheniensis)* and nannyberry*.* The herbaceous layer was comprised of garlic mustard, enchanter's nightshade, bracken fern, may apple, spotted geranium, herb Robert, yellow avens (*Geum aleppicum*), yellow trout lily (*Erythronium americanum*), goldenrod species, jack-in-the-pulpit, tall buttercup, wild cucumber, sensitive fern, field horsetail (*Equisetum arvense*), and avens species (*Geum sp.)*.

Willow Mineral Deciduous Swamp Type (SWD4-1) – The Willow Mineral Deciduous Swamp Type was the most dominant ELC community within the Study Area. This community is present within the forested ravine feature, southwest of the Project lands. The canopy layer was dominated by black willow (*Salix nigra*)*,* Manitoba maple, black walnut, green ash, black cherry and balsam poplar, with rare occurrences of hybrid crack willow (*Salix x rubens)*. The sub-canopy consisted of Manitoba maple and common buckthorn, while the shrub layer was comprised of gray dogwood, tartarian honeysuckle, riverbank grape, thicket creeper, with some red-osier dogwood (*Cornus sericea.*), silky dogwood and alternate leaved dogwood. The herbaceous layer consisted of enchanter's nightshade, garlic mustard, Canada anemone, spotted jewelweed, herb Robert, English plantain, common plantain,

tall buttercup, common dandelion, tall goldenrod, with some orchard grass, Kentucky bluegrass, white baneberry, cleavers, motherwort (*Leonurus cardiaca*), hairy willow-herb (*Epilobium hirsutum*), wild cucumber, virgin's bower (*Clematis virginiana*), and sensitive fern.

Red-osier Dogwood Organic Thicket Swamp Type (SWT3-5) – The Red-osier Dogwood Thicket Swamp Type is located south of the deciduous and mixed forest communities adjacent to the Dorchester Pond Drain. Species observed within the shrub layer include glossy buckthorn (*Fragula alnus*), red-osier dogwood, silky dogwood, gray dogwood, red currant, thicket creeper slender willow and narrow leaved meadow-sweet (*Spiraea alba*) while species observed within the herbaceous layer included sensitive fern, marsh fern, reed canary grass (*Phalaris arundinacea*), Kentucky blue grass, orchard grass, blue-joint grass (*Calamagrostis canadensis*), awnless brome, giant red top (*Agrostis gigantea*), narrow-leaved cattail (*Typha angustifolia*), broad-leaved cattail (*Typha latifolia*), fox sedge (*Carex vulpinoidea*), lake-bank sedge (*Carex lacustris*), Canada anemone, common dandelion, common milkweed, swamp milkweed (*Asclepias incarnata*), wild mint (*Mentha arvensis*), water-cress (*Nasturtium officinale*), motherwort, skunk cabbage, blue-flag iris (*Iris versicolor*), tall meadow rue (*Thalictrum pubescens*), bladder campion, bouncing bet, Curly-leaf dock, common burdock and rice cut grass (*Leersia oryzoides*). The canopy layer was sparse and included Bur oak and hybrid crack willow.

A total of 155 species were observed within the delineated vegetation communities, of which 71.6% are native (**Appendix F**). The Floristic Quality Index for this area is 36.45 with 47% of the species observed falling within the lowest sensitivity (0-3) ranking, 49% within the moderate sensitivity (4-6) ranking and 4% represented within the high sensitivity (7-8) ranking. Species within this category include skunk cabbage, common hackberry, prickly rose (*Rosa acicularis*), black ash (*Fraxinus nigra*), and downy arrow-wood (*Viburnum rafinesquianum*). Communities present along the southern border of the Project lands are therefore considered to be of Natural quality. Representative photographs are provided in **Appendix G**.

3.3.2 Breeding Birds

3.3.2.1 Background

Prior to breeding bird surveys, data from the Ontario Breeding Bird Atlas (OBBA; BSC et al. 2006) was collected to identify species of birds that have been recorded within the Study Area. Ninety-nine (99) species with various levels of breeding evidence were identified within the 10 by 10 km square (17MH95) that encompasses the Project lands. Of these birds, seven species are considered SAR or Species of Conservation Concern (SOCC). These species and their status are provided in **Table 5**.

Table 5. Avian Species at Risk Records

Common Name	Scientific Name	SARA Status	COSEWIC Status	ESA Status	COSSARO Status	NHIC S-Rank
Bank Swallow	*Riparia riparia*	THR Schedule 1	THR	THR	THR	S4B
Barn Swallow	*Hirundo rustica*	THR Schedule 1	THR	THR	THR	S4B
Bobolink	*Dolichonyx oryzivorus*	THR Schedule 1	THR	THR	THR	S4B
Eastern Meadowlark	*Sturnella magna*	THR Schedule 1	THR	THR	THR	S4B
Eastern Wood-Pewee	*Contopus virens*	SC Schedule 1	SC	SC	SC	S4B
Golden-winged Warbler	*Vermivora chrysoptera*	THR Schedule 1	THR	SC	SC	S4B
Wood Thrush	*Hylocicla mustelina*	THR Schedule 1	THR	SC	SC	S4B

Ontario Breeding Bird Atlas data

3.3.2.2 Field Investigation Methods

Due to the size and diversity of habitats within southern Ontario, several bird monitoring protocols have been developed that focus on targeting groups of birds. These protocols include the Canadian Wildlife Service (CWS) Forest Bird Monitoring Program (CWS 2009) and the Ontario Marsh Breeding Bird Monitoring Protocol (Bird Studies Canada et al. 2009). Similarly, the Ontario Breeding Bird Atlas Guide for Participants (2001) provides additional methods for conducting breeding bird surveys throughout Ontario. These protocols outline the methods to be conducted in order to obtain representative and unbiased data. The methods listed below outline proper site selection, timing including time of day and time of year to conduct the surveys, and suitable weather conditions (CWS 2009, Konze and McLaren 1997).

Breeding bird survey stations were located at least 200 m apart to maintain a degree of separation and reduce the chances of double counting individual birds. Two stations were established within and adjacent to natural features located throughout the Study Area. These stations were located within the forested communities present along the southern boundary of the Project lands. Locations of breeding bird survey stations are shown on **Figure 3**.

As outlined in the OBBA and CWS protocols, two point-count surveys were completed at each station during the breeding bird period between May 24 and July 7. The separate surveys are recommended as they typically provide data that more accurately reflects the number of species and birds utilizing the habitat at each station (EC-CWS 2009). Surveys were completed between 5:00am and 10:00am under appropriate weather conditions (i.e. no precipitation, calm to light wind; EC-CWS 2009). Each point-count consisted of two 5-minute surveys during which time, species, breeding evidence and individual bird movement within 100 m radius were recorded. Species heard outside of the 100 m radius or that were observed outside of their breeding habitat within the 100 m radius (i.e. Fly-overs) were recorded separately.

3.3.2.3 Results

Thirty-five (35) bird species were identified within the Study Area during field investigations. Of these species, two were recorded as ‘confirmed’, seven as ‘probable’ and 22 as ‘possible’ breeders. One provincially listed Special Concern species was observed within the Study Area: Grasshopper Sparrow (*Ammodramus savannarum*). There were no provincially Threatened or Endangered species observed during site investigations. A list of species observed is provided in **Table 6**.

Table 6. Breeding Bird Survey Results

Common Name	Scientific Name	AECOM Observations			
		Station 1	Station 2	Incidental 2017	Incidental 2018
Great Blue Heron	*Ardea herodias*				X
Green Heron	*Butorides virescens*				H
Canada Goose	Branta Canadensis				P
Mallard	*Anas platyrhynchos*				H
Osprey	*Pandion haliaetus*				X
Downy Woodpecker	*Picoides pubescens*			X	
Hairy Woodpecker	*Picoides villosus*			X	
Eastern Phoebe	*Sayornis phoebe*				S
Great Crested Flycatcher	*Myiarchus crinitus*	S			
Blue Jay	*Cyanocitta cristata*	H			
American Crow	*Corvus brachyrhynchos*				H
Black-capped Chickadee	*Poecile atricapillus*	H	H	X	
White-breasted Nuthatch	*Sitta carolinensis*		H	X	
House Wren	*Troglodytes aedon*	T			S

Common Name	Scientific Name	AECOM Observations			
		Station 1	Station 2	Incidental 2017	Incidental 2018
Veery	*Catharus fuscescens*	S			S
American Robin	*Turdus migratorius*		FY		
Gray Catbird	*Dumetella carolinensis*	T			
Cedar Waxwing	*Bombycilla cedrorum*				H
Warbling Vireo	*Vireo gilvus*		S		S
Red-eyed Vireo	*Vireo olivaceus*		S		
Yellow Warbler	*Dendroica petechia*				S
Pine Warbler	*Dendroica pinus*	S			S
American Redstart	*Setophaga ruticilla*	S			S
Common Yellowthroat	*Geothlyphis trichas*				S
Scarlet Tanager	*Piranga olivacea*	S			
Northern Cardinal	*Cardinalis cardinalis*	S	S		
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	S	T		
Chipping Sparrow	*Spizella passerina*				S
Vesper Sparrow	*Pooecetes gramineus*	S			
Grasshopper Sparrow	*Ammodramus savannarum*				A
Song Sparrow	*Melospiza melodia*	A	T		S
Swamp Sparrow	*Melospiza georgiana*				S
Red-winged Blackbird	*Agelaius phoeniceus*		T		S
Common Grackle	*Quiscalus quiscula*	H	FY		H
Baltimore Oriole	*Icterus galbula*				S

Legend: ***Breeding Bird Evidence (OBBA 2001)***
Observed *X - Species observed in its breeding season (no evidence of breeding).*
Possible *H - Species observed in its breeding season in suitable habitat*
S - Singing male present, or breeding calls heard, in its breeding season in suitable nesting habitat
Probable *P - Pair observed in their breeding season in suitable nesting habitat.*
T - Permanent territory presumed through registration of territorial song on at least 2 days, a week or more apart at the same place
A - Agitated behaviour or anxiety calls of an adult
Confirmed *FY - Recently fledged young or downy young, including young incapable of sustained flight*

Grasshopper Sparrow was observed within the Dry-Moist Old Field Meadow Type (CUM1-1) community located at the northwest portion of the Study Area. This species was observed during sites investigations completed on July 10th, 2018. The preferred habitat for this species consists of sparsely vegetated grasslands in well-drained sandy soil, as well as pasture, hayfields, alvars, prairies and occasionally grain crops such as barley (COSEWIC 2013). As grasshopper sparrow is listed as Special Concern provincially, it does not receive habitat protection under the *Endangered Species Act* (ESA); however, their habitat is considered Significant Wildlife Habitat (SWH) which is afforded protection in accordance with the PPS. Significant Wildlife Habitat is addressed in further detail in **Section 3.5**. There were no other SAR birds observed during field investigations conducted within the Study Area.

3.3.3 Amphibians

3.3.3.1 Background

There were no significant amphibian species identified as occurring within the Study Area during the review of background information (**Section 1.3**).

3.3.3.2 Field Investigation Methods

Three anuran call surveys were conducted at two wetland communities within the Study Area. The location of each anuran call survey can be found on **Figure 2**. These surveys were conducted following the Ontario Marsh Monitoring Program (Bird Studies Canada 2008).

In order to detect both early and late anuran breeders, three site visits were conducted during the breeding season (April to July). In accordance with the program, surveys did not begin until at least one-half hour after sunset and were completed before midnight. In addition, surveys were only conducted during suitable weather conditions which included winds less than 19 km/h (0-4 on the Beaufort wind scale) and minimum night-time air temperatures of at least 5°C for the first survey, 10°C for the second survey and 17°C for the third survey. Species observed and call frequency were recorded by biologists during each three minute point count. The frequency categories of anuran calls are as follows:

0 - None heard.
1 - Individuals can be counted, calls not overlapping.
2 - Numbers of some individuals can be estimated or counted, others overlapping.
3 - Full chorus, calls continuous and overlapping, and individuals not distinguishable.

3.3.3.3 Results

Three anuran species were observed within the Study Area during field investigations including green frog (*Rana clamitans*), spring peeper (*Pseudacris crucifer*) and wood frog (*Lithobates sylvaticus*). Anuran survey results are provided in **Table 7.**

Table 7. Anuran Call Survey Results

Station Name	Date	Start Time (24:00)	End Time (24:00)	Temperature (°C)	Beaufort Scale	Precipitation	Background Noise	Species observed within 200m station (count code)	Species observed outside 200m station
Round 1									
AMP-01	April 24th, 2018	22:15	22:18	10	1	Rain	1	Spring Peeper (3) Wood Frog (1-1)	Spring Peeper (3)
AMP-02		22:29	22:32	10	1	Rain	1	None	None
Round 2									
AMP-01	May 24th, 2018	22:52	22:55	14	0-1	None	2-3	Green Frog (1-1)	None
AMP-02		23:00	23:03	14	0-2	None	1-2	None	None
Round 3									
AMP-01	June 28th, 2018	23:22	23:25	24	2	None	1	Green Frog (1-1)	None
AMP-02		23:13	23:16	24	2	None	1	Green Frog (1-1)	None

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

No amphibian SAR were observed during field investigations conducted by AECOM and the criteria for SWH were not met (**Section 3.5**).

3.3.4 Reptiles

3.3.4.1 Background

Based on a review of background data (**Section 1.3**), four SAR or SOCC were identified with potential to occur in the Study Area and are listed in **Table 8**.

Table 8. Significant Reptile Records

Common Name	Scientific Name	SARA Status	ESA Status	S-rank
Blanding's Turtle	*Emydoidea blandingii*	THR Schedule 1	THR	S3
Snapping Turtle	*Chelydra serpentina*	SC Schedule 1	SC	S3
Northern Map Turtle	*Graptemys geographica*	SC Schedule 1	SC	S3
Queensnake	*Regina septemvittata*	END Schedule 1	END	S2

3.3.4.2 Field Investigation Methods

Snakes

Potential snake habitat or hibernacula were recorded, noting dimensions of any rock or debris piles and a description of surrounding habitat conditions, slope, and likelihood of the observed piles extending below frost line. These observations were used to inform the placement of cover boards for Artificial Cover Surveys within the Study Area.

Active snake surveys included both visual encounter surveys and artificial cover (cover board) surveys following the Survey Protocol for Ontario's SAR Snakes (MNRF 2016). Five visual and cover board surveys were conducted under ideal weather conditions including, calm, clear or partly cloudy days and with a temperature range of 10 to 25^{o}C (on very warm days surveys were conducted in the morning). Where large stones or other cover objects were observed, they were slowly and carefully overturned and checked for the presence of snakes. Cover boards were also overturned and gently replaced to check for the presence of snakes. Any snake species observed was visually identified; the estimated length and any other visible distinguishing characteristics were recorded. Locations of snake cover boards are shown on **Figure 2.**

Turtles

Five visual encounter (basking) surveys were conducted at ponds immediately south of the Project lands following the Survey Protocol for Blanding's Turtle (*Emydoidea blandingii*) in Ontario (MNRF 2015). At each pond location, a suitable vantage point was chosen that provided a clear view of the pond and potential basking locations and the GPS coordinates of each vantage point were recorded. Observations were made for a 20 minute period at each vantage point, with the number, species, approximate size and location of turtles observed being recorded as well as any information regarding behaviour or description of visible traits. Notes on the surrounding habitat were made and photographs taken. Weather conditions were also recorded. Surveys were completed between 8 am and 5 pm when the air temperature was above 5°C and between 8 am and 10 am when daytime high temperatures exceeded 25°C.

Locations of the turtle basking surveys are shown on **Figure 3**. Vantage point locations varied slightly over the course of the surveys as a result of vegetation growth obscuring visibility at some locations.

3.3.4.3 Results

Snakes

One potential hibernacula site was identified during field investigations, a concrete debris pile near edge of FOD7, which was partially buried and has the potential to access below the frost line. It's location is shown on **Figure 3**. One snake species, eastern gartersnake (*Thamnophis sirtalis*) was observed within the Study Area during site investigations, and is considered common and widespread throughout Ontario. Full results of cover board and visual encounter surveys are provided on **Table 9** and **Table 10**.

Table 9. Summary of Snake Cover Board Survey Results

Visit	Cover Board	Weather	Species Observed
Visit 1 – June 8th	**CB-01**	14°C	None
	CB-02	14°C	None
	CB-03	14°C	None
	CB-04	14°C	None
	CB-05	14°C	None
Visit 2 – June 14th	**CB-01**	16°C	None
	CB-02	16°C	None
	CB-03	16°C	None
	CB-04	16°C	None
	CB-05	16°C	None
Visit 3 – June 26th	**CB-01**	15°C	None
	CB-02	15°C	None
	CB-03	15°C	None
	CB-04	15°C	None
	CB-05	15°C	None
Visit 4 – July 5th	**CB-01**	24°C	None
	CB-02	24°C	None
	CB-03	24°C	None
	CB-04	24°C	None
	CB-05	24°C	None
Visit 5 – July 10th	**CB-01**	21°C	None
	CB-02	21°C	None
	CB-03	21°C	None
	CB-04	21°C	None
	CB-05	21°C	None

Table 10. Summary of Snake Area Search Results

Visit	Species	Weather	ELC Community
Visit 1 – May 1st	Eastern Gartersnake	18°C	CUM1-1
	Eastern Gartersnake		FOD7 at edge of recreational trail
Visit 2 – June 8th	None	14°C	N/A
Visit 3 – June 14th	None	16°C	N/A
Visit 4 – June 26th	None	15°C	N/A
Visit 5 – July 5th	None	24°C	N/A
Visit 6 – July 10th	Eastern Gartersnake	21°C	FOD7 near recreational trail

Turtles

Two turtle species were observed within the Study Area during field investigations: Midland painted turtle (*Chrysemys picta marginata*), and Blanding's turtle (*Emydoidea blandingii*). Full results of the Turtle Basking Surveys are provided in **Table 11**. Painted turtles were recorded on multiple basking surveys and are considered common and widespread throughout Ontario. One dead Blanding's turtle was observed floating in the pond at TU-02 during the July 10th, 2018 survey. Blanding's turtle and their habitat are afforded protection under the ESA as a Threatened species. Habitat for Blanding's turtle include shallow water, usually in large wetlands and shallow lakes with lots of aquatic plants and muddy substrates (MNRF 2018). This species is discussed further in **Section 3.4**.

No turtle nesting sites were observed during field investigations.

Table 11. Summary of Turtle Basking Survey Results

Visit	Species	Number	Weather	Feature
Visit 1 – May 1st	Painted Turtle	4	20-25°C	TU-02
Visit 2 – June 8th	N/A	0	15°C	N/A
Visit 3 – June 14th	Painted Turtle	1	18-19°C	TU-02
		1		TU-03
Visit 4 – June 26th	N/A	0	14-15°C	N/A
Visit 5 – July 5th	Painted Turtle	1	23-25°C	TU-02
		1		TU-03
Visit 6 – July 10th	Painted Turtle	1	21-27°C	TU-03
	Blanding's Turtle	1		TU-02

3.4 Species at Risk Assessment

3.4.1 Background

The status of species within Ontario is determined by the Committee on the Status of Species at Risk in Ontario (COSSARO) and, where species occur on federally owned land or are subject to federal regulatory processes, the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) which are independent bodies that classify native flora and fauna. The four categories of species classification include:

- **Extirpated**: no longer lives within a certain region of Ontario or Canada, although still lives somewhere in the world;
- **Endangered**: lives in the wild in Ontario or Canada but is facing imminent extinction or extirpation;
- **Threatened**: lives in the wild in Ontario or Canada, is not Endangered, but is likely to become endangered if steps are not taken to address factors threatening it; and
- **Special concern**: lives in the wild in Ontario or Canada, is not Endangered or Threatened, but may become Threatened or Endangered due to a combination of biological characteristics and identified threats.

For the purpose of this report, SAR are defined as species that are listed as either Threatened or Endangered provincially or federally. These species, as well as their habitat, are afforded protection under the provincial ESA and under the federal Species at Risk Act (SARA) on federally regulated watercourses for aquatic species. Species listed as Special Concern provincially or federally are not subject to the prohibitions under the ESA or SARA but, have been included in the SAR Screening as Special Concern species are considered Species of Conservation Concern (SOCC) in the NHRM (OMNR 2010). As such, habitat is considered SWH. SOCC are discussed further in **Section 3.5**.

3.4.2 Methods

A list of SAR which have the potential to occur within the Study Area was compiled based on a review of background information as described in **Section 1.3** and input provided through agency correspondence as outlined in **Section 1.4**. Terrestrial SAR with ranges that overlap the Study Area were screened by comparing their habitat requirements to the habitat conditions present within the Study Area based on a review of aerial imagery and refined ELC community delineation completed during field investigations. Where NHIC and DFO aquatic SAR mapping identified the presence of aquatic SAR, it was assumed that the species was present, unless indicated otherwise by the DFO or MNRF.

This assessment was conducted to refine the need for SAR specific surveys within the Study Area. Taxa specific field investigations including floral species inventory, breeding bird surveys, anuran call surveys, turtle basking surveys and snake surveys (e.g. visual encounter and cover board surveys) were completed to verify the presence of potential SAR within the Study Area.

3.4.3 Results

A review of background information and correspondence with the MNRF and UTRCA indicated that 75 SAR have the potential to occur within the Study Area. Of these, 35 are listed as Endangered, 21 are Threatened, and 19 are Special Concern. A preliminary desktop screening resulted in 70 SAR with potentially suitable habitat in the Study Area.

Completion of field investigations undertaken in 2017 and 2018 confirmed the presence of two SAR within the Study Area: one provincially listed Threatened species, Blanding's turtle and one Special Concern species, Grasshopper Sparrow. Presence or absence of several SAR could not be determined as species-specific surveys were not conducted. As such, these species are considered to have candidate habitat within the Study Area. **Table 12** summarizes the candidate and confirmed SAR species identified within the Study Area. Species-specific surveys are not typically conducted for aquatic SAR. If DFO aquatic SAR mapping, MNRF NHIC database, or agency correspondence indicates the presence of aquatic SAR, the occurrences are considered confirmed.

Table 12. Candidate and Confirmed Species at Risk Habitat

Common Name	Scientific Name	ESA Status	Candidate	Confirmed
Barn Swallow	*Hirundo rustica*	THR	X	
Grasshopper Sparrow	*Ammodramus savannarum*	SC		X
Little Brown Myotis	*Myotis lucifugus*	END	X	
Northern Myotis	*Myotis septentrionalis*	END	X	
Tri-colored Bat	*Perimyotis subflavus*	END	X	
Blanding's Turtle	*Emydoidea blandingii*	THR		X

As noted in **Section 3.3.4**, a single dead Blanding's turtle was observed in the pond at TU-02 during turtle basking surveys on July 10th, 2018. The Dorchester region (Mill Pond, nearby South Dorchester Swamp and additional wetlands and woodlands in this vicinity) is known to contain a Blanding's Turtle population. Potential turtle nesting habitat is present along the edge of the agricultural field within the Project lands and along a gravel recreational trail that passes through the forested portions of the natural features immediately to the south of the Project lands. No nesting sites were confirmed during field investigations.

Although Barn Swallow was not observed during breeding bird surveys, two barn structures at the north end of the Project lands provide potential nesting habitat. Nesting was not confirmed during field investigations as access was not obtained to assess these structures and remain candidate habitat.

Potential bat habitat is present within the forested communities located at the south portion of the Study Area, as well as the buildings located at the north end of the site. Bat habitat assessments and acoustic monitoring to determine bat presence were not completed as part of the 2017 and 2018 surveys as impacts to these features (e.g., tree clearing) are not anticipated.

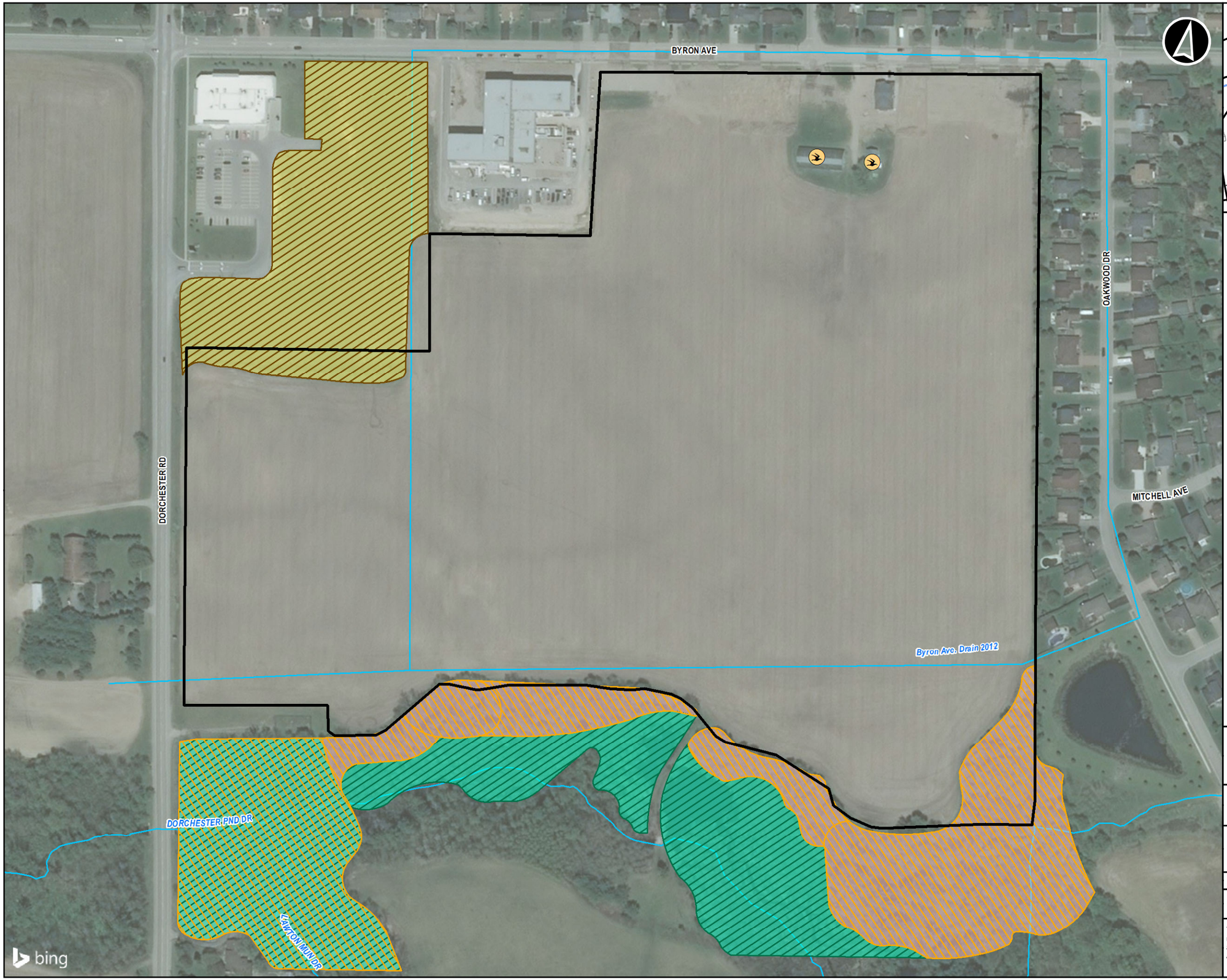
Species listed as Special Concern provincially are considered Species of Conservation Concern (SOCC) under the NHRM (2010). As such, habitat for these species is considered SWH and is afforded protection through the PPS (2014). Grasshopper Sparrow is discussed further in **Section 3.5**.

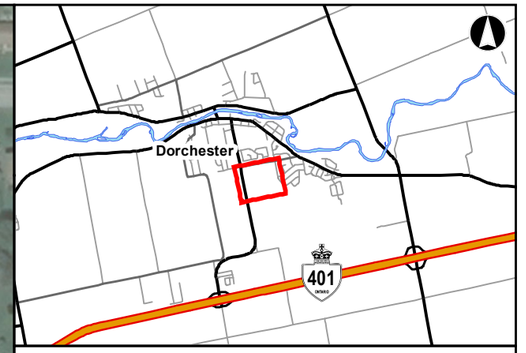
The complete SAR habitat screening is provided in **Appendix H**. Locations of candidate and confirmed SAR Habitat are shown on **Figure 6**.

3.5 Significant Wildlife Habitat Assessment

3.5.1 Background

A SWH screening exercise was conducted using the Wildlife Habitat Ecoregion Criteria Schedule 7E (MNRF 2015) to determine the presence of Candidate SWH. Species listed as Special Concern provincially, with an SRANK of S1 to S3, or species that are listed as Endangered or Threatened under federal legislation are referred to as Species of Conservation Concern. Species with these designations are not afforded protection; however, their habitat is considered SWH under the Significant Wildlife Habitat Technical Guide (MNRF 2000) and is afforded protection under the PPS (2014).





Legend

- Watercourse
- Subject Lands

Species At Risk Habitat

- Candidate - Barn Swallow Habitat
- Candidate - Spoon-leaved Moss
- Candidate - Bat Habitat
- Confirmed - Grasshopper Sparrow

Significant Wildlife Habitat

- Candidate - Bat Maternity Colonies
- Confirmed - Special Concern and Rare Wildlife Species
- Candidate - Turtle Wintering

0 20 40 80 120 160
Metres

187 Byron Avenue
Environmental Impact Study

Species at Risk and Significant Wildlife Habitat

Nov 27, 2018	1:2,500 * when printed 11"x17"	Datum: NAD83 UTM zone 17N Source: MNRF, MMAH, AECOM Bing Image: © 2018 Microsoft Corporation © 2018 DigitalGlobe ©CNES (2018) Distribution Airbus DS
P#: 60571588	V#: 001	**Figure 6**

AECOM

Map location: \\CAKCON1FP01\Data\Projects\605 71588 187 Byron\mxd\0-CAD_GIS\800 - Work\GIS\Design\01_Reports\Updated_EIS\MXD\605715881-Fig6_SAR20181122.mxd
Date Saved: 11/27/2018 1:47:20 PM User Name: amelia.walker

3.5.2 Methods

A desktop review of aerial imagery was completed to determine the presence of any candidate SWH habitat within the Study Area. Field investigations were then conducted to confirm the presence of species or the associated SWH type.

3.5.3 Results

During the desktop SWH screening exercise a total of 15 Candidate SWH's were identified within the Study Area. Further analysis of SWH was completed using the results from field surveys targeting vegetation and wildlife (**Section 3.3**). Following field investigations, 13 candidate habitats could be ruled out, resulting in two remaining as candidate. The following summarizes the number of candidate SWH, identified through a desktop review and field investigations of the Study Area, for each SWH category.

Seasonal Concentration Areas – two Candidate Habitats:

- Bat Maternity Colonies; and
- Turtle Wintering Areas

One additional SWH was confirmed within the Study Area: Special Concern and Rare Wildlife Species Habitat for Grasshopper Sparrow. This species was identified within the CUM1-1 Dry-Moist Old Field Meadow community in the northwest portion of the Study Area on July 10, 2018 during targeted reptile surveys.

The SWH screening exercise is provided as **Appendix I**. Locations of candidate and confirmed SAR Habitat is shown on **Figure 6**.

3.6 Hydrogeology and Geotechnical Investigations

Golder Associates Ltd. (Golder) were retained to conduct the geotechnical (Golder 2018a) and hydrogeological (Golder 2018b) assessments for the Subject Lands. A total of six boreholes were advanced during site investigations. Based on the information provided by the borehole logs, it was determined the site soils are generally sand to gravely sand with trace amounts of silt. For the hydrogeological study, a total of five monitoring wells and two piezometers were utilized to measure the groundwater levels. It was determined that the groundwater levels fluctuated from 1.6 m to 4.3 m below ground surface.

The hydrogeological study also provided detailed groundwater contouring mapping. Based on the groundwater elevation monitoring, contours have been produced demonstrating the groundwater gradient flows in the southwest direction, towards the Municipal wellhead and Dorchester Creek. See Golder (2018a, 2019a) for complete details.

4. Assessment of Significance

4.1 Federal

There are no federally owned lands or features present within the Study Area; however, work proposed in or near water features that have to potential to support fish might be regulated under the Fisheries Act if there is the potential to impact fish or fish habitat. No federally regulated aquatic Species at Risk have been identified within the Subject Lands. Risk of potential indirect impacts to aquatic species are discussed in **Section 6**.

4.2 Provincial

The following summarizes the provincially recognized features and species that are present or have the potential to occur within the Study Area:

1. South Dorchester Swamp Provincially Significant Wetland
2. Confirmed habitat for Species at Risk including:
   - Grasshopper Sparrow (Special Concern)
   - Blanding's Turtle (Threatened)
3. Candidate habitat for six terrestrial Species at Risk:
   - Barn Swallow (*Hirundo rustica*)
   - Grasshopper Sparrow (*Ammodramus savannarum*)
   - Little Brown Myotis (*Myotis lucifugus*)
   - Northern Myotis (*Myotis septentrionalis*)
   - Tri-colored Bat (*Perimyotis subflavus*).

Further surveys may be required to confirm the presence or absence of these species within the Study Area. Correspondence with the Ministry of the Environment Conservation and Parks may be required to determine any permitting requirements as a result of the proposed works on the Project lands.

4. One confirmed and two Candidate Significant Wildlife Habitats:
   a. Confirmed
   - Special Concern and Rare Wildlife Species Habitat for Grasshopper Sparrow

   b. Candidate
   - Bat Maternity Colonies
   - Turtle Wintering Areas

4.3 Municipal

The following summarizes municipally recognized features within the Study Area based on the Thames Centre Official Plan Schedule B-1:

1. Protection Area (Group B Features)
2. Environmental Area (Group C Features)

Appendix 1 (Part A) Natural Heritage Features of the Thames Centre Official Plan has identified the following features within or in the vicinity of the Project lands:

1. Provincially Significant Wetlands (South Dorchester Swamp) in the vicinity of the Project lands (located immediately to the south)
2. Woodland and Vegetation features within the Project lands
3. Maximum limit of regulatory flood lines within the Project lands

4.4 Conservation Authority Recognized Features

The following summarizes the features within the Study Area recognized by the UTRCA:

1. Woodlands identified in the Middlesex NHSS (2014) as Significant Ecologically Important
2. MNRF Provincially Evaluated Wetlands
3. Flooding Hazard Limit
4. Erosion Hazard Limit
5. Regulation Limit
6. Watercourses including the Lawton Drain and Big Swamp Drain (also known as Dorchester Pond Drain)

Correspondence with the UTRCA will be required to determine any permitting requirements as a result of the proposed works on the Project Lands.

5. Proposed Development Plan

The conceptual development plan, shown on **Figure 7,** is located on the north side of Byron Avenue and will provide low and medium density residential dwellings as well as erosion and water quality control for 20.86 ha of development.

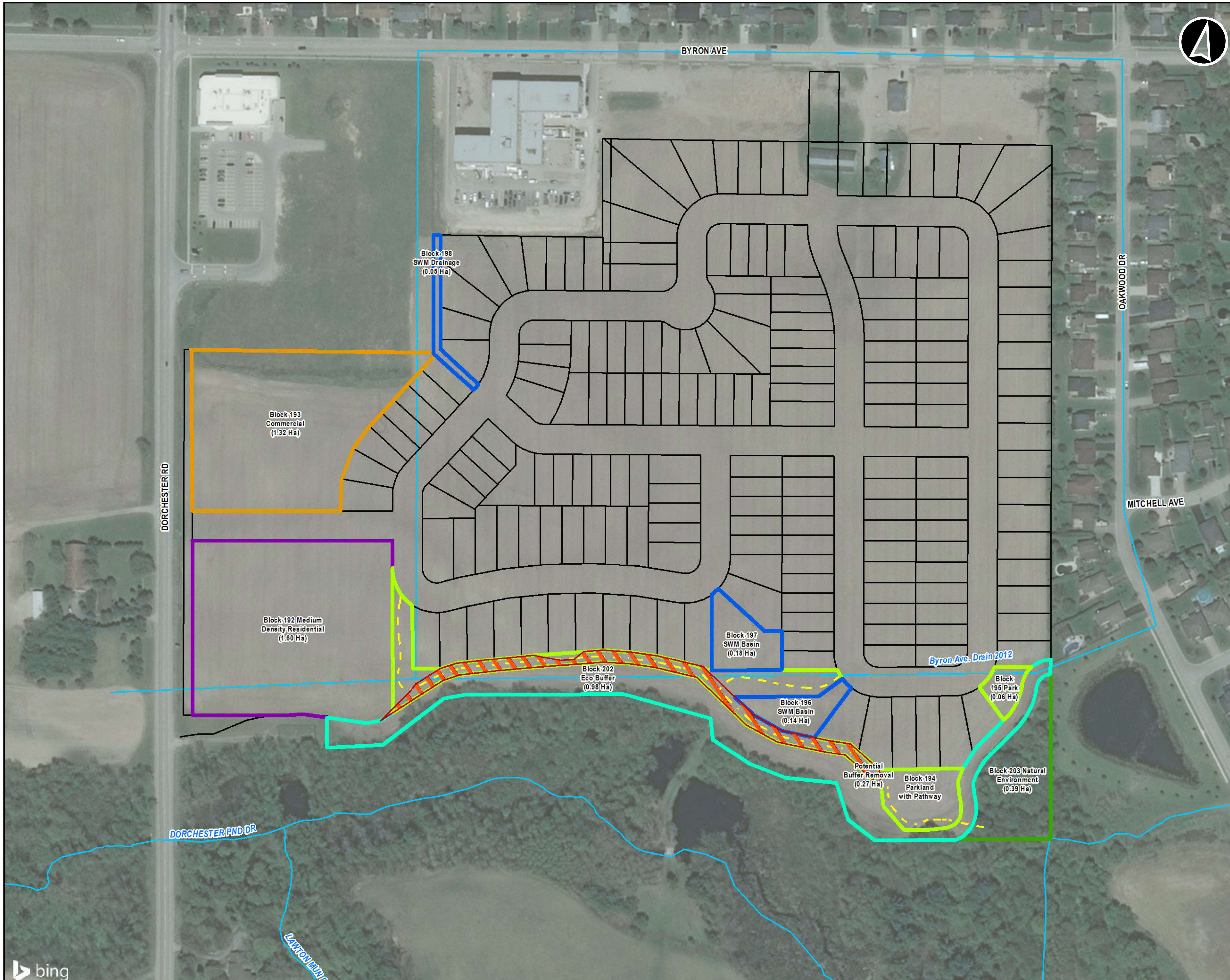
The proposed development includes the following components:

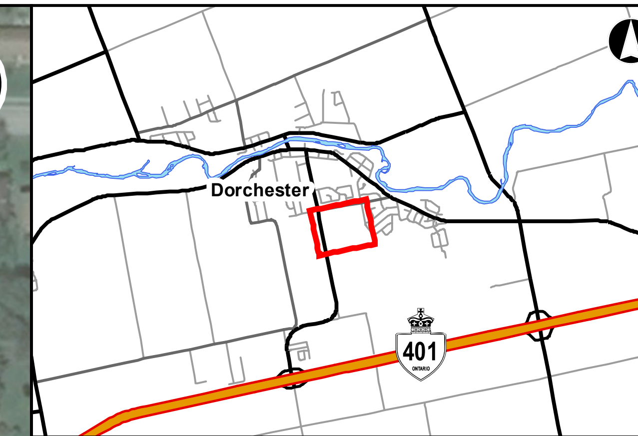
- Parcels for 191 single family homes;
- A 1.60 ha parcel for medium density dwellings;
- A 1.32 ha parcel for commercial development
- Space for 0.78 ha of parkland;
- A 0.39 ha natural environment block; and
- Roads and associated infrastructure to service the new parcels.

A Stormwater Management strategy for the proposed residential development is as follows:

- Goss traps combined with extended catch-basin sumps such as Litta-Trap providing pre-treatment of floatables, coarse sediments, and other debris;
- Disconnected building rainwater leaders;
- Rear-yard infiltration where practical and where grading permits, complete with overflow catch-basins and an overflow route to the ROW;
- Water quality treatment for the proposed ROWs provided via oil-grit separators units;
- On-site quantity and quality controls for the proposed commercial and medium-density or multi-family blocks;
- Unrestricted conveyance for both minor and major flows for the external lands; and,
- Major overland flow directed to Dorchester Road and Dorchester Creek.

The proposed SWM strategy for the residential development at 187 Dorchester Road incorporates several features that will allow the site to meet both quantity and quality control objectives while providing water balance across the site. The total site area is approximately 20.1 ha.





Legend

- Watercourse

Proposed Development

- Lot Lines
- Trail
- Potential Buffer Removal
- Park
- Commercial
- Eco Buffer
- Medium Density Residential
- Natural Environment
- SWM Basin or Drainage

0 20 40 80 120 160
Metres

187 Byron Avenue Environmental Impact Study

Proposed Development Plan

Aug 14, 2019	1:2,500 * when printed 11"x17"	Datum: NAD83 UTM zone 17N Source: MNRF, MMAH, AECOM Bing Image: © 2019 Microsoft Corporation © 2019 DigitalGlobe ©CNES (2019) Distribution Airbus DS
P#: 60571588	V#: 001	Figure 7

AECOM

6. Impact Assessment

6.1 Existing Environmental Impacts

It is recognized that a majority of natural areas within Southern Ontario have been affected by human disturbance. Therefore, in order to assess the potential impacts of a proposed development it is necessary to consider existing impacts that are present within the Project lands prior to the initiation of development-related work. Existing impacts should be documented in order to determine whether, following development or site alteration, impacts are a result of the development or a result of previous activities or events on the lands. Some existing impacts provide an opportunity for the implementation of restoration initiatives as part of the environmental management for a proposed development.

Based on AECOM's site investigations, the following existing impacts are relevant to the proposed plan and should be considered for future management of natural heritage features and functions within the Project lands.

Fragmentation of Natural Vegetation - The Study Area and surrounding landscape have been heavily influenced by human clearing for agricultural and residential purposes leaving reducing the size and quantity of vegetation patches.

Edge effects on Vegetation Communities – With the clearing of forested communities, edge effects related to light and wind exposure are apparent along the agricultural field. These edge effects also include the gradual invasion of weed species introduced by adjacent agricultural practices or residential gardens.

Human Activity and Noise - A large proportion of the Project lands consist of active agricultural fields. Within the agricultural fields, activities such as ploughing, seeding and harvesting with heavy equipment occur periodically throughout the year. Although the site is adjacent to areas of natural cover including woodlands and wetlands, agricultural and residential land uses feature prominently in the landscape. Moderate noise levels from farm activity or trail-users as well as adjacent land uses including roads are evident in some areas within the study boundary. This noise may have an effect on birds and other wildlife species inhabiting the woodlands resulting in the reduction in species abundance or richness within the area. Other species may have acclimated to the noises generated by human activities.

As part of the environmental management plan for the proposed development, AECOM is recommending measures to mitigate existing impacts and restore areas affected by past practices within the Project lands.

6.2 Potential Short-term Impacts

The potential short-term environmental impacts associated with the proposed development relate primarily to construction activities. Many of the potential short-term impacts are commonly encountered with land development and therefore, have associated standard mitigation measures. The potential short-term impacts associated with the proposed development are described below:

Damage and Disturbance to Adjacent Natural Features - During site clearing and grading, heavy machinery could injure trees and shrubs or compact soil within adjacent natural heritage features. Damage to trees by machinery including root damage and soil compaction can affect a tree's ability to grow and absorb nutrients and

water. These can be mitigated for with the installation of tree protection fencing along the forested boundary or development limit to exclude machinery and construction personnel.

Sediment and Erosion – Clearing and grading of the land for construction will require the removal of agricultural lands and exposure of fresh soils which can result in sediment runoff discharging into nearby aquatic and terrestrial communities. Elevated levels of sediment and related turbidity can reduce the productivity of an aquatic system by clogging the gills of fish, covering fry and eggs within the substrate and reducing prey availability. Sediment deposition within terrestrial communities can lead to suffocation of vegetation. Exposed soils can result in dust deposition within terrestrial communities which may interrupt the ability of vegetation to photosynthesize. In order to mitigate these impacts sediment and erosion control measures including silt fencing, temporary siltation ponds, riprap swales and hay-bale check dams can be installed prior to construction activities. Similarly, to mitigate dust deposition, a dust suppressant can be applied to areas of exposed soils to reduce or eliminate dust generation. Sediment mobilization has the potential to negatively impact aquatic organisms, including aquatic SAR recorded downstream of the Subject Lands.

Spills or Leaks - the use of machinery and vehicles on site could result in spills or leaks of oil, gasoline and other fluids which could enter the surrounding natural communities. These impacts can be limited and even avoided with proper machinery inspections and maintenance as well as establishing areas away from natural heritage features that are dedicated to re-fueling and storing machinery.

Disturbance to Wildlife – Construction activities within the Study Area have the potential to disturb breeding birds and other residential wildlife within the adjacent natural heritage areas. A certain degree of disturbance can be avoided by restricting construction activities to certain times of day and outside of breeding periods for any sensitive bird species identified within the Study Area.

While many of these potential short-term impacts are preventable, if they are not managed and prevented through proper practices and monitoring, they may lead to long-term impacts and significant damage to both ecological features and their functions. With the implementation of the recommendations outlined in the Environmental Management Plan (**Section 7**), the above listed impacts will be avoided or mitigated during the construction phase.

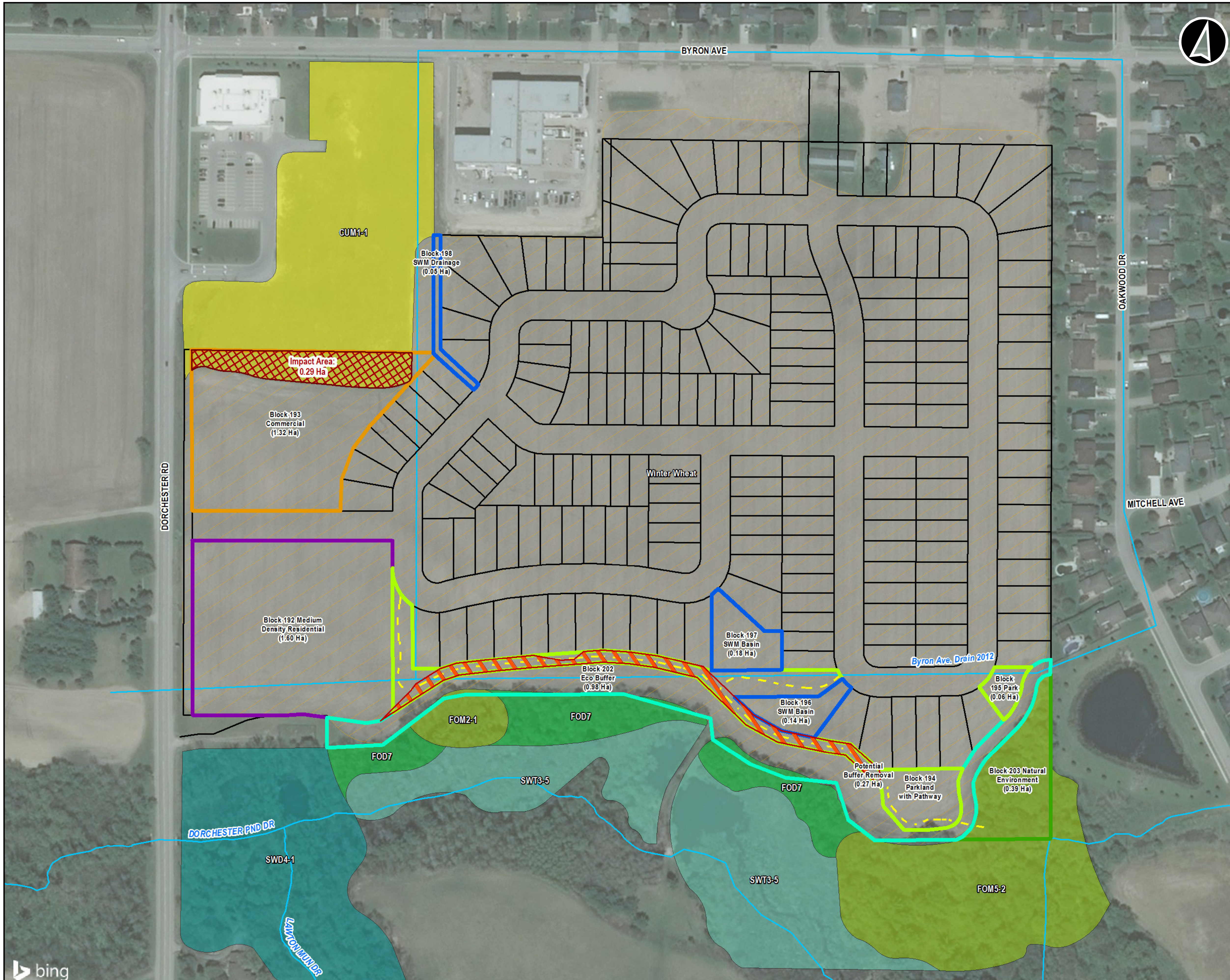
6.3 Potential Long-term Impacts

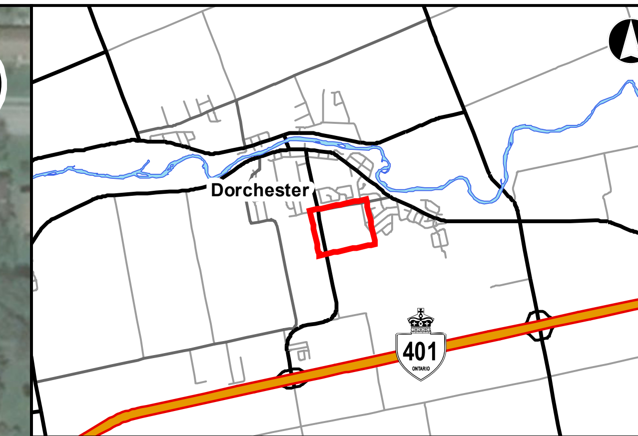
The following section describes the potential for long-term impacts as they relate to effects on terrestrial vegetation and associated habitats with focus on provincially, regionally or municipally recognized features and species as outlined in **Section 4**. The sources of potential long-term impacts of the proposed development include the development design and layout, site grading and drainage. Refer to **Section 5** for a detailed description of the proposed development.

6.3.1 Direct Impacts

Direct environmental impacts are defined as those impacts that result in the immediate loss of ecological features or functions through the implementation of a development plan. An example of a direct impact would be the removal of trees or other vegetation in order to clear land for a development. **Figure 8** shows the areas of direct impact associated with the proposed development plan.

