

# 720 Erbsville Road, Waterloo, Ontario

Environmental Impact Study

Prepared for:

Peter Degroot
Sunvest Development Corp.
901 Victoria Street North
Kitchener, ON, N2B 3C3

Project No. 2520 | January 2024

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

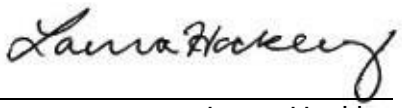
**720 Erbsville Road, Waterloo, Ontario**

**Environmental Impact Study**

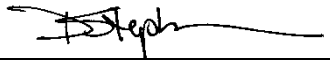
**Project Team**

| | |
|---|---|
| **David Stephenson** | Senior Biologist, Project Advisor |
| **Laura Hockley** | Ecologist, Project Manager |
| **Dan Riley** | Terrestrial & Wetland Biologist |
| **Blair Baldwin** | Aquatic Biologist |
| **Eve Kraus** | Field Biologist |

First report submitted on December 15, 2021
Second report submitted on January 23, 2024



Laura Hockley
Project Manager/Author
Ecologist



David Stephenson
Project Advisor
Senior Biologist/Certified Arborist

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## 1.0 Introduction

Natural Resource Solutions Inc. (NRSI) was retained in November 2020 by Sunvest Development Corp. to complete an Environmental Impact Study (EIS) for the proposed development at 720 Erbsville Road in the City of Waterloo, Ontario. An EIS for this proposed development was first submitted on December 15, 2021. This second submission incorporates changes to the proposed development plans, including a reduction in the total number of units, revised parking areas, an additional stormwater management facility (SWMF), and a revised development limit. It also provides clarification and addresses agency comments from the first submission and integrates additional field data collected in 2023. Agency comments on the first submission are included in Appendix I.

The subject property is approximately 9.3ha in area and is located in the northwest of the City of Waterloo. The property is bound by Conservation Drive and the Erbsville Kartway lands to the northwest and northeast, Erbsville Road to the southwest, and a small agricultural field to the southeast (Map 1).

The proposed residential development is a mixture of townhouses and stacked townhouses, with an internal road network, a mixture of residential density types, stormwater management, trails and parkland. The development will generally follow the land use structure of the Erbsville South Block Plan (City of Waterloo 2020a).

The subject property is comprised of agricultural fields, as well as wetlands and woodlands associated with Laurel Creek. The woodland/wetland complex on-site is part of the Environmentally Sensitive Policy Area (ESPA) 80, known as Laurel Creek Forest (RMOW 2015). The woodland/wetland complex is a Core Natural Feature and Laurel Creek is a Supporting “A” Natural Feature in the City of Waterloo’s Official Plan (OP) (2020b). Wetlands are part of the Laurel Creek-Sunfish Lake Provincially Significant Wetland (PSW) complex. The subject property is located in Ecoregion 6E.

The requirement for an EIS has been triggered by the presence of significant woodlands, the Laurel Creek Forest ESPA and the Sunfish Lake-Laurel Creek PSW. The natural features on the subject property have been extensively studied through the Erbsville South Environmental Study (ESES) (Dougan and Associates et al. 2018) and the Erbsville South Block Plan (City of Waterloo 2020a). Technical studies, relevant to other aspects of the project have been prepared by JPE Engineering (engineering, grading, and servicing), Water’s Edge (stormwater

management) and MHBC (planning). Ongoing natural environment monitoring of the subject lands as per the City's requirements has been undertaken by Stantec between 2006 and 2021. Additional pre-construction monitoring was also completed by NRSI in 2023, which has been incorporated into this revised EIS.

This report summarizes work completed in support of the EIS and background information collected on natural heritage features and wildlife including breeding birds, mammals, herpetofauna, Lepidoptera, Odonata, vascular flora, and aquatic habitats in the vicinity of the subject property. The findings of field surveys conducted as part of the Erbsville South Environmental Study (Dougan and Associates et al. 2018) as well as field work completed by NRSI in 2023 are included. As per the recommendations in the ESES and the Erbsville South Block Plan (City of Waterloo 2020a), natural features characterizations and findings completed within three years of the ESES will be used to determine impacts associated within the proposed development. Although it has been more than three years since the ESES surveys, this EIS still heavily relies on this data in conjunction with additional surveys completed by NRSI and Stantec in 2023. This impact study has been developed in accordance with the Region of Waterloo's OP (2015), the City of Waterloo's OP (2020b) and the Grand River Conservation Authorities' (GRCA) policies (2013).

## 2.0 Project Scoping

### 2.1 Study Area

Although the proponent owns a number of properties in the area, for the purposes of this report, the “subject property” refers to the lands at 720 Erbsville Road, Waterloo. The “development footprint” is the land occupied by the agricultural field, a cultural thicket, and a portion of the existing residential/anthropogenic area. Neighbouring natural features are being included that have ecological connections and interrelationships to the development area. This includes areas that contribute as well as receive flows from the development lands. In order to complete a comprehensive impact assessment, neighbouring natural features have been included in this study, but in lesser detail than features immediately adjacent to the development area. In order to effectively capture these interrelationships, we have included an area of approximately 200m around the proposed development portion of the subject property (Map 1). For the purposes of this study, these lands are referred to as the “study area”. This distance adequately captures the adjacent lands area as per the Provincial Policy Statement (PPS) (OMMAH 2020). Legacy data collected from agencies and wildlife atlases encompassed an area of approximately 10km around the property to ensure that all surrounding natural features were considered.

### 2.2 Preliminary Background Review for Scoping

In order to determine a study approach for the EIS, existing natural heritage information was gathered and reviewed to identify key natural heritage features and species that are known or have the potential to occur within the study area. Background information on the natural environmental features within the study area was gathered from the Natural Heritage Information Centre (NHIC) (MNRF 2023), Department of Fisheries and Oceans (DFO 2023) and relevant taxa-specific databases, as listed below.

Initial wildlife species lists were compiled to provide information on species reported from the vicinity of the study area (10km square grid) using various atlases, including the Ontario Mammal Atlas (Dobbyn 1994), the Ontario Reptile and Amphibian Atlas (Ontario Nature 2019), the Ontario Butterfly Atlas (Macnaughton et al. 2020), and the Ontario Odonata Atlas (OOAD 2023). Data on breeding birds in the area was extracted from the Ontario Breeding Bird Atlas (Bird Studies Canada et al. 2006). These initial species lists were used to guide the scope and type of wildlife field surveys required as outlined in the following sections.

Based on these initial species lists, a total of 16 Species at Risk (SAR) and 14 Species of Conservation Concern were identified as having records from within the vicinity of study area.

SAR are those listed on the Species at Risk in Ontario List (MECP 2023). These include species identified by the Committee on the Status of Species at Risk in Ontario (COSSARO) as provincially Endangered, Threatened, or Special Concern. Species listed as Endangered or Threatened are protected by the Endangered Species Act, 2007, which includes protection to their habitat. Additionally, species listed on Schedule 1 as Endangered or Threatened are protected under the Federal Species at Risk Act (SARA) 2002 on Federal lands, however, as the study area is on non-Federal lands this would only apply to aquatic species and migratory birds. As part of the recommendations in the ESES (Dougan and Associates et al. 2018) and the Erbsville South Block Plan (City of Waterloo 2020a), an Information Gathering Form was submitted to the MECP in January 2021, however no response was obtained. An updated IGF will be prepared that includes the updated development plan information and results of surveys.

Species considered Special Concern are included in the definition of Species of Conservation Concern, which includes the following:

- species designated provincially as Special Concern,
- species that have been assigned a conservation status (S-Rank) of S1 to S3 or SH by the Natural Heritage Information Centre, and
- species that are designated federally as Threatened or Endangered by the Committee for the Status of Endangered Wildlife in Canada (COSEWIC), but not provincially by the COSSARO. These species are protected by the federal Species at Risk Act but not provincially by the Endangered Species Act.

Species of Conservation Concern are discussed further within the context of Significant Wildlife Habitat (SWH) (Section 5.4).

A preliminary screening exercise was conducted on these species to identify which species have suitable habitat within the study area. This involved cross-referencing the preferred habitat for reported SAR and SCC against species reported in the ESES (Dougan and Associates et al. 2018) and observed by NRSI, and habitats known to occur within the development footprint. This was completed to ensure that the potential presence of all SAR and SCC within the study area was adequately assessed in this EIS.

Full results of the SAR/SCC screening exercise are provided in Appendix II.

A preliminary screening for the presence of SWH was also completed for the proposed development area. The Significant Wildlife Habitat Technical Guide (SWHTG) is a guideline document that outlines the types of habitats that the MNRF considers significant in Ontario as well as criteria to identify these habitats (OMNR 2000, OMNRF 2015a). The SWHTG groups SWH into four broad categories: seasonal concentration areas, rare vegetation communities and specialized wildlife habitat, habitats of species of Conservation Concern, and animal movement corridors.

Full results of the SWH screening are provided in Appendix III and further discussion is provided in Section 5.4.

## 2.3 Terms of Reference and Agency Input

Based on the findings described above, a Terms of Reference (TOR) for the EIS was prepared by NRSI and submitted to the City of Waterloo, Region of Waterloo, and GRCA on January 13, 2021 for review and comment. The GRCA, City of Waterloo, and Region of Waterloo reviewed the TOR, and on January 27, February 2 and March 4, 2021, respectively, provided comments to NRSI on the study approach. As comments were relatively minor in nature and the specified agencies approved the TOR, comments were addressed through emails to agency staff and within this EIS. The Terms of Reference, City of Waterloo, Region of Waterloo, and GRCA comments are appended to this report (Appendix IV).

As part of the City of Waterloo subdivision guidelines for environmental monitoring, the proponent was required to complete monitoring of the study area for a minimum of two years prior to development of the subject property, with at least one year of monitoring completed immediately preceding construction. A summary of pre-construction monitoring completed to-date is provided in Section 3.

## 2.4 Relevant Policies, Legislation, and Planning Studies

Natural features and species in the study area were evaluated against the relevant local, provincial and federal policies, legislation, and planning studies, to help inform suitable land-uses concepts, guide the layout of development, and identify areas to be protected. This analysis is shown in Table 1.

**Table 1. Relevant Policies, Legislation and Planning Studies**

| Policy/Legislation | Description | Project Relevance |
|---|---|---|
| Provincial Policy Statement (OMMAH 2020). | • Issued under the authority of Section 3 of the Planning Act and came into effect on May 1, 2020, replacing the 2014 PPS (OMMAH 2020).<br>• Section 2.1 of the PPS – Natural Heritage establishes clear direction on the adoption of an ecosystem approach and the protection of resources that have been identified as 'significant'.<br>• The Natural Heritage Reference Manual (OMNR 2010) and the Significant Wildlife Habitat Technical Guide (OMNR 2000, OMNR 2015) were prepared by the MNRF to provide guidance on identifying natural features and in interpreting the Natural Heritage sections of the PPS. | • Based on a preliminary analysis, the following natural features were identified within the study area which have implications under the PPS:<br>o Sunfish Lake-Laurel Creek Provincially Significant Wetland;<br>o Significant Woodland;<br>o Significant Wildlife Habitat;<br>o Habitat for Endangered and Threatened species, and<br>o Fish Habitat. |
| Endangered Species Act, 2007 | • The original ESA, written in 1971, underwent a year-long review which resulted in a number of changes which came into force in 2007.<br>• The ESA prohibits killing, harming, harassing or capturing Endangered and Threatened species and protects their habitats from damage and destruction.<br>• Ontario Regulation 242/088 under the ESA applies to all species on the Species at Risk List, as of June 2, 2017. | • Based on an analysis and review of the ESES, one regulated SAR (Blanding's Turtle) was identified as having the potential to occur within the study area, including within the development footprint, based on habitat present.<br>• Additional SAR have been identified by NRSI through further study, including Little Brown Myotis, Northern Myotis, and Black Ash. |
| Canadian Fisheries Act, 1985 | • The federal Fisheries Act provides the protection of fish and fish habitat.<br>• Fish are protected through two core prohibitions: Section 34.4(1) prohibits the death of fish by means other than fishing, and Section 35(1) prohibits the harmful alteration, disruptions, or destruction (HADD) of fish habitat.<br>• Fish habitat is defined as "spawning grounds and any other areas, including nursery, rearing, food supply, and migration areas, on which fish depend directly or indirectly in order to carry out their life processes".<br>• The Department of Fisheries and Oceans (DFO) has developed an online, self-assessment tool, where proponents can determine whether their projects require DFO review based on the type of water body | • The approach to stormwater management may have implications for fish habitat within Laurel Creek and Wideman Creek.<br>• The need for project review by the DFO Fish and Fish Habitat Protection Program (FFHPP) will be determined upon the completion of a proponent-led assessment of whether the proposed undertaking can meet all measures to protect fish and fish habitat (as outlined in the DFO's online Projects Near Water guidelines).<br>• Any proposed work, undertaking, or activity should aim to avoid causing the death of fish, or HADD. |

| Policy/Legislation | Description | Project Relevance |
|---|---|---|
| | the work is occurring in and the nature of the proposed activity. | |
| Migratory Birds Convention Act (MBCA) (Government of Canada 1994) | • The MBCA protects migratory game birds, insectivorous birds, and several other migratory non-game birds from persecution in the form of harassment.<br>• Prohibits the disturbance, destruction, or taking of a nest or eggs of migratory birds.<br>• The schedule of on-site work must consider MBCA windows, with timing of breeding bird season typically occurring approximately between April 1 and August 31; however, this is a guideline, since the MBCA applies to nesting bird species at any time.<br>• "Incidental take" is considered illegal, with the exception of a permit obtained by the Canadian Wildlife Service (CWS). | • Any vegetation removal and grading required for the proposed development must have regard for this legislation in the form of timing window restrictions or other suitable mitigation measures. |
| Migratory Bird Regulations (Government of Canada 2022) | • The Migratory Birds Regulations (MBR 2022) came into force on July 30, 2022, under the MBCA. This added new provisions for certain migratory birds and clarifies when nests are protected.<br>• Provides year-round protection to the nests of 18 species, that are known to re-use nests annually, now listed under Schedule 1. | • Four of the listed species (Great Blue Heron, Green Heron, Great Egret, Pileated Woodpecker) are known from the vicinity of the study area through background review.<br>• These species were observed within the study area, but no conclusive breeding or nesting evidence was found. |
| Fish and Wildlife Conservation Act (FWCA) (Government of Canada 1997) | • The FWCA provides protection for certain bird species, not protected under the MBCA (e.g., raptors and owl), as well as furbearing mammals and their dens or habitual dwellings, aside from the Red Fox (*Vulpes vulpes*) and Striped Skunk (*Mephitis mephitis*). | • The timing of construction activities, especially vegetation clearing and site grading, must have consideration for bird nesting (including nesting season for Raptors, Hawks and Owls) and den sites for furbearing mammals.<br>• Wildlife sweeps by a qualified biologist are recommended in advance of any vegetation clearing and site grubbing during the active season to ensure no active nests/dens are present. |
| Region of Waterloo Official Plan (RMOW 2015) | • The Regional Official Plan (OP) 2015 includes policies related to the natural environment.<br>• Map 4 of the OP identifies the location of Environmentally Sensitive Landscapes and Core Environmental Features including: Provincially | • Features protected by OP policy occur in the study area. |

| Policy/Legislation | Description | Project Relevance |
|---|---|---|
| | Significant Wetlands; Environmentally Sensitive Policy Areas; Regional Forests; Forests greater than 4 ha, and Significant Valley Features | |
| City of Waterloo Official Plan (2020b) | • The City of Waterloo Official Plan (2020b) outlines current policies for the protection of the City's natural heritage resources.<br>• Schedule A4 of the OP identifies the location of Core Environmental Features, Supporting Environmental Features | • Features protected by OP policy occur in the study area. |
| GRCA Regulation 150/06 Under the Conservation Authorities Act (GRCA 2013) | • Regulation issued under *Conservation Authorities Act,* R.S.O. 1990.<br>• Through this regulation, the GRCA has the responsibility to regulate activities in natural and hazardous areas (i.e., areas in and near rivers, streams, floodplains, wetlands, and slopes).<br>• GRCA requires that an EIS be undertaken in accordance with their *EIS Guidelines and Submission Standards for Wetlands* where development is proposed within 120m of PSW or 30m of non-PSW (GRCA 2005).<br>• Changes to the Conservation Authorities Act were introduced in Bill 23 in 2022, which impacts the role of Conservation Authorities in planning applications. Hazard lands remain part of their jurisdiction. | • The GRCA regulates a significant portion of the study area as the land is within its regulatory area, primarily associated with the presence of Laurel Creek and the Sunfish Lake-Laurel Creek PSW and its associated floodplain.<br>• As such, permitting from the GRCA must be obtained for proposed works within their regulation area.<br>• In accordance with GRCA policy, any proposed development must demonstrate no negative impacts to the regulated natural features or their ecological functions. |
| Final Subwatershed Management Plan 309/313 (SWS) (Planning Initiatives Ltd. and Associates 1996) | • The Laurel Creek Watershed Study was completed in 1993 and provided a comprehensive assessment of the natural features within the watershed.<br>• The Watershed Study provided 29 recommendations for the Laurel Creek Subwatershed; the Final Subwatershed Management Plan 309/313 was completed in 1996 in accordance with the recommendations in the 1993 Watershed Study.<br>• The SWS recommends constraints, remediation of riparian corridors, buffers, a community trail system and makes further recommendations. | • The study area is located within Subwatershed #309 and should consider the recommendations in the SWS. |
| Erbsville South Block Plan Study (City of Waterloo 2020a) | • Identifies Core Environmental Features, development setbacks, stormwater management, corridors and linkages, watercourses, hydrogeology and future | • The Block Plan Study addresses the subject property area and environmental features within the study area. |

| Policy/Legislation | Description | Project Relevance |
|---|---|---|
| | studies discussed in the Erbsville South Environmental Study (Dougan and Associates et al. 2018).<br>• Provides land-use and development recommendations for the subject property and surrounding area and recommends buffers and retention of Environmental Features. | • The Block Plan Study confirms that findings from the ESES may be used in subsequent studies within three years of the ESES publication. This EIS relies on this data in conjunction with additional surveys completed in 2023. |
| Erbsville South Environmental Study (ESES) (Dougan and Associates et al. 2018) | • Studied lands within the southern portion of the Erbsville Settlement Area.<br>• Supplements existing environmental information from the study area, and provides key recommendations to Core Environmental Features, Watercourses, Development Setbacks, Corridors/Linkages, Hydrogeology, Stormwater Management Strategy, Stewardship Initiatives, and Future Studies. | • Subject property falls within a portion of the ESES.<br>• Identifies that Scoped Environmental Impact Studies are required for site-specific development plans.<br>• Recommendations from the ESES should be carried forward for subsequent development applications. |

## 3.0 Field Methods

The field survey methods described below are primarily summarized from the ESES (Dougan and Associates et al. 2018). They also include vegetation monitoring completed by Stantec and additional surveys completed by NRSI in 2023 for SAR bats. A stand-alone 2023 Biological Monitoring report is included in Appendix V, which includes methods and results of additional pre-construction monitoring completed by NRSI. Use of the existing field data in the ESES was confirmed with the City of Waterloo, Region of Waterloo and GRCA and is detailed in a Terms of Reference which is appended to this report (Appendix V).

In addition to existing field data, NRSI completed a field review of the subject property in December 2020 to confirm the condition of natural feature boundaries. NRSI also completed a tree inventory and tree tally in June 2021 to identify trees within the subject property that are anticipated to be impacted by the proposed development.

Table 2 provides a summary of field surveys, dates, weather conditions and observers.

The following pre-construction monitoring, in accordance with the City of Waterloo Development Monitoring Protocol (1999, 2020b), has been completed within the study area to-date:

- Stantec:
    - Vegetation plot/transect monitoring: 2006-2019; 2021-2023
    - Photo plot/disturbance monitoring: 2017-2019; 2021-2023
    - Groundwater monitoring: 2007-2023
    - Surface water monitoring (City of Waterloo station results reviewed by Stantec): 2017-2023)
- NRSI:
    - Anuran call surveys: 2023
    - Breeding bird surveys: 2023
    - Aquatic habitat characterization: 2023
    - Fish community sampling: 2023
    - Two-season benthic macro-invertebrate sampling: 2023

It is anticipated that this monitoring will continue to allow for a full year of monitoring prior to construction.

**Table 2. Field Survey Summary**

| Survey Type | Protocol | Date | Start and End Time (24 hrs) | Temp. (°C) | Wind Speed[1] | Cloud Cover | Precipitation | Observers |
|---|---|---|---|---|---|---|---|---|
| **Summarized from Dougan and Associates et al. 2018** | | | | | | | | |
| Winter Wildlife Survey | Systematic search by ELC polygon | February 4, 2014 | 0800-1200 | -12.2 to -7 | 1 | 0 | None | D. White |
| Ecological Land Classification | Lee et. al (1998) | May 17, 2013 | -- | -- | -- | -- | -- | W. Frise |
| | | July 16, 2013 | -- | -- | -- | -- | -- | W. Frise |
| | | August 14, 2013 | -- | -- | -- | -- | -- | W. Frise |
| | | October 22, 2013 | -- | -- | -- | -- | -- | W. Frise |
| | | July 22, 2014 | -- | -- | -- | -- | -- | D. White and W. Frise |
| Vascular Flora Inventory | Systematic search by ELC polygon | May 17, 2013 | -- | -- | -- | -- | -- | W. Frise |
| | | July 16, 2013 | -- | -- | -- | -- | -- | W. Frise |
| | | August 14, 2013 | -- | -- | -- | -- | -- | W. Frise |
| | | October 22, 2013 | -- | -- | -- | -- | -- | W. Frise |
| | | July 22, 2014 | -- | -- | -- | -- | -- | D. White and W. Frise |
| Butternut Health Assessment | N/A | July 11, 2016 | -- | -- | -- | -- | -- | Z. Harris |
| Wetland and ESPA Flagging (ahead of Agency Site Walks | N/A | August 15, 2014 | -- | -- | -- | -- | -- | W. Frise |
| Wetland Boundary Delineation (with GRCA, RMOW and City of Waterloo staff) | N/A | August 18, 2014 | -- | -- | -- | -- | -- | W. Frise |
| ESPA Boundary Delineation | N/A | August 19, 2014 | -- | -- | -- | -- | -- | W. Frise |
| ESPA Boundary Re-flagging | N/A | October 10, 2014 | -- | -- | -- | -- | -- | W. Frise and K. Beauchamp |
| Breeding Bird Surveys | Cadman et al. 2007 | June 7, 2013 | 0630-0930 | 11-15 | Calm | Cloudy | None | I. Richards |
| | | June 14, 2013 | 0620-0930 | 15-18 | 2-3 | Mostly Clear | None | I. Richards |
| | BSC 2009 | April 27, 2013 | 2100-2300 | 11 | 0 | N/A | None | D. White |

| Survey Type | Protocol | Date | Start and End Time (24 hrs) | Temp. (°C) | Wind Speed[1] | Cloud Cover | Precipitation | Observers |
|---|---|---|---|---|---|---|---|---|
| Anuran Call Surveys | | May 22, 2013 | 2100-2300 | 18-20 | 2 | N/A | None | D. White |
| | | June 15, 2013 | 2130-2330 | 18-20 | 0 | N/A | None | D. White |
| Basking Turtle Surveys | Norminton 2013; OMNRF 2013a | April 27, 2013 | 1015-1050 | 11 | Calm | Sunny | None | I. Richards |
| | | May 16, 2013 | 0945-1020 | 16 | 3 | Sunny | None | I. Richards |
| | | June 7, 2013 | 0835-0930 | 11-15 | Calm | Cloudy | None | I. Richards |
| | | June 14, 2013 | 0820-0930 | 15-18 | 2-3 | Mostly Clear | None | I. Richards |
| | | June 19, 2013 | 1000-1500 | 21 | Calm | Sunny | None | D. White |
| | | May 13, 2014 | 1300-1400 | 12 | Calm | Mixed sun/cloud | None | D. White |
| | | June 4, 2014 | 1030-1100 | 12 | Calm | Sunny | None | D. White |
| | | March 9, 2016 | 1230-1445 | 6 | Calm | Sunny | None | D. White |
| | | April 27, 2016 | 1500-1730 | 10 | Calm | Sunny | Clear | D. White |
| | | May 4, 2016 | 1200-1545 | 14 | Calm | Mixed sun/cloud | None | D. White |
| | | May 11, 2016 | 1100-1315 | 15 | Calm | Mixed sun/cloud | None | D. White |
| | | May 16, 2016 | 1200-1430 | 17 | Calm | Sunny | None | D. White |
| Turtle Nest Survey | OMNRF 2016a | June 7, 2013 | 0630-0930 | 11-15 | Calm | Cloudy | None | I. Richards |
| | | June 14, 2013 | 0620-0930 | 15-18 | 2-3 | Clear | None | I. Richards |
| | | June 19, 2013 | 0945-1500 | 21 | Calm | Sunny | None | D. White |
| | | June 5, 2016 | 1800-1945 | 17 | -- | 50 | None | D. White |
| | | June 7, 2016 | 1800-1945 | 15 | -- | 30 | None | D. White |
| | | June 9, 2016 | 1815-2145 | 11-17 | -- | 15 | None | K. Beauchamp |
| | | June 10, 2016 | 1800-2130 | 17-23 | -- | Sunny | None | K. Beauchamp |
| | | June 12, 2016 | 1800-2125 | 11-17 | -- | 10 | None | K. Beauchamp |
| | | June 20, 2016 | 1330-1515 | 29 | -- | Sunny | None | M.A. Young, C Myrdal |
| Hatchling Turtle Survey | Systematic search within suitable habitats | September 20, 2013 | -- | 20-23 | -- | Cloudy | Light Drizzle | K. Konze |
| Salamander Trapping | Wildlife Care Committee Research | April 4, 2014 | -- | -- | -- | -- | -- | D. White |
| | | April 9, 2014 | -- | -- | -- | -- | -- | D. White and K. Konze |
| | | April 10, 2014 | -- | -- | -- | -- | -- | D. White and K. Konze |

| Survey Type | Protocol | Date | Start and End Time (24 hrs) | Temp. (°C) | Wind Speed[1] | Cloud Cover | Precipitation | Observers |
|---|---|---|---|---|---|---|---|---|
| | Protocol, Wildlife Scientific Collector's Authorization, and ESA 'B' Permit | April 11, 2014 | -- | -- | -- | -- | -- | D. White and K. Konze |
| | | April 15, 2014 | -- | -- | -- | -- | -- | D. White and K. Konze |
| | | April 17, 2014 | -- | -- | -- | -- | -- | D. White and K. Konze |
| Snake Coverboards | Systematic search within suitable habitats | May 8, 2013 | 0930-1530 | 14 | Calm | Sunny | None | D. White |
| | | June 4, 2013 | 0900-1500 | 16 | Calm | Sunny | None | D. White |
| | | June 19, 2013 | 0945-1515 | 15 | Calm | Sunny | None | D. White |
| | | October 21, 2013 | 1000-1600 | 11 | Light breeze | Cloudy | Light Rain | D. White |
| Reptile Hand Search | OMNRF 2013b | May 13, 2014 | 0930-1130 | 22 | Calm | Sunny | None | D. White |
| | | June 4, 2014 | 1100-1500 | 16 | Calm | Sunny | None | D. White |
| | | June 20, 2014 | 0745-1115 | 20 | Calm | Sunny | None | D. White |
| | | July 22, 2014 | 0800-1200 | 23 | Calm | Mix of sun/cloud | None | D. White |
| Roadkill Survey | Walking Transects | May 13, 2014 | -- | -- | -- | -- | -- | D. White |
| American Badger Survey | Systematic Searches in ELC Polygons | April 20, 2016 | 1400-1930 | 4 | Calm | Sunny | None | D. White |
| | | April 26, 2016 | 1245-1600 | 6 | Calm | Overcast | None | D. White |
| Aquatic Habitat Characterization, Fish Community Sampling, and Trout Spawning Surveys | Stanfield 2013 | November 10, 2013 | -- | -- | -- | -- | -- | C. Portt and Associates |
| | | November 14, 2013 | -- | -- | -- | -- | -- | C. Portt |
| | | November 19, 2013 | -- | -- | -- | -- | -- | C. Portt |
| | | May 29, 2014 | -- | -- | -- | -- | -- | C. Portt |
| | | August 18, 2014 | -- | -- | -- | -- | -- | C. Portt |
| | | August 19, 2014 | -- | -- | -- | -- | -- | C. Portt |
| | | August 20, 2014 | -- | -- | -- | -- | -- | C. Portt |
| | | August 21, 2014 | -- | -- | -- | -- | -- | C. Portt |
| | | August 22, 2014 | -- | -- | -- | -- | -- | C. Portt |
| | | October 27, 2014 | -- | -- | -- | -- | -- | C. Portt |

| Survey Type | Protocol | Date | Start and End Time (24 hrs) | Temp. (°C) | Wind Speed[1] | Cloud Cover | Precipitation | Observers |
|---|---|---|---|---|---|---|---|---|
| | | January 20, 2015 | -- | -- | -- | -- | -- | C. Portt |
| Benthic Invertebrates | Jones et al. 2007 | June 30, 2014 | -- | -- | -- | -- | -- | C. Portt |
| **Stantec Pre-construction Biological Monitoring[2]** | | | | | | | | |
| Vegetation Monitoring | Vegetation monitoring of established plots along transects; photo plot monitoring | July 16, 2017 | -- | -- | -- | -- | -- | Stantec Staff |
| | | October 13, 2017 | -- | -- | -- | -- | -- | Stantec Staff |
| | | July 27, 2018 | -- | -- | -- | -- | -- | Brian Miller |
| | | October 16, 2018 | -- | -- | -- | -- | -- | Brian Miller |
| | | June 29, 2019 | -- | -- | -- | -- | -- | Brian Miller |
| | | October 8, 2019 | -- | -- | -- | -- | -- | Brian Miller |
| | | June 16, 2021 | -- | -- | -- | -- | -- | Brian Miller |
| | | October 5, 2021 | -- | -- | -- | -- | -- | Brian Miller |
| | | June 27, 2022 | -- | -- | -- | -- | -- | Brian Miller |
| | | October 4, 2022 | -- | -- | -- | -- | -- | Brian Miller |
| Photo Plot/Disturbance Monitoring | n/a | July 16, 2017 | -- | -- | -- | -- | -- | Stantec Staff |
| | | October 13, 2017 | -- | -- | -- | -- | -- | Stantec Staff |
| | | July 27, 2018 | -- | -- | -- | -- | -- | Brian Miller |
| | | October 16, 2018 | -- | -- | -- | -- | -- | Brian Miller |
| | | June 29, 2019 | -- | -- | -- | -- | -- | Brian Miller |
| | | October 8, 2019 | -- | -- | -- | -- | -- | Brian Miller |
| | | June 16, 2021 | -- | -- | -- | -- | -- | Brian Miller |
| | | October 5, 2021 | -- | -- | -- | -- | -- | Brian Miller |
| | | June 27, 2022 | -- | -- | -- | -- | -- | Brian Miller |
| | | October 4, 2022 | -- | -- | -- | -- | -- | Brian Miller |
| **NRSI Field Surveys** | | | | | | | | |
| Tree Inventory and Tree Tally | N/A | June 17, 2021 | -- | 25 | 1 | 0 | None | D. Stephenson and J. Lance |
| Wetland and ESPA boundary review | N/A | December 8, 2020 | -- | -- | -- | -- | -- | D. Stephenson and K. Burrell |
| Wetland Boundary Confirmation with GRCA | MNRF 2022 | June 12, 2023 | 0930-1030 | -- | -- | -- | None | E. Gosnell, L. Hockley |

| Survey Type | Protocol | Date | Start and End Time (24 hrs) | Temp. (°C) | Wind Speed[1] | Cloud Cover | Precipitation | Observers |
|---|---|---|---|---|---|---|---|---|
| Anuran Call Surveys | BSC 2009 | April 20, 2023 | 2112-2120 | 9 | 2 | -- | None | E. Gosnell, C. Gosnell |
| | | May 18, 2023 | 2230-2236 | 11 | 1 | 50 | None | M. Beck, K. VanGoethem |
| | | June 28, 2023 | 2310-2316 | 19 | 0 | 0 | None | M. Sanderson |
| Breeding Bird Surveys | OBBA 2021a, OBBA 2021b | June 14, 2023 | 0701-0755 | 12-13 | 1 | 100 | None | J. Nafziger, A. Siemens |
| | | June 28, 2023 | 0812-0902 | 13 | 2-3 | 0 | None | J. Nafziger, K. VanGoethem |
| Fish Community Sampling | Stanfield 2017 | August 29, 2023 | 0900-1545 | 27 | 3 | 40 | None | B. Baldwin, O. Holbrook |
| Aquatic Habitat Assessment | Stanfield 2017, Bain and Steenson 1999 | September 27, 2023 | 1300-1615 | 24 | 2 | 0 | None | B. Baldwin |
| Benthic Invertebrates | Jones et al. 2007 | June 1, 2023 | 1415-1600 | 18 | 0 | 20 | None | B. Baldwin |
| | | September 27, 2023 | 1300-1615 | 24 | 2 | 0 | None | B. Baldwin |
| Bat Habitat Assessment (buildings and trees) | MECP 2021, MECP 2022a, MECP 2022b | May 5, 2023 | 1030-1302 | 14 | 2 | 40 | None | C. Humphrey, L. Hockley |
| Bat Exit Surveys | MECP 2018 | June 21, 2023 | 2043-2218 | 21 | 0 | 0 | None | L. Hockley, G. Schaus |
| | | June 28, 2023 | 2049-2214 | 17 | 0 | 20 | None | L. Hockley, E. Krauss |

[1]Numbers indicate Beaufort scale

[2]Only surveys from 2017 onward are discussed within this report.

## 3.1 Terrestrial Surveys

Terrestrial field surveys were undertaken by Dougan and Associates within the study area to characterize natural features and identify significant and sensitive natural heritage features and species that have potential to be adversely affected by the proposed development. A total of 44 field visits were completed between April 2013 and July 2016.

An additional site visit was conducted by NRSI in December 2020 to confirm the boundaries of natural features within the subject property including wetlands and woodlands and a tree inventory and tree tally were completed in June 2021. In 2023, NRSI also completed some additional pre-construction biological monitoring, including anuran and breeding bird surveys, and completed surveys for SAR bats.

### 3.1.1 Vegetation Surveys

Vegetation community delineation was completed by Dougan and Associates biologists using aerial photography and thorough investigations in the field between May 13, 2013 and July 22, 2014. The standard Ecological Land Classification (ELC) System for southern Ontario was applied (Lee et al. 1998). Details of vegetation communities were recorded including species composition, dominance, uncommon species or features, evidence of human impact, and surficial soil characterization.

All observed species of vascular flora were recorded during field surveys between May 13, 2013 and July 22, 2014. A three-season detailed botanical survey was completed concurrently with ELC surveys. Table 2 summarizes the specific dates, weather conditions and observers for ELC and vascular flora surveys.

**Butternut Health Assessments**

Initial vegetation surveys identified the presence of Butternut (*Juglans cinerea*), provincially and federally Endangered, within the study area. Butternut health assessments, completed in accordance with MNRF protocol following the Butternut Health Assessor's Field Guide (OMNRF 2015b), were conducted by Dougan and Associates biologists on July 11, 2016. Tissue samples were collected from each Butternut observed and were sent to the Ontario Forest Research Institute (OFRI) to determine hybridity according to standardized sampling protocol.

**Tree Inventory and Tree Tally**

A tree inventory and tree tally were completed by NRSI Certified Arborists on June 17, 2021, focusing on the aeas of overlap with the SWMF block that was proposed at the time. However, the SWMF blocks now contemplated in this submission no longer directly coincide with the areas that were inventoried. As such, the methods and results related to the tree inventory are no longer included in the EIS. It is anticipated that a comprehensive tree inventory will be completed as part of detailed design.

**Natural Feature Delineation**

The wetland boundaries on the subject property were flagged in the field on August 15, 2014 for subsequent surveying. Dougan and Associates biologists met with staff of the City of Waterloo, Region of Waterloo and GRCA to confirm wetland boundary delineation on August 18, 2014. Wetland boundaries were reassessed by NRSI biologists on December 8, 2020. It was determined that the wetland boundary surveyed by NRSI was almost exactly the same as the boundary confirmed by agency staff in 2014, however, GRCA staff requested that the boundary be re-confirmed in 2023. NRSI staff met with GRCA on June 12, 2023 to re-survey the wetland boundary, which has been incorporated into this updated EIS. The confirmed wetland flag locations were surveyed using a Trimble R10 pole-mounted receiver with a real-time kinematic (RTK) corrections subscription (Top-Net). Survey accuracy ranged from 0.01-2.0m, with an average accuracy of 1.03m (horizontal precision error).

The ESPA (woodland) dripline within the subject property was flagged on August 15, 2014. Dougan and Associates biologists met with staff of the City of Waterloo, Region of Waterloo and GRCA to confirm the ESPA boundary delineation on August 19, 2014. The ESPA boundary was re-flagged on October 10, 2014 in accordance with findings of the review of the boundary by agency staff. Woodland boundaries were reassessed by NRSI biologists on December 8, 2020. It was determined that the woodland dripline boundary surveyed by NRSI was almost exactly the same as the boundary confirmed by agency staff in 2014, and as a result the agency confirmed boundary was used for this EIS report.

### 3.1.2 Breeding Bird Surveys

Breeding bird surveys were completed by Dougan and Associates biologists on June 7 and 17, 2013 and data was recorded using standard OBBA call codes (OBBA 2001).

Surveys consisted of a walking transect by habitat type (ELC community) which occurred between dawn and 1000hrs. The location of walking transects within the study area are shown on Map 2. All visual and auditory observations of birds were recorded as well as the highest level of breeding evidence exhibited for each recorded species.

In 2023, two additional breeding bird surveys were completed by NRSI, using point counts. Survey methods primarily followed the Ontario Breeding Bird Atlas protocol (OBBA 2021a, OBBA 2022b). The breeding bird surveys consisted of 10-minute point counts located at four locations within the subject property and occurred in the early morning beginning no earlier than 30 minutes prior to sunrise and extending to four hours after sunrise. All birds observed, as well as the highest level of breeding evidence exhibited for each species, were recorded by an avian biologist.

### 3.1.3 Reptile Surveys

**Snake Surveys**

A combination of active searches and cover board surveys were undertaken by Dougan and Associates biologists to identify snake species present within the study area and subject property.

Active Searches

Active searches were conducted for a total of 13.5 person-hours over four days on May 13, June 4 and 20 and July 22, 2014 for all snake species. This involved flipping over logs, rocks, or other suitable covers. Any moved items were carefully replaced to their original location to avoid disrupting the habitat. During each survey, detailed notes were taken which described the habitat searched, level of effort, approximately how many suitable covers were looked under, weather conditions, and species observed.

Cover Board Surveys

A total of nine snake cover boards was installed in the study area for the property at 720 Erbsville Road on May 8, 2013; their locations are shown on Map 2. Each board measured 2ft x 2ft and was weathered in the field for one year prior to deployment. Boards were checked at total of three times on June 4 and 19 and October 21, 2013 during the morning for presence of snake species. When checking boards, biologists approached the board cautiously and lifted it to check for snakes underneath, taking

care to replace the board in its original location. All snake species, sex (if known), number of individuals, and behaviour were recorded on a detailed observation form.

**Turtle Surveys**

A combination of basking, nesting and hatchling surveys were undertaken by Dougan and Associates biologists to identify turtle species present within the study area and subject property.

Basking Surveys

A total of 14 turtle basking surveys was undertaken within the study area between April 2013 and May 2016. A complete summary of surveys is provided in Table 2. One site, a small 0.17ha pond behind 665 Erbville Road within the study area, was surveyed in 2013 and 2014. The small pond at 665 Erbville Road and an additional site, the Forest Gate stormwater management pond, were surveyed in 2016. The locations of the two waterbodies surveyed within the study area are identified on Map 2. Basking turtle surveys followed the Occurrence Survey Protocol for Blanding's Turtle (*Emydoidea blandingii*) in Ontario (OMNRF 2013a). Surveys were conducted prior to mid-June, on sunny or mostly sunny days between 0800 and 1700 and in suitable temperatures as per the survey protocol (OMNRF 2013a). The edges of waterbodies and suitable basking locations such as logs, rocks and vegetation hummocks were surveyed from a distance using binoculars. Care was taken to carefully and quietly approach the ponds so as not to scare turtles before they could be documented. All turtle species, sex (if known), number of individuals and behaviour were recorded on a detailed observation form.

Nesting Turtle Surveys

A total of nine turtle nesting surveys was conducted within the study area in 2013 and 2016. All surveys were completed in accordance with the Blanding's Turtle Nest and Nesting Survey Guidelines (OMNRF 2016a), except for the final survey in 2016 which could not be completed between 1800 and 2200 as recommended in the guidelines. A summary of all nesting turtle survey is provided in Table 2. Surveys were conducted on warm and humid nights between late May and early July, between 1800 and 2200. Transects were walked within all candidate nesting areas (open habitats with low vegetation cover, high sun exposure and well-drained soils). Habitats surveyed within the study area included agricultural fields and anthropogenic features. During surveys,

careful attention was paid to any potentially disturbed soils that may have provided evidence of nesting activities.

Hatchling Turtle Surveys

A single targeted survey for turtle hatchlings was conducted on September 20, 2013 with a focus on the lands associated with the Regal Place property and to the south, within the study area. Areas with the highest potential were examined for signs of previous nesting activity and evidence of exit holes. The timing of these surveys corresponded to the typical fall emergence period. Surveys were completed during mild temperatures and following periods of recent precipitation or high humidity.

### 3.1.4 Amphibian Surveys

**Anuran Call Surveys**

Evening anuran (frog and toad) call surveys were conducted on April 27, May 22 and June 15, 2013 by Dougan and Associates using the Marsh Monitoring Program protocol (BSC 2009) at two stations within the study area (Map 2). Monitoring focused on calling frogs and toads during 6-minute call counts (extended from the standard 3-minute call counts in the Marsh Monitoring protocol), which included call intensity and an estimated number of individuals. Additional information, including survey time, air and water temperature, wind speed, and cloud cover were recorded at each survey station.

NRSI completed additional anuran call surveys in 2023 at two locations within the subject property, following the same Marsh Monitoring Program protocols (BSC 2009). Methods are described in Appendix IV.

**Salamander Trapping**

Salamander trapping surveys were conducted within the study area by Dougan and Associates to assess the presence of Jefferson Salamander (*Ambystoma jeffersonianum*), which is provincially and federally Endangered. Applicable permit applications were submitted and approved prior to the initiation of surveys (Appendix 2.6, Dougan and Associates et al. 2018). Salamander trapping surveys were conducted at one location within the study area, the pond behind 665 Erbsville Road, between April 8 and 15, 2014. Five nights of trapping were completed in accordance with MNRF protocols (Dougan and Associates et al. 2018).

Trapping at the pond was completed using nine standard minnow traps (i.e. galvanized wire mesh, 6mm squares). Traps were submerged in the target ponds in the evening and checked before 0800 the following morning. Traps were placed around the perimeter of the pond with a focus on areas with high breeding potential, such as woody debris, vegetation or suitable upland habitat (Map 2). Specimens captured were examined, recorded and then released back to the pond. This protocol ensured that captured individuals spent a minimal amount of time in the traps.

### 3.1.5 Mammal Surveys

#### Winter Wildlife Surveys

A single winter wildlife survey was completed on February 4, 2014 by Dougan and Associates biologists. Weather was ideal for completion of the survey with a temperature of -12.2°C at the start of the survey, rising to -7°C by the end of the survey. The survey was completed approximately 50 hours after a large snowfall event, allowing for suitable snow conditions to observe wildlife activity imprinted on the snow. Evidence of winter wildlife was searched for along areas likely to serve as animal movement corridors. Signs of wildlife were identified to the species level where possible and behaviour was described. Field identification of tracks was aided by taking measurements and describing patterns and shapes.

#### American Badger Surveys

Two field surveys focused on the identification of evidence of American Badger (*Taxidea taxus*) presence were completed by Dougan and Associates biologists in April 2016. Open, upland habitats, hedgerows and forest edges were thoroughly searched for the presence of burrows. Transects across large open habitats were completed to ensure complete coverage of the study area and woodlands were examined within approximately 25m of open habitats. Surveys were completed prior to vegetation leaf-out to ensure good visibility and were conducted on days with dry, calm conditions. All mammal dens observed were characterized using measurements and photographs, and their GPS location was recorded.

#### Bat Habitat Assessments

In 2023, NRSI completed leaf-off bat habitat assessments for trees within the proposed development footprint and the existing structures within the subject property (Map 2). The following information was collected for treed habitats:

- Species;
- Diameter at breast height (DBH);
- Decay class (Watt & Caceres 1999);
- Canopy cover (%);
- Approximate tree height (m); and
- Roost tree attributes:
    - Number, type, and height of cavities;
    - Presence of loose bark; and
    - Evidence of use by predators and other species.

The existing structures were assessed by NRSI on May 5, 2023 following *Use of Buildings by Species at Risk Bats Survey Methodology* (MECP 2021). This included the existing house and an extension/addition on the north end of the house, referred to as the 'summer kitchen'. The interior attic space and exterior of both buildings were assessed. All suitable bat entry/exit locations on the exterior were documented and photographed. Characteristics such as the presence of an enclosed attic or basement, presence of other wildlife, etc., was noted. All external features that may provide suitable roosting habitat or access to suitable roosting habitat were examined, including fascia, soffits, roofline connections with walls, flashing, siding, etc. The ground underneath potential access points as well as window panes and walls were also examined during external inspections for guano, urine splashes and fur-oil staining. Internal features were examined for urine splashes, fur-oil staining, guano, feeding remains (e.g., moth wings) and live or dead individuals.

**Bat Exit Surveys**

The main house did not contain any evidence of bat use, however, the 'summer kitchen' had suitable entry/exit points and contained potential bat guano (Map 2). There was no access identified between the 'summer kitchen' and the main house.

Exit surveys on the 'summer kitchen' were conducted following *Use of Buildings by Species at Risk Bats Survey Methodology* (MECP 2021) on June 21, 2023 and June 28, 2023. Surveys were conducted for a minimum of 60 minutes, beginning before sunset and continuing until at least one hour after sunset. Weather conditions on both nights

were above 15°C (21°C and 17°C, respectively) with light wind (Beaufort Scale of 0). There was no precipitation on either survey night.

Surveys were completed with the use of video cameras equipped with night-vision capability and assisted with external infrared spotlights. There were 3 video cameras deployed at the 'summer kitchen' to ensure thorough coverage (Map 2). In addition to video cameras, NRSI biologists conducted visual inspections of the buildings during the surveys. For both surveys, this included two staff. Staff, microphones and video cameras were positioned to maximize bat visibility and acoustic detection. One Wildlife Acoustics SongMeter MiniBat was positioned at the northwest end of the structure on both surveys (Map 2), set to automatically collect audio calls from the full spectrum of bat calls (15-120kHz) for the entire duration of the exit survey. Video review following the survey was not required as staff had a clear view of any potential entry/exit points on the structure.

### 3.1.6 Road Mortality Survey

A single targeted road mortality survey was completed by Dougan and Associates biologists on May 13, 2014. Incidental road mortality observations were noted throughout the study period. The targeted survey was completed by walking the edges of roadways within the study area, including Erbsville Road and Schnarr Street. The survey was timed to occur less than 24 hours after a major rainfall even, allowing for anuran mortalities to be targeted. All road mortalities were examined and identified to species where possible.

### 3.1.7 Additional Wildlife

All observations of birds, amphibians, reptiles, mammals and insects were documented on all field visits. This included actual direct observations of individuals, as well as signs of wildlife presence (i.e. tracks, scats, dens, nests etc.).

## 3.2 Stantec Terrestrial Monitoring

Terrestrial monitoring, including vegetation monitoring, disturbance monitoring and qualitative photographic monitoring, of the subject property has been completed by Stantec annually from 2006 to 2023. The results of terrestrial monitoring are summarized in annual monitoring reports prepared under separate cover by Stantec. Terrestrial monitoring could not be completed by Stantec in 2020 as a result of

complications arising due to the COVID-19 pandemic; this decision was confirmed with City of Waterloo staff and it was determined that the monitoring would still be accepted if it resumed in 2021 (Stantec 2021).

This terrestrial monitoring of the subject property, in combination with the additional surveys completed by NRSI in 2023, provides baseline data prior to grading and development. The results of this monitoring will assist in evaluating the impacts of the development on adjacent natural features.

### 3.2.1 Vegetation Monitoring

Vegetation monitoring was completed by Stantec along four transects within the subject property. The first three transects were monitored between 2006 and 2023 with the fourth transect added in 2009. Permanent 2x2m plots were established 10m apart along each transect. Each transect has been monitored annually to characterize existing conditions, including descriptions of the canopy, shrub-layer and ground-layer with information on species presence and percent cover recorded. All trees ≥10 cm DBH within 5m of plots as well as standing water depth within each plot were also recorded. The locations of the transects and 2x2m plots are shown on Map 2.

Observations of disturbance within each plot, including type and severity, were recorded. Photographic monitoring to provide a visual representation of existing conditions within the subject property have been completed along each transect. The number, location and direction of each photo were recorded to allow for comparisons between monitoring years. Photographs have also been taken along the edges of natural areas within the subject property. Nine edge monitoring stations were established in 2006 and have been monitored annually, with the exception of 2014 and 2020. The locations of the edge monitoring stations are shown on Map 2.

## 3.3 Aquatic Field Surveys

Aquatic biologists from C. Portt and Associates conducted a total of 12 visits to the subject property and study area between 2013 and 2015, with NRSI biologists completing additional habitat characterization surveys during 2023. During these site visits, a detailed characterization of aquatic habitats within the study area was completed, including aquatic habitat assessments, electrofishing to determine the fish community, trout spawning surveys and benthic invertebrate sampling within Laurel

Creek and Wideman Creek. These surveys are described in further detail in the following sections and monitoring stations are shown on Map 3. Surveys completed by NRSI in 2023 are also described in detail in Appendix V.

### 3.3.1 Aquatic Habitat Assessment and Fish Community Sampling

Preliminary aquatic habitat assessments were conducted by C. Portt and Associates during 2014 following the Ontario Stream Assessment Protocol (OSAP) (Stanfield 2013). Additional habitat assessment surveys were completed by NRSI biologists in 2023 following a modified version of the Ontario Stream Assessment Protocol (OSAP) and methods described in Aquatic Habitat Assessments Common Methods (Stanfield 2017, Bain and Stevenson 1999). In order to characterize aquatic habitats within the study area, a wide range of aquatic habitat characteristics were recorded for Laurel Creek, Wideman Creek and the Wideman Creek Tributary within the study area, including visual inspection of in-water habitat features (flow conditions, abiotic conditions, etc.), channel dimension morphometrics (widths, depths, slope etc.), near-shore habitat inspection (aquatic vegetation, bank vegetation, bank stability, etc.), critical life stage area assessment (spawning, nursery habitat, etc.) and in-situ water quality.

Fish community characterization was completed to characterize the fish communities present within the subject property. These surveys were undertaken through the application of the single-pass screening level assessment as outlined in the OSAP at the samplings sites shown on Map 3 (Stanfield 2013, Stanfield 2017). Following fish collection, all specimens were identified to the species level and returned to the water.

Table 3 provides a summary of survey details at each fish sampling station within the study area.

**Table 3. Summary of Fish Sampling Survey Station Details**

| Consultant | Station | Date | Length (m) | Mean Width (m) | Mean Depth (mm) | Shocking Seconds |
|---|---|---|---|---|---|---|
| Dougan and Associates | EMS-001 | April 18, 2014 | 40 | 5.2 | 128 | 3410 |
| | EMS-002 | April 18, 2014 | 42.3 | 4.2 | 184 | 2752 |
| | EMS-003 | April 18, 2014 | 40.3 | 0.9 | 105 | 812 |
| NRSI | EMS-001 | August 29, 2023 | 40 | 4.5 | 150 | 850 |
| | EMS-002 | August 29, 2023 | 45 | 4.8 | 200 | 925 |
| | EMS-003 | August 29, 2023 | 40 | 3.5 | 75 | 815 |

### 3.3.2 Spawning Surveys

Trout spawning surveys were conducted on November 10, 14 and 19, 2013 and on October 27, 2014 by C. Portt and Associates. Surveys in 2013 investigated Laurel and Wideman Creek, while surveys in 2014 looked at Laurel Creek, Wideman Creek and the Wideman Creek Tributary (Map 3). The watercourses surveyed were carefully examined for evidence of substrate being disturbed in a manner consistent with spawning activity for Brown Trout (*Salmo trutta*) or Brook Trout (*Salvelinus fontinalis*) having occurred.

### 3.3.3 Benthic Macro-Invertebrate Sampling

Benthic macro-invertebrate surveys were carried out to assess the general health of the aquatic habitats within the study area using the benthos as indicators of water quality. There are a number of advantages to sampling benthic macro-invertebrates for water quality monitoring, including:

- They reflect local aquatic conditions as a result of their limited mobility;
- They provide a general indication of water quality based on the known environmental sensitivities and tolerances, and;
- They integrate the physical and chemical aspects of water quality over annual time periods due to their short life spans.

As part of preliminary benthic invertebrate sampling, C. Portt and Associates completed one season (Spring) of community sampling at three locations within Laurel Creek and one within Wideman Creek within the study area in June 2014. Additional two-season (Spring and Fall) benthic macro-invertebrate sampling was completed by NRSI in June and September 2023

Each benthic macro-invertebrate sampling station was established in accordance with the *Ontario Benthos Biomonitoring Network Protocol Manual* (OBBN) protocol (Jones et al. 2007). Each station, shown on Map 3, was comprised of 3 sub-stations: 2 from riffle habitat and 1 from pool habitat. For wade-able streams, such as the areas of the Wideman Creek tributary, the OBBN protocol employs a “Travelling Transect Kick and Sweep” method, where each sub-sample is made up by sampling 10 linear meters of stream transect over a 3-minute period (Jones et al. 2007; EC 2011). A 500 µm mesh D-net is held downstream of the substation transect to capture invertebrates dislodged

by vigorous kicking within the transect area. Samples were then preserved for later identification; 2023 benthic macro-invertebrate identification was completed by NRSI's in house laboratory.

**Benthic Macro-Invertebrate Identification and Data Analysis**

Preserved benthic macro-invertebrate samples were identified to the lowest practical taxonomic level, with identification completed by William Morton in 2014, and NRSI in 2023. Each monitoring station sub-sample was identified and the results of this identification were pooled for analysis. For the identification of the benthic macro-invertebrates within each sub-station, small randomly selected portions were taken for identification as representative samples of the sub-station. Successive portions were removed and fully analyzed until a minimum of 100 organisms were collected as per the requirements of the OBBN protocol (Jones et al. 2007). The sub-sample proportion was determined by measuring the total sample weight before identification and the remaining sample weight after identification. The difference between these 2 measurements represents the proportion sampled which is a percentage of the total sample (EC 2011).

Benthic organisms which do not fall within the 27 groups of benthic invertebrates outlined in the OBBN protocol were not included in the tally (Jones et al. 2007). The benthic invertebrate data was analyzed using a number of metrics to characterize the general condition of the watercourses. The metrics used for the assessment of watercourse conditions were selected to reflect the metrics and indices used for the ESES (Dougan et al. 2018) and recommended by the OBBN Protocol.

During preliminary 2014 benthic macro-invertebrate sampling, a total of 5 metrics were calculated to assess the water quality within each monitoring station. These metrics include:

- Taxa Richness – the number of taxa generally increases with habitat diversity and water quality (Jones et al. 2007),
- EPT Taxa Richness – the number of taxa from orders sensitive to pollution, specifically the orders *Ephemeroptera*, *Plecoptera*, and *Tricoptera* (Barbour et al. 1999; Weber 1973),

- Percent EPT – percent composition of a community by taxa from orders sensitive to pollution, specifically the orders *Ephemeroptera*, *Plecoptera*, and *Tricoptera* (Barbour et al*.* 1999; Weber 1973),
- Shannon Wiener Index (H') – an index used to measure the diversity in categorical data, taking into account the number of species and evenness of the species. Calculated as:

$$H' = -\sum(p_i)\,(lnp_i)$$

  - Where "$p_i$ "is the proportion of individuals in the i$^{th}$ taxon (EC 2011),

- BI – (Hilsenhoff Biotic Index) a measure of water quality based on the species-level "tolerance values" and the number of individuals of each species and the total number of individuals within the sample. Calculated as:

$$BI = \sum \frac{x_i t_i}{n}$$

  - Where "$x_i$" is the number of individuals within the i$^{th}$ taxon, "$t_i$" is the tolerance value of the i$^{th}$ taxon, and n is the total number of individuals within the sample (Hilsenhoff 1987).