The proposed development plan is to be constructed almost entirely outside of natural heritage features. Furthermore, through the application of a development limit defined by natural heritage features and buffer zones designed to protect those features, the present development plan avoids direct impacts as much as possible while still meeting standard municipal requirements for a development plan. As the majority of the development is proposed outside of natural heritage features and their buffer, direct impacts related to development within the Project lands will largely be limited to the following:





Legend

- Watercourse
- Permenant Impacts

Proposed Development

- Lot Lines
- Trail
- Potential Buffer Interaction
- Park
- Commercial
- Eco Buffer
- Medium Density Residential
- Natural Environment
- SWM Basin or Drainage

ELC Community

- Agricultural Field: Winter Wheat Crop
- CUM1-1 - Dry - Moist Old Field Meadow
- FOD7 - Fresh - Moist Lowland Deciduous Forest Ecosite
- FOM2-1 - Dry - Fresh White Pine - Oak Mixed Forest Type
- FOM5-2 - Dry - Fresh Poplar Mixed Forest
- SWD4-1 - Willow Mineral Deciduous Swamp
- SWT3-5 - Red-osier Organic Thicket Swamp

0 20 40 80 120 160
Metres

187 Byron Avenue Environmental Impact Study

Assessment of Impacts

Aug 14, 2019	1:2,500 * when printed 11"x17"	Datum: NAD83 UTM zone 17N Source: MNRF, MMAH, AECOM Bing Image: © 2019 Microsoft Corporation © 2019 DigitalGlobe ©CNES (2019) Distribution Airbus DS
P#: 60571588	V#: 001	Figure 8

AECOM

Loss of Native Vegetation and Wildlife Habitat – The proposed development plan will result in the loss of 0.29 ha of Cultural Meadow (CUM1-1). This area provides habitat for commonly encountered wildlife species. Furthermore, Grasshopper Sparrow, which is a SAR, was observed exhibiting breeding evidence within this habitat. It is anticipated that the removal of cultural meadow within the Study Area will reduce the amount of habitat for these species. However, the relative proportion of habitat loss is minimal and constitutes only 12% of the existing habitat within the Study Area which is not anticipated to alter the form or function of this feature.

Removal of Candidate Barn Swallow Habitat - The proposed development plan also involves the removal of the two barn structures at the north end of the Project lands. These structures are considered Candidate nesting habitat for another SAR, Barn Swallow. Barn swallows and their habitat are afforded protected under the ESA. Therefore, further implications for this species will need to be considered. Further details on these implications can be found in **Section 7.4.**

6.3.2 Indirect Impacts

Indirect environmental impacts are those which may occur following the completion of development and that originate from a source adjacent to or away from a feature or function. Indirect impacts can include noise, lighting and runoff.

Most potential indirect impacts associated with the proposed development will be mitigated through the implementation of an environmental management plan identified for the Study Area.

Storm Water Management Related Impacts - Potential impacts related to storm water management may be the result of the discharge of storm water collected from the future residential development and directed to a single point or multiple points along the natural feature. These potential impacts may include: thermal impacts, sediment deposition, loss or changes of surface water flows to the watercourse and wetland, and erosion of the watercourse banks.

Thermal impacts to Dorchester Pond Drain and South Dorchester Swamp PSW – Thermal impacts are an important consideration for stormwater management systems when discharge of stormwater is to be directed to a cool-water fish habitat watercourse. Since cool-water species, such as Northern Pike are found in Dorchester Pond Drain, are sensitive to increased water temperatures, stormwater discharge must maintain or improve the existing thermal regime within the watercourse. As it is expected that stormwater will be directed to infiltration sites at the rear of many properties, with overland discharge only occurring during significant rainfall events. As such, significant thermal impacts related to stormwater management are not anticipated.

Sediment deposition to Dorchester Pond Drain and South Dorchester Swamp PSW – Sediment loading from storm water discharge could have potential cumulative effect on fish habitat. The current draft plan is designed to that rear lots will be infiltrated, with overland flow would only occur in exceedance of the 100-year rainfall event. This will minimize the potential for sediment deposition to occur at the Dorchester Pond Drain or South Dorchester Swamp PSW.

Loss of groundwater discharge to Wetlands and Watercourse – Potential loss of groundwater discharge to wetlands within the Dorchester Swamp PSW and to Dorchester Pond Drain is important when considering the maintenance of these areas that rely on both groundwater and surface water contributions. If water supply is reduced or increased, wetland vegetation composition and extent could be altered. With reduced water levels, invasive uplands plant species will begin to dominate the wetlands from the outer edges inward and in the areas of wetland projections this dominance may be complete within a short period of time. Details pertaining to the peak discharge to each outlet are shown on Error! Reference source not f ound., **Table 13** and **Table 14** (AECOM 2019).

Table 13. Proposed Conditions Annual Water Budget for Subdivision

Parameter	Volume (m^3/year)	Depth (mm/year)
Precipitation	210,800 **(unchanged)**	1,012
Evapotranspiration	87,900 **(29% decrease)**	422
Infiltration	51,100 **(9% decrease)**	245
Runoff	71,900 **(137% increase)***	345

Table 14. Proposed Conditions Annual Discharge

Parameter	Existing Sewer / Dorchester Road (m^3/year)	Dorchester Pond Drain and Dorchester Swamp PSW (m^3/year)
Precipitation	111,900	989,000
Evapotranspiration	29,600	58,300
Infiltration	-	51,100
Runoff	68,900	2,900

Table 15. Environmental Water Balance

Parameter	Existing Conditions		Proposed Conditions	
	Sewer/Culvert	Dorchester Creek	Sewer/Culvert	Dorchester Drain and PSW
	(m^3)		(m^3)	
Rainfall Tributary	157,300	53,500	111,900	98,900
Evapotranspiration	92,700	31,600	29,600	58,300
Infiltration	-	56,300	56,300	51,100
Runoff	22,600	7,700	68,900	2,900
Total Discharge	**22,600**	**64,000**	**68,900**	**54,000**

These values are anticipated to provide adequate on-site water balance while limiting annual infiltration to existing (pre-development) levels with regards to the Dorchester Swamp PSW and to Dorchester Pond Drain, with additional consideration in order to satisfy concerns related to the site's proximity to Municipal well-heads.

Runoff associated with Residential Lots – The runoff associated with the newly created residential lots, streets and open space will be directed via grading to natural areas at the rear lot line. It is anticipated that the runoff from residential lots will be kept to predevelopment rates and will not reach volumes such as to cause erosion or associated impacts to the adjacent natural features. Buffers recommended for areas adjacent to residential lots will help filter any runoff from residential lots and reduce any potential for impacts to natural heritage features.

Lighting Impacts – The potential for lighting impacts to the natural features will be increased by the development of lots that back onto the boundary of the natural features. Potential associated impacts may include deterrence of nocturnal wildlife, and a reduction in wildlife use of the tablelands for movement. These potential impacts are minimal considering the existing adjacent properties land use. Mitigation of lighting impacts can be implemented through the use of light shields and planting of dense vegetation along the boundary of the natural features.

Green Waste and Garbage Disposal – With the development of residential lots in proximity to the natural features, there is potential for residents to discard yard waste and other garbage into these features. The potential impacts of such activities include: the introduction of invasive plants and animals, suffocation of natural vegetation, increased nutrient input to the natural features, and disturbance of wildlife and wildlife habitat. Adjacent property residents should be informed of the importance of the adjacent significant features and provided with information regarding restrictions of activities and use of these lands.

Human Encroachment – With the development of any residential lots adjacent to natural areas comes the potential for residents to encroach into these features. Such activities include: clearing of vegetation, construction of patios and outdoor structures, excessive trail creation and trampling, and planting of exotic vegetation in natural communities. All of these activities have the potential to negatively affect the natural communities and should be discouraged and are preventable. Homeowner education is often the best practice to reduce and eliminate such impacts. Other measures may include the installation of fencing along the boundary of natural features, planting of native plants, and signage.

Increased Ambient Noise Impacts – While the development of a residential subdivision will increase the ambient noise levels within the Study Area, it is not anticipated to cause a significant increase to noise levels already existing within the Study Area. Dense planting in buffer areas may be considered for noise reduction in select areas.

6.4 Impact Mitigation

In order to address the potential impacts identified for any proposed development plan, there are three general categories of measures:

1. ***Avoidance*** – Avoidance involves the design of a plan that protects natural heritage features and functions by keeping the development envelope outside of natural heritage features wherever possible.
2. ***Mitigation*** – Mitigation involves the implementation of measures designed to eliminate or reduce impacts by designing facilities or including natural elements that filter or prevent impacts.
3. ***Compensation*** – Compensation involves the replacement of a feature or function that may be lost as a result of the construction and long-term presence of the development.

6.4.1 Avoidance of Impacts

In the case of the proposed development, the avoidance of potential impacts is inherent in the identification and protection of the natural heritage features within the Project lands. As previously noted, the development limits have primarily been based on the protection of natural heritage features and functions within the site and on adjacent lands. For this reason, many potential impacts typical to land development have been avoided or limited only to those areas absolutely required for plan development. This approach substantially reduces the overall potential impacts resulting from the proposed plan.

6.4.2 Standard Mitigation Measures

Standard mitigation measures are typically associated with construction related impacts. These mitigation measures are commonly implemented with development projects and include measures to reduce or eliminate potential impacts to the natural environment. The following measures have been implemented or recommended to further mitigate potential impacts:

Establishment of Ecological Buffers – Impacts from development on a natural feature or function can often be avoided or mitigated for if an area of land is maintained in an undeveloped state. These buffers serve to protect the ecological integrity and function of natural heritage features. Buffers mitigate impacts by providing naturalized separation which provides key ecological functions including opportunities for surface water infiltration, wildlife corridor opportunities, protection of sensitive habitats from wind and extreme weather, as well as contributing to habitat and species diversity. Further details on buffer implementation are provided in **Section 7.2**.

Installation of Fencing – The installation of fencing, including tree protection fencing and silt fencing, can reduce or eliminate construction related impacts such as damage to trees or sediment loading in adjacent natural heritage features. However, proper installation and maintenance are necessary to ensure that impacts are mitigated appropriately. Installation and maintenance of sediment and erosion control measures can protect natural features within the Subject Lands as well as reduce the risk of impact to aquatic SAR recorded downstream of the Study Area.

Reptile and Amphibian Exclusionary Fencing – A qualified ecologist will clear the area of impact prior to the onset of construction and once cleared will exclusionary fencing will be installed along the perimeter of the area using protocols outlined in the MNRF Species at Risk Best Practices Technical Notes for Reptile and Amphibians Exclusion Fencing version 1.1 (July 2013).

Timing Restrictions – Restricting construction related activities outside of sensitive periods for local or significant wildlife species can limit disturbance during life cycle stages. Construction related activities should be limited to the daylight hours (i.e. 7am to 7pm) in order to reduce the amount of noise disturbance. Additionally, vegetation clearing should occur outside of the breeding bird period (i.e. April 1st to August 31st) to reduce impacts to breeding birds within the adjacent natural features and avoid incidental take. Similarly, all tree removal should be conducted outside of the bat roosting season (April 1st to September 30th) to avoid impacts to potential SAR and SWH bat habitat.

Species at Risk Buffers – Should SAR be encountered during grading or construction works, a buffer will be established to protect the species during construction. Details regarding the size and implementation of the buffer will be determined in consultation with the MNRF. Additionally, all SWH habitats, where possible, will be avoided and protected as appropriate and the appropriate surveys will be conducted prior to construction to provide clearance and ensure no SAR are affected by the proposed works.

6.4.3 Compensation

While being the least desirable measure, compensation for loss of vegetation or habitat, or the restoration of degraded areas can offer a means of providing a net benefit to the natural features and functions that contribute to an overall function natural heritage system.

The proposed residential development will result in a minimal loss of natural vegetation as the footprint is proposed primarily within an agricultural field and existing manicured landscape. The areas of loss, identified in **Section 6.3.1** and delineated on **Figure 8** are associated with the construction of a single residential lot, a park block and a commercial block, and include a small area of cultural meadow (0.29 ha). Proposed buffers provide opportunity to compensate for these losses through restoration and enhancement of natural features and will be planted and seeded with native species. The location of planting areas within the buffer zones is shown on **Figure 8**. Restoration and Enhancement mitigation recommendations are further detailed in **Section 7**.

6.5 Net Environmental Impacts

Net environmental impacts are considered to be those impacts that remain or are residual after avoidance, mitigation and restoration measures have been implemented.

The following criteria were applied during the assignment of net effects from the design, construction, and existing land use related to the proposed development. Impacts caused by the proposed development were considered relative to the significance and sensitivity of the ecological features or their functions.

NO Net Effect..... indicates that no impact to the identified ecological features or functions is anticipated;

NEGLIGIBLE Net Effect .... indicates no measurable impact to the identified ecological features or function;

LOW Net Effect..... indicates loss of habitat possessing limited potential habitat value, or loss of a portion of habitat, which will not result in long-term impact to the remaining habitat, or reduction in associated key ecological functions;

MODERATE Net Effect ..... indicates loss of habitat possessing moderate potential habitat value, or loss of a portion of habitat that may result in long term impact to the remaining habitat, or loss of associated key ecological functions; and

HIGH Net Effect..... indicates loss of habitat possessing significant potential habitat value, or loss of a portion of habitat that may result in long-term and potentially critical impact to the remaining habitat, or significant loss of associated key ecological functions

These potential impacts along with the associated recommended mitigation or restoration measures and net effect for the proposed development are summarized in Error! Reference source not found..

Based on the identified potential impacts and in recognition that the recommendations for mitigation measures and restoration, as detailed in the Environmental Management Plan (EMP; **Section 7**), will be implemented we believe that the net environmental impacts of the proposed plan and its EMP will be positive. This conclusion is based on the following:

1. The significant natural heritage features and functions identified for the Project lands are largely recommended for protection from development.
2. The proposed development plan is based on the protection of the natural heritage features and functions by means of restricting the development envelope to areas outside of natural heritage features where possible. Minor areas of exception are present within the plan, including the removal of 0.29 ha of cultural meadow and 0.09 ha of mixed forest.
3. Buffer areas have been included to mitigate the effects of adjacent land use where residential lots are proposed next to natural heritage features.
4. Restoration within buffer areas can offset vegetation and habitat loss.
5. Recommendations for mitigating servicing related impacts for stormwater management and streets have been included for the proposed development plan.
6. The construction mitigation recommendations will limit construction related impacts during build-out of the proposed development plan.
7. Additional recommendations for Homeowner Manual and stewardship programs will serve to increase awareness and assist in the protection and maintenance of the natural heritage system within the Project lands and area.

Table 16. Net Environmental Effects

Source of Impact	Potential Areas Affected or Potential Effects	Mitigation or Compensation	Net Effects or Rationale
1.0 Potential Short-term Impacts – Construction			
1.1 Equipment used for site clearing, grading or excavation	▪ Damage to vegetation along edges of natural heritage features during site clearing; and ▪ Dust accumulation on vegetation within natural heritage features affecting plants' ability to photosynthesize.	▪ Installation of protective fencing; ▪ Access restrictions or prohibition; and ▪ Use of dust suppressants.	NO NET EFFECT ▪ Proper installation and monitoring of protective fencing, restriction of access and use of dust suppressants can reduce the risk of potential impacts.
	▪ Damage to tree rooting zone immediately adjacent to areas of grading and excavation; and ▪ Soil compaction by machinery in areas adjacent to natural features affecting trees' ability to absorb nutrients and water.	▪ Root pruning of adjacent trees during grading and excavation; ▪ Installation of protective fencing; ▪ Access restrictions or prohibition.	(-) LOW - NO NET NEGATIVE EFFECT ▪ In some limited areas, roots may require pruning, but for most areas restriction of access and fencing should limit impacts to rooting zones.
1.2 Runoff during site grading and excavation	▪ Fill and sediment deposition within adjacent natural heritage features.	▪ Installation of sediment control fencing; ▪ Installation of temporary siltation ponds; ▪ Installation of rip-rap swales; ▪ Installation of hay-bale check dams; and ▪ Installation of "heavy-duty" sediment control fencing particularly for work areas adjacent to significant natural features.	NO NET EFFECT ▪ Proper installation and monitoring of sediment control fencing can reduce the risk of deposition of fill and sedimentation.
1.3 Construction noise and vibration	▪ Disturbance of breeding birds and other wildlife.	▪ Restrict construction activities to daytime hours (sunrise to sunset); and ▪ Restrict construction activities involving vegetation to periods before and after the bird nesting period of April 1st to August 31st.	(-) LOW - NO NET NEGATIVE EFFECT ▪ With the implementation of restrictions to the timing of construction disturbance to birds and wildlife can be avoided
2.0 Potential Long-term Impacts – Direct			
2.1 Loss of Native Vegetation	▪ Removal of native vegetation within a small portion of cultural meadow and along the northern edge of the Project lands and a portion of mixed forest at the southeast corner of the Project lands.	▪ Native plantings within the buffer will provide opportunities for habitat restoration and enhancement as well as habitat creation as the existing land use within the footprint is predominately cropland.	(+) NET POSITIVE EFFECT ▪ The planting of native plant species within the buffer will provide additional wildlife habitat as the proposed residential development footprint will be constructed within primarily agricultural lands.

Source of Impact	Potential Areas Affected or Potential Effects	Mitigation or Compensation	Net Effects or Rationale
2.2 Loss of Breeding or Foraging habitat for local wildlife	▪ Removal of a small portion of cultural meadow and along the northern edge of the Project lands and a portion of mixed forest at the southeast corner of the Project lands. ▪ Reduction of breeding habitat and food source within the landscape.	▪ Compensation planting to be determined at Detailed Design.	(+) NET POSITIVE EFFECT ▪ The planting of native plant species within the buffer will provide additional wildlife foraging habitat from existing conditions.
3.0 Potential Long-term Impacts – Indirect			
Stormwater Management Related Impacts			
3.1 Thermal impacts to Dorchester Pond Drain	▪ Increase in creek thermal regime resulting in an eventual loss of cool water fish population	▪ Avoidance of thermal impacts by eliminating the use of open water ponds ▪ Use of sub-drains to keep surface water cool ▪ Restoration of the existing creek corridor through plantings and bank stabilization	(+) NET POSITIVE EFFECT ▪ With the use of best management practices such as sub-drains and bioswales, and with the proposed creek corridor restoration, we anticipate a net benefit with respect to the creek's thermal regime and habitat.
3.2 Sedimentation within Dorchester Pond Drain	▪ Loss of fish habitat due to sedimentation of gravel beds used for spawning	▪ Implementation of best management practices for the protection of water quality; this is to include: oil grit separators and vegetated bioswales	NO NET EFFECT ▪ With the implementation of best management practices, no sedimentation is anticipated to occur within the creek as a result of the stormwater management system for the proposed plan.
3.3 Loss of surface water flows to wetlands and creek	▪ Loss of habitat due to insufficient surface water depth and flows in the creek ▪ Loss of wetland habitat due to restricted hydric conditions	▪ Maintain water balance to match pre-development flows to natural areas	NO NET EFFECT ▪ Stormwater management within the proposed plan will be designed such that post vs pre-development flows are similar
4.0 Groundwater Related Impacts			
4.1 Loss of groundwater discharge to Dorchester Pond Drain	▪ Loss of habitat due to insufficient surface water depth and flows	▪ Maintain infiltration through the use of bioswales and other best management practices	NO NET EFFECT ▪ Groundwater is not anticipated to be affected by the proposed development plan
4.2 Loss of groundwater discharge to wetlands	▪ Loss of wetland habitat due to restricted hydric conditions	▪ Maintain infiltration through the use of bioswales and other best management practices	NO NET EFFECT ▪ Groundwater is not anticipated to be affected by the proposed development plan
5.0 Residential Housing Related Impacts			
5.1 Runoff from residential lots	▪ Erosion of native soils and vegetation in adjacent natural areas ▪ Fertilizer and herbicide contamination in adjacent natural areas	▪ Establish buffers between rear lot lines and natural areas ▪ Ensure appropriate grading at rear lot line; restrict grading to areas outside of buffers ▪ Provide Homeowner's Manual to Living Next to Natural Areas	(-) LOW - NO NET NEGATIVE EFFECT ▪ Appropriate grading and the establishment of buffers should eliminate or avoid any potential runoff impacts

Source of Impact	Potential Areas Affected or Potential Effects	Mitigation or Compensation	Net Effects or Rationale
5.2 Green waste deposition in natural areas	▪ Introduction of invasive weed species into natural areas ▪ Suffocation of vegetation	▪ Establish buffers between rear lot lines and natural areas ▪ Installation of fencing at rear lot lines for lots adjacent to natural areas ▪ Provide Homeowner's Manual to Living Next to Natural Areas	(-) LOW - NO NET NEGATIVE EFFECT ▪ The establishment of buffers and fencing should prevent deposition of green waste directly into natural areas. A Homeowner's Manual should further assist by education homeowners on responsible stewardship.
5.3 Street and residential lighting	▪ Disturbance to nocturnal wildlife.	▪ Restrict lighting adjacent to natural areas; ▪ Install shielding on street lights to prevent direct light impacts in natural areas; ▪ Establish buffers between rear lot lines and natural areas; and ▪ Provide Homeowner's Manual to Living Next to Natural Areas.	(-) LOW NET NEGATIVE EFFECT ▪ Restricted lighting along streets will help to reduce lighting impacts and shielding can reduce impacts in rear lots.
5.4 Increased ambient noise	▪ Disturbance to birds and other wildlife.	▪ Establish buffers between rear lot lines and natural areas ▪ Dense planting within buffers ▪ Provide Homeowner's Manual to Living Next to Natural Areas	(-) LOW NET NEGATIVE EFFECT ▪ Noise impacts can be somewhat reduced with planted buffers, and education of landowners can help to reduce noise generation.
5.5 Creation of Ad Hoc Trails	▪ Disturbance to wetland and woodland vegetation.	▪ Installation of rear year fencing ▪ Provide Homeowner's Manual to Living Next to Natural Areas ▪ Dense planting within buffers	(-) LOW NET NEGATIVE EFFECT ▪ Impacts can be reduced with planted buffers, and education of landowners can reduce impacts.

7. Environmental Management Plan

The following section outlines the environmental management recommendations for the Byron Avenue residential development. The intent of these recommendations is to provide protection of the natural heritage features identified and to mitigate any potential impacts of the proposed development.

Through the identification of components of the Municipality of Thames Centre's Natural Heritage System requiring protection and the development of buffer zones to further protect those components, most of the potential impacts of the proposed residential development have been avoided. Potential impacts have been further avoided through the provision of recommendations to the planning and engineering design team and through an iterative process of design revisions. The proposed development plan has been designed based on AECOM's preliminary assessment of natural heritage constraints.

7.1 Natural Heritage Feature Protection

The natural heritage features for the Project lands have been identified for protection through detailed site investigations, assessment of significance, application of significance criteria, on-site delineation, and consultation with relevant review agencies. The South Dorchester Swamp PSW and the Significant Woodland are the primary features to be protected within the Study Area. The boundaries for these features are delineated on **Figure 8**. The following recommendations are provided with respect to the Natural Heritage Protection Areas identified in this report:

Recommendation 1 – Natural Heritage Features Protection: The natural heritage features identified in this Environmental Management Plan and as delineated on **Figure 8** of this report are to be protected from development.

7.2 Buffer Zones

Consistent with the requirements to protect the components of the Natural Heritage System and their key functions, there is a requirement to provide buffers in areas adjacent to protected areas. Buffers are defined here *as areas provided adjacent to significant or sensitive features, for the purpose of protecting the quality and integrity of those features or their functions*. As such, buffers create a separation from development and the natural feature to minimize edge effects and adjacent land derived impacts. The objective of buffer zones is to maintain and enhance adjacent habitat characteristics by providing a stable ecotone with effective screening capabilities including but not limited to (Castelle et al. 1993):

- soil stabilization to prevent soil erosion;
- filtering suspended soils, nutrients and harmful or toxic substances;
- supporting and protecting fish and wildlife habitat and diversity;
- providing and enhancing migration corridors;
- moderating the microclimate of the habitat; and
- reducing impacts of adjacent human influences, such as noise, artificial lights, trampled vegetation, etc.

The development of site-specific buffers for natural heritage features identified for protection is dependent on the identification and consideration of the sensitivities of, and risks to the feature as well as the identification and consideration of potential impacts from proposed works.

Generally, there are components of the natural heritage system within the Significant Woodland and PSW that should be considered in the development of buffers. These include:

1. the Significant Woodland and PSW Patch as a whole and the integrity of its edge vegetation (primarily trees and shrubs);
2. Dorchester Pond Drain fish habitat; and
3. the presence candidate SAR bat habitat.

7.2.1 Buffer Zone Rationale

The recommended buffers shown in **Figure 8** were determined using both the wetland boundary and the dripline assessment conducted by AECOM staff during field investigations. The resulting buffer zone will allow for the protection of tree rooting zones, as well as provide protection for the Significant Woodland feature from potential impacts resulting from the construction of the residential development as well as post-construction impacts. Buffers may include multi-use trails. The recommended buffer has been established 30 m from the wetland edge and 20 m from the forest dripline.

Recommendation 2 – **Ecological Buffers:** Ecological buffers, including a 30m buffer from the Provincially Significant Dorchester Swamp Wetland and 20m from the Significant Woodland boundary shall be established to protect the features from potential adjacent land-use derived impacts.

7.2.2 Buffer Zone Management

The primarily goal of the recommended buffers is to ensure that the Significant Woodland and PSW are protected from negative effects potentially resulting from the proposed development. Currently, the Significant Woodland experiences edge effects from existing land uses. As such, the implementation of buffers will provide opportunities for habitat enhancement within the Project lands.

Enhancement within the recommended buffers should include plantings of native shrubs and herbaceous species. Tree species recommended for planting include native species that exist within the Significant Woodland and PSW such as white pine, trembling aspen, balsam poplar, sugar maple, black cherry, bur oak and red oak. In order to provide rapid establishment of native ground cover, a seed mix comprised of grasses, asters, goldenrods, milkweeds and other open meadow wildlife species suitable for drier soils is recommended.

Recommendation 3 – The recommended buffers should be planted with native species to create and enhance habitat for local wildlife and further protect existing wildlife habitat within Significant Woodland and South Dorchester Swamp PSW. Detailed planting recommendations shall be included as part of detailed design drawings and contract specifications.

7.3 Construction Restrictions and Mitigation

Natural areas are most susceptible during the construction phase of the development since this is the time during which site conditions are most significantly altered. Therefore, construction activities need to be mitigated and controlled to avoid significant impacts.

Typical construction mitigation measures for the development of a site such as The Project include:

- Sediment and erosion control measures;
- Peripheral vegetation protection;
- Dust suppression;
- Control of construction vehicles and machinery access;
- Controls on vehicle re-fueling;
- Root protection during grading and grubbing;
- Wildlife habitat protection and mitigation measures;
- Protection of breeding birds during vegetation removal;
- Mitigation of noise disturbance to wildlife; and
- Species at Risk protection and handling.

Appendix J provides details regarding each of the above-noted construction mitigation measures.

Timing Restrictions – Restricting construction related activities outside of sensitive periods for local or significant wildlife species can limit disturbance during life cycle stages. Construction related activities should be limited to the daylight hours (i.e. 7am to 7pm) in order to reduce the amount of noise disturbance. Additionally, vegetation clearing should occur outside of the breeding bird period (i.e. April 1st to August 31st) to avoid contravention of the Migratory Birds Convention Act through incidental take. Similarly, all tree removal should be conducted outside of the bat roosting season (April 1st to September 30th) to avoid impacts to potential SAR bat habitat.

Recommendation 4 - Installation of Tree Protection Fencing: Tree protection fencing shall be installed at grading limits prior to construction is recommended.

Recommendation 5 – Construction Mitigation and Wildlife Protection Plan: It is recommended that a detailed construction mitigation and wildlife protection plan shall be developed, prior to issuance of contract drawings, wherein the mitigation measures detailed in **Appendix J** are tailored to site-specific requirements and conditions of the residential development. Detailed Construction Mitigation Plan measures should be included in the contract drawings for site development.

7.4 Species at Risk Management

Two confirmed (Grasshopper Sparrow, Blanding's Turtle) and two candidate (Barn Swallow, Spoon-leaved Moss) Species at Risk occur within the Study Area. Grasshopper Sparrow is listed as Special Concern provincially. Therefore habitat for this species is considered SWH as described in **Section 3.5**. The proposed development plan involves the removal of 0.29 ha of cultural meadow habitat for this species. Proposed buffers and restoration planting will provide impact mitigation. Therefore, no further management is required for this species.

Barn Swallow and Blanding's Turtle are listed as Threatened, while Spoon-leaved Moss is listed as Endangered provincially. The proposed development plan has been located outside of Blanding's Turtle and Spoon-leaved Moss habitat in order to avoid direct impacts. Similarly, proposed buffers will provide further impact mitigation and habitat enhancement opportunities. As such, there is no further management required for these species.

The Endangered Species Act (ESA) provides a strong framework for the protection and recovery of SAR listed as Threatened or Endangered in Ontario as well as their habitats. The major provisions of the ESA to protect SAR include:

Section 9 (1) – prohibits the killing, harming, harassment, capture, taking, possession, transport, collection, buying, selling, leasing, trading or offering to buy, sell, lease or trade a species listed as Extirpated, Endangered or Threatened

Section 10 – prohibits the damage or destruction of the habitat of Endangered, Threatened and in some cases Extirpated species on the Species at Risk in Ontario list.

As such, any activity proposed to harm or destroy a listed species or their habitat requires a permit or authorization from the MNRF. Effective July 1, 2013, applications for permit approval under the ESA have been streamlined to include species-specific exemptions. In order for an activity to be exempt from Sections 9 and 10 of the ESA, the following items must be addressed:

- Register a Notice of Activity (NOA) to the Minister;
- Minimize the effects to a newly protected species or habitat;
- Create and implement a mitigation or compensation plan for each affected species;
- Report sightings of the species;
- Monitor and report effectiveness of the mitigation or compensation efforts; and
- Prepare an annual report on the plan's effectiveness.

Recommendation 6 – Barn Swallow Habitat Assessment: As Barn Swallow nesting was not confirmed, it is recommended that additional surveys be conducted to determine nesting status within the two structures prior to their removal. Should nesting be confirmed, a NOA will be submitted and a Barn Swallow Mitigation Plan will be prepared in order to satisfy requirements under the ESA.

7.5 Environmental Monitoring

The monitoring of environmental conditions following the development of land is integral to determining the success of the implemented protection and mitigation measures. As with any plan that is implemented, the success of an Environmental Management Plan can only be determined through the implementation of an Environmental Monitoring Program. The following outlines the recommendation for the development of an Environmental Monitoring Program specific to the proposed development:

Recommendation 7 - The developer shall prepare an Environmental Monitoring Program, to be implemented prior to the commencement of construction, for the purposes of determining the successful implementation of this Environmental Management Plan (EMP):

- The Environmental Monitoring Program shall be prepared and determined through consultation with UTRCA, MECP and the Municipality of Thames Centre.
- The Environmental Monitoring Program shall include a baseline monitoring event to be conducted prior to the commencement of construction;
- The Environmental Monitoring Program should include the following:
  - Completion of a checklist for the successful establishment of buffer zones, grading, site lighting, etc.;
  - Establishment and monitoring of permanent monitoring stations for identified locations within buffer zones, restoration areas and wetland or woodland areas; and
  - The requirement for annual reporting of monitoring results to the Municipality of Thames Centre, MECP and UTRCA.

8. Conclusions

With the implementation of the recommendations of the Environmental Management Plan outlined in this report, it is anticipated that the construction of the proposed development will result in a net environmental benefit. The net environmental benefit will be based on the following:

- The implementation of naturalized buffer areas between the proposed residential development and the Significant Woodland and the South Dorchester Swamp PSW.
- Restoration of areas adjacent to the Significant Woodland and PSW to off-set the loss of habitat.
- Implementation of construction mitigation recommendations designed to avoid and prevent construction related impacts during construction of the proposed residential development.

The design and layout of the residential development and the implementation of the recommendations in the Environmental Management Plan will guide conformance of this project with the Municipality of Thames Centre Official Plan, the Provincial Policy Statement (2014), the *Endangered Species Act*, the Upper Thames River Conservation Authority's *Ontario Regulation 157/06*, the *Fisheries Act,* and the *Migratory Birds Convention Act.*

9. References

AECOM. 2019. Conceptual Stormwater Management Report and Water Balance.187 Dorchester Road. 124pp.

Bird Studies Canada, Environment Canada's Canadian Wildlife Service, Ontario Nature, Ontario Field Ornithologists and Ontario Ministry of Natural Resources and Forestry. 2006. Ontario Breeding Bird Atlas Website. http://www.birdsontario.org/atlas/index.jsp

Castelle, A.J., A.W. Johnson and C. Connolly, 1993:
Wetland and stream buffer size requirements – a review. *In*: Buffer Zones: The Upland Areas Adjacent to Aquatic Areas (i.e., Wetlands, Lakes, Streams) Designated by a Local Unit of Government to Protect the Ecological Values and Functions of the Upland/Aquatic System (ed: State of Minnesota Stormwater Advisory Group). Minnesota, USA.

Chapman, L.J. and D.F. Putnam. 1984. The Physiography of Southern Ontario, 3rd Edition. Ontario Geological Survey, Special Volume 2.

COSEWIC. 2011. COSEWIC assessment and status report on the Barn Swallow Hirundo rustica in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 37 pp.

COSEWIC. 2013. COSEWIC assessment and status report on the Grasshopper Sparrow pratensis subspecies Ammodramus savannarum pratensis in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 36 pp. Available online: https://www.registrelep-sararegistry.gc.ca/virtual_sara/files/cosewic/sr_Grasshopper%20Sparrow_2013_e.pdf

Environment Canada – Canadian Wildlife Service (EC-CWS), 2009: Forest Bird Monitoring Program Survey Instructions and Codes. May 2009 Edition.

EC-CWS. 2017. Migratory Birds: technical information on risk factors. Available: https://www.canada.ca/en/environment-climate-change/services/avoiding-harm-migratory-birds/technical-information-risk-factors.html

Fisheries and Oceans Canada. 2017. Species at Risk Mapping

Golder. 2019a. Geotechnical Exploration. Proposed Development 187 Byron Avenue, Dorchester, ON. 45pp.

Golder. 2019b. Hydrogeological Assessment. 187 Byron Avenue, Dorchester. 509pp.

Hagerty, T. P. and M. S. Kingston. 1992. Resources Management Branch. Ontario Ministry of Agriculture and Food. Guelph, Ontario. 217pp.

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

Marsh Monitoring Program Participant's Handbook Surveying Marsh Birds. 2009 Edition. 17 Pages. Published by Bird Studies Canada in cooperation with Environment Canada and the U.S Environmental Protection Agency. February 2009.

Marsh Monitoring Program Participant's Handbook Surveying Amphibians. 2008 Edition. 20 Pages. Published by Bird Studies Canada in cooperation with Environment Canada and the U.S Environmental Protection Agency. February 2008.

Middlesex County. 2014. Middlesex Natural Heritage Systems Study: A study to identify natural heritage systems in Middlesex County. Project management by Upper Thames River Conservation Authority in cooperation with Middlesex County Conservation Authorities.

Municipality of Thames Centre. 2016. Official Plan.

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

Oldham, M.J., W.D. Bakowsky, and D.A. Sutherland. 1995. Floristic quality assessment for Southern Ontario. Natural Heritage Information Center, Ontario Ministry of Natural Resources and Forestry, Peterborough, Ont., Canada.

Ontario Ministry of Municipal Affairs and Housing. 2014. Provincial Policy Statement (issued under Section 3 of the Planning Act). Queen's Printer, Toronto.

Ontario Ministry of Natural Resources and Forestry. 2014. How Species at Risk are Protected. © Queen's Printer for Ontario 2012-2014 Retrieved from http://www.ontario.ca/environment-and-energy/how-ontario- protects-species-risk on November 2014.

Ontario Ministry of Natural Resources and Forestry (MNRF), 2015:
Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E. January, 2015. © Queen's Printer for Ontario

Ontario Ministry of Natural Resources and Forestry. 2010. Natural Heritage Reference Manual for Policy 2.3 of the Ontario Provincial Policy Statement.

Ontario Ministry of Natural Resources and Forestry. 2013. Ontario Wetland Evaluation System, Southern Manual, 3rd Edition, Version 3.2. © Queen's Printer for Ontario

Ontario Ministry of Natural Resources and Forestry (MNRF), 2017: Make-a-Map: Natural Heritage Areas application. Available: https://www.ontario.ca/page/get-natural-heritage-information.

Ontario Ministry of Natural Resources and Forestry (MNRF). 2017. Species at Risk in Ontario List. © Queen's Printer for Ontario 2012-2014. Retrieved at http://www.ontario.ca/environment-and-energy/species-risk-ontario-list

Ontario Ministry of Natural Resources. October 2000. Significant Wildlife Habitat Technical Guide. 151p.

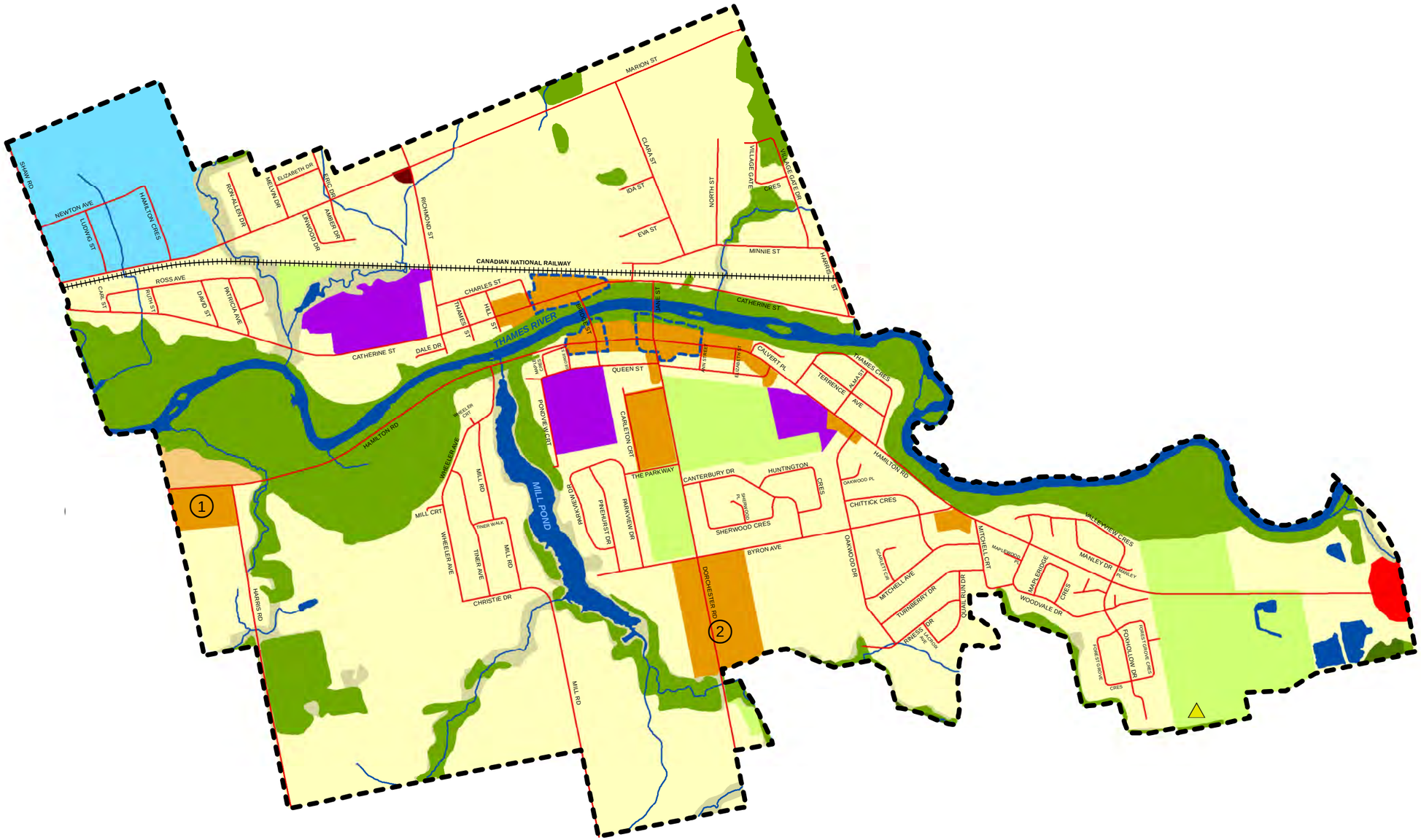
Ontario Nature. 2017. Reptiles and Amphibians of Ontario. Available from:
http://www.ontarionature.org/protect/species/reptiles_and_amphibians/index.php

Ontario Partners in Flight (OPIF). 2008. Ontario Landbird Conservation Plan: Lower Great Lakes - St. Lawrence Plain North American Bird Conservation Region 13. Ontario Ministry of Natural Resources, Bird Studies Canada, Environment Canada. Available at: http://www.bsc-eoc.org/PIF/PIFOBCR13Plan.pdf

AECOM Imagine it. Delivered.

Appendix A

Thames Centre Official Plan, Schedule B-1



LEGEND

- RESIDENTIAL
- NEIGHBOURHOOD COMMERCIAL
- GENERAL COMMERCIAL
- HIGHWAY COMMERCIAL
- SETTLEMENT INDUSTRIAL
- INSTITUTIONAL
- RECREATIONAL
- PROTECTION AREA
- NATURAL AREA
- PARKS & OPEN SPACE
- ENVIRONMENTAL AREA
- CORE AREAS
- URBAN SETTLEMENT AREA BOUNDARY
- SEWAGE TREATMENT FACILITY
- # SPECIAL POLICY AREA

BASE FEATURES

- ROADS
- RAIL LINE
- STREAM
- LAKE OR RIVER

SCHEDULE 'B-1'

LAND USE PLAN - DORCHESTER SETTLEMENT AREA

MUNICIPALITY OF THAMES CENTRE

OFFICIAL PLAN

N

SCALE : 1:18,000 metres

0 100 200 300 400 500

AECOM Imagine it. Delivered.

Appendix B

MNRF Correspondence

Ross, Matthew

From: McNaughton, Emily
Sent: Thursday, July 19, 2018 7:46 PM
To: Piette, Jessica; Walker, Jessica; Muscat, Shari; Pomeroy, Mark
Subject: FW: Information Request: 187 Byron Avenue, Dorchester

FYI

From: ESA-Aylmer (MNRF) [mailto:ESA.Aylmer@ontario.ca]
Sent: July-19-18 3:47 PM
To: McNaughton, Emily
Subject: RE: Information Request: 187 Byron Avenue, Dorchester

Hi Emily,

The Ministry of Natural Resources and Forestry (MNRF) understands that AECOM is conducting an EIS for Sifton Properties Ltd's residential development project proposed at 187 Byron Avenue in Thames Centre, ON as identified in the information provided.

MNRF provides the following natural heritage information in response to your request.

Species at Risk (SAR)

The Species at Risk in Ontario (SARO) List (https://www.ontario.ca/laws/regulation/080230) is Ontario Regulation 230/08 issued under the Endangered Species Act, 2007 (ESA). The ESA came into force on June 30, 2008, and provides both species protection (under section 9) and habitat protection (under section 10) to species listed as endangered or threatened on the SARO List.

An initial SAR (Endangered and Threatened species) screening has been completed for the above-noted property.

There are no known occurrences of SAR on the property; however, there are known occurrences of SAR in the general project area, including:

- QUEENSNAKE (Endangered), with regulated habitat protection
- BARN SWALLOW (Threatened), with general habitat protection
- BLANDINGS TURTLE (Threatened), with general habitat protection
- BOBOLINK (Threatened), with general habitat protection
- SPOON-LEAVED MOSS (Endangered), with general habitat protection
- WAVY-RAYED LAMPMUSSEL (Threatened), with regulated habitat protection
- SILVER SHINER (Threatened), with general habitat protection
- RAYED BEAN (Endangered), with general habitat protection
- BLACK REDHORSE (Threatened), with general habitat protection
- SPINY SOFTSHELL (Endangered), with general habitat protection

Please note that this is an initial screening for SAR and the absence of an element occurrence does not indicate the absence of species. The province has not been surveyed comprehensively for the presence or absence of SAR and MNRF data relies on observers to report sightings of SAR. Field assessments by a qualified professional may be necessary if there is a high likelihood for SAR species and/or habitat to occur within the project footprint and potentially be impacted.

Based on the information provided for this project, MNRF considers there to be high likelihood for the above-noted species and/or habitat to occur within the proposed project footprint. Please refer to our attached SAR Screening Process Technical Bulletin. MNRF strongly recommends that no on-site activity (i.e. site alteration, vegetation/debris removal, etc.) occurs until Stage 2 is complete, in

order for proponents to demonstrate due diligence and remain in compliance with the ESA. Failure to comply with this recommendation could result in a contravention of the ESA and possible compliance / enforcement action.

It is important to note the following:

- The Committee on the Status of Species at Risk in Ontario (COSSARO) meets regularly to evaluate new species for listing and/or re-evaluate species already on the SARO List.
- As a result, species designations may change and changes may occur in both species and habitat protection which could affect the level of protection they receive under the ESA 2007 and whether proposed projects may have adverse effects on SAR.
- Habitat protection provisions for a species may change if a species-specific habitat regulation comes into effect.
- If an activity or project will result in adverse effects to endangered or threatened species and/or their habitat, additional action would need to be taken in order to remain in compliance with the ESA. Additional action could be applying for an authorization under section 17(2)(c) of the ESA, or completing an online registry for an ESA regulation and following the rules in regulation if the project is eligible (http://www.ontario.ca/environment-and-energy/natural-resources-approvals). Questions about the registry process should be directed to MNRF's Registry and Approval Services Centre at 1-855-613-4256 or at mnr.rasc@ontario.ca. Please be advised that applying for an authorization does not guarantee approval and the process can take several months.

Significant Wildlife Habitat (SWH)

Significant wildlife habitat (SWH) may be present on or adjacent to the above-noted subject lands (within 120 m). Please consult the Significant Wildlife Habitat Technical Guide (SWHTG, OMNR 2000), the Natural Heritage Reference Manual (NHRM) and the Ecoregion Criteria Schedules for criteria on identifying and determining significance of wildlife habitat. SWH is identified by planning authorities using the criteria and processes recommended in the SWHTG and Ecoregion Criteria Schedules.

Link to the SWHTG: https://www.ontario.ca/environment-and-energy/guide-significant-wildlife-habitat

Link to Ecoregion 6E criteria schedule: http://publicdocs.mnr.gov.on.ca/View.asp?Document_ID=21842&Attachment_ID=45644

Link to Ecoregion 7E criteria schedule: http://publicdocs.mnr.gov.on.ca/View.asp?Document_ID=21843&Attachment_ID=45645

MNRF completed a screening for S1-S3, SH and special concern species and the following have known occurrences in the general project area:

- ELKTOE (S3)
- PURPLE WARTYBACK (S3)
- WABASH PIGTOE (S2S3)
- SLIPPERSHELL MUSSEL (S3)
- WOOD THRUSH (SC, S4B)
- SNAPPING TURTLE (SC, S3)
- LIZARD'S-TAIL (S3)
- HAIRY PINWEED (S3)
- EARLY-BRANCHING PANICGRASS (S3)
- EASTERN BURNING BUSH (S3)
- GREAT ST. JOHN'S-WORT (S3)
- GREATER REDHORSE (S3)
- BALD EAGLE (S2N, S4B)
- RAINBOW MUSSEL (SC, S2S3)

The habitat of provincially rare (S1-S3, SH) and Special Concern species is considered SWH under the category of 'Special Concern and Rare Wildlife Species' in the SWHTG Ecoregion Criteria Schedules. Therefore, consideration should be given to these species and whether their habitat occurs on or within 120 m of the subject lands.

Areas of Natural and Scientific Interest (ANSIs)

The Dorchester Swamp Life Science ANSI is located adjacent to the above-noted property.

Significant Woodlands

There appears to be woodland located adjacent to the project area. We recommend you refer to applicable Official Plans for criteria to determine the significance of woodlands near the project locations. The NHRM also contains information and criteria for determining significant woodlands.

Significant Wetlands

There is evaluated wetland present directly adjacent to the project area – Dorchester Swamp Provincially Significant Wetland. Please see the attached documents providing further information as per your request. Wetland shapefiles can be downloaded from Land Information Ontario (LIO).

Please see the attached reference sheet for a list of Ecological Land Classification (ELC) communities that could possibly be considered wetlands in Aylmer District. Site-specific investigation within the study area may find existing wetlands within such ELC communities that have not yet been evaluated or designated. Consideration and delineation of wetland areas should be determined using criteria and methodology as outlined in the Ontario Wetland Evaluation System (OWES) and submitted to MNRF for review.

Significant Valleylands

MNRF does not possess significant valleylands mapping. The NHRM provides guidance and evaluation criteria for determining significant valleylands. Conservation authorities should be contacted to inquire about information pertaining to significant valleylands if they have not been identified in the applicable Official Plan.

Fish and Fish Habitat

Mill Pond, located east of the subject property, is considered warm water with the following known species present:

- Bluegill Sunfish, Fathead Minnow, Golden Shiner, Northern Pike, Pumpkinseed, Rock Bass, Smallmouth Bass, White Sucker.

The Thames River, located north of the subject property, is considered warm water with the following known species present:

- Iowa Darter, North American Catfishes, Sunfishes, Black Bullhead, Blackside Darter, Bluntnose Minnow, Brook Stickleback, Brown Bullhead, Brown Trout, Central Mudminnow, Central Stoneroller, Common Carp, Common Shiner, Creek Chub, Eastern Blacknose Dace, Fantail Darter, Fathead Minnow.

MNRF recommends you contact the appropriate conservation authority and DFO for up-to-date fisheries, mussel, and drain information.

Natural Heritage Systems

Policy 2.1.2 of the PPS states that the diversity and connectivity of natural features in an area, and the long-term ecological function and biodiversity of natural heritage systems (NHS), should be maintained, restored or, where possible, improved, recognizing linkages between and among natural heritage features and areas, surface water features and ground water features.

Applicable natural heritage studies (e.g. in an EIS) should identify and recognize natural heritage systems and the linkages between and among natural heritage features and areas associated with the proposed development and site alteration. Based on the local NHS/linkages identified, or those specifically identified in an Official Plan, an EIS should outline potential impacts to the NHS and consider ways of maintaining, restoring, and/or improving linkages between and among natural heritage features and areas.

Conservation Authorities and Official Plans may provide additional natural heritage information for this study.

Please be advised that it is your responsibility to be aware of and comply with all relevant federal or provincial legislation, municipal by-laws or other agency approvals.

If you have any questions or require additional information, please feel free to contact me.

Thank you,

Emilee Hines
A/ Management Biologist
MNRF Aylmer District

From: McNaughton, Emily [mailto:Emily.McNaughton@aecom.com]
Sent: May 22, 2018 10:46 AM
To: ESA-Aylmer (MNRF) <ESA.Aylmer@ontario.ca>
Cc: Walker, Jessica <Jessica.Walker@aecom.com>; Piette, Jessica <Jessica.Piette@aecom.com>; Epp, Gary <Gary.Epp@aecom.com>
Subject: Information Request: 187 Byron Avenue, Dorchester

Good morning,

I am writing to you regarding the attached request for information for a residential development in Thames Centre (please see attached letter). Please also find attached a Figure showing the location of the study area and an information request form.

Please let me know if you have any questions or concerns.

Best Regards,

Emily McNaughton, M.Sc. ISA Cert.
Terrestrial Ecologist, Environment, Canada
W +1-519-963-5919
M +1-226-820-6324
emily.mcnaughton@aecom.com

AECOM
250 York Street, Citi Plaza
Suite 410
London, ON N6A 6K2, Canada
T +1-519-673-0510
aecom.com

Imagine it. Delivered.

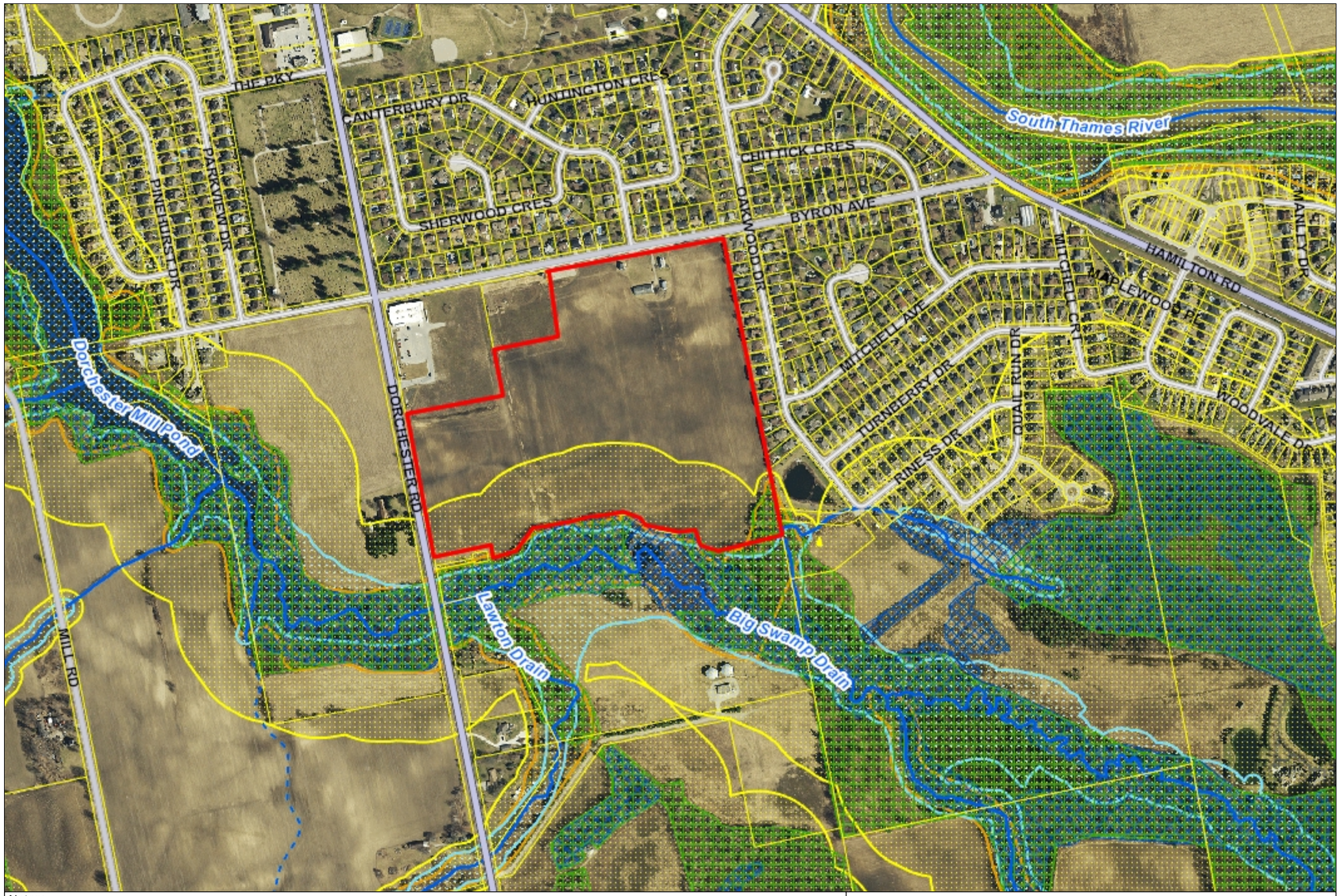
LinkedIn Twitter Facebook Instagram

FORTUNE WORLD'S MOST ADMIRED COMPANIES

AECOM Imagine it. Delivered.

Appendix C

UTRCA Correspondence



Notes:
187 Byron Ave, Dorchester

Created By: SM October 25, 2017

* Please note: Any reference to scale on this map is only appropriate when it is printed landscape on legal-sized (8.5" x 14") paper.

0 160 320 640
metres
1:8,000

N

Regulation Limit

Regulation under s.28 of the *Conservation Authorities Act*

Development, interference with wetlands, and alterations to shorelines and watercourses. O.Reg 157/06, 97/04.

Legend

- UTRCA Watershed (1:10K)
- Assessment Parcel (MPAC)
- Watercourse
  - Open
  - Tiled
- Middlesex NHSS Woodland (2014)
  - Candidate for Ecologicallly Important
  - Ecologicallly Important
  - Significant Ecologicallly Important
- Wetlands (MNR)
  - Evaluated-Provincial
  - Evaluated-Other
  - Not Evaluated
- Flooding Hazard
- Erosion Hazard
- Regulation Limit 2015

The Regulation Limit depicted on this map schedule is a representation of O.Reg 157/06 under O.Reg 97/04.

The Regulation Limit is a conservative estimation of the hazard lands within the UTRCA watershed. Depending on the specific characteristics of the hazard land and the land use proposed, the Regulation Limit may be subject to change.

The UTRCA disclaims explicitly any warranty, representation or guarantee as to the content, sequence, accuracy, timeliness, fitness for a particular purpose, merchantability or completeness of any of the data depicted and provided herein.

The UTRCA assumes no liability for any errors, omissions or inaccuracies in the information provided herein and further assumes no liability for any decisions made or actions taken or not taken by any person in reliance upon the information and data furnished hereunder.

This map is not a substitute for professional advice. Please contact UTRCA staff for any changes, updates and amendments to the information provided.

This document is not a Plan of Survey.

UPPER THAMES RIVER
CONSERVATION AUTHORITY

UTRCA Benthic Sampling Data

Dorchester Swamp Creek

Hamilton and Mill Rd (Downstream of Dam)

Site code: DO29 UTM X: 494607 UTM Y: 4759416

Sampled - 10/31/2002

REP: 1

Taxonomic Name	Common Name	Life Stage	# in Subsample	Biotic Index
Asellidae	Sow Bug	A	1	8
Caenidae	Crawling Mayfly	N	12	6
Ceratopogonidae	Biting Midge	L	1	6
Chironomidae	Midge	L	42	6
Coenagrionidae	Narrow-winged Damselfly	N	1	8
Elmidae	Riffle Beetle	A	2	5
Hyalellidae	Sideswimmer	A	100	8
Hydrobiidae	Snail	A	1	8
Hydropsychidae	Net-spinning Caddisfly	L	3	5
Oligochaeta	Aquatic Worm	A	11	8
Physidae	Pouch Snail	A	7	8
Planorbidae	Orb Snail	A	6	6
Pleidae	Pygmy Backswimmers	A	1	-1
Turbellaria	Flatworm	A	13	6

Stream Health **Poor** **Family Biotic Index** **7.19**

Sampled - 10/6/2005

REP: 1

Caenidae	Crawling Mayfly	N	3	6
Ceratopogonidae	Biting Midge	L	5	6
Chironomidae	Midge	L	140	6
Coenagrionidae	Narrow-winged Damselfly	N	1	8
Elmidae	Riffle Beetle	L	2	5
Haliplidae	Crawling Water Beetle	L	1	5
Hyalellidae	Sideswimmer	A	2	8
Hydrobiidae	Snail	A	2	8
Hydropsychidae	Net-spinning Caddisfly	L	2	5
Hydroptilidae	Micro-caddisfly	P	2	6
Leptoceridae	Long-horned Caddisfly	L	4	4
Libellulidae	Skimmer Dragonfly	N	1	2
Nematoda	Thread Worm	A	2	5
Oligochaeta	Aquatic Worm	A	10	8
Physidae	Pouch Snail	A	2	8
Pisidiidae	Fingernail Clam	A	6	6
Simuliidae	Black Fly	L	1	5
Turbellaria	Flatworm	A	4	6
Valvatidae	Round-mouthed Snail	A	1	8

Stream Health **Fairly Poor** **Family Biotic Index** **6.08**

Sampled - 5/17/2007

REP: 1

Acariformes	Water Mite	A	5	6
Baetidae	Small Mayfly	N	1	6
Caenidae	Crawling Mayfly	N	25	6
Ceratopogonidae	Biting Midge	L	3	6
Chironomidae	Midge	L	135	6
Chironomidae	Midge	P	21	6
Coenagrionidae	Narrow-winged Damselfly	N	2	8
Elmidae	Riffle Beetle	A	1	5
Empididae	Dance Fly	L	1	6
Haliplidae	Crawling Water Beetle	L	1	5

Taxonomic Name	Common Name	Life Stage	# in Subsample	Biotic Index
Hyalellidae	Sideswimmer	A	6	8
Hydrobiidae	Snail	A	2	8
Leptoceridae	Long-horned Caddisfly	L	1	4
Oligochaeta	Aquatic Worm	A	77	8
Physidae	Pouch Snail	A	5	8
Pisidiidae	Fingernail Clam	A	1	6
Planorbidae	Orb Snail	A	2	6
Psephenidae	Water Penny Beetle	L	1	4
Simuliidae	Black Fly	L	1	5
Turbellaria	Flatworm	A	1	6
	Stream Health	**Poor**	**Family Biotic Index**	**6.61**
Sampled - 9/20/2007				
	REP: 1			
Caenidae	Crawling Mayfly	N	37	6
Ceratopogonidae	Biting Midge	L	9	6
Chironomidae	Midge	P	2	6
Chironomidae	Midge	L	85	6
Coenagrionidae	Narrow-winged Damselfly	N	1	8
Empididae	Dance Fly	L	1	6
Gammaridae	Sideswimmer	A	1	6
Haliplidae	Crawling Water Beetle	L	1	5
Hyalellidae	Sideswimmer	A	57	8
Hydropsychidae	Net-spinning Caddisfly	L	8	5
Nematoda	Thread Worm	A	1	5
Oligochaeta	Aquatic Worm	A	10	8
Physidae	Pouch Snail	A	1	8
Pisidiidae	Fingernail Clam	A	20	6
Pleidae	Pygmy Backswimmers	A	1	-1
Pyralidae	Pyralid Moth	L	1	5
Tipulidae	Crane Fly	L	1	4
Turbellaria	Flatworm	A	15	6
	Stream Health	**Fairly Poor**	**Family Biotic Index**	**6.50**
Sampled - 9/24/2009				
	REP: 1			
Asellidae	Sow Bug	A	8	8
Caenidae	Crawling Mayfly	N	6	6
Ceratopogonidae	Biting Midge	L	3	6
Chironomidae	Midge	L	92	6
Empididae	Dance Fly	L	3	6
Helicopsychidae	Snail-case Caddisfly	L	1	3
Hyalellidae	Sideswimmer	A	68	8
Hydropsychidae	Net-spinning Caddisfly	L	34	5
Hydroptilidae	Micro-caddisfly	L	2	6
Leptoceridae	Long-horned Caddisfly	L	2	4
Lymnaeidae	Pond Snail	A	2	6
Oligochaeta	Aquatic Worm	A	12	8
Pisidiidae	Fingernail Clam	A	10	6
Simuliidae	Black Fly	L	53	5
Simuliidae	Black Fly	P	1	5
Tipulidae	Crane Fly	L	1	4
Turbellaria	Flatworm	A	9	6
	Stream Health	**Fairly Poor**	**Family Biotic Index**	**6.26**
Sampled - 9/27/2011				
	REP: 1			
Asellidae	Sow Bug	A	2	8

Taxonomic Name	Common Name	Life Stage	# in Subsample	Biotic Index
Caenidae	Crawling Mayfly	N	10	6
Chironomidae	Midge	L	83	6
Chironomidae	Midge	P	6	6
Elmidae	Riffle Beetle	L	22	5
Empididae	Dance Fly	L	5	6
Gammaridae	Sideswimmer	A	3	6
Helicopsychidae	Snail-case Caddisfly	L	1	3
Hyalellidae	Sideswimmer	A	1	8
Hydropsychidae	Net-spinning Caddisfly	L	95	5
Hydroptilidae	Micro-caddisfly	L	2	6
Leptoceridae	Long-horned Caddisfly	L	1	4
Limnephilidae	Northern Caddisfly	L	1	4
Nematoda	Thread Worm	A	1	5
Oligochaeta	Aquatic Worm	A	13	8
Philopotamidae	Finger-net Caddisfly	L	4	4
Pisidiidae	Fingernail Clam	A	24	6
Simuliidae	Black Fly	L	7	5
Turbellaria	Flatworm	A	31	6
	Stream Health	**Fair**	**Family Biotic Index**	**5.65**

Sampled - 9/30/2013

REP: 1

Acariformes	Water Mite	A	2	6
Caenidae	Crawling Mayfly	N	16	6
Ceratopogonidae	Biting Midge	L	2	6
Chironomidae	Midge	L	16	6
Chironomidae	Midge	P	1	6
Elmidae	Riffle Beetle	L	45	5
Empididae	Dance Fly	L	4	6
Helicopsychidae	Snail-case Caddisfly	L	6	3
Hyalellidae	Sideswimmer	A	20	8
Hydrophilidae	Water Scavenger Beetle	L	1	5
Hydropsychidae	Net-spinning Caddisfly	L	13	5
Leptoceridae	Long-horned Caddisfly	L	2	4
Oligochaeta	Aquatic Worm	A	2	8
Philopotamidae	Finger-net Caddisfly	L	10	4
Pisidiidae	Fingernail Clam	A	46	6
Planorbidae	Orb Snail	A	2	6
Simuliidae	Black Fly	L	3	5
Turbellaria	Flatworm	A	122	6
	Stream Health	**Fairly Poor**	**Family Biotic Index**	**5.81**

Sampled - 9/22/2015

REP: 1

Acariformes	Water Mite	A	2	6
Asellidae	Sow Bug	A	4	8
Baetidae	Small Mayfly	N	1	6
Caenidae	Crawling Mayfly	N	1	6
Chironomidae	Midge	L	42	6
Chironomidae	Midge	P	1	6
Elmidae	Riffle Beetle	L	11	5
Empididae	Dance Fly	L	1	6
Ephemerellidae	Mayfly	N	1	2
Helicopsychidae	Snail-case Caddisfly	L	1	3
Hyalellidae	Sideswimmer	A	3	8
Hydropsychidae	Net-spinning Caddisfly	L	162	5
Oligochaeta	Aquatic Worm	A	1	8
Philopotamidae	Finger-net Caddisfly	L	44	4

Taxonomic Name	Common Name	Life Stage	# in Subsample	Biotic Index
Pisidiidae	Fingernail Clam	A	42	6
Psephenidae	Water Penny Beetle	L	1	4
Simuliidae	Black Fly	P	1	5
Simuliidae	Black Fly	L	27	5
Tipulidae	Crane Fly	L	1	4
Turbellaria	Flatworm	A	12	6

Stream Health **Fair** **Family Biotic Index** **5.21**

Dorchester Swamp Creek

Dorchester Road (Upstream of Dam)

Site code: DO30 UTM X: 495532 UTM Y: 4758129

Sampled - 10/31/2002

REP: 1

Asellidae	Sow Bug	A	5	8
Caenidae	Crawling Mayfly	N	3	6
Ceratopogonidae	Biting Midge	L	6	6
Chironomidae	Midge	L	29	6
Chironomidae	Midge	P	4	6
Corixidae	Water Boatmen	A	1	5
Elmidae	Riffle Beetle	A	12	5
Elmidae	Riffle Beetle	L	22	5
Empididae	Dance Fly	L	2	6
Hyalellidae	Sideswimmer	A	12	8
Hydropsychidae	Net-spinning Caddisfly	L	33	5
Oligochaeta	Aquatic Worm	A	1	8
Phryganeidae	Large Caddisfly	L	1	4
Physidae	Pouch Snail	A	2	8
Pisidiidae	Fingernail Clam	A	42	6
Sialidae	Alderfly	N	1	4
Simuliidae	Black Fly	L	16	5
Taeniopterygidae	Stonefly	N	17	2
Tipulidae	Crane Fly	L	1	4

Stream Health **Fair** **Family Biotic Index** **5.44**

Sampled - 10/5/2004

REP: 1

Acariformes	Water Mite	A	14	6
Asellidae	Sow Bug	A	2	8
Baetidae	Small Mayfly	N	1	6
Calopterygidae	Broad-winged Damselfly	N	1	6
Ceratopogonidae	Biting Midge	L	5	6
Chironomidae	Midge	L	94	6
Chironomidae	Midge	P	5	6
Elmidae	Riffle Beetle	L	38	5
Elmidae	Riffle Beetle	A	2	5
Empididae	Dance Fly	L	2	6
Gammaridae	Sideswimmer	A	4	6
Hyalellidae	Sideswimmer	A	16	8
Hydrobiidae	Snail	A	2	8
Hydropsychidae	Net-spinning Caddisfly	L	43	5
Nematoda	Thread Worm	A	2	5
Oligochaeta	Aquatic Worm	A	5	8
Physidae	Pouch Snail	A	5	8
Pisidiidae	Fingernail Clam	A	9	6
Planorbidae	Orb Snail	A	1	6
Simuliidae	Black Fly	L	1	5
Taeniopterygidae	Stonefly	N	2	2
Tipulidae	Crane Fly	L	1	4

Taxonomic Name	Common Name	Life Stage	# in Subsample	Biotic Index
Turbellaria	Flatworm	A	1	6
	Stream Health	**Fairly Poor**	**Family Biotic Index**	**5.86**
Sampled - 10/6/2005				
	REP: 1			
Acariformes	Water Mite	A	5	6
Asellidae	Sow Bug	A	6	8
Caenidae	Crawling Mayfly	N	3	6
Ceratopogonidae	Biting Midge	L	5	6
Chironomidae	Midge	L	104	6
Corixidae	Water Boatmen	A	1	5
Elmidae	Riffle Beetle	A	3	5
Elmidae	Riffle Beetle	L	35	5
Empididae	Dance Fly	L	1	6
Haliplidae	Crawling Water Beetle	L	1	5
Hyalellidae	Sideswimmer	A	3	8
Hydropsychidae	Net-spinning Caddisfly	L	43	5
Leptoceridae	Long-horned Caddisfly	L	2	4
Limnephilidae	Northern Caddisfly	L	2	4
Notonectidae	Backswimmer	A	1	-1
Oligochaeta	Aquatic Worm	A	9	8
Physidae	Pouch Snail	A	1	8
Pisidiidae	Fingernail Clam	A	18	6
Simuliidae	Black Fly	L	5	5
Tipulidae	Crane Fly	L	1	4
Veliidae	Ripple Bug	A	1	-1
	Stream Health	**Fairly Poor**	**Family Biotic Index**	**5.76**
Sampled - 5/17/2007				
	REP: 1			
Acariformes	Water Mite	A	1	6
Asellidae	Sow Bug	A	4	8
Baetidae	Small Mayfly	N	35	6
Caenidae	Crawling Mayfly	N	2	6
Ceratopogonidae	Biting Midge	L	3	6
Chironomidae	Midge	P	16	6
Chironomidae	Midge	L	174	6
Coenagrionidae	Narrow-winged Damselfly	N	1	8
Dytiscidae	Predacious Diving Beetle	L	1	5
Elmidae	Riffle Beetle	A	15	5
Elmidae	Riffle Beetle	L	6	5
Ephydridae	Shore Fly	L	1	7
Hyalellidae	Sideswimmer	A	1	8
Hydropsychidae	Net-spinning Caddisfly	L	1	5
Nemouridae	Stonefly	N	6	2
Oligochaeta	Aquatic Worm	A	5	8
Perlidae	Stonefly	N	1	3
Perlodidae	Stonefly	N	6	2
Pisidiidae	Fingernail Clam	A	2	6
Simuliidae	Black Fly	L	3	5
	Stream Health	**Fairly Poor**	**Family Biotic Index**	**5.81**
Sampled - 9/20/2007				
	REP: 1			
Acariformes	Water Mite	A	6	6
Aeshnidae	Dragonfly	N	1	5
Asellidae	Sow Bug	A	2	8
Baetidae	Small Mayfly	N	12	6

Taxonomic Name	Common Name	Life Stage	# in Subsample	Biotic Index
Caenidae	Crawling Mayfly	N	3	6
Calopterygidae	Broad-winged Damselfly	N	5	6
Ceratopogonidae	Biting Midge	L	9	6
Chironomidae	Midge	P	15	6
Chironomidae	Midge	L	171	6
Elmidae	Riffle Beetle	A	6	5
Elmidae	Riffle Beetle	L	24	5
Empididae	Dance Fly	L	1	6
Gerridae	Water Strider	A	1	-1
Heptageniidae	Stream Mayfly	N	1	3
Hyalellidae	Sideswimmer	A	14	8
Hydropsychidae	Net-spinning Caddisfly	L	11	5
Leptoceridae	Long-horned Caddisfly	L	2	4
Leptophlebiidae	Mayfly	N	5	4
Nematoda	Thread Worm	A	2	5
Oligochaeta	Aquatic Worm	A	5	8
Physidae	Pouch Snail	A	3	8
Pisidiidae	Fingernail Clam	A	3	6
Sialidae	Alderfly	N	1	4
Tabanidae	Horse Fly	L	1	5
Tipulidae	Crane Fly	L	4	4
Turbellaria	Flatworm	A	2	6
	Stream Health	**Fairly Poor**	**Family Biotic Index**	**5.92**
Sampled - 9/27/2011				
	REP: 1			
Acariformes	Water Mite	A	6	6
Asellidae	Sow Bug	A	11	8
Baetidae	Small Mayfly	N	3	6
Chironomidae	Midge	P	3	6
Chironomidae	Midge	L	133	6
Elmidae	Riffle Beetle	A	6	5
Elmidae	Riffle Beetle	L	69	5
Empididae	Dance Fly	L	3	6
Glossosomatidae	Caddisfly	L	1	1
Helicopsychidae	Snail-case Caddisfly	L	6	3
Heptageniidae	Stream Mayfly	N	3	3
Hyalellidae	Sideswimmer	A	2	8
Hydropsychidae	Net-spinning Caddisfly	L	22	5
Leptoceridae	Long-horned Caddisfly	L	2	4
Nematoda	Thread Worm	A	5	5
Oligochaeta	Aquatic Worm	A	7	8
Pisidiidae	Fingernail Clam	A	7	6
Tabanidae	Horse Fly	L	3	5
Tipulidae	Crane Fly	L	2	4
Turbellaria	Flatworm	A	6	6
Valvatidae	Round-mouthed Snail	A	1	8
	Stream Health	**Fair**	**Family Biotic Index**	**5.66**
Sampled - 9/30/2012				
	REP: 1			
Acariformes	Water Mite	A	3	6
Asellidae	Sow Bug	A	8	8
Calopterygidae	Broad-winged Damselfly	N	2	6
Ceratopogonidae	Biting Midge	L	1	6
Chironomidae	Midge	P	3	6
Chironomidae	Midge	L	150	6
Elmidae	Riffle Beetle	A	8	5

Taxonomic Name	Common Name	Life Stage	# in Subsample	Biotic Index
Elmidae	Riffle Beetle	L	67	5
Empididae	Dance Fly	L	2	6
Glossosomatidae	Caddisfly	L	1	1
Helicopsychidae	Snail-case Caddisfly	L	4	3
Hyalellidae	Sideswimmer	A	1	8
Hydropsychidae	Net-spinning Caddisfly	L	50	5
Nematoda	Thread Worm	A	4	5
Oligochaeta	Aquatic Worm	A	3	8
Philopotamidae	Finger-net Caddisfly	L	1	4
Pisidiidae	Fingernail Clam	A	4	6
Planorbidae	Orb Snail	A	1	6
Simuliidae	Black Fly	L	3	5
Turbellaria	Flatworm	A	11	6
	Stream Health	**Fair**	**Family Biotic Index**	**5.61**

Sampled - 9/22/2015

REP: 1

Acariformes	Water Mite	A	12	6
Ancylidae	Limpet	A	1	6
Asellidae	Sow Bug	A	2	8
Baetidae	Small Mayfly	N	4	6
Cambaridae	Crayfish	A	1	6
Chironomidae	Midge	P	6	6
Chironomidae	Midge	L	79	6
Crangonyctidae	Sideswimmer	A	1	6
Elmidae	Riffle Beetle	A	11	5
Elmidae	Riffle Beetle	L	91	5
Empididae	Dance Fly	L	7	6
Glossosomatidae	Caddisfly	L	4	1
Helicopsychidae	Snail-case Caddisfly	L	5	3
Heptageniidae	Stream Mayfly	N	4	3
Hydropsychidae	Net-spinning Caddisfly	L	89	5
Nematoda	Thread Worm	A	5	5
Oligochaeta	Aquatic Worm	A	5	8
Pisidiidae	Fingernail Clam	A	2	6
Simuliidae	Black Fly	L	2	5
Tipulidae	Crane Fly	L	2	4
	Stream Health	**Fair**	**Family Biotic Index**	**5.29**

Benthic Samples were obtained using a Rapid Bioassessment Protocol developed by the United States Environmental Protection Agency and modified by Dr. Robert Bailey of the University of Western Ontario Zoology Department. A representative section of stream is selected, incorporating a riffle if present, and sampled by moving upstream along a diagonal transect, dislodging and capturing invertebrates with a .5 mm mesh "D"- frame net. Samples are preserved in the field and analyzed in the lab to randomly select a 100 bug subsample which is identified to the Family taxonomic level.

The biotic index is a value assigned to benthic invertebrate taxa indicating their pollution sensitivity and tolerance on a scale from 0 to 10. Lower numbers indicate pollution sensitivity and high numbers tolerance. A value of -1 indicates that no biotic index value has been assigned to these taxa.

The Family Biotic Index is the weighted average of the biotic index and number of bugs in each taxa in the sample. The water quality ranges for the FBI values are as follows: < 4.25 = Excellent; 4.25 - 5.00 = Good; 5.00 - 5.75 = Fair; 5.75 - 6.50 = Fairly Poor; 6.50 - 7.25 = Poor; and > 7.25 = Very Poor.

Report prepared - Tuesday, November 07, 2017

UTRCA (DFO, ROM, MNRF) Fish Sampling Records

		Species at Risk (SAR) Status				Thames Status	
		Federal		Provincial			
Species (Common Name)	**Scientific Name**	**COSEWIC**	**SARA**	**ESA 2007**	**SRank**	**Abundance**	**Distribution**
Dorchester Pond							
Location	South of Hamilton Rd, Dorchester			**Site Code**	R254	**Sample Date**	7/5/1974
UTM x: 494586	UTM y: 4759188						
Black Bullhead	*Ameiurus melas*				S4	Uncommon	Throughout
Location	South of Hamilton Rd, Dorchester			**Site Code**	R254	**Sample Date**	4/21/2015
UTM x: 494586	UTM y: 4759188						
Bluegill	*Lepomis macrochirus*				S5	Uncommon	Widespread
Pumpkinseed	*Lepomis gibbosus*				S5	Common	Throughout
Dorchester Pond Drain							
Location	Below Dam at Dorchester			**Site Code**	R253	**Sample Date**	7/5/1974
UTM x: 494607	UTM y: 4759416						
Stonecat	*Noturus flavus*				S4	Common	Throughout
Dorchester Pond Drain							
Location	Dorchester Road			**Site Code**	321-UT	**Sample Date**	12/7/1999
UTM x: 495532	UTM y: 4758129						
Blacknose Dace	*Rhinichthys atratulus*				S5	Abundant	Throughout
Brook Stickleback	*Culaea inconstans*				S5	Abundant	Throughout
Central Mudminnow	*Umbra limi*				S5	Uncommon	Throughout
Common Shiner	*Luxilus cornutus*				S5	Abundant	Throughout
Creek Chub	*Semotilus atromaculatus*				S5	Abundant	Throughout
Rock Bass	*Ambloplites rupestris*				S5	Abundant	Throughout
White Sucker	*Catostomus commersoni*				S5	Abundant	Throughout
Location	Dorchester Road			**Site Code**	321-UT	**Sample Date**	7/27/2010
UTM x: 495532	UTM y: 4758129						
Black Crappie	*Pomoxis nigromaculatus*				S4	Rare	Localized
Bluegill	*Lepomis macrochirus*				S5	Uncommon	Widespread
Largemouth Bass	*Micropterus salmoides*				S5	Common	Throughout
Northern Pike	*Esox lucius*				S5	Uncommon	Throughout
Northern Sunfish	*Lepomis peltastes*				S3	Uncommon	Throughout
Pumpkinseed	*Lepomis gibbosus*				S5	Common	Throughout
Rock Bass	*Ambloplites rupestris*				S5	Abundant	Throughout
White Sucker	*Catostomus commersoni*				S5	Abundant	Throughout

		Species at Risk (SAR) Status				Thames Status	
		Federal		Provincial			
Species (Common Name)	**Scientific Name**	**COSEWIC**	**SARA**	**ESA 2007**	**SRank**	**Abundance**	**Distribution**

COSEWIC Status: The Committee on the Status of Endangered Wildlife in Canada (COSEWIC) assesses species for their consideration for legal protection and recovery (or management) under the Species at Risk Act (SARA).

Extinct: A wildlife species that no longer exists.
Extirpated: A wildlife species no longer existing in the wild in Canada, but exists elsewhere.
Endangered: A wildlife species facing imminent extirpation or extinction.
Threatened: A wildlife species likely to become endangered if limiting factors are not reversed.
Special Concern: A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
Not at Risk: A wildlife species that has been evaluated and found to be not at risk of extinction given the current circumstances.
Data Deficient: A category that applies when the available information is insufficient (a) to resolve a wildlife species' eligibility for assessment or (b) to permit an assessment of the wildlife species' risk of extinction.

Reference: www.cosewic.gc.ca (current to November 2011)

SARA Status: The federal at risk designation for species under the Species at Risk Act (SARA)
Reference: www.sararegistry.gc.ca (current to December 2011)

ESA 2007 / SARO Status: Species at Risk in Ontario (SARO) are designated by the Ontario Ministry of Natural Resources (OMNR) in accordance with the provincial Endangered Species Act (ESA) through the Committee on the Status of Species at Risk in Ontario (COSSARO).

Extirpated: A native species that no longer exists in the wild in Ontario but still occurs elsewhere.
Endangered: A native species facing imminent extinction or extirpation in Ontario.
Threatened: A native species that is at risk of becoming endangered in Ontario.
Special Concern: A native species that is sensitive to human activities or natural events which may cause it to become endangered or threatened.

Reference: www.ontario.ca/speciesatrisk (current to January 2012)

Provincial Rank (SRANK): Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are assigned to consider only those factors within the political boundaries of Ontario.

SX Presumed Extirpated: Species or community is believed to be extirpated from the nation or state/province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered.
SH Possibly Extirpated (Historical): Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years. A species or community could become NH or SH without such a 20-40 year delay if the only known occurrences in a nation or state/province were destroyed or if it had been extensively and unsuccessfully looked for. The NH or SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurrences.
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: 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: 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.
SNR Unranked: Nation or state/province conservation status not yet assessed.
SU Unrankable: Currently unrankable due to lack of information or due to substantially conflicting information about status or trends.
SNA Not Applicable: A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
S#S# Range Rank: A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

Reference: http://nhic.mnr.gov.on.ca/MNR/nhic/nhic.cfm (current to March 2012)

Abundance: Refers to the relative abundance of the species found within the waters of the Upper Thames River watershed based on sampling results. Some species may be underrepresented as they are difficult to capture with commonly used sampling methods.
Abundant: Occurred in >25% of the sampling records
Common: Occurred in 10-25% of the samples
Uncommon: Occurred in <10% of the samples

Distribution: Based on the number of Upper Thames Watershed Report Card subwatersheds in which a species has been recorded.
Throughout: Recorded in >20 subwatersheds
Widespread: Recorded in 10-20 subwatersheds
Localized: Recorded in <10 subwatersheds

		Species at Risk (SAR) Status				Thames Status	
		Federal		Provincial			
Species (Common Name)	**Scientific Name**	**COSEWIC**	**SARA**	**ESA 2007**	**SRank**	**Abundance**	**Distribution**

Prepared - Tuesday, November 07, 2017

UPPER THAMES RIVER
CONSERVATION AUTHORITY

"Inspiring a Healthy Environment"

The Thames
A Canadian
Heritage River

November 27, 2017

AECOM
55 Wyndham St. North, Suite 215
Guelph, ON N1H 7T8

Attention: **Olivia Butty** - (via e-mail: Olivia.Butty@aecom.com)

Dear Ms. Butty:

Re: **Project No: 60557866 RE: The Boardwalk at Mill Pond Residential Development Project – Request for Natural Heritage Information & Fish Community Data**

Upper Thames River Conservation Authority (UTRCA) staff are in receipt of the information request regarding the above noted development project. (Please note that our scope of review is based on the policies set out in the Upper Thames River Conservation Authority Planning Policy Manual (June 28, 2006). We offer the following comments:

GENERAL COMMENT

Please note that given the broad concept proposal at this time, we are unable to provide detailed technical comments. However, we appreciate being contacted early in the process and are always open to meeting with you to discuss and work through any concerns or complications along the way.

UTRCA REGULATED AREAS

According to the enclosed project location mapping, portions of the study area occur within or adjacent natural hazard and natural heritage features regulated by the UTRCA. Provincially Significant Wetland (PSW) areas as well as riverine flood and erosion hazard features associated with a variety of watercourses exist within the study area. Mapping which outlines these features is attached to this letter.

UTRCA ENVIRONMENTAL PLANNING POLICY MANUAL

The UTRCA's Environmental Planning Policy Manual is available online at:
http://thamesriver.on.ca/planning-permits-maps/utrca-environmental-policy-manual/
The policies which are applicable to the subject lands include:

3.2.3 Riverine Flooding Hazard Policies

These policies address matters such as the provision of detailed flood plain mapping, uses that may be permitted in the flood plain, one & two zone flood plain policy areas as well as special policy areas.

3.2.4 Riverine Erosion Hazard Policies

The Authority generally does not permit development and site alteration in the meander belt or on the face of steep slopes, ravines and distinct valley walls. The establishment of the hazard limit must be based

upon the natural state of the slope, and not through re-grading or the use of structures or devices to stabilize the slope.

3.2.6 & 3.3.2 Wetland Policies

New development and site alteration is not permitted in wetlands. Furthermore, new development and site alteration may only be permitted in the area of interference and /or adjacent lands of a wetland if it can be demonstrated through the preparation of an Environmental Impact Study (EIS) that there will be no negative impact on the hydrological and ecological function of the feature.

SPECIES AT RISK

3.3.6 Policies for the Habitat of Endangered Species, Threatened Species, Species of Special Concern & Locally Rare Species

The Authority does not permit development and site alteration in the habitat of endangered and threatened species. Furthermore development and site alteration is not permitted on lands which are adjacent (within 50 metres) of the habitat of endangered and threatened species unless an EIS has been completed. We are aware of species at risk to occur within the vicinity of the property.

To obtain further information on the species, please contact the Aylmer Ministry of Natural Resources Species at Risk Biologists at ESAscreeningRequest.AylmerDistrict@ontario.ca.

FIELD STAFF COMMENTS

Threatened/Endangered Species

Blanding's Turtle (*Emydoidea blandingii*)

The Dorchester region (Mill Pond, nearby Dorchester Swamp and additional wetlands and woodlands in this vicinity) maintains the largest Blanding's Turtle population known within the Upper Thames River Watershed. Detailed study is lacking, though there are a number of confirmed observations. A small number of records are known from the Dorchester Mill Pond. The Dorchester Mill Pond provides suitable habitat for this species, and maintains links to larger wetland areas. Most records have been submitted to NHIC or ORAA over the years. UTRCA staff have observed this species within the Mill Pond as well. Although Blanding's Turtles may use organic soils to nest, sand or sand and gravel areas appear to be preferred. The adjacent farm fields/development site may provide some nesting opportunities. Due to the apparent low density of this species, locating nests is difficult at this site, and subsequently no oviposition sites have been confirmed.

Spiny Softshell (*Apalone spinifera*)

Over the years we have received a small number of calls regarding Spiny Softshell Turtles observed within Dorchester Mill Pond. Spiny Softshell Turtles may seek out pond/wetland areas adjacent to river, stream or lake sites during the spring and early summer. Often times it is adult females apparently seeking warmer water during gestation. Photos of an individual in the pond were submitted, along with a record of the species observed 10 years ago. Spiny Softshell Turtles have also been confirmed along the Thames River adjacent to the outlet of Dorchester Mill Pond.

Queensnake (*Regina septemvittata*)

No Queensnake records have been submitted to UTRCA, or observed by staff, from the Dorchester Mill Pond. According to the NHIC, Queensnakes have been observed along the river near Dorchester, but no records are known from the Mill Pond.

Special Concern Species

Snapping Turtle (*Chelydra serpentina*)

Snapping Turtles are commonly observed in and around Dorchester Mill Pond, often nesting on lawns and in farm fields within the vicinity of the Mill Pond. Oviposition habitat has been confirmed within the development area (see location information below).

The below location information was submitted to our office for our records. Photos are available for many of these observations. All additional species observations should be available through NHIC or ORAA.

SPINY SOFTSHELL TURTLE
Just below the "Lacey Lookout" in the Dorchester Mill Pond near the car park which can be accessed off Mill Road. Observed 10years ago.

BLANDING'S TURTLE
Aug 9/2015 Blandings Turtle (basking) GPS 42.979033, -81.061388
April 20/2016 Blandings Turtle(basking) GPS 42.986623, -81.065805

SNAPPING TURTLE
June 25/2015 Snapping Turtle nest (predated) GPS 42.979607, - 81.060761
June 13/2016 Snapping Turtle nest (predated) GPS 42.979092, -81.060392
June 18/2016 Snapper -large female I suspect finished laying GPS 42.978647, -81.062176 (10.42am) seen heading back to Millpond, at edge of farmers field / tree line)
June18/2016 Snapping Turtle nest (predated) GPS 42.978963, -81.059961
June 18/2016 Snapping Turtle nest (predated) GPS 42.978950, -81.060110
June 18/2016 Snapping Turtle nest (predated) GPS 42.979492, -81.065352
June 18/2016 Snapping Turtle nest (predated) GPS 42.978645, -81.061571
April10/2017 Young Snapping Turtle (basking) GPS 42.986146, -81.065267
June10/2017 Snapping Turtle (basking) GPS 42.981694, -81.065437

Additional Comments:

- Increased human presence generally poses a threat to SAR reptiles, including increased vehicle traffic, higher use of green space, harassment of wildlife, higher trail use or creation of additional trails and acute and chronic destruction of habitat

- If features to benefit these species are installed (ie nesting areas), please speak with Scott Gillingwater about effectiveness, location sensitivity, and maintenance of these sites.

- Based on the list provided, the site is unlikely to maintain Butler's Gartersnake, Eastern Musk Turtle, Gray Ratsnake, Common Five-lined Skink or Massasauga Rattlesnake.

FISH & BENTHIC RECORDS

As requested by your office, please find attached to this letter, the fish sampling results and benthic sampling data for the subject property and the areas immediately surrounding these lands. Please note that there are specific timing windows which must be adhered to when completing in-water works depending on the classification of the watercourse/species which are present.

NATURAL HERITAGE

3.3.3 Woodland Policies

New development and site alteration is not permitted in woodlands considered to be significant in the Middlesex County Natural Heritage Systems Study (2014). Furthermore, new development and site

alteration is not permitted on adjacent lands to significant woodlands unless an Environmental Impact Study/Development Assessment Report (EIS/DAR) has been completed to the satisfaction of the UTRCA which demonstrates that there will be no negative impact on the feature or its ecological function.

NOTE: Adjacent lands - Natural Heritage Reference Manual, Second Edition (OMNR, 2010)
We note that Table 4-2 of the *Natural Heritage Reference Manual Second Edition* (OMNR, 2010) identifies adjacent lands from significant natural heritage features as being 120m from the feature for considering potential negative impacts. The *Natural Heritage Reference Manual* provides technical guidance for implementing the natural heritage policies of the *Provincial Policy Statement*, 2014.

DRINKING WATER SOURCE PROTECTION

Clean Water Act

The *Clean Water Act* (CWA), 2006 is intended to protect existing and future sources of drinking water. The Act is part of the Ontario government's commitment to implement the recommendations of the Walkerton Inquiry as well as protecting and enhancing human health and the environment. The CWA sets out a framework for source protection planning on a watershed basis with Source Protection Areas established based on the watershed boundaries of Ontario's 36 Conservation Authorities. The Upper Thames River, Lower Thames Valley and St. Clair Region Conservation Authorities have entered into a partnership for The Thames-Sydenham Source Protection Region.

The Assessment Report for the Upper Thames watershed delineates three types of vulnerable areas: Wellhead Protection Areas, Highly Vulnerable Aquifers and Significant Groundwater Recharge Areas. Mapping which identifies these areas is available at: http://maps.thamesriver.on.ca/GVH_252/?viewer=tsrassessmentreport

SUMMARY

The UTRCA provides the foregoing information to assist the office of AECOM with conducting their collection of information. Please find attached to this email, the requested fish and benthic data, as well as the UTRCA's Regulation limit mapping.

Should you have any further questions, or require any additional information, please do not hesitate to contact the undersigned at ext. 228. For further information relating to species at risk, please contact Scott Gillingwater at ext. 236.

Yours truly,
UPPER THAMES RIVER CONSERVATION AUTHORITY

Spencer McDonald
Land Use Planner
SM/sm

c.c. Scott Gillingwater, UTRCA (via email: gillingwaters@thamesriver.on.ca)

Attachments:
1) UTRCA Regulation Limit Mapping (please print on legal sized paper for the scales to be accurate)
2) UTRCA Fish Sampling Records
3) UTRCA Benthic Sampling Data

AECOM Imagine it. Delivered.

Appendix D

Aquatic Photographic Log

Appendix D. Aquatic Photographic Log

Photograph 1 ↑
Reach overview upstream of Dorchester Road.

Photograph 2 ↑
Reach overview downstream of Dorchester Road.

Photograph 3 ↑
Overview of riparian vegetation.

Photograph 4 ↑
Culvert outlet at Dorchester Road.

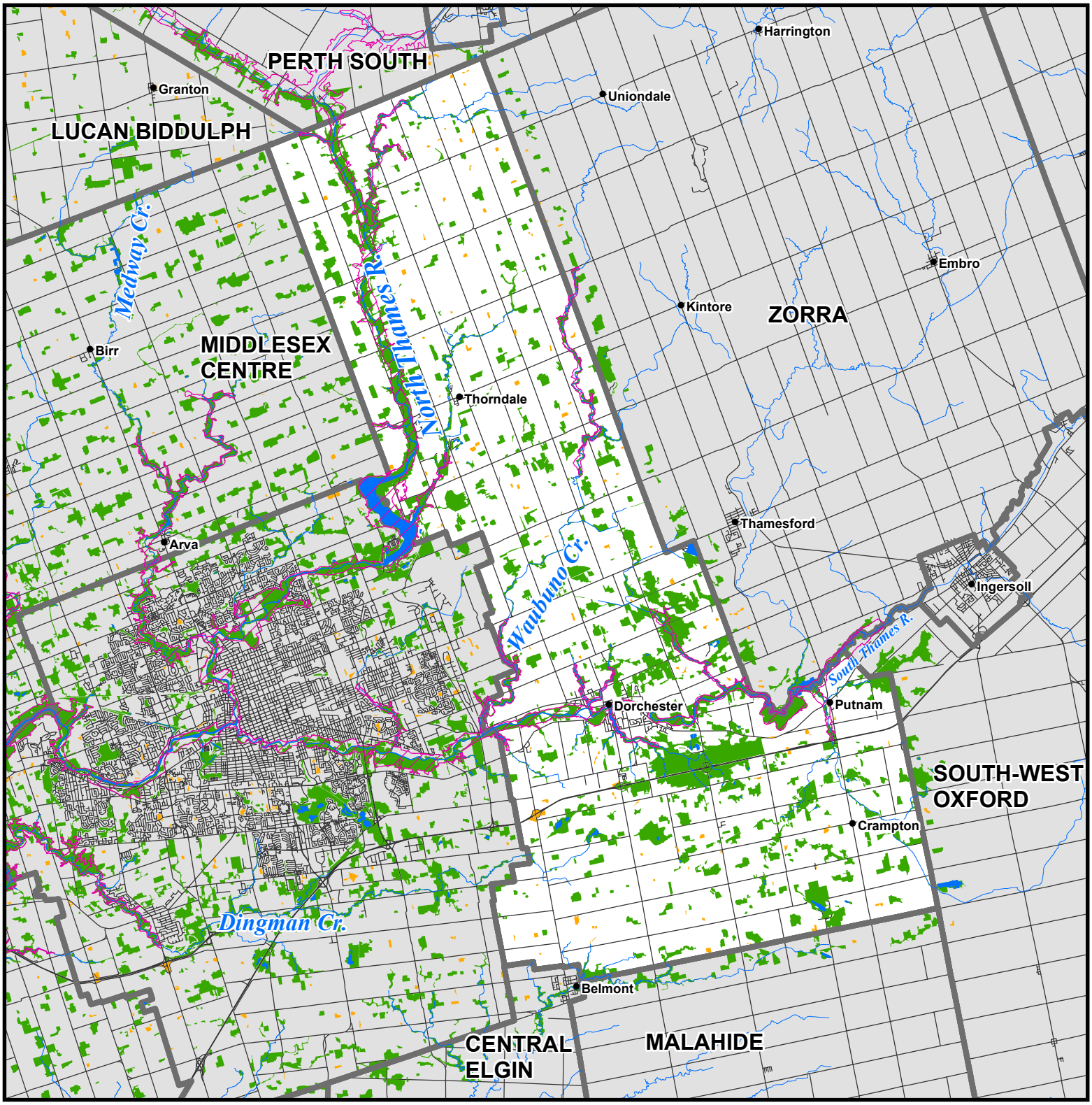
Photograph 5 ↑
Culvert inlet at Dorchester Road.

Photograph 6 ↑
Cyprinids observed during site investigation.

AECOM Imagine it. Delivered.

Appendix E

Middlesex Natural Heritage Systems Study Maps



Middlesex Natural Heritage Systems Study 2014

Thames Centre Significant Vegetation Patch

middlesex county

N
W E
S

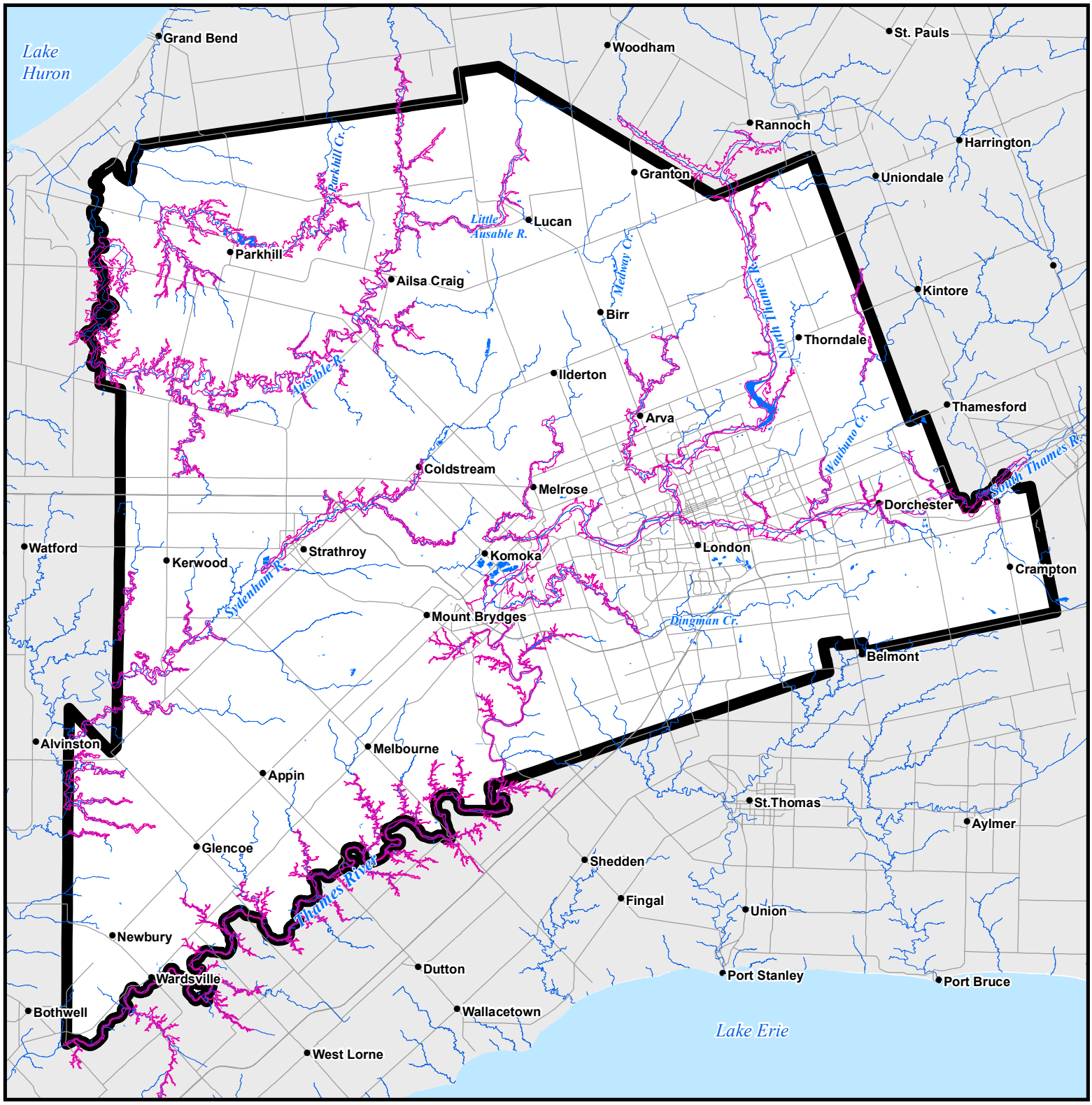
5 2.5 0 5 km

Legend

- Meet No Criteria
- Meet at Least One Criteria
- Significant Valley System
- Municipality Boundaries

Produce by Upper Thames River Conservation Authority, July 2014.
Basemapping :Land Information Ontario, Copyright © Queens Printer, 2014.