NRSI's 2023 benthic macro-invertebrate monitoring expanded the analysis to a total of 11 metrics to assess the water quality within each monitoring station, including:

- Taxa Richness (Jones et al. 2007),
- EPT Taxa Richness (Barbour et al*.* 1999; Weber 1973),
- Percent EPT (Barbour et al*.* 1999; Weber 1973),
- Percent *Oligochaetes* – percent composition of a community by aquatic worms, a group tolerant to pollutants (Jones et al. 2007),
- Percent *Diptera* – percent composition of a community by fly larvae which provides a context for other analysis (Jones et al. 2007),
- Percent *Chironomidae* – percent composition of a community by larval midges, a highly tolerant family (Jones et al. 2007),
- Dominant/Subdominant Taxa – highest and second highest number of taxa sampled,
- Percent Functional Feeding Groups – the percent composition of a community by Collector-filterers, Collector-gatherers, Predators, Scrapers,

and Shredders. Feeding groups can provide an indication of habitat conditions (Merritt et al. 2008),

- Shannon Wiener Index (H') (EC 2011),
- BI (Hilsenhoff Biotic Index) (Hilsenhoff 1987).
- FBI – (Family Biotic Index) (Hilsenhoff 1988).

These metrics can be used as measures of the environmental water quality and can reflect the level of impairment of a watercourse. In order to provide context, the results of these metrics are then compared to a range of 'Potentially Unimpaired' conditions and 'Potentially Impaired' conditions. The OBBN defines impaired as, "showing a biological response to imposed stressors; exhibiting a changed biological community brought about by degradation in water or habitat quality" (Jones et al. 2007). 'Potentially Unimpaired' conditions indicate a low probability of significant anthropogenic impact, and 'Potentially Impaired' conditions indicate a high probability of significant anthropogenic impact, within an aquatic environment.

These ranges can be used as measures of the environmental water quality and serve as potential indicators of ongoing environmental impacts. The ranges are based on the results of benthic rapid assessment methodologies developed by the Ministry of Natural Resources and Forestry (MNRF), the Ministry of Environment, Conservation and Parks (MECP), the Ministry of Municipal Affairs and Housing (MMAH), and the Toronto and Region Conservation Authority (TRCA). Table 4 below provides the range of results that can be attributed to the 'potentially unimpaired' and 'potentially impaired' categories within an ecosystem (Vannote et al. 1980). These assessment ranges are not available for Simpson's Diversity Index scores as the Simpson's Diversity Index assesses the uniformity of a population and not the sensitivity or tolerance of the species within (Simpson 1949).

**Table 4. General Benthic Invertebrate Assessment Ranges**

| Water Quality Index | Potentially Unimpaired | Potentially Impaired | Source(s) |
|---|---|---|---|
| EPT Richness | >10 | <10 | David et al. 1998 and Kilgour 2000 |
| % Oligochaetes | <10% | >10% | David et al. 1998 and Griffiths 1998 |
| % Chironomidae | <10% | >10% | Griffiths 1998 |
| % Diptera | 20-45% | <20 or >50% | David et al. 1998 |
| Shannon-Wiener Index | 1.5-3.5 | <1.5 or >3.5 | MacDonald 2003 |
| Family Biotic Index | <6 | >6 | Kilgour 1998 |
| Biotic Index | <7 | >7 | Kilgour 1998 |

### 3.3.4 Water Temperature Sampling

Water temperature loggers (Watertemp Pro V2, Onset Corporation) were installed at one location in Wideman Creek (TB-W1) and three locations in Laurel Creek, within the study area, on May 22, 2014 (Map 3). An additional temperature logger was installed in Wideman Creek (T-W2) on June 8, 2014. Temperature was logged on the quarter hour. Data were retrieved during other site visits and the last retrievals took place in late October and early November 2014.

Maximum daily water temperature at each location was plotted against the maximum daily air temperature at the Kitchener-Waterloo weather station (StationID=48569) for the dates between June 16 and August 30, when both air and water temperature were available and maximum daily temperature was 24°C or higher. These plots were compared to the nomogram in Chu et al (2009) to determine the thermal classification of the watercourses.

# 4.0 Existing Conditions

## 4.1 Soils, Terrain and Drainage

The study area is located in the physiographic region known as the Waterloo Moraine or the Waterloo Sand Hills (Chapman and Putnam 1984). This region is characterized by irregular hummocky to steeply rolling land comprised of a number of layers of ice contact and glacial outwash sands and gravels, separated by layers of silt and clay rich tills (Chapman and Putnam 1984). A series of alluvial terraces of the Grand River spillway system occur in the general vicinity, typically exhibiting relatively uniform substrates of sands and gravels (Chapman and Putnam 1984). The study area is located within the spillway portion of the physiographic region.

The tills in the study area are dominated by silts, clays and sands in variable compositions (Dougan and Associates et al. 2018). In general, the study area consists of an overburden system of aquitards interspersed with aquifers all overlaying bedrock. Shallow groundwater flows toward Laurel Creek and discharges to the watercourse (Dougan and Associates et al. 2018). The topography of the proposed development footprint is relatively flat sloping gradually to the northeast, towards Laurel Creek.

## 4.2 Vegetation

### 4.2.1 Vegetation Communities

The proposed development area is comprised primarily of agricultural fields as well as a hedgerow in the southeast and a small Mineral Cultural Thicket (CUT1) community located in the northwest of the proposed development area, in the area of the proposed western SWMF (‘A’). The remaining portion of the property and lands within 200m of the development area include swamps and woodlands. ELC community descriptions were not completed for the Sunfish Lake-Laurel Creek PSW complex in the north and northeast of the subject property as these lands are well outside of the proposed development footprint. A summary of ELC communities identified within the study area is provided in Table 5. ELC communities are described below in detail and shown on Map 4.

**Table 5. Vegetation Communities Identified within the Study Area**

| | |
|---|---|
| **Cultural** | |
| CUT1 | Mineral Cultural Thicket |
| CUW1 | Mineral Cultural Woodland |
| HR | Hedgerow |
| **Deciduous Forest** | |
| FOD8-1 | Fresh-Moist Poplar Deciduous Forest |
| **Mixed Forest** | |
| FOM | Mixed Forest |
| **Wetland** | |
| SWD7 | Birch-Poplar Organic Deciduous Swamp |
| SWC4-2 | Tamarack Coniferous Organic Swamp |
| SWM | Mixed Swamp |
| SWT2-2 | Willow Mineral Thicket Swamp |
| SWT3-2 | Willow Organic Thicket Swamp |
| **Aquatic** | |
| SAS1 | Submerged Shallow Aquatic |
| **Anthropogenic** | |
| ANTH | Anthropogenic |
| **Agricultural** | |
| AGR | Agricultural |

*Within Subject Property:*

Mineral Cultural Thicket (CUT1)

A small area of Mineral Cultural thicket is present in the northwest of the subject property between an existing residential lot and the agricultural field that comprises the majority of the subject property. A building foundation is present in this polygon, which is evidence of its disturbed, anthropogenic nature (Map 4). The sub-canopy is dominated by Black Locust (*Robinia pseudoacacia*) with some Manitoba Maple (*Acer negundo*) and young Green Ash (*Fraxinus pennsylvanica*) also present. The understorey and groundcover are primarily early-successional non-native species. Several candidate Butternuts (*Juglans cinerea*) were observed in this ELC community, later confirmed to all be hybrids. This ELC community is located within the proposed development footprint.

Mineral Cultural Woodland (CUW1)

A Mineral Cultural Woodland is present in the north of the subject property, along Laurel Creek. This woodland has limited tree cover, under 60% canopy and is relatively disturbed. This ELC polygon is located within the Laurel Creek Forest ESPA. Several candidate Butternuts were observed in this community; they were all later confirmed to all be hybrids. The highly disturbed woodland polygon is dominated by non-native

species such as Black Locust, European Buckthorn (*Rhamnus cathartica*), Periwink (*Vinca minor*), Garlic Mustard (*Alliaria petiolata*), and Orange Daylily (*Hemerocallis fulva*).

Hedgerow (HR)

A number of hedgerow polygons are present in the study area, including one present along the southeastern portion of the subject property, partially within the development footprint. The hedgerow within the subject property is an agricultural windbreak, that is comprised of native tree species, including Black Cherry (*Prunus serotina*) and American Basswood (*Tilia americana*).

Mixed Forest (FOM)

A narrow segment of mixed forest is present within the subject property along the edges of the wetland. This community would generally be considered too narrow/small to be a separate ELC community; no species information has been gathered.

Birch-Poplar Organic Deciduous Swamp (SWD7)

This ELC community is located in the northwest of the subject property and in lands to the north associated with the Sunfish Lake-Laurel Creek PSW complex. It is also present in the west of the study area, north and west of the Regal Place residential properties. Within the subject property the canopy of the Birch-Polar Organic Deciduous Swamp is dominated by Eastern Cottonwood (*Populus deltoides*), Eastern White Cedar and occasional willow spp. (*Salix* spp.). The understorey is comprised of European Buckthorn, Red-osier Dogwood (*Cornus sericea*) and willow spp. Groundcover is primarily Tussock Sedge (*Carex stricta*), Field Horsetail (*Equisetum arvense*), Periwinkle and Ostrich Fern (*Matteuccia struthiopteris*).

Mixed Swamp (SWM)

Two mixed swamp communities are mapped in the east of the subject property. These ELC communities are associated with the Sunfish Lake-Laurel Creek PSW complex and the Laurel Creek Forest ESPA.

Willow Organic Thicket Swamp (SWT3-2)

This ELC community is present in the north of the subject property, outside of the development footprint. This community borders the agricultural field and extends into the eastern portion of the study area associated with the Sunfish Lake-Laurel Creek

PSW complex. The sub-canopy of this ELC community is characterized by Eastern White Cedar and young poplar spp. (*Populus* spp.). The understorey is dominated by willow spp. and Red-osier Dogwood. Groundcover is a mix of unspecified plant species in the facultative wetland to facultative upland spectrum (Dougan and Associates et al. 2018).

Anthropogenic (ANTH)

Anthropogenic features, primarily consisting of residential lots and developments are present in the subject property and study area. A residential property is located in the northwest of the subject property and is comprised of a single-family dwelling, a paved driveway and maintained lawn. More sizeable residential developments are located to the west of Erbsville Road and include the Regal Place residential development as well as a series of single-family dwellings with paved or gravel driveways and maintained lawns. A residential block is also located in the southeast of the study area and is associated with Forest Gate Crescent. This residential area includes single-family dwellings, a paved road network, paved driveways, maintained lawns and stormwater management ponds.

Agricultural (AGR)

Agricultural polygons make up a significant portion of the subject property and study area. The primary agricultural field within the subject property is relatively flat and conveys some surface runoff to the deciduous swamp to the northeast of the subject property. An agricultural field is present in the study area, on the east side of Erbsville Road and to the southeast of the subject property. This field is separated from the subject property by a hedgerow and borders the Sunfish Lake-Laurel Creek PSW complex, as well as Wideman Creek. A large agricultural field is present within the study area on the west side of Erbsville Road. This field is bordered by hedgerows and natural features to the west of the study area. The majority of the proposed development footprint is comprised of an agricultural polygon.

*Outside Subject Property:*

Fresh-Moist Poplar Deciduous Forest (FOD8-1)

A small portion of this ELC community is present at the western edge of the study area. The polygon has moist soils due to its proximity to a swamp community. The forest is a young community with evidence of human disturbance, such as trails, cut stumps and

piled woody debris. The canopy of the forest is primarily Trembling Aspen (*Populus tremuloides*).

Tamarack Coniferous Organic Swamp (SWC4-2)

A very small portion of this ELC community is present to the extreme southwest of the study area, behind the pond located at 665 Erbsville Road. The canopy of this community is very sparse at just over 25% and consists of Tamarack (*Larix laricina*) and Eastern White Cedar (*Thuja occidentalis*). Groundcover is comprised of grasses, sedges (*Carex* spp.), ferns and wetland herbs. A small tributary to Wideman Creek is present within this ELC polygon. This ELC community is within the Sunfish Lake-Laurel Creek PSW complex.

Willow Mineral Thicket Swamp (SWT2-2)

A small portion of this ELC community is present in the extreme southwest of the study area behind the pond associated with 665 Erbsville Road. The sub-canopy is comprised mainly of Heart-leaved Willow (*Salix eriocephala*), which is less than 5m in height. The understorey is dominated by Red-osier Dogwood and the groundcover is mainly Reed Canary Grass (*Phalaris arundinacea*), Wild Strawberry (*Fragaria virginiana*), and avens spp. (*Geum spp.*)

Submerged Shallow Aquatic (SAS1)

This ELC community is located in the southwest corner of the study area and is associated with the pond behind 665 Erbsville Road. It consists of a shallow aquatic community with emergent aquatic flora around the edge, and is considered a part of the Sunfish Lake-Laurel Creek Wetland complex. An examination of the pond indicated that it was likely a dug pond that underwent natural succession to a wetland community. Vegetation at the perimeter of the pond is characterized by Narrow-leaved Cattail (*Typha angustifolia*), Soft-stemmed Bulrush (*Schoenoplectus tabernaemontanii*), Broad-leaved Arrowhead (*Sagittaria latifolia*), Dark-green Bulrush (*Scirpus atrovirens*), Reed Canary Grass and sedge spp. Wetland vegetation is also present on the slope that surrounds the pond and consists of Red-osier Dogwood, willow spp., Spotted Joe-pye Weed (*Eupatorium maculatum*) and Grass-leaved Goldenrod (*Euthamia graminifolia*).

### 4.2.2 Vascular Flora

Detailed vegetation inventories were conducted by Dougan and Associates et al. (2018) and 238 species were identified from the natural areas that surround the proposed development area. A complete list of these species is appended to this report (Appendix VI). Approximately 26.2% of species recorded are considered non-native species, which included highly invasive species such as European Buckthorn, Periwinkle and Garlic Mustard.

Background information (Dougan and Associates et al. 2018) and the SAR screening indicate that three significant plant species are known from within 1km of the study area. Appendix II provides a summary of these species, their current status ranks, and preferred habitats. Based on field work conducted, one of these species, Black Ash (*Fraxinus nigra*), was confirmed within the study area but was not identified in the subject property and has no suitable habitat within the development footprint. Candidate Butternuts were also identified within the subject property and study area. Based on the hybridity assessments, all of the identified Butternuts were confirmed to be hybrids and as such, are not provided protection under the *Endangered Species Act*, 2007. As such, they are not discussed further in this report.

**Black Ash**

Black Ash was recently uplisted to Endangered within Ontario on January 26, 2022 (MECP 2023). Multiple individuals were documented within the adjacent mixed swamp community on the Erbsville Kartway lands within the study area (Map 4). This species is typically closely associated with swamp ecosites. The observations from the mixed swamp community that overlaps the subject property make this area confirmed habitat for Black Ash.

**Regionally Significant Species**

In addition to plant species of provincial and federal significance, several regionally or locally rare plant species were identified within the study area but outside the proposed development footprint. These observations are shown on Map 4, with the location represented as the centroid of the ELC community in which they were observed.

These species include:

- Canada Rush (*Juncus canadensis*),

- Northern Bog Violet (*Viola nephrophylla*),
- Virginia Creeper (*Parthenocissus quinquefolia*),
- White Spruce (*Picea glauca*),
- Eastern Cottonwood, and
- Black Walnut (*Juglans nigra*).

Canada Rush and Northern Bog Violet are both ranked R in Waterloo Region, indicating that they are locally rare (Richardson and Martin 1999). Neither species were observed within the proposed development footprint.

Virginia Creeper, White Spruce and Eastern Cottonwood are ranked R+ indicating that they are locally rare, but only if demonstrably indigenous. Most populations of these species in Waterloo Region are thought to be non-indigenous (Richard and Martin 1999); however, the provenance of the individuals observed in the study area could not be confirmed. None of these species were observed within the proposed development footprint.

Black Walnut has a locally rarity status of R+*, which indicates that the species is significant in Waterloo Region if it is demonstrably indigenous and that given future studies it may be too common to be considered significant in the future (Richard and Martin 1999). This species was observed within the CUT1 community and the southeastern hedgerow, both of which are located in the proposed development footprint. It is not known whether the individuals within the development area are of indigenous origin. Black Walnut is now known to be very common throughout southwestern Ontario, including Waterloo Region. As such, the rarity ranking should not apply for the proposed development footprint, which is supported by the ESES (Dougan and Associates et al. 2018).

### 4.2.3 Vegetation Monitoring

Generally, the results of plot, transect and photo monitoring by Stantec are consistent with the findings of the ESES (Dougan and Associates et al. 2018).

Variability was observed in the coefficient of wetness between monitoring plots and monitoring years; however, this is not unexpected in floodplain communities where water levels rise and fall at differing rates between years. Moderate to large increases of exotic species groundcover was noted at 4 of the 8 monitoring plots. Increases in exotic

species cover often related to shady monitoring plots with low vegetation cover at the start of monitoring; sunnier plots with dense native vegetation did not experience the same increases, as non-native species did not have the same opportunities to establish themselves. Increases in exotic species cover generally correlate to monitoring plots located along the edge of the agricultural field.

Significant tree dieback was noted at a few of the monitoring plots, particularly those located in proximity to Laurel Creek. Tree species affected include Eastern White Cedar, Green Ash and Yellow Birch (*Betula alleghaniensis*). Dieback of Green Ash is expected to be related to the widely known and recognized spread of Emerald Ash Borer (EAB; *Agrilus planipennis*). Dieback of Eastern White Cedar and Yellow Burch is likely related to flooding in 2013. Overall, changes in species composition within the subject property are expected in response to natural fluctuations, including hydrology, sunlight levels and climatic conditions (Stantec 2018, 2019, 2020, 2021, 2023a, 2023b).

Eastern Rough Sedge (*Carex scabrata*), a native groundwater indicator species, was noted for the first time in 2018 and is now found in increasing abundance within Transect 2, which is located close to Laurel Creek (Stantec 2023b).

Black Ash was observed within T1A. Long-leaved Starwort (*Stellaria longifolia*), a Regionally Significant plant, was observed in T4A and T4B in small quantities.

## 4.3 Wildlife

### 4.3.1 Birds

In total, 113 bird species are reported from the vicinity of the study area based on the OBBA (Cadman et al. 2006). The data found in the OBBA includes those species that have been observed in the area (10 x 10km range), are known to nest in the area, and/or have exhibited some evidence of breeding in the area. Of these species, 63 were documented within the study area during all field surveys (Dougan and Associates and NRSI). An additional six species not listed in the OBBA were observed during field surveys, which represented migrants or wintering birds. Within the study area, 54 species exhibited signs of breeding, such as males singing, females carrying food or nest materials, and the presence of fledged young. Two species were “Confirmed” to be breeding within the study area, 29 species showed signs of “Probable” breeding, and 23

showed signs of “Possible” breeding within the study area. Refer to Appendix VII for a complete list of bird species found in the study area and vicinity.

Four bird SCC were observed within the study area, including Barn Swallow (*Hirundo rustica*), Canada Warbler (*Cardellina canadensis*), Bald Eagle (*Haliaeetus leucocephalus*; SCC), and Eastern Wood-Pewee (*Contopus viren*). None of these species have habitat within the proposed development footprint. These species are discussed further in Sections 5.4 and 5.6. Results of breeding bird surveys completed by NRSI in 2023 are also documented in Appendix V.

### Regionally Significant Birds

A total of 22 regionally significant bird species (Martin 1996) were observed within the study area, of which 12 exhibited “Probable” or “Possible” signs of breeding. Details on their provincial status, observation date, and habitat availability are provided in Table 6 below. Specific locations of bird observations were not provided by Dougan and Associates et al. (2018). Regionally significant bird observed by NRSI in 2023 are shown on Map 4 in the general vicinity of the breeding bird monitoring station where they were heard/observed.

**Table 6. Locally Significant Bird Observations**

| Scientific Name | Common Name | S-Rank (MNRF 2023) | Observation Year | Highest Level of Breeding Evidence | Habitat within the Study Area |
|---|---|---|---|---|---|
| *Aix sponsa* | Wood Duck | S5B, S3N | 2013 | Possible | Wooded swamps are present within the subject property and broader study area. Trees with cavities are present for potential nesting. |
| *Lophodytes cucullatus* | Hooded Merganser | S5 | 2013 | Possible | Laurel Creek may provide suitable habitat. Small ponds are also present within the study area, outside of the subject property. Trees with cavities are present for potential nesting. |
| *Coccyzus erythropthalmus* | Black-billed Cuckoo | S4 S5B | 2013 | Possible | Woodlands and thickets present within the subject property and broader study area. |

| Scientific Name | Common Name | S-Rank (MNRF 2023) | Observation Year | Highest Level of Breeding Evidence | Habitat within the Study Area |
|---|---|---|---|---|---|
| *Archilochus colubris* | Ruby-throated Hummingbird | S5B | 2023 | Possible | Forest edges and deciduous woodlands within the study area may be suitable. |
| *Accipiter striatus* | Sharp-shinned Hawk | S5 | 2013 | Possible | Dense coniferous forest not present within study area. |
| *Megaceryle alcyon* | Belted Kingfisher | S5B S4N | 2023 | Possible | Laurel Creek is likely suitable, however, nesting habitat is not likely present. |
| *Dryocopus pileatus* | Pileated Woodpecker | S5 | 2013 | Possible. | Mature deciduous and mixed forest present. No nesting cavities were identified within the development area. |
| *Melanerpes carolinus* | Red-bellied Woodpecker | S5 | 2013 | Probable | Deciduous forests and swamps present within the study area. No nesting habitat present within the development area. |
| *Empidonax alnorum* | Alder Flycatcher | S5B | 2013 | Probable | Swamp thickets present in the study area. |
| *Toxostoma rufum* | Brown Thrasher | S4B | 2013 | Possible | Thickets, hedgerows, and forest edges present within the study area. |
| *Geothlypis philadelphia* | Mourning Warbler | S5B | 2013 | Probable | Portions of woodlands within the study area are disturbed from human activities, which may be suitable. |
| *Setophaga ruticilla* | American Redstart | S5B | 2023 | Probable | Moist, deciduous woodlands present within the study area. Woodlands may not be large enough to be considered ideal habitat. |

### 4.3.2 Herpetofauna

According to the Ontario Amphibian and Reptile Atlas (Ontario Nature 2019), 24 species of herpetofauna are reported from within the 10km atlas square that overlaps the study area. Field investigations, conducted by Dougan and Associates et al. (2018) and NRSI in 2023 confirmed the presence of 11 species within the study area. One herpetofauna regulated SAR (Blanding's Turtle), and one SCC (Snapping Turtle), were observed within the study area, but none within the proposed development footprint.

Appendix II provides a summary of SAR and SCC herpetofauna observed in the study area, as well as a description of their habitat. A complete list of herpetofauna reported from the study area, based on background information and observations made as part of this study, is included in Appendix VII. The results of species-specific surveys are detailed in the following sections.

#### Anurans (Frogs and Toads)

Dougan and Associates et al. (2018) recorded a total of four species of anurans during anuran call surveys within the study area. These species included Spring Peeper (*Pseudacris crucifer*), Gray Treefrog (*Hyla versicolor*), Green Frog (*Lithobates clamitans*) and American Toad (*Anaxyrus americanus*). Table 7 provides a summary of the results of Dougan and Associates anuran calls surveys from 2013 within the study area.

**Table 7. Anuran Call Survey Results (Dougan and Associates 2018)**

| Station | Species | Anuran Call Survey[1] | | | Total Species | Total Individuals[2] |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | | |
| ANR-002 | Spring Peeper | Code 3 | Code 3 | | 2 | Code 3 x 2 = 30 |
| | Gray Treefrog | | Code 3 | Code 3 | | |
| ANR-003 | Spring Peeper | Code 2(9) | Code 2(5) | | 4 | Code 3 + 20 = 35 |
| | Gray Treefrog | | Code 3 | Code 2(13) | | |
| | Green Frog | | Code 2(3) | Code 2(4) | | |
| | American Toad | Code 2(7) | | | | |

[1]Marsh monitoring protocol call code with estimated number of individuals in brackets
[2]Assumes 15 individuals for call code 3

In addition to anurans documented during anuran call surveys, Northern Leopard Frog (*Lithobates pipiens*) was observed by Dougan and Associates during the road mortality surveys along Erbsville Road.

In 2023, NRSI recorded two anuran species during anuran call surveys, which included Spring Peeper and Green Frog. Table 8 provides a summary of the results of anuran surveys completed by NRSI in 2023 (also described in Appendix V).

**Table 8. 2023 Anuran Call Survey Results**

| Station | Species | Anuran Call Survey[1] | | | Total Species | Total Individuals[2] |
|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | | |
| ANR-002 | Spring Peeper | Code 2(4) | | | 1 | 4 |
| ANR-003 | Spring Peeper | Code 3 | | | 2 | Code 3 + 1 = 16 |
| | Green Frog | | | Code 1(1)[3] | | |

[1]Marsh monitoring protocol call code with estimated number of individuals in brackets
[2]Assumes 15 individuals for call code 3
[3]Heard outside of survey station radius

### Salamanders

One species of salamander, Red-spotted Newt (*Notophthalmus viridescens viridescens*), was observed during salamander trapping surveys by Dougan and Associates et al. (2018) within the study area. This included two adult males in the pond on 665 Erbsville Road. Red-spotted Newt is considered Regionally Significant (RMOW 1985). There are three life stages associated with this species: the larvae are aquatic, often found in small slow-moving streams, ponds, marshes, and swamps; they then transform into a terrestrial salamander for their juvenile eft stage, requiring damp woodland habitats adjacent or near their breeding ponds; and then finally become an aquatic adult, returning to their breeding ponds. Although no Red-spotted Newts have been documented on the 720 Erbsville property, Laurel Creek may be a suitable breeding habitat, with the mixed swamp providing suitable surrounding habitat. It is not unreasonable to assume Wideman Creek would provide similar conditions and that this species may travel between properties.

### Snakes

A single species of snake, Eastern Gartersnake (*Thamnophis sirtalis sirtalis*), was observed by Dougan and Associates et al. (2018) during targeted active searches within the study area, which included the observation of two individuals. No snakes were observed under cover boards placed within the study area. In addition to snakes observed during targeted surveys, a road mortality Eastern Milksnake (*Lampropeltis triangulum triangulum*) was observed and photographed along Erbsville Road near the intersection of Conservation Drive within the study area.

### Turtles

Three species of turtles were observed during turtle basking, nesting and hatchling surveys by Dougan and Associates et al. (2018). During the completion of basking turtle surveys between April 2013 and May 2016, Midland Painted Turtle (*Chrysemys picta*

*marginata*) and Snapping Turtle were observed within the study area, but none were observed within the proposed development footprint. The majority of turtle observations in the study area came from surveys conducted in 2016 with just two Midland Painted Turtles observed at BAS-001 in 2013. Midland Painted Turtle was the most abundant turtle species within the study area: a single individual was observed at BAS-001 in 2016, and a high count of six individuals were recorded at BAS-002 on May 11, 2016. The only Snapping Turtle observed during basking surveys was a dead individual observed along the bank at BAS-001 on May 4, 2016. Although the individual was dead, this observation confirms the presence of Snapping Turtle within the study area. A juvenile/sub-adult Snapping Turtle was also observed by NRSI on the adjacent Erbsville Kartway property in 2017 during turtle emergence/overwintering surveys on that site. It has been presumed that this individual overwintered within Laurel Creek, which contains deep-water pools.

Confirmed turtle nesting behaviour was not observed during turtle nest surveys completed within the study area. Two species of turtle were observed incidentally at BAS-001 during the completion of these surveys: a Snapping Turtle on June 12, 2016 and a Blanding's Turtle on June 10, 2016.

No turtles were observed during hatchling turtle surveys completed in the study area in 2013. No exit holes or other evidence of turtle nesting, such as raided nests were observed in the study area. No suitable habitat for Snapping Turtle is present within the development footprint. Turtle SWH for the study area and subject property is discussed in Section 5.4.

Blanding's Turtle is designated Threatened provincially (MECP 2023) and Endangered federally (Government of Canada 2023), and, as such, individuals and their habitat are provided protection under the Endangered Species Act, 2007. Blanding's Turtle was documented by a local resident in May 2016, crossing the laneway that runs across Laurel Creek, west of Schnarr Street, outside of the study area (Dougan and Associates 2018). In June 2016, an individual was observed incidentally by Dougan and Associates in the pond at 665 Erbsville (Map 4). Neither of these observations provided conclusive evidence of nesting or overwintering in the study area and further studies completed by Dougan and Associates et al. (2018) did not document any other individuals. The

identification of Blanding's Turtle habitat and its significance within the subject property are discussed in Section 5.6.1.

**Regionally Significant Herpetofauna**

Three of the reptile and amphibian species observed in the study area are considered regionally significant (RMOW 1985a). These species include Blanding's Turtle, Eastern Milksnake and Red-spotted Newt. Blanding's Turtle is also a designated SAR, as such its habitat within the study area is discussed at greater length in Section 5.6.1. None of the regionally significant herpetofauna are reported from the proposed development footprint.

Habitat for Eastern Milksnake may be present within the study area; however, suitable habitat is limited within the proposed development footprint. The edges of the woodland and wetland ecosites may provide suitable for this species, however these areas are largely outside the proposed development footprint and will be protected by buffers. Targeted cover board surveys and active searches did not locate any Eastern Milksnakes within the subject property, as such habitat is not considered to be present for this species within the proposed development footprint. A single Red-spotted Newt was observed to the extreme southwest of the study area in the pond behind 665 Erbsville Road (Map 4). This pond is separated from the subject property by Erbsville Road, which is anticipated to be a significant barrier to herpetofauna dispersal.

### 4.3.3 Mammals

According to the Mammal Atlas of Ontario (Dobbyn 1994), 45 mammal species are reported from within the atlas square that overlaps the study area. Of these species, 12 were observed or evidence of their presence was detected within the study area during field surveys. No regulated SAR or SCC mammals were observed within the study area. Candidate habitat for SAR bats is discussed below. Appendix VII provides a complete list of mammal species reported from the study area. The results of targeted surveys for mammals are described below.

**Winter Wildlife Survey**

The winter wildlife survey was undertaken by Dougan and Associates in the study area in order to identify areas of concentrated wildlife activity or movement. This survey focused on the margins of agricultural fields and woodlands as well as hedgerows.

Wildlife movement was found to be concentrated in these areas, and evidence of foraging and burrowing was also detected at the edges of forests and hedgerows. The most commonly detected species were Eastern Gray Squirrel (*Sciurus carolinensis*) and White-tailed Deer (*Odocoileus virginianus*). Northern Raccoon (*Procyon lotor*) was detected moving through the CUW1 community in the north of the subject property. White-tailed Deer movement corridors are addressed as SWH in Section 5.4.4.

**Bat Species at Risk**

Several SAR bats were identified as having records from the vicinity of the study area through the SAR screening exercise (Appendix II). These species include Eastern Small-footed Myotis (*Myotis leibii*), Little Brown Myotis (*Myotis lucifugus*), Northern Myotis (*Myotis septentrionalis*), and Tri-colored Bat (*Perimyotis subflavus*). Important habitats for these species typically consist of hibernacula and maternity colony roost sites (Humphrey 2017; Humphrey and Fotherby 2019). No hibernacula or sites that would provide suitable features for hibernation are known from the study area. Maternity colony habitat for Little Brown Myotis, Northern Myotis and Tri-colored Bat are often found in buildings, rock crevices, exfoliating bark and cavities in decaying trees (Humphrey and Fotherby 2019). Maternity habitat for Eastern Small-footed Myotis is poorly understood but thought to primarily consist of old buildings and rock crevices, however cavities in dead or decaying trees may also rarely be used (Humphrey 2017).

Bat habitat assessments for treed areas within the development footprint resulted in the identification of eight candidate SAR bat roosting trees, which would be suitable for Little Brown Myotis and/or Northern Myotis (Map 4). A description of each roost tree is provided in Table 9. No potential rock crevice habitats were identified within the development footprint.

**Table 9. Candidate Bat Roosting Trees**

| Tree ID | Species | | Location UTM Zone: 17T | | DBH (cm)[1] | Height Class[2] | Decay Class[3] | Habitat Features |
|---|---|---|---|---|---|---|---|---|
| | Common Name | Scientific Name | Easting | Northing | | | | |
| A | Black Cherry | *Prunus serotina* | 532350.44 | 4813974.76 | 18, 22 | 4 | 6 | Cavity (2m up tree) |
| B | Sugar Maple | *Acer saccharum* | 532403.64 | 4814001.55 | 43, 44 | 2 | 2 | Cavities (2m and 3m up tree) |
| C | Hybrid Butternut | *Juglans sp.* | 532172.34 | 4814180.97 | - | 2 | 2 | Cavity (4m up tree) |
| D | Black Walnut | *Juglans nigra* | 532096.40 | 4814177.36 | 15 | 4 | 4 | Loose bark (0.5m and 3m up tree) |
| E | Hybrid Butternut | *Juglans sp.* | 532087.70 | 4814186.70 | 19 | 3 | 2 | Cavity (1m and 1.5m up tree) |
| F | Norway Maple | *Acer platanoides* | 532082.13 | 4814189.08 | 30, 18 | 3 | 1 | Cavity (1m up tree) |
| G | European Horse-chestnut | *Aesculus hippocastanum* | 532104.46 | 4814209.32 | 44 | 2 | 1 | Cavity (8m up tree) |
| H | Norway Maple | *Acer platanoides* | 532128.41 | 4814207.30 | 55 | 2 | 2 | Cavity (2m up tree) |

[1]Diameter at Breast Height
[2]Height Class: 1 = Dominant (above canopy); 2 = Co-dominant (canopy height); 3 =Intermediate (just below canopy); 4 = Suppressed (well below canopy)
[3]Decay Class (Watt and Caceres 1999): 1 = Healthy, live tree; 2 = Declining Live Tree, Part of Canopy Lost; 3 = Very recently dead, no canopy, bark intact, branches intact; 4 = Recently dead, bark peeling, only large branches intact; 5 = Older dead tree, 90% of bark lost, few branch stubs, broken top' 6 = Very old dead tree, advanced decay, no branches, parts of the stem have rotted away.

Candidate roosting habitat for SAR bats would also be found within other woodland areas of the subject property outside of the development footprint, including the CUW1, FOM, SWD7 and SWM communities, which were not extensively searched as tree removal is not proposed within these features.

There were no bats observed exiting or entering the 'summer kitchen' during exit surveys in June 2023. The structure is therefore not considered candidate bat habitat.

**Locally Significant Mammal Species**

Of the mammals observed in the study area, none are considered to be regionally rare. Three of the species are considered scarce regionally including, Beaver (*Castor canadensis*), American Mink (*Neovison vison*) and Coyote (*Canis latrans*) (RMOW 1985b).

### 4.3.4 Butterflies

According to the Ontario Butterfly Atlas (Macnaughton et al. 2020), 61 butterfly species are known to occur in the vicinity of the study area. Dougan and Associates biologists observed 10 species incidentally during surveys completed within the study area. A complete list of species observed is provided in Appendix VII.

One butterfly SCC, Monarch (*Danaus plexippus*), was observed within the subject property and is discussed further below. One regionally rare species (Linton 2012) was observed: Juvenal's Duskywing (*Erynnis juvenalis*). Juvenal's Duskywing prefers Oak woods or scrub, and is often associated with woodland edges or fields; no suitable habitat is present within the development footprint.

**Monarch**

A single Monarch was photographed in the study area on June 12, 2013, and no additional observations were recorded. Suitable host plants for the species (Milkweed) are present along the edges of the subject property. No suitable habitat for Monarch is present within the proposed development footprint.

### 4.3.5 Odonata

According to the Ontario Odonata Atlas Database (OOAD 2023), 34 odonate (dragonfly and damselfly) species are reported from the vicinity of the study area. During field surveys conducted within the subject property, three (3) species of odonate were

observed incidentally by Dougan and Associates. None of the observed species are considered federally, provincially or regionally significant. A complete list of species observed is provided in Appendix VII.

## 4.4 Aquatic Habitat

Three watercourses are present within the study area: Laurel Creek, Wideman Creek and a tributary of Wideman Creek. With the exception of the Wideman Creek tributary, these watercourses are associated with the Sunfish Lake-Laurel Creek PSW complex. Laurel Creek is present in the north and northwest of the subject property, while the remaining watercourses are found with the broader study area. Preliminary aquatic habitat characterization and assessments were completed by Dougan Associates et al. (2018) with additional habitat assessments completed by NRSI in 2023 (also described in Appendix V). These watercourses and their reaches are presented on Map 3 and described below.

### 4.4.1 Watercourse Characterization

**Laurel Creek**

Within the study area, Laurel Creek was divided by Dougan and Associates et al. (2018) into five general assessment reaches, as shown on Map 3. Reaches L1-L4 were assessed by both Dougan and Associates et al. (2018) and NRSI.

Reach L1 is the downstream most reach of Laurel Creek within the study area and is characterized by a series of shallow riffles (max depth 0.15m) broken up by deeper pools (max depth 0.75m) with primarily cobble/gravel substrates and traces of sand/silt within deeper pools. Wetted widths throughout L1 were observed to range from 3.5-5.5m with bankfull widths ranging from 7.5-10.5m. Aquatic vegetation within Laurel creek was observed to consist of submerged Watercress (*Nasturtium sp.*) and emergent Narrow-leaved Cattail (*Typha angustifolia*) and Common Reed (*Phragmites* sp.). Dense overhanging bank vegetation, deciduous trees and shrubs presented nearly 100% shade throughout L1. Aquatic habitat and cover are provided by dense overhanging vegetation, undercut banks, and some woody debris.

Reach L2, upstream of the confluence with Wideman Creek, continues the trend of shallow riffles (max depth 0.15m) broken up by the occasional isolated pool (max depth 0.75m) with primarily gravel/sand with traces of silt and consolidated clay. Wetted

widths throughout L2 were observed to range from 4.15-5.0m with bankfull widths ranging from 7.5-8.5m. Aquatic vegetation within this reach of Laurel creek was observed to consist of isolated patches of submerged Watercress (*Nasturtium sp.*) and sparse patches of Common Reed. Dense overhanging bank vegetation, deciduous trees and shrubs presented nearly 100% shade throughout L2. Aquatic habitat and cover are provided by dense overhanging vegetation, undercut banks, and some woody debris.

Reach L3 (is a highly meandering channel flowing through a dense stand of mixed deciduous/coniferous forest with a visibly greatly reduced flow rate. Extended reaches of slow flowing runs (max depth 0.25m) are broken up by long narrow pools (max depth 0.75) and interrupted by numerous beaver dams. Substrates throughout this reach primarily consist of silt and organic detritus. Wetted widths throughout L3 were observed to range from 3.5-6.0m with bankfull widths ranging from 6.5-8.0m. Aquatic vegetation within this reach of Laurel creek was observed to consist of isolated patches of submerged Watercress. Dense overhanging bank vegetation, deciduous trees and shrubs presented nearly 100% shade throughout L3. Aquatic habitat and cover are provided by dense overhanging vegetation, undercut banks, and some woody debris.

Reach L4 is located immediately downstream of Erbsville Road and is characterized by gently meandering shallow riffles (max depth 0.3m) and pools (max depth 0.65m) with primarily cobble/gravel substrates and traces of silt and organic detritus. Wetted widths throughout L4 were observed to range from 3.15-5.15m with bankfull widths ranging from 6.5-7.0m. Aquatic vegetation within this reach of Laurel creek was observed to consist of isolated patches of submerged Watercress. Dense overhanging bank vegetation, deciduous trees and shrubs presented nearly 100% shade throughout L4. Aquatic habitat and cover are provided by dense overhanging vegetation, undercut banks, and some woody debris.

The presence of dense Watercress patches within pool habitat of L1-L4 suggests areas of groundwater upwelling within Laurel Creek.

**Wideman Creek**

Within the study area, Wideman Creek was assessed by Dougan and Associates et al. (2018) and NRSI, which includes W1 and W2 (Map 3). W2 was only assessed by NRSI as part of the 665 Erbsville Pre-construction Biological Monitoring Program.

Immediately upstream of the confluence with Laurel Creek reach, W1 extends from Laurel Creek to Erbsville Road. The reach is a narrow highly braided channel (maximum depth 0.35m),within a densely vegetated fringe of wetland habitat consisting of Common Reed and Narrow-leaved Cattail. Wetted widths throughout the reach of Wideman Creek were observed to range from 0.5-1.5m with bankfull widths ranging from 5.5-6.5m. Substrates throughout this reach of Wideman Creek consisted primarily of silt with traces of sand and gravel. The Erbsville Road culvert located at the upstream extent of this reach does not present a barrier to upstream fish movement.

Upstream of Erbsville Road, reach W2 of Wideman Creek is a channelized watercourse running along the edge of the Sunfish Lake Laurel Creek Wetland Complex. Wetted widths throughout W2 were observed to range from 0.5-1.5m with bankfull widths ranging from 2.5-3.5m. Substrates consisted primarily of sand and silt, with deposits of cobble and boulder along the edge of the adjacent agricultural field. Aquatic vegetation was generally lacking within the channel with pockets of Common Reed throughout the channel. Aquatic habitat and cover are provided by dense overhanging vegetation, undercut banks, and some woody debris.

### 4.4.2 Fish Community and Habitat

Fish community monitoring was completed in 2014 by C. Portt and Associates (Dougan and Associates et al. 2018) and in 2023 by NRSI at three locations within the study area: two in Laurel Creek (EMS-001 and EMS-002) and one in Wideman Creek (EMS-003), as depicted in Map 3. A total of 11 species was sampled, each typical of a small cool or warm water surface watercourse, with species generally tolerant of environmental disturbance and changes to surface water temperature and salinity. Low overall fish populations observed throughout Wideman Creek are indicative of watercourses subject to significant seasonal water level fluctuations, such as those expected from temporary and intermittent watercourses. No federally, provincially, or regionally significant fish species were observed within the study area (Table 10).

**Table 10. Fish Sampling Survey Results**

| Common Name | Scientific Name | Thermal Regime[1] | Tolerance[1] | EMS-001 | | EMS-002 | | EMS-003 | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | 2014 | 2023 | 2014 | 2023 | 2014 | 2023 |
| Western Blacknose Dace | *Rhinichthys obtusus* | Coolwater | Intermediate | 2 | 25 | 39 | 10 | 1 | |
| Bluntnose Minnow | *Pimephales notatus* | Warmwter | Intermediate | 14 | 35 | 17 | 5 | 2 | 10 |
| Brassy Minnow | *Hybognathus hankinsoni* | Coolwater | Intermediate | | | 13 | | | |
| Brook Stickleback | *Culaea inconstans* | Coolwater | Intermediate | | | | | 2 | 15 |
| Creek Chub | *Semotilus atromaculatus* | Coolwater | Intermediate | 2 | 25 | 56 | 10 | 2 | 10 |
| Fathead Minnow | *Pimephales promelas* | Warmwater | Tolerant | 7 | | | | 1 | |
| Iowa Darter | *Etheostoma exile* | Coolwater | Intermediate | 332 | 10 | 417 | 25 | 30 | |
| Largemouth Bass | *Micropterus nigricans* | Warmwater | Tolerant | 1 | | | | | |
| Northern Redbelly Dace | *Chrosomus eos* | Coolwater | Intermediate | | 10 | 6 | | | |
| Pumpkinseed | *Lepomis gibbosus* | Warmwater | Intermediate | 1 | | | | | |
| White Sucker | *Catostomus commersonii* | Coolwater | Tolerant | 1 | 25 | 4 | 15 | 2 | |
| **Total Species** | | | | **8** | **6** | **7** | **5** | **7** | **3** |
| **Total Individuals** | | | | **360** | **130** | **559** | **65** | **40** | **35** |

[1](Barbour et al 1999)

### 4.4.3 Trout Spawning

No evidence of salmonid spawning was observed during these spawning surveys completed in Laurel Creek and Wideman Creek. Based on channel morphology, substrates and stream size, reaches L1 and L4 contain potential Brown Trout spawning habitat, and the same would likely be true for reaches L2 and L3 if the beaver dam were not present. Suitable spawning substrates for Brown Trout were not observed in Wideman Creek. Additional surveys for Redds are not recommend due to the comprehensive surveying undertaken as a part of previous studies in the area and the limited suitable habitat within the study area.

### 4.4.4 Benthic Invertebrates

The results of 2023 benthic macro-invertebrate sampling conditions are summarized in Table 11 and Table 12, with the raw benthic macro-invertebrate data included in Appendix V.

**Table 11. Spring 2023 Benthic Macro-Invertebrate Sampling Conditions**

| Station | BTH-001 | | | BTH-002 | | | BTH-003 | | | BTH-004 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | June 1, 2023 | | | June 1, 2023 | | | June 1, 2023 | | | June 1, 2023 | | |
| Time (hrs) | 1415 | | | 1445 | | | 1515 | | | 1545 | | |
| Water Temperature (°C) | 15 | | | 15 | | | 15 | | | 18 | | |
| | **Riffle 1** | **Pool** | **Riffle 2** | **Riffle 1** | **Pool** | **Riffle 2** | **Riffle 1** | **Pool** | **Riffle 2** | **Riffle 1** | **Pool** | **Riffle 2** |
| Wetted Width (m) | 4.50 | 5.50 | 4.14 | 4.15 | 5.00 | 4.25 | 5.50 | 5.75 | 4.45 | 0.50 | 0.50 | 0.50 |
| Maximum Depth (m) | 0.35 | 0.50 | 0.60 | 0.65 | 0.75 | 0.50 | 0.50 | 0.75 | 0.50 | 0.15 | 0.15 | 0.20 |
| Maximum Hydraulic Head (mm) | 10 | 0 | 5 | 7 | 0 | 5 | 5 | 0 | 10 | 15 | 0 | 15 |
| Dominant Substrate | Sand | Sand | Sand | Sand | Sand | Sand | Sand | Sand | Sand | Silt | Silt | Silt |
| Sub-Dominant Substrate | Gravel | Silt | Gravel | Gravel | Gravel | Gravel | Gravel | Silt | Gravel | Sand | Sand | Sand |

**Table 12. Fall 2023 Benthic Macro-Invertebrate Sampling Conditions**

| Station | BTH-001 | | | BTH-002 | | | BTH-003 | | | BTH-004 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | September 27, 2023 | | | September 27, 2023 | | | September 27, 2023 | | | September 27, 2023 | | |
| Time (hrs) | 1300 | | | 1330 | | | 1415 | | | 1545 | | |
| Water Temperature (°C) | 18 | | | 18 | | | 18 | | | 21 | | |
| | **Riffle 1** | **Pool** | **Riffle 2** | **Riffle 1** | **Pool** | **Riffle 2** | **Riffle 1** | **Pool** | **Riffle 2** | **Riffle 1** | **Pool** | **Riffle 2** |
| Wetted Width (m) | 4.15 | 6.0 | 5.15 | 4.75 | 5.5 | 4.75 | 4.15 | 5.25 | 4.75 | 0.5 | 0.35 | 0.5 |
| Maximum Depth (m) | 0.5 | 0.7 | 0.5 | 0.45 | 0.5 | 0.5 | 0.5 | 0.75 | 0.75 | 0.1 | 0.1 | 0.1 |
| Maximum Hydraulic Head (mm) | 10 | 0 | 15 | 15 | 0 | 10 | 10 | 0 | 5 | 15 | 0 | 15 |
| Dominant Substrate | Sand | Silt | Sand | Sand | Sand | Sand | Sand | Silt | Sand | Silt | Silt | Silt |
| Sub-Dominant Substrate | Gravel | Sand | Gravel | Gravel | Gravel | Gravel | Gravel | Sand | Gravel | Sand | Sand | Sand |

A total of 37 taxa was identified within the 4 sampling stations during 2014 and 2023 The identification and enumeration of benthic invertebrates are provided in tabular format in Appendix V. Survey results are summarized in Table 13.

Overall, the resulting benthic invertebrate community composition metrics fell predominantly within the “Potentially Unimpaired” assessment range across the majority of the assessment criteria throughout both Laurel (BTH-001, BTH-002, and BTH-003) and Wideman (BTH-004) Creeks during both 2014 and 2023 benthic macro-invertebrate community monitoring.

Taxonomic richness was relatively consistent between Spring and Fall monitoring events during 2023 monitoring, with the EPT Richness approximately consistent between 2014 and 2023. In general conditions within Laurel Creek exhibited a comparatively higher diversity and higher environmental water quality when compared to Wideman Creek, suggesting wider range of diverse habitat types within Laurel Creek. Despite the overall limited taxa richness observed throughout all monitoring stations, the results of the Shannon Weiner (H’), measure of diversity and evenness, and the Simpsons Diversity Index suggest a relatively diverse benthic invertebrate community, with no single taxa achieving true dominance across all monitoring stations within both Laurel and Wideman Creeks during both 2014 and 2023.

The environmental water quality as measured by the Family Biotic Index indicated an environmental water quality of Good within Laurel Creek and Fair within Wideman Creek during 2023. The genus level Biotic Index was observed to range between Fairly Poor to Good within Laurel Creek and Poor to Fair within Wideman Creek between 2014 and 2023. This further supports the determination of Potentially Unimpaired conditions within both Wideman and Laurel Creeks despite the low taxa richness and proportion of sensitive taxa, the aquatic habitat conditions within the study area are stable but indicative of limited habitat diversity dominated primarily by highly organic substrates and limited riffle habitat.

**Table 13. Calculated Benthic Invertebrate Metrics**

| Benthic Invertebrate Metrics | Dougan and Associates et al. 2018 | | | | NRSI Spring 2023 | | | | NRSI Fall 2023 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | BTH-001 | BTH-002 | BTH-003 | BTH-004 | BTH-001 | BTH-002 | BTH-003 | BTH-004 | BTH-001 | BTH-002 | BTH-003 | BTH-004 |
| Taxa Richness | 37 | 28 | 36 | 34 | 21 | 16 | 12 | 8 | 14 | 11 | 17 | 14 |
| **Sensitive Groups** | | | | | | | | | | | | |
| EPT Taxa Richness | 5 | 3 | 6 | 3 | 7 | 5 | 4 | 0 | 5 | 3 | 3 | 1 |
| % EPT | N/A | N/A | N/A | N/A | 28.2 | 30.3 | 37.9 | 0.0 | 17.8 | 9.5 | 13.7 | 1.6 |
| **Tolerant Groups** | | | | | | | | | | | | |
| % *Oligochaetes* | N/A | N/A | N/A | N/A | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 |
| % *Diptera* | N/A | N/A | N/A | N/A | 45.2 | 41.7 | 18.8 | 38.7 | 30.4 | 50.4 | 22.9 | 40.5 |
| % *Chironomidae* | N/A | N/A | N/A | N/A | 41.6 | 41.7 | 13.3 | 38.7 | 25.5 | 50. | 20.6% | 35. |
| **Functional Feeding Groups** | | | | | | | | | | | | |
| % Collector-Filter | N/A | N/A | N/A | N/A | 46.2 | 45.5 | 21.5 | 13.8 | 19.3 | 6.9 | 13.3 | 9.7% |
| % Collector-Gatherer | N/A | N/A | N/A | N/A | 22.8 | 30.5 | 47.5 | 68.5 | 73.0 | 79.3 | 52.3 | 71.9 |
| % Predators | N/A | N/A | N/A | N/A | 14.0 | 11.5 | 23.0 | 6.4 | 2.4 | 10.4 | 29.0 | 0.0 |
| % Scrapers | N/A | N/A | N/A | N/A | 13.8 | 12.5 | 7.9 | 0.0 | 5.3 | 3.5 | 3.8 | 3.9 |
| % Shredders | N/A | N/A | N/A | N/A | 3.1 | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1.6 | 3.9 |
| **Diversity and Biotic Indices** | | | | | | | | | | | | |
| Shannon-Wiener Index | 2.3 | 2.0 | 2.2 | 2.1 | 2.9 | 2.7 | 2.3 | 1.8 | 2.2 | 2.2 | 2.5 | 2.2 |
| Family Biotic Index | N/A | N/A | N/A | N/A | 4.58 | 4.5 | 4.5 | 5.6 | 4.9 | 5.0 | 4.4 | 5.7 |
| Family Biotic Index Water Quality | N/A | N/A | N/A | N/A | Good | Good | Good | Fair | Good | Good | Good | Fair |
| Biotic Index | 6.7 | 6.0 | 6.9 | 6.4 | 5.5 | 5.6 | 5.3 | 7.3 | 6.3 | 7.2 | 5.6 | 7.6 |
| Biotic Index Water Quality | Fairly Poor | Fair | Fairly Poor | Fair | Good | Fair | Good | Fairly Poor | Fair | Fairly Poor | Fair | Poor |
| Simpsons Diversity Index | N/A | N/A | N/A | N/A | 0.94 | 0.93 | 0.90 | 0.87 | 0.85 | 0.87 | 0.9 | 0.9 |

Potentially Unimpaired Potentially Impaired

### 4.4.5 Water Temperature

Water temperature was logged at five locations within the study area: three in Laurel Creek (TMP-001, TMP-002, TMP-003) and two in Wideman Creek (TMP-004 and TMP-005). Water temperature was found to be relatively consistent between the monitoring locations; however, it was considerably higher on a number of occasions at TMP-002 which was placed downstream from the beaver dam. Temperatures at TMP-002 were similar to other stations after significant rainfall events. This variation in temperature suggests that this channel ceases to flow during low flow periods. As a result, the water temperature at this station rises. If this station is not taken into account, water temperatures in Laurel Creek did not exceed 24°C at TMP-001, and exceeded 24° on two days at TMP-003.

In Wideman Creek, water temperature at TMP-004 exceeded 24°C on one day, and were generally comparable to the temperatures of Laurel Creek. The creek was found to be notably colder at TMP-005, with a maximum of 19.9°C recorded.

The results of water temperature monitoring in Laurel Creek when compared to the nomogram derived from Ontario stream data and presented in Chu et al. (2009) indicate that it should be classified as a cool-warmwater or, possibly, coolwater stream. The results from Wideman Creek at TMP-004 indicate it is similar to Laurel Creek and indicate that it should be classified as a cool-warmwater or, possibly, coolwater stream. Results from TMP-005 indicate Wideman Creek at this location is a cold-coolwater or coolwater stream.

## 5.0 Significance Natural Heritage Features and Constraints

The natural environment constraints analysis is used to identify natural features that are sensitive to disturbance based on the rarity or significance of the feature or its function, or policies that prohibit disturbance within them. These areas are identified as "constraints" and are discussed in the context of natural heritage policies governing their protection. As noted in previous sections, the proposed development footprint overlaps primarily active agricultural fields with a hedgerow, a small CUT1 community, and anthropogenic areas associated with the existing dwelling also located within the footprint of the proposed development.

## 5.1 Significant Wetlands

All of the wetlands within the study area and subject property are included in the Sunfish Lake-Laurel Creek PSW complex. The only waterbodies within the study area not included in the PSW are the Forest Gate stormwater management ponds. The Sunfish Lake-Laurel Creek PSW complex is present in the immediate north, northeast and east of the subject property (see Map 1). A wetland evaluation for the PSW complex was completed by the Ministry of Natural Resources in 2003 (Drabick 2003). A total of 109 wetland units were evaluated encompassing a total area of 811ha. The majority of wetlands within the PSW complex are swamps with some marsh (Dougan and Associates et al. 2018). All wetlands within the complex are either palustrine or riverine, with some small isolated wetlands also identified (Dougan and Associates et al. 2018). A variety of provincially and federally listed as well as regionally and locally rare wildlife species are known from the PSW complex.

The PPS (OMMAH 2020) states that development and site alteration is not permitted in significant wetlands; this policy applies to the Sunfish Lake-Laurel Creek PSW complex. In addition to the PPS, the Region of Waterloo OP (RMOW 2015) and City of Waterloo OP (2020b) both identify that development is not permitted in PSWs, which are classified as Core Environmental Features, with a few exceptions relating to essential infrastructure, and flooding and erosion control. In the context of the study area, the Sunfish Lake-Laurel Creek PSW provides significant wildlife habitat, habitat for Endangered and Threatened species and habitat for locally significant species.

Furthermore, development and site alteration is not permitted in the adjacent lands to PSWs, unless an EIS can demonstrate that there will be no negative impacts to the

feature and its ecological function (OMMAH 2020, RMOW 2015, City of Waterloo 2020b).

The wetland boundary most recently approved by GRCA in 2023 is shown on Map 5.

The ESES (Dougan and Associates et al. 2018) identifies that through discussion with the GRCA, a 30m buffer from the PSW is recommended (Map 5). The proposed buffer will effectively protect the PSW from edge effects and will provide improved wildlife habitat along the wetland boundary.

## 5.2 Environmentally Significant Policy Area (ESPA)

The Laurel Creek Forest ESPA (#80) is located to the north, northeast and east of the subject property and is closely associated with Laurel Creek (see Map 1). The ESPA is a Core Natural Feature in the City of Waterloo's OP (2020b) and the Regional OP (RMOW 2015). Development or site alteration of Core Natural Features is not permitted under the policies in these official plans. The forest is primarily a combination of swamp and upland communities and provides an important natural corridor between Schaefer's Woods ESPA (#17), west of the study area, and the Laurel Creek Reservoir, east of the study area. The woodlands associated with the ESPA provide significant wildlife habitat, habitat for Endangered and Threatened species and habitat for locally significant wildlife. Most of these habitats are concentrated within the portion of the ESPA that coincides with the PSW. In addition to being identified as an ESPA, the woodland in the study area qualifies as a Significant Woodland under the Natural Heritage Reference Manual (NHRM) guidelines (OMNR 2010). Laurel Creek, a coolwater stream, is located within the ESPA as well. Sections of this watercourse have been rehabilitated to provide improved fish habitat.

Furthermore, development and site alteration are not permitted in the adjacent lands to Significant Woodlands, unless an EIS can demonstrate that there will be no negative impacts to the feature and its ecological function (OMMAH 2020, RMOW 2015, City of Waterloo 2020b).

The ESPA/woodland dripline boundary surveyed in 2014 and 2020 are presented on Map 5.

The ESES recommends a 10m buffer from ESPAs and woodlands within the study area (Dougan and Associates et al. 2018). The 10m buffer will be established from the woodland dripline delineated by Dougan and Associates. This dripline is coincident with the Laurel Creek Forest ESPA boundary (Map 5). The established 10m buffer will provide protection to the woodland and ESPA from edge effects related to the development and will be enhanced to improve wildlife habitat in an area that is currently comprised of anthropogenic, agricultural and cultural vegetation communities.

## 5.3 Watercourses

Laurel Creek, a coolwater stream system, is located within the subject property and study area. This watercourse provides habitat for a variety of fish species and provides a natural corridor for wildlife moving between the Schaefer Woods ESPA and the Laurel Creek Reservoir, with historical records of Brown Trout spawning and potential for Brook Trout spawning (Dougan and Assoicates et al. 2018). Watercourses in the Region of Waterloo are regulated by the GRCA, and perennial watercourses are considered to be Supporting “A” Natural Features under the City of Waterloo OP (2020b). The form and ecological function of Supporting Natural Features are to be maintained, enhanced, or where feasible restored. The City of Waterloo recommends a 30m buffer on either side of perennial watercourses, from the bankfull channel (City of Waterloo 2020b). The ESES identifies a 30m buffer from Laurel Creek and this recommendation has been carried forward (Map 5).

## 5.4 Significant Wildlife Habitat

Based on the results of a comprehensive background review and a review of the ESES, candidate SWH types were identified within the study area and subject property, but not within the development area. Significant Wildlife Habitats are considered to be Supporting “A” Natural Features in the City of Waterloo OP (2020b). Development and site alteration is not permitted within adjacent lands to SWH, unless an EIS can demonstrate that there will be no negative impact to the SWH or the ecological function (OMMAH 2020, City of Waterloo 2020b).

Based on background information review, desktop analysis, and field studies completed by Dougan and Associates et al. (2018) and NRSI in 2023, no SWH types are considered present in the proposed development area. SWH that are present adjacent

to the development footprint and were considered for the subject property are discussed in detail in the following sections and shown on Map 5.

### 5.4.1 Seasonal Concentration Areas

Wildlife seasonal concentration areas are defined as areas where animals occur in relatively high densities for all, or portions, or their life cycle (OMNR 2000). These areas are generally small in size, particularly when compared to areas used by these species during other times of the year.

#### Bat Maternity Colonies

Habitat for bat maternity colonies has been identified as **presumed Candidate SWH** for the study area and a portion of the subject property. The FOM, SWD7 and SWM communities within the subject property may provide cavity trees that have the potential to be occupied by bat maternity colonies. Suitable bat maternity habitat SWH is not present within the proposed development footprint. Presumed candidate areas for this SWH are entirely contained within the boundaries of the Laurel Creek Forest ESPA and the Sunfish Lake-Laurel Creek PSW complex. These areas are presumed candidate because bat habitat assessments, in the form of inventory plots, would be required within these features to determine whether the required density of 10 candidate roost trees/ha would be met in order to be considered candidate significant habitat. SWH would be further confirmed through the use of exit surveys within these communities. Because the communities associated with the ESPA and PSW are not within the development footprint and buffers are provided, additional surveys were not undertaken as these potential habitats will be adequately protected.

#### Turtle Wintering Habitat

Suitable habitat for turtle wintering is potentially present within Laurel Creek as well as in the SWD7, SWM and SWT3-2 communities within the study area and subject property. Laurel Creek and these vegetation communities are entirely contained within the Sunfish Lake-Laurel Creek PSW complex, and do not overlap with the proposed development footprint. Snapping Turtle was confirmed overwintering within a section of Laurel Creek that overlaps the subject property. Laurel Creek, which contains sufficient deep-water pools, is therefore considered **Confirmed SWH.** This habitat type is limited within the watershed.

**Snake Hibernaculum**

Candidate snake hibernaculum SWH was identified by Dougan and Associates for an old building foundation within the CUT1 community at the northwest end of the proposed development footprint (Map 4). It is the opinion of NRSI that this foundation would not provide suitable habitat for snake hibernation. Snakes need to hibernate between the frostline and the groundwater table, in what is referred to as the life zone (OMNRF 2018). Due to the proximity of the foundation to Laurel Creek and the Sunfish Lake-Laurel Creek PSW complex it is anticipated that groundwater would be too close to the surface to provide suitable hibernacula in the vicinity of the old foundation. The approximate groundwater depth at the old building foundation is 348masl. It has been inferred from spot elevations and contours from the topographic survey that the ground elevation in this area is between 348-348.5masl. Frost depth in southern Ontario is typically between 62 and 122cm below ground surface (likely closer to 122cm in the Region of Waterloo) (Armstrong and Csathy 1963). Based on these elevations and the depth of frost in Southern Ontario it is likely that the frost line and groundwater table would be too close together to provide suitable hibernacula habitat for snakes. For this reason, the foundation would not provide snake hibernaculum SWH.

**Deer Winter Congregation Areas**

Deer winter congregation areas are identified by MNRF based on the congregation of deer in large numbers in suitable habitats (OMNRF 2014). Woodlands are typically >100ha in size but smaller woodlands may be considered significant (OMNRF 2015a). The winter congregation area mapped by MNRF within the study area contains a complex of woodlands and treed wetlands that total approximately 56ha. This area was originally identified in 1987 and was revised in April 2011 based on 2006 ortho-photos. Dougan and Associates et al. (2018) noted extensive deer use in these areas during their surveys. This area, which is located outside of the subject property, is **Confirmed SWH.**

### 5.4.2 Specialized Wildlife Habitat

Specialized wildlife habitats include those that support wildlife species with highly specific habitat requirements, areas with exceptionally high species diversity, and/or areas that provide habitat that greatly enhances a species' chance of survival (OMNR

2000). The SWHTG indicates that most specialized habitats have not been formally identified or mapped by any agency (OMNR 2000).

### Turtle Nesting Area

Turtle nesting area SWH was identified in the ESES for lands adjacent to the study area. All areas of turtle nesting SWH identified were located to the west of Erbsville Road. Suitable habitat was considered to potentially be present within the agricultural field in the subject property; however, turtle nesting surveys undertaken by Dougan and Associates in 2013 and 2016 did not identify any evidence of turtle nesting within the 720 Erbsville Road subject property. As such, this SWH is not present within the subject property.

### Seeps and Springs

Seeps and springs are **Confirmed SWH** within the woodland and wetland features surrounding Laurel Creek within the Erbsville Kartway lands within the study area. Although these areas are not considered part a headwater area of Beaver or Laurel Creek, they have been designated as SWH because they meet many other criteria provided in Appendix Q of the SWHTG (OMNR 2000). These areas are entirely contained within the boundaries of the Laurel Creek Forest ESPA and the Sunfish Lake-Laurel Creek PSW complex. No other seeps or springs were noted within the CUT1 or CUW1 communities on the subject property.

### Amphibian Breeding Habitat (Woodland)

Woodland amphibian breeding habitats are characterized by shallow, un-polluted water that may be temporary or permanent (OMNRF 2014). Emergent and submergent vegetation are important for calling and egg laying (OMNRF 2014). Additionally, the surrounding woodland habitat is important to offer a shady and moist understorey, and maintain breeding pond function (OMNRF 2014). Dougan and Associates identified woodland breeding habitat based on 2013 anuran call surveys, whereby Spring Peeper and Gray Treefrog were heard at ANR-002 with Call Code 3. This station was located in close proximity to the SWT3-2 community that surrounds Laurel Creek within the subject property. Sufficient breeding evidence was not found during surveys completed by NRSI in 2023, however, the SWT3-2 and other contiguous wetland habitats (SWM) have been identified as **Confirmed SWH** based on the results of earlier surveys.

### 5.4.3 Habitat for Species of Conservation Concern

Species of Conservation Concern are species with a provincial S-rank of S1 to S3, species listed as species of Special Concern provincially, or species listed as Endangered or Threatened nationally with no provincial designation (i.e., not protected by the ESA). Confirmed habitat for SCC may be considered Significant Wildlife Habitat (OMNR 2000). For wildlife species, it is important to understand the reasons for the species being designated as rare or of concern in order to adequately delineate and protect critical habitats (OMNR 2000). For example, this usually includes the breeding habitat for most bird species, which may be in decline for various reasons. For less mobile species, such as amphibians and reptiles, essentially all their habitat types (breeding, summer, winter, and movement corridors) are important to protect (OMNR 2000). Four SCC were observed within the subject property during the completion of field surveys: Barn Swallow, Eastern Wood-Pewee, Snapping Turtle, and Monarch. Additional SCC observed within the study area are also discussed.

**Barn Swallow**

Barn Swallow is listed provincially (MECP 2023) and federally (Government of Canada 2023) as Special Concern. Barn Swallows forage over open country habitats including wetlands, farmland, lakeshore and riparian habitats, road right-of-ways, clearings in wooded areas, parkland, urban, and rural residential areas. Barn Swallows are closely associated with human settlements as they build their nests inside or outside of buildings, under bridges and wharves, and in road culverts. Foraging habitat is present within the subject property and broader study area. Barn Swallow nests are known from three locations within the study area: behind 665 Erbsville Road, at 521 Forest Gate Crescent, and within one of the buildings on the Erbsville Kartway lands (Map 4). Foraging habitat for Barn Swallow is considered to have the most tolerance to alteration (OMNRF 2013c). As no nesting habitat is being altered, and foraging habitat will be maintained within natural features, SWH has not been identified within the subject property.

**Eastern Wood-Pewee**

Eastern Wood-Pewee is listed provincially (MECP 2023) and federally (Government of Canada 2023) as Special Concern. Dougan and Associates et al. (2018) identified this species as a Probable breeder in the study area, based on multiple observations in

various habitats during breeding bird surveys completed in 2013. Only one observation was made within the subject property. In 2023, NRSI observed Possible breeding evidence approximately 100m from BMB-003 (Map 4). SWH is confirmed when Probable breeding evidence is found; since the breeding evidence within the subject property is not strong enough, SWH for this species is not present.

**Canada Warbler**

Canada Warbler is listed provincially as Special Concern (MECP 2023) and federally as Threatened (Government of Canada 2023). Dougan and Associates et al. (2018) noted that this species was identified in 2008 and 2011 by local residents within the study area, on the shoulder of Conservation Drive. Based on the dates of the observations, Dougan and Associates et al. (2018) assumed that these observations were migrants and that the observations were far enough away that they would not pose a constraint to development. This species was not observed by NRSI during breeding bird surveys in 2023. Therefore, SWH for this species is not present.

**Bald Eagle**

Bald Eagle is listed provincially as Special Concern (MECP 2023). Dougan and Associates et al. (2018) noted that this species was identified in 2012 and 2015 by local residents within the study area, however, specific locations were not provided. They determined that it was unlikely to be utilizing habitats in the study area. This species was not observed by NRSI during breeding bird surveys in 2023. Therefore, SWH for this species is not present.

**Snapping Turtle**

Snapping Turtle was observed on multiple occasions within the study area. Overwintering habitats are addressed under Turtle Wintering SWH, which is confirmed within Laural Creek within the subject property/study area. Other habitats for Snapping Turtle which are important throughout various stages of their life include summer habitats, movement habitats, and nesting habitats. There are no open water wetlands within the subject property. Nesting was not found within the subject property, either. Laurel Creek likely provides adequate movement habitat conditions, allowing this species to access other suitable habitats within and beyond the study area, such as other sections of Laural Creek and Wideman Creek, and larger ponds and wetlands such as the Laurel Creek Reservoir. The wetlands surrounding Laurel Creek within the

study area are considered **Confirmed SWH** for Snapping Turtle, in addition to the overwintering area identified (Map 5).

**Monarch**

There is no suitable habitat for Monarch within the subject property or development area.

### 5.4.4 Animal Movement Corridors

Animal movement corridors are elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another (OMNR 2000, OMNRF 2015a). They can include natural landscapes such as shorelines as well as anthropogenic features such as trails, hedgerows and hydro corridors.

**Deer Movement Corridors**

In the ESES (Dougan and Associates et al. 2018), deer movement corridor SWH was considered candidate for the subject property based on the presence of deer winter congregation areas to the west of the study area, in the large coniferous forest associated with the Schaefer's Woods ESPA. The winter wildlife survey, conducted by Dougan and Associates, identified the presence of a deer movement corridor between this winter congregation area and natural features to the east of the study area, including the Laurel Creek Reservoir. The deer movement corridor, considered candidate in the ESES (Dougan and Associates et al. 2018), is located along the hedgerow to the southeast of the subject property, within the proposed development footprint (Map 5).

The presence of this deer movement corridor was identified prior to the construction of the Regal Place subdivision, which now significantly reduces the functionality of the hedgerow as a movement corridor for deer. The corridor associated with Wideman Creek (Map 5) is anticipated to provide a more suitable corridor for wildlife movement; this is stated in the ESES (Dougan and Associates et al. 2018) and was confirmed by agency staff. The Wideman Creek corridor is located 80m south of the southeastern hedgerow within the subject property, and as a result the hedgerow is considered redundant as a deer movement corridor. Considering the current conditions, the hedgerow in the southeast of the proposed development footprint is not considered deer movement corridor SWH.

## 5.5 Corridors and Linkages

Corridors and linkages are naturally or anthropogenically vegetated pathways between larger natural features in the landscape. They allow wildlife to move between otherwise disjunct areas of habitat, which facilitates access to different foraging, wintering and breeding areas and allows for gene flow between wildlife populations. No designated corridors or linkages have been identified within the study area based on a review of background information sources. Three potentially suitable ecological linkages are present within the subject property, connecting natural features to the east and west of Erbsville Road (Map 5). These potential linkages are present in three locations within the study area, along Wideman Creek in the south of the study area, along the hedgerow in the south of the subject property (discussed in Section 5.4.4) and along Laurel Creek in the north of the study area (Dougan and Associates et al. 2018), as shown on Map 5.

The Wideman Creek corridor is located at the south end of the subject property and is comprised of riparian vegetation along the banks of Wideman Creek. It is considered the highest quality linkage in the study area (Dougan and Associates et al. 2018). The Final Subwatershed Management Plan 309/313 makes recommendations to strengthen the linkage function. This includes upgrading the culvert to Regional Storm capacity, designing the new culvert to provide opportunities for wildlife movement, and planting native species within the 30m buffer applied to the creek. Marsh areas associated with Wideman Creek will be maintained. This enhanced wildlife corridor will allow for increased movement between natural features to the east and west of Erbsville Road and reduce road mortality. As a Secondary “A” Natural Feature, perennial watercourse, a 30m buffer applies to both sides of Wideman Creek. The 30m buffer does not overlap the subject property and has not been mapped.

The Laurel Creek linkage is present in the north of the study area along the watercourse, and is part of the Laurel Creek Forest ESPA. This linkage provides a secondary movement corridor for wildlife in the study area and its vicinity. The linkage will be preserved by the 30m buffer applied to the PSW, and the 10m buffer from the ESPA.

## 5.6 Habitat of Endangered and Threatened Species

Based on the results of wildlife-specific field surveys detailed in Section 4.3, the following SAR habitats have been identified within the subject property:

- Category 2 and Category 3 habitat for Blanding's Turtle;
- Candidate habitats for SAR bats; and
- Black Ash.

As per a recommendation in the ESES (Dougan and Associates et al. 2018) and the Erbsville South Block Plan (City of Waterloo 2020a), an Information Gathering Form was submitted to the MECP in January 2021, however no response was obtained. An updated IGF will be prepared that includes the updated development plan information and results of surveys.

### 5.6.1 Blanding's Turtle

Based on two observations of Blanding's Turtle within the area in 2016, along with other records within 2km of the study area, Category 2 and Category 3 habitats for the species have been identified in the subject property (Dougan and Associates et al. 2018). The ESES (Dougan and Associates et al. 2018) included an assessment of Category 2 and 3 habitats within the study area, however, the mapping has been revised to reflect other habitat mapping revisions completed for the Erbsville North study area. Mapping included within the ESES has been further scrutinized and therefore revised to better reflect the regulated habitat descriptions (OMNF 2013d). As such, NRSI's interpretation of Blanding's Turtle habitat in the study area is provided on Map 5.

Blanding's Turtle habitat has been categorized by the MNRF, as follows (OMNRF 2013d):

- Category 1: Nest and area within 30m or Overwintering sites and the area within 30m.
- Category 2: The wetland complex (i.e. all suitable wetlands or waterbodies within 500m of each other) that extends up to 2 km from an occurrence, and the area within 30m around those suitable wetlands or waterbodies.
- Category 3: Area between 30m and 250m around suitable wetlands/waterbodies identified in Category 2, within 2 km of an occurrence.

Category 2 habitat has been identified in all wetland habitats and watercourses within the subject property which also includes a 30m buffer from the edge of such features. It excludes the active recreation areas of the Erbsville Kartway lands due existing barriers.

Category 3 habitat for Blanding's Turtle provides movement corridors for the species. Within the study area, this includes all lands from 30m to 250m from Category 2 habitats, with the exception of existing dense residential areas that also provide a barrier.

Generally, habitat associated with Laurel Creek and the Wideman Creek corridor appears to provide the most suitable travel corridors for Blanding's Turtle. It would be unlikely that a turtle would leave these watercourse systems to venture overland to rejoin the watercourse, even if it provides a shorter direct distance. Furthermore, Erbsville Road is a significant barrier for Blanding's Turtle (and other herpetofauna species) movement; the most suitable route would be through the Wideman Creek culvert at Erbsville Road, once it has been updated and enhanced.

### 5.6.2 Little Brown Myotis & Northern Myotis

As discussed in Section 4.3.3, there are candidate bat roosting trees present within the subject property and development area that may be utilized by two bat SAR: Little Brown Myotis and Northern Myotis. Eight candidate roost trees were identified (Map 5). Deciduous and mixed treed communities within the study area also have the potential to contain maternity roosting habitat. Bat SAR are likely to be foraging along woodland edges and over wetlands within the study area. There is no suitable SAR bat habitat within the buildings/structures on the subject property, which are proposed to be removed.

### 5.6.3 Black Ash

Black Ash has been confirmed within wetland communities on the Erbsville Kartway lands which overlap the subject property. MECP has temporarily suspended protection for Black Ash until January 26, 2024; until then, proponents do not need to seek authorizations for activities that impact Black Ash or its habitat. The recovery strategy for Black Ash notes that the entire ELC community where an individual is present should be protected, along with all of the area within a 28m radius from the tree(s) (Catling et al. 2022). Recent proposals by the MECP, posted on the Environmental Registry of Ontario (ERO; #019-7378), include protection of only those that are at least 8cm DBH in size and have appeared to have survived exposure to EAB in regions where significant EAB-related mortality has occurred. MECP has also proposed to protect the area within 30m of each tree that meets those criteria. Final details on protection for this species have

not been released. The individuals observed were all >30m from the subject property, however, the entire mixed swamp community overlaps the subject property in which individuals were found has been included as candidate habitat, as a conservative approach while the regulations are finalized (Map 5).

## 5.7 Summary of Constraints

A number of significant habitats have been identified within the wetlands, watercourses, and riparian areas in the study area, including that of SAR and SWH. These habitats require specific conditions in order for the species that utilize them to carry out their life processes. In particular, many of the herpetofauna documented to be breeding within the adjacent wetlands have a medium-high sensitivity to hydrologic change (TRCA 2017). Fish species within Laurel and Wideman Creek rank low-medium, and a majority of the flora documented within the wetland have a medium sensitivity to hydrologic change (TRCA 2017). Two obligate wetland flora species, Rough-leaved Goldenrod (*Solidago patula*) and Eastern Rough Sedge (*Carex scabrata*), were documented by Stantec during vegetation plot monitoring and have a high sensitivity to hydrologic change (TRCA 2017). As such, the maintenance of water balance on an annual as well as a monthly basis, particularly during the growing season, is required to allow for these habitats to continue to provide these functions and be suitable for the documented species.

Other isolated features, such as trees that have been identified as candidate bat habitat, also require consideration for the proposed development.

# 6.0 Impact Analysis and Recommendations

## 6.1 Description of the Proposed Undertaking

The development of the subject property has been guided by a number of environmental, planning and engineering studies over the past years. The ESES was prepared by Dougan and Associates, IBI Group, JTB Environmental Systems Inc., LVM, and C. Portt and Associates. This study was approved by the City of Waterloo Council in June 2018 and builds on existing environmental data from the Laurel Creek Watershed Study and the Subwatershed Management Plan (#309 and #313). It identifies natural features and functions for the 720 Erbsville Road study area and surrounding area and recommends development setbacks and mitigation measures for development within the study area. The Erbsville South Block Plan Study (City of Waterloo 2020a), prepared by WSP for the City of Waterloo, provides a general pattern for development within the study area, and conceptual road networks and locations for stormwater management facilities. The Block Plan Study identifies key planning considerations for future development within the study area and summarizes the findings of related studies including the ESES (Dougan and Associates et al. 2018). The proposed development concept for 720 Erbsville Road was designed using the recommendations and framework provided in these studies, with the intent to avoid direct impacts to natural features and their functions.

Details on the lots, internal road layout, stormwater management, grading and servicing have been prepared for the proposed development at 720 Erbsville Road. Details on stormwater management, grading and servicing have been provided in a Functional Servicing Report prepared by JPE Engineering (2023). A Stormwater Management Report has been prepared by Water's Edge (2023) that includes details on stormwater quantity and quality control, a water balance assessment, and proposed monitoring.

The proposed residential development at 720 Erbsville Road will include a mixture of townhouse and stacked townhouse blocks, for a total of 169 units (Map 6). Both at-grade driveway parking areas and surface parking lots will be provided. Two entrances to the residential development will be provided from Erbsville Road. It is anticipated that Erbsville Road will be widened by approximately 2m to provide a 4-lane urban cross section at a future date (not as part of this development). An internal road and sidewalk network will provide access to the development for drivers and pedestrians alike and a

future internal connection road will be constructed to provide access to a future development to the south of 720 Erbsville Road, at 672 Erbsville Road. Considerable amenity space will also be provided within the development. Two park/amenity space blocks have been provided, at the north and south end of the site. At this time, a conceptual trail has not been identified within the development plan, however, it is anticipated that a trail will be provided and determined through detailed design, which will likely coincide with the limit of development or may slightly encroach proposed buffers, where acceptable, in accordance with the Erbsville South Block Plan (City of Waterloo 2020a).

A stormwater management system will be developed on-site, whereby runoff will be collected from buildings, impervious surfaces, and landscaped areas through sheet flow and catch basins (JPE Engineering 2023). All stormwater onsite will be directed to one of the two SWMFs (Pond A or Pond B), with the exception of the rear portion of the development area along the eastern side, which includes the most eastern residential blocks' rear yards and portion of the roofs; this is a low area that will not allow for stormwater to be directed to the SWMFs so infiltration swales have been designed to capture sheet flow from this eastern portion of the site (JPE Engineering 2023). Stormwater flows across the site from events greater than minor storm events (5-year storm) will be conveyed overland as sheet flow from surface routes such as driveways and swales (JPE Engineering 2023). The two SWMFs are shown on Map 6 and have been situated in locations that allow for the existing central drainage divide to be maintained, allowing for the existing drainage patterns and outlet locations to be mimicked (JPE Engineering 2023). Additionally, SWMF Pond B has been proposed in a location that will allow for integration with future development at 672 Erbsville Road (JPE Engineering 2023). Discharge from the SWMFs will occur through stone spreader swales that will spill to the existing ground elevation and infiltrate to the ground or sheet drain to Laurel Creek (JPE Engineering 2023).

## 6.2 Approach to Impact Analysis

The boundaries of significant natural features and their associated recommended buffers were provided to the study team to guide the development proposal. This information was combined with other physical and planning constraints to come up with a suitable development plan for the property which respects the natural environment. The details of the undertaking prepared by MHBC (2024) are shown on Map 6. Further details of

the proposed development, including stormwater management, grading, and servicing were prepared by JPE Engineering and Water's Edge under separate covers.

Potential impacts arising from the proposed development were determined by comparing details of the proposed undertaking with the characteristics of the existing natural features and their functions. The following is a description of the types of impacts which will be discussed.

- Direct impacts to the natural features on the subject lands associated with disruption or displacement caused by the actual proposed 'footprint' of the undertaking.
- Indirect impacts associated with changes in site conditions such as drainage and water quantity/quality.
- Induced impacts associated with impacts after the development is constructed such as subsequent demand on the resources created by increased habitation/use of the area and vicinity.

### 6.2.1 Proposed Buffers

Buffers are a mitigation measure that are utilized for the protection of natural heritage features such as woodlands, wetlands, significant wildlife habitats, and watercourses during and following development. Table 14 provides a summary of buffers and constraints identified for the proposed development at 720 Erbsville Road. In general, buffers for the subject property maintain a distance of 30m between the limit of development and natural features including the Laurel Creek-Sunfish Lake PSW complex and the Laurel Creek watercourse. The distance between natural features and the limit of development is generally 10m in width in areas where only the woodland dripline associated with ESPA #80 is present adjacent to the development. Some minor buffer encroachments, totaling 0.11ha in area, are required to facilitate stormwater management facilities and associated spreader swales as well as infiltration swales. The limit of development, which includes the PSW, watercourse and ESPA/woodland buffers is shown on Map 6.

**Table 14. Summary of Natural Heritage Constraints and Buffers**

| Natural Feature Constraint | Regulatory and Permitting Considerations | Project Considerations |
|---|---|---|
| Sunfish Lake-Laurel Creek PSW Complex (Core Environment Feature) | • GRCA Ont. Reg. 150/06<br>• Region of Waterloo OP (RMOW 2015)<br>• City of Waterloo OP (2020b) | • Development and site alteration within the regulated wetlands are prohibited<br>• It must be demonstrated through an appropriate study (e.g. EIS) that a proposed development within 120m of a confirmed wetland boundary of a PSW (within the area of interference) will not negatively impact the wetland or its ecological functions.<br>• A minimum 10m buffer has been recommended for Core Environmental Features.<br>• A buffer of approximately 30m from the delineated PSW boundary has been identified for all areas within the subject property and has been incorporated into the limit of development. However, one location of wetland buffer encroachment is proposed associated with the spreader swale for SWMF 'B' and the adjacent infiltration swale (Map 7). This encroachment totals 0.06ha in area and results in construction and grading within 19-25m of the surveyed wetland boundary. |
| Laurel Creek Forest ESPA and Significant Woodland (Core Environment Feature) | • Provincial Policy Statement (OMMAH 2020)<br>• Region of Waterloo OP (RMOW 2015)<br>• City of Waterloo OP (2020b) | • Development and site alteration are not permitted within ESPAs or Significant Woodlands.<br>• Development within 30m of an ESPA or Significant Woodland must demonstrate no negative impact to the feature through an EIS.<br>• A minimum 10m buffer has been recommended for Core Environmental Features.<br>• The woodland dripline and ESPA boundary have been delineated in the field and a 10m buffer has been identified from this boundary and incorporated into the limit of development. However, two locations of woodland buffer encroachment are proposed associated with the spreader swales for both SWMFs (Map 7). Encroachment associated with SWMF Pond 'A' is 0.01ha in area and results in construction and grading within 5-6m of the surveyed woodland boundary. Encroachment associated with SWMF Pond 'B' is 0.002ha in area and results in construction and grading within 7m of the surveyed woodland boundary. |
| Laurel Creek and Wideman Creek (Supporting "A" Natural Features and Fish Habitat) | • Provincial Policy Statement (OMMAH 2020)<br>• Federal Fisheries Act (1985)<br>• GRCA Ont. Reg. 150/06<br>• Region of Waterloo OP (RMOW 2015) | • Development and site alteration are not permitted within fish habitat, except in accordance with federal and provincial requirements to the satisfaction of the Department of Fisheries and Oceans.<br>• Development and site alteration are not permitted in Supporting "A" Natural Features.<br>• Development in the adjacent lands must demonstrate no negative impacts to the ecological function. |

| Natural Feature Constraint | Regulatory and Permitting Considerations | Project Considerations |
|---|---|---|
| | • City of Waterloo OP (2020b) | • Supporting Natural Features will be maintained, enhanced, and wherever possible, restored.<br>• A 30m buffer is recommended on either side of permanent and perennial watercourses.<br>• A 30m buffer has been provided for Laurel Creek and Wideman Creek and is incorporated into the limit of development. The buffer for Wideman Creek has not been mapped as it does not overlap the subject property.<br>• Two locations of Laurel Creek buffer encroachment are proposed associated with the spreader swales for the SWMFs (Map 7). Encroachment associated with SWMF Pond 'A' is 0.02ha in area and results in construction and grading within 5-21-27m of the approximate Laurel Creek location. Encroachment associated with SWMF Pond 'B' is 0.008ha in area and results in construction and grading within 24-28m of the approximate Laurel Creek location. |
| Significant Wildlife Habitat (Supporting "A" Natural Features) | • Provincial Policy Statement (OMMAH 2020)<br>• Region of Waterloo OP (RMOW 2015)<br>• City of Waterloo OP (2020b) | • Development and site alteration are not permitted in Supporting "A" Natural Features.<br>• Supporting Natural Features will be maintained enhanced and, wherever possible, restored.<br>• Development in the adjacent lands must demonstrate no negative impacts to the ecological function.<br>• Five SWH are considered confirmed, with an additional 5 considered candidate or possible SWH for the study area. Four SWH have been confirmed within habitats that overlap the subject property, outside of the development area.<br>• All identified SWH, are entirely contained within the Sunfish Lake-Laurel Creek PSW complex or the Laurel Screek ESPA and protection will be provided by their respective buffers. |
| Corridors and Linkages | • Provincial Policy Statement (OMMAH 2020)<br>• Region of Waterloo OP (RMOW 2015)<br>• City of Waterloo OP (2020b) | • Linkages and corridors will be identified through appropriate studies accepted by the City. Once identified, they are to be maintained, enhanced or wherever possible, restored.<br>• Three corridors have been identified within the study area: one along Laurel Creek, one along a hedgerow in the southeast of the subject property and one along Wideman Creek.<br>• The corridor along Laurel Creek and Wideman Creek will be maintained and provided a 30m watercourse buffer as described above, providing linkage functions. |

| Natural Feature Constraint | Regulatory and Permitting Considerations | Project Considerations |
|---|---|---|
| | | • Future enhancements are proposed for the Wideman Creek corridor in the ESES and Erbsville South Block Plan.<br>• Both the Laurel Creek corridor and Wideman Creek corridor provide opportunities for direct wildlife connections with the use of culverts, which may be considered in the future. |
| Habitat of Endangered and Threatened Species | • Provincial Policy Statement (OMMAH 2020)<br>• Endangered Species Act, 2007<br>• Region of Waterloo OP (RMOW 2015)<br>• City of Waterloo OP (2020b) | • Development and site alteration are not permitted within significant habitats of endangered and threatened species, except in accordance with provincial and federal requirements<br>• The habitats of endangered and threatened species are identified as Core Environmental Features<br>• Category 2 habitat for Blanding's Turtle is present within the subject property. This habitat is entirely contained within the PSW complex and Laurel Creek, and their buffers.<br>• Category 3 habitat for Blanding's Turtle has been within the areas of 30m-250m of Category 2 habitats, within the study area.<br>• Candidate SAR bat roosting trees have been identified within the subject property, including within the development footprint.<br>• Black Ash is present within wetland communities that overlap the subject property. No individuals were observed within the subject property or within 30m of proposed development. |

## 6.3 Direct Impacts and Mitigation Measures

The approach to identifying and delineating the natural features and associated buffers was aimed at avoiding direct impacts from development on important natural features. Therefore, direct impacts to these natural features have been avoided to the extent possible. Direct impacts and recommended mitigation measures are discussed in the context of:

- Site grading
- Tree and vegetation removal
- Impacts to Wildlife
- Corridors and linkages

### 6.3.1 Site Grading

A preliminary grading plan has been prepared by JPE Engineering and is described in the FSR (2023). Grading will be completed outside of all significant natural features and their identified buffers, with the exception of minor encroachment (0.11ha total) within buffers to allow for the construction of the SWMFs and infiltration swales, as discussed in Table 14. These encroachments are not anticipated to result in negative impacts to adjacent natural features because the stormwater management components will include low-impact designs and the existing land use in these areas are currently disturbed. An area of 0.03ha has been identified as additional buffer space/buffer gain, which will not be disturbed to offset some of the area lost due to encroachment (Map 7).

These minor encroachments into buffers are not anticipated to cause negative impacts to the adjacent natural features, provided that the following mitigation measures are followed:

*Mitigation:*

- *The limit of development and grading should be protected with heavy duty erosion and sediment control (ESC) fencing in areas adjacent to natural features or isolated trees identified for retention.*
- *Graded areas should be re-vegetated as soon as possible to minimize erosion, and the selected seed mix should contain species that are native and complementary to adjacent natural vegetation communities.*

- *Infiltration swales should be naturalized with appropriate native species.*
- *An ecological restoration plan, to the satisfaction of the reviewing agencies, is recommended to be developed during detailed design that outlines enhancement measures within buffer areas and areas with low impact design stormwater management infrastructure.*

### 6.3.2 Tree and Vegetation Removal

Based on the proposed development concept, direct impacts to natural features will include limited tree loss along the southeastern property boundary as well as in the vicinity of the proposed SWMFs. The majority of the proposed development footprint is currently occupied by agricultural lands, and as a result, vegetation removal within natural vegetation communities will be limited to the CUT1 community and southeastern hedgerow. Tree and vegetation removal will also be required within the anthropogenic community surrounding the residential dwelling.

Trees that will likely require removal include those situated within the grading limit or in close proximity that may incur root damage as a result of grading. There is not expected to be any tree removal required within the boundaries of significant natural features.

*Mitigation:*

- *A detailed tree inventory and Tree Saving and Protection Plan should be completed at the detailed design stage. Trees shall be replaced at a 2:1 ratio to compensate for the canopy loss. Compensation plantings are recommended within natural feature buffers.*
- *A vegetation management plan must be approved prior to vegetation removal occurring onsite.*
- *It is recommended that tree protection fencing (and associated ESC fencing) be installed at the limit of grading where vegetation communities abut the proposed grading area.*
- *Upon installation of the tree protection fencing, the area should be reviewed by a Certified Arborist to ensure that trees are properly protected and no limb or root damage has occurred.*
- *Vegetation should only be cleared where absolutely necessary.*

- *Areas to be cleared should be clearly marked using flagging tape, fencing, spray paint or other signage prior to the initiation of clearing activities.*
- *Trees will be felled into the area to be cleared to avoid damage to adjacent vegetation.*

### 6.3.3 Impacts to Wildlife

**Birds**

The proposed development may temporarily displace wildlife species, including birds, that are currently using the subject property while the site is under construction. Species that use the subject property are common and well-adapted to relatively urban conditions and landscapes, and are expected to return to the adjacent natural areas. Additional habitat will also be provided in protected buffer areas post-development, provided that native tree and herbaceous plantings are installed within these areas.

Vegetation clearing has the potential to directly impact bird breeding activity through damage and destruction of nests, eggs, and young, or avoidance of the area by breeding adults.

According to the Canadian Wildlife Service (CWS), the peak breeding period for migratory birds that nest in treed habitat in southern Ontario is between April 1 and August 31 (ECCC 2023). During this period, the CWS recommends that no clearing of vegetation within simple and/or complex habitats occur. The *Migratory Birds Convention Act* (MBCA, Government of Canada 1994) protects migratory birds, their eggs and nests from being harmed or destroyed at any time of the year. However, nest searches, as a means of mitigation during the core breeding period, may be undertaken in "simple" habitats such as hedgerows, isolated trees, or constructed features (e.g., bridges, barns, etc.) where the potential to observe all active nests is relatively high.

*Mitigation:*

- *During the time period from April 1 to August 31 it is recommended that no clearing of vegetation occur within the 720 Erbsville Road property.*
- *Should vegetation removal be required during the breeding and nesting season for migratory birds, surveys for nesting birds in "simple habitats" may*

*be undertaken by a qualified biologist to permit vegetation removal should breeding bird absence be confirmed.*

- *A clearance letter is to be prepared by the qualified biologist that undertook the nest searches and submitted to the Developer for their files in the event a record of due diligence is requested by CWS. Areas identified as having no bird nesting activity can be cleared; however, clearing must occur within 48 hours of nest searching.*
- *It is unlikely that bird species that include as raptors, hawks or owls are nesting within the proposed development area. However, timing of vegetation and removals should consider the timing windows for bird species protected under the Fish and Wildlife Conservation Act that are not afforded protection under the MBCA (November to March).*
- *ESC fencing is to be erected along the limit of development prior to any on-site works to ensure that construction activities and equipment are maintained outside of the protected areas and their buffers.*

**Species at Risk**

Blanding's Turtle

Category 2 habitat for Blanding's Turtle is present within the subject property and is considered to be moderately tolerant of alteration (OMNRF 2013d). The proposed development includes a total of 0.08ha of encroachment within Category 2 habitat. These areas are currently comprised of agricultural field, cultural thicket, and anthropogenic areas (residential) and are generally unsuitable for the life processes of Blanding's Turtle. Buffer areas outside of the limit of development and adjacent to natural features will be planted and enhanced to provide suitable habitat for species like Blanding's Turtle. Efforts have been made to avoid Category 2 habitats to the extent possible. The small overlap between the proposed development footprint and Category 2 Blanding's Turtle habitat is not anticipated to impact the species or its habitat. Additional mitigation measures that may be required by the MECP will be addressed at the detailed design stage. Dependent on comments received from the MECP, it may be necessary to pursue an authorization under the Endangered Species Act.

*Mitigation:*

- *Native plantings and enhancements to buffer areas are recommended as a measure to ensure the functionality of buffers and to increase the availability of suitable habitat for wildlife species. An ecological restoration plan is recommended to be prepared for the buffer areas associated with the proposed development area at the detailed design stage. These buffer enhancements will improve the quality of habitat for Blanding's Turtle since much of the Category 2 habitat area is currently agricultural field planted with row crops.*
- *The proposed work area shall be surrounded with geotextile cloth fencing (exclusion fencing/sediment control measures) in order to exclude turtles from the work area and to prevent nesting in areas which may be disturbed by digging and other works. Fencing should be installed before April 1 to ensure that turtles aren't accessing the development area to nest before the fence goes up. Fencing is to be regularly inspected and maintained throughout the construction period. Any gaps in the fencing should be immediately repaired and replaced. Fencing will follow guidelines outlined in the documents, Reptile and Amphibian Exclusion Fencing (MNRF 2013a) and Best Management Practices for Mitigating the Effects of Roads on Amphibian and Reptile Species at Risk in Ontario (MNRF 2016b).*
- *Prior to construction work starting, examination of the work area by a qualified biologist and the relocation of any wildlife is recommended. A targeted wildlife search should be completed within the fenced-in development area prior to construction starting to ensure no wildlife has been trapped within the development area.*
- *Exclusion/sediment control measures should remain in place throughout the life of the project and regularly inspected to ensure good working condition. Regular attention should be paid to exclusion fencing located adjacent to the wetland/watercourse.*
- *Site grading will occur outside of sensitive turtle habitats to the greatest extent possible to avoid contraventions of the ESA.*

- *All on-site workers will receive SAR response training and shall be advised to stop work immediately and inform the Contract Administrator if any turtles or any other potential SAR are encountered during any phase of the work.*
- *Permanent fencing around the back of the lots/along buffer limits should be installed with permanent exclusion measures, to prevent Blanding's Turtle from accessing yards or crossing roads within the development.*
- *Permanent fencing should be erected around SWMFs to prevent turtles from entering the ponds. SWM ponds are typically fenced for public safety, however, a specific wildlife fence can be affixed as well. This can be explored through detailed design.*

A total of 3.06ha of Category 3 habitat for Blanding's Turtle overlaps with the proposed development in the southern portion of the property. The Category 3 habitat identified within the proposed development area consists of agricultural row crop, hedgerow, cultural thicket, and anthropogenic areas. No Blanding's Turtles were observed using the development area for any part of their life cycle despite extensive field surveys. Category 3 habitat within the development area currently connects Category 2 habitat that occurs on the western side of Erbsville Road, where there is the risk of road mortality for turtles attempting to cross to the other side. The future enhancement of the Wideman Creek corridor and replacement of the culvert under Erbsville Road, as described in the ESES (Dougan and Associates et al. 2018) and Erbsville South Block Plan (City of Waterloo 2020a), are expected to provide a safer and more appropriate corridor for Blanding's Turtle as well as other turtle species attempting to travel from the Laurel Creek-Sunfish Lake PSW complex to the west side of Erbsville Road. Direct impacts to Category 3 habitat for Blanding's Turtle within the development area are anticipated to be minimal and are not expected to adversely affect the ability of the species to carry out its life processes as long as appropriate mitigation measures are undertaken. An IGF will be submitted to the MECP with updated development details, identifying the proposed future movement corridors and appropriate mitigation measures. Dependent on comments received from the MECP, it may be necessary to pursue an authorization under the Endangered Species Act for the modification of this habitat.

Since Category 3 habitat for Blanding's Turtle has been identified within the proposed development area, direct impacts to the species including mortality as a result of

interactions with construction equipment are possible during the construction phase if proper mitigation measures are not taken.

*Mitigation:*

- *In order to mitigate the loss of marginal Category 3 habitat within the proposed development area, an ecological enhancement plan is recommended to be prepared at the detailed design stage. It should include details on the enhancement of buffer areas to increase the functionality of overland movement habitat for the species.*
- *The presence of the Wideman Creek corridor will ensure that a linkage is available between the Laurel Creek-Sunfish Lake PSW complex and Blanding's Turtle habitat on the west side of Erbsville Road.*
- *Wildlife exclusion fencing discussed in relation to Category 2 habitat will also ensure that there are no direct impacts to Blanding's Turtle while they are migrating or moving between habitats.*
- *During the detailed design of the future road widening, turtle barrier fencing and eco-culverts are recommended to ensure turtle movement is maintained throughout the study area. Timing windows will need to be considered to minimize impacts to turtles during the active season, while also considering implications to other sensitive species (i.e., fish).*
- *In order to prevent migrating turtles from entering the developed areas, permanent wildlife fencing is recommended. Specifications should be provided at the detailed design stage.*

<u>Bat Species at Risk</u>

Three candidate SAR bat roosting trees were identified within the development footprint and will likely require removal. Two of these trees (A and B) are located within the hedgerow along the southeastern property boundary. Tree C is located within the cultural thicket. Additional trees in close proximity to the limit of grading may also require removal, subject to further study (i.e., comprehensive tree inventory) during detailed design. Other candidate SAR bat habitat has been identified in treed vegetation communities that are located outside of the proposed development footprint; these habitats will not be impacted by the proposed development. More recently, MECP has been providing guidance related to tree removals such that if the proposed activity will

not impair or eliminate the function of the habitat (e.g., by only removing a proportionally small number of potential maternity or day roost trees in treed habitats which would not result in fragmentation or barriers), tree removals outside of the bat active season would not result in the contravention of the *ESA* and additional monitoring is not required (MECP 2022a).

If tree removal is required for the demolition of the existing house, the same mitigation measures apply.

The proposed tree removals represent a proportionally small number of candidate habitat trees and the surrounding habitats will not be impacted, therefore the removal of trees associated with the proposed development is not considered to contravene the *ESA* as it relates to bat SAR.

*Mitigation:*

- *To prevent harm to SAR bats, and avoid contravention of the ESA, all proposed tree removal and vegetation clearing must be completed outside of the bat active season, which occurs from April 1 to September 30.*
- *Tree protection fencing and ESC fencing should be utilized to demarcate the limits of development/grading and prevent unintended encroachment into retained habitats.*
- *Ecological restoration that includes tree plantings, as determined through detailed design, should provide additional roosting and foraging habitat in the long-term for bat SAR.*

Significant Wildlife Habitat

Significant Wildlife Habitats associated with the subject property are confined to natural features including ESPA #80 and the Laurel Creek-Sunfish Lake PSW complex. Direct impacts to these habitats are not expected to occur as a result of the proposed development and both natural features are provided buffers that will also protect any associated SWH from direct impacts.

### 6.3.4 Corridors and Linkages

The hedgerow in the southeast of the development footprint (Southeastern Hedgerow Corridor) has been identified as an ecological linkage in the ESES (Dougan and

Associates et al. 2018). This ecological linkage is approximately 115m long and a single tree wide for most of its length. The hedgerow is proposed for removal in support of the development. As discussed in Section 5.4.4, the function of the hedgerow as a corridor is poor due to its narrow width and the barrier currently presented by Erbsville Road. The linkage function provided by the hedgerow has been degraded following the construction of the Regal Place Subdivision, to the west of Erbsville Road. The linkage is also redundant since the Wideman Creek corridor is located just 80m south of the hedgerow, and this corridor is much better suited to a linkage function and enhancement efforts. The presence of two wildlife corridors in close proximity to one another means that White-tailed Deer and other wildlife may attempt to cross Erbsville Road at multiple points, increasing the potential for collisions between wildlife and vehicles. The Wideman Creek corridor will provide a crossing location for which signage can be installed to inform motorists that it is a wildlife crossing location. Additionally, an alternative wildlife corridor is provided along Laurel Creek to the north of the proposed development footprint and will be retained in its existing condition. This corridor provides a second linkage should the Wideman Creek corridor be rendered ineffective at any point in the future.

*Mitigation:*

- *Enhancement of buffer areas within the subject property will help direct wildlife toward the Wideman Creek corridor and/or the Laurel Creek corridor. Native trees, shrubs, and seed mixes are recommended.*
- *Grubbing of vegetation in the hedgerow should be completed in keeping with the mitigation measures recommended for tree and vegetation removal as well as those relating to bird nest destruction and bat roosting.*

## 6.4 Indirect Impacts and Mitigations

Indirect impacts are effects that are not a direct result of the development footprint, but can instead occur in areas adjacent to the development site. For the development at 720 Erbsville Road, these can include:

- Changes to groundwater and surface water flow patterns and volumes,
- Changes to water quality,
- Sedimentation and erosion, and

- Indirect impacts to wildlife and sensitive species.

### 6.4.1 Surface Flow and Groundwater Water Balance

A preliminary stormwater management strategy has been provided in the FSR (JPE Engineering 2023) and SWM report (Water's Edge 2023), and demonstrates how the requirements of the GRCA and City of Waterloo are met. The stormwater management strategy is based on maintaining existing drainage patterns including pre-development peak flow rates and patterns. Multiple stormwater catchment areas have been identified for the post-development scenario, with the ultimate outlet being Laurel Creek and the surrounding wetland. This includes both sheet flow across the back of residential lots and from the SWMFs.

Peak discharges from the SWMFs have been calculated by Water's Edge (2023) to be below allowable levels for all the storm events. This has been achieved with the discharge of stormwater through level stone spreader swales, which will also allow for diffuse runoff over a larger area, ultimately reaching the wetland and Laurel Creek. An emergency overflow weir has been provided for any storm events in exceedance of the 100-year storm (Water's Edge 2023).

The proposed SWMFs have been designed to be large enough to detain runoff from the 100-year storm, however, a detention time of over 48 hours as is required in the South Erbsville Block Plan (City of Waterloo 2020a), cannot be achieved (Water's Edge 2023). Despite this, it is not anticipated to result in erosion because of the use of the spreader swales (Water's Edge 2023).

Water's Edge (2023) has calculated a water balance for the subject property on an annual and monthly basis, focusing on inputs to Laurel Creek and the surrounding wetlands. On an annual basis, both runoff and recharge are anticipated to differ from pre-development levels (Water's Edge 2023). The infiltration swales along the back of the property and an infiltration gallery have been proposed to further mitigate the effects. With those mitigations considered, runoff is expected to increase by 5,623$m^3$ (+121%) and recharge is expected to decrease by 41$m^3$ (-1%) on an annual basis (Water's Edge 2023).

**Changes to Runoff**

A comparison of pre- vs. post-development (with mitigation) runoff on a monthly basis is provided in Table 15 and Figure 1. During a majority of the growing season (April-October) it is anticipated that runoff will increase substantially, however, when considered in the context of an average of 10 rain events per month, the volume change ranges between 248$m^3$ (April) and 34$m^3$ (June) per rain event. In May, a decrease in 18$m^3$, or 2$m^3$ per rain event, is anticipated.

Runoff is expected to reach the wetland and Laurel Creek via multiple pathways, with the following proportion of inputs from each (Water's Edge 2023):

- SWMF 'A' outlet/spreader swale: 4,972.2$m^3$ (48.5%)
- SWMF 'B' outlet/spreader swale: 4,763.9$m^3$ (46.5%)
- Catchment 2: 60.1$m^3$ (0.5%)
- Rear Lots 4, 9, 13: 458.1$m^3$ (4.5%)

Having multiple locations where runoff will be directed to the wetlands and Laurel Creek will reduce potential impacts associated with increased runoff as this will provide different lag times during and after rain events, reducing the potential for inundation of the wetland and watercourse. The use of spreader swales also enhances infiltration, evapotranspiration, and evaporation of runoff prior to reaching these receivers.

With the highest increase in runoff volume occurring during the growing season, the potential for inundation of the wetland community and of increases in water level in Laurel Creek have been considered. Substantial increases in runoff volumes to the wetland community may result in plant species that are more sensitive to hydrologic change not being able to withstand increases in water levels or duration of flooding. This, in turn, could impact wildlife species that rely on specific habitat conditions for their life processes. Much of the runoff is expected to ultimately be received by Laurel Creek, which is part of a larger hydrologic system within a large catchment area. Provided that the increase in runoff does not result in a substantial increase in water levels in Laurel Creek, negative impacts to Laurel Creek are not anticipated (Water's Edge 2023). As indicated in the water balance analysis in Appendix D of the SWM report by Water's Edge (2023), the average flow volume for Laurel Creek from these inputs ranges between 0.18-0.24% of the total flow, which is a negligible amount for the system.

**Table 15. Pre- and Post-Development Runoff to Wetland/Laurel Creek**

| Month | Pre-development ($m^3$) | Post-development with mitigation ($m^3$) | Change ($m^3$) | Change (%) | Change per rain event ($m^3$)* |
|---|---|---|---|---|---|
| January | 119 | 66 | -53 | -44 | -5 |
| February | 60 | 33 | -27 | -45 | -3 |
| March | 29 | 16 | -13 | -46 | -1 |
| April | 589 | 3070 | 2482 | 422 | 248 |
| May | 1586 | 1568 | -18 | -1 | -2 |
| June | 793 | 1130 | 337 | 42 | 34 |
| July | 397 | 1047 | 650 | 164 | 65 |
| August | 168 | 814 | 616 | 310 | 62 |
| September | 99 | 792 | 693 | 699 | 69 |
| October | 51 | 593 | 543 | 1074 | 54 |
| November | 474 | 993 | 519 | 110 | 52 |
| December | 237 | 131 | -106 | -45 | -11 |
| **TOTAL** | **4631** | **10253** | **5622** | **121** | **-** |

Green cells denote months within the growing season
*Assuming an average of 10 rain events per month

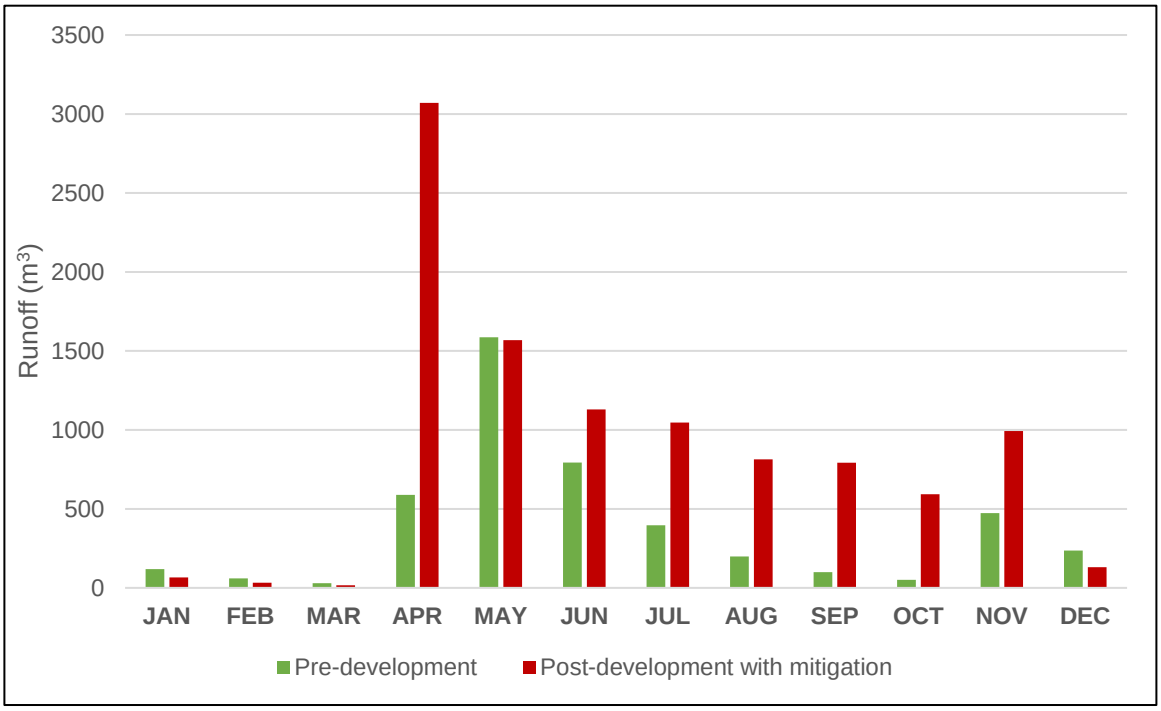



**Figure 1. Pre- and Post-Development Runoff to Wetland/Laurel Creek**

The water balance analysis completed by Water's Edge (2023) does not factor in the potential additional benefit of planting and enhancing the buffer areas adjacent to the wetlands. It is recommended that these areas be planted to improve the function of the buffers in protecting the features. Planting of woody shrubs and trees within the buffer areas will increase water update in comparison to mown grass and row crops because of the deeper root systems which increases the interaction with soil water. With the

planting of buffer areas, it is expected that surface runoff will be reduced through increased infiltration and evapotranspiration as a result of increased pore space. An increase in soil depth through the application of topsoil can increase the water holding capacity. If 10cm of soil is applied to the plant-able buffer areas as shown on Map 7 (0.64ha), approximately 160m$^3$ of additional water could be retained by the soil in this area, assuming a ¼ amount of soil volume is available pore space. This is more than the anticipated volume during the average rain event for all months except April (Table 15). The capacity of soils between the SWMFs and the wetland boundaries will also be greater during the growing season when some of the higher runoff volumes are anticipated.

Water's Edge (2023) concluded that the additional runoff will not negatively impact Laurel Creek or adjacent riparian areas given that the additional volumes account for less than 1% of the monthly volumes.

If the following mitigation measures are integrated with the detailed design, negative impacts are not anticipated.

*Mitigation:*

- *An updated water balance analysis should be completed during detailed design to ensure there are no negative impacts to hydrological receivers. It should also review the potential changes in water levels in Laurel Creek.*
- *Additional mitigation measures should be explored during detailed design to further reduce increases in runoff during the growing season and provide an annual balance that matches closer to pre-development conditions. It is recommended that the buffer areas be planted and topsoil added to increase the water retention capability in the soil and root zones. The updated water balance analysis should incorporate the influence of such measures.*
- *During- and post-construction monitoring should also document any changes in abundance and/or health condition of higher sensitivity plant species, such as Rough-leaved Goldenrod and Eastern Rough Sedge.*

**Changes to Recharge**

A comparison of pre- vs. post-development (with mitigation) recharge on a monthly basis is provided in Table 16 and Figure 2. During the majority of the growing season (April-

October) it is anticipated that recharge will increase substantially, with the exception of May and June, which are anticipated to have a reduction in 1053m$^3$ and 342 m$^3$, respectively. When considered in the context of an average of 10 rain events per month, the volume change ranges between 9m$^3$ (July) and 94m$^3$ (April) per rain event for volume increases and -34m$^3$ (June) and -105m$^3$ (May) per rain event for volume decreases.