Vegetation Patch and Significant Valley Systems defined by Conservation Authorities: Ausable Bayfield, St. Clair Region, Upper Thames River, Lower Thames Valley, based on 2010 imagery.



Middlesex Natural Heritage Systems Study 2014

Significant Valley System

middlesex county

N
W E
S

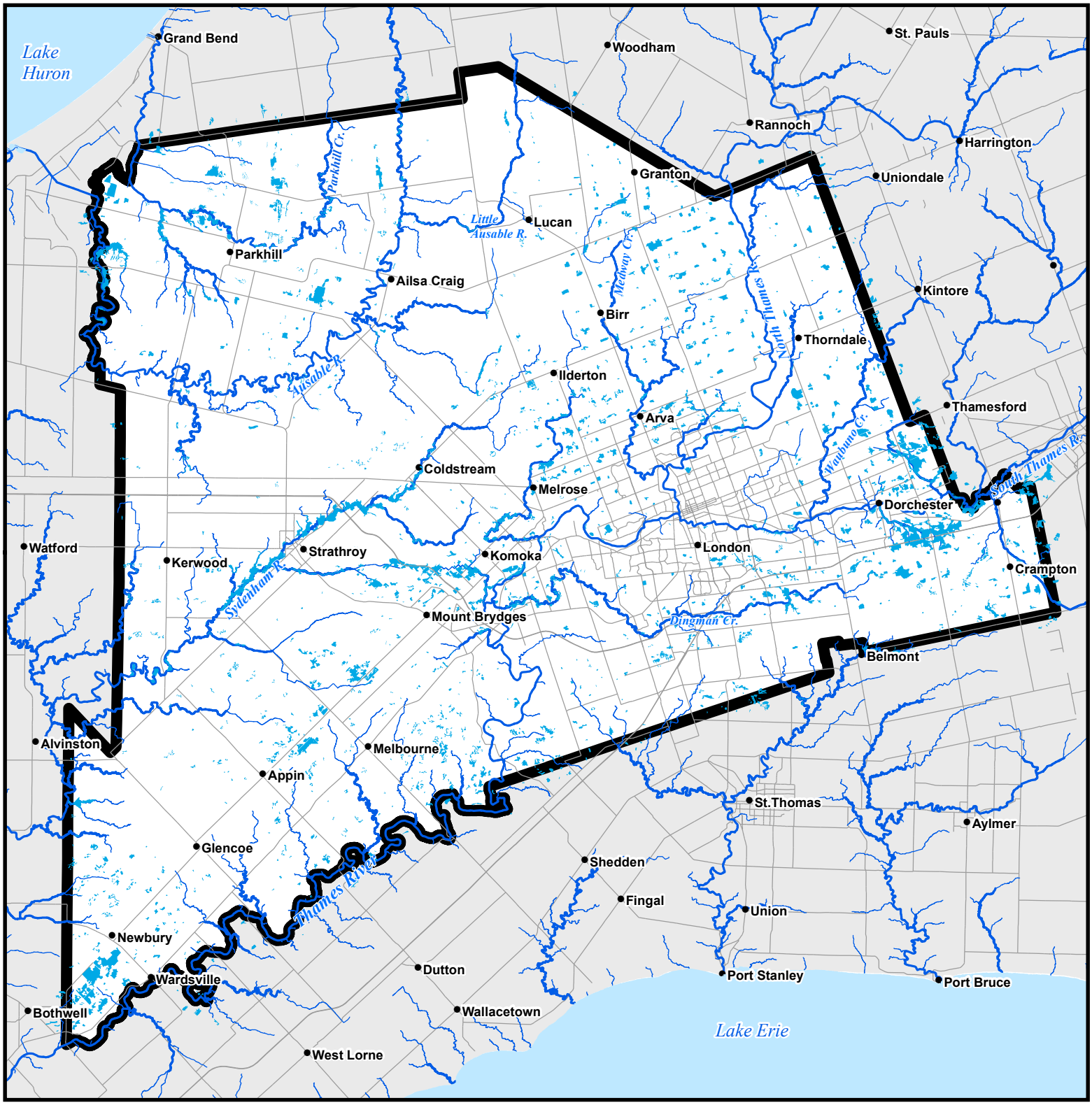
10 5 0 10 km

Legend

- Significant Valley System
- Study Boundary

Produce by Upper Thames River Conservation Authority, July 2014,
Basemapping :Land Information Ontario, Copyright © Queens Printer, 2014.

Significant Valley Systems defined by Conservation Authorities: Ausable Bayfield, St. Clair Region, Upper Thames River, Lower Thames Valley.



Middlesex Natural Heritage Systems Study 2014

Wetland Group

middlesex county

N
W E
S

10 5 0 10 km

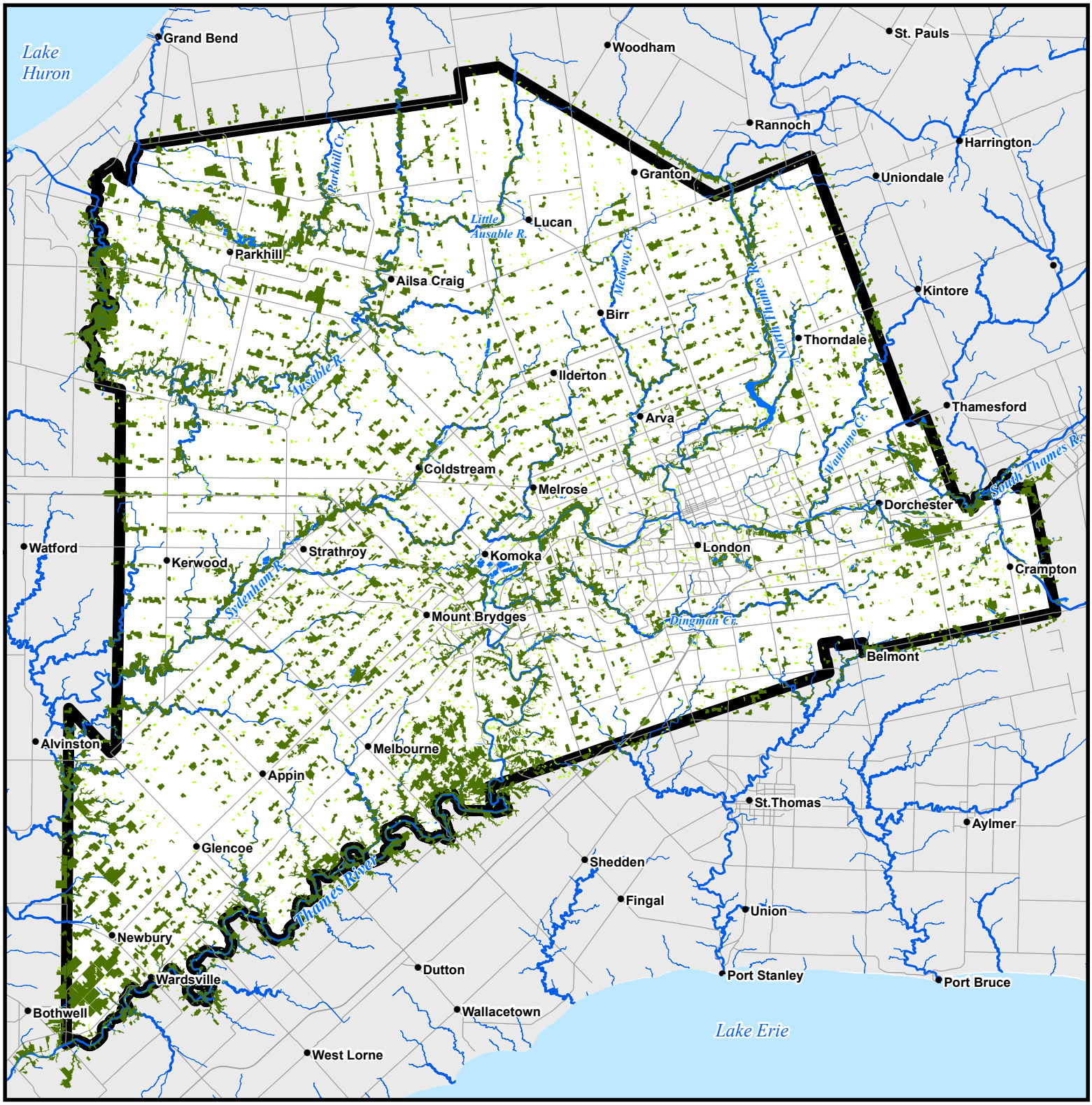
Legend

Wetland Group

Study Boundary

Produce by Upper Thames River Conservation Authority, July 2014,
Basemapping :Land Information Ontario, Copyright © Queens Printer, 2014.

Wetland Boundaries: Ontario Ministry of Natural Resources, Copyright © Queens Printer, 2014 and Conservation Authorities: Ausable Bayfield, St. Clair Region, Upper Thames River, based on 2010 imagery.



Middlesex Natural Heritage Systems Study 2014

Woodland Group

middlesex county

N
W E
S

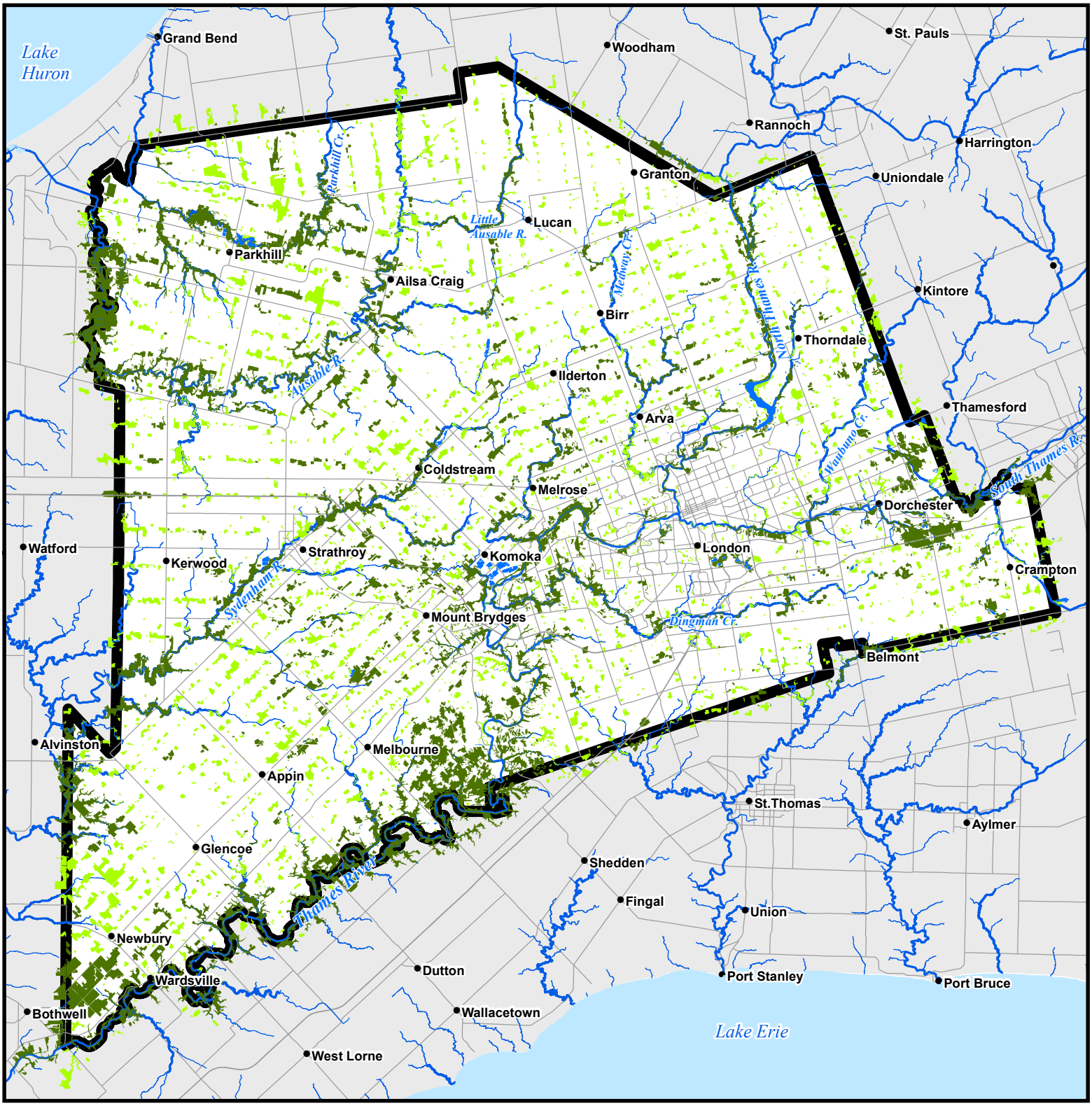
10 5 0 10 km

Legend

- Woodland Group <4ha
- Woodland Group ≥ 4ha
- Study Boundary

Produce by Upper Thames River Conservation Authority, July 2014,
Basemapping :Land Information Ontario, Copyright © Queens Printer, 2014.

Woodlands defined by Conservation Authorities Ausable Bayfield, St. Clair Region, Upper Thames River, based on 2010 imagery.



Middlesex Natural Heritage Systems Study 2014

Woodland Group

middlesex county

N
W E
S

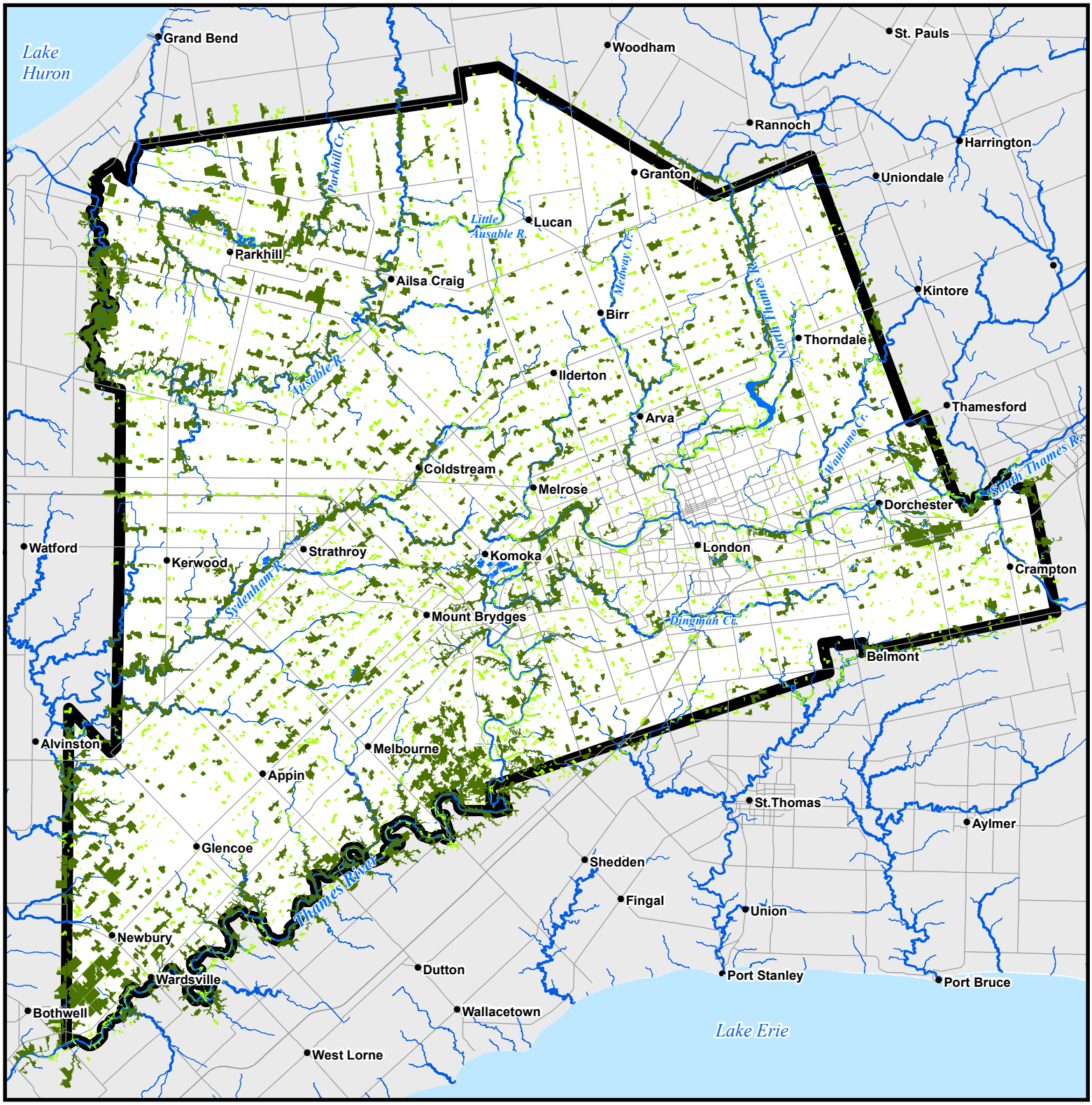
10 5 0 10 km

Legend

- Not Witbin 100m of Another Woodland >4ha
- Witbin 100m of Another Woodland >4ha
- Study Boundary

Produce by Upper Thames River Conservation Authority, July 2014,
Basemapping :Land Information Ontario, Copyright © Queens Printer, 2014.

Woodlands defined by Conservation Authorities Ausable Bayfield, St. Clair Region, Upper Thames River, based on 2010 imagery.



Middlesex Natural Heritage Systems Study 2014

Woodland Group

middlesex county

N
W E
S

10 5 0 10 km

Produce by Upper Thames River Conservation Authority, July 2014,
Basemapping :Land Information Ontario, Copyright © Queens Printer, 2014.

Woodlands defined by Conservation Authorities Ausable Bayfield, St. Clair Region, Upper Thames River, based on 2010 imagery.

Legend

- Woodland Group no Interior
- Woodland Group with Interior
- Study Boundary

AECOM Imagine it. Delivered.

Appendix F

Plant Species List

EXPLANATION OF TERMINOLOGY *(See the following pages for addition detailed information on terms.)*

Botanical and Common Name: From Newmaster et. al, 1998. Species requiring confirmation noted (cf).

Co-efficient of Conservatism: This value, ranging from 0 (low) to 10 (high), is based on a species tolerance of disturbance and fidelity to a specific habitat integrity.

Wetness Index: This value, ranging from -5 (obligate wetland) to 5 (upland) provides the probability of a species occurring in wetland or upland habitats.
Weediness Index: This value, ranging from -1 (low) to -3 (high) quantifies the potential invasiveness of non-native plants. In combination with the percentage of non-native plants, it can be used as an indicator of disturbance.
Provincial Status: Provincial ranks are used by the NHIC to set protection priorities for rare species and natural communities. These ranks are not legal designations. S4 and S5 species are generally uncommon to common in the province. Species ranked S1-S3 are considered to be rare in Ontario.

Local Status:

X: native species present (collection-based) and all exotic species

R: native species locally rare (number of stations): Durham (<10 stations), GTA (<40 stations), Site District 6E7 (<20 stations)

U: native species locally uncommon Durham (11-20 stations), GTA (41-80 stations), Site District 6E7 (21-40 stations)

Note: study area in Site District 6E13

Record Type

SR - sight record

SRP - sight record with photograph

KRAUS-00-001 - collection by D.T. Kraus for deposition into OAC (University of Guelph) herbarium

Annotations: Provides comments on general distribution and abundance on the subject lands. Definitions of terminology and abbreviations used as follows.

Abundance
Dominant: A plant with the greatest cover and/or biomass within a plant community and represented throughout the community by large numbers of individuals. Visually more abundant than other species in the same stratum and forming >10% ground cover, and >35% of the vegetation cover in any one stratum.
Abundant: Referring to a plant which is represented throughout the polygon or community by large numbers of individuals or clumps. Likely to be encountered anywhere in the polygon. Usually forming >10% ground cover.
Occasional: Referring to plants which are present as scattered individuals throughout a community, or represented by one or more large clumps of many individuals. Most species will fall into this category.

*Rare: C*over or abundance of a plant species that is represented in the area of interest by only one to a few individuals.

DETAILED EXPLANATION OF TERMS

Floral Quality Index and Coefficient of Conservatism Values

Vegetation species and community sensitivity was assessed through the application of coefficient of conservatism values (CC), assigned to each native species in southern Ontario (Oldham, et. al, 1995). The value of CC, ranging from 0 (low) to 10 (high), is based on a species tolerance of disturbance and fidelity to specific habitat integrity. The occurrence of species with a CC of 9 or 10 can be good indicators of undisturbed conditions such as mature forests, fens or bogs.

General habitat values associated with the CC values are:

0-3: species found in a wide variety of communities, including disturbed sites

4-6: species associated with a specific community, but tolerate moderate disturbance

7-8: species associated with a community in an advanced successional stage, tolerant of minor disturbances

9-10: species with a high degree of fidelity to a narrow range of synecological parameters

The floristic quality of an area is reflected in the mean value of CC. For example, an old field or grazed woodlot would tend have a low mean CC; these habitats are dominated by opportunistic species that occur in a wide range of site conditions and are tolerant of disturbance. A bog, prairie or intact forest would have a higher value, reflecting the specific habitat requirements of many of the species and a generally undisturbed condition. The following provides an example of interpretation of CC values:

mean CC value / % spp CC >8 / Condition of the Landscape

5 / 27 / intact

3.5 / 19 / slightly degraded

1.3 / 2 / severely degraded

The FQI accounts for the species diversity of the area by equating the number of native species with the mean CC value. The FQI is generally used for comparing natural areas. The CC value and FQI of the study area were calculated for the entire study area.

Weediness Index

The sensitivity of natural areas can be assessed through application of the Weediness Index. The Weediness Index quantifies the potential invasiveness of non-native plants, and, in combination with the percentage of non-native plants can be used as an indicator of disturbance. Values (ranging from 1- to -3) have been assigned to most non-native species based on the potential impact each species can have in natural areas:

-1: little or no impact on natural areas (most non-native plants are in this category)

-2: occasional impacts on natural areas, generally infrequent or localized

-3: major potential impacts on natural areas

Wetness Index

All plants in southern Ontario have been assigned a wetland category, based on the designations developed for use by the United States Fish & Wildlife Service. Plants are designated into the following categories:

OBL (Obligate Wetland): occurs almost always in wetlands under natural conditions (estimated >99% probability)

FACW (Facultative Wetland): usually occurs in wetlands, but occasionally found in non-wetlands (estimated 67-99% probability)

FAC (Facultative): equally likely to occur in wetlands or non-wetlands (estimated 34-66% probability)

FACU (Facultative Upland): occasionally occurs in wetlands, but usually occurs in non-wetlands (estimated 1-33% probability)

UPL (Upland): occurs almost never in wetlands under natural conditions (estimated <1% probability)

Further refinement of the Facultative categories are denoted by a "+" or "-" to express exaggerated tendencies for those species. The "+" denotes a greater estimated probability occurring in wetlands than species in the general indicator category, but a lesser probability than species occurring in the next higher category. The "-" denotes a lesser estimated probability of occurring in wetlands than species in the general indicator category, but a greater probability than species occurring in the next lower general category.

Each wetland category has been assigned a numerical value to facilitate the quantification of the wetness index. The wetland categories and their corresponding values are as follows:

OBL : -5

FACW+: -4

FACW: -3

FACW-: -2

FAC+: -1

FAC: 0

FAC-: 1

FACU+: 2

FACU: 3

FACU-: 4

UPL: 5

Provincial Status

Provincial ranks are used by the NHIC to set protection priorities for rare species and natural communities. These rankings are based on the total number of extant Ontario populations and the degree to which they are potentially or actively threatened with destruction. The ranks are:

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—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—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

SH: Possibly Extirpated (Historical)—Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years. A species or community could become NH or SH without such a 20-40 year delay if the only known occurrences in a nation or state/province were destroyed or if it had been extensively and unsuccessfully looked for. The NH or SH rank is reserved for species or communities for which some effort has been made to relocate occurrences, rather than simply using this status for all elements not known from verified extant occurrences

SNR Unranked—Nation or state/province conservation status not yet assessed

SX: Presumed Extirpated—Species or community is believed to be extirpated from the nation or state/province. Not located despite intensive searches of historical sites and other appropriate habitat, and virtually no likelihood that it will be rediscovered

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

SU: Unrankable—Currently unrankable due to lack of information or due to substantially conflicting information about status or trends

Rank ranges, e.g. S2S3, indicate that the rank is either S2 or S3, but that current information is insufficient to differentiate.
S#S# Range Rank —A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community. Ranges cannot skip more than one rank (e.g., SU is used rather than S1S4).

REFERENCES

Nomenclature based on:

"Complete PLANTS Checklist." USDA PLANTS, 03 Sept. 2016. Accessed Septemeber, 2016.

Co-efficient of Conservatism, Wetness & Weediness:

Oldham, M.J., W.D. Bakowsky and D.A. Sutherland. 1995. Floristic quality assessment for southern Ontario. OMNR, Natural Heritage Information Centre, Peterborough. 68 pp.

SARA (Species at Risk Act) Status:

"A to Z Species Index." *Environment Canada*. Government of Canada, 29 Aug. 2016. Accessed September, 2016.

COSEWIC (Committee on the Status of Endangered Wildlife in Canada) Status:

"A to Z Species Index." *Environment Canada*. Government of Canada, 29 Aug. 2016. Accessed September, 2016.

OMNR (Ontario Ministry of Natural Resources and Forestry) Status:

"A to Z Species Index." *Environment Canada*. Government of Canada, 29 Aug. 2016. Accessed September, 2016.

Provincial (Ontario) Status:

Natural Heritage Information Centre (NHIC). August 26, 2016. Ontario Vascular Plants. http://www.sse.gov.on.ca/sites/MNR-PublicDocs/EN/ProvincialServices/Ontario_Vascular_Plants.xlsx. OMNR, Peterborough.

Local Status:

Varga, S., editor. August 2000. Distribution and status of the vascular plants of the Greater Toronto Area. Ontario Ministry of Natural Resources, Aurora District. 103 pp.

Local Status - TRCA:

"Terrestrial Habitat & Species - Toronto and Region Conservation Authority." *Toronto and Region Conservation Authority*, April 2016.

Local Status - Niagara:

Oldham, Michael J. "Natural Areas Inventory." *Niagara Peninsula Conservation Authority*, Mar. 2010. https://npca.ca/natural-areas-inventory. Accessed September, 2016.

Local Status - Middlesex:

"Middlesex County Natural Heritage Study (2003)." *Upper Thames River Conservation Authority*, July 2003. https://www.middlesex.ca/council/2014/october/14/B%207%20-%20Attachment3-2003%20Middlesex%20Natural%20Heritage%20Study.pdf. Accessed on September, 2016.

Local Status - Halton/Hamilton:

"Halton-Hamilton Regional Plant List." *Conservation Halton.* October 2016. Accessed November 2016.

BOTANICAL NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX
PTERIDOPHYTES		**FERNS & ALLIES**									
Dennstaedtiaceae		**Bracken Fern Family**									
Pteridium	*aquilinum*	Bracken	2	3	-	S5	-	-	-	G5	X
Dryopteridaceae		**Wood Fern Family**									
Onoclea	*sensibilis*	Sensitive Fern	4	-3	-	S5	-	-	-	G5	X
Equisetaceae		**Horsetail Family**									
Equisetum	*arvense*	Field Horsetail	0	0	-	S5	-	-	-	G5	C
Thelypteridaceae		**Marsh Fern Family**									
Thelypteris	*palustris*	Eastern Marsh Fern	5	-4	-	S5	-	-	-	G5	X
GYMNOSPERMS		**CONIFERS**									
Pinaceae		**Pine Family**									
Pinus	*strobus*	Eastern White Pine	4	3	-	S5	-	-	-	G5	X
DICOTYLEDONS		**DICOTS**									
Aceraceae		**Maple Family**									
Acer	*negundo*	Manitoba Maple	0	-2	-	S5	-	-	-	G5	C
Acer	*platanoides*	Norway Maple	-	5	-3	SNA	-	-	-	GNR	IU
Acer	*saccharinum*	Silver Maple	5	-3	-	S5	-	-	-	G5	C
Acer	*saccharum*	Sugar Maple	4	3	-	S5	-	-	-	G5	C
Acer X	*freemanii*	Freeman's Maple	-	0	-	SNA	-	-	-	GNR	-
Anacardiaceae		**Sumac or Cashew Family**									
Rhus	*typhina*	Staghorn Sumac	1	5	-	S5	-	-	-	G5	C
Apiaceae		**Carrot or Parsley Family**									
Angelica	*atropurpurea*	Purplestem Angelica	6	-5	-	S5	-	-	-	G5	C
Daucus	*carota*	Wild Carrot	-	5	-2	SNA	-	-	-	GNR	IC
Asclepiadaceae		**Milkweed Family**									
Asclepias	*incarnata*	Swamp Milkweed	6	-5	-	S5	-	-	-	G5	C
Asclepias	*syriaca*	Common Milkweed	0	5	-	S5	-	-	-	G5	C
Asteraceae		**Composite or Aster Family**									
Ambrosia	*artemisiifolia*	Common Ragweed	0	3	-	S5	-	-	-	G5	C
Arctium	*minus*	Common Burdock	-	5	-2	SNA	-	-	-	GNR	IC
Aster	*species*	Aster species	0	-	-	-	-	-	-	-	-
Symphyotrichum	*ericoides*	Heath Aster	4	4	-	S5	-	-	-	G5T?	-
Symphyotrichum	*lanceolatum*	White Panicled Aster	3	-3	-	S5	-	-	-	G5T5	C
Symphyotrichum	*novae-angliae*	New England Aster	2	-3	-	S5	-	-	-	G5	C
Leucanthemum	*vulgare*	Ox-eye Daisy	-	5	-1	SNA	-	-	-	GNR	IC
Cichorium	*intybus*	Chicory	-	5	-1	SNA	-	-	-	GNR	IC
Cirsium	*arvense*	Canada Thistle	-	3	-1	SNA	-	-	-	GNR	IC

BOTANICAL NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX
Cirsium	*vulgare*	Bull Thistle	-	4	-1	SNA	-	-	-	GNR	I
Erigeron	*annus*	Eastern Daisy Fleabane	0	1	-	S5	-	-	-	G5	C
Erigeron	*philadelphicus ssp. philadelphicus*	Philadelphia Fleabane	1	-3	-	S5	-	-	-	G5	C
Eupatorium	*perfoliatum*	Boneset	2	-4	-	S5	-	-	-	G5	-
Eutrochium	*maculatum*	Spotted Joe-pye-weed	3	-5	-	S5	-	-	-	G5T5	C
Euthamia	*graminifolia*	Grass-leaved Goldenrod	2	-2	-	S5	-	-	-	G5	-
Hieracium	*caespitosum*	Field Hawkweed	-	5	-2	SE5	-	-	-	-	I
Lactuca	*serriola*	Prickly Lettuce	-	0	-1	SNA	-	-	-	GNR	I
Solidago	*altissima*	Tall Goldenrod	1	3	-	S5	-	-	-	GNR	U
Solidago	*canadensis*	Canada Goldenrod	1	3	-	S5	-	-	-	G5	X
Solidago	*gigantea*	Giant Goldenrod	4	-3	-	S5	-	-	-	G5	X
Solidago	*rugosa ssp. rugosa*	Wrinkle-leaf Goldenrod	4	-1	-	S5	-	-	-	G5T5	X
Taraxacum	*officinale*	Common Dandelion	-	-	-	SNA	-	-	-	G5	-
Tragopogon	*pratensis ssp. pratensis*	Yellow Goat's-beard/Jack go to bed at noon	-	5	-1	SNA	-	-	-	GNR	I
Balsaminaceae		**Touch-me-not Family**									
Impatiens	*capensis*	Jewelweed	4	-3	-	S5	-	-	-	G5	C
Berberidaceae		**Barberry Family**									
Podophyllum	*peltatum*	May-apple	5	3	-	S5	-	-	-	G5	X
Betulaceae		**Birch Family**									
Betula	*papyrifera*	Paper Birch	2	2	-	S5	-	-	-	G5	X
Carpinus	*caroliniana ssp. virginiana*	Blue Beech	6	0	-	S5	-	-	-	G5	-
Bignoniaceae		**Bignonia Family**									
Catalpa	*speciosa*	Northern Catalpa	-	3	-1	SNA	-	-	-	G4?	-
Brassicaceae		**Mustard Family**									
Alliaria	*petiolata*	Garlic Mustard	-	0	-3	SNA	-	-	-	GNR	-
Nasturtium	*officinale*	Water-cress	-	-5	-1	SNA	-	-	-	GNR	I
Thlaspi	*arvense*	Field Penny-cress	-	5	-1	SNA	-	-	-	GNR	IC
Caprifoliaceae		**Honeysuckle Family**									
Lonicera	*tatarica*	Tartarian Honeysuckle	-	3	-3	SNA	-	-	-	GNR	I
Sambucus	*nigra*	Black Elderberry	-	-	-	SNA	-	-	-	G5T5	-
Viburnum	*lentago*	Nannyberry	4	-1	-	S5	-	-	-	G5	C
Viburnum	*opulus*	European Cranberrybush	-	0	-1	SNA	-	-	-	GNR	IR
Viburnum	*rafinesquianum*	Downy Arrow-wood	7	5	-	S5	-	-	-	G5	X
Caryophyllaceae		**Pink Family**									
Saponaria	*officinalis*	Bouncing-bet	-	3	-3	SNA	-	-	-	GNR	I
Silene	*vulgaris*	Maidenstears	-	5	-1	SNA	-	-	-	GNR	-
Cornaceae		**Dogwood Family**									

BOTANICAL NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX
Cornus	*alternifolia*	Alternate-leaved Dogwood	6	5	-	S5	-	-	-	G5	X
Cornus	*amomum*	Silky Dogwood	5	-4	-	S5	-	-	-	G5	X
Cornus	*racemosa*	Gray Dogwood	2	-2	-	S5	-	-	-	G5?	X
Cornus	*sericea*	Red-osier Dogwood	2	-3	-	S5	-	-	-	G5	C
Cucurbitaceae		**Gourd Family**									
Echinocystis	*lobata*	Wild Cucumber	3	-2	-	S5	-	-	-	G5	X
Fabaceae		**Pea Family**									
Amphicarpaea	*bracteata*	Hog Peanut	4	0	-	S5	-	-	-	G5	C
Lotus	*corniculatus*	Bird's-foot Trefoil	-	1	-2	SNA	-	-	-	GNR	I
Medicago	*lupulina*	Black Medick	-	1	-1	SNA	-	-	-	GNR	IC
Melilotus	*alba*	White Sweet-clover	-	3	-3	SNA	-	-	-	G5	IC
Trifolium	*pratense*	Red Clover	-	2	-2	SNA	-	-	-	GNR	I
Fagaceae		**Beech Family**									
Quercus	*alba*	White Oak	6	3	-	S5	-	-	-	G5	C
Quercus	*macrocarpa*	Bur Oak	5	1	-	S5	-	-	-	G5	C
Quercus	*rubra*	Red Oak	6	3	-	S5	-	-	-	G5	C
Geraniaceae		**Geranium Family**									
Geranium	*maculatum*	Spotted Geranium	6	3	-	S5	-	-	-	G5	X
Geranium	*robertianum*	Herb-robert	-	5	-2	S5	-	-	-	G5	IC
Grossulariaceae		**Currant Family**									
Ribes	*cynosbati*	Eastern Prickly Gooseberry	4	5	-	S5	-	-	-	G5	C
Ribes	*rubrum*	Red Currant	-	5	-2	SNA	-	-	-	G4G5	IR
Juglandaceae		**Walnut Family**									
Juglans	*nigra*	Black Walnut	5	3	-	S4	-	-	-	G5	X
Lamiaceae		**Mint Family**									
Leonurus	*cardiaca ssp. cardiaca*	Common Motherwort	-	5	-2	SNA	-	-	-	GNR	IC
Mentha	*arvensis*	American Wild Mint	3	-3	-	S5	-	-	-	G5	X
Monarda	*fistulosa*	Wild Bergamot	6	3	-	S5	-	-	-	G5T5?	C
Oleaceae		**Olive Family**									
Fraxinus	*americana*	White Ash	4	3	-	S4	-	-	-	G5	C
Fraxinus	*nigra*	Black Ash	7	-4	-	S4	-	-	-	G5	X
Fraxinus	*pennsylvanica*	Green Ash	3	-3	-	S4	-	-	-	G5	C
Onagraceae		**Evening-primrose Family**									
Circaea	*canadensis*	Canada Enchanter's Nightshade	3	3	-	S5	-	-	-	G5T5	X
Epilobium	*hirsutum*	Great Hairy Willow-herb	-	-4	-2	SNA	-	-	-	GNR	I
Oxalidaceae		**Wood Sorrel Family**									
Oxalis	*stricta*	Common Yellow Oxalis	0	3	-	S5	-	-	-	G5	X

BOTANICAL NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX
Plantaginaceae		**Plantain Family**									
Plantago	*lanceolata*	English Plantain	-	0	-1	SNA	-	-	-	G5	IC
Plantago	*major*	Common Plantain	-	-1	-1	S5	-	-	-	G5	IC
Polygonaceae		**Smartweed Family**									
Rumex	*crispus*	Curly-leaf Dock	-	-1	-2	SNA	-	-	-	GNR	-
Primulaceae		**Primrose Family**									
Lysimachia	*ciliata*	Fringed Loosestrife	4	-3	-	S5	-	-	-	G5	X
Ranunculaceae		**Buttercup Family**									
Actaea	*pachypoda*	White Baneberry	6	5	-	S5	-	-	-	G5	C
Anemone	*canadensis*	Canada Anemone	3	-3	-	S5	-	-	-	G5	C
Clematis	*virginiana*	Virgin's-bower	3	0	-	S5	-	-	-	G5	C
Ranunculus	*acris*	Tall Buttercup	-	-2	-2	SNA	-	-	-	G5	IC
Thalictrum	*dioicum*	Early Meadow-rue	5	2	-	S5	-	-	-	G5	X
Thalictrum	*pubescens*	King of the Meadow	5	-2	-	S5	-	-	-	G5	X
Rhamnaceae		**Buckthorn Family**									
Rhamnus	*cathartica*	Common Buckthorn	-	3	-3	SNA	-	-	-	GNR	IC
Frangula	*alnus*	Glossy Buckthorn	-	-1	-3	SNA	-	-	-	GNR	-
Rosaceae		**Rose Family**									
Crataegus	*sp.*	Hawthorn species	4	5	-	-	-	-	-	-	X
Crataegus	*punctata*	Dotted Thorn	4	5	-	S5	-	-	-	G5	C
Fragaria	*vesca ssp. americana*	Woodland Strawberry	4	4	-	S5	-	-	-	G5	X
Geum	*aleppicum*	Yellow Avens	2	-1	-	S5	-	-	-	G5	X
Geum	*canadense*	White Avens	3	0	-	S5	-	-	-	G5	X
Geum	*species*	Avens species	0	-	-	-	-	-	-	-	-
Malus	*pumila*	Common Apple	-	5	-1	SNA	-	-	-	G5	I
Potentilla	*recta*	Sulphur Cinquefoil	-	5	-2	SNA	-	-	-	GNR	I
Potentilla	*simplex*	Old-field Cinquefoil	3	4	-	S5	-	-	-	G5	X
Prunus	*serotina*	Black Cherry	3	3	-	S5	-	-	-	G5	C
Prunus	*virginiana*	Choke Cherry	2	1	-	S5	-	-	-	G5	C
Rosa	*acicularis*	Prickly Rose	7	3	-	S5	-	-	-	G5	R1
Rosa	*multiflora*	Multiflora Rose	-	3	-3	SNA	-	-	-	GNR	I
Rubus	*allegheniensis*	Common Blackberry	2	2	-	S5	-	-	-	G5	C
Rubus	*idaeus*	American Red Raspberry	0	-2	-	SNA	-	-	-	G5T5	-
Rubus	*occidentalis*	Black Raspberry	2	5	-	S5	-	-	-	G5	X
Spiraea	*alba*	White Meadow-sweet	3	-4	-	S5	-	-	-	G5	X
Rubiaceae		**Madder Family**									
Galium	*aparine*	Cleavers	4	3	-	S5	-	-	-	G5	X

BOTANICAL NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX
Salicaceae		**Willow Family**									
Populus	*balsamifera ssp. balsamifera*	Balsam Poplar	4	-3	-	S5	-	-	-	G5	X
Populus	*deltoides ssp. deltoides*	Eastern Cottonwood	4	-1	-	S5	-	-	-	G5T5	X
Populus	*tremuloides*	Trembling Aspen	2	0	-	S5	-	-	-	G5	X
Salix	*species*	Willow species	0	-	-	-	-	-	-	-	-
Salix	*discolor*	Pussy Willow	3	-3	-	S5	-	-	-	G5	X
Salix	*exigua*	Narrow-leaf Willow	3	-5	-	SNA	-	-	-	GNR	C
Salix	*nigra*	Black Willow	6	-5	-	S4?	-	-	-	G5	X
Salix	*petiolaris*	Meadow Willow	3	-4	-	S5	-	-	-	G4	X
Salix X	*rubens*	Reddish Willow	-	-4	-3	SE4	-	-	-	HYB	IR
Scrophulariaceae		**Figwort Family**									
Verbascum	*thapsus*	Common Mullein	-	5	-2	SNA	-	-	-	GNR	IC
Solanaceae		**Nightshade Family**									
Solanum	*dulcamara*	Bittersweet Nightshade	-	0	-2	SNA	-	-	-	GNR	IC
Tiliaceae		**Linden Family**									
Tilia	*americana*	American Basswood	4	3	-	S5	-	-	-	G5	C
Ulmaceae		**Elm Family**									
Celtis	*occidentalis*	Common Hackberry	8	1	-	S4	-	-	-	G5	X
Ulmus	*americana*	American Elm	3	-2	-	S5	-	-	-	G5?	X
Urticaceae		**Nettle Family**									
Pilea	*pumila*	Canadian Clearweed	5	-3	-	S5	-	-	-	G5	X
Urtica	*dioica ssp. dioica*	Stinging Nettle	-	-1	-1	SNA	-	-	-	G5T5?	IR
Violaceae		**Violet Family**									
Viola	*pubescens*	Downy Yellow Violet	5	4	-	S5	-	-	-	G5T5	C
Vitaceae		**Grape Family**									
Parthenocissus	*inserta*	Thicket-creeper	3	3	-	S5	-	-	-	G5	X
Vitis	*riparia*	Riverbank Grape	0	-2	-	S5	-	-	-	G5	C
MONOCOTYLEDONS		**MONOCOTS**									
Araceae		**Arum Family**									
Arisaema	*triphyllum*	Small Jack-in-the-pulpit	5	-2	-	S5	-	-	-	G5	C
Symplocarpus	*foetidus*	Skunk Cabbage	7	-5	-	S5	-	-	-	G5	C
Cyperaceae		**Sedge Family**									
Carex	*sp.*	Sedge species	0	-	-	-	-	-	-	-	-
Carex	*arctata*	Drooping Wood Sedge	5	5	-	S5	-	-	-	G5	-
Carex	*gracillima*	Graceful Sedge	4	3	-	S5	-	-	-	G5	-
Carex	*lacustris*	Lake Sedge	5	-5	-	S5	-	-	-	G5	C
Carex	*rosea*	Rosy Sedge	5	5	-	S5	-	-	-	G5	C

BOTANICAL NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX
Carex	*stricta*	Tussock Sedge	4	-5	-	S5	-	-	-	G5	C
Carex	*vulpinoidea*	Fox Sedge	3	-5	-	S5	-	-	-	G5	C
Iridaceae		**Iris Family**									
Iris	*versicolor*	Harlequin Blue-flag	5	-5	-	S5	-	-	-	G5	X
Juncaceae		**Rush Family**									
Juncus	*effusus var. solutus*	Lamp Rush	4	-5	-	S5	-	-	-	G5	X
Liliaceae		**Lily Family**									
Erythronium	*americanum*	Yellow Trout-lily	5	5	-	S5	-	-	-	G5	X
Maianthemum	*canadense*	Wild Lily-of-the-Valley	5	0	-	S5	-	-	-	G5	X
Maianthemum	*racemosum*	Large False Solomon's Seal	4	3	-	S5	-	-	-	G5	X
Poaceae		**Grass Family**									
Agrostis	*gigantea*	Redtop	-	0	-2	SNA	-	-	-	G4G5	IC
Agrostis	*stolonifera*	Creeping Bent Grass	0	-3	-	SNA	-	-	-	G5	C
Bromus	*inermis ssp. inermis*	Smooth Brome	-	5	-3	SNA	-	-	-	G5TNR	IC
Calamagrostis	*canadensis*	Blue-joint Grass	4	-5	-	S5	-	-	-	G5	X
Dactylis	*glomerata*	Orchard Grass	-	3	-1	SNA	-	-	-	GNR	IC
Elymus	*repens*	Quack Grass	-	3	-3	SNA	-	-	-	GNR	IC
Elymus	*virginicus var. virginicus*	Virginia Wild Rye	5	-2	-	S5	-	-	-	G5T5	X
Leersia	*oryzoides*	Rice Cut Grass	3	-5	-	S5	-	-	-	G5	X
Phalaris	*arundinacea*	Reed Canary Grass	0	-4	-	S5	-	-	-	G5	X
Phleum	*pratense*	Timothy	-	3	-1	SNA	-	-	-	GNR	IC
Poa	*palustris*	Fowl Blue Grass	5	-4	-	S5	-	-	-	G5	X
Poa	*pratensis ssp. pratensis*	Kentucky Blue Grass	0	1	-	S5	-		-	G5T	C
Smilacaceae		**Catbrier Family**									
Smilax	*hispida*	Bristly Greenbrier	6	0	-	S4	-	-	-	G5Q	X
Typhaceae		**Cattail Family**									
Typha	*angustifolia*	Narrow-leaved Cattail	3	-5	-	SNA	-	-	-	G5	X
Typha	*latifolia*	Broad-leaved Cattail	3	-5	-	S5	-	-	-	G5	X

BOTANICAL NAME	COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX

FLORISTIC SUMMARY & ASSESSMENT

Species Diversity

Total Species:		**155**	
Native Species:		**111**	71.61%
Exotic Species		**44**	28.39%
Total Taxa in Region (List Region, Source)		10000	
% Regional Taxa Recorded		1.55%	
Regionally Significant Species		0	
S1-S3 Species		0	
S4 Species		6	
S5 Species		97	

Co-efficient of Conservatism and Floral Quality Index

Co-efficient of Conservatism (CC) (average)		**3.46**	
CC 0 to 3	*lowest sensitivity*	52	46.85%
CC 4 to 6	*moderate sensitivity*	54	48.65%
CC 7 to 8	*high sensitivity*	5	4.50%
CC 9 to 10	*highest sensitivity*	0	0.00%
Floral Quality Index (FQI)		**36.45**	

Presence of Weedy & Invasive Species

mean weediness		**-1.84**	
weediness = -1	*low potential invasiveness*	18	40.91%
weediness = -2	*moderate potential invasiveness*	15	34.09%
weediness = -3	*high potential invasiveness*	11	25.00%

Presence of Wetland Species

average wetness value	**0.48**	
upland	28	18.06%
facultative upland	41	26.45%
facultative	30	19.35%
facultative wetland	37	23.87%
obligate wetland	16	10.32%

BOTANICAL NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX
DICOTYLEDONS		**DICOTS**									
Aceraceae		**Maple Family**									
Acer	*negundo*	Manitoba Maple	0	-2	-	S5	-	-	-	G5	C
Anacardiaceae		**Sumac or Cashew Family**									
Rhus	*typhina*	Staghorn Sumac	1	5	-	S5	-	-	-	G5	C
Apiaceae		**Carrot or Parsley Family**									
Daucus	*carota*	Wild Carrot	-	5	-2	SNA	-	-	-	GNR	IC
Asclepiadaceae		**Milkweed Family**									
Asclepias	*syriaca*	Common Milkweed	0	5	-	S5	-	-	-	G5	C
Asteraceae		**Composite or Aster Family**									
Aster	*species*	Aster species	0	-	-	-	-	-	-	-	-
Leucanthemum	*vulgare*	Ox-eye Daisy	-	5	-1	SNA	-	-	-	GNR	IC
Cichorium	*intybus*	Chicory	-	5	-1	SNA	-	-	-	GNR	IC
Cirsium	*arvense*	Canada Thistle	-	3	-1	SNA	-	-	-	GNR	IC
Cirsium	*vulgare*	Bull Thistle	-	4	-1	SNA	-	-	-	GNR	I
Erigeron	*annus*	Eastern Daisy Fleabane	0	1	-	S5	-	-	-	G5	C
Erigeron	*philadelphicus ssp. philadelphicus*	Philadelphia Fleabane	1	-3	-	S5	-	-	-	G5	C
Euthamia	*graminifolia*	Grass-leaved Goldenrod	2	-2	-	S5	-	-	-	G5	-
Hieracium	*caespitosum*	Field Hawkweed	-	5	-2	SE5	-	-	-	-	I
Lactuca	*serriola*	Prickly Lettuce	-	0	-1	SNA	-	-	-	GNR	I
Solidago	*altissima*	Tall Goldenrod	1	3	-	S5	-	-	-	GNR	U
Solidago	*canadensis*	Canada Goldenrod	1	3	-	S5	-	-	-	G5	X
Taraxacum	*officinale*	Common Dandelion	-	-	-	SNA	-	-	-	G5	-
Tragopogon	*pratensis ssp. pratensis*	Yellow Goat's-beard/Jack go to bed at noon	-	5	-1	SNA	-	-	-	GNR	I
Brassicaceae		**Mustard Family**									
Alliaria	*petiolata*	Garlic Mustard	-	0	-3	SNA	-	-	-	GNR	-
Caryophyllaceae		**Pink Family**									
Saponaria	*officinalis*	Bouncing-bet	-	3	-3	SNA	-	-	-	GNR	I
Silene	*vulgaris*	Maidenstears	-	5	-1	SNA	-	-	-	GNR	-
Fabaceae		**Pea Family**									
Lotus	*corniculatus*	Bird's-foot Trefoil	-	1	-2	SNA	-	-	-	GNR	I
Medicago	*lupulina*	Black Medick	-	1	-1	SNA	-	-	-	GNR	IC
Melilotus	*alba*	White Sweet-clover	-	3	-3	SNA	-	-	-	G5	IC
Trifolium	*pratense*	Red Clover	-	2	-2	SNA	-	-	-	GNR	I
Plantaginaceae		**Plantain Family**									
Plantago	*lanceolata*	English Plantain	-	0	-1	SNA	-	-	-	G5	IC

BOTANICAL NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX
Polygonaceae		**Smartweed Family**									
Rumex	*crispus*	Curly-leaf Dock	-	-1	-2	SNA	-	-	-	GNR	-
Rosaceae		**Rose Family**									
Potentilla	*recta*	Sulphur Cinquefoil	-	5	-2	SNA	-	-	-	GNR	I
Potentilla	*simplex*	Old-field Cinquefoil	3	4	-	S5	-	-	-	G5	X
Salicaceae		**Willow Family**									
Populus	*balsamifera ssp. balsamifera*	Balsam Poplar	4	-3	-	S5	-	-	-	G5	X
Populus	*deltoides ssp. deltoides*	Eastern Cottonwood	4	-1	-	S5	-	-	-	G5T5	X
Salix	*species*	Willow species	0	-	-	-	-	-	-	-	-
Salix	*discolor*	Pussy Willow	3	-3	-	S5	-	-	-	G5	X
Salix	*exigua*	Narrow-leaf Willow	3	-5	-	SNA	-	-	-	GNR	C
Scrophulariaceae		**Figwort Family**									
Verbascum	*thapsus*	Common Mullein	-	5	-2	SNA	-	-	-	GNR	IC
MONOCOTYLEDONS		**MONOCOTS**									
Poaceae		**Grass Family**									
Agrostis	*stolonifera*	Creeping Bent Grass	0	-3	-	SNA	-	-	-	G5	C
Bromus	*inermis ssp. inermis*	Smooth Brome	-	5	-3	SNA	-	-	-	G5TNR	IC
Dactylis	*glomerata*	Orchard Grass	-	3	-1	SNA	-	-	-	GNR	IC
Elymus	*repens*	Quack Grass	-	3	-3	SNA	-	-	-	GNR	IC
Phalaris	*arundinacea*	Reed Canary Grass	0	-4	-	S5	-	-	-	G5	X
Poa	*pratensis ssp. pratensis*	Kentucky Blue Grass	0	1	-	S5	-		-	G5T	C

BOTANICAL NAME	COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX

FLORISTIC SUMMARY & ASSESSMENT

Species Diversity			
Total Species:		**40**	
Native Species:		**18**	45.00%
Exotic Species		**22**	55.00%
Total Taxa in Region (List Region, Source)		10000	
% Regional Taxa Recorded		0.40%	
Regionally Significant Species		0	
S1-S3 Species		0	
S4 Species		0	
S5 Species		14	
Co-efficient of Conservatism and Floral Quality Index			
Co-efficient of Conservatism (CC) (average)		**1.28**	
CC 0 to 3	*lowest sensitivity*	16	88.89%
CC 4 to 6	*moderate sensitivity*	2	11.11%
CC 7 to 8	*high sensitivity*	0	0.00%
CC 9 to 10	*highest sensitivity*	0	0.00%
Floral Quality Index (FQI)		**5.42**	
Presence of Weedy & Invasive Species			
mean weediness		**-1.77**	
weediness = -1	*low potential invasiveness*	10	45.45%
weediness = -2	*moderate potential invasiveness*	7	31.82%
weediness = -3	*high potential invasiveness*	5	22.73%
Presence of Wetland Species			
average wetness value		**1.66**	
upland		11	27.50%
facultative upland		10	25.00%
facultative		9	22.50%
facultative wetland		7	17.50%
obligate wetland		1	2.50%

BOTANICAL NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX
PTERIDOPHYTES		**FERNS & ALLIES**									
Dennstaedtiaceae		**Bracken Fern Family**									
Pteridium	*aquilinum*	Bracken	2	3	-	S5	-	-	-	G5	X
Dryopteridaceae		**Wood Fern Family**									
Onoclea	*sensibilis*	Sensitive Fern	4	-3	-	S5	-	-	-	G5	X
GYMNOSPERMS		**CONIFERS**									
Pinaceae		**Pine Family**									
Pinus	*strobus*	Eastern White Pine	4	3	-	S5	-	-	-	G5	X
DICOTYLEDONS		**DICOTS**									
Aceraceae		**Maple Family**									
Acer	*negundo*	Manitoba Maple	0	-2	-	S5	-	-	-	G5	C
Acer	*saccharum*	Sugar Maple	4	3	-	S5	-	-	-	G5	C
Anacardiaceae		**Sumac or Cashew Family**									
Rhus	*typhina*	Staghorn Sumac	1	5	-	S5	-	-	-	G5	C
Apiaceae		**Carrot or Parsley Family**									
Daucus	*carota*	Wild Carrot	-	5	-2	SNA	-	-	-	GNR	IC
Asteraceae		**Composite or Aster Family**									
Ambrosia	*artemisiifolia*	Common Ragweed	0	3	-	S5	-	-	-	G5	C
Arctium	*minus*	Common Burdock	-	5	-2	SNA	-	-	-	GNR	IC
Euthamia	*graminifolia*	Grass-leaved Goldenrod	2	-2	-	S5	-	-	-	G5	-
Hieracium	*caespitosum*	Field Hawkweed	-	5	-2	SE5	-	-	-	-	I
Solidago	*altissima*	Tall Goldenrod	1	3	-	S5	-	-	-	GNR	U
Solidago	*canadensis*	Canada Goldenrod	1	3	-	S5	-	-	-	G5	X
Taraxacum	*officinale*	Common Dandelion	-	-	-	SNA	-	-	-	G5	-
Balsaminaceae		**Touch-me-not Family**									
Impatiens	*capensis*	Jewelweed	4	-3	-	S5	-	-	-	G5	C
Berberidaceae		**Barberry Family**									
Podophyllum	*peltatum*	May-apple	5	3	-	S5	-	-	-	G5	X
Betulaceae		**Birch Family**									
Betula	*papyrifera*	Paper Birch	2	2	-	S5	-	-	-	G5	X
Bignoniaceae		**Bignonia Family**									
Catalpa	*speciosa*	Northern Catalpa	-	3	-1	SNA	-	-	-	G4?	-
Brassicaceae		**Mustard Family**									
Alliaria	*petiolata*	Garlic Mustard	-	0	-3	SNA	-	-	-	GNR	-
Thlaspi	*arvense*	Field Penny-cress	-	5	-1	SNA	-	-	-	GNR	IC
Caprifoliaceae		**Honeysuckle Family**									
Lonicera	*tatarica*	Tartarian Honeysuckle	-	3	-3	SNA	-	-	-	GNR	I

BOTANICAL NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX
Sambucus	*nigra*	Black Elderberry	-	-	-	SNA	-	-	-	G5T5	-
Viburnum	*opulus*	European Cranberrybush	-	0	-1	SNA	-	-	-	GNR	IR
Caryophyllaceae		**Pink Family**									
Saponaria	*officinalis*	Bouncing-bet	-	3	-3	SNA	-	-	-	GNR	I
Silene	*vulgaris*	Maidenstears	-	5	-1	SNA	-	-	-	GNR	-
Cornaceae		**Dogwood Family**									
Cornus	*amomum*	Silky Dogwood	5	-4	-	S5	-	-	-	G5	X
Cornus	*racemosa*	Gray Dogwood	2	-2	-	S5	-	-	-	G5?	X
Cucurbitaceae		**Gourd Family**									
Echinocystis	*lobata*	Wild Cucumber	3	-2	-	S5	-	-	-	G5	X
Fabaceae		**Pea Family**									
Amphicarpaea	*bracteata*	Hog Peanut	4	0	-	S5	-	-	-	G5	C
Medicago	*lupulina*	Black Medick	-	1	-1	SNA	-	-	-	GNR	IC
Fagaceae		**Beech Family**									
Quercus	*macrocarpa*	Bur Oak	5	1	-	S5	-	-	-	G5	C
Geraniaceae		**Geranium Family**									
Geranium	*maculatum*	Spotted Geranium	6	3	-	S5	-	-	-	G5	X
Geranium	*robertianum*	Herb-robert	-	5	-2	S5	-	-	-	G5	IC
Grossulariaceae		**Currant Family**									
Ribes	*rubrum*	Red Currant	-	5	-2	SNA	-	-	-	G4G5	IR
Juglandaceae		**Walnut Family**									
Juglans	*nigra*	Black Walnut	5	3	-	S4	-	-	-	G5	X
Lamiaceae		**Mint Family**									
Monarda	*fistulosa*	Wild Bergamot	6	3	-	S5	-	-	-	G5T5?	C
Oleaceae		**Olive Family**									
Fraxinus	*americana*	White Ash	4	3	-	S4	-	-	-	G5	C
Fraxinus	*pennsylvanica*	Green Ash	3	-3	-	S4	-	-	-	G5	C
Onagraceae		**Evening-primrose Family**									
Circaea	*canadensis*	Canada Enchanter's Nightshade	3	3	-	S5	-	-	-	G5T5	X
Oxalidaceae		**Wood Sorrel Family**									
Oxalis	*stricta*	Common Yellow Oxalis	0	3	-	S5	-	-	-	G5	X
Plantaginaceae		**Plantain Family**									
Plantago	*major*	Common Plantain	-	-1	-1	S5	-	-	-	G5	IC
Ranunculaceae		**Buttercup Family**									
Actaea	*pachypoda*	White Baneberry	6	5	-	S5	-	-	-	G5	C
Anemone	*canadensis*	Canada Anemone	3	-3	-	S5	-	-	-	G5	C
Ranunculus	*acris*	Tall Buttercup	-	-2	-2	SNA	-	-	-	G5	IC

BOTANICAL NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX
Rhamnaceae		**Buckthorn Family**									
Rhamnus	*cathartica*	Common Buckthorn	-	3	-3	SNA	-	-	-	GNR	IC
Rosaceae		**Rose Family**									
Crataegus	*punctata*	Dotted Thorn	4	5	-	S5	-	-	-	G5	C
Fragaria	*vesca ssp. americana*	Woodland Strawberry	4	4	-	S5	-	-	-	G5	X
Geum	*canadense*	White Avens	3	0	-	S5	-	-	-	G5	X
Malus	*pumila*	Common Apple	-	5	-1	SNA	-	-	-	G5	I
Prunus	*serotina*	Black Cherry	3	3	-	S5	-	-	-	G5	C
Rubus	*idaeus*	American Red Raspberry	0	-2	-	SNA	-	-	-	G5T5	-
Rubus	*occidentalis*	Black Raspberry	2	5	-	S5	-	-	-	G5	X
Rubiaceae		**Madder Family**									
Galium	*aparine*	Cleavers	4	3	-	S5	-	-	-	G5	X
Salicaceae		**Willow Family**									
Populus	*balsamifera ssp. balsamifera*	Balsam Poplar	4	-3	-	S5	-	-	-	G5	X
Populus	*deltoides ssp. deltoides*	Eastern Cottonwood	4	-1	-	S5	-	-	-	G5T5	X
Populus	*tremuloides*	Trembling Aspen	2	0	-	S5	-	-	-	G5	X
Salix X	*rubens*	Reddish Willow	-	-4	-3	SE4	-	-	-	HYB	IR
Tiliaceae		**Linden Family**									
Tilia	*americana*	American Basswood	4	3	-	S5	-	-	-	G5	C
Ulmaceae		**Elm Family**									
Celtis	*occidentalis*	Common Hackberry	8	1	-	S4	-	-	-	G5	X
Ulmus	*americana*	American Elm	3	-2	-	S5	-	-	-	G5?	X
Violaceae		**Violet Family**									
Viola	*pubescens*	Downy Yellow Violet	5	4	-	S5	-	-	-	G5T5	C
Vitaceae		**Grape Family**									
Parthenocissus	*inserta*	Thicket-creeper	3	3	-	S5	-	-	-	G5	X
Vitis	*riparia*	Riverbank Grape	0	-2	-	S5	-	-	-	G5	C
MONOCOTYLEDONS		**MONOCOTS**									
Araceae		**Arum Family**									
Arisaema	*triphyllum*	Small Jack-in-the-pulpit	5	-2	-	S5	-	-	-	G5	C
Cyperaceae		**Sedge Family**									
Carex	*sp.*	Sedge species	0	-	-	-	-	-	-	-	-
Carex	*arctata*	Drooping Wood Sedge	5	5	-	S5	-	-	-	G5	-
Carex	*gracillima*	Graceful Sedge	4	3	-	S5	-	-	-	G5	-
Carex	*rosea*	Rosy Sedge	5	5	-	S5	-	-	-	G5	C
Liliaceae		**Lily Family**									
Maianthemum	*racemosum*	Large False Solomon's Seal	4	3	-	S5	-	-	-	G5	X

BOTANICAL NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX
Poaceae		**Grass Family**									
Bromus	*inermis ssp. inermis*	Smooth Brome	-	5	-3	SNA	-	-	-	G5TNR	IC
Dactylis	*glomerata*	Orchard Grass	-	3	-1	SNA	-	-	-	GNR	IC
Elymus	*repens*	Quack Grass	-	3	-3	SNA	-	-	-	GNR	IC
Phleum	*pratense*	Timothy	-	3	-1	SNA	-	-	-	GNR	IC
Poa	*palustris*	Fowl Blue Grass	5	-4	-	S5	-	-	-	G5	X
Poa	*pratensis ssp. pratensis*	Kentucky Blue Grass	0	1	-	S5	-		-	G5T	C
Smilacaceae		**Catbrier Family**									
Smilax	*hispida*	Bristly Greenbrier	6	0	-	S4	-	-	-	G5Q	X

BOTANICAL NAME	COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX

FLORISTIC SUMMARY & ASSESSMENT

Species Diversity

Total Species:	**74**	
Native Species:	**52**	70.27%
Exotic Species	**22**	29.73%
Total Taxa in Region (List Region, Source)	10000	
% Regional Taxa Recorded	0.74%	
Regionally Significant Species	0	
S1-S3 Species	0	
S4 Species	5	
S5 Species	47	

Co-efficient of Conservatism and Floral Quality Index

Co-efficient of Conservatism (CC) (average)		**3.31**	
CC 0 to 3	*lowest sensitivity*	24	46.15%
CC 4 to 6	*moderate sensitivity*	27	51.92%
CC 7 to 8	*high sensitivity*	1	1.92%
CC 9 to 10	*highest sensitivity*	0	0.00%
Floral Quality Index (FQI)		**23.85**	

Presence of Weedy & Invasive Species

mean weediness		**-1.91**	
weediness = -1	*low potential invasiveness*	9	40.91%
weediness = -2	*moderate potential invasiveness*	6	27.27%
weediness = -3	*high potential invasiveness*	7	31.82%

Presence of Wetland Species

average wetness value	**1.64**	
upland	15	20.27%
facultative upland	29	39.19%
facultative	12	16.22%
facultative wetland	17	22.97%
obligate wetland	0	0.00%

BOTANICAL NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX
PTERIDOPHYTES		**FERNS & ALLIES**									
Dennstaedtiaceae		**Bracken Fern Family**									
Pteridium	*aquilinum*	Bracken	2	3	-	S5	-	-	-	G5	X
GYMNOSPERMS		**CONIFERS**									
Pinaceae		**Pine Family**									
Pinus	*strobus*	Eastern White Pine	4	3	-	S5	-	-	-	G5	X
DICOTYLEDONS		**DICOTS**									
Aceraceae		**Maple Family**									
Acer	*negundo*	Manitoba Maple	0	-2	-	S5	-	-	-	G5	C
Acer	*platanoides*	Norway Maple	-	5	-3	SNA	-	-	-	GNR	IU
Anacardiaceae		**Sumac or Cashew Family**									
Rhus	*typhina*	Staghorn Sumac	1	5	-	S5	-	-	-	G5	C
Asteraceae		**Composite or Aster Family**									
Arctium	*minus*	Common Burdock	-	5	-2	SNA	-	-	-	GNR	IC
Solidago	*altissima*	Tall Goldenrod	1	3	-	S5	-	-	-	GNR	U
Solidago	*canadensis*	Canada Goldenrod	1	3	-	S5	-	-	-	G5	X
Balsaminaceae		**Touch-me-not Family**									
Impatiens	*capensis*	Jewelweed	4	-3	-	S5	-	-	-	G5	C
Berberidaceae		**Barberry Family**									
Podophyllum	*peltatum*	May-apple	5	3	-	S5	-	-	-	G5	X
Betulaceae		**Birch Family**									
Carpinus	*caroliniana ssp. virginiana*	Blue Beech	6	0	-	S5	-	-	-	G5	-
Brassicaceae		**Mustard Family**									
Alliaria	*petiolata*	Garlic Mustard	-	0	-3	SNA	-	-	-	GNR	-
Caprifoliaceae		**Honeysuckle Family**									
Lonicera	*tatarica*	Tartarian Honeysuckle	-	3	-3	SNA	-	-	-	GNR	I
Viburnum	*lentago*	Nannyberry	4	-1	-	S5	-	-	-	G5	C
Cornaceae		**Dogwood Family**									
Cornus	*alternifolia*	Alternate-leaved Dogwood	6	5	-	S5	-	-	-	G5	X
Cornus	*amomum*	Silky Dogwood	5	-4	-	S5	-	-	-	G5	X
Cornus	*racemosa*	Gray Dogwood	2	-2	-	S5	-	-	-	G5?	X
Cucurbitaceae		**Gourd Family**									
Echinocystis	*lobata*	Wild Cucumber	3	-2	-	S5	-	-	-	G5	X
Fagaceae		**Beech Family**									
Quercus	*alba*	White Oak	6	3	-	S5	-	-	-	G5	C
Quercus	*macrocarpa*	Bur Oak	5	1	-	S5	-	-	-	G5	C
Quercus	*rubra*	Red Oak	6	3	-	S5	-	-	-	G5	C

BOTANICAL NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX
Geraniaceae		**Geranium Family**									
Geranium	*maculatum*	Spotted Geranium	6	3	-	S5	-	-	-	G5	X
Geranium	*robertianum*	Herb-robert	-	5	-2	S5	-	-	-	G5	IC
Grossulariaceae		**Currant Family**									
Ribes	*rubrum*	Red Currant	-	5	-2	SNA	-	-	-	G4G5	IR
Juglandaceae		**Walnut Family**									
Juglans	*nigra*	Black Walnut	5	3	-	S4	-	-	-	G5	X
Onagraceae		**Evening-primrose Family**									
Circaea	*canadensis*	Canada Enchanter's Nightshade	3	3	-	S5	-	-	-	G5T5	X
Ranunculaceae		**Buttercup Family**									
Thalictrum	*dioicum*	Early Meadow-rue	5	2	-	S5	-	-	-	G5	X
Rhamnaceae		**Buckthorn Family**									
Rhamnus	*cathartica*	Common Buckthorn	-	3	-3	SNA	-	-	-	GNR	IC
Rosaceae		**Rose Family**									
Geum	*species*	Avens species	0	-	-	-	-	-	-	-	-
Prunus	*serotina*	Black Cherry	3	3	-	S5	-	-	-	G5	C
Prunus	*virginiana*	Choke Cherry	2	1	-	S5	-	-	-	G5	C
Rosa	*multiflora*	Multiflora Rose	-	3	-3	SNA	-	-	-	GNR	I
Rubus	*idaeus*	American Red Raspberry	0	-2	-	SNA	-	-	-	G5T5	-
Rubiaceae		**Madder Family**									
Galium	*aparine*	Cleavers	4	3	-	S5	-	-	-	G5	X
Salicaceae		**Willow Family**									
Populus	*balsamifera ssp. balsamifera*	Balsam Poplar	4	-3	-	S5	-	-	-	G5	X
Populus	*deltoides ssp. deltoides*	Eastern Cottonwood	4	-1	-	S5	-	-	-	G5T5	X
Populus	*tremuloides*	Trembling Aspen	2	0	-	S5	-	-	-	G5	X
Ulmaceae		**Elm Family**									
Ulmus	*americana*	American Elm	3	-2	-	S5	-	-	-	G5?	X
Vitaceae		**Grape Family**									
Parthenocissus	*inserta*	Thicket-creeper	3	3	-	S5	-	-	-	G5	X
MONOCOTYLEDONS		**MONOCOTS**									
Araceae		**Arum Family**									
Arisaema	*triphyllum*	Small Jack-in-the-pulpit	5	-2	-	S5	-	-	-	G5	C
Cyperaceae		**Sedge Family**									
Carex	*rosea*	Rosy Sedge	5	5	-	S5	-	-	-	G5	C
Liliaceae		**Lily Family**									
Maianthemum	*canadense*	Wild Lily-of-the-Valley	5	0	-	S5	-	-	-	G5	X
Maianthemum	*racemosum*	Large False Solomon's Seal	4	3	-	S5	-	-	-	G5	X

BOTANICAL NAME	COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX

FLORISTIC SUMMARY & ASSESSMENT

Species Diversity

Total Species:	**43**	
Native Species:	**35**	81.40%
Exotic Species	**8**	18.60%
Total Taxa in Region (List Region, Source)	10000	
% Regional Taxa Recorded	0.43%	
Regionally Significant Species	0	
S1-S3 Species	0	
S4 Species	1	
S5 Species	33	

Co-efficient of Conservatism and Floral Quality Index

Co-efficient of Conservatism (CC) (average)		**3.54**	
CC 0 to 3	*lowest sensitivity*	15	42.86%
CC 4 to 6	*moderate sensitivity*	20	57.14%
CC 7 to 8	*high sensitivity*	0	0.00%
CC 9 to 10	*highest sensitivity*	0	0.00%
Floral Quality Index (FQI)		**20.96**	

Presence of Weedy & Invasive Species

mean weediness		**-2.63**	
weediness = -1	*low potential invasiveness*	0	0.00%
weediness = -2	*moderate potential invasiveness*	3	37.50%
weediness = -3	*high potential invasiveness*	5	62.50%

Presence of Wetland Species

average wetness value	**1.57**	
upland	7	16.28%
facultative upland	18	41.86%
facultative	8	18.60%
facultative wetland	9	20.93%
obligate wetland	0	0.00%

BOTANICAL NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX
PTERIDOPHYTES		**FERNS & ALLIES**									
Dennstaedtiaceae		**Bracken Fern Family**									
Pteridium	*aquilinum*	Bracken	2	3	-	S5	-	-	-	G5	X
Dryopteridaceae		**Wood Fern Family**									
Onoclea	*sensibilis*	Sensitive Fern	4	-3	-	S5	-	-	-	G5	X
Equisetaceae		**Horsetail Family**									
Equisetum	*arvense*	Field Horsetail	0	0	-	S5	-	-	-	G5	C
Thelypteridaceae		**Marsh Fern Family**									
Thelypteris	*palustris*	Eastern Marsh Fern	5	-4	-	S5	-	-	-	G5	X
GYMNOSPERMS		**CONIFERS**									
Pinaceae		**Pine Family**									
Pinus	*strobus*	Eastern White Pine	4	3	-	S5	-	-	-	G5	X
DICOTYLEDONS		**DICOTS**									
Aceraceae		**Maple Family**									
Acer	*negundo*	Manitoba Maple	0	-2	-	S5	-	-	-	G5	C
Acer	*saccharinum*	Silver Maple	5	-3	-	S5	-	-	-	G5	C
Acer	*saccharum*	Sugar Maple	4	3	-	S5	-	-	-	G5	C
Acer X	*freemanii*	Freeman's Maple	-	0	-	SNA	-	-	-	GNR	-
Asteraceae		**Composite or Aster Family**									
Solidago	*altissima*	Tall Goldenrod	1	3	-	S5	-	-	-	GNR	U
Solidago	*canadensis*	Canada Goldenrod	1	3	-	S5	-	-	-	G5	X
Berberidaceae		**Barberry Family**									
Podophyllum	*peltatum*	May-apple	5	3	-	S5	-	-	-	G5	X
Betulaceae		**Birch Family**									
Carpinus	*caroliniana ssp. virginiana*	Blue Beech	6	0	-	S5	-	-	-	G5	-
Brassicaceae		**Mustard Family**									
Alliaria	*petiolata*	Garlic Mustard	-	0	-3	SNA	-	-	-	GNR	-
Caprifoliaceae		**Honeysuckle Family**									
Lonicera	*tatarica*	Tartarian Honeysuckle	-	3	-3	SNA	-	-	-	GNR	I
Viburnum	*lentago*	Nannyberry	4	-1	-	S5	-	-	-	G5	C
Viburnum	*rafinesquianum*	Downy Arrow-wood	7	5	-	S5	-	-	-	G5	X
Cornaceae		**Dogwood Family**									
Cornus	*racemosa*	Gray Dogwood	2	-2	-	S5	-	-	-	G5?	X
Cornus	*sericea*	Red-osier Dogwood	2	-3	-	S5	-	-	-	G5	C
Cucurbitaceae		**Gourd Family**									
Echinocystis	*lobata*	Wild Cucumber	3	-2	-	S5	-	-	-	G5	X
Fagaceae		**Beech Family**									
Quercus	*macrocarpa*	Bur Oak	5	1	-	S5	-	-	-	G5	C
Geraniaceae		**Geranium Family**									
Geranium	*maculatum*	Spotted Geranium	6	3	-	S5	-	-	-	G5	X

BOTANICAL NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX
Geranium	*robertianum*	Herb-robert	-	5	-2	S5	-	-	-	G5	IC
Grossulariaceae		**Currant Family**									
Ribes	*cynosbati*	Eastern Prickly Gooseberry	4	5	-	S5	-	-	-	G5	C
Ribes	*rubrum*	Red Currant	-	5	-2	SNA	-	-	-	G4G5	IR
Oleaceae		**Olive Family**									
Fraxinus	*americana*	White Ash	4	3	-	S4	-	-	-	G5	C
Fraxinus	*pennsylvanica*	Green Ash	3	-3	-	S4	-	-	-	G5	C
Onagraceae		**Evening-primrose Family**									
Circaea	*canadensis*	Canada Enchanter's Nightshade	3	3	-	S5	-	-	-	G5T5	X
Primulaceae		**Primrose Family**									
Lysimachia	*ciliata*	Fringed Loosestrife	4	-3	-	S5	-	-	-	G5	X
Ranunculaceae		**Buttercup Family**									
Ranunculus	*acris*	Tall Buttercup	-	-2	-2	SNA	-	-	-	G5	IC
Thalictrum	*pubescens*	King of the Meadow	5	-2	-	S5	-	-	-	G5	X
Rhamnaceae		**Buckthorn Family**									
Rhamnus	*cathartica*	Common Buckthorn	-	3	-3	SNA	-	-	-	GNR	IC
Rosaceae		**Rose Family**									
Crataegus	*sp.*	Hawthorn species	4	5	-	-	-	-	-	-	X
Crataegus	*punctata*	Dotted Thorn	4	5	-	S5	-	-	-	G5	C
Geum	*aleppicum*	Yellow Avens	2	-1	-	S5	-	-	-	G5	X
Geum	*canadense*	White Avens	3	0	-	S5	-	-	-	G5	X
Geum	*species*	Avens species	0	-	-	-	-	-	-	-	-
Prunus	*serotina*	Black Cherry	3	3	-	S5	-	-	-	G5	C
Prunus	*virginiana*	Choke Cherry	2	1	-	S5	-	-	-	G5	C
Rosa	*acicularis*	Prickly Rose	7	3	-	S5	-	-	-	G5	R1
Rubus	*allegheniensis*	Common Blackberry	2	2	-	S5	-	-	-	G5	C
Rubus	*idaeus*	American Red Raspberry	0	-2	-	SNA	-	-	-	G5T5	-
Rubus	*occidentalis*	Black Raspberry	2	5	-	S5	-	-	-	G5	X
Salicaceae		**Willow Family**									
Populus	*tremuloides*	Trembling Aspen	2	0	-	S5	-	-	-	G5	X
Urticaceae		**Nettle Family**									
Pilea	*pumila*	Canadian Clearweed	5	-3	-	S5	-	-	-	G5	X
Vitaceae		**Grape Family**									
Parthenocissus	*inserta*	Thicket-creeper	3	3	-	S5	-	-	-	G5	X
Vitis	*riparia*	Riverbank Grape	0	-2	-	S5	-	-	-	G5	C
MONOCOTYLEDONS		**MONOCOTS**									
Araceae		**Arum Family**									
Arisaema	*triphyllum*	Small Jack-in-the-pulpit	5	-2	-	S5	-	-	-	G5	C
Symplocarpus	*foetidus*	Skunk Cabbage	7	-5	-	S5	-	-	-	G5	C
Liliaceae		**Lily Family**									
Erythronium	*americanum*	Yellow Trout-lily	5	5	-	S5	-	-	-	G5	X

BOTANICAL NAME	COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX

FLORISTIC SUMMARY & ASSESSMENT

Species Diversity			
Total Species:		**49**	
Native Species:		**43**	87.76%
Exotic Species		**6**	12.24%
Total Taxa in Region (List Region, Source)		10000	
% Regional Taxa Recorded		0.49%	
Regionally Significant Species		0	
S1-S3 Species		0	
S4 Species		2	
S5 Species		39	
Co-efficient of Conservatism and Floral Quality Index			
Co-efficient of Conservatism (CC) (average)		**3.37**	
CC 0 to 3	*lowest sensitivity*	21	48.84%
CC 4 to 6	*moderate sensitivity*	19	44.19%
CC 7 to 8	*high sensitivity*	3	6.98%
CC 9 to 10	*highest sensitivity*	0	0.00%
Floral Quality Index (FQI)		**22.11**	
Presence of Weedy & Invasive Species			
mean weediness		**-2.50**	
weediness = -1	*low potential invasiveness*	0	0.00%
weediness = -2	*moderate potential invasiveness*	3	50.00%
weediness = -3	*high potential invasiveness*	3	50.00%
Presence of Wetland Species			
average wetness value		**0.84**	
upland		8	16.33%
facultative upland		15	30.61%
facultative		10	20.41%
facultative wetland		15	30.61%
obligate wetland		1	2.04%

BOTANICAL NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX
PTERIDOPHYTES		**FERNS & ALLIES**									
Dryopteridaceae		**Wood Fern Family**									
Onoclea	*sensibilis*	Sensitive Fern	4	-3	-	S5	-	-	-	G5	X
DICOTYLEDONS		**DICOTS**									
Aceraceae		**Maple Family**									
Acer	*negundo*	Manitoba Maple	0	-2	-	S5	-	-	-	G5	C
Asteraceae		**Composite or Aster Family**									
Symphyotrichum	*novae-angliae*	New England Aster	2	-3	-	S5	-	-	-	G5	C
Eutrochium	*maculatum*	Spotted Joe-pye-weed	3	-5	-	S5	-	-	-	G5T5	C
Solidago	*altissima*	Tall Goldenrod	1	3	-	S5	-	-	-	GNR	U
Solidago	*canadensis*	Canada Goldenrod	1	3	-	S5	-	-	-	G5	X
Solidago	*gigantea*	Giant Goldenrod	4	-3	-	S5	-	-	-	G5	X
Taraxacum	*officinale*	Common Dandelion	-	-	-	SNA	-	-	-	G5	-
Balsaminaceae		**Touch-me-not Family**									
Impatiens	*capensis*	Jewelweed	4	-3	-	S5	-	-	-	G5	C
Brassicaceae		**Mustard Family**									
Alliaria	*petiolata*	Garlic Mustard	-	0	-3	SNA	-	-	-	GNR	-
Caprifoliaceae		**Honeysuckle Family**									
Lonicera	*tatarica*	Tartarian Honeysuckle	-	3	-3	SNA	-	-	-	GNR	I
Cornaceae		**Dogwood Family**									
Cornus	*alternifolia*	Alternate-leaved Dogwood	6	5	-	S5	-	-	-	G5	X
Cornus	*amomum*	Silky Dogwood	5	-4	-	S5	-	-	-	G5	X
Cornus	*racemosa*	Gray Dogwood	2	-2	-	S5	-	-	-	G5?	X
Cornus	*sericea*	Red-osier Dogwood	2	-3	-	S5	-	-	-	G5	C
Cucurbitaceae		**Gourd Family**									
Echinocystis	*lobata*	Wild Cucumber	3	-2	-	S5	-	-	-	G5	X
Geraniaceae		**Geranium Family**									
Geranium	*robertianum*	Herb-robert	-	5	-2	S5	-	-	-	G5	IC
Grossulariaceae		**Currant Family**									
Ribes	*rubrum*	Red Currant	-	5	-2	SNA	-	-	-	G4G5	IR
Juglandaceae		**Walnut Family**									
Juglans	*nigra*	Black Walnut	5	3	-	S4	-	-	-	G5	X
Lamiaceae		**Mint Family**									
Leonurus	*cardiaca ssp. cardiaca*	Common Motherwort	-	5	-2	SNA	-	-	-	GNR	IC
Oleaceae		**Olive Family**									
Fraxinus	*pennsylvanica*	Green Ash	3	-3	-	S4	-	-	-	G5	C
Onagraceae		**Evening-primrose Family**									
Circaea	*canadensis*	Canada Enchanter's Nightshade	3	3	-	S5	-	-	-	G5T5	X
Epilobium	*hirsutum*	Great Hairy Willow-herb	-	-4	-2	SNA	-	-	-	GNR	I

BOTANICAL NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX
Plantaginaceae		**Plantain Family**									
Plantago	*lanceolata*	English Plantain	-	0	-1	SNA	-	-	-	G5	IC
Plantago	*major*	Common Plantain	-	-1	-1	S5	-	-	-	G5	IC
Primulaceae		**Primrose Family**									
Lysimachia	*ciliata*	Fringed Loosestrife	4	-3	-	S5	-	-	-	G5	X
Ranunculaceae		**Buttercup Family**									
Actaea	*pachypoda*	White Baneberry	6	5	-	S5	-	-	-	G5	C
Anemone	*canadensis*	Canada Anemone	3	-3	-	S5	-	-	-	G5	C
Clematis	*virginiana*	Virgin's-bower	3	0	-	S5	-	-	-	G5	C
Ranunculus	*acris*	Tall Buttercup	-	-2	-2	SNA	-	-	-	G5	IC
Rhamnaceae		**Buckthorn Family**									
Rhamnus	*cathartica*	Common Buckthorn	-	3	-3	SNA	-	-	-	GNR	IC
Rosaceae		**Rose Family**									
Crataegus	*sp.*	Hawthorn species	4	5	-	-	-	-	-	-	X
Prunus	*serotina*	Black Cherry	3	3	-	S5	-	-	-	G5	C
Prunus	*virginiana*	Choke Cherry	2	1	-	S5	-	-	-	G5	C
Rosa	*multiflora*	Multiflora Rose	-	3	-3	SNA	-	-	-	GNR	I
Rubus	*idaeus*	American Red Raspberry	0	-2	-	SNA	-	-	-	G5T5	-
Spiraea	*alba*	White Meadow-sweet	3	-4	-	S5	-	-	-	G5	X
Rubiaceae		**Madder Family**									
Galium	*aparine*	Cleavers	4	3	-	S5	-	-	-	G5	X
Salicaceae		**Willow Family**									
Populus	*balsamifera ssp. balsamifera*	Balsam Poplar	4	-3	-	S5	-	-	-	G5	X
Populus	*deltoides ssp. deltoides*	Eastern Cottonwood	4	-1	-	S5	-	-	-	G5T5	X
Salix	*nigra*	Black Willow	6	-5	-	S4?	-	-	-	G5	X
Salix X	*rubens*	Reddish Willow	-	-4	-3	SE4	-	-	-	HYB	IR
Vitaceae		**Grape Family**									
Parthenocissus	*inserta*	Thicket-creeper	3	3	-	S5	-	-	-	G5	X
Vitis	*riparia*	Riverbank Grape	0	-2	-	S5	-	-	-	G5	C
MONOCOTYLEDONS		**MONOCOTS**									
Araceae		**Arum Family**									
Arisaema	*triphyllum*	Small Jack-in-the-pulpit	5	-2	-	S5	-	-	-	G5	C
Symplocarpus	*foetidus*	Skunk Cabbage	7	-5	-	S5	-	-	-	G5	C
Poaceae		**Grass Family**									
Dactylis	*glomerata*	Orchard Grass	-	3	-1	SNA	-	-	-	GNR	IC
Phalaris	*arundinacea*	Reed Canary Grass	0	-4	-	S5	-	-	-	G5	X
Poa	*pratensis ssp. pratensis*	Kentucky Blue Grass	0	1	-	S5	-		-	G5T	C

BOTANICAL NAME	COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX

FLORISTIC SUMMARY & ASSESSMENT

Species Diversity

Total Species:	**48**	
Native Species:	**35**	72.92%
Exotic Species	**13**	27.08%
Total Taxa in Region (List Region, Source)	10000	
% Regional Taxa Recorded	0.48%	
Regionally Significant Species	0	
S1-S3 Species	0	
S4 Species	2	
S5 Species	32	

Co-efficient of Conservatism and Floral Quality Index

Co-efficient of Conservatism (CC) (average)		**3.11**	
CC 0 to 3	*lowest sensitivity*	20	57.14%
CC 4 to 6	*moderate sensitivity*	14	40.00%
CC 7 to 8	*high sensitivity*	1	2.86%
CC 9 to 10	*highest sensitivity*	0	0.00%
Floral Quality Index (FQI)		**18.42**	

Presence of Weedy & Invasive Species

mean weediness		**-2.15**	
weediness = -1	*low potential invasiveness*	3	23.08%
weediness = -2	*moderate potential invasiveness*	5	38.46%
weediness = -3	*high potential invasiveness*	5	38.46%

Presence of Wetland Species

average wetness value	**-0.27**	
upland	6	12.50%
facultative upland	11	22.92%
facultative	7	14.58%
facultative wetland	21	43.75%
obligate wetland	3	6.25%

BOTANICAL NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX
PTERIDOPHYTES		**FERNS & ALLIES**									
Dryopteridaceae		**Wood Fern Family**									
Onoclea	*sensibilis*	Sensitive Fern	4	-3	-	S5	-	-	-	G5	X
Equisetaceae		**Horsetail Family**									
Equisetum	*arvense*	Field Horsetail	0	0	-	S5	-	-	-	G5	C
Thelypteridaceae		**Marsh Fern Family**									
Thelypteris	*palustris*	Eastern Marsh Fern	5	-4	-	S5	-	-	-	G5	X
DICOTYLEDONS		**DICOTS**									
Aceraceae		**Maple Family**									
Acer	*negundo*	Manitoba Maple	0	-2	-	S5	-	-	-	G5	C
Apiaceae		**Carrot or Parsley Family**									
Angelica	*atropurpurea*	Purplestem Angelica	6	-5	-	S5	-	-	-	G5	C
Asclepiadaceae		**Milkweed Family**									
Asclepias	*incarnata*	Swamp Milkweed	6	-5	-	S5	-	-	-	G5	C
Asclepias	*syriaca*	Common Milkweed	0	5	-	S5	-	-	-	G5	C
Asteraceae		**Composite or Aster Family**									
Arctium	*minus*	Common Burdock	-	5	-2	SNA	-	-	-	GNR	IC
Aster	*species*	Aster species	0	-	-	-	-	-	-	-	-
Symphyotrichum	*ericoides*	Heath Aster	4	4	-	S5	-	-	-	G5T?	-
Symphyotrichum	*lanceolatum*	White Panicled Aster	3	-3	-	S5	-	-	-	G5T5	C
Eupatorium	*perfoliatum*	Boneset	2	-4	-	S5	-	-	-	G5	-
Eutrochium	*maculatum*	Spotted Joe-pye-weed	3	-5	-	S5	-	-	-	G5T5	C
Solidago	*altissima*	Tall Goldenrod	1	3	-	S5	-	-	-	GNR	U
Solidago	*canadensis*	Canada Goldenrod	1	3	-	S5	-	-	-	G5	X
Solidago	*rugosa ssp. rugosa*	Wrinkle-leaf Goldenrod	4	-1	-	S5	-	-	-	G5T5	X
Taraxacum	*officinale*	Common Dandelion	-	-	-	SNA	-	-	-	G5	-
Betulaceae		**Birch Family**									
Carpinus	*caroliniana ssp. virginiana*	Blue Beech	6	0	-	S5	-	-	-	G5	-
Brassicaceae		**Mustard Family**									
Nasturtium	*officinale*	Water-cress	-	-5	-1	SNA	-	-	-	GNR	I
Caprifoliaceae		**Honeysuckle Family**									
Lonicera	*tatarica*	Tartarian Honeysuckle	-	3	-3	SNA	-	-	-	GNR	I
Caryophyllaceae		**Pink Family**									
Saponaria	*officinalis*	Bouncing-bet	-	3	-3	SNA	-	-	-	GNR	I
Silene	*vulgaris*	Maidenstears	-	5	-1	SNA	-	-	-	GNR	-
Cornaceae		**Dogwood Family**									
Cornus	*amomum*	Silky Dogwood	5	-4	-	S5	-	-	-	G5	X

BOTANICAL NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX
Cornus	*racemosa*	Gray Dogwood	2	-2	-	S5	-	-	-	G5?	X
Cornus	*sericea*	Red-osier Dogwood	2	-3	-	S5	-	-	-	G5	C
Cucurbitaceae		**Gourd Family**									
Echinocystis	*lobata*	Wild Cucumber	3	-2	-	S5	-	-	-	G5	X
Fabaceae		**Pea Family**									
Amphicarpaea	*bracteata*	Hog Peanut	4	0	-	S5	-	-	-	G5	C
Fagaceae		**Beech Family**									
Quercus	*macrocarpa*	Bur Oak	5	1	-	S5	-	-	-	G5	C
Grossulariaceae		**Currant Family**									
Ribes	*rubrum*	Red Currant	-	5	-2	SNA	-	-	-	G4G5	IR
Lamiaceae		**Mint Family**									
Leonurus	*cardiaca ssp. cardiaca*	Common Motherwort	-	5	-2	SNA	-	-	-	GNR	IC
Mentha	*arvensis*	American Wild Mint	3	-3	-	S5	-	-	-	G5	X
Oleaceae		**Olive Family**									
Fraxinus	*nigra*	Black Ash	7	-4	-	S4	-	-	-	G5	X
Plantaginaceae		**Plantain Family**									
Plantago	*lanceolata*	English Plantain	-	0	-1	SNA	-	-	-	G5	IC
Plantago	*major*	Common Plantain	-	-1	-1	S5	-	-	-	G5	IC
Polygonaceae		**Smartweed Family**									
Rumex	*crispus*	Curly-leaf Dock	-	-1	-2	SNA	-	-	-	GNR	-
Ranunculaceae		**Buttercup Family**									
Anemone	*canadensis*	Canada Anemone	3	-3	-	S5	-	-	-	G5	C
Thalictrum	*pubescens*	King of the Meadow	5	-2	-	S5	-	-	-	G5	X
Rhamnaceae		**Buckthorn Family**									
Rhamnus	*cathartica*	Common Buckthorn	-	3	-3	SNA	-	-	-	GNR	IC
Frangula	*alnus*	Glossy Buckthorn	-	-1	-3	SNA	-	-	-	GNR	-
Rosaceae		**Rose Family**									
Potentilla	*simplex*	Old-field Cinquefoil	3	4	-	S5	-	-	-	G5	X
Spiraea	*alba*	White Meadow-sweet	3	-4	-	S5	-	-	-	G5	X
Rubiaceae		**Madder Family**									
Galium	*aparine*	Cleavers	4	3	-	S5	-	-	-	G5	X
Salicaceae		**Willow Family**									
Populus	*deltoides ssp. deltoides*	Eastern Cottonwood	4	-1	-	S5	-	-	-	G5T5	X
Salix	*species*	Willow species	0	-	-	-	-	-	-	-	-
Salix	*exigua*	Narrow-leaf Willow	3	-5	-	SNA	-	-	-	GNR	C
Salix	*petiolaris*	Meadow Willow	3	-4	-	S5	-	-	-	G4	X
Salix X	*rubens*	Reddish Willow	-	-4	-3	SE4	-	-	-	HYB	IR

BOTANICAL NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX
Solanaceae		**Nightshade Family**									
Solanum	*dulcamara*	Bittersweet Nightshade	-	0	-2	SNA	-	-	-	GNR	IC
Ulmaceae		**Elm Family**									
Ulmus	*americana*	American Elm	3	-2	-	S5	-	-	-	G5?	X
Urticaceae		**Nettle Family**									
Urtica	*dioica ssp. dioica*	Stinging Nettle	-	-1	-1	SNA	-	-	-	G5T5?	IR
Vitaceae		**Grape Family**									
Parthenocissus	*inserta*	Thicket-creeper	3	3	-	S5	-	-	-	G5	X
Vitis	*riparia*	Riverbank Grape	0	-2	-	S5	-	-	-	G5	C
MONOCOTYLEDONS		**MONOCOTS**									
Symplocarpus	*foetidus*	Skunk Cabbage	7	-5	-	S5	-	-	-	G5	C
Cyperaceae		**Sedge Family**									
Carex	*sp.*	Sedge species	0	-	-	-	-	-	-	-	-
Carex	*lacustris*	Lake Sedge	5	-5	-	S5	-	-	-	G5	C
Carex	*stricta*	Tussock Sedge	4	-5	-	S5	-	-	-	G5	C
Carex	*vulpinoidea*	Fox Sedge	3	-5	-	S5	-	-	-	G5	C
Iridaceae		**Iris Family**									
Iris	*versicolor*	Harlequin Blue-flag	5	-5	-	S5	-	-	-	G5	X
Juncaceae		**Rush Family**									
Juncus	*effusus var. solutus*	Lamp Rush	4	-5	-	S5	-	-	-	G5	X
Poaceae		**Grass Family**									
Agrostis	*gigantea*	Redtop	-	0	-2	SNA	-	-	-	G4G5	IC
Bromus	*inermis ssp. inermis*	Smooth Brome	-	5	-3	SNA	-	-	-	G5TNR	IC
Calamagrostis	*canadensis*	Blue-joint Grass	4	-5	-	S5	-	-	-	G5	X
Dactylis	*glomerata*	Orchard Grass	-	3	-1	SNA	-	-	-	GNR	IC
Elymus	*virginicus var. virginicus*	Virginia Wild Rye	5	-2	-	S5	-	-	-	G5T5	X
Leersia	*oryzoides*	Rice Cut Grass	3	-5	-	S5	-	-	-	G5	X
Phalaris	*arundinacea*	Reed Canary Grass	0	-4	-	S5	-	-	-	G5	X
Poa	*pratensis ssp. pratensis*	Kentucky Blue Grass	0	1	-	S5	-		-	G5T	C
Typhaceae		**Cattail Family**									
Typha	*angustifolia*	Narrow-leaved Cattail	3	-5	-	SNA	-	-	-	G5	X
Typha	*latifolia*	Broad-leaved Cattail	3	-5	-	S5	-	-	-	G5	X

BOTANICAL NAME	COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS (2016-08-19)	SARA STATUS (2016-08-19)	GLOBAL STATUS	LOCAL STATUS MIDDLESEX

FLORISTIC SUMMARY & ASSESSMENT

Species Diversity

Total Species:	**68**	
Native Species:	**50**	73.53%
Exotic Species	**18**	26.47%
Total Taxa in Region (List Region, Source)	10000	
% Regional Taxa Recorded	0.68%	
Regionally Significant Species	0	
S1-S3 Species	0	
S4 Species	1	
S5 Species	45	

Co-efficient of Conservatism and Floral Quality Index

Co-efficient of Conservatism (CC) (average)		**3.12**	
CC 0 to 3	*lowest sensitivity*	29	58.00%
CC 4 to 6	*moderate sensitivity*	19	38.00%
CC 7 to 8	*high sensitivity*	2	4.00%
CC 9 to 10	*highest sensitivity*	0	0.00%
Floral Quality Index (FQI)		**22.06**	

Presence of Weedy & Invasive Species

mean weediness		**-2.00**	
weediness = -1	*low potential invasiveness*	6	33.33%
weediness = -2	*moderate potential invasiveness*	6	33.33%
weediness = -3	*high potential invasiveness*	6	33.33%

Presence of Wetland Species

average wetness value	**-1.20**	
upland	6	8.82%
facultative upland	10	14.71%
facultative	14	20.59%
facultative wetland	20	29.41%
obligate wetland	15	22.06%

AECOM Imagine it. Delivered.

Appendix G

Terrestrial Photographic Log

Appendix G. Terrestrial Photographic Log

Photograph 1 ↑
SWD4-1: Willow Mineral Deciduous Swamp

Photograph 2 ↑
SWD4-1: Willow Mineral Deciduous Swamp

Photograph 3 ↑
FOM2-1: Dry-Fresh White Pine-Oak Mixed Forest Type

Photograph 4 ↑
FOM2-1: Dry-Fresh White Pine-Oak Mixed Forest Type

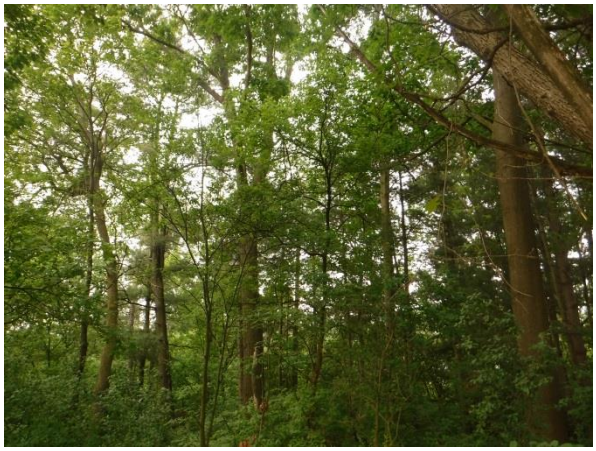
Photograph 5 ↑
SWT3-5: Red-osier Dogwood Organic Thicket Swamp Type

Photograph 6 ↑
SWT3-5: Red-osier Dogwood Organic Thicket Swamp Type

Appendix G. Terrestrial Photographic Log

Photograph 7 ↑
FOM5-2 : Dry-Fresh Poplar Mixed Forest Type

Photograph 8 ↑
FOM5-2 : Dry-Fresh Poplar Mixed Forest Type



Photograph 9 ↑
FOD7 : Fresh-Moist Lowland Deciduous Forest Type

Photograph 10 ↑
FOD7 : Fresh-Moist Lowland Deciduous Forest Type

Photograph 11 ↑
CUM1-1 : Dry-Moist Old Field Meadow Type

Photograph 12 ↑
CUM1-1 : Dry-Moist Old Field Meadow Type

Appendix G. Terrestrial Photographic Log

Photograph 13 ↑

SWT3-5: Red Osier Dogwood Thicket Swamp with Shallow Marsh (MAS) inclusion and east pond

Photograph 14 ↑

SWT3-5: Red Osier Dogwood Thicket Swamp with Shallow Marsh (MAS) inclusion

Photograph 15 ↑

East pond (east of central pond)

Photograph 16 ↑

Pond at the west end of the watercourse

Photograph 17 ↑

Central pond (east of pond in Photograph 16)

Photograph 18 ↑

Barn structures overview

AECOM Imagine it. Delivered.