**Table 16. Pre- and Post-Development Recharge to Wetland/Laurel Creek**

| Month | Pre-development ($m_3$) | Post-development with mitigation ($m^3$) | Change ($m^3$) | Change (%) | Change per rain event ($m^3$)* |
|---|---|---|---|---|---|
| January | 178 | 72 | -107 | -60 | -11 |
| February | 90 | 36 | -54 | -60 | -5 |
| March | 44 | 18 | -26 | -60 | -3 |
| April | 883 | 1822 | 939 | 106 | 94 |
| May | 2379 | 1326 | -1053 | -44 | -105 |
| June | 1190 | 848 | -342 | -29 | -34 |
| July | 595 | 682 | 87 | 15 | 9 |
| August | 297 | 496 | 199 | 67 | 20 |
| September | 149 | 454 | 305 | 205 | 31 |
| October | 76 | 333 | 257 | 339 | 26 |
| November | 711 | 677 | -34 | -5 | -3 |
| December | 355 | 143 | -212 | -60 | -21 |
| **TOTAL** | **6947** | **6906** | **-41** | **-1** | **-** |

Green cells denote months within the growing season
*Assuming an average of 10 rain events per month

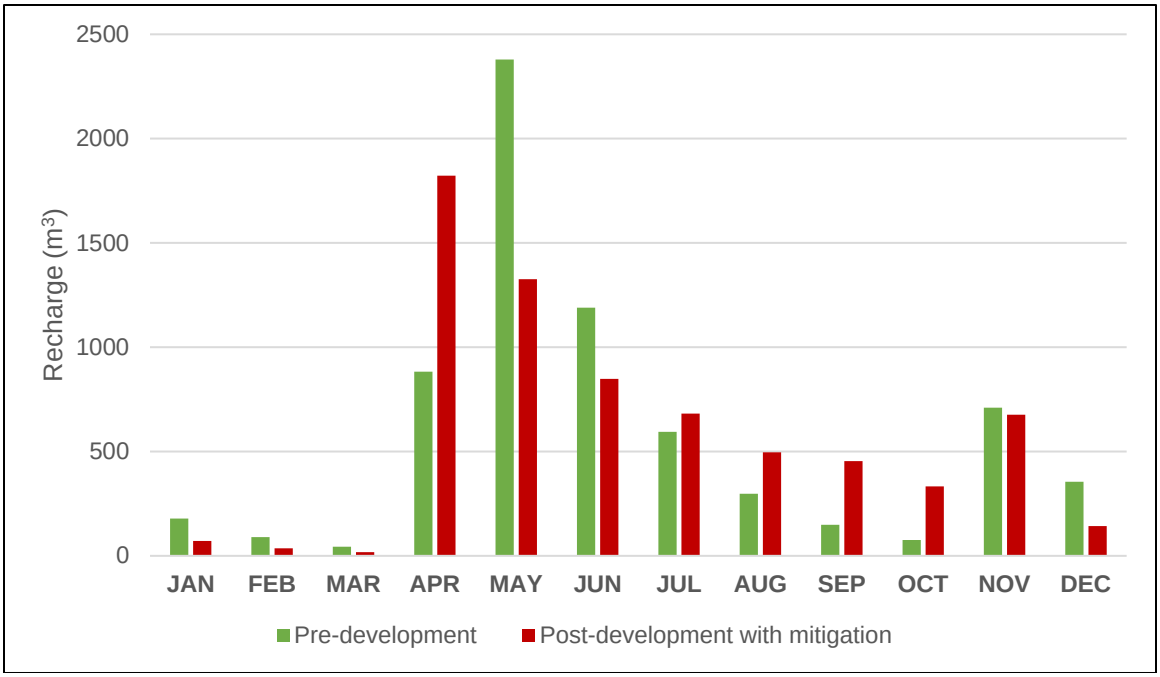



**Figure 2. Pre- and Post-Development Recharge to Wetland/Laurel Creek**

As described in the ESES (Dougan and Associates et al. 2018), a larger portion of the recharge in the study area is expected to become local baseflow for the watercourses. The wetland is considered a discharging wetland that is supported by discharge from the Shallow Overburden Aquifer and runoff (Dougan and Associates et al. 2018). Groundwater is also known to discharge along the banks of Laurel Creek and Wideman Creek (Dougan and Associates et al. 2018). Furthermore, groundwater discharge plays an important role in maintaining thermal regimes for the watercourses (Dougan and Associates et al. 2018).

Although the annual change in recharge is negligible, monthly fluctuations have the potential to impact sensitive receivers. Increases in recharge to the wetland have the potential to cause the groundwater table to rise, which can affect the hydroperiod and cause flooding. Conversely, decreases in recharge have the potential to cause the groundwater table to recede, which can cause drier conditions.

If the following mitigation measures are integrated with the detailed design, negative impacts are not anticipated.

*Mitigation:*

- *An updated water balance analysis should be completed during detailed design to ensure there are no negative impacts to hydrological receivers. It should also confirm the potential changes in water levels in Laurel Creek.*
- *Additional mitigation measures should be explored during detailed design to further match infiltration and recharge rates during the growing season, while still maintaining an annual balance. It is recommended that the buffer areas be planted and topsoil added to increase the water retention capability in the soil and root zones. The updated water balance analysis should incorporate the influence of such measures.*
- *During- and post-construction monitoring should also document any changes in abundance and/or health condition of higher sensitivity plant species, such as Rough-leaved Goldenrod and Eastern Rough Sedge.*
- *Localized groundwater mounding should be considered in the water balance analysis during detailed design.*

### 6.4.2 Changes to Water Quality

The preliminary stormwater management strategy described in the FSR (JPE Engineering 2023) and SWM report (Water's Edge 2023) identifies how water quality will be maintained for the subject property and adjacent wetlands and watercourses. The maintenance of water quality parameters is important from an ecological perspective, especially given the sensitive species that have been documented using Laurel Creek and Wideman Creek in the study area. In particular, coolwater and coldwater fish species rely on specific temperature regimes and ranges for spawning and other life processes.

An Enhanced Protection Level is required for the downstream receiver, and 80% Total Suspended Solids (TSS) removal for 90% of annual flows must be achieved by the stormwater management system. A treatment-train approach will be implemented for the proposed development, as is recommended in the Erbsville South Block Plan (City of Waterloo 2020a). The treatment-train approach will use an oil-grit separator unit as well as additional polishing and extended detention in a dry pond facility to meet the Enhanced Protection Level (Water's Edge 2023). The following water quality parameters have been considered by Water's Edge (2023):

- **Temperature** - maintain or reduce instream surface water temperatures in Laurel Creek to protect the coldwater fish species upstream of the reservoir (threshold of 22°C instream temperature from April 1 to October 31 and between 4°C and 14°C from November 1 to March 31).
- **Dissolved Oxygen (DO)**: maintain an instream minimum DO level of 6.0mg/L or greater upstream of the Laurel Creek reservoir.
- **Phosphorus (TP)**: 90% of the TOP should be removed from the runoff from developments discharging to Laurel Creek, with a target instream PT above the Laurel Creek Reservoir of 0.03mg/L.
- **Total Suspended Solids (TSS)**: maintain concentration during rainfall events of less than 25mg/L for the effluent from SWM facilities to Laurel Creek.
- **Bacteria (E.coli):** Based on Provincial Water Quality Guidelines for bathing beaches, an instream target of 100 CFI/100mL for areas tributary to the Laurel Creek Reservoir has been identified.

A summary of how these parameters are anticipated to change through development is provided in Table 17, based on the analysis and recommendations provided in the SWM report (Water's Edge 2023).

**Table 17. Stormwater Quality Parameters for Watercourse Targets**

| Parameter | Target | Proposed Development Scenario |
|---|---|---|
| Temperature | ≤22°C (April-October), 4-14°C (November-March) | April, August, and September will experience higher temperatures and flows than pre-development conditions, however, when considering the cooling effects of the spreader swales, temperatures are not anticipated to exceed the targets. |
| DO | ≥6.0mg/L | Exact DO ranges unknown in the proposed scenario, however, previous sampling has included ranges that are higher than the target (28%). |
| TP | ≤0.03mg/L | Expected to be reduced as a result of SWMFs. Historical measurements have been above the target, likely as a result of upstream agricultural activities. |
| TSS | No instream target (<25mg/L for SWM facility effluent | Anticipated to be similar to existing conditions/pre-development levels, which are often below the target. Enhanced protection will provide 80% TSS removal for 90% of annual flows. |
| E.Coli | <100 CFU/100mL | The proposed design will minimize the direct transmission of contaminated runoff to Laurel Creek, however, no future monitoring is proposed. |

The SWMF ponds outlet to level stone spreaders prior to discharging to Laurel Creek and the surrounding wetland. The level stone spreaders outlet will assist in maintaining the existing diffuse drainage patterns of the site and will mitigate thermal impacts by cooling water prior to its discharge overland to Laurel Creek (Water's Edge 2023). The level stone spreaders outlet will also mitigate the effects of erosion by slowing discharged water and spreading it over a large area.

Provided that the preliminary storm water management strategy achieves 80% TSS removal for 90% of annual flows as described in the FSR and SWM report, and the following mitigation measures are followed, no impacts to water quality are anticipated as a result of the proposed development.

*Mitigation:*

- *Laurel Creek and Wideman Creek should continue to be monitored for changes in water quality following implementation of the proposed*

*stormwater management strategy. Results should be compared to the pre-development monitoring completed for this site.*

- *Details on during and post-construction monitoring are included in Section 6.6 and are recommended to be implemented. The monitoring program integrates recommendations from the FSR (JPE Engineering 2023) and the SWM report (Water's Edge 2023).*
- *The infiltration swales are recommended to be naturalized with native plantings to provide additional cooling effects.*
- *Snow storage locations should be located as far as possible from the wetland and storm water drainage intake, to reduce the potential for increased salt going to sensitive receivers. A Salt Management Plan should be prepared through detailed design.*

### 6.4.3 Sedimentation and Erosion

During construction, areas of bare soil will be exposed which have the potential to erode during rainfall events and impact adjacent natural features. In the event of a heavy rain, sediment laden runoff can enter adjacent natural areas by way of overland flow. In order to protect on-site and off-site natural features from potential impacts due to sediment, an Erosion and Sediment Control (ESC) plan must be developed prior to any construction activities on the site. The details of the ESC plan will follow the Erosion and Sediment Control Guidelines for Urban Construction which will be provided during final design. The ESC plan will take into consideration the recommendations provided in the ESES (Dougan and Associates et al. 2018).

Preliminary recommendations for sediment and erosion control have been provided in the FSR prepared by JPE Engineering (2023) which include silt fences, mud-mats at construction accesses, temporary ditches/swales, straw bale/rock check dams, and temporary sediment ponds, as necessary. Provided that the following mitigation measures are followed, negative impacts associated with sedimentation and erosion are not anticipated:

*Mitigation:*

- *A final ESC plan should be prepared and implemented taking into account recommendations provided in the ESES and details provided by the project engineers.*
- *Areas of bare soil, including topsoil stockpiles, should be moistened with water to prevent dust and seeded with native seed mix if left inactive for more than 30 days.*
- *An environmental monitoring program is recommended to ensure that the ESC control measures are installed, maintained and functioning as intended. A recommended monitoring program is provided in Section 6.6.*

### 6.4.4 Indirect Impacts to Wildlife

Indirect disturbances can stress natural features and weaken their ecological integrity. Natural features in a weakened state are more susceptible to the establishment and proliferation of invasive, non-native species such as Black Locust. The establishment of invasive species in natural vegetation communities reduces their ecological value by suppressing native species, reducing biodiversity, and decreasing habitat suitability. Potential indirect impacts to wildlife in adjacent natural features may arise from noise and dust associated with construction activities and unnatural lighting resulting from the development. Large amounts of dust can induce changes in vegetation due to increased heat absorption and decreased transpiration. Dust can also cause adverse effects to wetlands and aquatic systems through increased sedimentation. Indirect impacts associated with construction are anticipated to be temporary and localized; therefore, significant effects on wildlife from noise and dust are not expected.

The wetland community identified as habitat for SAR, including Blanding's Turtle and Black Ash, has the potential to be indirectly impacted by the proposed development. The mitigations listed below, in addition to those listed for changes to surface water and groundwater balance and water quality, will ensure no negative impacts to this habitat.

*Mitigation:*

- *Dust and noise associated with construction is anticipated to be temporary. Best Management Practices for limiting dust should be employed, such as*

*moistening areas of bare soil with water during construction activities and seeding areas of bare soil within 30 days of being inactive.*

- *Topsoil should be stockpiled in areas with limited exposure to wind and away from buffers and natural features. Native seed mixes should be utilized to reduce erosion of stockpiles.*
- *Construction activities should be limited on a daily basis to daytime hours (typically 7:00am to 7:00pm).*
- *Lighting designs should include shielding and directional lighting on roads and buildings to avoid lightwash impacts on wildlife and their habitats. Detailed lighting plans for subsequent phases of development should ensure that 0 foot-candles are within the retained natural features and their buffers.*
- *Permanent wildlife exclusion fencing should be established at the limit of buffer areas to prevent wildlife including turtles from entering the proposed development.*
- *The limit of development should be well established to avoid excessive vegetation removal during grubbing, grading and other construction activities.*
- *Designated areas for construction lay-down, vehicle access, parking, equipment storage, stockpiling of materials and on-site construction offices should be located outside of natural features and their buffers, and ideally these areas should be kept away from buffers to limit potential indirect impacts to natural features.*

Maintenance of the stormwater management ponds has the potential to impact wildlife such as amphibians and turtles which may take up residence in the pond. It is well documented that Painted Turtles and Snapping Turtles move into man-made ponds after construction, and it is possible that the ponds may attract Blanding's Turtles as well. The footprint of the actual ponds have been placed outside of the Category 2 habitat of Blanding's Turtle which will avoid the need for registering any maintenance works for an exemption under the ESA, but best management practices should be employed when planning pond clean out. Timing windows to avoid the active turtle season as well as wildlife salvage prior to activities will help avoid impacts to wildlife.

*Mitigation:*

- *Install permanent fencing (such as chain link plus a wildlife barrier) around the SWM pond to effectively exclude turtles (including juveniles) from the infrastructure.*
- *Assess wildlife use of the pond prior to clean-out. Avoid in-water maintenance of SWM pond during the summer season when turtles may be using the pond (i.e. avoid work during May 1 to August 31).*
- *Implement wildlife and fish salvage immediately prior to maintenance work (i.e. dredging), to ensure that turtles are not overwintering in the pond.*

If a trail is proposed to overlap portions of the natural feature buffers, there is potential to cause indirect impacts to these features if not mitigated appropriately. During detailed design, efforts should be made to implement low impact design features, minimize grading to the extent possible, and minimize encroachment within buffers. Encroachment within the outer 5m of buffers may be permitted, consistent with the recommendations from the ESES (Dougan and Associates et al. 2018).

*Mitigation:*

- *Erosion and sediment control fencing should be installed at the limits of trail construction where it is located close to sensitive natural features, such as woodlands and wetlands.*
- *Permeable surfaces such as crushed gravel or permeable pavers are recommended to maintain surface water inputs within wetland catchment areas.*

## 6.5 Induced Impacts and Mitigations

Induced impacts are described as those that are not directly related to the construction or operation of the facilities in question, but rather arise from the use of the natural areas by humans as a result of the development. The regularly encountered example is occupancy effects such as increased use of natural areas by residents and their pets resulting in impacts such as unauthorized trail construction, introduction of non-native and invasive plant species, garbage dumping, and wildlife disturbance and mortality.

Once the development is completed, subsequent use of the natural areas by residents is difficult to control.

A variety of options are available to assist with the mitigation of potential impacts related to human occupancy, some of which are discussed in the ESES (Dougan and Associates et al. 2018). These include restricting or controlling human access into natural features through fencing or dense plantings at the interface of the development and natural area to prevent access and rear lot encroachment into buffers and other sensitive areas. The City of Waterloo requires that standard chain-link fencing be installed along the interface of public/private spaces to prevent encroachment. Fencing should be located at the limit of buffers, or allowed encroachment. A low impact public trail system can assist in providing controlled access to less sensitive natural areas. Signage can also be provided along the trail to educate residents on the natural features and to recommend good practices for walking through natural areas (i.e., remain on trails, keep pets on-leash, respect plants and wildlife, etc.). The proposed trail network should provide an active transportation route without the need for crossing sensitive natural features and should discourage the creation of unauthorized trails.

The design of any fencing should incorporate the requirements of turtle barrier fencing, in consultation with MECP.

Education with respect to the values and appropriate stewardship of the neighbouring natural areas should be promoted through signage and environmental brochures. The City of Waterloo has a brochure entitled “Naturally Your Waterloo” that can be purchased and provided to homeowners.

For townhouse units that abut natural features, dense buffer plantings and fencing will be key to ensure protection of the natural areas.

The Laurel Creek Subwatershed Management Plan (Planning Initiatives Ltd. and Associates 1996) recognizes that this area of Waterloo will face development pressures. Through the ESES (Dougan and Associates et al. 2018) and the Erbsville South Block Plan Study (City of Waterloo 2020a), mitigation measures have been identified to allow for development of the broader study area while also protecting sensitive features, which have been integrated throughout the impacts discussion.

## 6.6 Monitoring

The City of Waterloo requires pre-, during- and post-construction monitoring as detailed in the ESES and the Erbsville South Block Plan. The reader is referred to these for more detail. As noted above, the pre-construction monitoring has been completed by Stantec for many years and is ongoing. Additional pre-construction biological monitoring has been completed by NRSI in 2023. Pre-, during- and post-construction monitoring recommendations are provided below, which includes compliance and performance monitoring to ensure there are no negative impacts to protected features or wildlife.

### 6.6.1 Pre-construction Monitoring

Prior to construction works occurring, on-site inspections are recommended to be completed by a qualified environmental inspector, Certified Arborist, or qualified biologist, as applicable. This should include inspections to ensure proper installation of:

- Sediment and erosion control measures;
- Tree protection measures, such as fences installed along dripline setbacks and trees to be retained;
- Wildlife exclusion fencing around natural features and wildlife habitats on the subject property.

After inspection, if any deficiencies are noted, they should be repaired or rectified prior to initiating construction activities. After the installation and inspection of wildlife exclusion measures, a wildlife sweep should be completed within the fenced-in areas to ensure no wildlife is trapped within the development area. Captured wildlife should be relocated to appropriate habitats outside of the development area.

### 6.6.2 During-construction Monitoring

During-construction monitoring is the responsibility of the proponent and is tied to the specific undertaking. Generally, construction monitoring must occur to ensure compliance with the conditions of various permits. Often, an environmental inspector is required to carry out construction monitoring during grading, servicing, and building construction. Additional construction monitoring may be required based on consultation with MECP with regards to SAR. The following monitoring activities are recommended during construction:

- A qualified inspector should regularly inspect ESC measures as set out by the permitting process from GRCA and under the ESA, but at a minimum, inspection should be completed weekly and after significant weather events, which include significant rainfall (≥15mm in 24 hours or after 5mm has fallen in an hour or an event with an intensity of ≥5mm/hr and during which at least 10 mm have been received (TRCA 2019), melt events and wind events;
- Areas of bare soil should be monitored for erosion hazards to natural features;
- All tree protection fencing should be assessed regularly for damage, particularly after significant rainfall, snow fall or melt events;
- Pruning of any limbs or roots disrupted during construction (of trees to be retained) should be completed by a Certified Arborist;
- A construction sighting protocol should be provided to all construction personnel working onsite, along with detailed fact sheets specific to SAR, SCC, and common wildlife species that may be encountered within the development area. If wildlife are encountered during construction, it is recommended that works stop in the immediate vicinity and a Qualified Biologist be contacted for next steps.
- Machinery onsite should be regularly inspected and maintained. No maintenance or refueling of machinery is to occur within 30m of natural or sensitive features. Machines should be inspected prior to use on a daily basis for both leaks and for use by wildlife.

The biological and hydrological/groundwater monitoring program should continue on an annual or semi-annual basis through construction in order to ensure mitigation measures are functioning and performing as intended. This includes both short- and long-term monitoring. As detailed in the SWM report (Water's Edge 2023), this may also include SWMF monitoring such as inspection of vegetation, structures, and general operation, as well as ESC monitoring. During-construction monitoring is anticipated to continue until 90% stabilization of the SWMF contributing catchment area is achieved (i.e., buildings are constructed and lots are sodded) (Water's Edge 2023).

Monitoring reports are recommended to be completed that document the results of on-going monitoring, to the satisfaction of the City of Waterloo and GRCA.

### 6.6.3 Post-Construction Monitoring

In order to detect any potential negative impacts to the adjacent natural features, post-construction monitoring is recommended. Typically, post-construction monitoring similar to during-construction monitoring is required for a specified length of time following the completion of construction. A minimum of 2 years is recommended.

Additional monitoring will likely be required for any restoration plantings and enhancement measures, which should be determined through detailed design.

## 6.7 Impact Assessment Summary

A summary of potential impacts associated with proposed development, with associated recommended mitigations and significance of impacts once mitigated, are presented in Table 17.

**Table 18. Summary of Potential Impacts and Recommended Mitigation Measures**

| Activity | Potential Impact | Recommended Mitigation Measure(s) | Residual Negative Impact |
|---|---|---|---|
| **Design and Construction Phase** | | | |
| Grading and Vegetation Grubbing/Habitat Removal | • Construction activities are proposed in close proximity to natural features and habitats. | • The limit of development should be identified with heavy-duty ESC fencing to protect adjacent features and prevent unintended encroachment. ESC measures should be regularly inspected.<br>• Graded areas should be revegetated as soon as possible.<br>• Buffers should be naturalized to provide enhanced protection of natural features. | • Not significant |
| | • Tree removal will be required in anthropogenic communities and a hedgerow, which have been identified as candidate SAR bat habitats. | • Tree removals should occur outside of the bat active window, which occurs from April 1 – September 30, to avoid contravention of the ESA.<br>• TPF is recommended adjacent to retained trees and woodlands.<br>• Suitable trees should be planted in buffer areas to provide compensation for tree removals.<br>• Enhancement of other wildlife corridors (i.e., buffer plantings) will provide better linkage functions than the current hedgerow. | • Not significant |
| | • Suitable buffers have been identified to protect retained natural features. This results in of overlap with buffer areas, which are considered Blanding's Turtle Category 2 habitat (0.08ha) and of overlap with Blanding's Turtle Category 3 habitat (3.06ha). | • Buffer enhancements (0.64ha) will provide additional habitat for Blanding's Turtle, creating a better movement corridor on the subject property.<br>• Grubbing of vegetation within Blanding's Turtle habitats should occur outside of the active season for Blanding's Turtle, which occurs from April 1 - October 31.<br>• Establish wildlife exclusion fencing at the limit of buffer areas/construction. | • Not significant |
| Grading and Vegetation Grubbing/Habitat Removal & | • Bird nest disruption and avoidance, and active nest destruction; other wildlife avoidance | • Vegetation removal should occur outside of the typical breeding bird season (April 1 – August 31).<br>• If vegetation removal must occur during the bird breeding season, retain an avian biologist to survey for active nests | • Not significant |

| Activity | Potential Impact | Recommended Mitigation Measure(s) | Residual Negative Impact |
|---|---|---|---|
| Active Construction | | just prior to vegetation removal activities. This does not apply to candidate bat roost trees.<br>• Restrict the daily timing of construction activities to between 7:00 am and 7:00 pm. Construction lighting should be directed away from natural areas and buffers.<br>• Establish wildlife exclusion fencing at the limit of buffer areas/construction.<br>• Areas of bare soil should be moistened with water to prevent dust and seeded if left inactive for more than 30 days. | |
| Construction | • Indirect impacts to groundwater and surface water functions for wetlands and watercourses | • The use of spreader swales and infiltration swales provide additional opportunities for infiltration and increase the lag time during storm events.<br>• Runoff rates will be maintained through the extended detention pond.<br>• Additional low impact designs should be explored during detailed design to more closely match pre-development runoff and recharge volumes going to Laurel Creek and the PSW during the growing season.<br>• The planting and addition of topsoil within the buffer areas and areas surrounding the SWMF outlets should increase infiltration and increase the lag time for runoff during storm events.<br>• Maintenance of water balance in the wetland will ensure habitats identified for SAR and SWH are protected.<br>• Trails may be located within outer portions of buffers, provided that low impact designs are integrated with minimal encroachments.<br>• Monitoring will be required to ensure mitigation measures are functioning. | • Not significant |
| | • Changes in water quality | • Buffer plantings, SWMF plantings, and naturalization of infiltration swales will provide additional cooling effects for water being routed to Laurel Creek. | • Not significant |

| Activity | Potential Impact | Recommended Mitigation Measure(s) | Residual Negative Impact |
|---|---|---|---|
| | | • Monitoring of water quality parameters should continue during- and post-construction to ensure mitigation measures are functioning as intended. | |
| | • Sedimentation and Erosion | • A Sediment and Erosion Control Plan should be developed and implemented.<br>• Install silt fencing along the boundaries of the construction zone, inspect on a regular basis, remove accumulated sediment as needed, and immediately replace any damaged fencing. | • Not significant |
| **Post-Construction Use** | | | |
| Resident Occupancy | • Disturbances to adjacent and retained natural features on property | • "Naturally Your Waterloo" brochure should be distributed to residents.<br>• Permanent fencing should be erected to minimize encroachment into adjacent natural areas. Wildlife exclusion fencing should be affixed to reduce human contact with sensitive wildlife.<br>• Garbage, leaf litter, and other debris should not be deposited within the adjacent forest or wetland, or within other existing subject property natural features.<br>• The use of lawn or garden chemicals should be reduced or eliminated.<br>• Any landscape plantings should use native species to avoid the proliferation of non-native species within adjacent natural features.<br>• Household pet cats should not be permitted by the owners to roam within the adjacent natural features.<br>• A permanent trail system should be created to prevent residents from trespassing into protected natural areas. | • Not significant |
| SWMF Maintenance | • Impacts to wildlife | • Permanent fencing should be installed around SWMFs to exclude turtles from using ponds. | • Not significant |

## 7.0 Summary and Conclusions

NRSI was retained by Sunvest Development Corp. to complete an EIS for a proposed development at 720 Erbsville Road in the City of Waterloo, Ontario. This EIS builds on the characterization of natural features presented in the ESES (Dougan and Associates et al. 2018) as well as recommendations made in the Erbsville South Block Plan (City of Waterloo 2020a). It also incorporates the findings of 15 years of pre-construction terrestrial and water monitoring completed by Stantec on the subject property and provides update biological monitoring results from surveys completed by NRSI in 2023.

Black Ash and Blanding's Turtle, both Species at Risk, have been observed in the study area but not within the subject property. Blanding's Turtle Category 2 habitat is present in wetland and watercourse features on the subject property and within their 30m buffers, with Category 3 habitat extending 250m from those buffers. Since Category 3 habitat proposed for removal in the development footprint consists almost entirely of agricultural fields and buffer enhancements are proposed which will direct migrating Blanding's Turtles to the Wideman Creek corridor, negative impacts to the species are not anticipated. An updated IGF will be submitted to the MECP; dependent on comments received it may be necessary to pursue an authorization under the Endangered Species Act for removal of this habitat and for the encroachments within Category 2 and 3 habitats. Potential impacts to Black Ash will be mitigated through standard practices during and post-construction. Candidate habitats have also been identified for bat SAR. Potential roost trees shall be removed outside of the bat active season to ensure there is no contravention of the *ESA.*

The woodland/wetland complex within the subject property is designated as an ESPA, PSW, Significant Woodland and a Core Natural Feature in the City of Waterloo's OP (2020b). Laurel Creek to the east of the subject property is a Supporting "A" Natural Feature in the City's OP and provides an important ecological linkage for wildlife movement. The proposed development footprint of the subject property is comprised almost entirely of agricultural lands, with a small cultural thicket and anthropogenic communities in the northwest, and a hedgerow in the southeast. The cultural thicket contains a high percentage of invasive, non-native Black Locust. The hedgerow in the southeast provides a poor movement corridor for wildlife: its quality has been degraded since the construction of the Regal Place subdivision to the west of Erbsville Road and a more suitable ecological linkage, Wideman Creek, is located 80m to the south.

The ESES and Erbsville South Block Plan provide recommendations for development of the subject property as well as appropriate buffers and setbacks from natural features. These recommendations were employed for the design of the layout of the proposed development. Recommended buffers have been adhered to and ecological enhancements will improve the quality of habitat provided in buffer areas. Buffers adjacent to the development footprint will be allowed to naturalize and will be enhanced with native plantings. The enhanced buffer areas will provide improved habitat and movement corridors for Blanding's Turtle as well as other wildlife.

A Functional Servicing report (JPE Engineering 2023) and Stormwater Management report (Water's Edge 2023) have been prepared that demonstrate how the development design will meet the criteria of provincial and local policies (GRCA, City of Waterloo) and the ESES for quantity, quality, erosion control, infiltration and thermal mitigation. These criteria will be achieved through on-site stormwater management facilities, infiltration of runoff, use of a level stone spreader outlet to maintain the thermal regime of watercourses and implementation of a treatment train approach to protect water quality. Further mitigations are recommended to be explored through detailed design to better match the monthly water balance volumes during the growing season.

Mitigation and compliance monitoring measures have been provided by the team of engineers and NRSI to avoid, minimize and lessen any potential impacts during the construction process and occupancy by residents. The need for a pre-, during- and post- construction monitoring program has been identified, the details of which will be identified at the detailed design stage. The program will aim to track and compare environmental conditions of the subject property and adjacent natural features to ensure that negative impacts do not occur as a result of the development. It is anticipated that during- and post-construction monitoring results can be compared to the comprehensive monitoring program that has been undertaken to-date.

The development concept for 720 Erbsville Road has been located outside of natural features. Minor encroachment within buffers are required to facilitate stormwater management components, including spreader swales and infiltration swales, given the existing drainage patterns on the site. The plan identifies how buffer areas will be established between the proposed development and natural features to ensure that negative impacts do not occur. This report provides recommendations to minimize impacts and ensure that mitigative measures are installed and functioning property.

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Appendix I
Agency Comments on First EIS Submission

Region of Waterloo

PLANNING, DEVELOPMENT
AND LEGISLATIVE SERVICES
Community Planning
150 Frederick Street 8th Floor
Kitchener Ontario N2G 4J3 Canada
Telephone: 519-575-4400
TTY: 519-575-4608
Fax: 519-575-4466
www.regionofwaterloo.ca

Shilling Yip (226) 753-1064 (C)
Files: D17-40/4/22045
C14-60/4/22015

March 13, 2023

Rita Szilock, MCIP. RPP
Planner
Integrated Planning & Public Works
City of Waterloo
100 Regina Street S.
P.O. Box 337, Stn. Waterloo
Waterloo, ON N2J 4A8

Dear Ms. Szilock:

**Post Circulation Comments**
**Official Plan Amendment 45**
**Zoning By-law Amendment Z-22-15**
**Sunvest Group of Companies**
**720 Erbsville Road**
**CITY OF WATERLOO**

Region staff has reviewed the above-noted applications and provides the following comments for your consideration at this time. The purpose of the OPA is two-fold: 1) to create a special provision to permit stacked townhouses that are 6 units wide and 4 units vertical with a total of 24 units, whereas the Erbsville South Block Plan limits stacked THs to 4 units in width and 2 units vertical for a total of 8 units. 2) to provide a maximum building height of 12 metres for the proposed stacked THs, whereas the current maximum building height is 10 metres.

The purpose of the ZBA is to re-zone from Future Determination (FD) to Residential Eight (R8) and Conservation (OS3) with site specific provisions to provide: 1) minimum interior lot line setback of 2.8m, whereas 7.5m is required; 2) maximum building height of 12m for stacked THs whereas the maximum height is 10m; and 3) minimum parking rate of 0.05 spaces per TH unit whereas 0.1 spaces per TH is required.

The applications will provide for development of 59 townhouse units and 120 Stacked townhouse units (179 units total) and 251 parking spaces along with common elements including drive aisles. The development is proposed on municipal services.

A plan of standard condominium application file 30CDM-22408 is also being processed by the Region, in conjunction with the two subject applications. Notwithstanding comments on the condominium plan provided below, additional comments on the condominium application, including agency comments will be provided under separate cover. It is also noted at this time that the Region will not be in a position to draft approve the draft plan of condominium until the official plan and zoning by-law amendments have been approved and in effect.

The lands are designated Urban Area "Designated Greenfield Areas" and Core Environmental Features on Maps 3a and 4 respectively in the Regional Official Plan (ROP).

**Density**

The Planning Justification Report (MHBC Planning, December 2021) notes the density for this development will yield a density of 119 residents and jobs per hectare (p. 23). Although the calculations have not been detailed in the report, Region staff calculation of the density (based on the Land Budget PPU in effect) is slightly lower at 114. The difference may be a result of the take-outs assumed in the density calculation. Staff also notes the Grand River Conservation Authority comments of December 14, 2022 require confirmation of the floodplain and wetland limits, which may change the take-outs assumed. Nevertheless, density for this development exceeds the minimum of 55 residents and jobs per hectare required in the ROP.

**Water Services**

Water Services (Engineering and Planning) have reviewed the application and provide the following comments:

1) The Functional Servicing and SWM Report prepared by IBI Group dated October 2021 does not adequately show that the existing water infrastructure can support the proposed development. The fire flow calculations are not consistent with the proposed development. For example, the largest row townhouse site contains 6 units, and the architectural drawings show it to have an area of 548$m^2$. The FUS fire demand calculations do not contain the calculations for the largest building.

2) Furthermore, assumptions made in the fire flow demand estimation provide for a non-combustible occupancy. Contents of residential dwellings are considered regular combustible, and typically no reduction for occupancy is appropriate. With the corrected fire demand calculations, the largest building (548 $m^2$) requires 200 L/s (3,170 gpm).

3) The available flow from the hydrant test is shown to be 1705 gpm (107 L/s) @ 50 psi. The consultant is required to calculate the estimated available flow at 20 psi using the NFPA 291 Handbook.

4) It is anticipated that the consultant will discover that the available flow from the existing infrastructure will be less than the required demand. The results may be a change in the proposed site plan orientation, recommendations for fire walls, less units per building, etc.

5) Alternatively, there may be additional watermain infrastructure required in order to service the proposed development. The City and Region have dual ownership watermains planned for the area along Erbsville Rd, Conservation Drive, and Beaver Creek Rd in order to service the Beaver Creek Meadows District Plan area. The watermain installation is currently budgeted for 2024/2025. Depending on the timing of development of the subject lands at 720 Erbsville, the site may benefit from the additional looping of watermains.

The consultant is required to review and resubmit the FSR for the property which addresses the above comments.

**Hydrogeology & Water Programs (Source Water Protection)**

The property 720 Erbsville Rd is within Wellhead Protection Sensitivity 8 as designated on Map 6a of the Regional Official Plan. The purpose of the designation and policies contained in Chapter 8 of the ROP is to protect long-term municipal groundwater supplies.

Hydrogeology and Water Programs staff will require a Salt Management Plan prior to site plan approval for this development.

**Record of Site Condition (RSC)**

The MHBC cover letter of December 20, 2021 acknowledges a RSC has not been submitted with the applications. Region staff can support securing completion of the RSC and submission of the same along with the MECP acknowledgement to the Region, through a holding provision in the proposed zoning by-law amendment.

**Corridor Planning**

<u>Noise Study</u>

Corridor Planning staff has reviewed the Noise Report for the proposed residential development at 665 & 720 Erbsville Road, City of Waterloo, prepared by IBI Group, dated October 2021. The Report has assessed traffic noise from Erbsville Road.

Based on the excess road noise levels and nature of the development, the following mitigation will be required:

Ventilation (All Units)

Provision for installation of central air conditioning will be required for all units in the proposed development, including forced air ventilation systems with ductwork sized for future installation of central air conditioning systems by the occupant. The location, installation and sound rating of the air conditioning device should comply with NPC-216, Residential Air Conditioning Devices.

The provision for adding central air conditioning systems and window and building construction meeting the minimum requirements of the Ontario Building Code (OBC) will provide adequate sound insulation for the proposed building and will exceed this requirement.

Warning Clause (All Units)

The owner will be required to enter into an agreement with the Region of Waterloo / City of Waterloo to include noise warning clauses in the offers to purchase and/or rental agreements for all dwelling units, and in the declaration of any future plan of condominium as follow:

*"This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."*

Prior to the issuance of building occupancy permits for this development, the Municipality's building inspector or a Professional Engineer qualified to provide acoustical engineering services in the Province of Ontario to certify that the recommended noise control measures have been properly installed and constructed.

The above may be secured by way of conditions of draft approval for the condominium application.

<u>Stormwater Management & Site Grading</u>

Region staff have undertaken review of the Functional Servicing and SWM Report dated October 2021 authored by IBI Group, and generally have no concerns.

Under detailed engineering design, a Lot Grading, Site Servicing plans and a Stormwater Management Report will be required at the site plan application stage for this development. Please email all pertinent plans and reports; no hard copies are requested.

The site must be constructed and graded in accordance with the approved plans, and the Regional Road allowance must be restored to the satisfaction of the Regional Municipality of Waterloo.

Please note that any new servicing connection(s) from the Regional right-of-way would require Regional approval through a separate process of Municipal Consent and Regional Work Permit. A Region of Waterloo Work Permit must be obtained from the Region prior to commencing construction within the Region's right of way. In this regard, please visit https://rmow.permitcentral.ca/ for further guidance.

This may be deferred to Site Plan Application stage.

Regional Road Dedication

The Region's Official Plan identifies Regional Road 70 (Erbsville Road) with a designated road width of 30.480 metres. Staff estimates that an approximate road widening of 2.10 metre will be required along the Erbsville Road frontages of the subject properties (up to Schnarr Street). The Owner/Applicant must engage an Ontario Land Surveyor (OLS) to prepare a draft reference plan which illustrates the road widening prior to registering the reference plan, the OLS should submit a draft copy of the plan to the Transportation Planner for review. The land must be dedicated to the Region of Waterloo for road allowance purposes, and must be dedicated without cost and free of encumbrance.

This may be deferred to Site Plan application stage.

Access Permit/TIS/Access Regulation

Region staff has undertaken review of the Transportation Impact Study titled "665 & 720 Erbsville Road Transportation Impact Study" dated July 2022 submitted by Paradigm Transportation Solutions Limited, and generally concur with the recommendation therein. Region comments will be forwarded later under separate cover.

Please note that proposed accesses to Regional Road 70 (Erbsville Road) will require a Regional Road Access Permit ($230 fee) https://forms.regionofwaterloo.ca/ePay/PDLS-Online-Payment-Forms/Commercial-Access-Permit-Application. The access must comply with the Regional Access Policy in design i.e. minimum width 7.6 metres; 6.0 metres turning radii.

This may be deferred to Site Plan Application Stage.

Transit Planning

There are currently no plans to extend transit service to those sections of the proposed development and along this section of Erbsville Road. Any transit requirements and needs for the extension of transit services would be identified at a later stage once more detailed plans for the proposed development on the subject lands are available.

Fencing

Any back lotted residential developments may require a 1.8 m black vinyl fence, to be erected at the developer's cost, on the Region's property.

Application Fees

A $300 Preliminary Site Plan consultation fee and a $805 Site Plan review fee will be required for a Site Plan Application. These fees shall be provided to the Region of Waterloo directly.

This will be deferred to Site Plan Application Stage.

Transportation Capital Program (TCP)

Erbsville Road is currently scheduled for road resurfacing in 2026.

For further information please contact Jim Ellerman @ 519-575-4100 X 3757 Email: JEllerman@regionofwaterloo.ca

**Environmental Planning**

Environmental Planning has reviewed the materials submitted in support of the proposed Official Plan Amendment, Zoning By-law and Plan of Condominium applications, including the “720 Erbsville Road, Waterloo, Ontario, Environmental Impact Study” (the EIS) prepared by NRSI, December 2021. The EIS generally addresses the terms of reference that were agreed to, relying on the previously collected field work which was undertaken through the Erbsville South Environmental Study by Dougan and Associates (2018), and not undertaking new surveys.

There are some items that will require clarification before the EIS can be ultimately accepted, as well as confirmation of MECP input on the Species at Risk, and confirmation on design/layout of the site. Until such time as the items below are addressed completely, environmental planning staff will not be in a position to support the approval of any of the applications. Once feature limits and buffers are confirmed, then the Official Plan Amendment and Zoning By-law Amendment applications may be supported. In order for the Draft Plan of Condominium to be supported, all of the items identified below will be required to be addressed. The applicant is invited to contact Jane Gurney (Senior Planner – Environment, jgurney@regionofwaterloo.ca) for further information or clarification on the following.

- Buffers – the text of the EIS refers to smoothing of buffers, however the labeling of the buffers on the figures appears to indicate that the minimum buffers are applied throughout the site. Based on review of the figures in the EIS as well as the Draft Plan of Condominium, there appear to be areas where the buffers do not actually meet the minimum requirements. An updated figure which includes the feature limits (see note below), associated buffers, and proposed site layout would be appreciated. This figure should also identify areas where buffer minimums are not met.
- Wetland delineation – it is understood that an updated confirmation of the wetland limits is required. If there are changes in the wetland limits, updated mapping and associated buffers will be required.

- General design – the figures appear to show some encroachment into the feature limits and floodlines (as per our current mapping). Confirmation of the wetland and floodline depicted throughout the submission is required through the GRCA.
- The site appears quite tight, and it is not clear how or where snow storage will be accommodated, and if there will be any associated impacts to the adjacent Core Environmental Features; the EIS should be updated to address this.
- If a trail is proposed within the site, the EIS will need to reflect this.
- It is anticipated that access to the adjacent Core Environmental Features and the trail network proposed in the subdivisions to the east may invite encroachment through the feature, including through the southern portion of the feature where it is narrower. Please provide additional information as to how the Core Environmental Features adjacent to the site will be protected through the proposed mitigation measures and an assessment of the mitigation measures, especially as they relate to the rear of the units abutting the features (Units 1-43).
- Bats – There is a reference in Sections 4.3.3.2 and 5.2.3 of the EIS to potential bat habitat in a building northwest of the site, but which is not proposed to be altered or demolished as part of the proposed development. Please clarify which structure this is; it is appears that this may be the house that is within the subject property (opposite the intersection of Erbsville and Shnarr), and which is in an area that is likely to be impacted by the proposed stormwater management facility and associated green space. If the house is to be removed, please ensure that the EIS, including Map 5, is updated accordingly and any associated correspondence with MECP is provided.
- Blanding's Turtle – MECP input is pending, and until such time as it is received, regional environmental planning will not be able to support the draft approval on the subject lands.
- With regard to the overlap between the proposed development area and the Category 2 Blanding's habitat, consideration should be given to the potential restoration and enhancement of this area rather than the exclusion and use of the area for development related purposes.
- Permanent exclusion fencing (for turtles) does not appear to be recommended other than around SWM facility. Given the approach on the adjacent lands it would seem an appropriate measures to ensure that there are not turtles inadvertently directed to this site due to being restricted from adjacent sites would be appropriate. If exclusion fencing is not being proposed around the limits of the environmental features and Blanding's habitat, please provide additional explanation as to why the use of exclusion fencing is not appropriate on the subject site.
- As noted above, MECP input is required in advance of draft approval or final design acceptance.

## Archaeology

Regional Cultural Heritage staff have received and reviewed the document titled: “Stage 1-2 Archaeological Property Assessment : 720 Erbsville Road, Waterloo” (AMICK, Aug. 23, 2022) and the associated Ministry Acknowledgement Letter.

The area of land subject to the proposed plan has been cleared of archaeological concern, however, the applicant and the City should be made aware that the lands identified on the Draft Plan of Standard Condominium (last revised Dec. 17, 2021) as “Additional Lands Owned by Applicant” continues to possess the potential for the recovery or archaeological resources. Any proposed use of these lands must be preceded by an Archaeological Assessment before any ground altering activities of any kind are permitted.

## Housing

General

The following Regional policies and initiatives support the development and maintenance of affordable housing:

- Regional Strategic Plan
    - Objective 4.2 requires the Region to make affordable housing more available to individuals and families.
- 10-Year Housing and Homelessness Plan
    - contains an affordable housing target which is that 30% of all new residential development between 2019 and 2041 in Waterloo Region is to be affordable to low and moderate income households.
- Building Better Futures Framework
    - shows how the Region plans to create 2,500 units of housing affordable to people with low to moderate incomes by 2025.
- Region of Waterloo Official Plan
    - Section 3.A (Range and Mix of Housing) contains land use policies that ensure the provision of a full and diverse range and mix of permanent housing that is safe, affordable, of adequate size, and meets the accessibility requirements of all residents.

The Region supports the provision of a full range of housing options, including affordable housing. Should this development application move forward, staff recommend that the applicant consider providing a number of affordable housing units on the site, as defined in the Regional Official Plan. Rent levels and house prices that are considered affordable according to the Regional Official Plan are provided below in the section on affordability.

In order for affordable housing to fulfill its purpose of being affordable to those who require rents or purchase prices lower than the regular market provides, a mechanism

should be in place to ensure the units remain affordable and establish income levels of the households who can rent or own the homes.

Staff further recommend meeting with Housing Services to discuss the proposal in more detail and to explore opportunities for partnerships or programs and mechanisms to support a defined level of affordability.

Policy 3.A.6 in the Regional Official Plan (ROPA 6) applies to this site. It states:

“Where a development application proposing residential uses is submitted for a site containing one hectare or more of developable land, the Region and the area municipalities will require, a minimum of 30 percent of new residential units to be planned in forms other than single-detached, semi-detached, and street fronting and single unit condominium townhouse units. Examples of other potential housing forms may include, but are not limited to: duplexes; tri-plexes; four-plexes; multi-plexes; stacked and back-to-back townhouses; and apartments.”

A review of the proposed unit types on the Draft Plan of Condominium indicates that this proposal adheres to Policy 3.A.6.

Affordability

For the purposes of evaluating the affordability of an ownership unit, based on the definition in the Regional Official Plan, the purchase price is compared to the least expensive of:

| | |
|---|---|
| Housing for which the purchase price results in annual accommodation costs which do not exceed 30 percent of gross annual household income for low and moderate income households | $385,500 |
| Housing for which the purchase price is at least 10 percent below the average purchase price of a resale unit in the regional market area | $576,347 |

*Based on the most recent information available from the PPS Housing Tables (2021).

In order for an owned unit to be deemed affordable, the maximum affordable house price is $385,500.

For the purposes of evaluating the affordability of a rental unit, based on the definition of affordable housing in the Regional Official Plan, the average rent is compared to *the least expensive of*:

| | |
|---|---|
| A unit for which the rent does not exceed 30 per cent of the gross annual household income for low and moderate income renter households | $1,470 |
| A unit for which the rent is at or below the average market rent (AMR) in the regional market area | Bachelor: $950<br>1-Bedroom: $1,134<br>2-Bedroom: $1,356<br>3-Bedroom: $1,538<br>4+ Bedroom: $3,997 |

*Based on the most recent information available from the PPS Housing Tables (2021)

In order for a rental unit to be deemed affordable, the average rent for the proposed units which have fewer than 3 bedrooms must be at or below the average market rent in the regional market area as shown above. For proposed units with three or more bedrooms, the average rent for the units must be below $1,470.

Please do not hesitate to contact Judy Maan Miedema directly by email at JMaanMiedema@regionofwaterloo.ca should you have any questions or wish to discuss in more detail.

**Proposed Zoning By-law Amendment**

Staff continues to review the proposed zoning by-law amendment.

**Regional Development Charges**

Any future development on the subject lands will be subject to provisions of Regional Development Charges By-law 19-037 or any successor thereof.

**Other**

Staff acknowledges the Region's required review fees for the OPA and ZBA applications were received November 21, 2022.

Staff continues to review the applications.

If you have any questions, please feel free to contact me (226) 753-1064.

Yours truly,



Shilling Yip, MCIP, RPP
Senior Planner

cc. Dave Aston, MHBC Planning

THE CITY OF Waterloo | **Integrated Planning & Public Works**

*Planning Approvals*

April 17, 2023

Mr. Dave Aston, MCIP, RPP
Vice President & Partner
MHBC Planning
200-540 Bingemans Centre Drive
Kitchener, ON N2B 3X9

File No.: Post-Circulation Comments
Official Plan Amendment No. 45 and Zoning By-law Amendment Z-22-15
Re: 720 Erbsville Road, Waterloo
Sunvest Group of Companies

Dear Mr. Aston,

City of Waterloo Staff and other Review Agencies have reviewed the materials submitted in support of Official Plan Amendment No. 45 and Zoning By-law Amendment Z-22-15. The application is being advanced to permit the construction of 179 new residential condominium units. The proposed development would consist of 59 townhouse units, 120 stacked townhouse units and 251 parking spaces.

## Requested Official Plan Amendment

Amend the Official Plan to create a Specific Provision Area (SPA) to permit:

- Stacked townhouses that are 6 units wide and 4 units vertical with a total of 24 units, whereas the Erbsville South Block Plan limits stacked townhouses to 4 units in width and 2 units vertical for a total of 8 units in a Block.
- A maximum building height of 12 metres for the proposed stacked townhouses, whereas the maximum building height is 10 metres.

## Requested Zoning By-law Amendment

Amend the City's Zoning By-law by rezoning the lands from Future Determination (FD) to Residential Eight (R8) and Conservation (OS3). Permit the following site specific provisions to be included within the Residential Eight (R8) zone:

- Minimum interior lot line setback of 2.8 metres, whereas 7.5 metres is required;
- Maximum building height of 12 metres for the stacked townhouse buildings, whereas the maximum building height is 10 metres;
- Minimum visitor parking rate of 0.05 spaces per townhouse unit (total of 3 parking spaces) associated with the 59 townhouse units, whereas 0.33 spaces per townhouse unit is required (a total of 20 parking spaces). The visitor parking rate for the stacked townhouse units would remain unchanged.



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## 1. Official Plan

### 1.1 Low Density Residential Designation

The subject lands are designated "Low Density Residential" on Schedule 'A' of the Official Plan. The Low Density Residential designation allows for consideration of a range of low-rise buildings as well as community uses. The maximum density of any one site shall not exceed 150 bedrooms per hectare, and the maximum height of buildings shall not exceed 10 metres.

The Official Plan contemplates developments such as terraced dwellings in Low Density Designated areas through policy 10.1.3 (7). For clarity, "Terraced Dwellings" (term used in Official Plan) and "Stacked Townhouses" (term used in Zoning By-law) are equivalent built forms. Policies 10.1.3 (8) – (9) outlines the criteria that must be met to contemplate terraced dwellings in Low Density residential designated areas. In general, terraced dwellings/stacked townhouses can be contemplated for the subject site, though more specific considerations for the development of terraced dwellings are outlined in SPA 3, Erbsville South Block Plan.

Policy 10.1.3 (8) (h) address the requirement for development to be built in a context sensitive manner that is consistent to the neighbourhood character. Policy 10.1.3 (8) (f) states that "The development capacity of the site is not exceeded, and the proposal does not require significant relief from standard regulations". Further, policy 10.1.3 (8) (g) notes "The Development maintains the land use intensity of the surrounding low density neighbourhood."

While the stacked townhouse use is contemplated in the low density residential designation and further permitted thought SPA 3, the scale of the proposed use greatly exceeds the intent of policy 10.1.3 (8) and SPA 3 (see additional Block Plan comments below). Staff note that a significant increase is being requested to the size of the stacked townhouse blocks. A total of 8 units are contemplated within a stacked townhouse block, whereas 24 units are being requested. In addition, to facilitate the development, as proposed, significant reductions are being requested to the parking requirement and the minimum rear yard setbacks.

Lastly, at the proposed built form of 24 units within a block, the proposed stacked townhouses are not consistent with policy 10.1.3. (9), which speaks to locational criteria applicable to stacked townhouses. The intent of policy 10.1.3 (9) is to direct stacked townhouse blocks that are larger in scale with greater residential density adjacent to designated Nodes or Corridors to form as a buffer between Low Density Residential properties and properties within the designated Node/Corridor.

### 1.2 Erbsville South Block Plan (SPA 3)

The subject lands are within the boundary of the Council-adopted Erbsville South Block Plan Area. The policies of the Block Plan form Special Provision Area (SPA) 3 of the Official Plan. The Block Plan was developed through a public planning process, which refined the land use direction outlined within the Official Plan. The Erbsville South area is identified on Schedule 'A6' of the Official Plan. The subject lands are designated as 'Low Density Residential', on Schedule 'A6b' of the Official Plan which is referenced

within the Erbsville South Block Plan. The intent of the Block Plan is to provide detailed guidance regarding the expected development pattern and land uses in the Erbsville South Block Plan Area (policy 11.1.3 (1) of the Block Plan).

*Coordinated Development*

The Erbsville Block Plan includes two development parcels on the east side of Erbsville Road. The subject development includes 720 Erbsville Road, which is the larger of the potential development blocks. Adjacent to the site is a smaller development parcel located at 672 Erbsville Road. As per the Block Plan, development of 720 Erbsville and 672 Erbsville should be coordinated the greatest extent possible as per policy (14) of the Block Plan which states:

> (14) *To help ensure the orderly development of land, the development parcels east of Erbsville Road are encouraged to be jointly designed and developed.*

It is unclear if attempts have been made to coordinate development with the adjacent lands. Coordination of development is important to ensure that the transportation/active transportation, servicing and parkland planning for the site are appropriate and completed in an efficient manner.

*Built Form*

The intent of the Erbsville South Block Plan is to provide for development that will maintain and enhance the character of the former Erbsville settlement as a low-rise residential area. The Block Plan policies note that a range of residential unit types are contemplated in the Block Plan area. Policy 21 (policy 11.1.3 (21)) of the Block Plan states:

> (21) *A range of residential unit types are contemplated within the Low Density Residential designation, being single detached dwellings, semi-detached dwellings, triplexes, and townhouse dwellings, including stacked townhouse dwellings with up to and including eight dwelling units. In addition, ancillary accessory uses are contemplated, such as home occupations and home office uses as well as secondary residential units.*

Policy 31 of the Block Plan (policy 11.1.3(31)) further outlines requirements for the development of stacked townhouses noting:

> *(31) Where proposed, townhouses and stacked townhouse units shall meet the following policies:*
> *(a) Townhouse buildings will consist of a maximum 6 units within each block. Stacked townhouse buildings will be a maximum 4 units in width and a maximum of 2 units vertical.*
> *(b) Townhouses and stacked townhouse buildings shall achieve a high standard of architectural design/treatment, including roof design, enhanced finishes, setback variations, and entry and garage treatments to help visually break up each unit within the block, while ensuring an overall harmonious design through repeating elements, materials and features.*

Where the Block Plan limits stacked townhouse blocks to 4-units wide by 2-units vertical (total of 8-units per block), the proposed development includes blocks of up to 6-units wide by 4-units vertical (total of 24-units per block).

The intent of the Block Plan is to provide for diversity in unit types and density while recognizing the unique character of the Erbsville area and the constraints (limited development blocks surrounded by sensitive environmental areas). These constraints, and the area's location in northwest Waterloo, result in limited public amenities with lower densities being contemplated. While Erbsville Road is a Regional road, it maintains a rural cross-section. The high concentration of sensitive environmental lands result in this area of the City maintaining a less-urban character compared to other parts of the City. Therefore, the density of development area was limited based on the need to maintain the greenfield density of 55 persons and jobs per hectare, while recognizing the constraints of the area. The Block Plan identified this lower density character through the guiding principles. For example a guiding principle under the built form section states in 11.1.3 (3) (b) i) "Where feasible, shorter block lengths are preferred". Also, the context of the plan area is intend to be low rise residential. Policy 11.1.3 (3) (d) states:

> *(d) Context and Compatibility Principles*
>
> *i) Facilitate complementary development (i.e., low-density residential and limited medium-density residential) in proximity to existing residential neighbourhoods through implementing regulations and site planning, to facilitate a seamless transition and built-form compatibility; and,*
>
> *ii) Promote the efficient use of land in a low-rise built form, including more compact lot frontages and residential block sizes, while providing sufficient room for the growth of mature canopy trees.*

As such, any proposed stacked townhouse blocks are limited in the Erbsville South Block Plan to a total of 8-units. The proposal of 24-units is a 200% increase over what was originally envisioned for the area. The 24 unit townhouse blocks, as proposed, are more suited to a minor node area, or a more urbanized cross section. Planning staff are not supportive of the proposal to increase the stacked townhouse blocks to 24-units. The scale of the 24-unit stacked townhouse blocks are not consistent with the Council-adopted Erbsville Block Plan. A more modest increase of four unit vertical and four units wide could perhaps be considered, if it is demonstrated that the proposed development appropriately addressed all applicable Official Plan policies.

In addition, to the increase in block size and number of units within each stacked townhouse block, additional height is being requested (12 m whereas 10 m is permitted). Planning staff are of the opinion that a 12 metre height could only be considered if the width of the stacked townhouse blocks remains narrow.

*Open Space and Parks*

The Erbsville South Block Plan identifies the conceptual location for Open Space areas on Schedule 'A6b' and Schedule 'A6d' of the Official Plan. These conceptual locations are not intended to indicate exact locations for parks and open space, but are intended to highlight that some park space should be included in each development area within the Block Plan area. Policy 11.1.3 (48) of the Block Plan states:

*(48) Schedule 'A6b' identifies conceptual Open Space locations, which could consist of small parks, trail connections, community gardens and similar features that provide recreational opportunities for the future residents. Open Space areas will provide opportunities for each individual development enclave and the broader neighbourhood to interact and gather locally, and thus designed and located as focal points within each enclave.*

There does not appear to have been any provisions of parks and open spaces in the proposed development. Further, policy 11.1.3 (9) encourages open spaces to locate adjacent to Wideman Creek to support linkages. As an alternative for providing public open space, the Block Plan contemplates meeting park space needs through privately owned public spaces (POPS) as detailed in policy 11.1.3 (51), which states:

*(51) To achieve adequate provision of park spaces and trials, the City may consider Privately Owned Public Spaces (POPS) within the Erbsville South Block Plan Area as a condition of development. Under all circumstances, such spaces shall be welcoming to the general public, and not viewed as "private".*

*Mobility Principles and Trail Connections*

In regards to mobility, the Erbsville South Block Plan places a high degree of importance on creating a walkable and accessible community. Several guiding principles outline the importance of mobility as outlined in policies 11.1.3 (3) (c) (i)-(vi). Further, Schedule 'A6d' of the Official Plan outline a conceptual trail location along the buffer area of the subject lands. The proposed development should incorporate an active transportation connection through the subject lands in accordance with the Block Plan.

As currently proposed, there is a large parking area in the middle of the developable area, which is not conducive to safe and accessible active transportation. Policy 11.1.3 (65) outlines the need for a complete streets approach within the Block Plan area. Therefore, mitigations measures outlined in the policies including sidewalks, traffic calming and pedestrian crossings for the internal areas of the site should be considered to mitigate impacts of vehicular traffic. Policies 11.1.4(66)-(72) outline additional provisions for active transportation.

## 2. Urban Design

### 2.1 Built Form

- The site has been designed with 2, 3 and 4-storey townhouse and stacked townhouse units which have been oriented towards the interior of the site.
- The proposed buildings are oriented away from the street with no entrances facing Erbsville, and instead face the parking lots located in the interior of the site. To complement the street facing character of the local village as well as create an active, pedestrian-oriented streetscape, the development should be revised to align with principles of good urban and community design, as well as the policies in the SPA that discourage backlotting (e.g. 11.1.3.(24), 11.1.3(25)(2), and 11.1.3(25(5)).

- The UDG states that the Stacked townhouse units will be designed with prominent porches to provide clear entrances to each unit. Vertical articulation through the use of prominent front porches and building entrances will also be used to ensure that facades read as individual units, rather than a single mass. This is true, however only for the portion of the buildings that are internal facing. The intent is for units to read as individual units facing the public right-of-way. A more balanced approach to how the street facing units are designed is required.
- Consider architectural variation between the neighbouring townhouse blocks.
- Precedent townhouse imagery was shown in the Urban Design Guidelines that claimed to have "prominent building entrances", and "prominent front porches" when in fact the examples are more than 50% garage doors at grade. In order to establish an improved pedestrian experience, consider recessed garages and larger more prominent porches/entrances as well as windows at grade.

### 2.2 Site Plan and Organization

- Consider breaking up the parking into even smaller parking courts as opposed to the very lengthy parking "road" bisecting the center of the development. More localized courts directly affiliated with an adjacent townhouse block would be more balanced and attractive.
- Staff would like to see sidewalks on both sides of the proposed condominium roads for a complete and safe circulation network for **all** users.
- Internal "streets" should provide adequate space for large canopy tree plantings for pedestrian comfort and climate control.

## 3. Zoning

### 3.1 Conservation (OS3) Zoned Lands

It is the City's long standing practice to secure environmental lands and associated buffers in public ownership. Therefore, OS3 zoned lands should be conveyed to the City prior to Site Plan approval.

### 3.2 Residential Eight (R8) Zoned Lands

#### *3.2.1 Visitor Parking*

The applicant should reconsider the request to reduce the required visitor parking spaces associated with the 59 townhouse units from 0.33 spaces per townhouse unit (20 parking spaces) to 0.05 spaces per townhouse unit (3 parking spaces). This is a significant reduction, especially when taking into consideration how isolated the subject site is. The site is surrounded either by environmental lands or farmland on three sides with no opportunity for parking overflow. To the west is Erbsville Road and Regal Place subdivision, neither are appropriate for parking overflow. Parking is not permitted on Erbsville Road and parking on Regal Place would be unsafe for visitor as they would have to cross a busy Regional road without a safe pedestrian crosswalk in place. In addition, there is no bus service in front of the subject site. The nearest bus stop is approximately a kilometer away at the intersection of Laurelwood Drive and Erbsville Road. Similarly, the nearest Commercial Plaza, Laurelwood Commons, is also located approximately a kilometer away.

The Planning Justification Report (PJR) states that the reduction in visitor parking would be offset by the additional tandem parking spaces in each of the driveways. It notes that each of the townhouse units will have a required parking space in the garage and an additional parking space in front of the garage in the driveway. According to the PJR the visitor parking reduction is appropriate because any visitor parking space requirements can be satisfied by the one additional parking space in the driveway of each of the townhouse units.

Planning staff disagree with the above rationale that the visitor parking needs of the townhouse units can be offset by the additional tandem parking space in the single car driveways for the following reasons:

- It is very likely that the driveway of the townhouse units will already be occupied by a second car. For example, there may be a second member of the household that requires a car for their day-to-day commute.
- It is highly unlikely that only one additional parking space will be able to accommodate all required visitor parking needs when a unit owner has a gathering. Generally, multiple people and families are invited to a gathering, requiring multiple parking spaces at a time. One additional parking space in the driveway would not be able to accommodate the visitor parking demand of the unit. Also, it is not likely that unit owners would make their driveways available to their neighbours to accommodate guest parking.

Therefore, planning staff are of the opinion that the required visitor parking should be accommodated independent of the space available in the single driveway of the townhouse units.

Please redesign the proposed development to meet the parking requirements of the R8 zone. If some reduction in the visitor parking is still required then a Parking Study with appropriate rationale will have to be submitted as part of the resubmission package.

Staff recognize that the applicant is currently working on redesigning the proposed development and may have made appropriate changes to address the above raised concerns in a proposed redesigned Concept Plan, dated February 1, 2023.

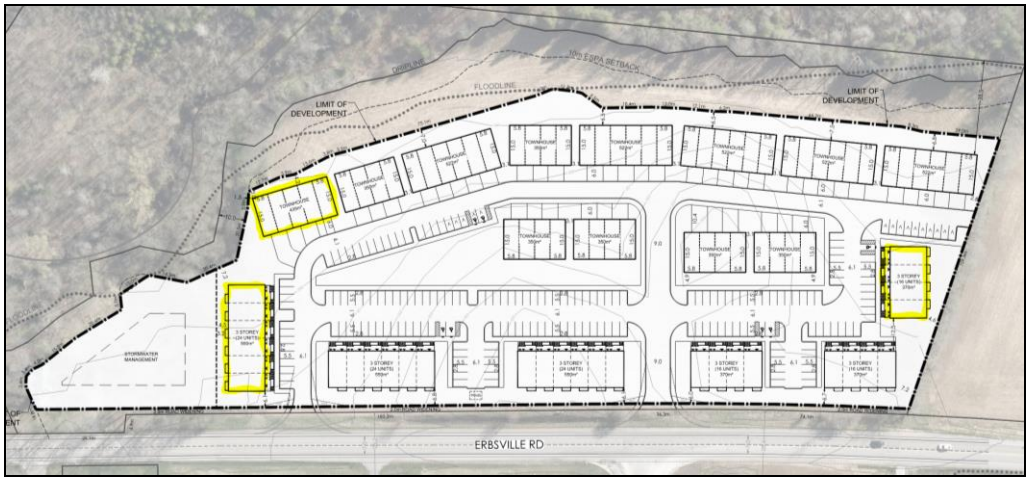
### *3.2.2 Interior Lot Line Setback*

The Residential Eight (R8) zone requires an interior lot line setback of 7.5 metres. The purpose of the 7.5 metre setback requirement is:

- To ensure that there is sufficient space in the rear yard of the townhouse units for a private amenity area and to ensure that there is sufficient space in the rear yard of the stacked townhouse units for a shared common amenity area.
- To ensure that there is sufficient space in the side yard of townhouse buildings and stacked townhouse buildings for access, maintenance and drainage.

*Rear Yards*

Staff are concerned that the rear yards of some of the townhouse and stacked townhouse blocks have been significantly reduced. See below image for reference, townhouse blocks in questions are highlighted in yellow.




The rear yard setback of the eastern townhouse block ranges between 3.0 metres and 4.2 metres. At 3.0 metres and 4.2 metres these rear yards could not accommodate a raised deck, which would have to meet a minimum rear yard setback of 4.0 metres. In addition, the usable rear yard of the external units would be further reduced as an access easement would be required to provide access to the internal units. The proponent should revise proposed conceptual site plan to ensure that the internal lot line setbacks for these rear yards meet the 7.5 metre requirement to the extent possible.

Similarly, the rear yards of the northernmost and southernmost stacked townhouses have also been reduced significantly, ranging between 4.5 metres and 4.6 metres. The proposed rear yard setback seems significant especially for the northernmost stacked townhouse block. The proponent should revise the proposed conceptual site plan to ensure that the internal lot line setbacks for these rear yards meet the 7.5 metre requirement to the extent possible. If a deviation is required at certain pinch points an appropriate planning rationale should be submitted to justify the reduction.

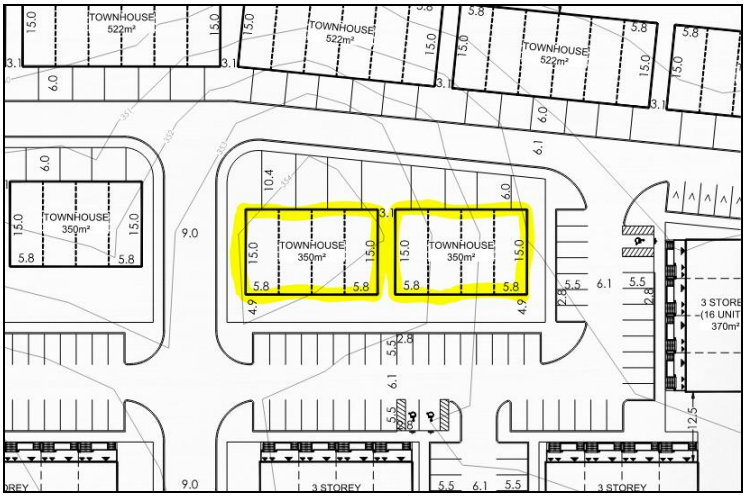
Staff recognize that the applicant has made appropriate changes to address the above raised concerns in the proposed redesigned Concept Plan, dated February 1, 2023.

*Side yards*

At the northeastern portion of the site the interior lot line setback appears to be 1.5 metres along the side of the townhouse building. Through the resubmission considerations should be given to redesigning the site and increasing this side yard setback to the extent possible. If the interior lot line setback cannot be met to this side yard then appropriate planning rationale should be submitted to justify any reduction. Staff note that in the Planning Justification Report, dated December 2021, references a minimum interior lot line setback of 2.8 metres, whereas the submitted plans indicate that the interior lot line setback to a side building façade is 1.5 metres at its smallest point.

### *3.2.3 Rear Yard Setback (interior to the site)*

The rear yard setback and interior lot line setback overlap in some instances and have already been discussed in previous comments. In the case of two of the townhouse blocks in the interior of the proposed development, see below blocks highlighted in yellow, the proposed Master Plan identifies a rear yard setback of 4.9 metres.




Although internal to the site, the intent is that the rear yards of these internal townhouse blocks function the same way as the townhouse blocks along the exterior of the site and that they maintain a 7.5 metre rear yard setback to the degree possible to allow for a sufficient private amenity area. Staff are not supportive of the 4.9 metre rear yard setback. The proposed 4.9 metre rear yard setback does not provide sufficient space to accommodate a raised deck in these rear yards and would not provide sufficient space for a private amenity area.

In the resubmission consideration should be given to redesigning this area of the site to increase the rear yard setback for these blocks. For your consideration, staff suggest the following two redesign options be explored.

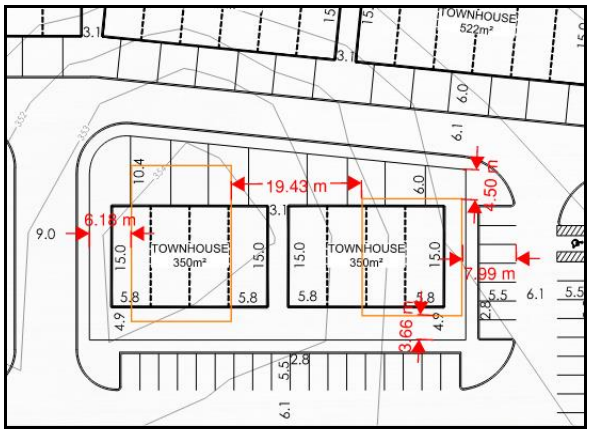
*Option 1*

In reviewing the revised concept plan, dated February 1, 2023, consider removing the two townhouse blocks completely and locating the park space here. Locating the park space here would allow for convenient connectivity to the proposed trail and a visual connection to the stormwater management pond and the environmental lands beyond. Then consider relocating the 8 units lost in a stacked townhouse form along Erbsville Road. This could be achieved by breaking up the existing 24 unit block into two 16 unit, 3 storey blocks. See below redlined image of Option 1 for illustration purposes.




*Option 2*

Rotate existing townhouse blocks 90 degrees and reduce the size of one block to 3 units. This configuration could potentially achieve a 9 metre rear yard setback. See following image for your consideration.




Please note that if a 7.5 metre rear yard setback cannot be accommodated, then planning rationale should be submitted as part of the resubmission to justify the appropriateness of a rear yard that is less than 7.5 metres in depth.

### *3.2.4 Internal Road Width*

In your resubmission please explain the need for a 9.0 metre wide internal road width. Is the intent to accommodate parallel parking on one side of the internal road? The maximum width of the internal road (driveway) is 7.6 metres as per Table 6H of the Zoning By-law. If the 9.0 metre width is to be maintained an additional zoning by-law amendment will be require as well as associated planning rationale.

### *3.2.5 Loading Space*

One Type A Loading space (3 m by 7 m) will be required on the subject site, as per section 6.9.4.4 of the Zoning By-law. As part of the resubmission, please revise the conceptual plans to accommodate the required loading space.

### *3.2.6 Bicycle Parking*

The stacked townhouse blocks require bicycle parking as per the section 6.6 of the Zoning By-law. As part of the resubmission, the conceptual plans should be revised to demonstrate that the required bicycle parking (0.3 Type A per dwelling unit and 0.3 Type B per dwelling unit) can be accommodated on the site.

## 4. Site Design Considerations

### 4.1 Parkland

The proposed development should be redesigned to incorporate a park space that would meet the needs of the proposed development and the needs of existing developments in the surrounding area. The submitted conceptual Master Plan does not appear to incorporate any park space into the proposed development. Whereas, the Erbsville South Land Use Plan (Schedule 'A6b') identified two conceptual open space locations within the subject site.

The City's preference is that a park be conveyed to the City as per the City's Parkland dedication by-law, which stipulates that a 5% parkland conveyance is required for any residential development having a density of 100 units per hectare or less. As part of your resubmission, redesign the proposed development to incorporate a park space that is at least 5% of the net lot area. Based on a net lot area of 3.14 hectares, the park space should be at minimum 1,570 square metres in size. As stated earlier, the City's preference is that the park space be conveyed to the City, however as per the Block Plan the City will consider privately owned public spaces (POPS) to meet the park space needs of the development. Whether in public or private ownership the park space should be zoned Parks and Recreation (OS1) to ensure that its intended long term use is protected overtime.

In discussion with Park's staff the following locational criteria should be taken into consideration when locating the park space:

a) One larger park space is preferred to two smaller park spaces.
b) The park space should connect into the future trail connection that runs along the perimeter of the subject site.
c) It is preferred that the park space is located adjacent to the storm water management pond. By locating the park adjacent to the stormwater management pond it will help to make the park space appear larger, especially if the park space is small (less than 0.5 ha in size).
d) If possible, the park space should have frontage on a municipal road for easy access and visibility in case of an emergency.

In reviewing the revised conceptual Master Plan, dated February 1, 2023, staff have outlined the following three options for the applicant's consideration when redesigning the proposed conceptual Master Plan to accommodate the park space. Please note that Option 1 and Option 2 are preferred over Option 3.

*Option 1*

As suggested previously, consider removing the two townhouse blocks with the significantly reduced rear yards and locate the park space in their place. Locating the park space here would allow for convenient connectivity to the proposed trail and a visual connection to the stormwater management pond and the environmental lands beyond. Then consider relocating the 8 units lost in a stacked townhouse form along Erbsville Road. This could be achieved by breaking up the existing 24 unit block into two 16 unit, 3 storey blocks. See below redlined image of Option 1 for your consideration.




*Option 2*

As before, remove the two townhouse blocks with the significantly reduced rear yards. Remove the stacked townhouse block adjacent to SWM pond and relocate to townhouse block location but break up stacked townhouse block into two smaller 12 unit blocks. Locate the proposed park space adjacent to the SWM pond by reconfiguring the shape of the SWM pond and removing two of the townhouse units backing onto the environmental lands. As stated before the park space should be minimum 1,570 square metres in size, this can be achieved by removed some of the surface parking in the area and by reconfiguring the SWM pond layout. Additional lost units can be accommodated in a stacked townhouse form along Erbsville Road. This could be achieved by breaking up the existing 24 unit block into one 16 unit, 3 storey block and one 12 unit, 3 storey block. See following redlined image of Option 2 for your consideration.




*Option 3*

In reviewing the revised concept plan, dated February 1, 2023, reduce the width of the northerly stacked townhouse block from 6 units to 4 units for a total of 16 units and reduce the parking area in this location to accommodate a park space that is at least 1,570 square metres in size. See below redlined image of Option 3:




## 4.2 Trail Connection

The proposed development should be redesigned to incorporate a trail connection wrapping around the outside of proposed development as shown within Schedule 'A6d' (Erbsville South: Mobility Network) of the Official Plan. The proposed trail connection should connect into the internal sidewalk network and the proposed park space. The trail connections can be located within the natural feature buffer and should be conveyed to the City as part of the Conservation (OS3) zoned lands. Please note that the trail connection

should run all the way down to Schnarr Street, as shown within Schedule 'A6d' (Erbsville South: Mobility Network).

### 4.3 Sidewalk along Erbsville Road

The Mobility Principles outlined in policies 11.1.3 (3) (c) (i)-(vi) of the Erbsville South Block Plan have not been appropriately addressed. In the revised development concept please incorporate a sidewalk along Erbsville Road and incorporate appropriate pedestrian connectivity to the proposed trail connection. Also, explore whether it is feasible to incorporate a sidewalk on both sides of the internal roadway to address the Mobility Principles outlined within the Erbsville South Block Plan.

### 4.4 Orientation of Stacked Townhouses along Erbsville Road

The front of the stacked townhouses should be oriented toward Erbsville Road in accordance with SPA 3 policy 11.1.3 (24), which state that "residential dwelling are encouraged to face or flank Erbsville Road, without direct vehicular entrance onto Erbsville Road." As part of the resubmission, please redesign the stacked townhouse blocks along Erbsville Road to ensure that the blocks either face or flank Erbsville Road. The stacked townhouse blocks should complement the street facing character of the historic Erbsville settlement and facilitate good urban design.

### 4.5 Coordination of Development

As per Condition # 32 of Subdivision 30T-90039, within OMB Decision No. S910005, 720 Erbsville Road and 672 Erbsville Road have to be developed in conjunction and will need to be developed in a consolidated manner when it comes to access and servicing. Further, as per Erbsville South Environmental Study both properties must share the same SWM facility and the same SWM strategy.

Trillium Estates, owner of 672 Erbsville Road, has submitted a letter, dated January 11, 2023, raising a number of concerns about the proposed development and how it will impact 672 Erbsville Road. In the resubmission, the applicant will have to address all of the concerns raised by Trillium Developments, in their January 11, 2023 comment letter. Also, describe how the orderly development with Trillium Lands (672 Erbsville Road) will occur.

### 4.6 Stormwater Management Pond

The proposed location of the Stormwater Management (SWM) pond does not align with the SWM pond location recommended by the Erbsville South Environment Study, which recommended that that one SWM facility serve both 672 Erbsville Road and 720 Erbsville Road and that it be located in the southeast corner of 720 Erbsville Road. The SWM pond location should be redesigned to better align with the Erbsville South Environment Study recommendation.

Similar to the park space the SWM pond should be zoned Parks and Recreation (OS1), whether in public or private ownership.

### 4.7 Water Distribution System and Multiple Condominiums

In reviewing the submitted servicing plans it appears that the water main on 720 Erbsville Road crosses over to 672 Erbsville Road. Please note that the City does not support multiple condominiums sharing a single connection to the water distribution system. The applicant should ensure 720 Erbsville Road and 672 Erbsville Road have separate water connections from the Regional right-of-way if these properties will be under separate condominium ownership.

In your resubmission please provide clarity on the future ownership of 720 Erbsville Road and 672 Erbsville Road. Are these properties intended to be owned by the same condominium or separate condominiums?

### 4.8 Road Widening

The Region of Waterloo identified that this section Erbsville Road has a designated road width of 30.48 metres, therefore an approximate road widening of 2.1 metres is required along the frontage of the subject site (up to Schnarr Street). Submit a draft reference plan, prepared by an Ontario Land surveyor illustrating the correct road widening along Erbsville Road. Please updated all plans to reflect the correct road widening. Net lot area, density, landscape open space and setbacks should be updated accordingly.

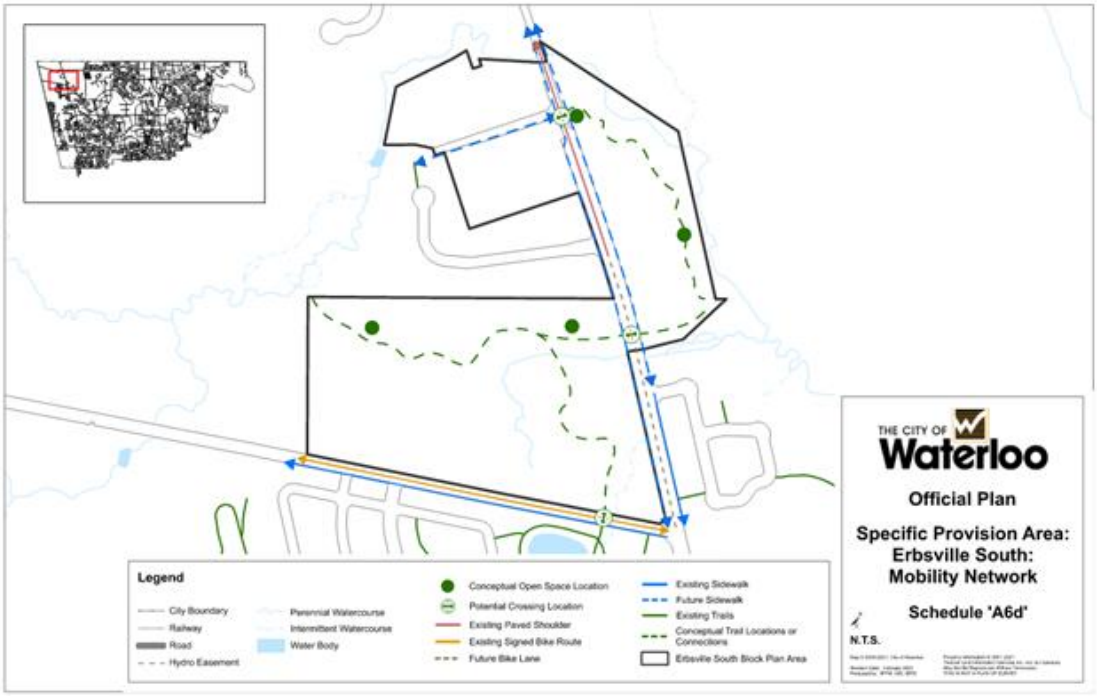
### 4.9 Other Site Design Considerations/Master Plan Comments

- Include phasing of development (if the intention is to develop the subject site in phases)
- All retaining wall should be clearly identified on the Site Plan and Grading Plan. If retaining walls are proposed they should not impact the 30 metre wetland buffer.
- Townhouse blocks should be labelled in resubmission, allowing staff to easily refer to them and differentiate between them when providing comments.
- Proponent should consult with Enova Power early on in the process to ensure that the number of Transformers required to service this site can be accommodated.
- Transformers should not be located in the front yard. In resubmission please relocate transformer(s) so that they are not visible from Erbsville Road.
- Snow storage location should be located as far as possible from the wetland and storm water drainage intake.
- Site Statistics chart should be updated to correctly reflect amendment required from Zoning By-law.

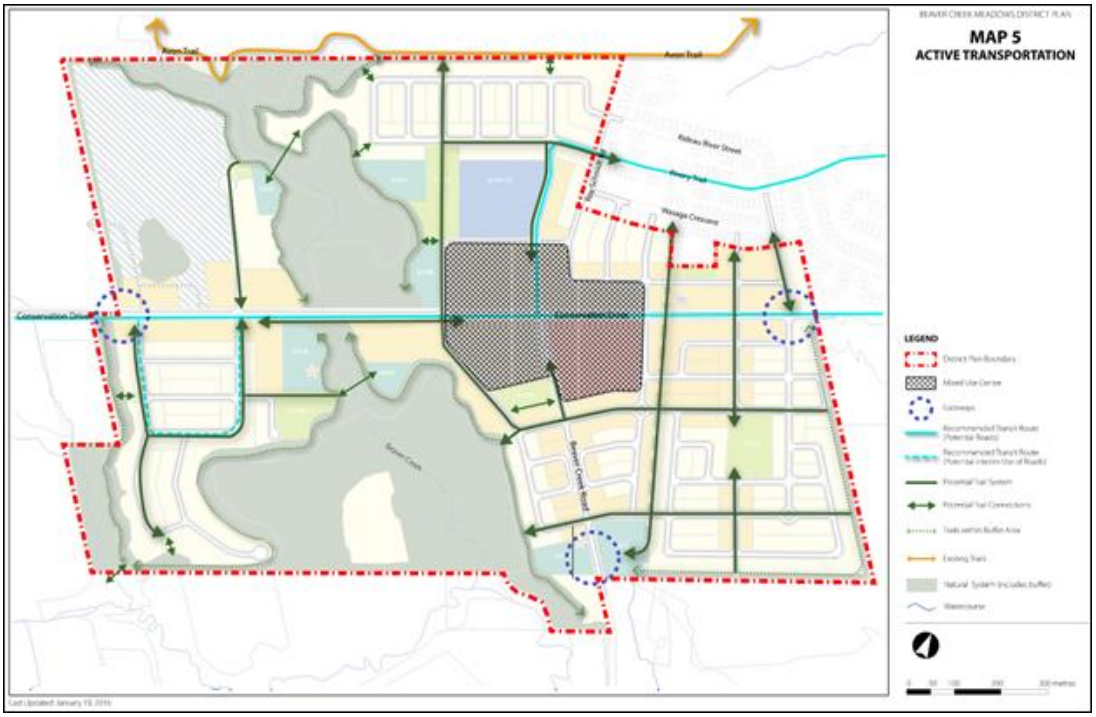
## 5. Environmental Planning

1. Section 4.1.3 of the Planning Justification Report states that "*…the pedestrian infrastructure allows for the establishment of connections to a possible future trail network through the open space system located immediately east of the proposed development*". It is unclear whether this statement is referring to a trail within the natural feature buffers that would wrap around the proposed development and/or a trail through the natural features to connect to the property to the east. Trails and associated creek crossings are conceptually shown on Schedule 'A6d' of the

Official Plan. Schedule ‘A6d’ shows a trail wrapping around the development but does not contemplate a trail connection through the natural features, as shown below.




This is consistent with Map 5 of the Beaver Meadows District Plan, which also does not show a potential trail connection through the natural features in this area, as indicated below.



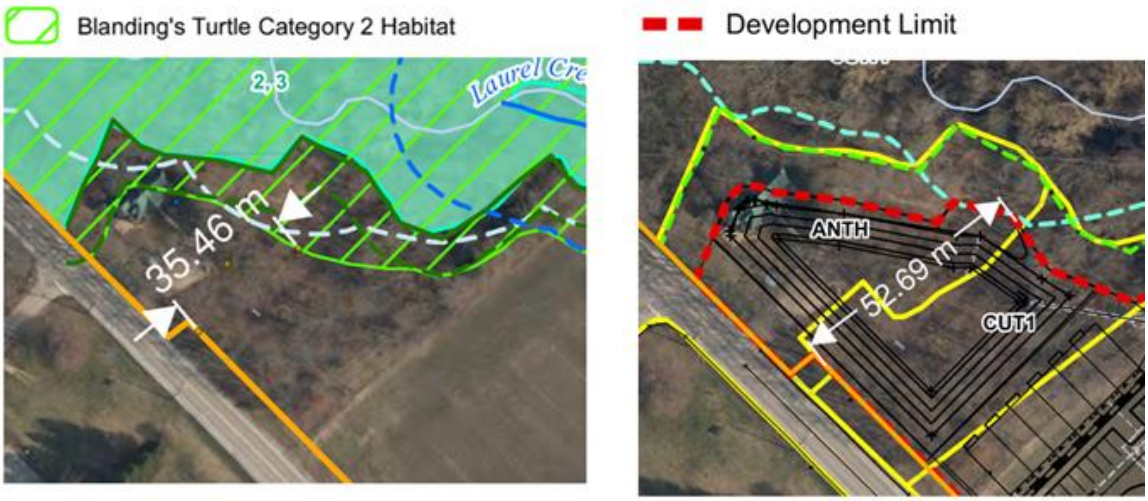
The only trail connection contemplated through the natural features was at the south limit of the District on the Erbsville Kartway property. The EIS that was completed for the Erbsville Kartway property noted the following with respect to that potential trail connection: *"It is recommended that this connection be removed as the natural area to be crossed is highly sensitive provincially significant wetland with deep organic soils and is significant wildlife habitat for turtle overwintering. A trail crossing here is inappropriate*."

Based on the direction provided through the Official Plan and District Plan, as well as the findings of the Erbsville Kartway EIS, a trail connection through the natural features to the east should not be contemplated. However, should one be pursued, consistent with Official Plan policy 8.2.2(11), the City would need to undertake an EIS to evaluate a potential trail, as those lands are to be conveyed to the City through the Erbsville Kartway draft plan conditions. For any trails wrapping around the development, the Erbsville South Environmental Study (ESES) sets out that they may be permitted in the outer portions of buffers (i.e. the outer 5 metres) subject to consideration in an EIS so to ensure the trails do not reduce the integrity and functionality of the buffer. The EIS, as submitted, does not provide any specific analysis or recommendations related to trail layout or design. Should a trail wrapping around the development be pursued, the EIS will need to be updated.

2. The submitted plans and drawings show the dripline and the proposed 10 metre buffer from the dripline (labeled as the ESPA setback). Wetland limits and corresponding buffers also need to be shown, as does the buffer for Laurel Creek. Staff note that these limits and buffers are shown on Map 5 of the EIS but that map does not include the proposed development limit. Staff also note that the buffers on Map 5 are not fully representative of what is actually proposed.

3. Based on the Draft Plan of Condominium, the lands containing the natural features and the buffer areas will be retained by the current owner. It is the City's preference and long standing practice to secure environmental lands in public ownership. This approach is supported by Official Plan policy 8.2.2(19), which identifies a number of options for securing lands in public ownership, and by the City's Environmental Lands Acquisition and Maintenance Policy (1999), which recognizes that environmental lands should be publically owned to the greatest extent possible. In addition to the natural features, and as set out by Official Plan policy 8.2.4(11), buffers required to ensure the protection of natural features are to generally be secured in public ownership.

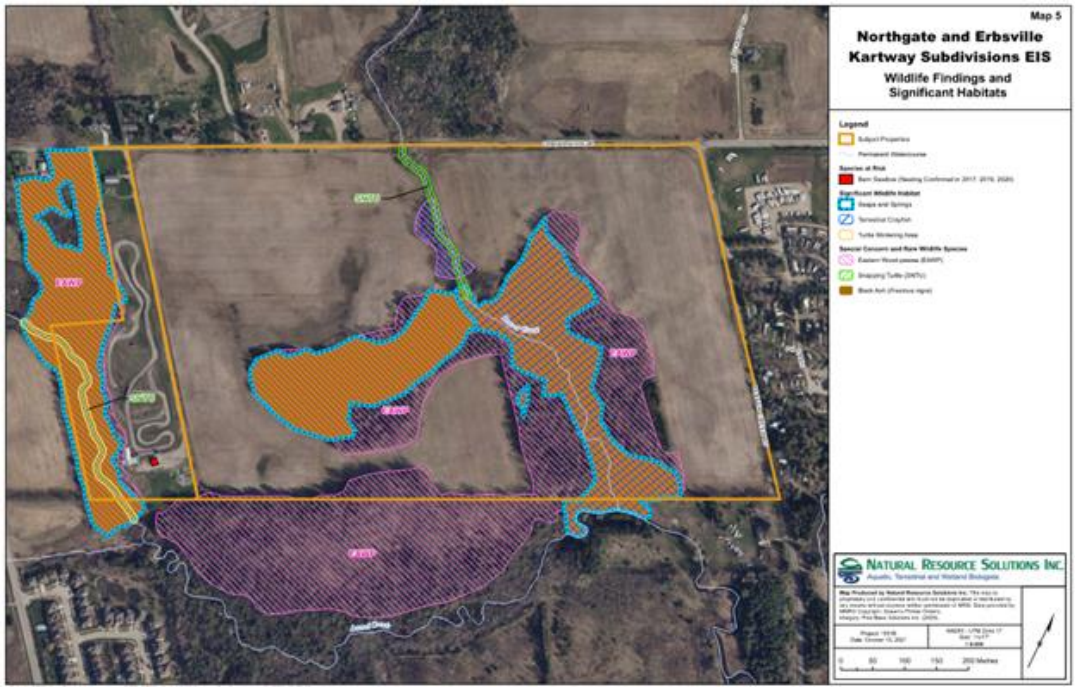
4. It is stated on page 8 of the EIS that Category 2 habitat for Blanding's Turtle does not overlap the development footprint. However, when Map 5 and 6 are compared, it appears the development footprint does encroach into the Category 2 habitat, as shown below through benchmarking measurements.




5. Section 2.3 of the EIS notes that "*Stantec Inc. has undertaken monitoring of the property beginning in 2006 and continuing through to 2021, however, to-date reports have been prepared up to 2020.*" As set out in the Terms of Reference for the EIS, and as supported by City staff, an additional single year (2021) of pre-construction monitoring ahead of construction (i.e. site grading) will be undertaken. Please confirm if this work has been completed or whether the timing of this work has shifted based on when the development applications were submitted.

6. Section 3.1.2 of the EIS notes that a tree inventory was completed for all trees along the perimeter of the proposed stormwater management pond location that have the potential to be impacted by the proposed development but that trees within the area of the proposed stormwater management pond and in the southeastern hedgerow were not individually inventoried since all trees will need to be removed in support of the proposed development, with a tally of these trees being completed to provide a general assessment of what is present so that any required compensation can be provided for these trees following their removal. Results of the tree inventory and tree tally are then presented in Section 4.2.3. Provided the other concerns raised are addressed, particularly Comments 3 and 9, and the owner of 672 Erbsville Road does not raise a concern about the removal of the southeastern hedgerow, staff can generally support the removal of the trees. A Tree Saving and Protection Plan that specifies measures for removal, retention and replacement using a 2:1 ratio will be required as part of detailed design.

7. Section 4.2.2.1 of the EIS discusses Black Ash, noting Black Ash was documented in the SWC4-2 community to the extreme southwest of the study area. Black Ash has also been confirmed east of the subject property through the North Waterloo Scoped Subwatershed Study and the EIS was completed (by NRSI) for Erbsville Kartway. The EIS for Erbsville Kartway mapped habitats containing Black Ash as Significant Wildlife Habitat under the Special Concern and Rare Wildlife Species category as follows:




8. Section 4.3.3.2 of the EIS discusses bats, noting that suitable maternity colony habitat for Species at Risk bats may be present in the house located to the immediate northwest of the proposed development footprint and that this building will be retained. Which house is being referred to? Is it the one circled in red below? Based on the Draft Plan of Condominium (dated December 17, 2021) and the Master Plan (dated October 19, 2022), it appears this house will be removed.



9. Section 5.1.1 of the EIS states that a 30 metre buffer will extend from the wetland boundary. The 30 metre buffer is shown on Map 5, however, when compared and measured against the development footprint included on Map 6, the 30 metre buffer has not been consistently applied, as shown below.







Minimal justification is provided for this under Section 5.3, where it is noted that the buffers have been smoothed to create a uniform edge as recommended in the ESES. This appears to be an unintended application of the ESES given that the buffer widths it recommends are minimum setbacks and the suggestion to smooth buffers to produce a uniform edge is made under the ecological enhancement section. Together, these two things suggest that smoothing of the buffers should have the effect of making the buffers wider on a variable basis, rather than narrower. Please provide a figure that shows areas of proposed buffer encroachment (i.e. areas where the buffer is less than 30 metres for the wetland and watercourse) and areas of buffer addition (i.e. areas where the buffer is greater than 30 metres for the wetland and watercourse).

10. The map included under Comment 7 should be used to complement/supplement the Significant Wildlife Habitat discussion provided under Section 5.1.4.

11. It is noted on page 65 of the EIS that the proposed development follows the land use structure of the Erbsville South Block Plan. At a minimum, this does not seem to be the case with the SWM facility. Section 7.6 of the ESES recommends that there be one SWM facility for 720 and 672 Erbsville Road. Staff defer to Planning Approvals and Engineering Services staff to determine whether the SWM facility as proposed would encumber the property at 672 Erbsville Road from managing its stormwater appropriately. Further, based on how the SWM facility is shown, it is unclear how it will be maintained. Typically, an access road, which also functions as a trail, is constructed around SWM ponds to facilitate access and maintenance.

12. Section 6.3.4.2 of the EIS notes that in order to prevent migrating turtles from entering the developed areas, permanent wildlife fencing is recommended. A Blanding's Turtle Habitat Mitigation Plan for much of the lands within North Waterloo has been prepared (by NRSI) through work completed for the Erbsville Kartway and Northgate subdivisions. The Plan is attached for reference. Please confirm with MECP whether turtle barrier fencing will be required for this area as well.

13. Section 3.2 of the Functional Servicing and SWM Report states that in areas where 3:1 grading is not possible, retaining walls will be proposed to achieve the required slopes. Any retaining walls will need to be outside of the buffers and be able to be maintained without accessing the buffers.

14. The infiltration swale shown on the Functional Grading Plan extends beyond the proposed Limit of Development that is shown. Further, any infiltration swale should be located outside of the buffer. As set out in Official Plan policy 8.2.4(9), buffers are to remain in or be restored to a primarily natural state and it is unclear whether the swale would need to be maintained/manicured.

15. Consideration needs to be given to snow storage, as the piling or dumping of snow into buffers will need to be avoided.

16. Based on the review undertaken to date, it is anticipated the following will need to be included as conditions of approval, with the mechanism to be determined at a later time (e.g. development agreement and/or site plan agreement and/or condo declaration). For consistency, the wording that is ultimately used should be the same as or align with the wording that was used for the Erbsville Kartway and Northgate draft approval conditions.
    - Landscape Plan that includes buffer plantings, ecological enhancements and educational signage
    - Tree Saving and Protection Plan that specifies measures for removal, retention and replacement using a 2:1 ratio
    - Invasive Species Management Plan
    - Trail Network Plan
    - Comprehensive Fencing Plan
    - Turtle barrier fencing
    - Assessment of any trees to be removed for bird nests/potential bat roosting habitat in accordance with the Endangered Species Act and Migratory Birds Convention Act
    - Removal of refuse/garbage from the natural features and buffers
    - Operation Maintenance Plan for the SWM facility that specifies in-water maintenance work should not be undertaken between May 1 and August 31 to ensure no negative impact to Blanding's Turtle or where maintenance cannot be avoided, wildlife salvage will be implemented
    - Timing window for breeding bird season (April 1 to August 31)
    - Timing window for bats (April 1 to September 30)
    - Approval and implementation of a pre-, during- and post-construction monitoring program
    - Dedication of the environmental lands and their buffers to the City free of charge and without any encumbrances

## 6. Development Engineering

1. Proposed servicing conflicts with Ontario Building Code.
    a. Water servicing cannot service another property through the 720 Erbsville Road development.
    b. 672 Erbsville Road will require its own water and sanitary servicing connection to Erbsville Road.

c. Shared stormwater management will require a shared servicing agreement between 720 Erbsville Road and the 672 Erbsville Road. City of Waterloo should also be included in the agreement.

    i. Proposed stormwater management pond could be privately owned.

2. Confirm how the regulatory floodline was determined with topographical survey.
3. Provide detail of infiltration swale, including sizing calculations and demonstrate how infiltration targets will be met.
4. Grading and Drainage from the site is to be designed such that overland flows do not negatively impact adjacent properties. The major overland flow routes from this property should be directed to the right of way and not to the adjacent property.
5. An updated detailed water distribution analysis will be required at the detailed design stage.
    a. Discrepancies are noted with units used to calculate fire flow and the proposed development plans.
    b. Available flow from existing hydrant test were shown at 50 psi, where the required available flow should be demonstrated at 20 psi.
6. The proposed stormwater management facility is not located in the previous submissions location. As per the Erbsville Environmental Study, May 2018, 672 Erbsville Road is to be developed in conjunction with the subject property, with the SWM facility designed to accommodate both properties.
    a. SWM pond property should be designed to allow for proper access for maintenance purposes. No clear access shown on submitted plan.
    b. Target flows for the 2-year storm event appear to be miscalculated. Review and revise.
    c. SWM Facility outlet orifice shows invert of 348.90m, and the control orifice discharge shows an elevation of 349.65m. Confirm design of outlet structure.
    d. Extend detention storage volumes in Table 6 differs from what is provided.
7. Internal preliminary assessment of the sanitary capacity, having a proposed discharge of 7.0 L/s:
    a. 2029 projected ‘post-development’ modelling indicates the sanitary sewer downstream of the proposed development appears to have capacity available during wet weather scenarios
8. Further details will be required during the Site Plan process and detailed design stage for review and acceptance from the Engineering Division.

## 7. Landscape Review

General landscape architectural comments for consideration, applicable at the Site Plan stage and detailed design stage are outlined below:

1. Include a Vegetation Management Plan and Landscape Plan. Be sure to include trees within 6m of property (i.e., existing street trees to be preserved).

2. A Vegetation Management Plan must be undertaken and approved prior to removal of any vegetation on site.

3. The City recommends replacement rate of trees to be removed is at a ratio of 2:1. The applicant is encouraged to maximize tree planting wherever possible on site.

4. Provide a landscape design that will enhance and strengthen the streetscape quality along Erbsville Road including but not limited to street trees, enhanced planting and paving, site furnishings, etc.

5. Landscape design must comply with the City of Waterloo's accessibility guidelines to ensure adequate provisions for accessibility.

Further details will be required during the Site Plan process and detailed design stage of review and landscape acceptance.

## 8. Transportation Services

1. Transportation Services forecast increased demand for limited on-street parking spaces on the neighbouring streets, and recommend that sufficient parking be provided on-site to meet the regular demands of the residents, and visitors without reliance on municipal on-street parking. Transportation Services does not support the reduced visitor parking rate for the following reasons:
    - There are no alternatives for visitors to park nearby the site, see below for nearby on-street parking restrictions:
        - 3 Hour parking restriction on Regal Place (across a regional arterial road with no crossing facilities) with limited spaces for parking
        - 3 Hour parking restriction on Forest Gate Crescent (500 metres away from the proposed development)
    - The closest transit service is approximately 700 metres south of the proposed development
    - There are no dedicated cycling infrastructure along Erbsville Road north of Laurelwood Drive

    - There are no dedicated pedestrian infrastructure along Erbsville Road north of Forest Gate Crescent.
2. Transportation Services recommend additional parking be explored on site.
3. Transportation Services have reviewed the provided transportation impact study. At this time, there are no remedial measures required because of the development at 720 Erbsville Road.
4. Transportation Services request a sidewalk along the frontage of the site.
5. Please verify the Erbsville Road road widening with the Region of Waterloo.

## 9. EXTERNAL AGENCY COMMENTS

The following External Agency Comments are appended to this letter:

Appendix 1 – Region of Waterloo
Appendix 2 – Grand River Conservation Authority
Appendix 3 – Enova Power
Appendix 4 – Waterloo Catholic District School Board
Appendix 5 – Waterloo Region District School Board

## 10. Next Steps

Please review the comments contained in this letter and the agency comments enclosed and provide the additional information or rationale requested, addressing all staff/agency comments. Should you wish to discuss the comments in this letter further please feel free to contact me and we can set up a meeting to discuss the comments further and work to resolve any outstanding issues.

The list of required resubmission items include:

a) Three (3) copies of a **Resubmission Letter** addressing all comments received.
b) Three (3) copies of a **Planning Justification Addendum Letter**
    - Include justification for any additional amendment being requested (if any).
c) Three (3) copies of the revised **Urban Design Guidelines**.
    - Include three dimensional renderings of proposed townhouse blocks.
    - Include updated three dimensional renderings of the proposed stacked townhouse blocks that address staff comments.
    - Once the location of the park space is confirmed a high level design of the park and outdoor recreational spaces should be included in the Urban Design Guidelines.
d) Three (3) copies of the revised **Scoped Environmental Impact Study**
e) Three (3) copies of the revised **Functional Servicing and SWM Report**
f) Three (3) copies of the revised **Noise Report**
    - Noise Report should be revised to take into consideration the revised site layout.
g) Two (2) copies of the **Parking Study** (if a parking reduction is required)
    - Terms of Reference for Parking Study to be approved by City Planning and Transportation Staff
h) Three (3) copies of the revised **Master Plan/Site Plan** (11" by 17")

i) Three (3) copies of the revised **Condominium Plan** (11" by 17")
    - If the individual townhouse units are to include the surrounding yard space as part of the unit then ensure that the townhouse building is not shown in a heavy line weight. The line that outlines the unit should have the heaviest line weight and the townhouse building itself should be in a thinner line weight to clearly define the unit boundary.

j) Three (3) copies of a draft **Reference Plan**.
    - Plan to confirm exact Regional Road widening
    - Plan to show surveyed boundary limit between the R8 zone and OS3 zone (based on re-verified wetland boundary).

k) Three (3) copies of a **Topographical Survey** with flood elevations and vertical datums noted
    - See GRCA comments for details

l) Three (3) copies of proposed **Zoning Plan** that clearly identifies the limits of the R8 zone, OS3 zone and OS1 zone.

m) Three (3) copies of **Record of Site Condition (RSC) and Acknowledgement Letter**.
    - If RSC is not received then staff may consider placing a Holding provision on the site.

n) One (1) **digital copy** of the above listed resubmission items. Please ensure the digital copies meet AODA standards.

Once City Staff receive the resubmission package it will be circulated to internal and external commenting agencies for review.

If you have any questions, please contact the undersigned.

Regards,



**Rita Szilock, MCIP, RPP**
**Planner**
Planning Approvals
Integrated Planning & Public Works
City of Waterloo
**P:** 519.747.8650 / **F:** 519.747.8523 / **TTY:** 1.866.786.3941 / **E:** rita.szilock@waterloo.ca

cc. Aleah Clarke, MHBC Planning (email only)
Natalie Hardacre, City of Waterloo (email only)
Shilling Yip, Region of Waterloo (email only)
Trevor Heywood, GRCA (email only)
Ric Martins, Policy Planning, City of Waterloo (email only)
Max Kerrigan, Urban Designer, City of Waterloo (email only)
Robyn McMullen, Environmental Planning, City of Waterloo (email only)
Mike Defoa, Development Engineering, City of Waterloo (email only)
Ainsley Rego, Transportation Services, City of Waterloo (email only)

# Appendix 1

## Region of Waterloo

PLANNING, DEVELOPMENT
AND LEGISLATIVE SERVICES
Community Planning
150 Frederick Street 8th Floor
Kitchener Ontario N2G 4J3 Canada
Telephone: 519-575-4400
TTY: 519-575-4608
Fax: 519-575-4466
www.regionofwaterloo.ca

Shilling Yip (226) 753-1064 (C)
Files: D17-40/4/22045
C14-60/4/22015

March 13, 2023

Rita Szilock, MCIP. RPP
Planner
Integrated Planning & Public Works
City of Waterloo
100 Regina Street S.
P.O. Box 337, Stn. Waterloo
Waterloo, ON N2J 4A8

Dear Ms. Szilock:

**Post Circulation Comments**
**Official Plan Amendment 45**
**Zoning By-law Amendment Z-22-15**
**Sunvest Group of Companies**
**720 Erbsville Road**
**CITY OF WATERLOO**

Region staff has reviewed the above-noted applications and provides the following comments for your consideration at this time. The purpose of the OPA is two-fold: 1) to create a special provision to permit stacked townhouses that are 6 units wide and 4 units vertical with a total of 24 units, whereas the Erbsville South Block Plan limits stacked THs to 4 units in width and 2 units vertical for a total of 8 units. 2) to provide a maximum building height of 12 metres for the proposed stacked THs, whereas the current maximum building height is 10 metres.

The purpose of the ZBA is to re-zone from Future Determination (FD) to Residential Eight (R8) and Conservation (OS3) with site specific provisions to provide: 1) minimum interior lot line setback of 2.8m, whereas 7.5m is required; 2) maximum building height of 12m for stacked THs whereas the maximum height is 10m; and 3) minimum parking rate of 0.05 spaces per TH unit whereas 0.1 spaces per TH is required.

Document Number: 4312409 Version: 1

The applications will provide for development of 59 townhouse units and 120 Stacked townhouse units (179 units total) and 251 parking spaces along with common elements including drive aisles. The development is proposed on municipal services.

A plan of standard condominium application file 30CDM-22408 is also being processed by the Region, in conjunction with the two subject applications. Notwithstanding comments on the condominium plan provided below, additional comments on the condominium application, including agency comments will be provided under separate cover. It is also noted at this time that the Region will not be in a position to draft approve the draft plan of condominium until the official plan and zoning by-law amendments have been approved and in effect.

The lands are designated Urban Area "Designated Greenfield Areas" and Core Environmental Features on Maps 3a and 4 respectively in the Regional Official Plan (ROP).

**Density**

The Planning Justification Report (MHBC Planning, December 2021) notes the density for this development will yield a density of 119 residents and jobs per hectare (p. 23). Although the calculations have not been detailed in the report, Region staff calculation of the density (based on the Land Budget PPU in effect) is slightly lower at 114. The difference may be a result of the take-outs assumed in the density calculation. Staff also notes the Grand River Conservation Authority comments of December 14, 2022 require confirmation of the floodplain and wetland limits, which may change the take-outs assumed. Nevertheless, density for this development exceeds the minimum of 55 residents and jobs per hectare required in the ROP.

**Water Services**

Water Services (Engineering and Planning) have reviewed the application and provide the following comments:

1) The Functional Servicing and SWM Report prepared by IBI Group dated October 2021 does not adequately show that the existing water infrastructure can support the proposed development. The fire flow calculations are not consistent with the proposed development. For example, the largest row townhouse site contains 6 units, and the architectural drawings show it to have an area of 548m$^2$. The FUS fire demand calculations do not contain the calculations for the largest building.

2) Furthermore, assumptions made in the fire flow demand estimation provide for a non-combustible occupancy. Contents of residential dwellings are considered regular combustible, and typically no reduction for occupancy is appropriate. With the corrected fire demand calculations, the largest building (548 m$^2$) requires 200 L/s (3,170 gpm).

3) The available flow from the hydrant test is shown to be 1705 gpm (107 L/s) @ 50 psi. The consultant is required to calculate the estimated available flow at 20 psi using the NFPA 291 Handbook.

4) It is anticipated that the consultant will discover that the available flow from the existing infrastructure will be less than the required demand. The results may be a change in the proposed site plan orientation, recommendations for fire walls, less units per building, etc.

5) Alternatively, there may be additional watermain infrastructure required in order to service the proposed development. The City and Region have dual ownership watermains planned for the area along Erbsville Rd, Conservation Drive, and Beaver Creek Rd in order to service the Beaver Creek Meadows District Plan area. The watermain installation is currently budgeted for 2024/2025. Depending on the timing of development of the subject lands at 720 Erbsville, the site may benefit from the additional looping of watermains.

The consultant is required to review and resubmit the FSR for the property which addresses the above comments.

**Hydrogeology & Water Programs (Source Water Protection)**

The property 720 Erbsville Rd is within Wellhead Protection Sensitivity 8 as designated on Map 6a of the Regional Official Plan. The purpose of the designation and policies contained in Chapter 8 of the ROP is to protect long-term municipal groundwater supplies.

Hydrogeology and Water Programs staff will require a Salt Management Plan prior to site plan approval for this development.

**Record of Site Condition (RSC)**

The MHBC cover letter of December 20, 2021 acknowledges a RSC has not been submitted with the applications. Region staff can support securing completion of the RSC and submission of the same along with the MECP acknowledgement to the Region, through a holding provision in the proposed zoning by-law amendment.

**Corridor Planning**

Noise Study

Corridor Planning staff has reviewed the Noise Report for the proposed residential development at 665 & 720 Erbsville Road, City of Waterloo, prepared by IBI Group, dated October 2021. The Report has assessed traffic noise from Erbsville Road.

Based on the excess road noise levels and nature of the development, the following mitigation will be required:

Ventilation (All Units)

Provision for installation of central air conditioning will be required for all units in the proposed development, including forced air ventilation systems with ductwork sized for future installation of central air conditioning systems by the occupant. The location, installation and sound rating of the air conditioning device should comply with NPC-216, Residential Air Conditioning Devices.

The provision for adding central air conditioning systems and window and building construction meeting the minimum requirements of the Ontario Building Code (OBC) will provide adequate sound insulation for the proposed building and will exceed this requirement.

Warning Clause (All Units)

The owner will be required to enter into an agreement with the Region of Waterloo / City of Waterloo to include noise warning clauses in the offers to purchase and/or rental agreements for all dwelling units, and in the declaration of any future plan of condominium as follow:

*"This dwelling unit has been designed with the provision for adding central air conditioning at the occupant's discretion. Installation of central air conditioning by the occupant in low and medium density developments will allow windows and exterior doors to remain closed, thereby ensuring that the indoor sound levels are within the sound level limits of the Municipality and the Ministry of the Environment."*

Prior to the issuance of building occupancy permits for this development, the Municipality's building inspector or a Professional Engineer qualified to provide acoustical engineering services in the Province of Ontario to certify that the recommended noise control measures have been properly installed and constructed.

The above may be secured by way of conditions of draft approval for the condominium application.

Stormwater Management & Site Grading

Region staff have undertaken review of the Functional Servicing and SWM Report dated October 2021 authored by IBI Group, and generally have no concerns.

Under detailed engineering design, a Lot Grading, Site Servicing plans and a Stormwater Management Report will be required at the site plan application stage for this development. Please email all pertinent plans and reports; no hard copies are requested.

The site must be constructed and graded in accordance with the approved plans, and the Regional Road allowance must be restored to the satisfaction of the Regional Municipality of Waterloo.

Please note that any new servicing connection(s) from the Regional right-of-way would require Regional approval through a separate process of Municipal Consent and Regional Work Permit. A Region of Waterloo Work Permit must be obtained from the Region prior to commencing construction within the Region's right of way. In this regard, please visit https://rmow.permitcentral.ca/ for further guidance.

This may be deferred to Site Plan Application stage.

Regional Road Dedication

The Region's Official Plan identifies Regional Road 70 (Erbsville Road) with a designated road width of 30.480 metres. Staff estimates that an approximate road widening of 2.10 metre will be required along the Erbsville Road frontages of the subject properties (up to Schnarr Street). The Owner/Applicant must engage an Ontario Land Surveyor (OLS) to prepare a draft reference plan which illustrates the road widening prior to registering the reference plan, the OLS should submit a draft copy of the plan to the Transportation Planner for review. The land must be dedicated to the Region of Waterloo for road allowance purposes, and must be dedicated without cost and free of encumbrance.

This may be deferred to Site Plan application stage.

Access Permit/TIS/Access Regulation

Region staff has undertaken review of the Transportation Impact Study titled "665 & 720 Erbsville Road Transportation Impact Study" dated July 2022 submitted by Paradigm Transportation Solutions Limited, and generally concur with the recommendation therein. Region comments will be forwarded later under separate cover.

Please note that proposed accesses to Regional Road 70 (Erbsville Road) will require a Regional Road Access Permit ($230 fee) https://forms.regionofwaterloo.ca/ePay/PDLS-Online-Payment-Forms/Commercial-Access-Permit-Application. The access must comply with the Regional Access Policy in design i.e. minimum width 7.6 metres; 6.0 metres turning radii.

This may be deferred to Site Plan Application Stage.

Transit Planning

There are currently no plans to extend transit service to those sections of the proposed development and along this section of Erbsville Road. Any transit requirements and needs for the extension of transit services would be identified at a later stage once more detailed plans for the proposed development on the subject lands are available.

Fencing

Any back lotted residential developments may require a 1.8 m black vinyl fence, to be erected at the developer's cost, on the Region's property.

Application Fees

A $300 Preliminary Site Plan consultation fee and a $805 Site Plan review fee will be required for a Site Plan Application. These fees shall be provided to the Region of Waterloo directly.

This will be deferred to Site Plan Application Stage.

Transportation Capital Program (TCP)

Erbsville Road is currently scheduled for road resurfacing in 2026.