Appendix H

Species at Risk Screening

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Birds	Acadian Flycatcher Empidonax virescens	END	END Schedule 1	END	In Ontario, the Acadian Flycatcher primarily lives in the warmer climate of southern Ontario's Carolinian forests. It needs large, undisturbed forests, often more than 40 hectares in size. It is typically found in mature, shady forests with ravines, or in forested swamps with lots of maple and beech trees. The nest is placed near the tip of a lower limb on a tree, and is loosely woven, with strands of plant material hanging down. This species can typically be associated with the following ELC communities: SWD, FOD communities that are mature, have a closed canopy and are of sufficient size.	In Canada, the Acadian Flycatcher nests only in southwestern Ontario, mostly in large forests and forested ravines near the shore of Lake Erie. It has also been known to nest at a few sites in the Greater Toronto Area but this is unusual. The Acadian Flycatcher population in Ontario is very small, with 25 to 75 breeding pairs recorded in 2010.	SARO	No Wooded communities within the study area are not of sufficient size to support this species.	No This species was not observed during field investigations. Suitable habitat was not identified.
Birds	Bald Eagle Haliaeetus leucocephalus	SC	No Status	Not at Risk	Bald Eagles nest in a variety of habitats and forest types, almost always near a major lake or river where they do most of their hunting. While fish are their main source of food, Bald Eagles can easily catch prey up to the size of ducks, and frequently feed on dead animals, including White-tailed Deer. They usually nest in large trees such as pine and poplar. During the winter, Bald Eagles sometimes congregate near open water such as the St. Lawrence River, or in places with a high deer population where carcasses might be found. This species can typically be associated with the following ELC communities: FOC, FOM, FOD, SWC, SWM and SWD. Nests typically located near major bodies of water.	Bald Eagles are widely distributed throughout North America. In Ontario, they nest throughout the north, with the highest density in the northwest near Lake of the Woods. Historically they were also relatively common in southern Ontario, especially along the shore of Lake Erie, but this population was all but wiped out 50 years ago. After an intensive re-introduction program and environmental clean-up efforts, the species has rebounded and can once again be seen in much of its former southern Ontario range.	SARO	Yes The study area is in close proximity to the Thames River; wooded communities may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although forest and swamp communities provide suitable habitat, no nesting was observed
Birds	Bank Swallow Riparia riparia	THR	No Status	THR	Bank swallows nest in burrows in natural and human-made settings where there are vertical faces in silt and sand deposits. Many nests are on banks of rivers and lakes, but they are also found in active sand and gravel pits or former ones where the banks remain suitable. The birds breed in colonies ranging from several to a few thousand pairs.	The bank swallow is found all across southern Ontario, with sparser populations scattered across northern Ontario. The largest populations are found along the Lake Erie and Lake Ontario shorelines, and the Saugeen River (which flows into Lake Huron).	OBBA	Yes The study area is in close proximity to the Thames River and may provide suitable foraging habitat for this species.	No This species was not observed during field investigations. No No nesting sites were identified. A cultural meadow, as well as the ponds within the wetland provide foraging habitat, however foraging habitat is not reguated under the ESA.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Birds	Barn Swallow Hirundo rustica	THR	No Status	THR	Barn Swallows often live in close association with humans, building their cup-shaped mud nests almost exclusively on human-made structures such as open barns, under bridges and in culverts. The species is attracted to open structures that include ledges where they can build their nests, which are often re-used from year to year. They prefer unpainted, rough-cut wood, since the mud does not adhere as well to smooth surfaces. This species can typically be associated with the following ELC communities: TPO, CUM1, MAM, MAS, OAO, SAS1, SAM1, SAF1; containing or adjacent structures that are suitable for nesting.	The Barn Swallow may be found throughout southern Ontario and can range as far north as Hudson Bay, wherever suitable locations for nests exist.	OBBA, MNRF Aylmer district	Yes Open fields and ponds within the study area may provide suitable foraging habitat. Barns and culverts within the study area may provide nesting habitat.	No This species was not observed during field investigations. Candidate A cultural meadow, as well as the ponds within the wetland provide foraging habitat. Barns and culverts within the study area provide potential nesting habitat.
Birds	Bobolink Dolichonyx oryzivorus	THR	No Status	THR	Historically, Bobolinks lived in North American tallgrass prairie and other open meadows. With the clearing of native prairies, Bobolinks moved to living in hayfields. Bobolinks often build their small nests on the ground in dense grasses. Both parents usually tend to their young, sometimes with a third Bobolink helping. This species can typically be associated with the following ELC communities: TPO, TPS, CUM1 and MAM2.	The Bobolink breeds across North America. In Ontario, it is widely distributed throughout most of the province south of the boreal forest, although it may be found in the north where suitable habitat exists.	OBBA, SARO, MNRF Aylmer district	Yes Open fields within the study area may provide suitable habitat.	No This species was not observed during field investigations. No Although cultural meadow habitat is present within the study area, the species was no observed during breeding bird surveys.
Birds	Cerulean Warbler Dendroica cerulea	THR	SC Schedule 1	END	Cerulean Warblers spend their summers (breeding seasons) in mature, deciduous forests with large, tall trees and an open under storey. In late summer, they begin their long migration to wintering grounds in the Andes Mountains in South America. This species can typically be associated with the following ELC communities: FOD and SWD that are mature and contain an open understory.	The Cerulean Warbler's breeding range extends from extreme southwestern Quebec and southern Ontario west to Minnesota and Nebraska and south to Texas and other Gulf states across to North Carolina. In southern Ontario, populations appear to be separated into two distinct bands: one from southern Lake Huron to western Lake Ontario, and further north, the other from the Bruce Peninsula and Georgian Bay area to the Ottawa River.	SARO	Yes Wooded communities within the study area may provide suitable habitat.	No This species was not observed during field investigations. No Although deciduous forest and deciduous swamp communities may provide suitable habitat, the species was not observedduring field investigations.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Birds	Chimney Swift Chaetura pelagica	THR	THR Schedule 1	THR	Before European settlement Chimney Swifts mainly nested on cave walls and in hollow trees or tree cavities in old growth forests. Today, they are more likely to be found in and around urban settlements where they nest and roost (rest or sleep) in chimneys and other manmade structures. They also tend to stay close to water as this is where the flying insects they eat congregate. Foraging habitat for this species can be associated with the following ELC codes: TPO, CUM1, MAM, MAS, OAO, SAS1, SAM1, SAF1 containing or adjacent structures with suitable nesitng habitat (i.e. chimneys).	The Chimney Swift breeds in eastern North America, possibly as far north as southern Newfoundland. In Ontario, it is most widely distributed in the Carolinian zone in the south and southwest of the province, but has been detected throughout most of the province south of the 49th parallel. It winters in northwestern South America.	SARO	Yes Open fields and ponds within the study area may provide suitable foraging habitat. Residential buildings within and adjacent to the study area may provide nesting habitat.	No This species was not observed during field investigations. No A cultural meadow, as well as ponds within the wetland, provide foraging habitat, however foraging habitat is not regulated under the ESA. No Nesting habitat was identified.
Birds	Eastern Meadowlark Sturnella magna	THR	No Status	THR	Eastern Meadowlarks breed primarily in moderately tall grasslands, such as pastures and hayfields, but are also found in alfalfa fields, weedy borders of croplands, roadsides, orchards, airports, shrubby overgrown fields, or other open areas. Small trees, shrubs or fence posts are used as elevated song perches. This species can typically be associated with the following ELC communities: TPO, TPS, CUM1, CUS, and MAM2 with elevated song perches.	In Ontario, the Eastern Meadowlark is primarily found south of the Canadian Shield but it also inhabits the Lake Nipissing, Timiskaming and Lake of the Woods areas.	OBBA, SARO	Yes Open fields within the study area may provide suitable habitat.	No This species was not observed during field investigations. No Although a cultural meadow community may provide suitable habitat, the species was not detected during field investigations.
Birds	Eastern Wood-Pewee Contopus virens	SC	No Status	SC	The Eastern Wood-Pewee can be found in every type of wooded community in eastern North America. The size of the forest does not appear to be an important factor in habitat selection as this species has been found in both small fragmented forests and larger forest tracks. [4] This species can typically be associated with the following ELC communities: FOC, FOM, FOD, SWD, SWM and CUW.	The Eastern Wood-Pewee Breed throughout central and eastern North America from Saskatchewan to Nova Scotia south along the Atlantic Coast to North Florida and the Gulf Coast. [4]	OBBA	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although forest and swamp communities provide suitable habitat, the species was not detected during field investigations.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Birds	Golden-winged Warbler Vermivora chrysoptera	SC	THR Schedule 1	THR	Golden-winged Warblers prefer to nest in areas with young shrubs surrounded by mature forest – locations that have recently been disturbed, such as field edges, hydro or utility right-of-ways, or logged areas.	The Golden-winged Warbler is found in southern Saskatchewan, Manitoba, Ontario, and Quebec, as well as the north-eastern United States. In Ontario, these birds breed in central-eastern Ontario, as far south as Lake Ontario and the St. Lawrence River, and as far north as the northern edge of Georgian Bay. Golden-winged Warblers have also been found in the Lake of the Woods area near the Manitoba border, and around Long Point on Lake Erie. Golden-winged Warblers spend the winter in Central America, some Caribbean islands, and the northern part of South America.	OBBA	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Altholugh mixed and deciduous forest communities may provide suitable habitat, the species was not detected during field investigations.
Birds	Grasshopper Sparrow Ammodramus savannarum	SC	SC Schedule 1	SC	The Grasshopper Sparrow lives in open grassland areas with well-drained, sandy soil. It will also nest in hayfields and pasture, as well as alvars, prairies and occasionally grain crops such as barley. It prefers areas that are sparsely vegetated. Its nests are well-hidden in the field and woven from grasses in a small cup-like shape.	The Grasshopper Sparrow can be found throughout southern Ontario, but only occasionally on the Canadian Shield. It is most common where grasslands, hay or pasture dominate the landscape. The Grasshopper Sparrow is a short-distance migrant and leaves Ontario in the fall to migrate to the southestern United States and Central America for the winter.	Observed during field investigations	Yes Open meadows within the study area may provide suitable habitat.	Yes This species was observed during field investigations. Yes A cultural meadow community provides suitable habitat.
Birds	Henslow's Sparrow Ammodramus henslowii	END	END Schedule 1	END	In Ontario, the Henslow's Sparrow lives in open fields with tall grasses, flowering plants, and a few scattered shrubs. It has also been found in abandoned farm fields, pastures, and wet meadows. It tends to avoid fields that have been grazed or are crowded with trees and shrubs. It prefers extensive, dense, tall grasslands where it can more easily conceal its small ground nest. This species can typically be associated with the following ELC communities: TPO, CUM, and MAM that are a minimum of 30 ha in size with vegetation that is over 30cm in height with a thick thatch layer and a lack of emergent woody vegetation.	The Henslow's Sparrow breeds in the northeastern and east-central United States, and reaches its northeastern limit in Ontario. It was once fairly common in scattered areas of suitable habitat south of the Canadian Shield. However, steep declines since the 1960s have all but wiped this bird out as a breeding species in Ontario. A few are still seen each spring at migration hotspots such as Point Pelee National Park, and a few may breed at selected locations.	SARO	No Open meadow habitat within the study area is not of sufficient size to support this species.	No This species was not observed during field investigations. Suitable habitat was not identified.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Birds	King Rail Rallus elegans	END	END Schedule 1	END	King Rails are found in densely vegetated freshwater marshes with open shallow water that merges with shrubby areas. They are sometimes found in smaller isolated marshes but most seem to prefer larger, coastal wetlands. Its nest is a dinner-plate sized platform made of plant material, placed just above the water in shrubs or clumps of other marsh plants. This species can typically be associated with the following ELC communities: MAS, SWT and MAM.	King Rails reach their northern limit in southern Ontario, where they are quite rare. Recent province-wide surveys suggest there are only about 30 pairs left, the majority of which are in the large wetlands bordering Lake St. Clair. Most of the remainder are found in several key coastal marshes along Lakes Erie and Ontario.	SARO	Yes The study area is in close proximity to wetland communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although thicket swamp communities may provide suitable habitat, the species was not detected during field investigations.
Birds	Least Bittern Ixobrychus exilis	THR	THR Schedule 1	THR	In Ontario, the Least Bittern is found in a variety of wetland habitats, but strongly prefers cattail marshes with a mix of open pools and channels. This bird builds its nest above the marsh water in stands of dense vegetation, hidden among the cattails. The nests are almost always built near open water, which is needed for foraging. This species eats mostly frogs, small fish, and aquatic insects. This species can typically be associated with the following ELC communities: MAS2-1, MAS3-1, SA and OAO.	In Ontario, the Least Bittern is mostly found south of the Canadian Shield, especially in the central and eastern part of the province. Small numbers also breed occasionally in northwest Ontario. This species has disappeared from much of its former range, especially in southwestern Ontario, where wetland loss has been most severe. In winter, Least Bitterns migrate to the southern United States, Mexico and Central America.	SARO	Yes The study area is in close proximity to wetland communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No No cattail marsh communities were identified.
Birds	Loggerhead Shrike Lanius ludovicianus	END	END Schedule 1	END	In Ontario, the Loggerhead Shrike prefers pasture or other grasslands with scattered low trees and shrubs. It lives in fields or alvars (areas of exposed bedrock) with short grass, which makes it easier to spot prey. It builds its nest in small trees or shrubs and hunts by waiting patiently in tree branches until it swoops down and attacks its unsuspecting prey – usually large insects, such as grasshoppers. Loggerhead Shrikes also require spiny, multi-branched shrubs where they can impale prey before eating it. Barbed wired fencing can also be used for this. This species can typically be associated with the following ELC communities: SWT, CUM, CUT, ALO and ALS.	The Loggerhead Shrike currently breeds in central and western North America. Until the 1970s, the Loggerhead Shrike could be found at many locations throughout southern Ontario and other parts of northeastern North America, but it has declined dramatically. Although the occasional bird is still found within the broader former range, most remaining Loggerhead Shrikes are now found in two core grassland habitats - the Carden Plain north of Lindsay, and the Napanee Limestone Plain. Every fall these birds migrate to the southern United States for the winter.	SARO	Yes The study area is in close proximity to thicket communities and may provide suitable habitat for this species.	No This species was not observed during field investigations. No Thicket communities identified are not of suitable composition.
Birds	Louisiana Waterthrush Parkesia motacilla	SC	SC Schedule 1	SC	The Louisiana Waterthrush is usually found in steep, forested ravines with fast-flowing streams. Although it prefers running water, especially clear, coldwater streams, it also less frequently inhabits heavily wooded, deciduous swamps having large pools of open water. It nests among the roots of fallen trees, in niches of stream banks, and in or under mossy logs. This species can typically be associated with the following ELC communities: FOD, FOM and SWD with fast flowing coldwater streams or large pools of open water.	In Canada, the Louisiana Waterthrush breeds only in southern Ontario, along the Niagara Escarpment, in woodlands along Lake Erie and scattered locations elsewhere. It probably nests sporadically in southwestern Quebec, but breeding there has never been confirmed. The Canadian breeding population is estimated to be between 105 and 195 pairs, which represents less than one per cent of the total continental population. Although the species has declined locally in some parts of its breeding range, due to habitat loss and degradation, overall population levels have been relatively stable in both Canada and much of the United States over the past 20 years.	SARO	Yes The study area is in close proximity to forested communities and may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although forest and swamp communities may provide suitable habitat, the species was not detected during field investigations.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Birds	Northern Bobwhite Colinus virginianus	END	END Schedule 1	END	Northern Bobwhites live in savannahs, grasslands, around abandoned farm fields, along brushy fencerows and other similar sites. Grasslands that are occasionally burned are particularly important because the fires help keep the habitat from becoming too forested. In such places, bobwhites can find most of their needs such as food, nesting cover, and places to hide and rest throughout the year. In severe winter conditions bobwhites sometimes need to move into small forest areas to find snow-free areas for foraging. Bobwhites lay up to 16 eggs in a shallow natural depression that they line with plant material and conceal with grasses and vines. This species can typically be associated with the following ELC communities: TPO, TPS, CUM, CUT, CUS and CUW.	The Northern Bobwhite is near its northern range limit in southern Ontario. This bird benefited greatly when the original forests were cleared and it expanded its range significantly in Ontario. At its peak over a century ago, its range in Ontario extended north to Georgian Bay and east to Kingston. This range has steadily retracted and now includes only the southwest corner of the province, mostly on Walpole Island, and possibly a few scattered locations nearby. Isolated sightings away from this area are usually a result of introductions or birds escaping from captivity.	SARO	Yes Open meadows within the study area may provide suitable habitat.	No This species was not observed during field investigations. No A meadow community identified is not of suitable composition.
Birds	Peregrine Falcon Falco peregrinus	SC	SC Schedule 1	SC	Peregrine Falcons usually nest on tall, steep cliff ledges close to large bodies of water. Although most people associate Peregrine Falcons with rugged wilderness, some of these birds have adapted well to city life. Urban peregrines raise their young on ledges of tall buildings, even in busy downtown areas. Cities offer peregrines a good year-round supply of pigeons and starlings to feed on. This species can be associated with the following ELC communities: CLO.	Although Peregrine Falcons now nest in and around Toronto and several other southern Ontario cities, the majority of Ontario's breeding population is found around Lake Superior in northwestern Ontario.	SARO	No There are no records of cliff habitat in the vincinity of the study area.	No This species was not observed during field investigations. Suitable habitat was not identified.
Birds	Prothonotary Warbler Protonotaria citrea	END	END Schedule 1	END	In Ontario, the Prothonotary Warbler is found in the warmer climate of the Carolinian deciduous forests. It nests in small, shallow holes, found low in the trunks of dead or dying trees standing in or near flooded woodlands or swamps. They will also readily use properly placed artificial nest boxes. Silver maple, ash, and yellow birch are common trees in these habitats. The Prothonotary is the only warbler in eastern North America that nests in tree cavities, where it typically lays four to six eggs on a cushion of moss, leaves and plant fibres. This species can typically be associated with the following ELC communities: FOD and SWD with standing water.	In Canada, the Prothonotary Warbler is only known to nest in southwestern Ontario, primarily along the north shore of Lake Erie. Over half of the small and declining population is found in Rondeau Provincial Park. In 2005, it was estimated that there were only between 28-34 individuals in Ontario.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although forest and swamp communities may provide suitable habitat, the species was not detected during field investigations.
Birds	Wood Thrush Hylocichla mustelina	SC	No Status	THR	The Wood Thrush can typically be found in the interior and along the edges of well-develoepd upland deciduous and mixed forests. Key elements of these forests include trees that are greater than 16 m in height, high variety of deciduous tree species, moderate subcanopy and shrub density, shade, fairly open forest floor, moist soils and decaying leaf litter. Wood Thrush is more likely to occur in larger forests but may also nest in 1 ha fragments and semi-wooded residential areas and parks. Smaller habitat fragments have lower fecundity when compared to larger fragments.[3] This species can typically be associated with the following ELC communities: FOD and FOM that are greater than 1 ha in size.	The Wood Thrush ranges across central and southern Ontario, southern Quebec, New Brunswick and southern Nova Scotia and the majority of the eastern United States. It winters in Central American between southern Mexico and Panama.[3]	OBBA	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous and mixed forest communities may provide suitable habitat, the species was not detected during field investigations.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Birds	Yellow-breasted Chat Icteria virens	END	SC Schedule 1	END	The Yellow-breasted Chat lives in thickets and scrub, especially locations where clearings have become overgrown. These birds spend their winters in coastal marshes. This species can typically be associated with the following ELC communities: CUT and SWT.	The Yellow-breasted Chat is found in much of the United States. In Canada, it lives in southern British Columbia, the Prairies, and southwestern Ontario, where it is concentrated in Point Pelee National Park and Pelee Island in Lake Erie.	SARO	Yes The study area is in close proximity to wetland communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although thicket swamp communities may provide suitable habitat, the species was not detected during field investigations.
Fish	Black Redhorse Moxostoma duquesnei	THR	No Schedule	THR	In Ontario, the Black Redhorse lives in pools and riffle areas of medium-sized rivers and streams that are usually less than two metres deep. These rivers usually have few aquatic plants, a moderate to fast current, and a sandy or gravel bottom. In the spring, it migrates to breeding habitat where eggs are laid on gravel in fast water. The winter is spent in deeper pools. Adults feed on crustaceans and aquatic insects, while the young fish feed on plankton.	In Canada, the Black Redhorse is found only in southwestern Ontario at a few locations in the Bayfield River, Maitland River, Ausable River, Grand River, Thames River, and Spencer Creek watersheds.	MNRF Aylmer district	Yes Potentially suitable habitat identified in the study area	Candidate Consultation with Aylmer district MNRF identified the presence of this species in the general project area.
Fish	Eastern Sand Darter Ammocrypta pellucida	END	THR Schedule 1	THR	The Eastern Sand Darter prefers shallow habitats in lakes, streams, and rivers with clean, sandy bottoms. It often buries itself completely in the sand. It feeds on aquatic insects, but due to its small mouth is limited in the size of prey it can eat. This species can typically be associated with the following ELC communities: OAO with sandy bottoms.	In Ontario, the Eastern Sand Darter is still found in Lake St. Clair, Lake Erie, Big Creek and in the Grand, Sydenham and Thames rivers. The species may have disappeared from several other rivers in southwestern Ontario.	DFO, SARO	Yes Potentially suitable habitat identified in the study area	N/A Species and habitat presence to be determined through agency consultation
Fish	Lake Sturgeon (Great Lakes-Upper St. Lawrence River population) Acipenser fulvescens	END	No Schedule, No Status	THR	The Lake Sturgeon lives almost exclusively in freshwater lakes and rivers with soft bottoms of mud, sand or gravel. They are usually found at depths of five to 20 metres. They spawn in relatively shallow, fast-flowing water (usually below waterfalls, rapids, or dams) with gravel and boulders at the bottom. However, they will spawn in deeper water where habitat is available. They also are known to spawn on open shoals in large rivers with strong currents. This species can be associated with the following ELC communities: OAO. Large lakes/rivers > 20m deep with soft mud, sand or gravel bottoms required.	In Ontario, the Lake Sturgeon is found in the rivers of the Hudson Bay basin, the Great Lakes basin and their major connecting waterways, including the St. Lawrence River. There are three distinct populations in Ontario: Great Lakes - Upper St. Lawrence River, Northwestern Ontario, and Southern Hudson Bay - James Bay.	SARO	No Suitable lacustrine or riverine habitat is not present within or adjacent to the study area.	N/A Species and habitat presence to be determined through agency consultation

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Fish	Northern Brook Lamprey Ichthyomyzon fossor	SC	SC Schedule 1	SC	The Northern Brook Lamprey inhabits clear, coolwater streams. The larval stage requires soft substrates such as silt and sand for burrowing which are often found in the slow-moving portions of a stream. Adults are found in areas associated with spawning, including fast flowing riffles comprised of rock or gravel. This species can typicallay be associated with the following ELC communiteis: OAO charaterized as clear, coolwater streams with silt and sand substrates.	The Northern Brook Lamprey lives in the eastern United States in the upper Mississippi and southern Hudson Bay drainages, ranging from Manitoba and the Great Lakes region south to Missouri, and east to the St. Lawrence River in Quebec. In Ontario, it lives in rivers draining into Lakes Superior, Huron and Erie, and the Ottawa River.	DFO, SARO	Yes Potentially suitable habitat identified in the study area	N/A Species and habitat presence to be determined through agency consultation
Fish	Northern Madtom Noturus stigmosus	END	END Schedule 1	END	The Northern Madtom usually lives in large creeks and rivers with a moderate to swift current, and a sand, gravel, or mud bottom. However, in Ontario, this fish has also been captured in the deeper waters of Lake St. Clair and the Detroit River. It prefers clean, unpolluted water but can tolerate slightly muddy water. Adults eat aquatic insects, crustaceans, and smaller fish. During the summer breeding season, Northern Madtoms normally build nests under large flat rocks and logs. This species can typically be associated with the following ELC communities: OAO with a moderate to swift current and a sand gravel or mud bottom.	In Canada, the Northern Madtom is only found in Ontario in the St. Clair River, Lake St. Clair, the Detroit River, and the Thames River. It has not been seen in the Sydenham River since 1975.	SARO	Yes Potentially suitable habitat identified in the study area	N/A Species and habitat presence to be determined through agency consultation
Fish	Silver Shiner Notropis photogenis	THR	SC Schedule 3	THR	Silver Shiners prefer moderate to large size streams with swift currents that are free of weeds and have clean gravel or boulder bottoms. They live in schools and feed on crustaceans and adult flies that fall in the water or fly just above the surface. In June or July, they spawn by scattering their eggs over gravel riffles. This species can typically be associated with the follwoing ELC communities: OAO charachterized as moderate to large streams with swift currents, no weeds and gravel or boulder substrates.	The Silver Shiner range includes east-central North America throughout the Ohio and Tennessee River drainage basins. In Ontario, it is found in the Thames and Grand Rivers, and in Bronte Creek and Sixteen Mile Creek, which flow into Lake Ontario.	NHIC, SARO, MNRF Aylmer district	Yes Potentially suitable habitat identified in the study area	Candidate Consultation with Aylmer district MNRF identified the presence of this species in the general project area.
Fish	Spotted Sucker Minytrema melanops	SC	SC Schedule 1	SC	The Spotted Sucker usually inhabits clear creeks and small to moderate sized rivers with sand, gravel or hard-clay bottoms, usually free of silt. However, in Ontario it has frequently been found in turbid habitats. In late spring and early summer, Spotted Suckers move to rocky riffle areas of streams to breed This species can typically be associated with the following ELC communities: OAO characterized as creeks or small to moderate sized rivers with clear water and sand, gravel or hard-clay substrates.	The Spotted Sucker range is restricted to the fresh waters of eastern and central North America from the lower Great Lakes east to Pennsylvania, south to the Gulf Coast and Florida, and west to Texas. In Canada, this species is limited to southwestern Ontario, where it is found in Lake St. Clair and western Lake Erie as well as the Detroit, St. Clair, Sydenham and Thames rivers.	DFO, SARO	Yes The study area contains water features which may provide suitable habitat for this species.	N/A Species and habitat presence to be determined through agency consultation

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Insects	Rusty-patched Bumble Bee Bombus affinis	END	END Schedule 1	END	This species, like other bumble bees, can be found in open habitat such as mixed farmland, urban settings, savannah, open woods and sand dunes. The most recent sightings have been in oak savannah, which contains both woodland and grassland flora and fauna. This species can typically be associated with the following ELC communities: CUM, TPO, TPS, TPW, CUS, SDO, SDS and SDT.	The Rusty-patched Bumble Bee was once widespread and common in eastern North America, found from southern Ontario south to Georgia and west to the Dakotas. The species has suffered rapid, severe decline throughout its entire range since the 1970s with only a handful of specimens collected in recent years in Ontario. The only sightings of this bee in Canada since 2002 have been at The Pinery Provincial Park on Lake Huron.	SARO	Yes Open meadows within the study area may provide suitable habitat.	No This species was not observed during field investigations. No A cultural meadow community idenitifed provides suitable habiat. However, the study area is outside the known range of this species.
Mammals	American Badger Taxidea taxus	END	END Schedule 1	END	In Ontario, badgers are found in a variety of habitats, such as tall grass prairie, sand barrens and farmland. These habitats provide badgers with small prey, including groundhogs, rabbits and small rodents. This speices can typically be associated with the following ELC communiteis: TPS1, CUM1, CUS, SBO with dry sandy soil.	In Ontario, the badger is found primarily in the southwestern part of the province, close to Lake Erie in Haldimand-Norfolk County. There are also badgers in northwestern Ontario in the Thunder Bay and Rainy River Districts. Badgers can travel sizeable distances and occupy large home ranges of many square kilometres. There are thought to be fewer than 200 in Ontario.	SARO	Yes Open meadows and agricultural fields within the study area may provide suitable habitat.	No This species was not observed during field investigations. No Although cultural meadow and agricultural fields may provide suitable habitat, no den sites were observed.
Mammals	Little Brown Myotis (Bat) Myotis lucifugus	END	No Status	END	Bats are nocturnal. During the day they roost in trees and buildings. They often select attics, abandoned buildings and barns for summer colonies where they can raise their young. Bats can squeeze through very tiny spaces (as small as six millimetres across) and this is how they access many roosting areas. Little brown bats hibernate from October or November to March or April, most often in caves or abandoned mines that are humid and remain above freezing. This species can typically be associated with any community where suitable roosting (i.e. cavity trees, houses, abandoned buildings, barns, etc.) habitat is available.	The little brown bat is widespread in southern Ontario and found as far north as Moose Factory and Favourable Lake. Outside Ontario, this bat is found across Canada (except in Nunavut) and most of the United States.	Bat Conservation International Species Range Maps MNRF Habitat Management Guidelines for Bats of Ontario (2015)	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. Candidate Forest and swamp communities provide suitable habitat.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Mammals	Eastern Small-footed Myotis Myotis leibii	END			In the spring and summer, eastern small-footed bats will roost in a variety of habitats, including in or under rocks, in rock outcrops, in buildings, under bridges, or in caves, mines, or hollow trees. These bats often change their roosting locations every day. At night, they hunt for insects to eat, including beetles, mosquitos, moths, and flies. In the winter, these bats hibernate, most often in caves and abandoned mines. They seem to choose colder and drier sites than similar bats and will return to the same spot each year.	The eastern small-footed bat has been found from south of Georgian Bay to Lake Erie and east to the Pembroke area. There are also records from the Bruce Peninsula, the Espanola area, and Lake Superior Provincial Park. Most documented sightings are of bats in their winter hibernation sites.	Bat Conservation International Species Range Maps MNRF Habitat Management Guidelines for Bats of Ontario (2015)	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Suitable rocky features were not identified.
Mammals	Northern (Long-eared) Myotis (Bat) Myotis septentrionalis	END	No Status	END	Northern long-eared bats are associated with boreal forests, choosing to roost under loose bark and in the cavities of trees. These bats hibernate from October or November to March or April, most often in caves or abandoned mines. This species can typically be associated with the following ELC communities: FOC, FOM, FOD, SWC, SWM and SWD where suitable roosting (i.e. cavity trees and trees with loose bark) habitat is available.	The northern long-eared bat is found throughout forested areas in southern Ontario, to the north shore of Lake Superior and occasionally as far north as Moosonee, and west to Lake Nipigon. This bat is found in all Canadian provinces as well as the Yukon and Northwest Territories.	Bat Conservation International Species Range Maps MNRF Habitat Management Guidelines for Bats of Ontario (2015)	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. Candidate Forest and swamp communities provide suitable habitat.
Mammals	Woodland Vole Microtus pinetorum	SC	SC Schedule 1	SC	In Ontario, the Woodland Vole lives in mature deciduous forest in the Carolinian region where there is a deep litter layer that allows it to burrow. This species can typically be associated with the following ELC communities: FOD with a deep leaf litter and loose soils.	In Ontario, it is known to exist at 30 sites from the Municipality of Chatham-Kent and Lambton County, east to Haldimand County, and north to Halton Regional Municipality and the City of Hamilton. Because it spends most of its time below ground, this species is difficult to spot and may have been missed at other locations in the province.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No Suitable habitat was not observed during 2017 field investigations. Soil in the general area consists of fine sandy loam, very fine sandy loam and very fine sand and there is minimal leaf litter cover.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Mammals	Tri-colored Bat Perimyotis subflavus	END	END Schedule 1	END	In Ontario, the Tri-colored Bat lives in forested habitats, forming day roosts and maternity colonies in older forest within foliage or in high tree cavities, occasionally also in barns or other structures. This species forages over water and along streams in forests. At the close of the summer season, this species congregate at a location to swarm, usually near caves, mines or underground locations where they will winter; it has a strong fidelity to its winter hibernation sites. This bat overwinters in caves, typically individually instead of as a group.	This bat is found in Southern Ontario and ranging as far north as Espanola, near Sudbury, having a scattered distribution. Its broad range sweeps from eastern North America down to Central America.	Bat Conservation International Species Range Maps MNRF Habitat Management Guidelines for Bats of Ontario (2015)	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. Candidate Forest and swamp communities provide suitable habitat.
Molluscs	Kidneyshell Ptychobranchus fasciolaris	END	END Schedule 1	END	The Kidneyshell is typically found in small to medium sized rivers. It prefers shallow, clear, swift-moving water with gravel and sand. It also used to occur on gravel shoals in the Great Lakes. All mussels filter water to find food, such as bacteria and algae. Mussel larvae are parasitic and must attach to a fish host, where they consume nutrients from the fish body until they transform into juvenile mussels that drop off of the fish. The Kidneyshell has three known fish hosts in Canada: Blackside Darter, Fantail Darter, and Johnny Darter. The presence of fish hosts is one of the key features for an area to support a healthy mussel population. This species can typically be associated with the follwoing ELC communites: OAO with shallow, clear, swift flowing water with a gravel and sand substrate.	In Canada, the Kidneyshell is currently found in four areas in southwestern Ontario. There are reproducing populations in the East Sydenham River and in the Ausable River. Small populations are also found in St. Clair River delta in Lake St. Clair and a tributary of the Thames River. The species no longer occurs in Lake Erie or the Detroit, Thames, Grand, Welland or Niagara rivers.	SARO	Yes Potentially suitable habitat identified in the study area	N/A Species and habitat presence to be determined through agency consultation
Molluscs	Northern Riffleshell Epioblasma torulosa rangiana	END	END Schedule 1	END	In Ontario, the Northern Riffleshell is found in riffle areas within rivers or streams with rocky, sand, or gravel bottoms. Like all freshwater mussels, this species feeds on algae and bacteria that it filters out of the water. Mussel larvae are parasitic and must attach to a fish host, where they consume nutrients from the fish body until they transform into juvenile mussels and drop off. The Northern Riffleshell is believed to have several potential fish hosts in Ontario: Blackside Darter, Fantail Darter, Iowa Darter, Johnny Darter, Rainbow Darter, Logperch, Brown Trout and Mottled Sculpin. The presence of fish hosts is one of the key features for an area to support a healthy mussel population. This species can typically be associated with the following ELC communities: OAO in riffles with rocky, sand or gravel bottoms.	In North America, the Northern Riffleshell's range has decreased by 95 per cent. In Ontario, it is now only found in the Sydenham River and Ausable River in southwestern Ontario. Populations in Lake Erie, Lake St. Clair and the Detroit River have disappeared.	SARO	Yes Potentially suitable habitat identified in the study area	N/A Species and habitat presence to be determined through agency consultation

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Molluscs	Rainbow Mussel Villosa iris	SC	END Schedule 1	SC	The Rainbow mussel prefers small to medium-sized rivers with a moderate to strong current and sand, rocky, or gravel bottoms. It is found in or near riffle areas and along the edges of vegetation in water less than one metre deep. All mussels filter water to find food, such as bacteria and algae. Mussel larvae must attach to a fish, called a host, where they consume nutrients from the fish body until they transform into juvenile mussels and then drop off. The Rainbow mussel uses a variety of fish hosts in Ontario, including Striped shiner, Smallmouth bass, Largemouth bass, Green sunfish, Greenside darter, Rainbow darter, and Yellow perch.	In Canada, the Rainbow mussel is found only in Ontario in the Ausable, Bayfield, Detroit, Grand, Maitland, Moira, Niagara, Salmon, Saugeen, Sydenham, Thames and Trent rivers and in Lake St. Clair. It may no longer exist in the St. Clair, Detroit and Niagara rivers, and Lake Erie.	DFO	Yes Potentially suitable habitat identified in the study area	N/A Species and habitat presence to be determined through agency consultation
Molluscs	Rayed Bean Villosa fabalis	END	END Schedule 1	END	The Rayed Bean is typically found buried in sand or gravel in shallow, clear headwaters and riffle areas of small tributaries. It is often found buried among the roots of aquatic plants. The Rayed Bean filters water to find food, such as bacteria and algae. Mussel larvae are parasitic and must attach to a fish host, where they consume nutrients from the fish body until they transform into juvenile mussels and drop off. In Ontario, the fish hosts of the Rayed Bean include: the Brook Stickleback, Largemouth Bass, Greenside Darter, Johnny Darter, Rainbow Darter, Logperch, and Mottled Sculpin. The presence of fish hosts is one of the key features for an area to support a healthy mussel population. This species can typically be associated with the following ELC communities: OAO that are clear headwaters and riffle areas of small tributaris with a sand or gravel substrate and the presence of fish host species.	In Canada, the Rayed Bean is found only in southern Ontario, in the East Sydenham River and a small section of the North Thames River. The species has been lost from Lake Erie and the Detroit River.	DFO, SARO, MNRF Aylmer district	Yes Potentially suitable habitat identified in the study area	Candidate Consultation with Aylmer district MNRF identified the presence of this species in the general project area.
Molluscs	Round Hickorynut Obovaria subrotunda	END	END Schedule 1	END	In Ontario, the Round Hickorynut is mainly found in rivers with clay, sand, or gravel bottoms. It also lives in shallow areas of lakes with firm sand. It prefers moderately fast moving water. Like all mussels, this species filters water to find food, such as bacteria and algae. Mussel larvae are parasitic and must attach to a fish host, where they consume nutrients from the fish body until they transform into juvenile mussels and drop off. The fish hosts of the Round Hickorynut in Canada have not been confirmed but may include the Greenside Darter and the Eastern Sand Darter, which is also a species at risk. The presence of fish hosts is one of the key features for an area to support a healthy mussel population. This species can typically be associated with the following ELC communities: OAO that are rivers with clay, sand or gravel bottoms or shallow areas of lakes with a firm sand substrate.	The Round Hickorynut has been lost from 90 per cent of its former range in Canada. It is now found only in the Sydenham River and the St. Clair River delta in Lake St. Clair in southwest Ontario. Populations have been lost from the rest of Lake St. Clair, the Thames River, the Detroit River, Lake Erie and the Grand and Niagara River drainages.	SARO	Yes Potentially suitable habitat identified in the study area	N/A Species and habitat presence to be determined through agency consultation
Molluscs	Round Pigtoe Pleurobema sintoxia	END	END Schedule 1	END	The Round Pigtoe is usually found in rivers of various sizes with deep water and sandy, rocky, or mud bottoms. Like all freshwater mussels, this species feeds on algae and bacteria that it filters out of the water. Mussel larvae are parasitic and must attach to a fish host, where they consume nutrients from the fish body until they transform into juvenile mussels and drop off. Known fish hosts of the Round Pigtoe include: Bluegill, Spotfin Shiner, Bluntnose Minnow, and Northern Redbelly Dace. The presence of fish hosts is one of the key features for an area to support a healthy mussel population. This species can typically be associated with the following ELC commuinites: OAO rivers with deep water and sandy, rocky or mud substrates.	In Canada, Round Pigtoe are found only in southwestern Ontario, mainly in the St. Clair River delta and the Sydenham River but small populations still exist in the Grand and Thames rivers and in shallow areas near the shorelines of Lake Erie and Lake St. Clair.	DFO, SARO	Yes Potentially suitable habitat identified in the study area	N/A Species and habitat presence to be determined through agency consultation

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Molluscs	Salamander Mussel Simpsonaias ambigua	END	END Schedule 1	END	The Salamander Mussel prefers waterbodies with a soft bottom and a swift current and is often found burrowed in sand or silt under large rocks in shallow areas, on gravel bars, or in mud. It is found in streams that support the Mudpuppy, an aquatic salamander. Salamander Mussel larvae are parasitic and use the Mudpuppy as a host, where they consume nutrients from the salamander's body until they transform into juvenile mussels and drop off. Adult mussels feed by filtering algae and bacteria from the water. This species can typically be associated with the following ELC communities: OAO with a soft sand or silt substrate and a swift current.	In Ontario, the Salamander Mussel occurs only in the East Sydenham River and at one location in the Thames River. The species has disappeared from the Detroit River due to Zebra Mussel impacts, but it may remain in the small area of the St. Clair River delta in Lake St. Clair.	SARO	Yes Potentially suitable habitat identified in the study area	N/A Species and habitat presence to be determined through agency consultation
Molluscs	Snuffbox Epioblasma triquetra	END	END Schedule 1	END	The Snuffbox is typically found in small to medium-sized rivers in shallow riffle areas. They prefer clean, clear, swift-flowing water and firm rocky, gravel or sand river bottoms. Mussel larvae are parasitic and must attach to a fish host, where they consume nutrients from the fish body until they transform into juvenile mussels and drop off. In Ontario, the main fish host for Snuffbox is the Logperch but other host fish may include various darter species, Largemouth Bass, Mottled Sculpin and Brook Stickleback. Like all freshwater mussels, the Snuffbox feeds on algae and bacteria that it filters out of the water. This speices can typically be associated with the following ELC communities: OAO characterized as small to medium sized rivers with clear, swift flowing water and firm rocky, gravel or sandy substrates.	In Canada, the Snuffbox is now only found in the East Sydenham River and the Ausable River in southwest Ontario. The total population size is very small. Historically, the species was also found in Lake Erie, Lake St. Clair, and the Thames, Detroit, Grand, and Niagara rivers.	SARO	Yes Potentially suitable habitat identified in the study area	N/A Species and habitat presence to be determined through agency consultation
Molluscs	Wavy-rayed Lampmussel Lampsilis fasciola	THR	SC Schedule 1	SC	The Wavy-rayed Lampmussel is usually found in small to medium rivers with clear water. It lives in shallow riffle areas with clean gravel or sand bottoms. Like all mussels, this species filters water to find food, such as bacteria and algae. Mussel larvae are parasitic and must attach to a fish host, where they consume nutrients from the fish body until they transform into juvenile mussels and drop off. The Wavy-rayed Lampmussel's fish hosts are the Largemouth Bass and Smallmouth Bass. The presence of fish hosts is one of the key features for an area to support a healthy mussel population. This species can typically be associated with the following ELC communities: OAO characterized as small to medium rivers with clean water and riffles with gravel or sand substrates.	In Canada, the Wavy-rayed Lampmussel is found only in Ontario in the Grand, upper Thames, Maitland, and Ausable rivers, and the St. Clair River delta in Lake St. Clair. It has disappeared from Lake Erie, the Detroit River and most of Lake St. Clair, and may also be gone from the Sydenham River.	NHIC, DFO, SARO, MNRF Aylmer district	Yes Potentially suitable habitat identified in the study area	Candidate Consultation with Aylmer district MNRF identified the presence of this species in the general project area.
Mosses	Spoon-leaved Moss Bryoandersonia illecebra	END	END Schedule 1	END	Spoon-leaved Moss grows in a range of habitat types but most Canadian populations are located on soil in low-lying areas that are seasonally flooded under trees or shrub thickets. It is often found in close proximity to a species of moss called narrow-leaved wetland plume moss, which is associated with swamps, marshes, and wet meadows. This species can typically be associated with the following ELC communities: SWD, SWT, MAS and MAM that are seasonally flooded.	Spoon-leaved Moss is found only in eastern North America, from southern Ontario south to Texas and Florida. In Canada, it is restricted to a few sites in southern Ontario – Elgin, Essex and Welland counties, and the Niagara Region.	SARO, MNRF Aylmer district	Yes The study area is in close proximity to wetland communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. Candidate Consultation with Aylmer district MNRF identified the presence of this species in the general project area. Deciduous swamp and thicket swamp communities provide suitable habitat.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Plants	American Chestnut Castanea dentata	END	END Schedule 1	END	The American Chestnut prefers dryer upland deciduous forests with sandy, acidic to neutral soils. In Ontario, it is only found in the Carolinian Zone between Lake Erie and Lake Huron. The species grows alongside Red Oak, Black Cherry, Sugar Maple, American Beech and other deciduous tree species. This species can typically be associated with the following ELC communities: FOD with dry sandy soil.	The American Chestnut has almost disappeared from eastern North America due to an epidemic caused by a fungal disease called the chestnut blight (Cryphonectria parasitica). In Canada, the American Chestnut is restricted primarily to southwestern Ontario. Based on information available in 2004, it was estimated that there are 120 to 150 mature trees and 1,000 or more small, young trees in the province.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous forest communities may provide suitable habitat, the species was not detected during field investigations.
Plants	Blue Ash Fraxinus quadrangulata	SC	SC Schedule 1	SC	In Ontario, Blue Ash grows in deciduous floodplain forests, and along sandy beaches and on limestone outcrops associated with Lake Erie. This species can typically be associated with the following ELC communiteis: BBO, BBS, BBT, SDO, SDS, SDT, FOD6, FOD7, FOD8, FOD9, ALO, ALS and ALT.	The range of Blue Ash extends from southwestern Ontario south to Oklahoma and Georgia. In Canada, it occurs only in southwestern Ontario, at the northern limits of its range, where about 56 occurrences are known.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous forest communities may provide suitable habitat, the species was not detected during field investigations.
Plants	Broad Beech Fern Phegopteris hexagonoptera	SC	SC Schedule 3	SC	The Broad Beech Fern prefers to grow in rich soils in deciduous forests, often in areas dominated by maple and beech trees. It requires moist soil and usually grows in full shade. This species can typically be associated with the following ELC communities: FOD5 and FOD6 with moist soils and closed canopies.	The Broad Beech Fern grows in eastern North America from the southern Great Lakes region west to southeast Kansas and northeast Oklahoma, south to northeast Texas and the Gulf Coast and east to the Atlantic coast. In Ontario, the species is found in forest remnants in southern Muskoka, along Lake Erie, and in the eastern Lake Ontario-St. Lawrence River region.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Deciduous forest communities identified are not of suitable composition to support this species.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Plants	Climbing Prairie Rose Rosa setigera	SC	SC Schedule 1	SC	The Climbing Prairie Rose is typically found in open habitats with moist heavy clay to clay-loam soils such as old fields, abandoned agricultural land, as well as prairie remnants and shrub thickets. This rose depends on areas being kept open by periodic fire or other disturbances. This species can typically be associated with the following ELC communities: CUM, CUT, and TPO with moist heavy clay to clay-loam soils.	In Ontario the Climbing Prairire Rose can be found in south western Ontario between Windsor and Chatham, on Walpole Island and near Belville.	SARO	Yes Open meadows within the study area may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although a cultural meadow community may provide suitable habitat, the species was not detected during field investigations.
Plants	Crooked-stem Aster Symphyotrichum prenanthoides	THR	THR Schedule 1	SC	Crooked-stem Aster grows in rich, sandy soil at the edge of forests or in sunny openings within forests. It also grows in wet areas along the banks of rivers and streams, and is sometimes found along roadsides.	The Crooked-stem Aster range includes the eastern United States, from New York south to North Carolina and Tennessee, and west to Indiana. There is a separate population in the American Midwest within Wisconsin, Minnesota, Iowa and Illinois. In Canada, the Crooked-stem Aster is only found in southwestern Ontario. About 22 populations were believed to exist in 2002, most of these in Elgin County.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although decidous and mixed forest communities may provide suitable habitat, the species was not detected during field investigations.
Plants	Dense Blazing Star Liatris spicata	THR	THR Schedule 1	THR	In Ontario, Dense Blazing Star grows in moist prairies, grassland savannahs, wet areas between sand dunes, and abandoned fields. This plant does not do well in the shade and is usually found in areas that are kept open and sunny by fire, floods, drought, or grazing. This species can typically be associated with the following ELC cmmuniteis: TPO2, TPS2, SDO and CUM with moist soils.	Dense Blazing Star is found only in North America. In Canada, it occurs naturally only in southwest Ontario, mainly in the area between Lake St. Clair, Lake Huron and Lake Erie. There are believed to be 11 to 13 populations in the province with six populations known to have been lost.	SARO	Yes Open meadows within the study area may provide suitable habitat for this species.	No This species was not observed during field investigations. No Potential habitat is likely too dry to support this species.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Plants	Drooping Trillium Trillium flexipes	END	END Schedule 1	END	Drooping Trillium grows on damp sandy soil in mature, deciduous forests that are usually close to a river or stream. It is found in Carolinian forests with Maple, White Ash, Basswood, Hackberry, White Elm, and Blue Ash trees. It shares the forest floor with other native plants including Ostrich Fern, Wild Ginger and Jack-in-the-pulpit. This species can typically be associated with the following ELC communities: FOD4-2, FOD4-3, FOD5, FOD6 and FOD7 that are mature and have sandy soils, typically near a river or stream with the associate species listed above.	In Canada, Drooping Trillium only grows in southwestern Ontario in the warmer climate of the Carolinian forest. There were once six known locations in the province, but today there are only two. A total of 1465 flower stems were reported in 2007. Both populations along the Sydenham River in Middlesex County and along the Thames River in Elgin County are believed to be reproducing successfully.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous forest communities may provide suitable habitat, the species was not detected during field investigations.
Plants	Eastern Flowering Dogwood Cornus florida	END	END Schedule 1	END	Eastern Flowering Dogwood grows under taller trees in mid-age to mature deciduous or mixed forests. It most commonly grows on floodplains, slopes, bluffs and in ravines, and is also sometimes found along roadsides and fencerows. This species can typically be associated with the following ELC communities: FOD and FOM.	In Canada, it can only be found in southern Ontario in the Carolinian Zone (the small area of Ontario southwest of Toronto to Sarnia down to the shores of Lake Erie).	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous and mixed forest communities may provide suitable habitat, the species was not detected during field investigations.
Plants	False Hop Sedge Carex lupuliformis	END	END Schedule 1	END	In Canada, this plant most often grows in riverine swamps and marshes, and around temporary forest ponds. It prefers open areas and areas under forest canopy openings, with lots of sunlight. This species can typically be associated with the following ELC communities: SWD and MAS lots of sunlight.	False Hop Sedge ranges from Florida and Texas north to Quebec and Ontario. In Ontario, seven occurrences are known to persist. In Quebec, there are three persisting populations and three populations that are being restored where False Hop Sedge is believed to have been extirpated. The largest populations occur in southern Ontario.	SARO	Yes The study area is in close proximity to wetland communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous forest and swamp communities may provide suitable habitat, the species was not detected during field investigations.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Plants	False Rue-anemone Enemion biternatum	THR	THR Schedule 1	THR	False Rue-anemone grows in deciduous forests and thickets with rich, moist soil, often in valleys, floodplains and ravine bottoms. This species is frequently found close to watercourses within mature forests with lots of maple and beech trees. It prefers partial sun or somewhat shady conditions. This species can typically be associated with the following ELC communities: FOD2, FOD4, FOD5, FOD6, FOD7 and FOD9.	In Canada, based on information available in 2003, False Rue-anemone is believed to occupy only six places in southwestern Ontario, all in the Carolinian region. Some sites support tens of thousands of plants but they are often densely clustered into a small area.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous forest communities may provide suitable habitat, the species was not detected during field investigations.
Plants	Green Dragon Arisaema dracontium	SC	SC Schedule 3	SC	The Green Dragon grows in somewhat wet to wet deciduous forests along streams, particularly maple forest and forest dominated by Red Ash and White Elm trees. This species can typically be associated with the following ELC communities: FOD6, FOD7, FOD8, FOD9 and SWD with moist soils.	Primarily a plant of the southern United States, the Green Dragon is found from the Great Lakes region and southern Quebec east to the Atlantic coast, south to Florida and the Gulf coast, and west to Texas and Nebraska. In Ontario, it is believed to still occur at about 30 to 35 sites in the southwestern part of the province.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous forest and swamp communities may provide suitable habitat, the species was not detected during field investigations.
Plants	Heart-leaved Plantain Plantago cordata	END	END Schedule 1	END	A semi-aquatic plant, Heart-leaved Plantain is found in relatively undisturbed wet woods, often along the rocky or gravelly limestone beds of shallow, slow-moving clear streams. Moisture is generally always present above or just below the soil surface. The most common trees in Ontario woodlots associated with this plant are Sugar Maple (Acer saccharum), Silver Maple (Acer saccharinum), Red Maple (Acer rubrum), Blue-beech (Carpinus caroliniana), Shagbark Hickory (Carya ovata), White Ash (Fraxinus americana), Black Ash (F. pennsylvanica) and Basswood (Tilia americana). This species can typically be associated with the following ELC communities: FOD6, FOD7, FOD9, SWD2-2 and SWD3-3.	In Canada, Heart-leaved Plantain grows in a few locations in southwestern Ontario near Windsor, between Chatam and London and near the Grand Bend area.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous forest communities may provide suitable habitat, the species was not detected during field investigations.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Plants	Kentucky Coffee-tree Gymnocladus dioicus	THR	THR Schedule 1	THR	Kentucky Coffee-tree is found in a variety of habitats, but grows best on moist rich soil. Consequently, it is often found in floodplains, though it will tolerate shallow rocky or sandy soils. It is shade-intolerant, and therefore grows along the edges of woodlot or relies on canopy openings in forests and woodlots. This species can typically be associated with the following ELC communites: FOD typically on moist rich soils along forest edges or in forest openings.	The Kentucky Coffee-tree is rare throughout its range, which extends from the southern Great Lakes region east to New York in scattered localities, south to Oklahoma and Arkansas, and west to Kansas and Nebraska. In Canada, it is only found in southwest Ontario where it was documented at 20 locations in 2000.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous forest communities may provide suitable habitat, the species was not detected during field investigations.
Plants	Large Whorled Pogonia Isotria verticillata	END	END Schedule 1	END	In Ontario, Large Whorled Pogonia has been found in deciduous or mixed forests with sandy soil and a thick layer of leaf litter. A relatively open forest canopy is required so that enough light can reach the plant. This species can typically be associated with the following ELC communities: FOM and FOD with sandy soils, a thick leaf litter and a relatively open forest canopy.	Large Whorled Pogonia ranges from New England and Michigan south to Texas and Georgia. In Canada, there are three records in southwestern Ontario. The last recorded sighting of Large Whorled Pogonia in Ontario was in 1996, when a single plant was found.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous and mixed forest communities may provide suitable habitat, the species was not detected during field investigations.
Plants	Red Mulberry Morus rubra	END	END Schedule 1	END	In Ontario, Red Mulberry grows in moist, forested habitats and on both sandy and limestone-based loamy soils. It is often found in areas where the forest canopy is quite open and allows lots of sunlight to reach the forest floor, but it will tolerate some shade. This species can typically be associated with the follwoing ELC communities: FOD6, FOD7, FOD8 and FOD9.	Red Mulberry occurs in eastern North American forests. In Canada, it is only found in the Carolinian Zone (the small area of Ontario southwest of Toronto to Sarnia down to the shores of Lake Erie) near rivers, the shores of Lake Erie, and the slopes of the Niagara Escarpment.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous forest communities may provide suitable habitat, the species was not detected during field investigations.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Plants	Riddell's Goldenrod Solidago riddellii	SC	SC Schedule 1	SC	Riddell's Goldenrod prefers open tallgrass prairie habitat with moist to wet calcium-rich soils. In Ontario, it also occurs in roadside ditches and along railway right-of-ways. This species can typically be associated with the follwoing ELC communities: TP2, CUM1-1 and MAM2 with moist soils.	Riddell's Goldenrod range extends across the midwest United States, from Ohio west to South Dakota and south to Arkansas. In Canada, populations are restricted to southwestern Ontario and southeastern Manitoba.	SARO	Yes Open meadows within the study area may provide suitable habitat for this species.	No This species was not observed during field investigations. No Potential habitat is likely too dry to support this species.
Plants	Tuberous Indian-plantain Arnoglossum plantagineum	SC	SC Schedule 1	SC	This species prefers open sunny areas in wet, calcium-rich meadows or shoreline fens. In Ontario, it grows along river banks and in wetlands near Lake Huron. This species can typically be associated with the following ELC communities: MAM and FEO.	In the United States, the range of the Tuberous Indian-plantain extends from Ohio and Michigan west to South Dakota, south to Texas and Alabama and east to the Appalachians. In Canada, it only grows in southern Ontario, where it is believed to still occur at about 18 sites near Lake Huron, most of them on the west side of the Bruce Peninsula.	SARO	Yes The study area is in close proximity to wetland communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Suitable wetland communities were not identified.
Plants	Willowleaf Aster Symphyotrichum praealtum	THR	THR Schedule 1	THR	In Ontario, the Willowleaf Aster is found in openings of oak savannahs, a very rare type of vegetation community containing many tallgrass prairie herbs and oak trees. It has also been found along railways, roadsides and in abandoned farm fields. This species can typically be associated with the following ELC communities: TPO, TPS and CUM.	In Canada, the Willowleaf Aster is believed to exist at about 12 locations in southwest Ontario, in Lambton, Essex and Middlesex Counties and the Municipality of Chatham-Kent. Additional populations may no longer exist. The largest populations are in the greater Ojibway Prairie Complex of Windsor and on Walpole Island. The population size is unknown. The Willowleaf Aster is common in the Midwestern United States.	SARO	Yes Open meadows within the study area may provide suitable habitat for this species.	No This species was not observed during field investigations. No Potential habitat is likely too dry to support this species.
Plants	Wood-poppy Stylophorum diphyllum	END	END Schedule 1	END	In Ontario, Wood-poppy is found in rich mixed deciduous woodlands, forested ravines and slopes, and along wooded streams. It is possible that Wood-poppy is still found in these areas because they were unsuitable for agriculture, rather than being reflective of its true habitat requirements. Wood-poppy grows in full shade, although the cultivated variety does well in partial sun. Associated dominant trees include: Sugar Maple, White Ash, American Beech, Black Cherry, and Hackberry. This species can typically be associated with the following ELC communities: FOM2-2, FOM3-2, FOM6-1, FOM7-1, FOD4 and FOD5.	In Canada, there are only three known populations of Wood-poppy found in southwestern Ontario, all in the county of Middlesex.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous forest communities may provide suitable habitat, the species was not detected during field investigations.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Reptiles	Blanding's Turtle Emydoidea blandingii	THR	THR Schedule 1	THR	Blanding's Turtles live in shallow water, usually in large wetlands and shallow lakes with lots of water plants. It is not unusual, though, to find them hundreds of metres from the nearest water body, especially while they are searching for a mate or traveling to a nesting site. Blanding's Turtles hibernate in the mud at the bottom of permanent water bodies from late October until the end of April. This species can typically be associated with the following ELC communities: SWT2, SWT3, SWD, SWM, MAS2, SAS1, SAM1, where open water is present.	The Blanding's Turtle is found in and around the Great Lakes Basin, with isolated populations elsewhere in the United States and Canada. In Canada, the Blanding's Turtle is separated into the Great Lakes-St. Lawrence population and the Nova Scotia population. Blanding's Turtles can be found throughout southern, central and eastern Ontario.	NHIC, ORAA, SARO, MNRF Aylmer district	Yes The study area is in close proximity to wetland communities which may provide suitable habitat for this species.	Yes This species was observed during field investigations. Yes Deciduous swamp and swamp thicket communities, as well as ponds within the wetlands, provide suitable habitat.
Reptiles	Butler's Gartersnake Thamnophis butleri	END	END Schedule 1	END	The Butler's Gartersnake prefers open, moist habitats, such as dense grasslands and old fields, with small wetlands where it can feed on leeches and earthworms. Burrows made by small mammals and even crayfish are sometimes used as hibernation sites, called hibernacula. This species is also commonly found in rock piles or old stonewalls. This species can typically be associated with the followin ELC communities: CUM and MAM.	The only place in the world where Butler's Gartersnake is found is in the lower Great Lakes region. In Ontario, this snake is concentrated in two areas: within 10 kilometres of the Detroit River, Lake St. Clair, the St. Clair River, and Lake Huron from Amherst Point to Errol, in Essex and Lambton counties and the Luther Marsh in Dufferin and Wellington counties. Population sizes can vary. Estimates done at several sites in Ontario in 1997 ranged between 50 and 900 snakes. At some sites it is considered to be locally common.	SARO	Yes Open meadows within the study area may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although cultural meadow habitat is present, the study area is outside the known range of this species.
Reptiles	Common Five-lined Skink (Carolinian population) Plestiodon fasciatus	END	END Schedule 1	END	Common Five-lined Skinks like to bask on sunny rocks and logs to maintain a preferred body temperature (28-36°C). During the winter, they hibernate in crevices among rocks or buried in the soil. There are two populations of Common Five-lined Skink in Ontario and they each occupy different types of habitat. The Carolinian population can be found under woody debris in clearings with sand dunes, open forested areas, and wetlands. This species can typically be associated with the following ELC communities: SDO, SDS, SDT, TPS, CUS, CUW, FOM, FOD and MAM where suitable cover and basking habitat is present.	In Canada, the species is limited to two distinct areas, along the southern margin of the Canadian Shield, and in the Carolinian Zone where it is found near the shores of Lakes Erie, St. Clair and Huron.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Potential forest habitat has a dense canopy and is too shaded to provide suitable habitat.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Reptiles	Eastern Musk Turtle (Stinkpot) Sternotherus odoratus	THR	THR Schedule 1	SC	Eastern Musk Turtles are found in ponds, lakes, marshes and rivers that are generally slow-moving have abundant emergent vegetation and muddy bottoms that they burrow into for winter hibernation. Nesting habitat is variable, but it must be close to the water and exposed to direct sunlight. Nesting females dig shallow excavations in soil, decaying vegetation and rotting wood or lay eggs in muskrat lodges, on the open ground or in rock crevices. This species can typically be assocaited with the following ELC communities: MAS, OAO, SAS, SAM and SAF. Nesting habitat can be any upland areas adjacent these area that are exposed to direct sunlight.	In Canada, the Eastern Musk Turtle is found mostly along the southern edge of the Canadian Shield in Ontario and Quebec. In Ontario, it also occurs at various locations throughout southwestern and eastern Ontario. The limited data available indicate that the stinkpot has disappeared from much of its original range in southwestern Ontario.	SARO	Yes The study area is in close proximity to wetland communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous swamp and swamp thicket communities, as well as ponds within the wetlands, may provide suitable habitat, the species was not detected during field investigations.
Reptiles	Eastern Ribbonsnake Thamnophis sauritus	SC	SC Schedule 1	SC	The Eastern Ribbonsnake is usually found close to water, especially in marshes, where it hunts for frogs and small fish. A good swimmer, it will dive in shallow water, especially if it is fleeing from a potential predator. At the onset of cold weather, these snakes congregate in underground burrows or rock crevices to hibernate together. This species can typically be associated with the following ELC communities: FOC, FOM, FOD, SWC, SWM, SWD, MAM, MAS, OAO, SAS, SAM and SAF containing or near year round standing or flowing water.	The Eastern Ribbon Snake is found from southern Ontario west to Michigan and Wisconsin (isolated pockets), south to Illinois and Ohio, and east to New York State and Nova Scotia, where there is an isolated population. In Ontario, this snake occurs throughout southern and eastern Ontario and is locally common in parts of the Bruce Peninsula, Georgian Bay and eastern Ontario.	SARO	Yes The study area is in close proximity to forest and wetland communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although forest and swamp communities, as well as ponds within the wetland, may provide suitable habitat, the species was not detected during field investigations.
Reptiles	Gray Ratsnake (Carolinian population) Pantherophis spiloides	END	END Schedule 1	END	The two populations of Gray Ratsnake in Ontario can be found in different types of habitat. The Frontenac Axis population requires a variety of habitat types including deciduous forests, wetlands, lakes, rocky outcrops and agricultural fields. The Carolinian population is found in a mix of agricultural land and deciduous forest, preferring habitat where forest meets more open environments. Adults are strongly attached to their home ranges and often return to the same nesting and hibernation sites. They often lay eggs in logs or compost piles that serve as incubators. Sometimes several females will use the same site to deposit eggs.	Gray Ratsnakes are widely distributed throughout the eastern and central United States, extending as far north as southern Ontario. There are two widely separated populations in Ontario: the Carolinian in southwestern Ontario and the Frontenac Axis in southeastern Ontario.	SARO	Yes Agricultural lands within the study area lie adjacent to forested communities.	No This species was not observed during field investigations. No Although forest communities adjacent to agricultural land may provide suitable habitat, the species was not detected during field investigations.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Reptiles	Massasauga Sistrurus catenatus	THR	No Status	THR	Massasaugas live in different types of habitats throughout Ontario, including tall grass prairie, bogs, marshes, shorelines, forests and alvars. Within all of these habitats, Massasaugas require open areas to warm themselves in the sun. Pregnant females are most often found in open, dry habitats such as rock barrens or forest clearings where they can more easily maintain the body temperature required for the development of their offspring. Non-pregnant females and males forage and mate in lowland habitats such as grasslands, wetlands, bogs and the shorelines of lakes and rivers. Massasaugas hibernate underground in crevices in bedrock, sphagnum swamps, tree root cavities and animal burrows where they can get below the frost line but stay above the water table. This species can be associated with the following ELC communities: TP, BO, MA, FO, AL, RB, and CUM with open areas.	In Canada, the Massasauga is found only in Ontario, primarily along the eastern side of Georgian Bay and on the Bruce Peninsula. Two small populations are also found in the Wainfleet Bog on the northeast shore of Lake Erie and near Windsor. The Massasauga was once more widespread in southwestern Ontario, especially along the shores of the Great Lakes.	SARO	Yes The study area is in close proximity to forest communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. Forest communities are far outside the known range of this species.
Reptiles	Northern Map Turtle Graptemys geographica	SC	SC Schedule 1	SC	The Northern Map Turtle inhabits rivers and lakeshores where it basks on emergent rocks and fallen trees throughout the spring and summer. In winter, the turtles hibernate on the bottom of deep, slow-moving sections of river. They require high-quality water that supports the female's mollusc prey. Their habitat must contain suitable basking sites, such as rocks and deadheads, with an unobstructed view from which a turtle can drop immediately into the water if startled. This species can typically be associated with the following ELC communities: OAO, SA with emergent rocks and fallen trees suitable habitat for prey.	The Northern Map Turtle's range extends from the Great Lakes region west to Oklahoma and Kansas, south to Louisiana and east to the Adirondack and Appalachian mountain barrier. There are isolated populations in New Jersey and New York states. In Canada, it is found in southwestern Quebec and southern Ontario. In southern Ontario, it lives primarily on the shores of Georgian Bay, Lake St. Clair, Lake Erie and Lake Ontario, and along larger rivers including the Thames, Grand and Ottawa.	ORAA, SARO	No Suitable lacustrine or riverine habitat is not present within or adjacent to the study area.	No This species was not observed during field investigations. Suitable habitat was not identified.
Reptiles	Queensnake Regina septemvittata	END	END Schedule 1	END	The Queensnake is an aquatic species that is seldom found more than a few metres from the water. It prefers rivers, streams and lakes with clear water, rocky or gravel bottoms, lots of places to hide, and an abundance of crayfish. Queensnakes will often hibernate in groups with other snakes, amphibians and even crayfish. Suitable hibernation sites (called hibernacula) include abutments of old bridges and crevices in bedrock. This species can typically be be associated with the following ELC communities: OAO with clear water and rocky or gravel bottoms with lots of places to hide and abundance of crayfish.	In Ontario, the Queensnake is found only in the southwest in Middlesex, Brant, Huron and Essex counties, and on the Bruce Peninsula. There are fewer than 25 sites where it is known to occur in these areas. The extremely specialized habitat requirements of the Queensnake restrict this species to particular areas, with large gaps of unfavourable habitat in between populations. The snake's home range is quite small, making Queensnakes less likely to move into new areas or areas where it was historically found.	ORAA, SARO, MNRF Aylmer district	Yes Watercourses adjacent to the study area may provide suitable habitat.	No This species was not observed during field investigations. No The substrate of the watercourse is not of suitable composition to support this species.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Reptiles	Snapping turtle Chelydra serpentina	SC	SC Schedule 1	SC	Snapping Turtles spend most of their lives in water. They prefer shallow waters so they can hide under the soft mud and leaf litter, with only their noses exposed to the surface to breathe. During the nesting season, from early to mid summer, females travel overland in search of a suitable nesting site, usually gravelly or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits. This species can typically be associated with the following ELC communities: OAO, SA near gravelly or sandy areas.	The Snapping Turtle's range extends from Ecuador to Canada. In Canada this turtle can be found from Saskatchewan to Nova Scotia. It is primarily limited to the southern part of Ontario. The Snapping Turtle's range is contracting.	NHIC, ORAA, SARO	Yes The study area is in close proximity to wetland communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although ponds within the wetland adjacent to the study area may provide suitable habitat, the species was not detected during field investigations.
Reptiles	Spiny Softshell Apalone spinifera	THR	THR Schedule 1	THR	Spiny Softshells are highly aquatic turtles that rarely travel far from water. They are found primarily in rivers and lakes but also in creeks and even ditches and ponds near rivers. Key habitat requirements are open sand or gravel nesting areas, shallow muddy or sandy areas to bury in, deep pools for hibernation, areas for basking, and suitable habitat for crayfish and other food species. These habitat features may be distributed over an extensive area, as long as the intervening habitat doesn't prevent the turtles from traveling between them. This species can typically be associated with the following ELC communities: OAO charaterized as rivers with nearby open sand or gravel nesting areas, shallow muddy or sandy substrates, deep pools, basking areas and suitable habitat for food species.	In Canada, the Spiny Softshell is found only in Quebec and southwestern Ontario in the Lake St. Clair, Lake Erie and western Lake Ontario watersheds. The majority of Spiny Softshells in Ontario are found in the Thames and Sydenham rivers and at two sites in Lake Erie. The size of the home range of this turtle depends on availability of habitat features such as nesting and hibernation sites. Some turtles travel up to 30 kilometres in a year from one part of their home range to another.	SARO, MNRF Aylmer district	Yes The study area is in close proximity to wetland communities and watercourses which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although ponds within the wetland adjacent to the study area may provide suitable habitat, the species was not detected during field investigations.

Glossary

EXP	ESA - Extripated - a species that no longer exists in the wild in Ontario but still occurs elsewhere. SARA - Extripated - a wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild.
END	ESA - Endangered - a species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's Endangered Species Act. SARA - Endangered - a wildlife species that is facing imminent extirpation or extinction.
THR	ESA - Threatened - a species that is at risk of becoming endangered in Ontario if limiting factors are not reversed. SARA - 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	ESA - Special Concern (formerly Vulnerable) - a species with characteristics that make it sensitive to human activities or natural events. SARA - Special Concern - a wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
OMNR	Ontario Ministry of Natural Resources
ESA	Endangered Species Act
SARA	Species at Risk Act (Federal)
Schedule 1	The official list of species that are classified as extirpated, endangered, threatened, and of special concern.
Schedule 2	Species listed in Schedule 2 are species that had been designated as endangered or threatened, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.
Schedule 3	Species listed in Schedule 3 are species that had been designated as special concern, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.
COSEWIC	Committee on the Stauts of Endangerd Wildlife in Canada - a committee of experts that assesses and designates which wild species are in some danger of disappearing from Canada.

References

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations

1 - Species at Risk . Ontario Ministry of Natural Resources. http://www.mnr.gov.on.ca/en/Business/Species/index.html. © Queens Printer For Ontario, 2013.

2 - Species at Risk Status Reports. Committed on the Status of Endangered Wildlife in Canada. Ottawa. http://www.sararegistry.gc.ca/search/advSearchResults_e.cfm?stype=doc&docID=18.

3 - Evans, Melissa, Elizabeth Gow, R. R. Roth, M. S. Johnson and T. J. Underwood. 2011. Wood Thrush (Hylocichla mustelina), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; doi:10.2173/bna.246
Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/246

4 - McCarty, John P. 1996. Eastern Wood-Pewee (Contopus virens), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/245doi:10.2173/bna.245

AECOM Imagine it. Delivered.

Appendix I

Significant Wildlife Habitat Screening

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Birds	Acadian Flycatcher Empidonax virescens	END	END Schedule 1	END	In Ontario, the Acadian Flycatcher primarily lives in the warmer climate of southern Ontario's Carolinian forests. It needs large, undisturbed forests, often more than 40 hectares in size. It is typically found in mature, shady forests with ravines, or in forested swamps with lots of maple and beech trees. The nest is placed near the tip of a lower limb on a tree, and is loosely woven, with strands of plant material hanging down. This species can typically be associated with the following ELC communities: SWD, FOD communities that are mature, have a closed canopy and are of sufficient size.	In Canada, the Acadian Flycatcher nests only in southwestern Ontario, mostly in large forests and forested ravines near the shore of Lake Erie. It has also been known to nest at a few sites in the Greater Toronto Area but this is unusual. The Acadian Flycatcher population in Ontario is very small, with 25 to 75 breeding pairs recorded in 2010.	SARO	No Wooded communities within the study area are not of sufficient size to support this species.	No This species was not observed during field investigations. Suitable habitat was not identified.
Birds	Bald Eagle Haliaeetus leucocephalus	SC	No Status	Not at Risk	Bald Eagles nest in a variety of habitats and forest types, almost always near a major lake or river where they do most of their hunting. While fish are their main source of food, Bald Eagles can easily catch prey up to the size of ducks, and frequently feed on dead animals, including White-tailed Deer. They usually nest in large trees such as pine and poplar. During the winter, Bald Eagles sometimes congregate near open water such as the St. Lawrence River, or in places with a high deer population where carcasses might be found. This species can typically be associated with the following ELC communities: FOC, FOM, FOD, SWC, SWM and SWD. Nests typically located near major bodies of water.	Bald Eagles are widely distributed throughout North America. In Ontario, they nest throughout the north, with the highest density in the northwest near Lake of the Woods. Historically they were also relatively common in southern Ontario, especially along the shore of Lake Erie, but this population was all but wiped out 50 years ago. After an intensive re-introduction program and environmental clean-up efforts, the species has rebounded and can once again be seen in much of its former southern Ontario range.	SARO	Yes The study area is in close proximity to the Thames River; wooded communities may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although forest and swamp communities provide suitable habitat, no nesting was observed
Birds	Bank Swallow Riparia riparia	THR	No Status	THR	Bank swallows nest in burrows in natural and human-made settings where there are vertical faces in silt and sand deposits. Many nests are on banks of rivers and lakes, but they are also found in active sand and gravel pits or former ones where the banks remain suitable. The birds breed in colonies ranging from several to a few thousand pairs.	The bank swallow is found all across southern Ontario, with sparser populations scattered across northern Ontario. The largest populations are found along the Lake Erie and Lake Ontario shorelines, and the Saugeen River (which flows into Lake Huron).	OBBA	Yes The study area is in close proximity to the Thames River and may provide suitable foraging habitat for this species.	No This species was not observed during field investigations. No No nesting sites were identified. A cultural meadow, as well as the ponds within the wetland provide foraging habitat, however foraging habitat is not reguated under the ESA.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Birds	Barn Swallow Hirundo rustica	THR	No Status	THR	Barn Swallows often live in close association with humans, building their cup-shaped mud nests almost exclusively on human-made structures such as open barns, under bridges and in culverts. The species is attracted to open structures that include ledges where they can build their nests, which are often re-used from year to year. They prefer unpainted, rough-cut wood, since the mud does not adhere as well to smooth surfaces. This species can typically be associated with the following ELC communities: TPO, CUM1, MAM, MAS, OAO, SAS1, SAM1, SAF1; containing or adjacent structures that are suitable for nesting.	The Barn Swallow may be found throughout southern Ontario and can range as far north as Hudson Bay, wherever suitable locations for nests exist.	OBBA, MNRF Aylmer district	Yes Open fields and ponds within the study area may provide suitable foraging habitat. Barns and culverts within the study area may provide nesting habitat.	No This species was not observed during field investigations. Candidate A cultural meadow, as well as the ponds within the wetland provide foraging habitat. Barns and culverts within the study area provide potential nesting habitat.
Birds	Bobolink Dolichonyx oryzivorus	THR	No Status	THR	Historically, Bobolinks lived in North American tallgrass prairie and other open meadows. With the clearing of native prairies, Bobolinks moved to living in hayfields. Bobolinks often build their small nests on the ground in dense grasses. Both parents usually tend to their young, sometimes with a third Bobolink helping. This species can typically be associated with the following ELC communities: TPO, TPS, CUM1 and MAM2.	The Bobolink breeds across North America. In Ontario, it is widely distributed throughout most of the province south of the boreal forest, although it may be found in the north where suitable habitat exists.	OBBA, SARO, MNRF Aylmer district	Yes Open fields within the study area may provide suitable habitat.	No This species was not observed during field investigations. No Although cultural meadow habitat is present within the study area, the species was no observed during breeding bird surveys.
Birds	Cerulean Warbler Dendroica cerulea	THR	SC Schedule 1	END	Cerulean Warblers spend their summers (breeding seasons) in mature, deciduous forests with large, tall trees and an open under storey. In late summer, they begin their long migration to wintering grounds in the Andes Mountains in South America. This species can typically be associated with the following ELC communities: FOD and SWD that are mature and contain an open understory.	The Cerulean Warbler's breeding range extends from extreme southwestern Quebec and southern Ontario west to Minnesota and Nebraska and south to Texas and other Gulf states across to North Carolina. In southern Ontario, populations appear to be separated into two distinct bands: one from southern Lake Huron to western Lake Ontario, and further north, the other from the Bruce Peninsula and Georgian Bay area to the Ottawa River.	SARO	Yes Wooded communities within the study area may provide suitable habitat.	No This species was not observed during field investigations. No Although deciduous forest and deciduous swamp communities may provide suitable habitat, the species was not observedduring field investigations.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Birds	Chimney Swift Chaetura pelagica	THR	THR Schedule 1	THR	Before European settlement Chimney Swifts mainly nested on cave walls and in hollow trees or tree cavities in old growth forests. Today, they are more likely to be found in and around urban settlements where they nest and roost (rest or sleep) in chimneys and other manmade structures. They also tend to stay close to water as this is where the flying insects they eat congregate. Foraging habitat for this species can be associated with the following ELC codes: TPO, CUM1, MAM, MAS, OAO, SAS1, SAM1, SAF1 containing or adjacent structures with suitable nesitng habitat (i.e. chimneys).	The Chimney Swift breeds in eastern North America, possibly as far north as southern Newfoundland. In Ontario, it is most widely distributed in the Carolinian zone in the south and southwest of the province, but has been detected throughout most of the province south of the 49th parallel. It winters in northwestern South America.	SARO	Yes Open fields and ponds within the study area may provide suitable foraging habitat. Residential buildings within and adjacent to the study area may provide nesting habitat.	No This species was not observed during field investigations. No A cultural meadow, as well as ponds within the wetland, provide foraging habitat, however foraging habitat is not regulated under the ESA. No Nesting habitat was identified.
Birds	Eastern Meadowlark Sturnella magna	THR	No Status	THR	Eastern Meadowlarks breed primarily in moderately tall grasslands, such as pastures and hayfields, but are also found in alfalfa fields, weedy borders of croplands, roadsides, orchards, airports, shrubby overgrown fields, or other open areas. Small trees, shrubs or fence posts are used as elevated song perches. This species can typically be associated with the following ELC communities: TPO, TPS, CUM1, CUS, and MAM2 with elevated song perches.	In Ontario, the Eastern Meadowlark is primarily found south of the Canadian Shield but it also inhabits the Lake Nipissing, Timiskaming and Lake of the Woods areas.	OBBA, SARO	Yes Open fields within the study area may provide suitable habitat.	No This species was not observed during field investigations. No Although a cultural meadow community may provide suitable habitat, the species was not detected during field investigations.
Birds	Eastern Wood-Pewee Contopus virens	SC	No Status	SC	The Eastern Wood-Pewee can be found in every type of wooded community in eastern North America. The size of the forest does not appear to be an important factor in habitat selection as this species has been found in both small fragmented forests and larger forest tracks. [4] This species can typically be associated with the following ELC communities: FOC, FOM, FOD, SWD, SWM and CUW.	The Eastern Wood-Pewee Breed throughout central and eastern North America from Saskatchewan to Nova Scotia south along the Atlantic Coast to North Florida and the Gulf Coast. [4]	OBBA	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although forest and swamp communities provide suitable habitat, the species was not detected during field investigations.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Birds	Golden-winged Warbler Vermivora chrysoptera	SC	THR Schedule 1	THR	Golden-winged Warblers prefer to nest in areas with young shrubs surrounded by mature forest – locations that have recently been disturbed, such as field edges, hydro or utility right-of-ways, or logged areas.	The Golden-winged Warbler is found in southern Saskatchewan, Manitoba, Ontario, and Quebec, as well as the north-eastern United States. In Ontario, these birds breed in central-eastern Ontario, as far south as Lake Ontario and the St. Lawrence River, and as far north as the northern edge of Georgian Bay. Golden-winged Warblers have also been found in the Lake of the Woods area near the Manitoba border, and around Long Point on Lake Erie. Golden-winged Warblers spend the winter in Central America, some Caribbean islands, and the northern part of South America.	OBBA	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Altholugh mixed and deciduous forest communities may provide suitable habitat, the species was not detected during field investigations.
Birds	Grasshopper Sparrow Ammodramus savannarum	SC	SC Schedule 1	SC	The Grasshopper Sparrow lives in open grassland areas with well-drained, sandy soil. It will also nest in hayfields and pasture, as well as alvars, prairies and occasionally grain crops such as barley. It prefers areas that are sparsely vegetated. Its nests are well-hidden in the field and woven from grasses in a small cup-like shape.	The Grasshopper Sparrow can be found throughout southern Ontario, but only occasionally on the Canadian Shield. It is most common where grasslands, hay or pasture dominate the landscape. The Grasshopper Sparrow is a short-distance migrant and leaves Ontario in the fall to migrate to the southestern United States and Central America for the winter.	Observed during field investigations	Yes Open meadows within the study area may provide suitable habitat.	Yes This species was observed during field investigations. Yes A cultural meadow community provides suitable habitat.
Birds	Henslow's Sparrow Ammodramus henslowii	END	END Schedule 1	END	In Ontario, the Henslow's Sparrow lives in open fields with tall grasses, flowering plants, and a few scattered shrubs. It has also been found in abandoned farm fields, pastures, and wet meadows. It tends to avoid fields that have been grazed or are crowded with trees and shrubs. It prefers extensive, dense, tall grasslands where it can more easily conceal its small ground nest. This species can typically be associated with the following ELC communities: TPO, CUM, and MAM that are a minimum of 30 ha in size with vegetation that is over 30cm in height with a thick thatch layer and a lack of emergent woody vegetation.	The Henslow's Sparrow breeds in the northeastern and east-central United States, and reaches its northeastern limit in Ontario. It was once fairly common in scattered areas of suitable habitat south of the Canadian Shield. However, steep declines since the 1960s have all but wiped this bird out as a breeding species in Ontario. A few are still seen each spring at migration hotspots such as Point Pelee National Park, and a few may breed at selected locations.	SARO	No Open meadow habitat within the study area is not of sufficient size to support this species.	No This species was not observed during field investigations. Suitable habitat was not identified.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Birds	King Rail Rallus elegans	END	END Schedule 1	END	King Rails are found in densely vegetated freshwater marshes with open shallow water that merges with shrubby areas. They are sometimes found in smaller isolated marshes but most seem to prefer larger, coastal wetlands. Its nest is a dinner-plate sized platform made of plant material, placed just above the water in shrubs or clumps of other marsh plants. This species can typically be associated with the following ELC communities: MAS, SWT and MAM.	King Rails reach their northern limit in southern Ontario, where they are quite rare. Recent province-wide surveys suggest there are only about 30 pairs left, the majority of which are in the large wetlands bordering Lake St. Clair. Most of the remainder are found in several key coastal marshes along Lakes Erie and Ontario.	SARO	Yes The study area is in close proximity to wetland communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although thicket swamp communities may provide suitable habitat, the species was not detected during field investigations.
Birds	Least Bittern Ixobrychus exilis	THR	THR Schedule 1	THR	In Ontario, the Least Bittern is found in a variety of wetland habitats, but strongly prefers cattail marshes with a mix of open pools and channels. This bird builds its nest above the marsh water in stands of dense vegetation, hidden among the cattails. The nests are almost always built near open water, which is needed for foraging. This species eats mostly frogs, small fish, and aquatic insects. This species can typically be associated with the following ELC communities: MAS2-1, MAS3-1, SA and OAO.	In Ontario, the Least Bittern is mostly found south of the Canadian Shield, especially in the central and eastern part of the province. Small numbers also breed occasionally in northwest Ontario. This species has disappeared from much of its former range, especially in southwestern Ontario, where wetland loss has been most severe. In winter, Least Bitterns migrate to the southern United States, Mexico and Central America.	SARO	Yes The study area is in close proximity to wetland communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No No cattail marsh communities were identified.
Birds	Loggerhead Shrike Lanius ludovicianus	END	END Schedule 1	END	In Ontario, the Loggerhead Shrike prefers pasture or other grasslands with scattered low trees and shrubs. It lives in fields or alvars (areas of exposed bedrock) with short grass, which makes it easier to spot prey. It builds its nest in small trees or shrubs and hunts by waiting patiently in tree branches until it swoops down and attacks its unsuspecting prey – usually large insects, such as grasshoppers. Loggerhead Shrikes also require spiny, multi-branched shrubs where they can impale prey before eating it. Barbed wired fencing can also be used for this. This species can typically be associated with the following ELC communities: SWT, CUM, CUT, ALO and ALS.	The Loggerhead Shrike currently breeds in central and western North America. Until the 1970s, the Loggerhead Shrike could be found at many locations throughout southern Ontario and other parts of northeastern North America, but it has declined dramatically. Although the occasional bird is still found within the broader former range, most remaining Loggerhead Shrikes are now found in two core grassland habitats - the Carden Plain north of Lindsay, and the Napanee Limestone Plain. Every fall these birds migrate to the southern United States for the winter.	SARO	Yes The study area is in close proximity to thicket communities and may provide suitable habitat for this species.	No This species was not observed during field investigations. No Thicket communities identified are not of suitable composition.
Birds	Louisiana Waterthrush Parkesia motacilla	SC	SC Schedule 1	SC	The Louisiana Waterthrush is usually found in steep, forested ravines with fast-flowing streams. Although it prefers running water, especially clear, coldwater streams, it also less frequently inhabits heavily wooded, deciduous swamps having large pools of open water. It nests among the roots of fallen trees, in niches of stream banks, and in or under mossy logs. This species can typically be associated with the following ELC communities: FOD, FOM and SWD with fast flowing coldwater streams or large pools of open water.	In Canada, the Louisiana Waterthrush breeds only in southern Ontario, along the Niagara Escarpment, in woodlands along Lake Erie and scattered locations elsewhere. It probably nests sporadically in southwestern Quebec, but breeding there has never been confirmed. The Canadian breeding population is estimated to be between 105 and 195 pairs, which represents less than one per cent of the total continental population. Although the species has declined locally in some parts of its breeding range, due to habitat loss and degradation, overall population levels have been relatively stable in both Canada and much of the United States over the past 20 years.	SARO	Yes The study area is in close proximity to forested communities and may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although forest and swamp communities may provide suitable habitat, the species was not detected during field investigations.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Birds	Northern Bobwhite Colinus virginianus	END	END Schedule 1	END	Northern Bobwhites live in savannahs, grasslands, around abandoned farm fields, along brushy fencerows and other similar sites. Grasslands that are occasionally burned are particularly important because the fires help keep the habitat from becoming too forested. In such places, bobwhites can find most of their needs such as food, nesting cover, and places to hide and rest throughout the year. In severe winter conditions bobwhites sometimes need to move into small forest areas to find snow-free areas for foraging. Bobwhites lay up to 16 eggs in a shallow natural depression that they line with plant material and conceal with grasses and vines. This species can typically be associated with the following ELC communities: TPO, TPS, CUM, CUT, CUS and CUW.	The Northern Bobwhite is near its northern range limit in southern Ontario. This bird benefited greatly when the original forests were cleared and it expanded its range significantly in Ontario. At its peak over a century ago, its range in Ontario extended north to Georgian Bay and east to Kingston. This range has steadily retracted and now includes only the southwest corner of the province, mostly on Walpole Island, and possibly a few scattered locations nearby. Isolated sightings away from this area are usually a result of introductions or birds escaping from captivity.	SARO	Yes Open meadows within the study area may provide suitable habitat.	No This species was not observed during field investigations. No A meadow community identified is not of suitable composition.
Birds	Peregrine Falcon Falco peregrinus	SC	SC Schedule 1	SC	Peregrine Falcons usually nest on tall, steep cliff ledges close to large bodies of water. Although most people associate Peregrine Falcons with rugged wilderness, some of these birds have adapted well to city life. Urban peregrines raise their young on ledges of tall buildings, even in busy downtown areas. Cities offer peregrines a good year-round supply of pigeons and starlings to feed on. This species can be associated with the following ELC communities: CLO.	Although Peregrine Falcons now nest in and around Toronto and several other southern Ontario cities, the majority of Ontario's breeding population is found around Lake Superior in northwestern Ontario.	SARO	No There are no records of cliff habitat in the vincinity of the study area.	No This species was not observed during field investigations. Suitable habitat was not identified.
Birds	Prothonotary Warbler Protonotaria citrea	END	END Schedule 1	END	In Ontario, the Prothonotary Warbler is found in the warmer climate of the Carolinian deciduous forests. It nests in small, shallow holes, found low in the trunks of dead or dying trees standing in or near flooded woodlands or swamps. They will also readily use properly placed artificial nest boxes. Silver maple, ash, and yellow birch are common trees in these habitats. The Prothonotary is the only warbler in eastern North America that nests in tree cavities, where it typically lays four to six eggs on a cushion of moss, leaves and plant fibres. This species can typically be associated with the following ELC communities: FOD and SWD with standing water.	In Canada, the Prothonotary Warbler is only known to nest in southwestern Ontario, primarily along the north shore of Lake Erie. Over half of the small and declining population is found in Rondeau Provincial Park. In 2005, it was estimated that there were only between 28-34 individuals in Ontario.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although forest and swamp communities may provide suitable habitat, the species was not detected during field investigations.
Birds	Wood Thrush Hylocichla mustelina	SC	No Status	THR	The Wood Thrush can typically be found in the interior and along the edges of well-develoepd upland deciduous and mixed forests. Key elements of these forests include trees that are greater than 16 m in height, high variety of deciduous tree species, moderate subcanopy and shrub density, shade, fairly open forest floor, moist soils and decaying leaf litter. Wood Thrush is more likely to occur in larger forests but may also nest in 1 ha fragments and semi-wooded residential areas and parks. Smaller habitat fragments have lower fecundity when compared to larger fragments.[3] This species can typically be associated with the following ELC communities: FOD and FOM that are greater than 1 ha in size.	The Wood Thrush ranges across central and southern Ontario, southern Quebec, New Brunswick and southern Nova Scotia and the majority of the eastern United States. It winters in Central American between southern Mexico and Panama.[3]	OBBA	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous and mixed forest communities may provide suitable habitat, the species was not detected during field investigations.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Birds	Yellow-breasted Chat Icteria virens	END	SC Schedule 1	END	The Yellow-breasted Chat lives in thickets and scrub, especially locations where clearings have become overgrown. These birds spend their winters in coastal marshes. This species can typically be associated with the following ELC communities: CUT and SWT.	The Yellow-breasted Chat is found in much of the United States. In Canada, it lives in southern British Columbia, the Prairies, and southwestern Ontario, where it is concentrated in Point Pelee National Park and Pelee Island in Lake Erie.	SARO	Yes The study area is in close proximity to wetland communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although thicket swamp communities may provide suitable habitat, the species was not detected during field investigations.
Fish	Black Redhorse Moxostoma duquesnei	THR	No Schedule	THR	In Ontario, the Black Redhorse lives in pools and riffle areas of medium-sized rivers and streams that are usually less than two metres deep. These rivers usually have few aquatic plants, a moderate to fast current, and a sandy or gravel bottom. In the spring, it migrates to breeding habitat where eggs are laid on gravel in fast water. The winter is spent in deeper pools. Adults feed on crustaceans and aquatic insects, while the young fish feed on plankton.	In Canada, the Black Redhorse is found only in southwestern Ontario at a few locations in the Bayfield River, Maitland River, Ausable River, Grand River, Thames River, and Spencer Creek watersheds.	MNRF Aylmer district	Yes Potentially suitable habitat identified in the study area	Candidate Consultation with Aylmer district MNRF identified the presence of this species in the general project area.
Fish	Eastern Sand Darter Ammocrypta pellucida	END	THR Schedule 1	THR	The Eastern Sand Darter prefers shallow habitats in lakes, streams, and rivers with clean, sandy bottoms. It often buries itself completely in the sand. It feeds on aquatic insects, but due to its small mouth is limited in the size of prey it can eat. This species can typically be associated with the following ELC communities: OAO with sandy bottoms.	In Ontario, the Eastern Sand Darter is still found in Lake St. Clair, Lake Erie, Big Creek and in the Grand, Sydenham and Thames rivers. The species may have disappeared from several other rivers in southwestern Ontario.	DFO, SARO	Yes Potentially suitable habitat identified in the study area	N/A Species and habitat presence to be determined through agency consultation
Fish	Lake Sturgeon (Great Lakes-Upper St. Lawrence River population) Acipenser fulvescens	END	No Schedule, No Status	THR	The Lake Sturgeon lives almost exclusively in freshwater lakes and rivers with soft bottoms of mud, sand or gravel. They are usually found at depths of five to 20 metres. They spawn in relatively shallow, fast-flowing water (usually below waterfalls, rapids, or dams) with gravel and boulders at the bottom. However, they will spawn in deeper water where habitat is available. They also are known to spawn on open shoals in large rivers with strong currents. This species can be associated with the following ELC communities: OAO. Large lakes/rivers > 20m deep with soft mud, sand or gravel bottoms required.	In Ontario, the Lake Sturgeon is found in the rivers of the Hudson Bay basin, the Great Lakes basin and their major connecting waterways, including the St. Lawrence River. There are three distinct populations in Ontario: Great Lakes - Upper St. Lawrence River, Northwestern Ontario, and Southern Hudson Bay - James Bay.	SARO	No Suitable lacustrine or riverine habitat is not present within or adjacent to the study area.	N/A Species and habitat presence to be determined through agency consultation

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Fish	Northern Brook Lamprey Ichthyomyzon fossor	SC	SC Schedule 1	SC	The Northern Brook Lamprey inhabits clear, coolwater streams. The larval stage requires soft substrates such as silt and sand for burrowing which are often found in the slow-moving portions of a stream. Adults are found in areas associated with spawning, including fast flowing riffles comprised of rock or gravel. This species can typicallay be associated with the following ELC communiteis: OAO charaterized as clear, coolwater streams with silt and sand substrates.	The Northern Brook Lamprey lives in the eastern United States in the upper Mississippi and southern Hudson Bay drainages, ranging from Manitoba and the Great Lakes region south to Missouri, and east to the St. Lawrence River in Quebec. In Ontario, it lives in rivers draining into Lakes Superior, Huron and Erie, and the Ottawa River.	DFO, SARO	Yes Potentially suitable habitat identified in the study area	N/A Species and habitat presence to be determined through agency consultation
Fish	Northern Madtom Noturus stigmosus	END	END Schedule 1	END	The Northern Madtom usually lives in large creeks and rivers with a moderate to swift current, and a sand, gravel, or mud bottom. However, in Ontario, this fish has also been captured in the deeper waters of Lake St. Clair and the Detroit River. It prefers clean, unpolluted water but can tolerate slightly muddy water. Adults eat aquatic insects, crustaceans, and smaller fish. During the summer breeding season, Northern Madtoms normally build nests under large flat rocks and logs. This species can typically be associated with the following ELC communities: OAO with a moderate to swift current and a sand gravel or mud bottom.	In Canada, the Northern Madtom is only found in Ontario in the St. Clair River, Lake St. Clair, the Detroit River, and the Thames River. It has not been seen in the Sydenham River since 1975.	SARO	Yes Potentially suitable habitat identified in the study area	N/A Species and habitat presence to be determined through agency consultation
Fish	Silver Shiner Notropis photogenis	THR	SC Schedule 3	THR	Silver Shiners prefer moderate to large size streams with swift currents that are free of weeds and have clean gravel or boulder bottoms. They live in schools and feed on crustaceans and adult flies that fall in the water or fly just above the surface. In June or July, they spawn by scattering their eggs over gravel riffles. This species can typically be associated with the follwoing ELC communities: OAO charachterized as moderate to large streams with swift currents, no weeds and gravel or boulder substrates.	The Silver Shiner range includes east-central North America throughout the Ohio and Tennessee River drainage basins. In Ontario, it is found in the Thames and Grand Rivers, and in Bronte Creek and Sixteen Mile Creek, which flow into Lake Ontario.	NHIC, SARO, MNRF Aylmer district	Yes Potentially suitable habitat identified in the study area	Candidate Consultation with Aylmer district MNRF identified the presence of this species in the general project area.
Fish	Spotted Sucker Minytrema melanops	SC	SC Schedule 1	SC	The Spotted Sucker usually inhabits clear creeks and small to moderate sized rivers with sand, gravel or hard-clay bottoms, usually free of silt. However, in Ontario it has frequently been found in turbid habitats. In late spring and early summer, Spotted Suckers move to rocky riffle areas of streams to breed This species can typically be associated with the following ELC communities: OAO characterized as creeks or small to moderate sized rivers with clear water and sand, gravel or hard-clay substrates.	The Spotted Sucker range is restricted to the fresh waters of eastern and central North America from the lower Great Lakes east to Pennsylvania, south to the Gulf Coast and Florida, and west to Texas. In Canada, this species is limited to southwestern Ontario, where it is found in Lake St. Clair and western Lake Erie as well as the Detroit, St. Clair, Sydenham and Thames rivers.	DFO, SARO	Yes The study area contains water features which may provide suitable habitat for this species.	N/A Species and habitat presence to be determined through agency consultation

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Insects	Rusty-patched Bumble Bee Bombus affinis	END	END Schedule 1	END	This species, like other bumble bees, can be found in open habitat such as mixed farmland, urban settings, savannah, open woods and sand dunes. The most recent sightings have been in oak savannah, which contains both woodland and grassland flora and fauna. This species can typically be associated with the following ELC communities: CUM, TPO, TPS, TPW, CUS, SDO, SDS and SDT.	The Rusty-patched Bumble Bee was once widespread and common in eastern North America, found from southern Ontario south to Georgia and west to the Dakotas. The species has suffered rapid, severe decline throughout its entire range since the 1970s with only a handful of specimens collected in recent years in Ontario. The only sightings of this bee in Canada since 2002 have been at The Pinery Provincial Park on Lake Huron.	SARO	Yes Open meadows within the study area may provide suitable habitat.	No This species was not observed during field investigations. No A cultural meadow community idenitifed provides suitable habiat. However, the study area is outside the known range of this species.
Mammals	American Badger Taxidea taxus	END	END Schedule 1	END	In Ontario, badgers are found in a variety of habitats, such as tall grass prairie, sand barrens and farmland. These habitats provide badgers with small prey, including groundhogs, rabbits and small rodents. This speices can typically be associated with the following ELC communiteis: TPS1, CUM1, CUS, SBO with dry sandy soil.	In Ontario, the badger is found primarily in the southwestern part of the province, close to Lake Erie in Haldimand-Norfolk County. There are also badgers in northwestern Ontario in the Thunder Bay and Rainy River Districts. Badgers can travel sizeable distances and occupy large home ranges of many square kilometres. There are thought to be fewer than 200 in Ontario.	SARO	Yes Open meadows and agricultural fields within the study area may provide suitable habitat.	No This species was not observed during field investigations. No Although cultural meadow and agricultural fields may provide suitable habitat, no den sites were observed.
Mammals	Little Brown Myotis (Bat) Myotis lucifugus	END	No Status	END	Bats are nocturnal. During the day they roost in trees and buildings. They often select attics, abandoned buildings and barns for summer colonies where they can raise their young. Bats can squeeze through very tiny spaces (as small as six millimetres across) and this is how they access many roosting areas. Little brown bats hibernate from October or November to March or April, most often in caves or abandoned mines that are humid and remain above freezing. This species can typically be associated with any community where suitable roosting (i.e. cavity trees, houses, abandoned buildings, barns, etc.) habitat is available.	The little brown bat is widespread in southern Ontario and found as far north as Moose Factory and Favourable Lake. Outside Ontario, this bat is found across Canada (except in Nunavut) and most of the United States.	Bat Conservation International Species Range Maps MNRF Habitat Management Guidelines for Bats of Ontario (2015)	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. Candidate Forest and swamp communities provide suitable habitat.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Mammals	Eastern Small-footed Myotis Myotis leibii	END			In the spring and summer, eastern small-footed bats will roost in a variety of habitats, including in or under rocks, in rock outcrops, in buildings, under bridges, or in caves, mines, or hollow trees. These bats often change their roosting locations every day. At night, they hunt for insects to eat, including beetles, mosquitos, moths, and flies. In the winter, these bats hibernate, most often in caves and abandoned mines. They seem to choose colder and drier sites than similar bats and will return to the same spot each year.	The eastern small-footed bat has been found from south of Georgian Bay to Lake Erie and east to the Pembroke area. There are also records from the Bruce Peninsula, the Espanola area, and Lake Superior Provincial Park. Most documented sightings are of bats in their winter hibernation sites.	Bat Conservation International Species Range Maps MNRF Habitat Management Guidelines for Bats of Ontario (2015)	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Suitable rocky features were not identified.
Mammals	Northern (Long-eared) Myotis (Bat) Myotis septentrionalis	END	No Status	END	Northern long-eared bats are associated with boreal forests, choosing to roost under loose bark and in the cavities of trees. These bats hibernate from October or November to March or April, most often in caves or abandoned mines. This species can typically be associated with the following ELC communities: FOC, FOM, FOD, SWC, SWM and SWD where suitable roosting (i.e. cavity trees and trees with loose bark) habitat is available.	The northern long-eared bat is found throughout forested areas in southern Ontario, to the north shore of Lake Superior and occasionally as far north as Moosonee, and west to Lake Nipigon. This bat is found in all Canadian provinces as well as the Yukon and Northwest Territories.	Bat Conservation International Species Range Maps MNRF Habitat Management Guidelines for Bats of Ontario (2015)	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. Candidate Forest and swamp communities provide suitable habitat.
Mammals	Woodland Vole Microtus pinetorum	SC	SC Schedule 1	SC	In Ontario, the Woodland Vole lives in mature deciduous forest in the Carolinian region where there is a deep litter layer that allows it to burrow. This species can typically be associated with the following ELC communities: FOD with a deep leaf litter and loose soils.	In Ontario, it is known to exist at 30 sites from the Municipality of Chatham-Kent and Lambton County, east to Haldimand County, and north to Halton Regional Municipality and the City of Hamilton. Because it spends most of its time below ground, this species is difficult to spot and may have been missed at other locations in the province.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No Suitable habitat was not observed during 2017 field investigations. Soil in the general area consists of fine sandy loam, very fine sandy loam and very fine sand and there is minimal leaf litter cover.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Mammals	Tri-colored Bat Perimyotis subflavus	END	END Schedule 1	END	In Ontario, the Tri-colored Bat lives in forested habitats, forming day roosts and maternity colonies in older forest within foliage or in high tree cavities, occasionally also in barns or other structures. This species forages over water and along streams in forests. At the close of the summer season, this species congregate at a location to swarm, usually near caves, mines or underground locations where they will winter; it has a strong fidelity to its winter hibernation sites. This bat overwinters in caves, typically individually instead of as a group.	This bat is found in Southern Ontario and ranging as far north as Espanola, near Sudbury, having a scattered distribution. Its broad range sweeps from eastern North America down to Central America.	Bat Conservation International Species Range Maps MNRF Habitat Management Guidelines for Bats of Ontario (2015)	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. Candidate Forest and swamp communities provide suitable habitat.
Molluscs	Kidneyshell Ptychobranchus fasciolaris	END	END Schedule 1	END	The Kidneyshell is typically found in small to medium sized rivers. It prefers shallow, clear, swift-moving water with gravel and sand. It also used to occur on gravel shoals in the Great Lakes. All mussels filter water to find food, such as bacteria and algae. Mussel larvae are parasitic and must attach to a fish host, where they consume nutrients from the fish body until they transform into juvenile mussels that drop off of the fish. The Kidneyshell has three known fish hosts in Canada: Blackside Darter, Fantail Darter, and Johnny Darter. The presence of fish hosts is one of the key features for an area to support a healthy mussel population. This species can typically be associated with the follwoing ELC communites: OAO with shallow, clear, swift flowing water with a gravel and sand substrate.	In Canada, the Kidneyshell is currently found in four areas in southwestern Ontario. There are reproducing populations in the East Sydenham River and in the Ausable River. Small populations are also found in St. Clair River delta in Lake St. Clair and a tributary of the Thames River. The species no longer occurs in Lake Erie or the Detroit, Thames, Grand, Welland or Niagara rivers.	SARO	Yes Potentially suitable habitat identified in the study area	N/A Species and habitat presence to be determined through agency consultation
Molluscs	Northern Riffleshell Epioblasma torulosa rangiana	END	END Schedule 1	END	In Ontario, the Northern Riffleshell is found in riffle areas within rivers or streams with rocky, sand, or gravel bottoms. Like all freshwater mussels, this species feeds on algae and bacteria that it filters out of the water. Mussel larvae are parasitic and must attach to a fish host, where they consume nutrients from the fish body until they transform into juvenile mussels and drop off. The Northern Riffleshell is believed to have several potential fish hosts in Ontario: Blackside Darter, Fantail Darter, Iowa Darter, Johnny Darter, Rainbow Darter, Logperch, Brown Trout and Mottled Sculpin. The presence of fish hosts is one of the key features for an area to support a healthy mussel population. This species can typically be associated with the following ELC communities: OAO in riffles with rocky, sand or gravel bottoms.	In North America, the Northern Riffleshell's range has decreased by 95 per cent. In Ontario, it is now only found in the Sydenham River and Ausable River in southwestern Ontario. Populations in Lake Erie, Lake St. Clair and the Detroit River have disappeared.	SARO	Yes Potentially suitable habitat identified in the study area	N/A Species and habitat presence to be determined through agency consultation