For further information please contact Jim Ellerman @ 519-575-4100 X 3757 Email: JEllerman@regionofwaterloo.ca

**Environmental Planning**

Environmental Planning has reviewed the materials submitted in support of the proposed Official Plan Amendment, Zoning By-law and Plan of Condominium applications, including the "720 Erbsville Road, Waterloo, Ontario, Environmental Impact Study" (the EIS) prepared by NRSI, December 2021. The EIS generally addresses the terms of reference that were agreed to, relying on the previously collected field work which was undertaken through the Erbsville South Environmental Study by Dougan and Associates (2018), and not undertaking new surveys.

There are some items that will require clarification before the EIS can be ultimately accepted, as well as confirmation of MECP input on the Species at Risk, and confirmation on design/layout of the site. Until such time as the items below are addressed completely, environmental planning staff will not be in a position to support the approval of any of the applications. Once feature limits and buffers are confirmed, then the Official Plan Amendment and Zoning By-law Amendment applications may be supported. In order for the Draft Plan of Condominium to be supported, all of the items identified below will be required to be addressed. The applicant is invited to contact Jane Gurney (Senior Planner – Environment, jgurney@regionofwaterloo.ca) for further information or clarification on the following.

- Buffers – the text of the EIS refers to smoothing of buffers, however the labeling of the buffers on the figures appears to indicate that the minimum buffers are applied throughout the site. Based on review of the figures in the EIS as well as the Draft Plan of Condominium, there appear to be areas where the buffers do not actually meet the minimum requirements. An updated figure which includes the feature limits (see note below), associated buffers, and proposed site layout would be appreciated. This figure should also identify areas where buffer minimums are not met.
- Wetland delineation – it is understood that an updated confirmation of the wetland limits is required. If there are changes in the wetland limits, updated mapping and associated buffers will be required.

- General design – the figures appear to show some encroachment into the feature limits and floodlines (as per our current mapping). Confirmation of the wetland and floodline depicted throughout the submission is required through the GRCA.
- The site appears quite tight, and it is not clear how or where snow storage will be accommodated, and if there will be any associated impacts to the adjacent Core Environmental Features; the EIS should be updated to address this.
- If a trail is proposed within the site, the EIS will need to reflect this.
- It is anticipated that access to the adjacent Core Environmental Features and the trail network proposed in the subdivisions to the east may invite encroachment through the feature, including through the southern portion of the feature where it is narrower. Please provide additional information as to how the Core Environmental Features adjacent to the site will be protected through the proposed mitigation measures and an assessment of the mitigation measures, especially as they relate to the rear of the units abutting the features (Units 1-43).
- Bats – There is a reference in Sections 4.3.3.2 and 5.2.3 of the EIS to potential bat habitat in a building northwest of the site, but which is not proposed to be altered or demolished as part of the proposed development. Please clarify which structure this is; it is appears that this may be the house that is within the subject property (opposite the intersection of Erbsville and Shnarr), and which is in an area that is likely to be impacted by the proposed stormwater management facility and associated green space. If the house is to be removed, please ensure that the EIS, including Map 5, is updated accordingly and any associated correspondence with MECP is provided.
- Blanding's Turtle – MECP input is pending, and until such time as it is received, regional environmental planning will not be able to support the draft approval on the subject lands.
- With regard to the overlap between the proposed development area and the Category 2 Blanding's habitat, consideration should be given to the potential restoration and enhancement of this area rather than the exclusion and use of the area for development related purposes.
- Permanent exclusion fencing (for turtles) does not appear to be recommended other than around SWM facility. Given the approach on the adjacent lands it would seem an appropriate measures to ensure that there are not turtles inadvertently directed to this site due to being restricted from adjacent sites would be appropriate. If exclusion fencing is not being proposed around the limits of the environmental features and Blanding's habitat, please provide additional explanation as to why the use of exclusion fencing is not appropriate on the subject site.
- As noted above, MECP input is required in advance of draft approval or final design acceptance.

**Archaeology**

Regional Cultural Heritage staff have received and reviewed the document titled: "Stage 1-2 Archaeological Property Assessment : 720 Erbsville Road, Waterloo" (AMICK, Aug. 23, 2022) and the associated Ministry Acknowledgement Letter.

The area of land subject to the proposed plan has been cleared of archaeological concern, however, the applicant and the City should be made aware that the lands identified on the Draft Plan of Standard Condominium (last revised Dec. 17, 2021) as "Additional Lands Owned by Applicant" continues to possess the potential for the recovery or archaeological resources. Any proposed use of these lands must be preceded by an Archaeological Assessment before any ground altering activities of any kind are permitted.

**Housing**

General

The following Regional policies and initiatives support the development and maintenance of affordable housing:

- Regional Strategic Plan
  - Objective 4.2 requires the Region to make affordable housing more available to individuals and families.
- 10-Year Housing and Homelessness Plan
  - contains an affordable housing target which is that 30% of all new residential development between 2019 and 2041 in Waterloo Region is to be affordable to low and moderate income households.
- Building Better Futures Framework
  - shows how the Region plans to create 2,500 units of housing affordable to people with low to moderate incomes by 2025.
- Region of Waterloo Official Plan
  - Section 3.A (Range and Mix of Housing) contains land use policies that ensure the provision of a full and diverse range and mix of permanent housing that is safe, affordable, of adequate size, and meets the accessibility requirements of all residents.

The Region supports the provision of a full range of housing options, including affordable housing. Should this development application move forward, staff recommend that the applicant consider providing a number of affordable housing units on the site, as defined in the Regional Official Plan. Rent levels and house prices that are considered affordable according to the Regional Official Plan are provided below in the section on affordability.

In order for affordable housing to fulfill its purpose of being affordable to those who require rents or purchase prices lower than the regular market provides, a mechanism

should be in place to ensure the units remain affordable and establish income levels of the households who can rent or own the homes.

Staff further recommend meeting with Housing Services to discuss the proposal in more detail and to explore opportunities for partnerships or programs and mechanisms to support a defined level of affordability.

Policy 3.A.6 in the Regional Official Plan (ROPA 6) applies to this site. It states:

"Where a development application proposing residential uses is submitted for a site containing one hectare or more of developable land, the Region and the area municipalities will require, a minimum of 30 percent of new residential units to be planned in forms other than single-detached, semi-detached, and street fronting and single unit condominium townhouse units. Examples of other potential housing forms may include, but are not limited to: duplexes; tri-plexes; four-plexes; multi-plexes; stacked and back-to-back townhouses; and apartments."

A review of the proposed unit types on the Draft Plan of Condominium indicates that this proposal adheres to Policy 3.A.6.

Affordability

For the purposes of evaluating the affordability of an ownership unit, based on the definition in the Regional Official Plan, the purchase price is compared to the least expensive of:

| | |
|---|---|
| Housing for which the purchase price results in annual accommodation costs which do not exceed 30 percent of gross annual household income for low and moderate income households | $385,500 |
| Housing for which the purchase price is at least 10 percent below the average purchase price of a resale unit in the regional market area | $576,347 |

*Based on the most recent information available from the PPS Housing Tables (2021).

In order for an owned unit to be deemed affordable, the maximum affordable house price is $385,500.

For the purposes of evaluating the affordability of a rental unit, based on the definition of affordable housing in the Regional Official Plan, the average rent is compared to *the least expensive of*:

| | |
|---|---|
| A unit for which the rent does not exceed 30 per cent of the gross annual household income for low and moderate income renter households | $1,470 |
| A unit for which the rent is at or below the average market rent (AMR) in the regional market area | Bachelor: $950<br>1-Bedroom: $1,134<br>2-Bedroom: $1,356<br>3-Bedroom: $1,538<br>4+ Bedroom: $3,997 |

*Based on the most recent information available from the PPS Housing Tables (2021)

In order for a rental unit to be deemed affordable, the average rent for the proposed units which have fewer than 3 bedrooms must be at or below the average market rent in the regional market area as shown above. For proposed units with three or more bedrooms, the average rent for the units must be below $1,470.

Please do not hesitate to contact Judy Maan Miedema directly by email at JMaanMiedema@regionofwaterloo.ca should you have any questions or wish to discuss in more detail.

**Proposed Zoning By-law Amendment**

Staff continues to review the proposed zoning by-law amendment.

**Regional Development Charges**

Any future development on the subject lands will be subject to provisions of Regional Development Charges By-law 19-037 or any successor thereof.

**Other**

Staff acknowledges the Region's required review fees for the OPA and ZBA applications were received November 21, 2022.

Staff continues to review the applications.

If you have any questions, please feel free to contact me (226) 753-1064.

Yours truly,

Shilling Yip, MCIP, RPP
Senior Planner

cc. Dave Aston, MHBC Planning

Document Number: 4312409 Version: 1

# Appendix 2

## Grand River Conservation Authority

Administration Centre: 400 Clyde Road, P.O. Box 729 Cambridge, ON N1R 5W6
Phone: 519-621-2761 Toll free: 1-866-900-4722 Fax: 519-621-4844 www.grandriver.ca

December 14, 2022

Rita Szilock
Planner
City of Waterloo
100 Regina Street South
PO Box 337, Station Waterloo
Waterloo ON N2J 4A8
rita.szilock@waterloo.ca

**Re: Draft Plan of Condominium**
**Official Plan Amendment 45**
**Zoning Bylaw Amendment Z-22-15**
**720 Erbsville Road, Waterloo**
**Sunvest Group**

Dear Ms. Szilock,

Grand River Conservation Authority (GRCA) staff have reviewed the above-noted application for 179 townhouse units.

**Recommendation**

We recommend deferring approval of the applications until regulated feature limits and stormwater management (SWM) details are confirmed.

**Documents Reviewed by Staff**

Staff have reviewed the following documents submitted with this application:

- Planning Justification Report (MHBC, December 2021)
- Functional Servicing and Stormwater Management Report (IBI, October 2021)
- Environmental Impact Study (NRSI, December 2021)
- Master Plan (MHBC, revised October 19, 2022)
- Draft Plan (MHBC, revised December 17, 2021)



Member of Conservation Ontario, representing Ontario's 36 Conservation Authorities | The Grand – A Canadian Heritage River

This follows our pre-consultation comments dated August 20, 2020.

## GRCA Comments

The GRCA has reviewed this application as per our Provincial delegated responsibility to review natural hazards identified in Section 3.1 of the Provincial Policy Statement (PPS, 2020), as a public body under the Planning Act, and in accordance with Ontario Regulation 150/06, GRCA's Board approved policies, and our MOU with the Region of Waterloo.

Information currently available at our office indicates that the subject lands contain Laurel Creek, an unnamed tributary, their associated floodplain and the Provincially Significant Sunfish Lake Laurel Creek Wetland Complex.

After reviewing the submission, the GRCA requires confirmation of the floodplain and wetland limits, as well as some stormwater management details prior to recommending approval of the applications.

### Engineering

1. Please confirm how the regulatory floodline was determined. Please provide a topographical survey with flood elevation(s) and vertical datums noted.

2. Please provide a section and sizing calculations for the infiltration swale, and demonstrate how infiltration targets are being met. The subwatershed report (Final Subwatershed Management Plan, Subwatershed Plans #313/309, Planning Initiatives Limited And Associates, April 1996) requires a safety factor of 1.25 for infiltration from lots, and a safety factor of 1.67 for infiltration from roads. Further, any infiltration from roads require a winter bypass.

3. There appears to be a typo in Table 1 for the catchment area of Catchment 111/102. Regardless, the target flows for the 2-year storm appear to be miscalculated. Please review and revise.

4. The Stage-Storage-Discharge relationship for the SWM facility notes that the 150mm outlet orifice has an invert elevation of 348.90 metres. However, control orifice discharge only starts at 349.65 metres. Please clarify the design of the outlet structure.

5. Table 6 indicates a required extended detention storage volume of 955 cubic metres. However, it appears only 930 cubic metres of storage appears is provided. Please review and revise.

Ecology

6. As requested during the Environmental Impact Study (EIS) Terms of Reference stage on January 27, 2021, we wish to re-verify of the wetland boundary. This is due to the length of time since the last GRCA-verified wetland staking (August 18, 2014), the length of time since finalization of the 2018 Erbsville South Environmental Study (May 11, 2018), and season of the more recent reconfirmation (December 8, 2020). Please reach out to the GRCA during the 2023 growing season (May to September) to complete this. Updated wetland limits and applicable buffers must be indicated in a revised EIS and on all plans, noting the date GRCA verified the boundary.

7. Please provide a feature-based monthly water balance calculation for the wetlands and Laurel Creek.

8. Laurel Creek is a coldwater receiver. Please incorporate thermal mitigation measures and confirm how temperature targets outlined in the subwatershed report will be maintained. Other water quality parameters discussed in B8.4 of the subwatershed report should be discussed in the SWM plan, as well as proposing a monitoring plan for the effectiveness of the proposed mitigations.

**Advisory / Detailed Design Comments to the Applicant**

A. If retaining walls are to be used, the applicant should ensure that maintenance and repair needs of retaining walls is considered during detailed design, and will be possible without impacting the 30 metre wetland buffer.

B. Section 6.4 of the EIS indicates that active infiltration measures are feasible for this property. GRCA staff encourage the use of these measures where possible.

C. Planned snow storage locations should be illustrated on site plan drawings and located as far as possible from the wetland and storm water drainage intakes.

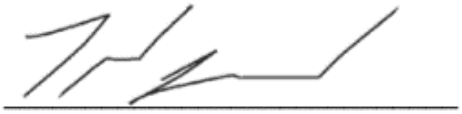
**Advisory Comment to the City**

I. The proposed SWM facility location is not consistent with the conceptual location shown in the Erbsville South Block Plan and supporting Erbsville South Environmental Study (IBI et al., May 2018). The latter document indicates that the adjacent property (672 Erbsville Road) must be developed in conjunction with the subject property, and consequently they must share the same SWM strategy. The Erbsville South Environmental Study recommends one SWM facility for both parcels at the southeast corner of the subject property and/or within 672 Erbsville Road.

Consistent with GRCA's 2022 approved fee schedule, this application requires a base fee of $2,410.00, and a net per hectare fee of $1,255.00. We have calculated a total fee of $6,349.70, based off of the area provided in the master plan. We will invoice the applicant for 70% of the fee ($4,444.79) for our review. The remainder of the fee will be required prior to draft plan approval. Additional fees are required for clearance, and a separate fee will be required for a GRCA permit.

We trust this information is of assistance, and request that the applicant provides a comment-response matrix to address our concerns. If you have any questions or require additional information, please contact me at 519-621-2763 ext. 2292 or theywood@grandriver.ca.

Sincerely,



Trevor Heywood
Resource Planner
Grand River Conservation Authority

Encl. Resource Mapping

cc: Dave Aston, MHBC
Shilling Yip, Region of Waterloo
Jane Gurney, Region of Waterloo
Robyn McMullen, City of Waterloo

# Appendix 3

## Enova Power

December 14, 2022

Rita Szilock, Planner
City of Waterloo
100 Regina St S
Waterloo, N2J 4A8

### Draft Plan Review Comments

**RE: (Z-22-15) 720 Erbsville Rd, Waterloo**

Enova Power Corp. ("**Enova**") has reviewed the Customer's draft plan application to The Regional Municipality of Waterloo for the referenced project and has the following comments:

1. **Conditions of Services**: Enova standard conditions in effect at the time of servicing will apply.

2. **Existing System**: Enova has 3-phase primary overhead distribution lines on the south-west side Erbsville Rd. Enova intends to maintain the overhead distribution system on all abutting streets.

3. **Relocation of Existing Facilities**: Any relocation of existing Enova facilities, if possible, will be at 100% of the applicant's cost.

4. **Expansion and Upgrade**: If modifications or additions to Enova existing distribution system triggered by a subdivision development are necessary otherwise customer connections cannot be made, Enova will conduct an economic evaluation outlined in *OEB Distribution System Code*. Such expansion cost will be stated in a Subdivision Agreement between WNH and the Customer and shall be signed by bother parties prior to construction.

5. **Set Back**: The proposed building(s) must be set back a minimum of 5.0m from all overhead primary conductors. Decreased setbacks (if proposed) may necessitate the installation of non-combustible barrier walls between Enova padmount transformers and the housing unit as per the Ontario Electrical Safety Code, Section 26-014. This installation would be at 100% the developer's cost and may require a revised right of way cross section to facilitate the installation due to the proximity of the padmount transformer to the sidewalk.

6. **Clearance**: Any objects (crane, similar hoisting device, backhoe, power shovel or other vehicle or equipment) shall not be brought closer than 3 meters to an energized overhead conductor owned by Enova.

# Appendix 4

## Waterloo Catholic District School Board

The Waterloo Catholic District School Board has reviewed the subject application and based on our development circulation criteria have the following comment(s)/condition(s) to be applied at such time as draft plan of condominium/site plan:

A) That any Education Development Charges shall be collected prior to the issuance of a building permit(s).

B) That the developer and the Waterloo Catholic District School Board reach an agreement regarding the supply and erection of a sign (at the developer's expense and according to the Board's specifications) affixed to the development sign advising prospective residents about schools in the area.

C) That the developer shall include the following wording in the condominium declaration to advise all purchasers of residential units and/or renters of same:

*"In order to limit risks, public school buses contracted by Student Transportation Services of Waterloo Region (STSWR), or its assigns or successors, will not travel on privately owned or maintained right-of-ways to pick up and drop off students, and so bussed students will be required to meet the bus at a congregated bus pick-up point."*

If you require any further information, please contact me by e-mail at Jordan.Neale@wcdsb.ca.

Thank you,
Jordan Neale
Planning Technician, WCDSB
480 Dutton Dr, Waterloo, ON N2L 4C6
519-578-3660 ext. 2355

# Appendix 5

## Waterloo Region District School Board

The Waterloo Region District School Board (WRDSB) has reviewed the above-noted application that proposes the amendments of OPA 45 and ZBA Z-22-15 in order to facilitate the development of 179 townhouse condominiums. The WRDSB offers the following comments.

### Student Accommodation

At this time, the subject lands are within the boundaries of the following WRDSB schools:

- Abraham Erb Public School (Junior Kindergarten to Grade 6);
- Laurelwood Public School (Grade 7 to Grade 8); and
- Laurel Heights Secondary School (Grade 9 to Grade 12).

The WRDSB's 2020-2030 Long-Term Accommodation Plan provides information on student enrolment and accommodation at these schools. Please note, Laurelwood PS and Laurel Heights SS are both experiencing sustained over-utilization. As such, portable classrooms may be located on-site to provide additional capacity on an interim basis.

### Student Transportation

The WRDSB supports active transportation, and we ask that pedestrians be considered in the review of all development applications to ensure the enhancement of safety and connectivity. Specific to the proposed development, we would ask that consideration be given to pedestrian use along Erbsville Road.

Please be advised that Student Transportation Services of Waterloo Region (STSWR)'s school buses will not travel privately owned or maintained right-of-ways to pick-up/drop-off students. Transported students will be required to meet the bus at a congregated bus pick-up point. STSWR may have additional comments about student pick-up point(s) placement on municipal right-of-ways.

### Education Development Charges

Please also be advised that any development on the subject lands is subject to the provisions of the WRDSB's Education Development Charges By-law, 2021 or any successor thereof and may require the payment of Education Development Charges for these developments prior to issuance of a building permit.

The WRDSB requests to be circulated on any subsequent submissions on the subject lands and reserves the right to comment further on this application.

Regards,

**Brandon Coveney**
**Senior Planner**
**Waterloo Region District School Board**
51 Ardelt Avenue, Kitchener ON, N2C 2R5
Email: brandon_coveney@wrdsb.ca

Appendix II
Species at Risk and Species of Conservation Concern Screening

**Species at Risk (SAR) and Species of Conservation Concern (SCC) Screening Table for the Study Area - Erbsville South Environmental Study (Project #2520)**

| Scientific Name | Common Name | S-RANK[1] | SARO[2] | COSEWIC[3] | SARA[3] | SARA Schedule[3] | Background Source | Documented in ESES (Dougan and Associates 2018)[4] | Observed by NRSI | Habitat Preference[5] | Suitable Habitats within the Development Footprint | Rationale |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Birds** | | | | | | | | | | | | |
| *Ammodramus savannarum* | Grasshopper Sparrow | S4B | SC | SC | SC | Schedule 1 | BSC et al. 2006, MNRF 2023b | No | No | Well-drained grassland or prairie with low cover of grasses, taller weeds on sandy soil; hayfields or weedy fallow fields; uplands with ground vegetation of various densities; perches for singing; requires tracts of grassland > 10 ha | No | Breeding bird surveys (Dougan and Associates 2018/NRSI) did not document the presence of this species within the study area. |
| *Cardellina canadensis* | Canada Warbler | S5B | SC | SC | T | Schedule 1 | BSC et al. 2006, MNRF 2023b | No | No | Interior forest habitats with a dense, well-developed shrub and vegetation understory; along riparian zones or wet bottomland habitat. Require tracts of land which are >30ha. | No | Breeding bird surveys (Dougan and Associates 2018/NRSI) documented the species >400m from the subject property along Conservation Drive. |
| *Chaetura pelagica* | Chimney Swift | S3B | THR | T | T | Schedule 1 | BSC et al. 2006 | No | No | Commonly found in urban areas near buildings; nests in hollow trees, crevices of rock cliffs, chimneys; highly gregarious; feeds over open water. | No | Breeding bird surveys (Dougan and Associates 2018/NRSI) did not document the presence of this species within the study area. |
| *Chordeiles minor* | Common Nighthawk | S4B | SC | SC | SC | Schedule 1 | BSC et al. 2006 | No | No | Open ground; clearings in dense forests; ploughed fields; gravel beaches or barren areas with rocky soils; open woodlands; flat gravel roofs. | No | Breeding bird surveys (Dougan and Associates 2018/NRSI) did not document the presence of this species within the study area. |
| *Contopus virens* | Eastern Wood-Pewee | S4B | SC | SC | SC | Schedule 1 | BSC et al. 2006, MNRF 2023b | Yes | Yes | Open, deciduous, mixed or coniferous forest; predominated by oak with little understory; forest clearings, edges; farm woodlots, parks | No | Breeding bird surveys documented the presence of this species within the subject property. Habitat is confirmed within the study area. |
| *Dolichonyx oryzivorus* | Bobolink | S4B | THR | SC | T | Schedule 1 | BSC et al. 2006, MNRF 2023b | No | No | Large, open expansive grasslands with dense ground cover; hayfields, meadows or fallow fields; marshes; requires tracts of grassland >50 ha. | No | Breeding bird surveys (Dougan and Associates 2018) did not document the presence of this species within the study area. |
| *Empidonax virescens* | Acadian Flycatcher | S1B | END | E | E | Schedule 1 | BSC et al. 2006 | No | No | Mature, shady, deciduous forests; heavily wooded ravines; creek bottoms or river swamps; availability of good quality habitat is limiting factor; needs at least 30 ha of forest. | No | Breeding bird surveys (Dougan and Associates 2018/NRSI) did not document the presence of this species within the study area. |
| *Falco peregrinus anatum/tundrius* | Peregrine Falcon | S4 | SC | NAR | NS | No Schedule | BSC et al. 2006 | No | No | Rock cliffs, crags, especially situated near water; tall buildings in urban centres; threatened by chemical contamination; reintroduction efforts have been attempted in numerous locations throughout Ontario. | No | Breeding bird surveys (Dougan and Associates 2018/NRSI) did not document the presence of this species within the study area. |

| Scientific Name | Common Name | S-RANK[1] | SARO[2] | COSEWIC[3] | SARA[3] | SARA Schedule[3] | Background Source | Documented in ESES (Dougan and Associates 2018)[4] | Observed by NRSI | Habitat Preference[5] | Suitable Habitats within the Development Footprint | Rationale |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Haliaeetus leucocephalus* | Bald Eagle | S4 | SC | NAR | NS | No schedule | MNRF 2023b | Yes | No | Requires large continuous are of decidious or mixed woods around large lakes and rivers. Requires at least 255ha for nesting, shelter, feeding, and roosting. Prefers open woods with 30-50% canopy cover and will nest in tall trees 50-200m from shore. Perches on tall, dead/partially dead trees within 400m of shore for perching. | No | Breeding bird surveys (Dougan and Associates 2018/NRSI) did not document the presence of this species within the study area. |
| *Hirundo rustica* | Barn Swallow | S4B | SC | SC | T | Schedule 1 | BSC et al. 2006, MNRF 2023b | Yes | Yes | Farmlands or rural areas; cliffs, caves, rock niches; buildings or other man-made structures for nesting; open country near body of water. | Yes | Foraging habitat is present within the development footprint. Nesting has been confirmed within the Erbsville Kartway property, within the study area. |
| *Hylocichla mustelina* | Wood Thrush | S4B | SC | T | T | Schedule 1 | BSC et al. 2006, MNRF 2023b | No | No | Carolinian and Great Lakes-St. Lawrence forest zones; undisturbed moist mature deciduous or mixed forest with deciduous sapling growth; near pond or swamp; hardwood forest edges; must have some trees higher than 12 m. | No | Breeding bird surveys (Dougan and Associates 2018/NRSI) did not document the presence of this species within the study area. |
| *Ixobrychus exilis* | Least Bittern | S4B | THR | T | T | Schedule 1 | MNRF 2023b | No | No | Deep marshes, swamps and bogs; marshy borders of lakes, ponds, streams, and ditches. Also found in dense emergent vegetation of cattail, bulrush, sedge. Nests in cattails. Intolerant of loss of habitat and human disturbance. | No | Breeding bird surveys (Dougan and Associates 2018/NRSI) did not document the presence of this species within the study area. |
| *Melanerpes erythrocephalus* | Red-headed Woodpecker | S3 | END | E | E | Schedule 1 | BSC et al. 2006, MNRF 2023b | Yes | No | Open, deciduous forest with little understory; fields or pasture lands with scattered large trees; wooded swamps; orchards, small woodlots or forest edges; groves of dead or dying trees; feeds on insects and stores nuts or acorns for winter; loss of habitat is limiting factor; requires cavity trees with at least 40 cm dbh; require about 4 ha for a territory. | No | This species was documented by local residents outside of the study area (Dougan and Associates 2018). |
| *Progne subis* | Purple Martin | S3B | | | | | BSC et al. 2006 | No | No | Open areas and treed areas such as farmland, parks, yards, and marshes. Usually found near large bodies of water and is colonial. Nests in tree cavities and cliff edges. Requires open space for foraging an dprefers trees >15cm dbh. | No | Breeding bird surveys documented the species breeding within the larger study area (Dougan and Associates 2018). |
| *Setophaga cerulea* | Cerulean Warbler | S2B | THR | E | E | Schedule 1 | BSC et al. 2006, MNRF 2023b | No | No | Mature deciduous woodland of Great Lakes- St. Lawrence and Carolinian forests, sometimes coniferous; swamps or bottomlands with large trees; area sensitive species needing extensive areas of forest (>100 ha). | No | Breeding bird surveys (Dougan and Associates 2018/NRSI) did not document the presence of this species within the study area. |

| Scientific Name | Common Name | S-RANK[1] | SARO[2] | COSEWIC[3] | SARA[3] | SARA Schedule[3] | Background Source | Documented in ESES (Dougan and Associates 2018)[4] | Observed by NRSI | Habitat Preference[5] | Suitable Habitats within the Development Footprint | Rationale |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Sturnella magna* | Eastern Meadowlark | S4B, S3N | THR | T | T | No Schedule | BSC et al. 2006, MNRF 2023b | No | No | Open, grassy meadows, farmland, pastures, hayfields or grasslands with elevated singing perches; cultivated land and weedy areas with trees; old orchards with adjacent, open grassy areas >10 ha in size. | No | Suitable habitat is not present within the development footprint. Breeding bird surveys (Dougan and Associates 2018) did not document the presence of this species within the study area. |
| **Herpetofauna** | | | | | | | | | | | | |
| *Graptemys geographica* | Northern Map Turtle | S3 | SC | SC | SC | Schedule 1 | Ontario Nature 2020; Dougan and Associates 2018 | No | No | Large bodies of water with soft bottoms, and aquatic vegetation; basks on logs or rocks or on beaches and grassy edges, will bask in groups; uses soft soil or clean dry sand for nest sites; may nest at some distance from water. | No | Herpetofaunal surveys documented a single individual off-site, >200m from the subject property (Dougan and Associates 2018). |
| *Chelydra serpentina serpentina* | Common Snapping Turtle | S4 | SC | SC | SC | Schedule 1 | Ontario Nature 2020; Dougan and Associates 2018 | Yes | No | Permanent or semi-permanent fresh water; marshes, swamps or bogs; rivers and streams with soft muddybanks or bottoms. The species often uses soft soil or clean dry sand on south-facing slopes for nest sites and may nest at some distance from water. | Yes | Suitable nesting habitat is found within the development footprint, however, field surveys did not document the species within the development footprint. Species was detected within the study area (Dougan and Associates 2018). |
| *Emydoidea blandingii* | Blanding's Turtle (Great Lakes/St Lawrence population) | S3 | THR | E | E | Schedule 1 | Ontario Nature 2020; Dougan and Associates 2018 | Yes | No | Shallow water marshes, bogs, ponds or swamps, or coves in larger lakes with soft muddy bottoms and aquatic vegetation; basks on logs, stumps or banks; surrounding natural habitat is important in summer as they frequently move from aquatic habitat to terrestrial habitats; hibernates in bogs; not readily observed. | Yes | Suitable nesting habitat is found within the development footprint, however, field surveys did not document the species within the development footprint. Species was detected within the study area (Dougan and Associates 2018). |
| *Ambystoma jeffersonianum* | Jefferson Salamander | S2 | END | E | E | Schedule 1 | Ontario Nature 2020; Dougan and Associates 2018 | No | No | Damp shady deciduous forest, swamps, moist pasture, lakeshores; temporary woodland pools for breeding; hides under leaf litter, stones or in decomposing logs. | No | Salamander trapping (Dougan and Associates 2018) did not document the presence of this species within the study area. |
| *Pseudacris triseriata pop. 2* | Western Chorus Frog (Great Lakes / St. Lawrence - Canadian Shield population) | S4 | NAR | T | T | Schedule 1 | Ontario Nature 2020; Dougan and Associates 2018 | No | No | Roadside ditches or temporary ponds in fields; swamps or wet meadows; woodland or open country with cover and moisture; small ponds and temporary pools ponds and temporary pools | No | Anuran call surveys (Dougan and Associates 2018) did not document the presence of this species within the study area. |
| **Mammals** | | | | | | | | | | | | |
| *Myotis leibii* | Eastern Small-footed Myotis | S2S3 | END | | | | Dobbyn 1994 | No | No | Roosts in caves, mine shafts, crevices or buildings that are in or near woodland; hibernates in cold dry caves or mines; maternity colonies in caves or buildings; hunts in forests | No | Suitable foraging/flyway habitat is found within the study area. |

| Scientific Name | Common Name | S-RANK[1] | SARO[2] | COSEWIC[3] | SARA[3] | SARA Schedule[3] | Background Source | Documented in ESES (Dougan and Associates 2018)[4] | Observed by NRSI | Habitat Preference[5] | Suitable Habitats within the Development Footprint | Rationale |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Myotis lucifungus* | Little Brown Myotis | S3 | END | E | E | Schedule 1 | Dobbyn 1994 | No | No | Uses caves, quarries, tunnels, hollow trees or buildings for roosting; winters in humid caves; maternity sites in dark warm areas such as attics and barns; feeds primarily in wetlands, forest edges | Yes | Candidate roost trees have been documented within the development footprint and other areas on the subject property. Natural features would be suitable foraging/flyway habitat as well. Existing house does not provide roosting habitat. |
| *Myotis septentrionalis* | Northern Myotis | S3 | END | E | E | Schedule 1 | Dobbyn 1994 | No | No | Hibernates during winter in mines or caves; during summer males roost alone and females form maternity colonies of up to 60 adults; roosts in houses, man-made structures but prefers hollow trees or under loose bark; hunts within forest, below canopy | No | Candidate roost trees have been documented within the development footprint and other areas on the subject property. Natural features would be suitable foraging/flyway habitat as well. Existing house does not provide roosting habitat. |
| *Perimyotis subflavus* | Tri-colored Bat | S3? | END | E | E | Schedule 1 | Dobbyn 1994 | No | No | During the summer, the Tri-colored Bat is found in a variety of forested habitats. It forms day roosts and maternity colonies in older forest and occasionally in barns or other structures. They forage over water and along streams in the forest. Tri-colored Bats eat flying insects and spiders gleaned from webs. At the end of the summer they travel to a location where they swarm; it is generally near the cave or underground location where they will overwinter. They overwinter in caves where they typically roost by themselves rather than part of a group. | No | No candidate roosting habitat present. Natural features in the broader study area may be suitable. |
| *Taxidea taxus jacksoni* | American Badger | S1 | END | E | E | Schedule 1 | Dobbyn 1994 | No | No | Open grasslands and oak savannahs; dens in new hole or enlarged existing hole; sometimes makes food caches | No | Field surveys did not document the presence of this species or suitable burrows and/or dens within the study area (Dougan and Associates 2018). |
| **Butterflies** | | | | | | | | | | | | |
| *Danaus plexippus* | Monarch | S2N, S4B | SC | E | SC | Schedule 1 | TEA 2020 | Yes | No | Open areas with milkweed species (*Asclepias spp.* ). | No | Incidental observations (Dougan and Associates 2018) documented the species within the study area. No large patches of milkweed identified. |

| Scientific Name | Common Name | S-RANK[1] | SARO[2] | COSEWIC[3] | SARA[3] | SARA Schedule[3] | Background Source | Documented in ESES (Dougan and Associates 2018)[4] | Observed by NRSI | Habitat Preference[5] | Suitable Habitats within the Development Footprint | Rationale |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Plants** | | | | | | | | | | | | |
| *Aesculus glabra* | Ohio Buckeye | S1 | | | | | Dougan and Associates 2018 | No | | Deciduous forests, swamps, and river-bank thickets. Frequently planted as an ornamental, north of naturally occurring range. | No | Waterloo Region is well north of naturally occurring range. Individual documented within the study area was a planted individual (Dougan and Associates 2018). |
| *Fraxinus nigra* | Black Ash | S4 | END | T | NS | No Schedule | Dougan and Associates 2018 | Yes | No | Usually on mucky or peaty soils in swamps, such as river floodplains; a dominant tree, or merely scattered (as often in cedar swamps). | No | Vascular floral surveys documented the species off-site, within the study area (Dougan and Associates 2018). |
| *Juglans cinerea* | Butternut | S2? | END | E | E | Schedule 1 | Dougan and Associates 2018 | No | No | In Ontario, Butternut usually grows alone or in small groups in deciduous forests. It prefers moist, well-drained soil and is often found along streams. It is also found on well-drained gravel sites and rarely on dry rocky soil. This species does not do well in the shade, and often grows in sunny openings and near forest edges. | Yes | Several Butternuts were found within the development footprint, however, genetic testing documented that all individuals are hybrids (Dougan and Associates 2018). |

**References**


[1]Ministry of Natural Resources and Forestry (MNRF). 2023. Natural Heritage Information Centre (NHIC): Species List for Ontario. Published: 2014-07-17. All Species List Updated: 2023-05-17. Available: https://www.ontario.ca/page/get-natural-heritage-

[2]Ministry of the Environment, Conservation, and Parks (MECP). 2023. Species at Risk in Ontario. Published: 2018-07-12. Updated: 2023-05-23. Available: https://www.ontario.ca/page/species-risk-ontario

[3]Government of Canada. 2023. Species at Risk Public Registry: Species Search. COSEWIC Last Assessment Date: 2023-05-05. Available: https://species-registry.canada.ca/index-

[4]Dougan and Associates. 2018. Erbsville South Environmental Study. Prepared for Sunvest Development Corporation. May 2018.

[5]Ontario Ministry of Natural Resources (OMNR). 2000. Significant Wildlife Habitat Technical Guide. Appendix G: Wildlife Habitat Matrices and Habitat Descriptions for Rare Vascular Plants. October 2000.


| Legend |
|---|
| **SRank** |
| S1 Critically Imperiled |
| S2 Imperiled |
| S3 Vulnerable |
| S4 Apparently Secure |
| S5 Secure |
| S#? Rank Uncertain |
| **COSSARO/COSEWIC** |
| END/E Endangered |
| THR/T Threatened |
| SC Special Concern |
| NAR Not at Risk |
| **SARA Schedule** |
| Schedule 1 Officially Protected under SARA |

Appendix III
Significant Wildlife Habitat Screening

**#2520 - 720 Erbsville Road, Waterloo EIS**

**Significant Wildlife Habitat Assessment Tables**

**Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.**

| Rationale | Candidate SWH | | | Confirmed SWH | Assessment Details | |
|---|---|---|---|---|---|---|
| | Wildlife Species | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Study Area | Subject Property |
| **Wildlife Habitat: Waterfowl Stopover and Staging Areas (Terrestrial)** | | | | | Not Present | Not Present |
| Rationale:<br>Habitat important to migrating waterfowl. | American Black Duck<br>Wood Duck<br>Green-winged Teal<br>Blue-winged Teal<br>Mallard<br>Northern Pintail<br>Northern Shoveler<br>American Wigeon<br>Gadwall | CUM1<br>CUT1<br>- Plus evidence of annual spring flooding from melt water or run-off within these Ecosites. | Fields with sheet water during Spring (mid March to May).<br>• Fields flooding during spring melt and run-off provide important invertebrate foraging habitat for migrating waterfowl.<br>• Agricultural fields with waste grains are commonly used by waterfowl, these are not considered SWH unless they have spring sheet water available[exlviii].<br><br>Information Sources<br>• Anecdotal information from the landowner, adjacent landowners or local naturalist clubs may be good information in determining occurrence.<br>• Reports and other information available from Conservation Authorities (CAs)<br>• Sites documented through waterfowl planning processes (eg. EHJV implementation plan)<br>• Field Naturalist Clubs<br>• Ducks Unlimited Canada<br>• Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area | Studies carried out and verified presence of an annual concentration of any listed species, evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi]<br>• Any mixed species aggregations of 100 or more individuals required.<br>• The area of the flooded field ecosite habitat plus a 100-300m radius buffer dependent on local site conditions and adjacent land use is the significant wildlife habitat[cxlviii].<br>• Annual use of habitat is documented from information sources or field studies (annual use can be based on studies or determined by past surveys with species numbers and dates).<br>• SWHMiST[cxlix] Index #7 provides development effects and mitigation measures. | Suitable habitat of sufficient size is not present within the study area or subject property. | |

**Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.**

| Rationale | Candidate SWH | | | Confirmed SWH | Assessment Details | |
|---|---|---|---|---|---|---|
| | Wildlife Species | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Study Area | Subject Property |
| **Wildlife Habitat: Waterfowl Stopover and Staging Areas (Aquatic)** | | | | | Not Present | Not Present |
| Rationale:<br>Important for local and migrant waterfowl populations during the spring or fall migration or both periods combined. Sites identified are usually only one of a few in the eco-district. | Canada Goose<br>Cackling Goose<br>Snow Goose<br>American Black Duck<br>Northern Pintail<br>Northern Shoveler<br>American Wigeon<br>Gadwall<br>Green-winged Teal<br>Blue-winged Teal<br>Hooded Merganser<br>Common Merganser<br>Lesser Scaup<br>Greater Scaup<br>Long-tailed Duck<br>Surf Scoter<br>White-winged Scoter<br>Black Scoter<br>Ring-necked Duck<br>Common Goldeneye<br>Bufflehead<br>Redhead<br>Ruddy Duck<br>Red-breasted Merganser<br>Brant<br>Canvasback | MAS1<br>MAS2<br>MAS3<br>SAS1<br>SAM1<br>SAF1<br>SWD1<br>SWD2<br>SWD3<br>SWD4<br>SWD5<br>SWD6<br>SWD7 | • Ponds, marshes, lakes, bays, coastal inlets, and watercourses used during migration. Sewage treatment ponds and storm water ponds do not qualify as a SWH, however a reservoir managed as a large wetland or pond/lake does qualify.<br>• These habitats have an abundant food supply (mostly aquatic invertebrates and vegetation in shallow water).<br><br>Information Sources<br>• Environment Canada<br>• Naturalist clubs often are aware of staging/stopover areas.<br>• OMNRF Wetland Evaluations indicate presence of locally and regionally significant waterfowl staging.<br>• Sites documented through waterfowl planning processes (eg. EHJV implementation plan)<br>• Ducks Unlimited projects<br>• Element occurrence specification by Nature Serve: http://www.natureserve.org<br>• Natural Heritage Information Centre (NHIC) Waterfowl Concentration Area | Studies carried out and verified presence of:<br>• Aggregations of 100[i] or more of listed species for 7 days[i], results in > 700 waterfowl use days.<br>• Areas with annual staging of ruddy ducks, canvasbacks, and redheads are SWH[cxlix]<br>• The combined area of the ELC ecosites and a 100m radius area is the SWH[cxlviii]<br>• Wetland area and shorelines associated with sites identified within the SWHTG[cxlviii] Appendix K[cxlix] are significant wildlife habitat.<br>• Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi]<br>• Annual Use of Habitat is Documented from Information Sources or Field Studies (Annual can be based on completed studies or determined from past surveys with species numbers and dates recorded).<br>• SWHMiST[cxlix] Index #7 provides development effects and mitigation measures. | Suitable habitat of sufficient size is not present within the study area or subject property. | |
| **Wildlife Habitat: Shorebird Migratory Stopover Area** | | | | | Not Present | Not Present |
| Rationale:<br>High quality shorebird stopover habitat is extremely rare and typically has a long history of use. | Greater Yellowlegs<br>Lesser Yellowlegs<br>Marbled Godwit<br>Hudsonian Godwit<br>Black-bellied Plover<br>American Golden-Plover<br>Semipalmated Plover<br>Solitary Sandpiper<br>Spotted Sandpiper<br>Semipalmated Sandpiper<br>Pectoral Sandpiper<br>White-rumped Sandpiper<br>Baird’s Sandpiper<br>Least Sandpiper<br>Purple Sandpiper<br>Stilt Sandpiper<br>Short-billed Dowitcher<br>Red-necked Phalarope Whimbrel<br>Ruddy Turnstone<br>Sanderling<br>Dunlin<br>Whimbrel | BBO1<br>BBO2<br>BBS1<br>BBS2<br>BBT1<br>BBT2<br>SDO1<br>SDS2<br>SDT1<br>MAM1<br>MAM2<br>MAM3<br>MAM4<br>MAM5 | Shorelines of lakes, rivers and wetlands, including beach areas, bars and seasonally flooded, muddy and un-vegetated shoreline habitats. Great Lakes coastal shorelines, including groynes and other forms of armour rock lakeshores, are extremely important for migratory shorebirds in May to mid-June and early July to October. Sewage treatment ponds and storm water ponds do not qualify as a SWH.<br><br>Information Sources<br>• Western hemisphere shorebird reserve network.<br>• Canadian Wildlife Service (CWS) Ontario Shorebird Survey.<br>• Bird Studies Canada<br>• Ontario Nature<br>• Local birders and naturalist clubs<br>• Natural Heritage Information Center (NHIC) Shorebird Migratory Concentration Area | Studies confirming:<br>• Presence of 3 or more of listed species and > 1000 shorebird use days during spring or fall migration period. (shorebird use days are the accumulated number of shorebirds counted per day over the course of the fall or spring migration period)<br>• Whimbrel stop briefly (<24hrs) during spring migration, any site with >100 Whimbrel used for 3 years or more is significant.<br>• The area of significant shorebird habitat includes the mapped ELC shoreline ecosites plus a 100m radius area[cxlviii]<br>• Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi]<br>• SWHMiST[cxlix] Index #8 provides development effects and mitigation measures. | Suitable habitat of sufficient size is not present within the study area or subject property. | |

**Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.**

| Rationale | Candidate SWH | | | Confirmed SWH | Assessment Details | |
|---|---|---|---|---|---|---|
| | **Wildlife Species** | **ELC Ecosite Codes** | **Habitat Criteria and Information Sources** | **Defining Criteria** | **Study Area** | **Subject Property** |
| **Wildlife Habitat: Raptor Wintering Area** | | | | | Not Present | Not Present |
| <u>Rational:</u><br>Sites used by multiple species, a high number of individuals and used annually are most significant | Rough-legged Hawk<br>Red-tailed Hawk<br>Northern Harrier<br>American Kestrel<br>Snowy Owl<br><br><u>Special Concern:</u><br>Short-eared Owl<br>Bald Eagle | Hawks/Owls:<br>Combination of ELC Community Series; need to have present one Community Series from each land class:<br>Forest:<br>FOD, FOM, FOC<br><br>Upland:<br>CUM, CUT, CUS, CUW | The habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors.<br><br>Raptor wintering sites need to be > 20 ha[cxlviii, cxlix] with a combination of forest and upland.[xvi, xvii, xviii, xix, xx, xxi].<br>Least disturbed sites, idle/fallow or lightly grazed field/meadow (>15ha) with adjacent woodlands[cxlix]<br><br>Field area of the habitat is to be wind swept with limited snow depth or accumulation.<br><br>Eagle sites have open water, large trees and snags available for roosting<br><br><u>Information Sources</u><br>• OMNRF Ecologist or Biologist<br>• Field Natural Clubs<br>• Natural Heritage Information Center (NHIC) Raptor Winter Concentration Area<br>• Data from Bird Studies Canada<br>• Reports and other information available from Conservation Authorities CAs. | Studies confirm the use of these habitats by:<br>• One or more Short-eared Owls or; One or more Bald Eagles or; At least 10 individuals and two listed hawk/owl species<br>• To be significant a site must be used regularly (3 in 5 years)[cxlix] for a minimum of 20 days by the above number of birds<br>• The habitat area for an Eagle winter site is the shoreline forest ecosites directly adjacent to the prime hunting area<br>• Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi]<br>• SWHMiST[cxlix] Index #10 and #11 provides development effects and mitigation measures. | Suitable habitat of sufficient size is not present within the study area or subject property. Criterion species are not tolerant of highly urbanized areas. | |
| **Wildlife Habitat: Bat Hibernacula** | | | | | Not Present | Not Present |
| <u>Rationale</u><br>Bat hibernacula are rare habitats in Ontario landscapes. | Big Brown Bat<br>Tri-coloured Bat | Bat Hibernacula may be found in these ecosites:<br>CCR1<br>CCR2<br>CCA1<br>CCA2<br>(Note: buildings are not considered to be SWH) | • Hibernacula may be found in caves, mine shafts, underground foundations and Karsts.<br>• Active mine sites should not be considered as SWH<br>• The locations of bat hibernacula are relatively poorly known.<br><br><u>Information Sources</u><br>• OMNRF for possible locations and contact for local experts<br>• Natural Heritage Information Center (NHIC) Bat Hibernaculum<br>• Ministry of Northern Development and Mines for location of mine shafts.<br>• Clubs that explore caves (eg. Sierra Club)<br>• University Biology Departments with bat experts. | • All sites with confirmed hibernating bats are SWH.<br>• The habitat area includes a 200m radius around the entrance of the hibernaculum[cxlviii, ccvii] for most.<br>• Studies are to be conducted during the peak swarming period (Aug. – Sept.). Surveys should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for Wind Power Projects"[ccv]<br>• SWHMiST[cxlix] Index #1 provides development effects and mitigation measures. | There are no mine shafts, caves, or Karts within the subject property or study area. | |

**Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.**

| Rationale | Candidate SWH | | | Confirmed SWH | Assessment Details | |
|---|---|---|---|---|---|---|
| | Wildlife Species | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Study Area | Subject Property |
| **Wildlife Habitat: Bat Maternity Colonies** | | | | | Possible | Possible |
| Rationale:<br>Known locations of forested bat maternity colonies is extremely rare in all Ontario landscapes. | Big Brown Bat<br>Silver-haired Bat | Maternity colonies considered SWH are found in forested Ecosites.<br><br>All ELC Ecosites in ELC Community Series:<br>FOD<br>FOM<br>SWD<br>SWM | Maternity colonies can be found in tree cavities, vegetation and often in buildings[xxii, xxv, xxvi, xxvii, xxxi] (buildings are not considered to be SWH).<br>• Maternity roosts are not found in caves and mines in Ontario[xxii]<br>• Maternity colonies located in Mature deciduous or mixed forest stands[ccix, ccx] with >10/ha large diameter (>25cm dbh) wildlife trees[ccvii]<br>• Female Bats prefer wildlife tree (snags) in early stages of decay, class 1-3[ccxiv] or class 1 or 2[ccxii]<br>• Silver-haired Bats prefer older mixed or deciduous forest and form maternity colonies in tree cavities and small hollows. Older forest areas with at least 21 snags/ha are preferred[ccx]<br><br>Information Sources<br>• OMNRF for possible locations and contact for local experts<br>• University Biology Departments with bat experts. | • Maternity Colonies with confirmed use by:<br>• >10 Big Brown Bats<br>• >5 Adult Female Silver-haired Bats<br>• The area of the habitat includes the entire woodland or a forest stand ELC Ecosite or an Ecoelement containing the maternity colonies.<br>• Evaluation methods for maternity colonies should be conducted following methods outlined in the "Bats and Bat Habitats: Guidelines for wind Power Projects[ccv]<br>• SWHMiS T[cxlix] Index #12 provides development effects and mitigation measures. | Suitable habitat is present in the study area. None of the listed ELC communities overlap with the development footprint, therefore additional surveys were not completed to determine if the required number of roost trees are present to be considered candidate habitat. | |
| **Wildlife Habitat: Turtle Wintering Area** | | | | | Confirmed | Confirmed |
| Rationale:<br>Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant | Midland Painted Turtle<br><br>Special Concern:<br>Northern Map Turtle<br>Snapping Turtle | Snapping and Midland Painted Turtles -<br>ELC Community Classes: SW, MA, OA and SA;<br>ELC Community Series: FEO and BOO<br><br>Northern Map Turtle - Open Water areas such as deeper rivers or streams and lakes with current can also be used as over-wintering habitat. | For most turtles, wintering areas are in the same general area as their core habitat. Water has to be deep enough not to freeze and have soft mud substrates.<br>• Over-wintering sites are permanent water bodies, large wetlands, and bogs or fens with adequate Dissolved Oxygen[cix, cx, cxi, cxviii].<br>• Man-made ponds such as sewage lagoons or storm water ponds should not be considered SWH.<br>Information Sources<br>• EIS studies carried out by Conservation Authorities.<br>• Local field naturalists and experts, as well as university herpetologists may also know where to find some of these sites.<br>• OMNRF ecologist or biologist<br>• Natural Heritage Information Center (NHIC) | • Presence of 5 over-wintering Midland Painted Turtles is significant.<br>• One or more Northern Map Turtle or Snapping Turtle over-wintering within a wetland is significant.<br>• The mapped ELC ecosite area with the over wintering turtles is the SWH. If the hibernation site is within a stream or river, the deep-water pool where the turtles are over wintering is the SWH.<br>• Over wintering areas may be identified by searching for congregations (Basking Areas) of turtles on warm, sunny days during the fall (Sept. – Oct.) or spring (Mar. – May)[cvii]<br>• Congregation of turtles is more common where wintering areas are limited and therefore significant[cix, cx, cxi, cxii].<br>• SWHMiST[cxlix] Index #28 provides development effects and mitigation measures for turtle wintering habitat. | An overwintering Snapping Turtle was confirmed within Laurel Creek on the Erbsville Kartway property, within the study area and overlapping the subject property. Other habitats in the study area are also considered candidate. | |

**Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.**

| Rationale | Candidate SWH | | | Confirmed SWH | Assessment Details | |
|---|---|---|---|---|---|---|
| | Wildlife Species | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Study Area | Subject Property |
| **Wildlife Habitat: Snake Hibernaculum** | | | | | Possible | Not Present |
| Rationale:<br>Generally sites are the only known sites in the area. Sites with the highest number of individuals are most significant | Snakes:<br>Eastern Gartersnake<br>Northern Watersnake<br>Northern Red-bellied Snake<br>Northern Brownsnake<br>Smooth Green Snake<br>Northern Ring-necked Snake<br><br>Special Concern:<br>Milksnake<br>Eastern Ribbonsnake<br><br>Lizard:<br>Special Concern (Southern Shield population):<br>Five-lined Skink | For all snakes, habitat may be found in any ecosite other than very wet ones. Talus, Rock Barren, Crevice and Cave, and Alvar sites may be directly related to these habitats.<br><br>Observations of congregations of snakes on sunny warm days in the spring or fall is a good indicator.<br><br>For Five-lined Skink, ELC Community Series of FOD and FOM and Ecosites:<br>FOC1<br>FOC3 | • For snakes, hibernation takes place in sites located below frost lines in burrows, rock crevices and other natural locations. The existence of features that go below the frost line; such as rock piles or slopes, old stone fences, and abandoned crumbling foundations assist in identifying candidate SWH.<br>• Areas of broken and fissured rock are particularly valuable since they provide access to subterranean sites below the frost line[xliv, l, li, lii, cxii.]<br>• Wetlands can also be important over-wintering habitat in conifer or shrub swamps and swales, poor fens, or depressions in bedrock terrain with sparse trees or shrubs with sphagnum moss or sedge hummock ground cover.<br>• Five-lined skink prefer mixed forests with rock outcrop openings providing cover rock overlaying granite bedrock with fissures cciii.<br><br>Information Sources<br>• In spring, local residents or landowners may have observed the emergence of snakes on their property (e.g. old dug wells).<br>• Reports and other information from CAs.<br>• Local Field naturalists and experts, as well as university herpetologists may also know where to find some of these sites. clubs<br>• Natural Heritage Information Center (NHIC)<br>• OMNRF ecologist or biologist may be aware of locations of wintering skinks | Studies confirming:<br>• Presence of snake hibernacula used by a minimum of five individuals of a snake sp. or; individuals of two or more snake spp.<br>• Congregations of a minimum of five individuals of a snake sp. or; individuals of two or more snake spp. near potential hibernacula (eg. foundation or rocky slope) on sunny warm days in Spring (Apr/May) and Fall (Sept/Oct).<br>• Note: If there are Special Concern Species present, then site is SWH<br>• Note: Sites for hibernation possess specific habitat parameters (e.g. temperature, humidity, etc.) and consequently are used annually, often by many of the same individuals of a local population [i.e. strong hibernation site fidelity]. Other critical life processes (e.g. mating) often take place in close proximity to hibernacula. The feature in which the hibernacula is located plus a 30m buffer is the SWH[i]<br>• SWHMiST[cxlix] Index #13 provides development effects and mitigation measures for snake hibernacula.<br>• Presence of any active hibernaculum for skink is significant.<br>• SWHMiST[cxlix] Index #37 provides development effects and mitigation measures for five-lined skink wintering habitat. | Candidate Snake Hibernaculum habitat was identified within the subject property by Dougan and Associates. An old foundation is present in the cultural thicket in the northern portion of the subject property. However, due to the proximity of the foundation to the PSW and Laurel Creek, it is expected that subgrade conditions would be too wet to provide suitable conditions for snake hibernation. | |
| **Wildlife Habitat: Colonially - Nesting Bird Breeding Habitat (Bank and Cliff)** | | | | | Not Present | Not Present |
| Rationale:<br>Historical use and number of nests in a colony make this habitat significant. An identified colony can be very important to local populations. All swallow populations are declining in Ontario. | Cliff Swallow<br>Northern Rough-winged Swallow (this species is not colonial but can be found in Cliff Swallow colonies) | Eroding banks, sandy hills, borrow pits, steep slopes, and sand piles<br>Cliff faces, bridge abutments, silos, barns<br><br>Habitat found in the following ecosites:<br>CUM1 CUT1<br>CUS1 BLO1<br>BLS1 BLT1<br>CLO1 CLS1<br>CLT1 | • Any site or areas with exposed soil banks, undisturbed or naturally eroding that is not a licensed/permitted aggregate area.<br>• Does not include man-made structures (bridges or buildings) or recently (2 years) disturbed soil areas, such as berms, embankments, soil or aggregate stockpiles.<br>• Does not include a licensed/permitted Mineral Aggregate Operation.<br><br>Information Sources<br>• Reports and other information available from CAs<br>• Ontario Breeding Bird Atlas [ccv]<br>• Bird Studies Canada; *NatureCounts* http://www.birdscanada.org/birdmon/<br>• Field Naturalist clubs | Studies confirming:<br>• Presence of 1 or more nesting sites with 8[cxlvix] or more cliff swallow pairs and/or rough-winged swallow pairs during the breeding season.<br>• A colony identified as SWH will include a 50m radius habitat area from the peripheral nests[ccvii]<br>• Field surveys to observe and count swallow nests are to be completed during the breeding season Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi]<br>• SWHMiST[cxlix] Index #4 provides development effects and mitigation measures | The study area and subject property do not contain sutiable banks or cliffs for nesting bird breeding habitat. | |

**Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.**

| Rationale | Candidate SWH | | | Confirmed SWH | Assessment Details | |
|---|---|---|---|---|---|---|
| | Wildlife Species | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Study Area | Subject Property |
| **Wildlife Habitat: Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs)** | | | | | Not Present | Not Present |
| Rationale:<br>Large Colonies are important to local bird population, typically sites are only known colony in area and are used annually. | Great Blue Heron<br>Black-crowned Night-heron<br>Great Egret<br>Green Heron | SWM2 SWM3<br>SWM5 SWM6<br>SWD1 SWD2<br>SWD3 SWD4<br>SWD5 SWD6<br>SWD7 FET1 | • Nests in live or dead standing trees in wetlands, lakes, islands, and peninsulas. Shrubs and occasionally emergent vegetation may also be used.<br>• Most nests in trees are 11 to 15m from ground, near the top of the tree.<br><br>Information Sources<br>• Ontario Breeding Bird Atlas[ccv], colonial nest records.<br>• Ontario Heronry Inventory 1991 available from Bird Studies Canada or NHIC (OMNR).<br>• NHIC Mixed Wader Nesting Colony<br>• Aerial photographs can help identify large heronries<br>• Reports and other information available from CAs<br>• MNRF District Offices<br>• Local naturalist clubs | Studies confirming:<br>• Presence of 5[i] or more active nests of Great Blue Heron or other listed species.<br>• The habitat extends from the edge of the colony and a minimum 300m radius or extent of the Forest Ecosite containing the colony or any island <15.0ha with a colony is the SWH [cc, ccvii]<br>• Confirmation of active heronries are to be achieved through site visits conducted during the nesting season (April to August) or by evidence such as the presence of fresh guano, dead young and/or eggshells<br>• SWHMiST[cxlix] Index #5 provides development effects and mitigation measures. | Suitable habitat of sufficient size is not present. | |
| **Wildlife Habitat: Colonially - Nesting Bird Breeding Habitat (Ground)** | | | | | Not Present | Not Present |
| Rationale:<br>Colonies are important to local bird populations, typically sites are only known colony in area and are used annually. | Herring Gull<br>Great Black-backed Gull<br>Little Gull<br>Ring-billed Gull<br>Common Tern<br>Caspian Tern<br>Brewer's Blackbird | Any rocky island or peninsula (natural or artificial) within a lake or large river (two-lined on a 1:50,000 NTS map).<br><br>Close proximity to watercourses in open fields or pastures with scattered trees or shrubs (Brewer's Blackbird)<br><br>MAM1 – 6<br>MAS1 – 3<br>CUM<br>CUT<br>CUS | • Nesting colonies of gulls and terns are on islands or peninsulas associated with open water or in marshy areas.<br>• Brewers Blackbird colonies are found loosely on the ground in or in low bushes in close proximity to streams and irrigation ditches within farmlands.<br><br>Information Sources<br>• Ontario Breeding Bird Atlas[ccv], rare/colonial species records.<br>• Canadian Wildlife Service<br>• Reports and other information available from CAs<br>• Natural Heritage Information Center (NHIC) Colonial Waterbird Nesting Area<br>• MNRF District Offices<br>• Field naturalist clubs | Studies confirming:<br>• Presence of >25 active nests for Herring Gulls or Ring-billed Gulls, >5 active nests for Common Tern or >2 active nests for Caspian Tern[i].<br>• Presence of 5 or more pairs for Brewer's Blackbird.<br>• Any active nesting colony of one or more Little Gull, and Great Black-backed Gull is significant.<br>• The edge of the colony and a minimum 150m area of habitat, or the extent of the ELC ecosites containing the colony or any island <3.0ha with a colony is the SWH[cc, ccvii]<br>• Studies would be done during May/June when actively nesting. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi]<br>• SWHMiST[cxlix] Index #6 provides development effects and mitigation measures. | The study area and subject property do not contain islands or peninsulas in open water or marshy areas. | |

**Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.**

| Rationale | Candidate SWH | | | Confirmed SWH | Assessment Details | |
|---|---|---|---|---|---|---|
| | **Wildlife Species** | **ELC Ecosite Codes** | **Habitat Criteria and Information Sources** | **Defining Criteria** | **Study Area** | **Subject Property** |
| **Wildlife Habitat: Migratory Butterfly Stopover Areas** | | | | | Not Present | Not Present |
| <u>Rationale:</u><br>Butterfly stopovers areas are extremely rare habitats and are biologically important for butterfly species that migrate south for the winter. | Painted Lady<br>Red Admiral<br><br><u>Special Concern</u>:<br>Monarch | Combination of ELC Community Series:<br>Need to have present one Community Series from each landclass:<br><br><u>Field</u>:<br>CUM CUS<br>CUT<br><br><u>Forest</u>:<br>FOC FOM<br>FOD CUP<br><br>Anecdotally, a candidate sight for butterfly stopover will have a history of butterflies being observed. | A butterfly stopover area will be a minimum of 10 ha in size with a combination of field and forest habitat present, and will be located within 5 km of Lake Ontario[cxlix].<br>• The habitat is typically a combination of field and forest, and provides the butterflies with a location to rest prior to their long migration south[xxxii, xxxiii, xxxiv, xxxv, xxxvi.]<br>• The habitat should not be disturbed, fields/meadows with an abundance of preferred nectar plants and woodland edge providing shelter are requirements for this habitat cxlviii, cxlix.<br>• Staging areas usually provide protection from the elements and are often spits of land or areas with the shortest distance to cross the Great Lakes[xxxvii, xxxviii, xxxix, xl, xli.]<br><br><u>Information Sources</u><br>• OMNRF (NHIC)<br>• Agriculture Canada in Ottawa may have list of butterfly experts.<br>• Field Naturalist Clubs<br>• Toronto Entomologists Association<br>• Conservation Authorities | Studies confirm:<br>• The presence of Monarch Use Days (MUD) during fall migration (Aug/Oct)[xliii]. MUD is based on the number of days a site is used by Monarchs, multiplied by the number of individuals using the site. Numbers of butterflies can range from 100-500/day[xxxvii], significant variation can occur between years and multiple years of sampling should occur [xl, xliii].<br>• Observational studies are to be completed and need to be done frequently during the migration period to estimate MUD<br>• MUD of >5000 or >3000 with the presence of Painted Ladies or Red Admiral's is to be considered significant.<br>• SWHMiST[cxlix] Index #16 provides development effects and mitigation measures. | The study area or subject property is not within 5km of Lake Ontario. | |
| **Wildlife Habitat: Landbird Migratory Stopover Areas** | | | | | Not Present | Not Present |
| <u>Rationale:</u><br>Sites with a high diversity of species as well as high number are most significant | All migratory songbirds.<br><br>Canadian Wildlife Service Ontario website:<br>http://www.on.ec.gc.ca/wildlife_e.html<br><br>All migrant raptors species:<br><br>Ontario Ministry of Natural Resources:<br>Fish and Wildlife Conservation Act, 1997. Schedule 7: Specially Protected Birds (Raptors) | All Ecosites associated with these ELC Community Series:<br>FOC<br>FOM<br>FOD<br>SWC<br>SWM<br>SWD | Woodlots need to be >10 ha[f] in size and within 5km [iv, v, vi, vii, viii, ix, x, xi, xii, xiii, xiv, xv] of Lake Ontario.<br>• If multiple woodlands are located along the shoreline, those woodlands <2km from Lake Ontario are more significant[cxlix]<br>• Sites have a variety of habitats; forest, grassland and wetland complexes[cxlix].<br>• The largest sites are more significant[cxlix]<br>• Woodlots and forest fragments are important habitats to migrating birds[ccxviii], these features located along the shore and located within 5km of Lake Ontario are Candidate SWH[cxlviii].<br><br><u>Information Sources</u><br>• Bird Studies Canada<br>• Ontario Nature<br>• Local birders and naturalist club<br>• Ontario Important Bird Areas (IBA) Program | Studies confirm:<br>• Use of the woodlot by >200 birds/day and with >35 spp. with at least 10 bird spp. recorded on at least 5 different survey dates. This abundance and diversity of migrant bird species is considered above average and significant.<br>• Studies should be completed during spring (Apr/May) and fall (Aug/Oct) migration using standardized assessment techniques. Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi]<br>• SWHMiST[cxlix] Index #9 provides development effects and mitigation measures. | The study area and subject property is not within 5km of Lake Ontario. | |

**Table 1. Characteristics of Seasonal Concentration Areas for Ecoregion 6E.**

| Rationale | Candidate SWH | | | Confirmed SWH | Assessment Details | |
|---|---|---|---|---|---|---|
| | Wildlife Species | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Study Area | Subject Property |
| **Wildlife Habitat: Deer Yarding Areas** | | | | | Not Present | Not Present |
| <u>Rationale:</u><br>Winter habitat for deer is considered to be the main factor for northern deer populations. In winter, deer congregate in "yards" to survive severe winter conditions. Deer yards typically have a long history of annual use by deer, yards typically represent 10-15% of an areas summer range. | White-tailed Deer | Note: OMNRF to determine this habitat.<br><br>ELC Community Series providing a thermal cover component for a deer yard would include:<br>FOM, FOC, SWM and SWC.<br><br>Or these ELC Ecosites:<br>CUP2 CUP3<br>FOD3 CUT | • Deer yarding areas or winter concentration areas (yards) are areas deer move to in response to the onset of winter snow and cold. This is a behavioural response and deer will establish traditional use areas. The yard is composed of two areas referred to as Stratum I and Stratum II. Stratum II covers the entire winter yard area and is usually a mixed or deciduous forest with plenty of browse available for food. Agricultural lands can also be included in this area. Deer move to these areas in early winter and generally, when snow depths reach 20cm, most of the deer will have moved here. If the snow is light and fluffy, deer may continue to use this area until 30cm snow depth. In mild winters, deer may remain in the Stratum II area the entire winter.<br>• The Core of a deer yard (Stratum I) is located within the Stratum II area and is critical for deer survival in areas where winters become severe. It is primarily composed of coniferous trees (pine, hemlock, cedar, spruce) with a canopy cover of more than 60%[cxciv].<br>• OMNRF determines deer yards following methods outlined in “Selected Wildlife and Habitat Features: Inventory Manual"[cxcv]<br>• Woodlots with high densities of deer due to artificial feeding are not significant. | No Studies Required:<br>• Snow depth and temperature are the greatest influence on deer use of winter yards. Snow depths > 40cm for more than 60 days in a typically winter are minimum criteria for a deer yard to be considered as SWH[lvi, lvii, lviii, lix, lx, í].<br>• Deer Yards are mapped by OMNRF District offices. Locations of Core or Stratum 1 and Stratum 2 Deer yards considered significant by OMNRF will be available at local MNRF offices or via Land Information Ontario (LIO).<br>• Field investigations that record deer tracks in winter are done to confirm use (best done from an aircraft). Preferably, this is done over a series of winters to establish the boundary of the Stratum I and Stratum II yard in an "average" winter. MNRF will complete these field investigations[cxcv].<br>• If a SWH is determined for Deer Wintering Area or if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule.<br>• SWHMiST[cxlix] Index #2 provides development effects and mitigation measures. | Deer overwintering yard not identified by MNRF within or adjacent to the study area. | |
| **Wildlife Habitat: Deer Winter Congregation Areas** | | | | | Confirmed | Not Present |
| <u>Rationale:</u><br>Deer movement during winter in the southern areas of Ecoregion 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands to reduce or avoid the impacts of winter conditions[exlviii] | White-tailed Deer | All Forested Ecosites with these ELC Community Series:<br>FOC<br>FOM<br>FOD<br>SWC<br>SWM<br>SWD<br><br>Conifer plantations much smaller than 50ha may also be used. | • Woodlots will typically be >100 ha in size. Woodlots <100ha may be considered as significant based on MNRF studies or assessment.<br>• Deer movement during winter in the southern areas of Eco-region 6E are not constrained by snow depth, however deer will annually congregate in large numbers in suitable woodlands[cxlviii].<br>• If deer are constrained by snow depth refer to the Deer Yarding Area habitat within Table 1.1 of this Schedule.<br>• Large woodlots > 100ha and up to 1500 ha are known to be used annually by densities of deer that range from 0.1-1.5 deer/ha[ccxxiv].<br>• Woodlots with high densities of deer due to artificial feeding are not significant.<br><br><u>Information Sources</u><br>• MNRF District Offices<br>• LIO/NRVIS | Studies confirm:<br>• Deer management is an MNRF responsibility, deer winter congregation areas considered significant will be mapped by MNRF[cxlviii].<br>• Use of the woodlot by white-tailed deer will be determined by MNRF, all woodlots exceeding the area criteria are significant, unless determined not to be significant by MNR[í].<br>• Studies should be completed during winter (Jan/Feb) when >20cm of snow is on the ground using aerial survey techniques[ccxxiv] , ground or road surveys, or a pellet count deer density survey[ccxxv].<br>• If a SWH is determined for Deer Wintering Area of if a proposed development is within Stratum II yarding area then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule.<br>• SWHMiST[cxlix] Index #2 provides development effects and mitigation measures. | Stratum 2 Deer overwintering habitat (wetland and woodland habitats) is identified by MNRF as occurring within the wetland and woodland features within the study area. Suitable habitat is not present within the development footprint. | |

**#2520 - 720 Erbsville Road, Waterloo EIS**

**Significant Wildlife Habitat Assessment Tables**

**Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.**

| Rationale | Candidate SWH | | | Confirmed SWH | | |
|---|---|---|---|---|---|---|
| | ELC Ecosite Codes | Habitat Description | Detailed Information and Sources | Defining Criteria | Study Area | Subject Property |
| **Cliff and Talus Slopes** | | | | | Not Present | Not Present |
| Rationale:<br>Cliffs and Talus Slopes are extremely rare habitats in Ontario. | Any ELC Ecosite within Community Series:<br><br>TAO CLO<br>TAS CLS<br>TAT CLT | A Cliff is vertical to near vertical bedrock >3m in height.<br><br>A Talus Slope is rock rubble at the base of a cliff made up of coarse rocky debris. | Most cliff and talus slopes occur along the Niagara Escarpment.<br><br>Information Sources<br>• The Niagara Escarpment Commission has detailed information on location of these habitats.<br>• OMNRF District<br>• Natural Heritage Information Center (NHIC) has location information on their website<br>• Local naturalist clubs<br>• Conservation Authorities | • Confirm any ELC Vegetation Type for Cliffs or Talus Slopes[lxxviii]<br>• SWHMiST[cxlix] Index #21 provides development effects and mitigation measures. | The study area or subject proerty do not contain cliff and talus slopes. | |
| **Sand Barrens** | | | | | Not Present | Not Present |
| Rationale:<br>Sand barrens are rare in Ontario and support rare species. Most Sand Barrens have been lost due to cottage development and forestry. | ELC Ecosites:<br>SBO1<br>SBS1<br>SBT1<br><br>Vegetation cover varies from patchy and barren to continuous meadow (SBO1), thicket-like (SBS1), or more closed and treed (SBT1). Tree cover always <60%. | Sand Barrens typically are exposed sand, generally sparsely vegetated and caused by lack of moisture, periodic fires and erosion. They have little or no soil and the underlying rock protrudes through the surface. Usually located within other types of natural habitat such as forest or savannah. Vegetation can vary from patchy and barren to tree covered but less than 60%. | Any sand barren area, >0.5ha in size.<br><br>Information Sources<br>• OMNRF Districts.<br>• Natural Heritage Information Center (NHIC) has location information on their website<br>• Field naturalist clubs<br>• Conservation Authorities | • Confirm any ELC Vegetation Type for Sand Barrens[lxxviii]<br>• Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics)[i].<br>• SWHMiST[cxlix] Index #20 provides development effects and mitigation measures. | The study area or subject property do not contain sand barren type habitat. | |

**Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.**

| Rationale | Candidate SWH | | | Confirmed SWH | | |
|---|---|---|---|---|---|---|
| | ELC Ecosite Codes | Habitat Description | Detailed Information and Sources | Defining Criteria | Study Area | Subject Property |
| **Alvar** | | | | | Not Present | Not Present |
| Rationale:<br>Alvars are extremely rare habitats in Ecoregion 6E. Most alvars in Ontario are in Ecoregion 6E and 7E. Alvars in 6E are small and highly localized just north of the Palaeozoic-Precambrian contact. | ALO1<br>ALS1<br>ALT1<br>FOC1<br>FOC2<br>CUM2<br>CUS2<br>CUT2-1<br>CUW2<br><br>Five Alvar<br><br>Indicator Species:<br>1) Carex crawei<br>2) Panicum philadelphicum<br>3) Eleochairs compressa<br>4) Scutellaria parvula<br>5) Trichostema branchiatum<br><br>These indicator species are very specific to Alvars within Ecoregion 6E | An alvar is typically a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. The hydrology of alvars is complex, with alternating periods of inundation and drought. Vegetation cover varies from sparse lichen-moss associations to grasslands and shrublands and comprising a number of characteristic or indicator plant. Undisturbed alvars can be phyto- and zoo geographically diverse, supporting many uncommon or are relict plant and animals species. Vegetation cover varies from patchy to barren with a less than 60% tree cover[lxxviii]. | An Alvar site > 0.5 ha in size[lxxv].<br><br>Information Sources<br>• Alvars of Ontario (2000), Federation of Ontario Naturalists[lxxvi].<br>• Ontario Nature – Conserving Great Lakes Alvars[ccviii].<br>• Natural Heritage Information Center (NHIC) has location information on their website<br>• Field Naturalist clubs<br>• Conservation Authorities | Field studies identify four of the five Alvar indicator species[lxxv, cxlix] at a Candidate Alvar site is Significant.<br><br>• Site must not be dominated by exotic or introduced species (<50% vegetative cover are exotics sp.).<br>• The alvar must be in excellent condition and fit in with surrounding landscape with few conflicting land uses[lxxv].<br>• SWHMiST[cxlix] Index #17 provides development effects and mitigation measures. | The study area or subject property do not contain alvar habitat. | |
| **Old Growth Forest** | | | | | Not Present | Not Present |
| Rationale:<br>Due to historic logging practices, extensive old growth forest is rare in the Ecoregion. Interior habitat provided by old growth forests is required by many wildlife species. | Forest Community Series:<br>FOD<br>FOC<br>FOM<br>SWD<br>SWC<br>SWM | Old Growth forests are characterized by heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage development of a multi-layered canopy and an abundance of snags and downed woody debris. | Woodland Stands areas 30ha or greater in size or with at least 10 ha interior habitat assuming 100m buffer at edge of forest Í.<br><br>Information Sources<br>• OMNRF Forest Resource Inventory mapping<br>• OMNRF Forester, Ecologist or Biologist<br>• Field Local naturalist clubs<br>• Conservation Authorities<br>• Sustainable Forestry License (SFL) companies will possibly know locations through field operations.<br>• Municipal forestry departments | Field Studies will determine:<br>• If dominant trees species of the ecosite are >140 years old, then stand is Significant Wildlife Habitat[cxlviii]<br>• The stand will have experienced no recognizable forestry activities[cxlviii]<br>• The area of Forest Ecosites combined to make up the stand is the SWH.<br>• Determine ELC Vegetation Type for forest stand[lxxviii]<br>• SWHDSS[cxlix] Index #23 provides development effects and mitigation measures. | The study area or subject property do not contain old growth forest habitat. | |

**Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.**

| Rationale | Candidate SWH | | | Confirmed SWH | | |
|---|---|---|---|---|---|---|
| | ELC Ecosite Codes | Habitat Description | Detailed Information and Sources | Defining Criteria | Study Area | Subject Property |
| **Savannah** | | | | | Not Present | Not Present |
| Rationale:<br>Savannahs are extremely rare habitats in Ontario. | TPS1<br>TPS2<br>TPW1<br>TPW2<br>CUS2 | A Savannah is a tallgrass prairie habitat that has tree cover between 25 – 60%. | • No minimum size to site<br>Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH.<br><br>Information Sources<br>• Natural Heritage Information Center (NHIC) has location information on their website<br>• OMNRF Ecologists<br>• Field naturalists clubs<br>• Conservation Authorities | Field studies confirm one or more of the Savannah indicator species listed in[lxxv] Appendix N should be present. Note: Savannah plant spp. list from Ecoregion 6E should be used[cxlviii].<br><br>• Area of the ELC Ecosite is the SWH.<br>• Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics sp.).<br>• SWHMiST[cxlix] Index #18 provides development effects and mitigation measures. | The study area or subject property does not contain savannah habitat. | |
| **Tallgrass Prairie** | | | | | Not Present | Not Present |
| Rationale:<br>Tallgrass Prairies are extremely rare habitats in Ontario. | TPO1<br>TPO2 | A Tallgrass Prairie has ground cover dominated by prairie grasses. An open Tallgrass Prairie habitat has < 25% tree cover. | • No minimum size to site<br>Site must be restored or a natural site. Remnant sites such as railway right of ways are not considered to be SWH.<br><br>Information Sources<br>• OMNR Districts<br>• Natural Heritage Information Center (NHIC) has location information available on their website<br>• Field naturalists clubs<br>• Conservation Authorities | Field studies confirm one or more of the Prairie indicator species listed in[lxxv] Appendix N should be present. Note: Prairie plant spp. list from Ecoregion 6E should be used[cxlviii].<br>• Area of the ELC Ecosite is the SWH<br>• Site must not be dominated by exotic or introduced species (<50% vegetative cover exotics).<br>• SWHMiST[cxlix] Index #19 provides development effects and mitigation measures. | The study area and subject property does not contain tallgrass prarie. | |

**Table 2. Characteristics of Rare Vegetation Communities for Ecoregion 6E.**

| Rationale | Candidate SWH | | | Confirmed SWH | | |
|---|---|---|---|---|---|---|
| | ELC Ecosite Codes | Habitat Description | Detailed Information and Sources | Defining Criteria | Study Area | Subject Property |
| **Other Rare Vegetation Communities** | | | | | Not Present | Not Present |
| Rationale:<br>Plant communities that often contain rare species which depend on the habitat for survival. | Provincially Rare S1, S2 and S3 vegetation communities are listed in Appendix M of the SWHTG[cxlviii]. Any ELC Ecosite Code that has a possible ELC Vegetation Type that is Provincially Rare is Candidate SWH. | Rare Vegetation Communities may include beaches, fens, forest, marsh, barrens, dunes and swamps. | ELC Ecosite codes that have the potential to be a rare ELC Vegetation Type as outlined in appendix M[cxlviii]<br><br>The OMNR/NHIC will have up to date listing for rare vegetation communities.<br><br>Information Sources<br>• Natural Heritage Information Center (NHIC) has location information available on their website<br>• OMNRF Districts<br>• Field naturalists clubs<br>• Conservation Authorities | Field studies should confirm if an ELC Vegetation Type is a rare vegetation community based on listing within Appendix M of SWHTG[cxlviii].<br><br>• Area of the ELC Vegetation Type polygon is the SWH.<br>• SWHMiST[cxlix] Index #37 provides development effects and mitigation measures. | There are no other rare vegeration communites present within the study area or subject property. | |

## #2520 - 720 Erbsville Road, Waterloo EIS

### Significant Wildlife Habitat Assessment Tables

**Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.**

| Rationale | Candidate SWH | | | Confirmed SWH | Assessment Details | |
|---|---|---|---|---|---|---|
| | Wildlife Species | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Study Area | Subject Property |
| **Wildlife Habitat: Waterfowl Nesting Area** | | | | | Not Present | Not Present |
| Rationale:<br>Important to local waterfowl populations, sites with greatest number of species and highest number of individuals are significant. | American Black Duck<br>Northern Pintail<br>Northern Shoveler<br>Gadwall<br>Blue-winged Teal<br>Green-winged Teal<br>Wood Duck<br>Hooded Merganser<br>Mallard | All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH:<br>MAS1 MAS2<br>MAS3 SAS1<br>SAM1 SAF1<br>MAM1 MAM2<br>MAM3 MAM4<br>MAM5 MAM6<br>SWT1 SWT2<br>SWD1 SWD2<br>SWD3 SWD4<br><br>Note: includes adjacency to Provincially Significant Wetlands | A waterfowl nesting area extends 120m[cxlix] from a wetland (> 0.5 ha) or a wetland (>0.5ha) and any small wetlands (0.5ha) within 120m or a cluster of 3 or more small (<0.5 ha) wetlands within 120m of each individual wetland where waterfowl nesting is known to occur[cxlix].<br>• Upland areas should be at least 120m wide so that predators such as raccoons, skunks, and foxes have difficulty finding nests.<br>• Wood Ducks and Hooded Mergansers utilize large diameter trees (>40cm dbh) in woodlands for cavity nest sites.<br><br>Information Sources<br>• Ducks Unlimited staff may know the locations of particularly productive nesting sites.<br>• OMNRF Wetland Evaluations for indication of significant waterfowl nesting habitat.<br>• Reports and other information available from CAs | Studies confirmed:<br>• Presence of 3 or more nesting pairs for listed species excluding Mallards, or<br>• Presence of 10 or more nesting pairs for listed species including Mallards.<br>• Any active nesting site of an American Black Duck is considered significant.<br>• Nesting studies should be completed during the spring breeding season (April - June). Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi]<br>• A field study confirming waterfowl nesting habitat will determine the boundary of the waterfowl nesting habitat for the SWH, this may be greater or less than 120m[cxlviii] from the wetland and will provide enough habitat for waterfowl to successfully nest.<br>• SWHMiST[cxlix] Index #25 provides development effects and mitigation measures. | Suitable habitat of sufficient size not present. | |

**Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.**

| Rationale | Candidate SWH | | | Confirmed SWH | Assessment Details | |
|---|---|---|---|---|---|---|
| | Wildlife Species | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Study Area | Subject Property |
| **Wildlife Habitat: Bald Eagle and Osprey Nesting, Foraging and Perching Habitat** | | | | | Candidate | Not Present |
| Rationale:<br>Nest sites are fairly uncommon in Eco-region 6E are used annually by these species. Many suitable nesting locations may be lost due to increasing shoreline development pressures and scarcity of habitat. | Osprey<br><br>Special Concern:<br>Bald Eagle | ELC Forest Community Series: FOD, FOM, FOC, SWD, SWM and SWC directly adjacent to riparian areas – rivers, lakes, ponds and wetlands | • Nests are associated with lakes, ponds, rivers or wetlands along forested shorelines, islands, or on structures over water.<br>• Osprey nests are usually at the top a tree whereas Bald Eagle nests are typically in super canopy trees in a notch within the tree's canopy.<br>• Nests located on man-made objects are not to be included as SWH (e.g. telephone poles and constructed nesting platforms).<br><br>Information Sources<br>• Natural Heritage Information Center (NHIC) compiles all known nesting sites for Bald Eagles in Ontario.<br>• MNRF values information (LIO/NRVIS) will list known nesting locations. Note: data from NRVIS is provided as a point and does not represent all the habitat.<br>• Nature Counts, Ontario Nest Records Scheme data.<br>• OMNRF Districts<br>• Sustainable Forestry License (SFL) companies will identify additional nesting locations through field operations.<br>• Check the Ontario Breeding Bird Atlas[ccv] or Rare Breeding Birds in Ontario for species documented<br>• Reports and other information available from CAs.<br>• Field naturalists clubs | Studies confirm the use of these nests by:<br>• One or more active Osprey or Bald Eagle nests in an area[cxlviii].<br>• Some species have more than one nest in a given area and priority is given to the primary nest with alternate nests included within the area of the SWH.<br>• For an Osprey, the active nest and a 300m radius around the nest or the contiguous woodland stand is the SWHccvii, maintaining undisturbed shorelines with large trees within this area is important[cxlviii].<br>• For a Bald Eagle the active nest and a 400-800m radius around the nest is the SWH[cvi], ccvii. Area of the habitat from 400-800m is dependent on site lines from the nest to the development and inclusion of perching and foraging habitat[cvi].<br>• To be significant a site must be used annually. When found inactive, the site must be known to be inactive for >3 years or suspected of not being used for >5 years before being considered not significant[ccvii]<br>• Observational studies to determine nest site use, perching sites and foraging areas need to be done from mid March to mid August.<br>• Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects"[ccxi]<br>• SWHMiST[cxlix] Index #26 provides development effects and mitigation measures | Suitable habitat is present within the greater study area. Breed bird surveys did not document criterion species within the development footprint. | |

**Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.**

| Rationale | Candidate SWH | | | Confirmed SWH | Assessment Details | |
|---|---|---|---|---|---|---|
| | Wildlife Species | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Study Area | Subject Property |
| **Wildlife Habitat: Woodland Raptor Nesting Habitat** | | | | | Not Present | Not Present |
| Rationale:<br>Nests sites for these species are rarely identified; these area sensitive habitats and are often used annually by these species. | Northern Goshawk<br>Cooper's Hawk<br>Sharp-shinned Hawk<br>Red-shouldered Hawk<br>Barred Owl<br>Broad-winged Hawk | May be found in all forested ELC Ecosites.<br><br>May also be found in SWC, SWM, SWD and CUP3. | All natural or conifer plantation woodland/forest stands >30ha with >10ha of interior habitat[lxxxviii, lxxxix, xc, xci, xciii, xciv, xcv, xcvi, cxxxiii]. Interior habitat determined with a 200m buffer[cxlviii].<br>• Stick nests found in a variety of intermediate-aged to mature conifer, deciduous or mixed forests within tops or crotches of trees. Species such as Cooper's hawk nest along forest edges sometimes on peninsulas or small off-shore islands.<br>• In disturbed sites, nests may be used again, or a new nest will be in close proximity to old nest.<br><br>Information Sources<br>• OMNRF<br>• Check the Ontario Breeding Bird Atlas[ccv] or Rare Breeding Birds in Ontario for species documented.<br>• Check data from Bird Studies Canada<br>• Reports and other information available from CAs | Studies confirm:<br>• Presence of 1 or more active nests from species list is considered significant[cxlviii].<br>• Red-shouldered Hawk and Northern Goshawk – a 400m radius around the nest or 28ha area of habitat is the SWH[ccvii].<br>• Barred Owl – a 200m radius around the nest is the SWH[ccvii].<br>• Broad-winged Hawk and Coopers Hawk – a 100m radius around the nest is the SWH[ccvii].<br>• Sharp-shinned Hawk – a 50m radius around the nest is the SWH[ccvii].<br>• Conduct field investigations from mid-March to end of May. The use of call broadcasts can help in locating territorial (courting/nesting) raptors and facilitate the discovery of nests by narrowing down the search area.<br>• SWHMiST[cxlix] Index #27 provides development effects and mitigation measures. | Suitable habitat not present within the study area. Breeding bird surveys did not document confirmed nesting of criterion species. Suitable habitat not present within the development footprint. | |
| **Wildlife Habitat: Turtle Nesting Area** | | | | | Candidate | Not Present |
| Rationale:<br>These habitats are rare and when identified will often be the only breeding site for local populations of turtles | Midland Painted Turtle<br><br>Special Concern:<br>Northern Map Turtle<br>Snapping Turtle | Exposed mineral soil (sand or gravel) areas adjacent (<100m)[cxlviii] or within the following ELC Ecosites:<br>MAS1<br>MAS2<br>MAS3<br>SAS1<br>SAM1<br>SAF1<br>BOO1<br>FEO1 | • Best nesting habitat for turtles are close to water and away from roads and sites less prone to loss of eggs by predation from skunks, raccoons or other animals.<br>• For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles are able to dig in and are located in open, sunny areas. Nesting areas on the sides of municipal or provincial road embankments and shoulders are not SWH.<br>• Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, and rivers are most frequently used.<br><br>Information Sources<br>• Use Ontario Soil Survey reports and maps to help find suitable substrate for nesting turtles (well-drained sands and fine gravels).<br>• Check the Ontario Herpetofaunal Summary Atlas records or other similar atlases for uncommon turtles; location information may help to find potential nesting habitat for them.<br>• Natural Heritage Information Center (NHIC)<br>• Field Naturalist clubs and landowners | Studies confirm:<br>• Presence of 5 or more nesting Midland Painted Turtles<br>• One or more Northern Map Turtle or Snapping Turtle nesting is a SWH[i]<br>• The area or collection of sites within an area of exposed mineral soils where the turtles nest, plus a radius of 30-100m around the nesting area dependent on slope, riparian vegetation and adjacent land use is the SWH[cxlviii].<br>• Travel routes from wetland to nesting area are to be considered within the SWH[cxlix].<br>• Field investigations should be conducted in prime nesting season typically late spring to early summer. Observational studies observing the turtles nesting is a recommended method.<br>• SWHMiST[cxlix] Index #28 provides development effects and mitigation measures for turtle nesting habitat. | Herpetofauna surveys did not document turtle nesting occurrences within the development footprint (Dougan and Associates 2018). | |

**Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.**

| Rationale | Candidate SWH | | | Confirmed SWH | Assessment Details | |
|---|---|---|---|---|---|---|
| | Wildlife Species | ELC Ecosite Codes | Habitat Criteria and Information Sources | Defining Criteria | Study Area | Subject Property |
| **Wildlife Habitat: Seeps and Springs** | | | | | Confirmed | Confirmed |
| Rationale:<br>Seeps/Springs are typical of headwater areas and are often at the source of coldwater streams. | Wild Turkey<br>Ruffed Grouse<br>Spruce Grouse<br>White-tailed Deer<br>Salamander spp. | Seeps/Springs are areas where ground water comes to the surface. Often they are found within headwater areas within forested habitats. Any forested Ecosite within the headwater areas of a stream could have seeps/springs. | Any forested area (with <25% meadow/field/pasture) within the headwaters of a stream or river system[cxvii, cxlix].<br>• Seeps and springs are important feeding and drinking areas especially in the winter will typically support a variety of plant and animal species[cxix, cxx, cxxi, cxxii, cxiii, cxiv]<br><br>Information Sources<br>• Topographical Map<br>• Thermography<br>• Hydrological surveys conducted by CAs and MOE<br>• Field naturalists clubs and landowners<br>• Municipalities and Conservation Authorities may have drainage maps and headwater areas mapped. | Field Studies confirm:<br>• Presence of a site with 2 or more seeps/springs should be considered SWH.<br>• The area of a ELC forest ecosite containing the seeps/springs is the SWH. The protection of the recharge area considering the slope, vegetation, height of trees and groundwater condition need to be considered in delineation the habitat[cxlviii]<br>• SWHMiST[cxlix] Index #30 provides development effects and mitigation measures | Seeps and springs have been confirmed within the natural communities surrounding Laurel Creek on the Northgate Kartway lands, within the study area. | |
| **Wildlife Habitat: Amphibian Breeding Habitat (Woodland)** | | | | | Confirmed | Confirmed |
| Rationale:<br>These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations. | Eastern Newt<br>Blue-spotted Salamander<br>Spotted Salamander<br>Gray Treefrog<br>Spring Peeper<br>Western Chorus Frog<br>Wood Frog | All Ecosites associated with these ELC Community Series:<br>FOC<br>FOM<br>FOD<br>SWC<br>SWM<br>SWD<br><br>Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians. | • Presence of a wetland, pond or woodland pool (including vernal pools) >500m$^2$ (about 25m diameter) [ccvii] within or adjacent (within 120m) to a woodland (no minimum size)[clxxxii, lxiii, lxv, lxvi, lxvii, lxviii, lxix, lxx] Some small wetlands may not be mapped and may be important breeding pools for amphibians.<br>• Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat[cxlviii]<br><br>Information Sources<br>• Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records<br>• Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property.<br>• OMNRF District<br>• OMNRF wetland evaluations<br>• Field naturalist clubs<br>• Canadian Wildlife Service Amphibian Road Call Survey<br>• Ontario Vernal Pool Association: http://www.ontariovernalpools.org | Studies confirm:<br>• Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog species with at least 20 individuals (adults or eggs masses)[lxxi] or 2 or more of the listed frog species with Call Level Codes of 3.<br>• A combination of observational study and call count surveys[cviii] will be required during the spring March-June when amphibians are concentrated around suitable breeding habitat within or near the woodland/wetlands.<br>• The habitat is the woodland area plus a 230m radius of woodland area[lxiii,lxv, lxvi, lxvii, lxviii, lxix, lxx, lxxi] if a wetland area is adjacent to a woodland, a travel corridor connecting the wetland to the woodland is the be included in the habitat.<br>• SWHMiST[cxlix] Index #14 provides development effects and mitigation measures. | Spring Peeper and Gray Treefrog were observed with Call Code 3 during anuran call surveys by Dougan and Associates in 2013. Call codes not met in 2023. | |

**Table 3. Characteristics of Specialized Wildlife Habitat for Ecoregion 6E.**

| Rationale | Candidate SWH | | | Confirmed SWH | Assessment Details | |
|---|---|---|---|---|---|---|
| | **Wildlife Species** | **ELC Ecosite Codes** | **Habitat Criteria and Information Sources** | **Defining Criteria** | **Study Area** | **Subject Property** |
| **Wildlife Habitat: Amphibian Breeding Habitat (Wetland)** | | | | | Not Present | Not Present |
| Rationale:<br>These habitats are extremely important to amphibian biodiversity within a landscape and often represent the only breeding habitat for local amphibian populations | Eastern Newt<br>American Toad<br>Spotted Salamander<br>Four-toed Salamander<br>Blue-spotted Salamander<br>Gray Tree frog<br>Western Chorus Frog<br>Northern Leopard Frog<br>Pickerel Frog<br>Green Frog<br>Mink Frog<br>Bullfrog | ELC Community Classes SW, MA, FE, BO, OA and SA.<br><br>Typically these wetland ecosites will be isolated (>120m) from woodland ecosites, however larger wetlands containing predominantly aquatic species (e.g. Bull Frog) may be adjacent to woodlands. | • Wetlands >500m2 (about 25m diameter)[ccvii] supporting high species diversity are significant; some small or ephemeral habitats may not be identified on MNRF mapping and could be important amphibian breeding habitats[clxxxiv].<br>• Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, escape and concealment from predators.<br>• Bullfrogs require permanent water bodies with abundant emergent vegetation.<br><br>Information Sources<br>• Ontario Herpetofaunal Summary Atlas (or other similar atlases)<br>• Canadian Wildlife Service Amphibian Road Surveys and Backyard Amphibian Call Count.<br>• OMNRF Districts and wetland evaluations<br>• Reports and other information available from CAs. | Studies confirm:<br>• Presence of breeding population of 1 or more of the listed newt/salamander species or 2 or more of the listed frog/toad species and with at least 20 individuals (adults or eggs masses)[lxxi, lxxiii], or 2 or more of the listed frog/toad species with Call Level Codes of 3. or; Wetland with confirmed breeding Bullfrogs are significant.<br>• The ELC ecosite wetland area and the shoreline are the SWH.<br>• A combination of observational study and call count surveys[cviii] will be required during spring March to June) when amphibians are concentrated around suitable breeding habitat within or near the wetlands.<br>• If a SWH is determined for Amphibian Breeding Habitat (Wetlands) then Movement Corridors are to be considered as outlined in Table 1.4.1 of this Schedule.<br>• SWHMiST[cxlix] Index #15 provides development effects and mitigation measures. | Suitable wetland habitat not present within the study area. Required number of amphibian breeding populations not present. | |
| **Woodland Area-Sensitive Bird Breeding Habitat** | | | | | Not Present | Not Present |
| Rationale:<br>Large, natural blocks of mature woodland habitat within the settled areas of Southern Ontario are important habitats for area sensitive interior forest song birds. | Yellow-Bellied Sapsucker<br>Red-breasted Nuthatch<br>Veery<br>Blue-headed Vireo<br>Northern Parula<br>Black-throated Green Warbler<br>Blackburnian Warbler<br>Black-throated Blue Warbler<br>Ovenbird<br>Scarlet Tanager<br>Winter Wren<br><br>Special Concern:<br>Cerulean Warbler<br>Canada Warbler | All Ecosites associated with these ELC Community Series:<br>FOC<br>FOM<br>FOD<br>SWC<br>SWM<br>SWD | • Habitats where interior forest breeding birds are breeding, typically large mature (>60 yrs old) forest stands or woodlots >30 ha.[cv, cxxxi, cxxxii, cxxxiii, cxxxiv, cxxv, cxxvi, cxxxvii, cxxxviii, cxxxix, cxl, cxli, cxlii, cxliii, cxliv, cxlv, cxlvi, cl, cli, clii, cliii, cliv, clv, clvii, clviii, clix]<br>• Interior forest habitats are at least 200m from forest edge habitat.<br><br>Information Sources<br>• Local bird clubs<br>• Canadian Wildlife Service (CWS) for the location of forest bird monitoring.<br>• Bird studies Canada conducted a 3-year study of 287 woodlands to determine the effects of forest fragmentation on forest birds and to greatest value to interior species<br>• Reports and other information available from CAs. | • Presence of nesting or breeding pairs of 3 or more of the listed wildlife species.<br>• Note: any site with breeding Cerulean Warblers or Canada Warblers is to be considered SWH.<br>• Conduct field investigations in spring and early summer when birds are singing and defending their territories.<br>• Evaluation methods to follow “Bird and Bird Habitats:<br>Guidelines for Wind Power Projects”[ccxi]<br>• SWHMiST[cxlix] Index #34 provides development effects and mitigation measures. | Habitat of sufficient size not present. Breeding bird surveys completed have not documented the criterion species within the development footprint. | |

**#2520 - 720 Erbsville Road, Waterloo EIS**

**Significant Wildlife Habitat Assessment Tables**

**Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 6E.**

| Rationale | Candidate SWH | | | Confirmed SWH | | |
|---|---|---|---|---|---|---|
| | **Wildlife Species** | **ELC Ecosites** | **Detailed Information and Sources** | **Defining Criteria** | **Study Area** | **Subject Property** |
| **Wildlife Habitat: Marsh Bird Breeding Habitat** | | | | | Not Present | Not Present |
| Rationale:<br>Wetlands for these bird species are typically productive and fairly rare in Southern Ontario landscapes. | American Bittern<br>Virginia Rail<br>Sora<br>Common Gallinule<br>American Coot<br>Pied-billed Grebe<br>Marsh Wren<br>Sedge Wren<br>Common Loon<br>Sandhill Crane<br>Green Heron<br>Trumpeter Swan<br><br>Special Concern:<br>Black Tern<br>Yellow Rail | MAM1<br>MAM2<br>MAM3<br>MAM4<br>MAM5<br>MAM6<br>SAS1<br>SAM1<br>SAF1<br>FEO1<br>BOO1<br><br>For Green Heron:<br>All SW, MA and CUM1 sites. | • Nesting occurs in wetlands<br>• All wetland habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present[cxxiv].<br>• For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water.<br><br>Information Sources<br>• Contact OMNRF, wetland evaluations are a good source of information.<br>• Field naturalist clubs<br>• Natural Heritage Information Center (NHIC) Records<br>• Reports and other information available from CAs.<br>• Ontario Breeding Bird Atlas[ccv] | Studies confirm:<br>• Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or 1 pair of Sandhill Cranes; or breeding by any combination of 5 or more of the listed species[í].<br>• Note: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH[í].<br>• Area of the ELC ecosite is the SWH<br>• Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats.<br>• Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi].<br>• SWHMiST[cxlix] Index #35 provides development effects and mitigation measures | Suitable habitat of sufficient size is not present within the study area. Breeding bird surveys did have not documented the criterion species within the development footprint. | |
| **Wildlife Habitat: Open Country Bird Breeding Habitat** | | | | | Not Present | Not Present |
| Rationale:<br>This wildlife habitat is declining throughout Ontario and North America. Species such as the Upland Sandpiper have declined significantly the past 40 years based on CWS (2004) trend records. | Upland Sandpiper<br>Grasshopper Sparrow<br>Vesper Sparrow<br>Northern Harrier<br>Savannah Sparrow<br><br>Special Concern:<br>Short-eared Owl | CUM1<br>CUM2 | Large grassland areas (includes natural and cultural fields and meadows) >30 ha [clx, clxi, clxii, clxiii, clxiv, clxv, clxvi, clxvii, clxviii, clxix]. Grasslands not Class 1 or 2 agricultural lands, and not being actively used for farming (i.e. no row cropping or intensive hay or livestock pasturing in the last 5 years)[í].<br><br>Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older.<br><br>The Indicator bird species are area sensitive requiring larger grassland areas than the common grassland species.<br><br>Information Sources<br>• Agricultural land classification maps, Ministry of Agriculture.<br>• Ask local birders<br>• Ontario Breeding Bird Atlas[ccv]<br>• Reports and other information available from CAs. | Field Studies confirm:<br>• Presence of nesting or breeding of 2 or more of the listed species.<br>• A field with 1 or more breeding Short-eared Owl is to be considered SWH.<br>• The area of SWH is the contiguous ELC ecosite field areas.<br>• Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories.<br>• Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi].<br>• SWHMiST[cxlix] Index #32 provides development effects and mitigation measures. | Suitable habitat of sufficient size is not present within the study area. Breeding bird surveys did not document the criterion species within the development footprint. | |

**Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 6E.**

| Rationale | Candidate SWH | | | Confirmed SWH | | |
|---|---|---|---|---|---|---|
| | **Wildlife Species** | **ELC Ecosites** | **Detailed Information and Sources** | **Defining Criteria** | **Study Area** | **Subject Property** |
| **Wildlife Habitat: Shrub/Early Successional Bird Breeding Habitat** | | | | | Not Present | Not Present |
| Rationale:<br>This wildlife habitat is declining throughout Ontario and North America. The Brown Thrasher has declined significantly over the past 40 years based on CWS (2004) trend records cxcix. | Indicator spp.:<br>Brown Thrasher<br>Clay-coloured Sparrow<br><br>Common spp.:<br>Field Sparrow<br>Black-billed Cuckoo<br>Eastern Towhee<br>Willow Flycatcher<br><br>Special Concern:<br>Yellow-breasted Chat<br>Golden-winged Warbler | CUT1<br>CUT2<br>CUS1<br>CUS2<br>CUW1<br>CUW2<br><br>Patches of shrub ecosites can be complexed into a larger habitat for some bird species. | Large field areas succeeding to shrub and thicket habitats>10ha[clxiv] in size.<br>• Shrub land or early successional fields, not class 1 or 2 agricultural lands, not being actively used for farming (i.e. no row-cropping, haying or live-stock pasturing in the last 5 years)[í].<br><br>Shrub thicket habitats (>10 ha) are most likely to support and sustain a diversity of these species [clxxiii].<br><br>Shrub and thicket habitat sites considered significant should have a history of longevity, either abandoned fields or pasturelands.<br><br>Information Sources<br>• Agricultural land classification maps Ministry of Agriculture<br>Local bird clubs<br>• Ontario Breeding Bird Atlas[ccv]<br>• Reports and other information available from CAs | Field Studies confirm:<br>• Presence of nesting or breeding of 1 of the indicator species and at least 2 of the common species[í].<br>• A field with breeding Yellow-breasted Chat or Golden-winged Warbler is to be considered as Significant Wildlife Habitat.<br>• The area of the SWH is the contiguous ELC ecosite field/thicket area.<br>• Conduct field investigations of the most likely areas in spring and early summer when birds are singing and defending their territories<br>• Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects”[ccxi]<br>• SWHMiST[cxlix] Index #33 provides development effects and mitigation measures. | Suitable habitat of sufficient size is not present within the study area. Breeding bird surveys did not document the criterion species within the development footprint. | |
| **Wildlife Habitat: Terrestrial Crayfish** | | | | | Not Present | Not Present |
| Rationale:<br>Terrestrial Crayfish are only found within SW Ontario in Canada and their habitats are very rare.[ccii] | Chimney or Digger Crayfish: (*Fallicambarus fodiens*)<br><br>Devil Crawfish or Meadow Crayfish: (*Cambarus Diogenes*) | MAM1<br>MAM2<br>MAM3<br>MAM4<br>MAM5<br>MAM6<br>MAS1<br>MAS2<br>MAS3<br>SWD<br>SWT<br>SWM | Wet meadow and edges of shallow marshes (no minimum size) identified should be surveyed for terrestrial crayfish.<br>• Constructs burrows in marshes, mudflats, meadows, the ground can’t be too moist. Can often be found far from water.<br>• Both species are a semi-terrestrial burrower which spends most of its life within burrows consisting of a network of tunnels. Usually the soil is not too moist so that the tunnel is well formed.<br><br>Information Sources<br>• Information sources from “Conservation Status of Freshwater Crayfishes” by Dr. Premek Hamr for the WWF and CNF March 1998 | Studies Confirm:<br>• Presence of 1 or more individuals of species listed or their chimneys (burrows) in suitable marsh meadow or terrestrial sites[cci]<br>• Area of ELC Ecosite or an ecoelement area of meadow marsh or swamp within the larger ecosite area is the SWH<br>• Surveys should be done April to August during in temporary or permanent water<br>Note the presence of burrows or chemistry are often the only indicator of presence, observance or collection of individuals is very difficult[cci]<br>• SWHMiST[cxlix] Index #36 provides development effects and mitigation measures. | No terrestrial crayfish chimneys have been documented to suggest these species are present. | |

**Table 4. Characteristics of Habitat for Species of Conservation Concern for Ecoregion 6E.**

| Rationale | Candidate SWH | | | Confirmed SWH | | |
|---|---|---|---|---|---|---|
| | Wildlife Species | ELC Ecosites | Detailed Information and Sources | Defining Criteria | Study Area | Subject Property |
| **Wildlife Habitat: Special Concern and Rare Wildlife Species** | | | | | Confirmed | Confirmed |
| Rationale:<br>These species are quite rare or have experienced significant population declines in Ontario. | All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre. | All plant and animal element occurrences (EO) within a 1 or 10km grid.<br><br>Older element occurrences were recorded prior to GPS being available, therefore location information may lack accuracy. | When an element occurrence is identified within a 1 or 10 km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites[lxxviii].<br><br>Information Sources<br>• Natural Heritage Information Centre (NHIC) will have the Special Concern and Provincially Rare (S1-S3, SH) species lists with element occurrences data.<br>• NHIC Website: "Get Information": http://nhic.mnr.gov.on.ca<br>• Ontario Breeding Bird Atlas[ccv]<br>• Expert advice should be sought as many of the rare spp. have little information available about their requirements. | Studies Confirm:<br>• Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable.<br><br>• The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The habitat needs to be easily mapped and cover an important life stage component for a species e.g. specific nesting habitat or foraging habitat.<br>• SWHMiST[cxlix] Index #37 provides development effects and mitigation measures. | SCC habitat has been confirmed within the Erbsville Kartway lands within the study area, including Eastern Wood-Pewee and Snapping Turtle. Barn Swallow has also been observed within the subject property, however, no nesting habitat is present. No other SCC habitat has been identified within the study area. | |

## #2520 - 720 Erbsville Road, Waterloo EIS

### Significant Wildlife Habitat Assessment Tables

**Table 5. Characteristics of Animal Movement Corridors for Ecoregion 6E.**

| Rationale | Candidate SWH | | | Confirmed SWH | | |
|---|---|---|---|---|---|---|
| | Wildlife Species | Habitat Description | Detailed Information and Sources | Defining Criteria | Study Area | Subject Property |
| **Wildlife Habitat: Amphibian Movement Corridors** | | | | | Not Present | Not Present |
| **Rationale:**<br>Movement corridors for amphibians moving from their terrestrial habitat to breeding habitat can be extremely important for local populations. | Eastern Newt<br>Blue-spotted Salamander<br>Spotted Salamander<br>Gray Treefrog<br>Spring Peeper<br>Western Chorus Frog<br>Northern Leopard Frog<br>Pickerel Frog<br>Green Frog<br>Mink Frog<br>Bullfrog | Corridors may be found in all ecosites associated with water.<br>• Corridors will be determined based on identifying the significant breeding habitat for these species in Table 1.1. | Movement corridors between breeding habitat and summer habitat [clxxiv, clxxv, clxxvi, clxxvii, clxxviii, clxxix, clxxx, clxxxi].<br><br>Movement corridors must be determined when Amphibian breeding habitat is confirmed as SWH from Table 1.2.2 (Amphibian Breeding Habitat – Wetland) of this Schedule[í].<br><br>Information Sources<br>• MNRF District Office<br>• Natural Heritage Information Center NHIC<br>• Reports and other information available from CAs<br>• Field Naturalist Clubs | • Field Studies must be conducted at the time of year when species are expected to be migrating or entering breeding sites.<br>• Corridors should consist of native vegetation, with several layers of vegetation. Cooridors unbroken by roads, waterways or bodies, and undeveloped areas are most significant[cxlix].<br>• Corridors should have at least 15m of vegetation on both sides of waterway [cxlix] or be up to 200m wide[cxlix] of woodland habitat and with gaps <20m [cxlix].<br>• Shorter corridors are more significant than longer corridors, however amphibians must be able to get to and from their summer and breeding habitat[cxlix].<br>• SWHMiST[cxlix] Index #40 provides development effects and mitigation measures. | Amphibian Breeding Habitat (Wetland) not present. | |
| **Wildlife Habitat: Deer Movement Corridors** | | | | | Possible | Not Present |
| Rationale:<br>Corridors important for all species to be able to access seasonally important life-cycle habitats or to access new habitat for dispersing individuals by minimizing their vulnerability while travelling. | White-tailed Deer | Corridors may be found in all forested ecosites.<br><br>A Project Proposal in Stratum II Deer Wintering Area has potential to contain corridors. | Movement corridor must be determined when Deer Wintering Habitat is confirmed as SWH from Table 1.1 of this schedule[í].<br>• A deer wintering habitat identified by the OMNRF as SWH in Table 1.1 of this Schedule will have corridors that the deer use during fall migration and spring dispersion [clxxxii, clxxxiii, cxlix, cxciv].<br>• Corridors typically follow riparian areas, woodlots, areas of physical geography (ravines, or ridges).<br><br>Information Sources<br>• MNRF District Office<br>• Natural Heritage Information Center (NHIC)<br>• Reports and other information available from CAs<br>• Field Naturalist Clubs | • Studies must be conducted at the time of year when deer are migrating or moving to and from winter concentration areas.<br>• Corridors that lead to a deer wintering yard should be unbroken by roads and residential areas.<br>• Corridors should be at least 200m wide[cxlix] with gaps <20m[cxlix] and if following riparian area with at least 15m of vegetation on both sides of waterway[cxlix]. Shorter corridors are more significant than longer corridors[cxlix]<br>• SWHMiST[cxlix] Index #39 provides development effects and mitigation measures. | Deer Winter Congregation Area is present within the study area; therefore, deer movement corridors are considered candidate SWH within the ESES for the hedgerow. The hedgerow is a poor movement corridor since it is only a single tree wide for the majority of its length. The ability of the southeastern hedgerow to function as deer movement and the width is not sufficient to be considered significant. | |

Appendix IV
Terms of Reference and Agency Comments

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

January 13, 2021 Project No. 2520

Robyn McMullen
Environmental Policy Planner, City of Waterloo
100 Regina Street South
PO Box 337, Station Waterloo
Waterloo, ON, N2J 4A8

Jane Gurney
Principal Planner, Region of Waterloo
150 Frederick Street
Kitchener, ON, N2G 4J3

Trevor Heywood
Resource Planner, Grand River Conservation Authority
400 Clyde Road
PO Box 729
Cambridge, ON, N1R 5W6

Dear Ms. McMullen, Ms. Gurney, and Mr. Heywood,

**Re: 720 Erbsville Road, Waterloo, ON**
**Environmental Impact Study - Terms of Reference**

Natural Resource Solutions Inc. (NRSI) has been retained as part of a team by Sunvest Development Corp. to prepare an Environmental Impact Study (EIS) for the proposed development of the above noted property located on Erbsville Road in north Waterloo, Ontario. An EIS is required as the lands contain significant woodlands, the Laurel Creek Forest Environmentally Sensitive Policy Area (ESPA), and the Sunfish Lake-Laurel Creek Provincially Significant Wetland (PSW), which are designated and protected as:

- Core Environmental Features in the Region of Waterloo's Official Plan (2015),
- Core Natural Features, and Supporting Natural Features in the City of Waterloo's Official Plan (2020a), and
- Wetlands and watercourses in GRCA's Policies (2013).

In addition, the lands contain known and potential habitat for Species At Risk (SAR). These species and their habitat are protected under the Endangered Species Act through the Ministry of Environment, Conservation and Parks (MECP).

The natural features have been extensively studied through the Erbsville South Environmental Study (Dougan and Associates 2018) and the Erbsville South Block Plan (City of Waterloo 2020b). The EIS will be prepared in collaboration with the study team, which includes NRSI (biology), IBI (engineering, stormwater management, surface and groundwater monitoring), CVD (hydrogeology), and MHBC (planning).

This Terms of Reference (TOR) has been prepared in accordance with the City of Waterloo Official Plan (2020a), Region of Waterloo Official Plan (2015), Greenlands Network Implementation Guidelines (Region of Waterloo 2016), Erbsville South Block Plan (City of Waterloo 2020b), Erbsville South Environmental Study (Dougan and Associates 2018), and GRCA EIS Guidelines (2005). The

details of the TOR are attached for your review and comment. Please feel free to contact me if you have any questions or comments.

Sincerely,
Natural Resource Solutions Inc.



David E. Stephenson, M.Sc.
Senior Terrestrial and Wetland Biologist



Ken Burrell, M.E.S.,
Terrestrial and Wetland Biologist

**720 Erbsville Road, Waterloo**
**Environmental Impact Study Terms of Reference**
**January 13, 2021**

## Introduction

The subject property is approximately 9.3 ha in area and is bounded to the northwest by Conservation Drive and the Erbsville Kartway lands, Erbsville Road to the south, and a small agricultural field to the east (Map 1). Habitat within the subject property is comprised of agricultural fields, with wetlands and woodlands associated with Laurel Creek. The woodland/wetland complex on-site is part of Environmentally Sensitive Policy Area (ESPA) 80 known as Laurel Creek Forest (Region of Waterloo 2015) and is a Core Natural Feature in the City of Waterloo's Official Plan (2020a). Wetlands are part of the Laurel Creek-Sunfish Lake PSW.