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Molluscs	Rainbow Mussel Villosa iris	SC	END Schedule 1	SC	The Rainbow mussel prefers small to medium-sized rivers with a moderate to strong current and sand, rocky, or gravel bottoms. It is found in or near riffle areas and along the edges of vegetation in water less than one metre deep. All mussels filter water to find food, such as bacteria and algae. Mussel larvae must attach to a fish, called a host, where they consume nutrients from the fish body until they transform into juvenile mussels and then drop off. The Rainbow mussel uses a variety of fish hosts in Ontario, including Striped shiner, Smallmouth bass, Largemouth bass, Green sunfish, Greenside darter, Rainbow darter, and Yellow perch.	In Canada, the Rainbow mussel is found only in Ontario in the Ausable, Bayfield, Detroit, Grand, Maitland, Moira, Niagara, Salmon, Saugeen, Sydenham, Thames and Trent rivers and in Lake St. Clair. It may no longer exist in the St. Clair, Detroit and Niagara rivers, and Lake Erie.	DFO	Yes Potentially suitable habitat identified in the study area	N/A Species and habitat presence to be determined through agency consultation
Molluscs	Rayed Bean Villosa fabalis	END	END Schedule 1	END	The Rayed Bean is typically found buried in sand or gravel in shallow, clear headwaters and riffle areas of small tributaries. It is often found buried among the roots of aquatic plants. The Rayed Bean filters water to find food, such as bacteria and algae. Mussel larvae are parasitic and must attach to a fish host, where they consume nutrients from the fish body until they transform into juvenile mussels and drop off. In Ontario, the fish hosts of the Rayed Bean include: the Brook Stickleback, Largemouth Bass, Greenside Darter, Johnny Darter, Rainbow Darter, Logperch, and Mottled Sculpin. The presence of fish hosts is one of the key features for an area to support a healthy mussel population. This species can typically be associated with the following ELC communities: OAO that are clear headwaters and riffle areas of small tributaris with a sand or gravel substrate and the presence of fish host species.	In Canada, the Rayed Bean is found only in southern Ontario, in the East Sydenham River and a small section of the North Thames River. The species has been lost from Lake Erie and the Detroit River.	DFO, SARO, MNRF Aylmer district	Yes Potentially suitable habitat identified in the study area	Candidate Consultation with Aylmer district MNRF identified the presence of this species in the general project area.
Molluscs	Round Hickorynut Obovaria subrotunda	END	END Schedule 1	END	In Ontario, the Round Hickorynut is mainly found in rivers with clay, sand, or gravel bottoms. It also lives in shallow areas of lakes with firm sand. It prefers moderately fast moving water. Like all mussels, this species filters water to find food, such as bacteria and algae. Mussel larvae are parasitic and must attach to a fish host, where they consume nutrients from the fish body until they transform into juvenile mussels and drop off. The fish hosts of the Round Hickorynut in Canada have not been confirmed but may include the Greenside Darter and the Eastern Sand Darter, which is also a species at risk. The presence of fish hosts is one of the key features for an area to support a healthy mussel population. This species can typically be associated with the following ELC communities: OAO that are rivers with clay, sand or gravel bottoms or shallow areas of lakes with a firm sand substrate.	The Round Hickorynut has been lost from 90 per cent of its former range in Canada. It is now found only in the Sydenham River and the St. Clair River delta in Lake St. Clair in southwest Ontario. Populations have been lost from the rest of Lake St. Clair, the Thames River, the Detroit River, Lake Erie and the Grand and Niagara River drainages.	SARO	Yes Potentially suitable habitat identified in the study area	N/A Species and habitat presence to be determined through agency consultation
Molluscs	Round Pigtoe Pleurobema sintoxia	END	END Schedule 1	END	The Round Pigtoe is usually found in rivers of various sizes with deep water and sandy, rocky, or mud bottoms. Like all freshwater mussels, this species feeds on algae and bacteria that it filters out of the water. Mussel larvae are parasitic and must attach to a fish host, where they consume nutrients from the fish body until they transform into juvenile mussels and drop off. Known fish hosts of the Round Pigtoe include: Bluegill, Spotfin Shiner, Bluntnose Minnow, and Northern Redbelly Dace. The presence of fish hosts is one of the key features for an area to support a healthy mussel population. This species can typically be associated with the following ELC commuinites: OAO rivers with deep water and sandy, rocky or mud substrates.	In Canada, Round Pigtoe are found only in southwestern Ontario, mainly in the St. Clair River delta and the Sydenham River but small populations still exist in the Grand and Thames rivers and in shallow areas near the shorelines of Lake Erie and Lake St. Clair.	DFO, SARO	Yes Potentially suitable habitat identified in the study area	N/A Species and habitat presence to be determined through agency consultation

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Molluscs	Salamander Mussel Simpsonaias ambigua	END	END Schedule 1	END	The Salamander Mussel prefers waterbodies with a soft bottom and a swift current and is often found burrowed in sand or silt under large rocks in shallow areas, on gravel bars, or in mud. It is found in streams that support the Mudpuppy, an aquatic salamander. Salamander Mussel larvae are parasitic and use the Mudpuppy as a host, where they consume nutrients from the salamander's body until they transform into juvenile mussels and drop off. Adult mussels feed by filtering algae and bacteria from the water. This species can typically be associated with the following ELC communities: OAO with a soft sand or silt substrate and a swift current.	In Ontario, the Salamander Mussel occurs only in the East Sydenham River and at one location in the Thames River. The species has disappeared from the Detroit River due to Zebra Mussel impacts, but it may remain in the small area of the St. Clair River delta in Lake St. Clair.	SARO	Yes Potentially suitable habitat identified in the study area	N/A Species and habitat presence to be determined through agency consultation
Molluscs	Snuffbox Epioblasma triquetra	END	END Schedule 1	END	The Snuffbox is typically found in small to medium-sized rivers in shallow riffle areas. They prefer clean, clear, swift-flowing water and firm rocky, gravel or sand river bottoms. Mussel larvae are parasitic and must attach to a fish host, where they consume nutrients from the fish body until they transform into juvenile mussels and drop off. In Ontario, the main fish host for Snuffbox is the Logperch but other host fish may include various darter species, Largemouth Bass, Mottled Sculpin and Brook Stickleback. Like all freshwater mussels, the Snuffbox feeds on algae and bacteria that it filters out of the water. This speices can typically be associated with the following ELC communities: OAO characterized as small to medium sized rivers with clear, swift flowing water and firm rocky, gravel or sandy substrates.	In Canada, the Snuffbox is now only found in the East Sydenham River and the Ausable River in southwest Ontario. The total population size is very small. Historically, the species was also found in Lake Erie, Lake St. Clair, and the Thames, Detroit, Grand, and Niagara rivers.	SARO	Yes Potentially suitable habitat identified in the study area	N/A Species and habitat presence to be determined through agency consultation
Molluscs	Wavy-rayed Lampmussel Lampsilis fasciola	THR	SC Schedule 1	SC	The Wavy-rayed Lampmussel is usually found in small to medium rivers with clear water. It lives in shallow riffle areas with clean gravel or sand bottoms. Like all mussels, this species filters water to find food, such as bacteria and algae. Mussel larvae are parasitic and must attach to a fish host, where they consume nutrients from the fish body until they transform into juvenile mussels and drop off. The Wavy-rayed Lampmussel's fish hosts are the Largemouth Bass and Smallmouth Bass. The presence of fish hosts is one of the key features for an area to support a healthy mussel population. This species can typically be associated with the following ELC communities: OAO characterized as small to medium rivers with clean water and riffles with gravel or sand substrates.	In Canada, the Wavy-rayed Lampmussel is found only in Ontario in the Grand, upper Thames, Maitland, and Ausable rivers, and the St. Clair River delta in Lake St. Clair. It has disappeared from Lake Erie, the Detroit River and most of Lake St. Clair, and may also be gone from the Sydenham River.	NHIC, DFO, SARO, MNRF Aylmer district	Yes Potentially suitable habitat identified in the study area	Candidate Consultation with Aylmer district MNRF identified the presence of this species in the general project area.
Mosses	Spoon-leaved Moss Bryoandersonia illecebra	END	END Schedule 1	END	Spoon-leaved Moss grows in a range of habitat types but most Canadian populations are located on soil in low-lying areas that are seasonally flooded under trees or shrub thickets. It is often found in close proximity to a species of moss called narrow-leaved wetland plume moss, which is associated with swamps, marshes, and wet meadows. This species can typically be associated with the following ELC communities: SWD, SWT, MAS and MAM that are seasonally flooded.	Spoon-leaved Moss is found only in eastern North America, from southern Ontario south to Texas and Florida. In Canada, it is restricted to a few sites in southern Ontario – Elgin, Essex and Welland counties, and the Niagara Region.	SARO, MNRF Aylmer district	Yes The study area is in close proximity to wetland communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. Candidate Consultation with Aylmer district MNRF identified the presence of this species in the general project area. Deciduous swamp and thicket swamp communities provide suitable habitat.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Plants	American Chestnut Castanea dentata	END	END Schedule 1	END	The American Chestnut prefers dryer upland deciduous forests with sandy, acidic to neutral soils. In Ontario, it is only found in the Carolinian Zone between Lake Erie and Lake Huron. The species grows alongside Red Oak, Black Cherry, Sugar Maple, American Beech and other deciduous tree species. This species can typically be associated with the following ELC communities: FOD with dry sandy soil.	The American Chestnut has almost disappeared from eastern North America due to an epidemic caused by a fungal disease called the chestnut blight (Cryphonectria parasitica). In Canada, the American Chestnut is restricted primarily to southwestern Ontario. Based on information available in 2004, it was estimated that there are 120 to 150 mature trees and 1,000 or more small, young trees in the province.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous forest communities may provide suitable habitat, the species was not detected during field investigations.
Plants	Blue Ash Fraxinus quadrangulata	SC	SC Schedule 1	SC	In Ontario, Blue Ash grows in deciduous floodplain forests, and along sandy beaches and on limestone outcrops associated with Lake Erie. This species can typically be associated with the following ELC communiteis: BBO, BBS, BBT, SDO, SDS, SDT, FOD6, FOD7, FOD8, FOD9, ALO, ALS and ALT.	The range of Blue Ash extends from southwestern Ontario south to Oklahoma and Georgia. In Canada, it occurs only in southwestern Ontario, at the northern limits of its range, where about 56 occurrences are known.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous forest communities may provide suitable habitat, the species was not detected during field investigations.
Plants	Broad Beech Fern Phegopteris hexagonoptera	SC	SC Schedule 3	SC	The Broad Beech Fern prefers to grow in rich soils in deciduous forests, often in areas dominated by maple and beech trees. It requires moist soil and usually grows in full shade. This species can typically be associated with the following ELC communities: FOD5 and FOD6 with moist soils and closed canopies.	The Broad Beech Fern grows in eastern North America from the southern Great Lakes region west to southeast Kansas and northeast Oklahoma, south to northeast Texas and the Gulf Coast and east to the Atlantic coast. In Ontario, the species is found in forest remnants in southern Muskoka, along Lake Erie, and in the eastern Lake Ontario-St. Lawrence River region.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Deciduous forest communities identified are not of suitable composition to support this species.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Plants	Climbing Prairie Rose Rosa setigera	SC	SC Schedule 1	SC	The Climbing Prairie Rose is typically found in open habitats with moist heavy clay to clay-loam soils such as old fields, abandoned agricultural land, as well as prairie remnants and shrub thickets. This rose depends on areas being kept open by periodic fire or other disturbances. This species can typically be associated with the following ELC communities: CUM, CUT, and TPO with moist heavy clay to clay-loam soils.	In Ontario the Climbing Prairire Rose can be found in south western Ontario between Windsor and Chatham, on Walpole Island and near Belville.	SARO	Yes Open meadows within the study area may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although a cultural meadow community may provide suitable habitat, the species was not detected during field investigations.
Plants	Crooked-stem Aster Symphyotrichum prenanthoides	THR	THR Schedule 1	SC	Crooked-stem Aster grows in rich, sandy soil at the edge of forests or in sunny openings within forests. It also grows in wet areas along the banks of rivers and streams, and is sometimes found along roadsides.	The Crooked-stem Aster range includes the eastern United States, from New York south to North Carolina and Tennessee, and west to Indiana. There is a separate population in the American Midwest within Wisconsin, Minnesota, Iowa and Illinois. In Canada, the Crooked-stem Aster is only found in southwestern Ontario. About 22 populations were believed to exist in 2002, most of these in Elgin County.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although decidous and mixed forest communities may provide suitable habitat, the species was not detected during field investigations.
Plants	Dense Blazing Star Liatris spicata	THR	THR Schedule 1	THR	In Ontario, Dense Blazing Star grows in moist prairies, grassland savannahs, wet areas between sand dunes, and abandoned fields. This plant does not do well in the shade and is usually found in areas that are kept open and sunny by fire, floods, drought, or grazing. This species can typically be associated with the following ELC cmmuniteis: TPO2, TPS2, SDO and CUM with moist soils.	Dense Blazing Star is found only in North America. In Canada, it occurs naturally only in southwest Ontario, mainly in the area between Lake St. Clair, Lake Huron and Lake Erie. There are believed to be 11 to 13 populations in the province with six populations known to have been lost.	SARO	Yes Open meadows within the study area may provide suitable habitat for this species.	No This species was not observed during field investigations. No Potential habitat is likely too dry to support this species.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Plants	Drooping Trillium Trillium flexipes	END	END Schedule 1	END	Drooping Trillium grows on damp sandy soil in mature, deciduous forests that are usually close to a river or stream. It is found in Carolinian forests with Maple, White Ash, Basswood, Hackberry, White Elm, and Blue Ash trees. It shares the forest floor with other native plants including Ostrich Fern, Wild Ginger and Jack-in-the-pulpit. This species can typically be associated with the following ELC communities: FOD4-2, FOD4-3, FOD5, FOD6 and FOD7 that are mature and have sandy soils, typically near a river or stream with the associate species listed above.	In Canada, Drooping Trillium only grows in southwestern Ontario in the warmer climate of the Carolinian forest. There were once six known locations in the province, but today there are only two. A total of 1465 flower stems were reported in 2007. Both populations along the Sydenham River in Middlesex County and along the Thames River in Elgin County are believed to be reproducing successfully.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous forest communities may provide suitable habitat, the species was not detected during field investigations.
Plants	Eastern Flowering Dogwood Cornus florida	END	END Schedule 1	END	Eastern Flowering Dogwood grows under taller trees in mid-age to mature deciduous or mixed forests. It most commonly grows on floodplains, slopes, bluffs and in ravines, and is also sometimes found along roadsides and fencerows. This species can typically be associated with the following ELC communities: FOD and FOM.	In Canada, it can only be found in southern Ontario in the Carolinian Zone (the small area of Ontario southwest of Toronto to Sarnia down to the shores of Lake Erie).	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous and mixed forest communities may provide suitable habitat, the species was not detected during field investigations.
Plants	False Hop Sedge Carex lupuliformis	END	END Schedule 1	END	In Canada, this plant most often grows in riverine swamps and marshes, and around temporary forest ponds. It prefers open areas and areas under forest canopy openings, with lots of sunlight. This species can typically be associated with the following ELC communities: SWD and MAS lots of sunlight.	False Hop Sedge ranges from Florida and Texas north to Quebec and Ontario. In Ontario, seven occurrences are known to persist. In Quebec, there are three persisting populations and three populations that are being restored where False Hop Sedge is believed to have been extirpated. The largest populations occur in southern Ontario.	SARO	Yes The study area is in close proximity to wetland communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous forest and swamp communities may provide suitable habitat, the species was not detected during field investigations.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Plants	False Rue-anemone Enemion biternatum	THR	THR Schedule 1	THR	False Rue-anemone grows in deciduous forests and thickets with rich, moist soil, often in valleys, floodplains and ravine bottoms. This species is frequently found close to watercourses within mature forests with lots of maple and beech trees. It prefers partial sun or somewhat shady conditions. This species can typically be associated with the following ELC communities: FOD2, FOD4, FOD5, FOD6, FOD7 and FOD9.	In Canada, based on information available in 2003, False Rue-anemone is believed to occupy only six places in southwestern Ontario, all in the Carolinian region. Some sites support tens of thousands of plants but they are often densely clustered into a small area.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous forest communities may provide suitable habitat, the species was not detected during field investigations.
Plants	Green Dragon Arisaema dracontium	SC	SC Schedule 3	SC	The Green Dragon grows in somewhat wet to wet deciduous forests along streams, particularly maple forest and forest dominated by Red Ash and White Elm trees. This species can typically be associated with the following ELC communities: FOD6, FOD7, FOD8, FOD9 and SWD with moist soils.	Primarily a plant of the southern United States, the Green Dragon is found from the Great Lakes region and southern Quebec east to the Atlantic coast, south to Florida and the Gulf coast, and west to Texas and Nebraska. In Ontario, it is believed to still occur at about 30 to 35 sites in the southwestern part of the province.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous forest and swamp communities may provide suitable habitat, the species was not detected during field investigations.
Plants	Heart-leaved Plantain Plantago cordata	END	END Schedule 1	END	A semi-aquatic plant, Heart-leaved Plantain is found in relatively undisturbed wet woods, often along the rocky or gravelly limestone beds of shallow, slow-moving clear streams. Moisture is generally always present above or just below the soil surface. The most common trees in Ontario woodlots associated with this plant are Sugar Maple (Acer saccharum), Silver Maple (Acer saccharinum), Red Maple (Acer rubrum), Blue-beech (Carpinus caroliniana), Shagbark Hickory (Carya ovata), White Ash (Fraxinus americana), Black Ash (F. pennsylvanica) and Basswood (Tilia americana). This species can typically be associated with the following ELC communities: FOD6, FOD7, FOD9, SWD2-2 and SWD3-3.	In Canada, Heart-leaved Plantain grows in a few locations in southwestern Ontario near Windsor, between Chatam and London and near the Grand Bend area.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous forest communities may provide suitable habitat, the species was not detected during field investigations.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Plants	Kentucky Coffee-tree Gymnocladus dioicus	THR	THR Schedule 1	THR	Kentucky Coffee-tree is found in a variety of habitats, but grows best on moist rich soil. Consequently, it is often found in floodplains, though it will tolerate shallow rocky or sandy soils. It is shade-intolerant, and therefore grows along the edges of woodlot or relies on canopy openings in forests and woodlots. This species can typically be associated with the following ELC communites: FOD typically on moist rich soils along forest edges or in forest openings.	The Kentucky Coffee-tree is rare throughout its range, which extends from the southern Great Lakes region east to New York in scattered localities, south to Oklahoma and Arkansas, and west to Kansas and Nebraska. In Canada, it is only found in southwest Ontario where it was documented at 20 locations in 2000.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous forest communities may provide suitable habitat, the species was not detected during field investigations.
Plants	Large Whorled Pogonia Isotria verticillata	END	END Schedule 1	END	In Ontario, Large Whorled Pogonia has been found in deciduous or mixed forests with sandy soil and a thick layer of leaf litter. A relatively open forest canopy is required so that enough light can reach the plant. This species can typically be associated with the following ELC communities: FOM and FOD with sandy soils, a thick leaf litter and a relatively open forest canopy.	Large Whorled Pogonia ranges from New England and Michigan south to Texas and Georgia. In Canada, there are three records in southwestern Ontario. The last recorded sighting of Large Whorled Pogonia in Ontario was in 1996, when a single plant was found.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous and mixed forest communities may provide suitable habitat, the species was not detected during field investigations.
Plants	Red Mulberry Morus rubra	END	END Schedule 1	END	In Ontario, Red Mulberry grows in moist, forested habitats and on both sandy and limestone-based loamy soils. It is often found in areas where the forest canopy is quite open and allows lots of sunlight to reach the forest floor, but it will tolerate some shade. This species can typically be associated with the follwoing ELC communities: FOD6, FOD7, FOD8 and FOD9.	Red Mulberry occurs in eastern North American forests. In Canada, it is only found in the Carolinian Zone (the small area of Ontario southwest of Toronto to Sarnia down to the shores of Lake Erie) near rivers, the shores of Lake Erie, and the slopes of the Niagara Escarpment.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous forest communities may provide suitable habitat, the species was not detected during field investigations.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Plants	Riddell's Goldenrod Solidago riddellii	SC	SC Schedule 1	SC	Riddell's Goldenrod prefers open tallgrass prairie habitat with moist to wet calcium-rich soils. In Ontario, it also occurs in roadside ditches and along railway right-of-ways. This species can typically be associated with the follwoing ELC communities: TP2, CUM1-1 and MAM2 with moist soils.	Riddell's Goldenrod range extends across the midwest United States, from Ohio west to South Dakota and south to Arkansas. In Canada, populations are restricted to southwestern Ontario and southeastern Manitoba.	SARO	Yes Open meadows within the study area may provide suitable habitat for this species.	No This species was not observed during field investigations. No Potential habitat is likely too dry to support this species.
Plants	Tuberous Indian-plantain Arnoglossum plantagineum	SC	SC Schedule 1	SC	This species prefers open sunny areas in wet, calcium-rich meadows or shoreline fens. In Ontario, it grows along river banks and in wetlands near Lake Huron. This species can typically be associated with the following ELC communities: MAM and FEO.	In the United States, the range of the Tuberous Indian-plantain extends from Ohio and Michigan west to South Dakota, south to Texas and Alabama and east to the Appalachians. In Canada, it only grows in southern Ontario, where it is believed to still occur at about 18 sites near Lake Huron, most of them on the west side of the Bruce Peninsula.	SARO	Yes The study area is in close proximity to wetland communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Suitable wetland communities were not identified.
Plants	Willowleaf Aster Symphyotrichum praealtum	THR	THR Schedule 1	THR	In Ontario, the Willowleaf Aster is found in openings of oak savannahs, a very rare type of vegetation community containing many tallgrass prairie herbs and oak trees. It has also been found along railways, roadsides and in abandoned farm fields. This species can typically be associated with the following ELC communities: TPO, TPS and CUM.	In Canada, the Willowleaf Aster is believed to exist at about 12 locations in southwest Ontario, in Lambton, Essex and Middlesex Counties and the Municipality of Chatham-Kent. Additional populations may no longer exist. The largest populations are in the greater Ojibway Prairie Complex of Windsor and on Walpole Island. The population size is unknown. The Willowleaf Aster is common in the Midwestern United States.	SARO	Yes Open meadows within the study area may provide suitable habitat for this species.	No This species was not observed during field investigations. No Potential habitat is likely too dry to support this species.
Plants	Wood-poppy Stylophorum diphyllum	END	END Schedule 1	END	In Ontario, Wood-poppy is found in rich mixed deciduous woodlands, forested ravines and slopes, and along wooded streams. It is possible that Wood-poppy is still found in these areas because they were unsuitable for agriculture, rather than being reflective of its true habitat requirements. Wood-poppy grows in full shade, although the cultivated variety does well in partial sun. Associated dominant trees include: Sugar Maple, White Ash, American Beech, Black Cherry, and Hackberry. This species can typically be associated with the following ELC communities: FOM2-2, FOM3-2, FOM6-1, FOM7-1, FOD4 and FOD5.	In Canada, there are only three known populations of Wood-poppy found in southwestern Ontario, all in the county of Middlesex.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous forest communities may provide suitable habitat, the species was not detected during field investigations.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Reptiles	Blanding's Turtle Emydoidea blandingii	THR	THR Schedule 1	THR	Blanding's Turtles live in shallow water, usually in large wetlands and shallow lakes with lots of water plants. It is not unusual, though, to find them hundreds of metres from the nearest water body, especially while they are searching for a mate or traveling to a nesting site. Blanding's Turtles hibernate in the mud at the bottom of permanent water bodies from late October until the end of April. This species can typically be associated with the following ELC communities: SWT2, SWT3, SWD, SWM, MAS2, SAS1, SAM1, where open water is present.	The Blanding's Turtle is found in and around the Great Lakes Basin, with isolated populations elsewhere in the United States and Canada. In Canada, the Blanding's Turtle is separated into the Great Lakes-St. Lawrence population and the Nova Scotia population. Blanding's Turtles can be found throughout southern, central and eastern Ontario.	NHIC, ORAA, SARO, MNRF Aylmer district	Yes The study area is in close proximity to wetland communities which may provide suitable habitat for this species.	Yes This species was observed during field investigations. Yes Deciduous swamp and swamp thicket communities, as well as ponds within the wetlands, provide suitable habitat.
Reptiles	Butler's Gartersnake Thamnophis butleri	END	END Schedule 1	END	The Butler's Gartersnake prefers open, moist habitats, such as dense grasslands and old fields, with small wetlands where it can feed on leeches and earthworms. Burrows made by small mammals and even crayfish are sometimes used as hibernation sites, called hibernacula. This species is also commonly found in rock piles or old stonewalls. This species can typically be associated with the followin ELC communities: CUM and MAM.	The only place in the world where Butler's Gartersnake is found is in the lower Great Lakes region. In Ontario, this snake is concentrated in two areas: within 10 kilometres of the Detroit River, Lake St. Clair, the St. Clair River, and Lake Huron from Amherst Point to Errol, in Essex and Lambton counties and the Luther Marsh in Dufferin and Wellington counties. Population sizes can vary. Estimates done at several sites in Ontario in 1997 ranged between 50 and 900 snakes. At some sites it is considered to be locally common.	SARO	Yes Open meadows within the study area may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although cultural meadow habitat is present, the study area is outside the known range of this species.
Reptiles	Common Five-lined Skink (Carolinian population) Plestiodon fasciatus	END	END Schedule 1	END	Common Five-lined Skinks like to bask on sunny rocks and logs to maintain a preferred body temperature (28-36°C). During the winter, they hibernate in crevices among rocks or buried in the soil. There are two populations of Common Five-lined Skink in Ontario and they each occupy different types of habitat. The Carolinian population can be found under woody debris in clearings with sand dunes, open forested areas, and wetlands. This species can typically be associated with the following ELC communities: SDO, SDS, SDT, TPS, CUS, CUW, FOM, FOD and MAM where suitable cover and basking habitat is present.	In Canada, the species is limited to two distinct areas, along the southern margin of the Canadian Shield, and in the Carolinian Zone where it is found near the shores of Lakes Erie, St. Clair and Huron.	SARO	Yes The study area is in close proximity to forested communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Potential forest habitat has a dense canopy and is too shaded to provide suitable habitat.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Reptiles	Eastern Musk Turtle (Stinkpot) Sternotherus odoratus	THR	THR Schedule 1	SC	Eastern Musk Turtles are found in ponds, lakes, marshes and rivers that are generally slow-moving have abundant emergent vegetation and muddy bottoms that they burrow into for winter hibernation. Nesting habitat is variable, but it must be close to the water and exposed to direct sunlight. Nesting females dig shallow excavations in soil, decaying vegetation and rotting wood or lay eggs in muskrat lodges, on the open ground or in rock crevices. This species can typically be assocaited with the following ELC communities: MAS, OAO, SAS, SAM and SAF. Nesting habitat can be any upland areas adjacent these area that are exposed to direct sunlight.	In Canada, the Eastern Musk Turtle is found mostly along the southern edge of the Canadian Shield in Ontario and Quebec. In Ontario, it also occurs at various locations throughout southwestern and eastern Ontario. The limited data available indicate that the stinkpot has disappeared from much of its original range in southwestern Ontario.	SARO	Yes The study area is in close proximity to wetland communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although deciduous swamp and swamp thicket communities, as well as ponds within the wetlands, may provide suitable habitat, the species was not detected during field investigations.
Reptiles	Eastern Ribbonsnake Thamnophis sauritus	SC	SC Schedule 1	SC	The Eastern Ribbonsnake is usually found close to water, especially in marshes, where it hunts for frogs and small fish. A good swimmer, it will dive in shallow water, especially if it is fleeing from a potential predator. At the onset of cold weather, these snakes congregate in underground burrows or rock crevices to hibernate together. This species can typically be associated with the following ELC communities: FOC, FOM, FOD, SWC, SWM, SWD, MAM, MAS, OAO, SAS, SAM and SAF containing or near year round standing or flowing water.	The Eastern Ribbon Snake is found from southern Ontario west to Michigan and Wisconsin (isolated pockets), south to Illinois and Ohio, and east to New York State and Nova Scotia, where there is an isolated population. In Ontario, this snake occurs throughout southern and eastern Ontario and is locally common in parts of the Bruce Peninsula, Georgian Bay and eastern Ontario.	SARO	Yes The study area is in close proximity to forest and wetland communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although forest and swamp communities, as well as ponds within the wetland, may provide suitable habitat, the species was not detected during field investigations.
Reptiles	Gray Ratsnake (Carolinian population) Pantherophis spiloides	END	END Schedule 1	END	The two populations of Gray Ratsnake in Ontario can be found in different types of habitat. The Frontenac Axis population requires a variety of habitat types including deciduous forests, wetlands, lakes, rocky outcrops and agricultural fields. The Carolinian population is found in a mix of agricultural land and deciduous forest, preferring habitat where forest meets more open environments. Adults are strongly attached to their home ranges and often return to the same nesting and hibernation sites. They often lay eggs in logs or compost piles that serve as incubators. Sometimes several females will use the same site to deposit eggs.	Gray Ratsnakes are widely distributed throughout the eastern and central United States, extending as far north as southern Ontario. There are two widely separated populations in Ontario: the Carolinian in southwestern Ontario and the Frontenac Axis in southeastern Ontario.	SARO	Yes Agricultural lands within the study area lie adjacent to forested communities.	No This species was not observed during field investigations. No Although forest communities adjacent to agricultural land may provide suitable habitat, the species was not detected during field investigations.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Reptiles	Massasauga Sistrurus catenatus	THR	No Status	THR	Massasaugas live in different types of habitats throughout Ontario, including tall grass prairie, bogs, marshes, shorelines, forests and alvars. Within all of these habitats, Massasaugas require open areas to warm themselves in the sun. Pregnant females are most often found in open, dry habitats such as rock barrens or forest clearings where they can more easily maintain the body temperature required for the development of their offspring. Non-pregnant females and males forage and mate in lowland habitats such as grasslands, wetlands, bogs and the shorelines of lakes and rivers. Massasaugas hibernate underground in crevices in bedrock, sphagnum swamps, tree root cavities and animal burrows where they can get below the frost line but stay above the water table. This species can be associated with the following ELC communities: TP, BO, MA, FO, AL, RB, and CUM with open areas.	In Canada, the Massasauga is found only in Ontario, primarily along the eastern side of Georgian Bay and on the Bruce Peninsula. Two small populations are also found in the Wainfleet Bog on the northeast shore of Lake Erie and near Windsor. The Massasauga was once more widespread in southwestern Ontario, especially along the shores of the Great Lakes.	SARO	Yes The study area is in close proximity to forest communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. Forest communities are far outside the known range of this species.
Reptiles	Northern Map Turtle Graptemys geographica	SC	SC Schedule 1	SC	The Northern Map Turtle inhabits rivers and lakeshores where it basks on emergent rocks and fallen trees throughout the spring and summer. In winter, the turtles hibernate on the bottom of deep, slow-moving sections of river. They require high-quality water that supports the female's mollusc prey. Their habitat must contain suitable basking sites, such as rocks and deadheads, with an unobstructed view from which a turtle can drop immediately into the water if startled. This species can typically be associated with the following ELC communities: OAO, SA with emergent rocks and fallen trees suitable habitat for prey.	The Northern Map Turtle's range extends from the Great Lakes region west to Oklahoma and Kansas, south to Louisiana and east to the Adirondack and Appalachian mountain barrier. There are isolated populations in New Jersey and New York states. In Canada, it is found in southwestern Quebec and southern Ontario. In southern Ontario, it lives primarily on the shores of Georgian Bay, Lake St. Clair, Lake Erie and Lake Ontario, and along larger rivers including the Thames, Grand and Ottawa.	ORAA, SARO	No Suitable lacustrine or riverine habitat is not present within or adjacent to the study area.	No This species was not observed during field investigations. Suitable habitat was not identified.
Reptiles	Queensnake Regina septemvittata	END	END Schedule 1	END	The Queensnake is an aquatic species that is seldom found more than a few metres from the water. It prefers rivers, streams and lakes with clear water, rocky or gravel bottoms, lots of places to hide, and an abundance of crayfish. Queensnakes will often hibernate in groups with other snakes, amphibians and even crayfish. Suitable hibernation sites (called hibernacula) include abutments of old bridges and crevices in bedrock. This species can typically be be associated with the following ELC communities: OAO with clear water and rocky or gravel bottoms with lots of places to hide and abundance of crayfish.	In Ontario, the Queensnake is found only in the southwest in Middlesex, Brant, Huron and Essex counties, and on the Bruce Peninsula. There are fewer than 25 sites where it is known to occur in these areas. The extremely specialized habitat requirements of the Queensnake restrict this species to particular areas, with large gaps of unfavourable habitat in between populations. The snake's home range is quite small, making Queensnakes less likely to move into new areas or areas where it was historically found.	ORAA, SARO, MNRF Aylmer district	Yes Watercourses adjacent to the study area may provide suitable habitat.	No This species was not observed during field investigations. No The substrate of the watercourse is not of suitable composition to support this species.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations
Reptiles	Snapping turtle Chelydra serpentina	SC	SC Schedule 1	SC	Snapping Turtles spend most of their lives in water. They prefer shallow waters so they can hide under the soft mud and leaf litter, with only their noses exposed to the surface to breathe. During the nesting season, from early to mid summer, females travel overland in search of a suitable nesting site, usually gravelly or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits. This species can typically be associated with the following ELC communities: OAO, SA near gravelly or sandy areas.	The Snapping Turtle's range extends from Ecuador to Canada. In Canada this turtle can be found from Saskatchewan to Nova Scotia. It is primarily limited to the southern part of Ontario. The Snapping Turtle's range is contracting.	NHIC, ORAA, SARO	Yes The study area is in close proximity to wetland communities which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although ponds within the wetland adjacent to the study area may provide suitable habitat, the species was not detected during field investigations.
Reptiles	Spiny Softshell Apalone spinifera	THR	THR Schedule 1	THR	Spiny Softshells are highly aquatic turtles that rarely travel far from water. They are found primarily in rivers and lakes but also in creeks and even ditches and ponds near rivers. Key habitat requirements are open sand or gravel nesting areas, shallow muddy or sandy areas to bury in, deep pools for hibernation, areas for basking, and suitable habitat for crayfish and other food species. These habitat features may be distributed over an extensive area, as long as the intervening habitat doesn't prevent the turtles from traveling between them. This species can typically be associated with the following ELC communities: OAO charaterized as rivers with nearby open sand or gravel nesting areas, shallow muddy or sandy substrates, deep pools, basking areas and suitable habitat for food species.	In Canada, the Spiny Softshell is found only in Quebec and southwestern Ontario in the Lake St. Clair, Lake Erie and western Lake Ontario watersheds. The majority of Spiny Softshells in Ontario are found in the Thames and Sydenham rivers and at two sites in Lake Erie. The size of the home range of this turtle depends on availability of habitat features such as nesting and hibernation sites. Some turtles travel up to 30 kilometres in a year from one part of their home range to another.	SARO, MNRF Aylmer district	Yes The study area is in close proximity to wetland communities and watercourses which may provide suitable habitat for this species.	No This species was not observed during field investigations. No Although ponds within the wetland adjacent to the study area may provide suitable habitat, the species was not detected during field investigations.

Glossary

EXP	ESA - Extripated - a species that no longer exists in the wild in Ontario but still occurs elsewhere. SARA - Extripated - a wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild.
END	ESA - Endangered - a species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's Endangered Species Act. SARA - Endangered - a wildlife species that is facing imminent extirpation or extinction.
THR	ESA - Threatened - a species that is at risk of becoming endangered in Ontario if limiting factors are not reversed. SARA - 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	ESA - Special Concern (formerly Vulnerable) - a species with characteristics that make it sensitive to human activities or natural events. SARA - Special Concern - a wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.
OMNR	Ontario Ministry of Natural Resources
ESA	Endangered Species Act
SARA	Species at Risk Act (Federal)
Schedule 1	The official list of species that are classified as extirpated, endangered, threatened, and of special concern.
Schedule 2	Species listed in Schedule 2 are species that had been designated as endangered or threatened, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.
Schedule 3	Species listed in Schedule 3 are species that had been designated as special concern, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.
COSEWIC	Committee on the Stauts of Endangerd Wildlife in Canada - a committee of experts that assesses and designates which wild species are in some danger of disappearing from Canada.

References

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species / Habitat Observed During Field Investigations

1 - Species at Risk . Ontario Ministry of Natural Resources. http://www.mnr.gov.on.ca/en/Business/Species/index.html. © Queens Printer For Ontario, 2013.

2 - Species at Risk Status Reports. Committed on the Status of Endangered Wildlife in Canada. Ottawa. http://www.sararegistry.gc.ca/search/advSearchResults_e.cfm?stype=doc&docID=18.

3 - Evans, Melissa, Elizabeth Gow, R. R. Roth, M. S. Johnson and T. J. Underwood. 2011. Wood Thrush (Hylocichla mustelina), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; doi:10.2173/bna.246
Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/246

4 - McCarty, John P. 1996. Eastern Wood-Pewee (Contopus virens), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/245doi:10.2173/bna.245

AECOM Imagine it. Delivered.

Appendix J

Standard Construction Mitigation Measures

CONSTRUCTION MITIGATION MEASURES

Mitigation measures must be used for erosion and sediment control to prohibit sediment from entering the identified Natural Areas during construction. The primary principles associated with sedimentation and erosion protection measures are to: (1) minimize the duration of soil exposure, (2) retain existing vegetation, where feasible, (3) encourage re-vegetation, (4) divert runoff away from exposed soils, (5) keep runoff velocities low, and (6) trap sediment as close to the source as possible. To address these principles, the following mitigation measures are recommended:

Sediment and Erosion Control Fencing

- Typical erosion control measures such as light duty, heavy duty silt fencing, coco mats, straw bale/waddles, rock check dam etc. will be used as required.
- All identified sediment and erosion control measures should be installed according to Ontario Provincial Standard Specifications Drawings:
  - OPSD 219.100 Light-Duty Straw Bale Barrier
  - OPSD 219.110 Light-Duty Silt Fence Barrier
  - OPSD 219.130 Heavy-Duty Silt Fence Barrier
  - OPSD 219.150 Sandbag Barrier
  - OPSD 219.180 Straw Bale Flow Check Dam
  - OPSD 219.190 Silt Fence Flow Check Dam
  - OPSD 219.200 Sandbag Flow Check Dam
  - OPSD 219.210 Temporary Rock Flow Check Dam V-Ditch
  - OPSD 219.211 Temporary Rock Flow Check Dam Flat Bottom Ditch
  - OPSD 219.220 Excavated Sediment Trap In Ditch
  - OPSD 219.230 Chute For Excavated Sediment Trap
  - OPSD 219.231 Berm Barrier
  - OPSD 219.240 Dewatering Trap
  - OPSD 219.260 Turbidity Curtain
  - OPSD 219.261 Turbidity Curtain Seam Detail
- Excess silt fence should be maintained on-site, prior to the commencement of grading operations and throughout the duration of the construction, in the case of an emergency or repair.
- Silt fencing positioning should be incorporated into initial detailed design drawings and contract specifications.
- Protect all exposed surfaces and control all runoff during constructions.
- All erosion control measures must be in place prior to the start of construction and remain in place until restoration is complete and disturbed areas are stabilized against erosion. Maintain all erosion control measures during construction, Erosion and sediment control measures will be visually inspected daily during environmental monitoring, and following storm events.
- Straw bales/waddles to be used in localized areas to minimize sediment and intercept runoff.
- Maintain and replace straw bales/waddles as necessary.
- All excavated materials requiring stockpiling shall be kept away a minimum distance of 30 metres from all identified Natural Areas.
- All surfaces susceptible to erosion should be re-vegetated through the placement of seed, mulch or sod

immediately upon completion of construction activities.

During construction of facilities, roads and ditches adjacent to the identified Natural Areas, heavy equipment could damage peripheral vegetation from contact, excavation and/or soil compaction. Dust coated vegetation can reduce photosynthesis, increase susceptibility to disease and lead to death. It is anticipated that perimeter plants would be most susceptible to such effects. The following recommendations are made to mitigate these potential impacts.

Peripheral Vegetation Protection

Ø Prior to heavy machinery working adjacent to identified Natural Areas, a fence barrier for tree protection (OPSD 220.10) should be installed outside the drip-line of the significant features to protect any vegetation that is to be retained and is in the vicinity of exposure to damage by machinery.

Dust Suppressant Treatment

Ø Dust suppressants during dry periods should be applied to those areas which generate large amounts of dust.

Ø Restrict earth movement immediately adjacent to woodlands during periods of high dust generation.

Construction vehicle access should be limited to areas adjacent to identified Natural Areas to prevent soil compaction and/or the initiation of soil erosion events. Construction vehicle re-fueling stations should be centralized away from natural areas to ensure that potential chemical spills are directed away from natural areas. Vehicle washing should be prohibited in areas adjacent to the woodlands. The following recommendations are provided to address these potential sources of impacts.

Controlled Construction Vehicle Access

Ø Construction vehicle access should be limited to existing roadways and construction paths, away from the identified Natural Areas and their recommended buffers.

Ø For areas immediately adjacent to the identified Natural Area boundaries, periodic supervision of the construction is recommended.

Construction Vehicle Re-fueling Stations

Ø Re-fueling stations should be located within a centralized location on-site away from the identified Natural Areas and their recommended buffers

Ø Re-fueling stations should be constructed in a manner to prevent soil and/or surface and groundwater contamination from any leaks or spills.

Ø An emergency response kit should be made available at each re-fueling station in case of a spill.

Ø All on-site crew members operating construction vehicles should be appropriately trained in handling a

potential spill and have WHMIS Training.

Ø All chemical transfer/maintenance should be conducted within the refueling station areas.

Damage to Rooting Zones during removals

Ø During grading and construction in areas immediately adjacent to identified Natural Areas and planted trees, roots may be damaged by machinery and soils may be compacted, thereby affecting the trees' ability to grow and absorb nutrients and water. In order to address root damage, it will be necessary to prune roots of adjacent trees during grading and excavation. To avoid compaction of soils, root zones around trees within natural heritage features will need to be fenced. Most areas will be avoided by restricting construction to areas outside the features.

Construction activities within the study area have the potential to disturb breeding birds and other resident wildlife within the identified Natural Areas. A certain degree of disturbance can be avoided by the proper scheduling of construction periods. The following mitigation measures are recommended to minimize impacts to wildlife.

Wildlife Habitat Protection and Mitigation Measures

Upon the first encounter of any wildlife including SAR (Endangered, Threatened or Special Concern) the following steps are to be taken:

- Work in the immediate vicinity of the observation is to come to a stop;
- Should an Ecologist/Biologist not be on-site, one should be contacted immediately;
- Ecologist/Biologist will notify the District MNR Biologist within 48 hours of any observation of Endangered and Threatened species and/or immediately for any species going to a wildlife custodian
- It is not necessary to notify the District MNR Biologist with observations of Special Concern species (i.e. Snapping Turtle) or general wildlife sightings (i.e. deer, raccoon etc...).
- A 30m setback from the area of the species location should be applied to allow the species to vacate the area naturally within a 24 hour period and then exclusionary fencing is to be installed following MNR guidance document provided as Attachment 1;
- However should a species be encountered during construction activities completed during the winter months, the species should immediately be placed in appropriate containers and stored in a dark, warm, quiet place and be transported to an appropriate wildlife sanctuary/rehabilitation facility as soon as possible. Onsite Ecologists/Biologist will advise of the transportation arrangements and consult with MNR to notify them of the transportation;
- Onsite Ecologist/Biologist will call the wildlife sanctuary/rehabilitation facility prior to transporting the individual; and,
- Work is to not commence again in the immediate area of the observation until further instructed by onsite Ecologists/Biologist.
- Should a wildlife species be observed and on-site personnel are not able to accurately identify it, onsite Ecologist/Biologist is to be contacted immediately for proper identification. Photographs of the species and a description of the species location are to be recorded upon observation if possible.

Breeding Birds and Vegetation Removals

Ø Removal of vegetation within the study areas can occur between the months of September to April, which is outside of the typical breeding bird period (April1st to August31st) within southern Ontario. If removal of vegetation is to occur during the breeding bird window, the area will be searched by a qualified ecologist for the presence of nesting birds to avoid contravening the *Migratory Birds Convention Act*. The Surveys will document the location of breeding pairs and potential location of nests. Should nests/breeding pairs be observed within the clearing area, the location should be clearly marked/flagged and a minimum 10 meter buffer surrounding the nest be implemented. Depending on the species a larger buffer zone may be required. The space within this buffer should be protected until the young are fully fledged. An ecologist with ornithological experience should conduct the surveys and monitor the nests (should nests be discovered) periodically. Clearing can only be undertaken if the ecologist is satisfied there are no breeding/nesting pairs within the affected area

Construction Mitigation – Noise Disturbance to Resident Wildlife

Ø Construction is restricted to periods before and after breeding period (no works April1st to August31st).
Ø Limit construction activity to a period after 7 am and before 7 pm daily.
Ø Vegetation removal; where possible, is to occur outside of the bat breeding season which occurs from April 30th to September 1st of any calendar year with a strict no vegetation removal from June1st to July 31st.
Ø Cavity tree removal may occur between April 30th and May 31st or August 1st to September 1st provided a night exit survey is completed 24hr prior to each cavity tree being removed to confirm the presence or absence of bats. Exit surveys are to be conducted for each candidate cavity tree and will occur from 30 minutes before dusk until 60 minutes after dusk. If no bats are observed exiting the cavity tree the tree may be removed immediately the following day.

Species at Risk Protection and Handling

Ø Species at Risk (SAR) identified as potentially occurring within the study area should be surveyed for prior to the initiation of construction. *A qualified ecologist/biologist or ecologists should conduct a survey of the project work area and areas immediately adjacent to the work areas (10-30m) for the Species at Risk identified in the EIS document*. Where Species at Risk are found, appropriate transplanting (for vegetation species) and relocation (for reptiles and amphibians) will be undertaken by a qualified professional. *A Species at Risk Survey, Transplant and Relocation Plan should be prepared and implemented prior to construction*.
Ø Where SAR or SAR habitat have been identified for the project area, species-specific surveys are required to determine the need for a permit under the *Endangered Species Act* and the need for SAR species relocation prior to construction.
Ø Any required SAR relocation must be conducted by a qualified SAR Specialist.

Contact

Brandon Holden
Terrestrial Ecologist
T 519-963-5923
E brandon.holden@aecom.com

Gary A. Epp, B.Sc.(Hons.),M.Sc., Ph.D
Practice Lead & Senior Ecologist,
Water & Natural Resources, Environment
T 613-820-8282 x229
E gary.epp@aecom.com

aecom.com