## Proposed Undertaking

The proposed development is a mixture of townhouses and detached houses, with an internal road network, a mixture of residential density types, stormwater management, trails and parkland (Appendix I). The development plan will follow the land use structure of the Erbsville South Block Plan (City of Waterloo 2020b).

## Proposed Study Area

Although the proponent owns a number of properties in the area, for the purposes of this study, the "subject property" refers to the property located at 720 Erbsville Road, Waterloo. The "development footprint" is the land occupied by the agricultural field and the existing dwelling which are understood to be the lands being considered for the development. In addition, neighbouring natural features are being included that have ecological connections and interrelationships to the development area. This includes areas that contribute to as well as receive flows from the development lands. As well, there are fairly extensive woodlands and wetlands nearby, and in order to complete a comprehensive impact assessment, these larger features will be included in this study (but to a lesser detail than features immediately adjacent to the development area as reference to previously completed studies will provide the necessary information). To capture these ecological interrelationships, we have included an area of 200m around the property boundary. For the purpose of this study, these lands are called the 'study area'. This distance also adequately captures the adjacent lands area as per the PPS.

## Species At Risk (SAR) and Species of Conservation Concern (SCC) Screening

A SAR and SCC screening was completed by comparing the habitat requirements for significant species that are known from the vicinity of the study area based on the ESES (Dougan and Associates 2018) against the ELC communities and habitats within the subject property. This comparison allowed it to be determined which species occur or have the potential to occur within the subject property, and identify those species with potential to be impacted by the proposed undertaking. Based on this assessment, the following SAR and SCC have the potential to occur within the development footprint:

- Barn Swallow (*Hirundo rustica*),
- Snapping Turtle (*Chelydra serpentina serpentina*),
- Blanding's Turtle (*Emydoidea blandingii*), and
- Butternut (*Juglans cinerea*).

The SAR/SCC screening was completed for the submission of this TOR, and is appended (Appendix II).

Concurrent with the EIS process, NRSI will be submitting an Information Gathering Form to the MECP to address SAR documented by the ESES (Dougan and Associates 2018). Correspondence and documentation from this process will be appended to the EIS.

**Significant Wildlife Habitat (SWH) Screening**
SWH types were also screened based on NRSI's knowledge of the natural features on and adjacent to the subject property based on the survey results from the ESES (Dougan and Associates 2018), and using discrete significance criteria established by the MNRF (OMNRF 2015). Based on this assessment, the only SWH that has the potential to occur within the development footprint is deer movement corridors (*Candidate*).

Appendix II provides a summary of the SWH screening exercise including rationale as to why the SWH types are considered "candidate" or "not present".

**Characterization of Natural Features**
The natural features have been well studied through the Erbsville South Environmental Study (ESES) (Dougan and Associates 2018). As per recommendations made within the ESES (Dougan and Associates 2018) and the Erbsville South Block Plan (City of Waterloo 2020b) natural feature characterizations and findings within 3 years of the ESES (2018) will be used to determine impacts associated with the proposed undertaking. A summary of field surveys completed as part of the ESES (Dougan and Associates 2018) is provided in Appendix III.

The natural features on the subject property have been extensively characterized based on the field surveys completed as part of the ESES (Dougan and Associates 2018). The EIS will rely on the data in the existing reports but will provide a summary of site conditions. The following key components will be included in the site characterization:

- Summary of and mapping of vegetation communities using the Ecological Land Classification system for southern Ontario,
- Plant and wildlife species diversity and habitats,
- There have been no significant changes to any of the wetland boundaries and Core Environmental Feature boundaries as identified in the ESES (Dougan and Associates 2018) on the subject property. NRSI completed a field review of the subject property (December 8, 2020) to confirm natural feature boundaries, as documented in the ESES (Dougan and Associates 2018). Findings from this field survey confirmed that the natural features are consistent with the ESES findings. These boundaries will continue to be used and will be shown on all maps,
- Summary of wildlife species known to use the site including birds, mammals, reptiles and amphibians, and
- Description of aquatic habitat, fish and benthic communities in Laurel Creek.

**Assessment of Potential Impacts**
The analysis of impacts will be divided into:

- Direct impacts associated with disruption or displacement caused by the actual proposed 'footprint' of the undertaking, such as tree removal, direct impacts to wildlife and/or their habitats, or removal of invasive species / hazard trees.

- Indirect impacts associated with changes in site conditions such as indirect impacts to wildlife and modifications to drainage quantity/quality. This will include an analysis of the stormwater management plan for the site.
- Induced impacts associated with impacts after the development is constructed such as subsequent demand on the resources created by habitation/use of the area and vicinity.

**Environmental Monitoring**

The pre-construction monitoring program will incorporate field surveys completed during the ESES (Dougan and Associates 2018) and recommends a single year (2021) of pre-construction monitoring ahead of construction (i.e. site grading), due to the comprehensive field surveys completed to-date. The proposed biological monitoring program is provided in Appendix IV.

A pre-construction monitoring report will be prepared for the study area. The report will document the findings from the biological monitoring program. This data will be used to characterize the baseline conditions prior to the anticipated construction. The monitoring report will be submitted to the City for distribution to other agencies for review. It is expected that a condition of approval will require the implementation of the monitoring program and report, prior to final approval of the plan of subdivision. The site plan agreement will include an overview of the monitoring requirements.

Recommendations will be provided in the EIS for during- and post-construction monitoring of biological features, surface water and groundwater, mitigation measures and compliance, as per the City of Waterloo's Development Monitoring Protocol (1999). The basics of the during- and post-construction monitoring plan will be prepared during the EIS and implemented through the conditions of draft approval and agreement with the City. Prior to the initiation of the during-construction phase, the pre-construction monitoring methods will be revised to incorporate the recommendations of the EIS. The study design of the pre-construction monitoring plan will be replicated to provide consistency between the pre-, during- and post-construction monitoring plan.

**Reporting**

A summary of the findings, conclusions and recommendations in the EIS will be provided. The EIS report will be prepared in digital format including appropriate mapping (study area, existing conditions, monitoring locations, and development plan) and appendices (final TOR, species lists, pertinent agency correspondence, analysis tables, etc.) and will be submitted as part of a full submission with the study teams reports.

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# MAPS

532000 532250 532500

4814500 4814250 4814000

Sunfish Lake
Laurel Creek
Wetland Complex

CONSERVATION DRIVE

Sunfish Lake
Laurel Creek
Wetland Complex

Sunfish Lake
Laurel Creek
Wetland Complex

Laurel Creek

ERBSVILLE ROAD

SCHNARR STREET

Laurel Creek

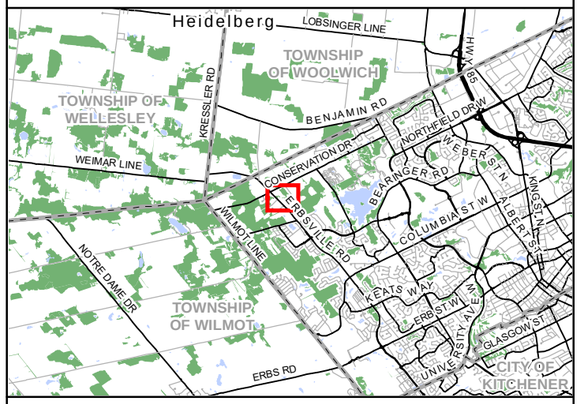
REGAL PLACE

Sunfish Lake
Laurel Creek
Wetland Complex

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**Map 1**

# 720 Erbsville Road
# Environmental Impact Study
## Study Area and Natural Features




**Legend**

- Subject Property
- ESPA #80 (Region of Waterloo, 2016)
- Permanent Watercourse
- Water Body
- Provincially Significant Wetland (PSW)

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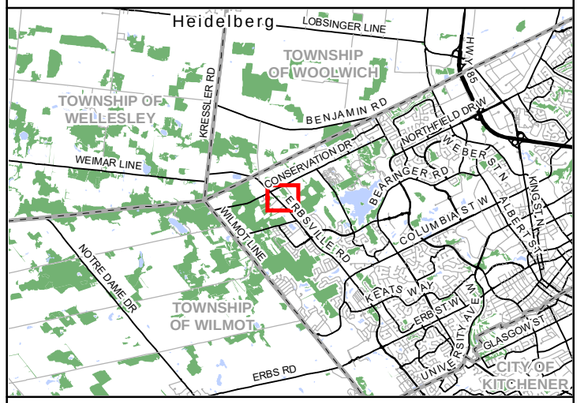
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| Project: 2520<br>Date: December 14, 2020 | NAD83 - UTM Zone 17<br>Size: 11x17"<br>**1:2,500** |

N

0 50 100 150 Metres

**Map 2**

# 720 Erbsville Road
# Environmental Impact Study
## Natural Heritage Constraints




**Legend**

- Subject Property
- ESPA #80 Boundary (Significant Woodland Dripline - confirmed with Region of Waterloo August 19 and October 10, 2014)
- ESPA #80 Buffer (15m)
- Provincially Significant Wetland Boundary (Confirmed with GRCA August 18, 2014)
- PSW Buffer (30m)
- Permanent Watercourse
- Water Body



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| Project: 2520<br>Date: December 14, 2020 | NAD83 - UTM Zone 17<br>Size: 11x17"<br>**1:2,500** |

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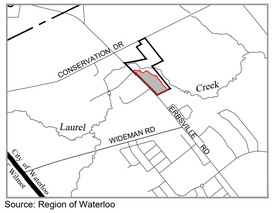
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## APPENDIX I

Concept Plan – 720 Erbsville Road

# 720 Erbsville Road Development Concept

**Key Plan**




Source: Region of Waterloo

Property Boundary (±9.3ha)

Potential Development Area (±3.1ha)

Potential Stormwater Management Facility

| PROPERTY | DEV AREA | UNITS ± |
|---|---|---|
| A- 720 Erbsville Road | 3.1ha | PT "A" 79 T.H.<br>PT "B" 39 T.H. or 23 Singles |
| **TOTAL** | **± 3.1ha** | **± 102-118** |

NOTES:
- Environmental constraints based on Erbsville EA Study, September, 2018
- Property boundaries approx. (City of Waterloo Open Data)- to be verified by survey
- Development area calculation does not account for potential road widenings or easements
- For conceptual purposes only
- Google Satellite 2018 Aerial Imagery

| Rev. No. | Date | Issued / Revision | By |
|---|---|---|---|


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| | |
|---|---|
| **Approval Stamp** | **Date** Oct 24, 2019 |
| | **Drawn By** GC |
| | **Plan Scale** 1:750 (36x24) |
| | **File No.** 0977D |
| **Project** ERBSVILLE | **Checked By** D.A. |
| **Client** | **Other** |
| **File Name** Development Concept | **Dwg No.** 1 of 1 |

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Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature, Toronto. xxii + 706 pp.

Jones, C., K.M. Somers, B. Craig, and T. B. Reynoldson. 2007. Ontario Benthos Biomonitoring Network: Protocol Manual, January 2007. 112pp.

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# APPENDIX IV

Pre-Construction Biological Monitoring Program

## 720 Erbsville Road, Waterloo – Pre-Construction Biological Monitoring Program

Natural Resource Solutions Inc. (NRSI) has been retained by Sunvest Development Corp. to carry out the Stage 1 pre-construction monitoring program required by the City of Waterloo. This monitoring is required to document baseline conditions in advance of proposed residential development. The monitoring program will include a biological monitoring component (to be completed by NRSI), and a surface and groundwater monitoring component (to be completed by IBI Group).

### Biological Monitoring Program

Field surveys will be carried out to provide baseline characterization of the biological features within the study area. The intent of these surveys is to provide a single year (2021) of pre-construction baseline data in addition to the fieldwork completed and summarized in the ESES (Dougan and Associates 2018). The following surveys are proposed:

- Terrestrial feature monitoring outlined in the City of Waterloo's Development Monitoring Protocol (1999) document for pre-construction (Section 2.2.3) will be conducted twice annually (spring and fall) by walking through the subject property and documenting the following:
    - General health of vegetation and trees
    - Evidence of soil movement
    - Evidence of human disturbance or encroachment
    - General fish and wildlife observations
    - Overall conditions
- Vascular flora and vegetation plots. Installation and monitoring of permanent 10m x 10m monitoring plots within the subject property.
- Photo monitoring at fixed locations will focus on edges of natural features where buffers will be implemented in future development.
- Anuran call surveys according to the Marsh Monitoring Protocol (MMP) (BSC 2009).
- Breeding bird surveys within the subject property, consistent with the Ontario Breeding Bird Atlas protocol (OBBA 2001). Surveys will include random (wandering) transects and 10-minute point counts. Surveys will be conducted twice during the peak breeding season (late May to early July) according to methodology.
- Aquatic habitat characterization of Laurel Creek during the summer at locations where access is available.
- Fish community sampling once annually (summer) at 2 stations in the study area. The sampling will consist of backpack electrofishing using the multiple pass method and will be carried out using the Ontario Stream Assessment Protocol (Stanfield 2017).
- Benthic macro-invertebrate (benthic) sampling twice annually (spring and fall) at 2 stations in the study area, located at the same locations as the fish community sampling. The sampling and assessment will involve the kick-and-sweep method and will be carried out using the Ontario Benthic Biomonitoring Network Protocol

(OBBN) (Jones et al. 2007). Benthic sample identification and analysis will be completed by certified NRSI taxonomists at NRSI's laboratory.

- Incidental wildlife observations made during all field visits will be recorded, including direct observations, as well as signs such as dens, tracks, scat, etc.

## References


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

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Stanfield, L. (editor). 2017. Ontario Stream Assessment Protocol. Version 10.0. Fisheries Policy Section. Ontario Ministry of Natural Resources. Peterborough, Ontario.

**Subject:** RE: 720 Erbsville Road, Waterloo EIS Terms of Reference (proj2520)
**From:** Jane Gurney <JGurney@regionofwaterloo.ca>
**Date:** 2021-03-04, 9:16 AM
**To:** 'Ken Burrell' <kburrell@nrsi.on.ca>
**CC:** 'Robyn McMullen' <Robyn.McMullen@waterloo.ca>, ""'Trevor Heywood' (theywood@grandriver.ca)'" <theywood@grandriver.ca>

Hello Ken,
My apologies on the delay in getting back to you on the Terms of Reference (TOR) you provided for the 720 Erbsville Road EIS. Regional Environmental Planning support the comments provided by the GRCA (Trevor Heywood, January 27, 2020) and the City (Robyn McMullen, February 2).

The TOR is fairly generic as it relates to the assessments and recommendations that will result from the EIS, but it is generally acceptable to Regional Environmental Planning. The TOR does not need to be updated or modified, however, for clarity, it is expected that the EIS will specifically address the following comments from the pre-submission consultation:

- Assessment of any trails to be constructed within environmental features or the associated buffers'
- Addressing the recommendations of the Dougan et al Environmental Study (May, 2018), specifically Sections 8 and 9 of the Study, including:
  - Recommended buffer widths and composition, to ensure buffers function at optimal levels and protect Core Environmental Features, and where feasible, enhance or restore these features and their functions;
  - Recommendations for stewardship opportunities (e.g. home owners' brochures, signage, etc.), where applicable.

If you have any questions or concerns, please let me know.
Jane

**Jane E. Gurney, RPP, MCIP, AICP**
Principal Planner
Community Planning
Region of Waterloo
Mobile: 519-589-6921
Office: 519-575-4500 Ext. 3454
JGurney@regionofwaterloo.ca

---

**From:** Ken Burrell <kburrell@nrsi.on.ca>
**Sent:** January 13, 2021 5:15 PM
**To:** Robyn.McMullen@waterloo.ca; Jane Gurney <JGurney@regionofwaterloo.ca>; theywood@grandriver.ca
**Cc:** peterdegroot@remaxtwincity.com; sander@vanaalstbeheer.nl; chris.shantz@rocketmail.com; richard.degroot@remaxtwincity.com; daston@mhbcplan.com; smirtitsch@mhbcplan.com; John.Perks@IBIGroup.com; Andy.Kroess@IBIGroup.com; Dave Stephenson <dstephenson@nrsi.on.ca>
**Subject:** 720 Erbsville Road, Waterloo EIS Terms of Reference (proj2520)

Good afternoon Robyn, Jane, and Trevor,

I hope you are all well. Please find attached the Terms of Reference for an Environmental Impact Study, in

support of a proposed residential development at 720 Erbsville Road, Waterloo for your review.

If you have any questions or concerns, please do not hesitate to contact me.

Kind regards,

Ken

--

Ken Burrell M.E.S.
Terrestrial and Wetland Biologist
**Natural Resource Solutions Inc.**
415 Phillip Street, Unit C
Waterloo, ON N2L 3X2
(p) 519-725-2227 Ext. 403 (f) 519-725-2575
(w)www.nrsi.on.ca (e) kburrell@nrsi.on.ca
@nrsinews Natural Resource Solutions Inc.
*Over 20 years of environmental consulting excellence*

**Subject:** Re: [EXTERNAL] 720 Erbsville Road, Waterloo EIS Terms of Reference (proj2520)
**From:** Ken Burrell <kburrell@nrsi.on.ca>
**Date:** 2021-02-02, 12:13 PM
**To:** Robyn McMullen <Robyn.McMullen@waterloo.ca>
**CC:** Trevor Heywood <theywood@grandriver.ca>, Jane Gurney <JGurney@regionofwaterloo.ca>, Dave Stephenson <dstephenson@nrsi.on.ca>

Hi Robyn,

Thanks for your comments and feedback, it is appreciated. I wanted to provide some responses, where you indicated that you were looking for confirmation, and I have included them, below, in your email in red.

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

Ken

Ken Burrell M.E.S.
Terrestrial and Wetland Biologist
**Natural Resource Solutions Inc.**
415 Phillip Street, Unit C
Waterloo, ON N2L 3X2
(p) 519-725-2227 Ext. 403 (f) 519-725-2575
(w)www.nrsi.on.ca (e) kburrell@nrsi.on.ca
@nrsinews Natural Resource Solutions Inc.
*Over 20 years of environmental consulting excellence*

On 2/2/2021 11:01 AM, Robyn McMullen wrote:

> Hi Ken,
>
> My comments on the proposed EIS TOR are below:
>
> 1. The Introduction refers to the woodlands and wetlands on site and correctly notes that they are Core Natural Features in the City's Official Plan. For completeness, Laurel Creek is a Supporting Natural Feature.
>
> 2. The EIS will need to incorporate the findings and recommendations of the other technical reports (e.g. functional servicing, stormwater, hydrogeological).
>
> 3. With respect to Significant Wildlife Habitat, in addition to the screening that was undertaken for the Terms of Reference, the findings contained in Appendix 2.9 (Assessment of Potential Significant Wildlife Habitat) of the Erbsville South Environmental Study will need to be addressed/discussed in the EIS. Based on the polygons identified on Figure 3-2 of that study, key excerpts from Appendix 2.9 are included below.

| Excerpts from Appendix 2.9. of the Erbsville South Environmental Study | | | | |
|---|---|---|---|---|
| **SWH Feature or Function** | **Polygon** | **Comments** | **OMNR 2000** | **OMNRF 2015** |
| Amphibian woodland breeding ponds *Amphibian breeding* | 30 – 31 46 – 47 & riparian | Suitable breeding habitat (*i.e.* wetland, and ponds inside or within 120 m of a woodland) occurs within and directly adjacent to the study area. | **Candidate** | **Candidate** |

| | | | | |
|---|---|---|---|---|
| *habitat (woodland)* | corridor east of 35 | | | |
| Seeps and springs<br>*Seeps and springs* | See text | Seeps and spring confirmed in polygons 16 & 29, suspected in polygon 1, 27 & 31 based on wetland characteristics, and possible in polygons 46 & 47 (both offsite). | **Candidate** | **Candidate** |
| Species whose populations appear to be experiencing substantial declines in Ontario. | 1, 2, 4, 6, 7, 10, 13, 24, 25, 37, 44 | Information on population declines was incorporated into the assessment conducted by Environment Canada[illegible] (EC, 2014).<br>Fourteen of the breeding species documented from the study area by D&A and local residents between 2012 and 2014 were identified as Priority Species of conservation concern in Bird Conservation Region 13, the Lower Great Lakes-St. Lawrence Plain. The population objective for all but one was "Maintain Current", "Increase", or "Recovery". For Canada Goose it was "Decrease".<br>The 14 species included: Canada Goose, Killdeer, Spotted Sandpiper, Black-billed Cuckoo, Belted Kingfisher, Northern Flicker, Eastern Wood-Pewee, Eastern Kingbird, Barn Swallow, Brown Thrasher, Field Sparrow, Savannah Sparrow, Rose-breasted Grosbeak, and Baltimore Oriole). | **Candidate** | Not addressed |
| Animal Movement Corridors | Laurel Creek riparian corridor.<br><br>Wideman Creek riparian corridor and woods. | Local connectivity is important for general wildlife dispersal. Two main animal movement corridors were identified within and adjacent to the study area: the Laurel Creek riparian corridor, and the Wideman Creek riparian corridor and woodlands. The Laurel Creek riparian corridor encompasses the entire extended study area, wraps around the northern edge of the primary study area, crosses Erbsville Road, and runs along the eastern edge of the primary study area. The Wideman Creek riparian corridor crosses Erbsville Rd. through the southern part of the primary study area. It joins up with the Laurel Creek riparian corridor by passing through the large forest block directly north of Wideman Road. | **Candidate** | Includes thresholds for only 2 groups (described below) |

Also, through the EIS that was completed (by NRSI) for the property to the east, Significant Wildlife Habitat was confirmed for the following:

- Seeps and Springs
- Special Concern and Rare Wildlife Species (Eastern Wood-pewee, Snapping Turtle, Black Ash)
- Turtle Wintering Area

It is hoped that since NRSI completed that work, the information can be easily accessed, but if a copy of that EIS is needed from the City, please advise. I will let you know if we cannot get a copy of this EIS internally.

4. Under 'Characterization of Natural Features' it is noted that the "EIS will rely on the data in the existing reports but will provide a summary of site conditions". Please confirm that the data from the monitoring program will be considered and/or incorporated as it becomes available. Yes, previous monitoring will be considered and/or incorporated as it becomes available.

5. The proposed single year (2021) of pre-construction monitoring is acceptable given the monitoring that has been completed to date by Stantec. Please confirm that the results of that previous monitoring will be incorporated into the monitoring program moving forward. Yes, the previous monitoring will be

incoroprated into the monitoring program going forward.

Kind regards,

**Robyn McMullen, MCIP, RPP**
Policy Planner, Growth Management
Integrated Planning and Public Works, City of Waterloo
100 Regina Street South
PO Box 337, Station Waterloo
Waterloo, ON, N2J 4A8
**P:** 519-747-8531
**TTY:** 1-866-786-3941
**E:** robyn.mcmullen@waterloo.ca
www.waterloo.ca

**IMPORTANT**: During the 'Provincial Shutdown', Planning Division services will not be available in-person or at City Hall. We are working remotely and available – please do not hesitate to reach out, and we will respond as soon as we are able. For general inquiries, please email devservices@waterloo.ca or call (519)747-8752. For zoning matters, please email zoning@waterloo.ca. For site plan matters, please email siteplan@waterloo.ca.

---

**From:** Ken Burrell <kburrell@nrsi.on.ca>
**Sent:** January 13, 2021 5:15 PM
**To:** Robyn McMullen <Robyn.McMullen@waterloo.ca>; JGurney@regionofwaterloo.ca; theywood@grandriver.ca
**Cc:** peterdegroot@remaxtwincity.com; sander@vanaalstbeheer.nl; chris.shantz@rocketmail.com; richard.degroot@remaxtwincity.com; daston@mhbcplan.com; smirtitsch@mhbcplan.com; John.Perks@IBIGroup.com; Andy.Kroess@IBIGroup.com; Dave Stephenson <dstephenson@nrsi.on.ca>
**Subject:** [EXTERNAL] 720 Erbsville Road, Waterloo EIS Terms of Reference (proj2520)

Good afternoon Robyn, Jane, and Trevor,

I hope you are all well. Please find attached the Terms of Reference for an Environmental Impact Study, in support of a proposed residential development at 720 Erbsville Road, Waterloo for your review.

If you have any questions or concerns, please do not hesitate to contact me.

Kind regards,

Ken

--

Ken Burrell M.E.S.
Terrestrial and Wetland Biologist
**Natural Resource Solutions Inc.**
415 Phillip Street, Unit C
Waterloo, ON N2L 3X2

(p) 519-725-2227 Ext. 403 (f) 519-725-2575

(w)www.nrsi.on.ca (e) kburrell@nrsi.on.ca
@nrsinews Natural Resource Solutions Inc.
*Over 20 years of environmental consulting excellence*

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**Subject:** RE: 720 Erbsville Road, Waterloo EIS Terms of Reference (proj2520)
**From:** Trevor Heywood <theywood@grandriver.ca>
**Date:** 2021-01-27, 9:43 AM
**To:** Ken Burrell <kburrell@nrsi.on.ca>
**CC:** Robyn McMullen <Robyn.McMullen@waterloo.ca>, Jane Gurney <jgurney@regionofwaterloo.ca>

Hey Ken,

We've reviewed and found the ToR to be acceptable. A couple of comments:

- We note that wetland boundaries were last verified in 2014. It is requested that wetland boundaries be verified with the GRCA. Please get in touch in the spring.
- It is requested that the EIS incorporate the key findings and recommendations of concurrent hydrogeological assessments.
- Laurel Creek is identified as a brook/brown trout spawning area by the MNRF. Spawning surveys/redd surveys are recommended along this watercourse.

Thanks,

**Trevor Heywood**
Resource Planner
Grand River Conservation Authority
theywood@grandriver.ca

---

**From:** Ken Burrell <kburrell@nrsi.on.ca>
**Sent:** Wednesday, January 13, 2021 5:15 PM
**To:** Robyn.McMullen@waterloo.ca; JGurney@regionofwaterloo.ca; Trevor Heywood <theywood@grandriver.ca>
**Cc:** peterdegroot@remaxtwincity.com; sander@vanaalstbeheer.nl; chris.shantz@rocketmail.com; richard.degroot@remaxtwincity.com; daston@mhbcplan.com; smirtitsch@mhbcplan.com; John.Perks@IBIGroup.com; Andy.Kroess@IBIGroup.com; Dave Stephenson <dstephenson@nrsi.on.ca>
**Subject:** 720 Erbsville Road, Waterloo EIS Terms of Reference (proj2520)

Good afternoon Robyn, Jane, and Trevor,

I hope you are all well. Please find attached the Terms of Reference for an Environmental Impact Study, in support of a proposed residential development at 720 Erbsville Road, Waterloo for your review.

If you have any questions or concerns, please do not hesitate to contact me.

Kind regards,

Ken

--

Ken Burrell M.E.S.
Terrestrial and Wetland Biologist
**Natural Resource Solutions Inc.**
415 Phillip Street, Unit C
Waterloo, ON N2L 3X2
(p) 519-725-2227 Ext. 403 (f) 519-725-2575
(w)www.nrsi.on.ca (e) kburrell@nrsi.on.ca
@nrsinews Natural Resource Solutions Inc.
*Over 20 years of environmental consulting excellence*

Appendix V
2023 Biological Monitoring Report



# 720 Erbsville Road, Waterloo, Ontario

Pre-Construction Biological Monitoring Report (2023)

Prepared for:

Peter de Groot
Sunvest Development Corp.
901 Victoria Street North
Kitchener, ON, N2B 3C3

Project No. 2520 | January 2024

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

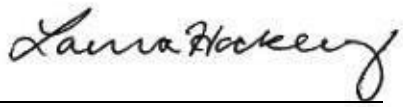
**720 Erbsville Road, Waterloo, Ontario**

**Pre-Construction Biological Monitoring Report (2023)**

## Project Team


| | |
|---|---|
| **David Stephenson** | Senior Biologist, Project Advisor |
| **Laura Hockley** | Ecologist, Project Manager |
| **Eve Krauss** | Field Biologist |
| **Blair Baldwin** | Aquatic Biologist |


Report submitted on January 2, 2024



Laura Hockley

Project Manager

Ecologist

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## 1.0 Introduction

Natural Resource Solutions Inc. (NRSI) was retained in May 2023 by Sunvest Development Corp. to complete components of the Pre-Construction Biological Monitoring for the proposed development at 720 Erbsville Road in the City of Waterloo, Ontario, referred to herein as the 'Subject Property'.

The subject property is approximately 9.3ha in area and is located in the northwest of the City of Waterloo. The property is bound by Conservation Drive and the Erbsville Kartway lands to the northwest and northeast, Erbsville Road to the southwest, and a small agricultural field to the southeast (Map 1).

The subject property is comprised of agricultural fields, as well as wetlands and woodlands associated with Laurel Creek. The woodland/wetland complex on-site is part of the Environmentally Sensitive Policy Area (ESPA) 80, known as Laurel Creek Forest (Region of Waterloo 2015). The woodland/ wetland complex is a Core Natural Feature and Laurel Creek is a Supporting "A" Natural Feature in the City of Waterloo's Official Plan (OP) (2022). Wetlands are part of the Laurel Creek-Sunfish Lake Provincially Significant Wetland (PSW) complex. Wetlands, watercourses, and floodplain areas are regulated by the Grand River Conservation Authority (GRCA). The subject property is located in Ecoregion 6E.

Based on the City of Waterloo's Development Monitoring Protocol (1999, 2020b), an ecological support and monitoring program is required to run annually 2-years in advance of construction. This report summarizes work completed in 2023 for the pre-construction monitoring following the City of Waterloo Development Monitoring/Laurel Creek Watershed Protocol. The City of Waterloo has confirmed that, should development applications and, consequently, construction, be delayed, a minimum of 1 year of pre-construction monitoring is required immediately before construction is expected to start. The Erbsville South Environmental Study (ESES; Dougan et al. 2018) recommended a comprehensive monitoring program prior to development on the lands within the Erbsville South Block Plan (City of Waterloo, 2020a). This monitoring program follows the recommendations and guidelines for pre-construction monitoring from that report.

## 1.1 Study Area

Although the proponent owns a number of properties in the area, for the purposes of this report, the "subject property" refers to the lands at 720 Erbsville Road, Waterloo. The term "study area" refers to the subject property plus the surrounding area within 200m (Map 1).

## 2.0 Biological Monitoring Program Components

The pre-construction biological monitoring program includes a number of components based on the City of Waterloo requirements for their Development Monitoring Program (1999, 2020) and the ESES (Dougan et al. 2018). The methods of the biological monitoring component are described below. Specific monitoring locations are shown on Map 2.

Terrestrial monitoring including vegetation monitoring, disturbance monitoring and qualitative photographic monitoring, of the subject property has been completed by Stantec annually from 2017 to 2023. The results of terrestrial monitoring are summarized in annual monitoring reports (Stantec 2018, 2019, 2020, 2021, 2023a, 2023b; results of monitoring undertaken in 2023 are not yet published).

## 2.1 Terrestrial Field Surveys

### 2.1.1 Avifauna Surveys

Breeding bird surveys were completed on the subject property on June 14 and June 28, 2023. Breeding bird survey data was recorded using standard Ontario Breeding Bird Atlas (OBBA) call codes (OBBA 2001). Methods followed the OBBA protocol (OBBA 2021, OBBA 2021b), with modifications from the Forest Bird Monitoring Program (Cadman et al. 1998). Surveys consisted of 10-minute point counts and a walking transect by habitat type, which occurred no earlier than 30 minutes prior to sunrise and extending to four hours after sunrise. All visual and auditory observations of birds was recorded as well as the highest level of breeding evidence exhibited for each recorded species. Abundance of species was documented.

### 2.1.2 Amphibian Surveys

Evening amphibian call surveys were completed at two monitoring stations located at wetland units within the subject lands on April 20, May 18, and June 28, 2023 (Map 2). A minimum of 15 days between visits was coordinated to correspond with peak vocalization periods for very early, mid, and late-season breeding species. Surveys occurred between one half-hour after sunset and midnight, on evenings with appropriate weather conditions, as specified in the Marsh Monitoring Program (MMP) amphibian monitoring standardized protocol (BSC 2009). Surveys were not conducted during rain events (light rain is acceptable) (BSC 2009).

Following this protocol, point counts were used to identify presence and relative abundance (based on calling intensity) of anuran (frog and toad) species within each wetland unit. At each

survey station, 3-minute point count surveys were conducted. A three-level calling code system was utilized to record relative levels of calling intensity for each identified species:

- calling code 1 is used when number of calling males can be estimated and calls do not overlap,
- calling code 2 is used when some calls overlap but number of calling males can still be estimated, and
- calling code 3 is used when males are calling at full chorus and it isn't possible to estimate the number of individuals.

Supplementary data was also recorded at each station, including the survey time, air temperature, wind speed (as per Beaufort Wind Scale), cloud cover, direction surveyors were facing, and background noise levels. A summary of survey conditions during each amphibian call survey in 2023 is provided in Table 1 below.

**Table 1. Amphibian Call Survey Conditions**

| Date | Time (24 hrs) | Air Temperature (°C) | Precipitation | Wind (Beauford Scale) | % Cloud Cover |
|---|---|---|---|---|---|
| April 20, 2023 | 2112-2120 | 9 | None | 2 | - |
| May 18, 2023 | 2230-2236 | 11 | None | 1 | 50 |
| June 28, 2023 | 2310-2316 | 19 | None | 0 | 0 |

### 2.1.3 Additional Wildlife

Incidental observations of all mammals, insects, and any other wildlife species were recorded during all field visits. This includes direct observations, as well as observations of tracks, scat, vocalizations, etc.

## 2.2 Aquatic Surveys

### 2.2.1 Aquatic Habitat Assessment

Aquatic habitat assessments were completed on two reaches of Wideman Creek and four reaches of Laurel Creek throughout the subject property (Map 2). The reach of Wideman Creek upstream of Erbsville Road was assessed for another nearby property owned by Sunvest Development, however due to its proximity to this subject property, the information has been included. These assessments were conducted on September 27, 2023 to assess aquatic features within the subject property. Each habitat assessment focused on a reach of the watercourse (defined in Map 2) and the following information was recorded:

- adjacent lands (e.g., land use, canopy, riparian habitat),
- channel morphology (e.g., bankfull and wetted widths, bank height, planform),
- substrate type and composition,
- available fish habitat and cover,
- general flow conditions (e.g., water depths, riffle/run/pool features),
- in-situ water quality parameters (water temperature, conductivity, dissolved oxygen etc.), and,
- critical life stage areas for fish (i.e., spawning, nursery habitat, etc.).

### 2.2.2 Benthic Macro-Invertebrate Surveys

Benthic macro-invertebrate surveys were carried out to assess the general health of the aquatic habitats within the study area using the benthos as indicators of water quality. There are a number of advantages to sampling benthic invertebrates for water quality monitoring:

- They reflect local aquatic conditions as a result of their limited mobility;
- They provide a general indication of water quality based on the known environmental sensitivities and tolerances, and;
- They integrate the physical and chemical aspects of water quality over annual time periods due to their short life spans.

Three benthic sampling stations were established within Laurel Creek and one within Wideman Creek (Map 2) in accordance with the *Ontario Benthos Biomonitoring Network Protocol Manual* (OBBN) protocol, sampled during both the Spring and Fall of 2023 (Jones et al. 2007). Each station comprised of three sub-stations: two from riffle habitat and one from pool habitat. For wade-able streams, the OBBN protocol employs a “Travelling Transect Kick and Sweep” method, where each sub-sample is made up by sampling 10 linear meters of stream transect over a 3-minute period (Jones et al. 2007; EC 2011). A 500 µm mesh D-net is held downstream of the substation transect to capture invertebrates dislodged by vigorous kicking within the transect area. Samples were then preserved in a buffered 70% ethanol solution for later identification at the NRSI laboratory. Spring sampling was completed on June 1, 2023 with fall sampling completed on September 27, 2023.

### 2.2.3 Benthic Macro-Invertebrate Identification and Data Analysis

Preserved benthic samples were processed and identified at NRSI’s in-house laboratory. Samples were identified to the lowest practical taxonomic level. Each monitoring station sub-

sample was identified and the results of this identification were pooled for analysis. For the identification of the benthic macro-invertebrates within each sub-station, small randomly selected portions were taken for identification as representative samples of the sub-station. Successive portions were removed and fully analyzed until a minimum of 100 organisms were collected as per the requirements of the OBBN protocol (Jones et al. 2007). The sub-sample proportion was determined by measuring the total sample weight before identification and the remaining sample weight after identification. The difference between these two measurements represents the proportion sampled which is a percentage of the total sample (EC 2011).

Benthic organisms which do not fall within the 27 groups of benthic invertebrates outlined in the OBBN protocol were not included in the tally (Jones et al. 2007). The benthic invertebrate data was analyzed using a number of metrics to characterize the general condition of the watercourses. The metrics used for the assessment of watercourse conditions were selected to reflect the metrics and indices used for the ESES (Dougan et al. 2018) and recommended by the OBBN Protocol. A total of 11 metrics and indices were calculated in order to assess the water quality within each monitoring station. These metrics include:

- Taxa Richness – the number of taxa generally increases with habitat diversity and water quality (Jones et al. 2007),
- EPT Taxa Richness – the number of taxa from orders sensitive to pollution, specifically the orders *Ephemeroptera*, *Plecoptera*, and *Tricoptera* (Barbour et al. 1999; Weber 1973),
- Percent EPT – percent composition of a community by taxa from orders sensitive to pollution, specifically the orders *Ephemeroptera*, *Plecoptera*, and *Tricoptera* (Barbour et al. 1999; Weber 1973),
- Percent *Oligochaetes* – percent composition of a community by aquatic worms, a group tolerant to pollutants (Jones et al. 2007),
- Percent *Diptera* – percent composition of a community by fly larvae which provides a context for other analysis (Jones et al. 2007),
- Percent *Chironomidae* – percent composition of a community by larval midges, a highly tolerant family (Jones et al. 2007),
- Dominant/Subdominant Taxa – highest and second highest number of taxa sampled,

- Percent Functional Feeding Groups – the percent composition of a community by Collector-filterers, Collector-gatherers, Predators, Scrapers, and Shredders. Feeding groups can provide an indication of habitat conditions (Merritt et al. 2008),
- Shannon Wiener Index (H') – an index used to measure the diversity in categorical data, taking into account the number of species and evenness of the species. Calculated as:

  $$H' = -\sum(p_i)\,(lnp_i)$$

  - Where "$p_i$ "is the proportion of individuals in the i$^{th}$ taxon (EC 2011),
- BI – a measure of water quality based on the species-level "tolerance values" and the number of individuals of each species and the total number of individuals within the sample. Calculated as:

  $$BI = \sum \frac{x_i t_i}{n}$$

  - Where "$x_i$" is the number of individuals within the i$^{th}$ taxon, "$t_i$" is the tolerance value of the i$^{th}$ taxon, and n is the total number of individuals within the sample (Hilsenhoff 1987).
- FBI – a measure of water quality based on the family-level "tolerance values" and the number of individuals within each family and the total number of individuals within the sample. Calculated as:

  $$FBI = \sum \frac{x_i t_i}{n}$$

  - Where "$x_i$" is the number of individuals within the i$^{th}$ family, "$t_i$" is the tolerance value of the "i$^{th}$" family, and n is the total number of individuals within the sample (Hilsenhoff 1988).

These metrics can be used as measures of the environmental water quality and can reflect the level of impairment of a watercourse. In order to provide context, the results of these metrics are then compared to a range of 'Potentially Unimpaired' conditions and 'Potentially Impaired' conditions. The OBBN defines impaired as, "showing a biological response to imposed stressors; exhibiting a changed biological community brought about by degradation in water or habitat quality" (Jones et al. 2007). 'Potentially Unimpaired' conditions indicate a low probability

of significant anthropogenic impact, and 'Potentially Impaired' conditions indicate a high probability of significant anthropogenic impact, within an aquatic environment.

These ranges can be used as measures of the environmental water quality and serve as potential indicators of ongoing environmental impacts. The ranges are based on the results of benthic rapid assessment methodologies developed by the Ministry of Natural Resources and Forestry (MNRF), the Ministry of Environment, Conservation and Parks (MECP), the Ministry of Municipal Affairs and Housing (MMAH), and the Toronto and Region Conservation Authority (TRCA). Table 2 below provides the range of results that can be attributed to the 'potentially unimpaired' and 'potentially impaired' categories within an ecosystem (Vannote et al. 1980). These assessment ranges are not available for Simpson's Diversity Index scores as the Simpson's Diversity Index assesses the uniformity of a population and not the sensitivity or tolerance of the species within (Simpson 1949).

**Table 2. General Benthic Invertebrate Assessment Ranges**

| Water Quality Index | Potentially Unimpaired | Potentially Impaired | Source(s) |
|---|---|---|---|
| EPT Richness | >10 | <10 | David et al. 1998 and Kilgour 2000 |
| % Oligochaetes | <10% | >10% | David et al. 1998 and Griffiths 1998 |
| % Chironomidae | <10% | >10% | Griffiths 1998 |
| % Diptera | 20-45% | <20 or >50% | David et al. 1998 |
| Shannon-Wiener Index | 1.5-3.5 | <1.5 or >3.5 | MacDonald 2003 |
| Family Biotic Index | <6 | >6 | Kilgour 1998 |
| Biotic Index | <7 | >7 | Kilgour 1998 |

### 2.2.4 Fish Community Sampling

Fish sampling was conducted at three monitoring stations (Map 2) using a single-pass screening level sampling method, following a modified version of the Ontario Stream Assessment Protocol (OSAP) and methods described in Aquatic Habitat Assessment Common Methods (Stanfield 2017). Sampling stations were chosen to sample different habitat conditions along the length of the Tributary. Each sampling station was isolated at its upstream and downstream extents using block nets, ensuring a minimum site length of 40m, as per the OSAP. Nets used included a weighted line along the bottom and a floating line along the top. Each net was secured at its location on either bank to ensure the net remained in place over the course of sampling. Care was taken to make sure nets were secured with no gaps that could allow fish to move in or out of the sample reach. The water conditions during electrofishing, the settings on the electrofishing unit, and sampling duration are all important to document in order to

compare fish sampling results from year to year. This information is summarized in Table 3 below.

**Table 3. Electrofishing Sampling Settings and Effort Levels**

| | EMS-001 | EMS-002 | EMS-003 |
|---|---|---|---|
| Date | August 29, 2023 | August 29, 2023 | August 29, 2023 |
| Sampling Start Time | 0945 | 1245 | 1115 |
| Sampling End Time | 1045 | 1415 | 1200 |
| Air Temperature (°C) | 28 | 29 | 28 |
| Water Temperature (°C) | 18 | 18 | 18 |
| Time Water Temp. Taken | 0954 | 1245 | 1115 |
| Conductivity (µs/cm) | 599 | 550 | 599 |
| Dissolved Oxygen (ppm, %) | 6.5<br>82.5% | 7.5<br>87.1% | 6.5<br>82.5% |
| Electrofisher Type | Smith-Root (LR-20B) | Smith-Root (LR-20B) | Smith-Root (LR-20B) |
| Number of Netters | 1 | 1 | 1 |
| Voltage (V) | 200 | 250 | 200 |
| Pulsating Frequency (Hz) | 90 | 90 | 90 |
| Shocking Time (sec.) | 850 | 925 | 815 |

A crew conducted a single pass of the isolated areas at each sampling station using a Smith-Root (LR-20B) backpack electrofishing unit, set to a pulsating frequency of 90Hz, and an electric potential of 200-250 volts. Sampling involved one biologist with the backpack electrofisher and one alongside with a dip net walking in transects from the downstream end of the site to the upstream end. As fish were captured by netters, they were placed in a bucket for processing. Following each electrofishing pass, fish were sorted by species, enumerated and released. Species composition was calculated for each station to identify variations in the fish community. The total catch of each species was calculated as a proportion of all fish captured at a given station.

## 3.0 Results

The following sections summarize and discuss the results of the 2023 pre-construction monitoring program for the subject property.

## 3.1 Avifauna Surveys

A variety of breeding bird evidence was documented during the surveys conducted in 2023. Of the 30 different species of birds documented, 20 species were listed as 'Probable' (PR) breeders, nine species were listed as 'Possible' (PO), and one species was 'Confirmed' (CO). Two bird species of federal and provincial significance were documented during breeding bird surveys: Barn Swallow (*Hirundo rustica; SCC)* and Eastern Wood-Pewee (*Contopus virens*; SCC). Additionally, there were three regionally significant bird species reported on site during breeding bird surveys. Significant bird observations are shown on Map 3 where specific locations were identified during surveys. If specific locations were not noted during surveys, the observation has been mapped in the general location of the survey station.

Appendix I provides a list of all bird species observed.

### 3.1.1 Barn Swallow

Barn Swallow is a Species of Conservation Concern (SCC), listed provincially (MECP 2023) and federally (Government of Canada 2023) as Special Concern. Individuals were observed with Possible ('PO') breeding evidence, with suitable nesting habitat available at BMB-002 during the second breeding bird survey.

### 3.1.2 Eastern Wood-Pewee

Eastern Wood-Pewee is an SCC, listed provincially (MECP 2023) and federally (Government of Canada 2023) as Special Concern. A single male individual was heard singing approximately 100m from BMB-003, with Possible ('PO') breeding evidence.

### 3.1.3 Regionally Significant Species

Two regionally significant bird species were reported by NRSI during breeding bird surveys in 2023. This includes Ruby-throated Hummingbird (*Archilochus colubris*) and American Redstart (*Setophaga ruticilla*). The breeding evidence, number of individuals observed, and habitat suitability is provided in Table 4.

**Table 4. Regionally Significant Bird Observations**

| Common Name | Scientific Name | Highest Recorded | Total Number of | Habitat Suitability within Study Area |
|---|---|---|---|---|

| | | Breeding Bird Evidence | Individuals Observed | |
|---|---|---|---|---|
| Ruby-throated Hummingbird | *Archilochus colubris* | PO | 1 | Forest edges and deciduous woodlands within the study area may be suitable. |
| American Redstart | *Setophaga ruticilla* | PR | 3 | Moist, deciduous woodlands present within the study area. Woodlands may not be large enough to be considered ideal habitat. |

## 3.2 Amphibians

A variety of amphibian breeding evidence was documented during the call surveys conducted in 2023. The results of amphibian call surveys are provided in Table 5.

**Table 5. Amphibian Call Survey Results**

| Survey Station | April 20th | May 18th | June 28th |
|---|---|---|---|
| ANR-002 | SPPE2(4) | None | None |
| ANR-003 | SPPE(3) | None | GRFR1(1) |

SPPE = Spring Peeper, GRTR = Gray Treefrog, GRFR = Green Frog, WOFR = Wood Frog, AMTO = American Toad, NLFR = Northern Leopard Frog, MIFR = Mink Frog

Code 1 = Individuals can be counted; calls not simultaneous. Estimated number of individuals in brackets.
Code 2 = Calls distinguishable; some simultaneous calling. Estimated number of individuals in brackets.
Code 3 = Full chorus; calls continuous and overlapping.

No federally, provincially, or regionally significant species were observed.

## 3.3 Incidental Wildlife

A summary of the incidental wildlife observations can be found in Table 6. Of these species, the Belted Kingfisher (*Megaceryle alcyon*) is considered regionally significant.

**Table 6. Incidental Wildlife Observations**

| Common Name | Scientific Name |
|---|---|
| Birds | |
| Red-Winged Blackbird | *Agelaius phoeniceus* |
| Belted Kingfisher | *Megaceryle alcyon* |
| American Crow | *Corvus brachyrhynchos* |
| Great Crested Flycatcher | *Myiarchus crinitus* |
| American Robin | *Turdus migratorius* |
| Black-capped Chickadee | *Poecile atricapillus* |
| Northern Cardinal | *Cardinalis cardinalis* |
| Wild Turkey | *Meleagris gallopavo* |

## 3.4 Aquatic Habitat

Three watercourses are present within the study area: Laurel Creek, Wideman Creek and a tributary of Wideman Creek. Both Laurel and Wideman Creek are associated with the Sunfish

Lake-Laurel Creek PSW Complex. Laurel Creek is present in the north and northwest of the subject property, while Wideman Creek and the tributary of Wideman Creek are found within the broader study area. These watercourses and their reaches are presented on Map 2 and described below.

The extent of Laurel Creek within the study area was assessed in four separate reaches. The downstream most reaches of Laurel Creek (L1 and L2) are characterized by a series of shallow riffle habitat (max depth 0.15m) with sporadic deeper pools (max depth 0.75m) (Map 2). L1 is comprised of primarily cobble and gravel substrates with small amounts of sand and silt present in the deeper pools with substrates in L2 changing slightly to gravel and sand dominant, with traces of silt and consolidated clay. Wetted widths between the two reaches ranged from 3.5-5.5m with bankfull widths ranging from 7.5-10.5m. Common Reed (*Phragmites* sp.) was present in both reaches, with Narrow-leaved Cattail (*Typha angustifolia*) present in only L1. L3 is unique from the rest of the Laurel Creek reaches with considerable meanders, slow flowing runs (max depth 0.25m), and long narrow pools (max depth 0.75m) punctuated by numerous beaver dams. Silt and organic detritus dominated the substrates through L3. Wetted widths ranged from 3.5-6.0m with bankfull widths ranging from 6.5-8.0m. L4 presented similarly to L1 and L2, with gently meandering shallow riffles (max depth 0.3m) and pools (max depth 0.65m) and substrates dominated by cobble and gravel with traces of silt and organic detritus. Wetted widths ranged from 3.15-5.15m and bankfull widths ranged from 6.5-7.0m.

Throughout the study area (L1-L4), Laurel Creek was nearly fully shaded (100%) due to the presence of dense overhanging bank vegetation (deciduous trees and shrubs). Undercut banks, woody debris and submerged Watercress (*Nasturtium* sp.) were also present in all four reaches. The presence of Watercress patches indicates that groundwater upwelling is occurring within Laurel Creek in the study area.

Wideman Creek was assessed in two different reaches: the downstream reach extending from Erbsville Road to the confluence with Laurel Creek, and the reach upstream of Erbsville Road (Map 2). The reach upstream of Erbsville Road was assessed as part of another nearby property owned by Sunvest Development, but due to its proximity to the subject property, the information for this reach is also included below. The downstream reach of Wideman Creek is a heavily braided channel (max depth 0.35m) with a narrow wetted width of 0.5-1.5m and bankfull widths ranging from 5.5-6.5m. Substrates were dominated by silt with smaller quantities of sand and gravel present. The banks of the downstream reach were heavily vegetated with wetland

species (Common Reed and Narrow-leaved Cattail). The reach upstream of Erbsville Road abuts the Sunfish Lake-Laurel Creek Wetland Complex and also maintains a narrow wetted width of 0.5-1.5m. The bankfull width was also narrow, ranging from 2.5-3.5m and was sporadically vegetated with Common Reed. Substrates consisted primarily of sand and silt with accumulations of cobble and boulder present along the length of the abutting agricultural field. Dense overhanging vegetation, undercut banks and some woody debris was also present within the upstream reach.

### 3.4.1 Fish Community Composition

During 2023 monitoring, a total of 130 fish composed of several different fish species were captured within the study area. A description of electrofishing results for each station can be found in Table 7 below.

**Table 7. 2023 Electrofishing Capture Results**

| Common Name | Scientific Name | Thermal Regime | Tolerance | EMS-001 | EMS-002 | EMS-003 | TOTAL |
|---|---|---|---|---|---|---|---|
| Western Blacknose Dace | *Rhinichthys obtusus* | Cool-water | Intermediate | 25 | 10 | | **35** |
| Bluntnose Minnow | *Pimephales notatus* | Warm-water | Intermediate | 35 | 5 | 10 | **50** |
| Brook Stickleback | *Culaea inconstans* | Cool-water | Intermediate | | | 15 | **15** |
| Creek Chub | *Semotilus atromaculatus* | Cool-water | Intermediate | 25 | 10 | 10 | **45** |
| Iowa Darter | *Etheostoma exile* | Cool-water | Intermediate | 10 | 25 | | **35** |
| Northern Redbelly Dace | *Chrosomus eos* | Cool-water | Intermediate | 10 | | | **10** |
| White Sucker | *Catostomus commersonii* | Cool-water | Tolerant | 25 | 15 | | **40** |
| **Total Fish Captured** | | | | **130** | **65** | **35** | **230** |

The dominant fish species captured throughout all sampling stations within the subject property was the intermediately tolerant, warm-water species the Bluntnose Minnow (*Pimephales notatus*). Bluntnose Minnows are a common freshwater species that prefer habitats with sand and gravel substrates and clear water.

The fish communities observed within Laurel and Wideman Creek are typical of small watercourses, comprised of species that are tolerant to environmental disturbance and changes to water temperature and salinity. No federally, provincially, or regionally significant species were found during site visits.

### 3.4.2 Benthic Macro-Invertebrate Community

Benthic macro-invertebrate sampling conditions are summarized in Table 8 (Spring) and Table 9 (Fall). Raw benthic invertebrate data is included in Appendix II.

**Table 8. Spring 2023 Benthic Invertebrate Sampling Conditions**

| Station | BTH-001 | | | BTH-002 | | | BTH-003 | | | BTH-004 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | June 1, 2023 | | | June 1, 2023 | | | June 1, 2023 | | | June 1, 2023 | | |
| Time (hrs) | 1415 | | | 1445 | | | 1515 | | | 1545 | | |
| Water Temperature (°C) | 15 | | | 15 | | | 15 | | | 18 | | |
| | **Riffle 1** | **Pool** | **Riffle 2** | **Riffle 1** | **Pool** | **Riffle 2** | **Riffle 1** | **Pool** | **Riffle 2** | **Riffle 1** | **Pool** | **Riffle 2** |
| Wetted Width (m) | 4.50 | 5.50 | 4.14 | 4.15 | 5.00 | 4.25 | 5.50 | 5.75 | 4.45 | 0.50 | 0.50 | 0.50 |
| Maximum Depth (m) | 0.35 | 0.50 | 0.60 | 0.65 | 0.75 | 0.50 | 0.50 | 0.75 | 0.50 | 0.15 | 0.15 | 0.20 |
| Maximum Hydraulic Head (mm) | 10 | 0 | 5 | 7 | 0 | 5 | 5 | 0 | 10 | 15 | 0 | 15 |
| Dominant Substrate | Sand | Sand | Sand | Sand | Sand | Sand | Sand | Sand | Sand | Silt | Silt | Silt |
| Sub-Dominant Substrate | Gravel | Silt | Gravel | Gravel | Gravel | Gravel | Gravel | Silt | Gravel | Sand | Sand | Sand |

**Table 9. Fall 2023 Benthic Invertebrate Sampling Conditions**

| Station | BTH-001 | | | BTH-002 | | | BTH-003 | | | BTH-004 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date | September 27, 2023 | | | September 27, 2023 | | | September 27, 2023 | | | September 27, 2023 | | |
| Time (hrs) | 1300 | | | 1330 | | | 1415 | | | 1545 | | |
| Water Temperature (°C) | 18 | | | 18 | | | 18 | | | 21 | | |
| | **Riffle 1** | **Pool** | **Riffle 2** | **Riffle 1** | **Pool** | **Riffle 2** | **Riffle 1** | **Pool** | **Riffle 2** | **Riffle 1** | **Pool** | **Riffle 2** |
| Wetted Width (m) | 4.15 | 6.0 | 5.15 | 4.75 | 5.5 | 4.75 | 4.15 | 5.25 | 4.75 | 0.5 | 0.35 | 0.5 |
| Maximum Depth (m) | 0.5 | 0.7 | 0.5 | 0.45 | 0.5 | 0.5 | 0.5 | 0.75 | 0.75 | 0.1 | 0.1 | 0.1 |
| Maximum Hydraulic Head (mm) | 10 | 0 | 15 | 15 | 0 | 10 | 10 | 0 | 5 | 15 | 0 | 15 |
| Dominant Substrate | Sand | Silt | Sand | Sand | Sand | Sand | Sand | Silt | Sand | Silt | Silt | Silt |
| Sub-Dominant Substrate | Gravel | Sand | Gravel | Gravel | Gravel | Gravel | Gravel | Sand | Gravel | Sand | Sand | Sand |

A total of 37 different taxa were identified within the four sampling stations. The identification and enumeration of benthic invertebrates are provided in tabular format in Appendix II. Survey results are summarized in Table 10 below.

**Table 10. Calculated Benthic Invertebrate Metrics**

| Benthic Invertebrate Metrics | Spring 2023 | | | | Fall 2023 | | | |
|---|---|---|---|---|---|---|---|---|
| | BTH-001 | BTH-002 | BTH-003 | BTH-004 | BTH-001 | BTH-002 | BTH-003 | BTH-004 |
| Taxa Richness | 21 | 16 | 12 | 8 | 14 | 11 | 17 | 14 |
| **Sensitive Groups** | | | | | | | | |
| EPT Taxa Richness | 7 | 5 | 4 | 0 | 5 | 3 | 3 | 1 |
| % EPT | 28.2 | 30.3 | 37.9 | 0.0 | 17.8 | 9.5 | 13.7 | 1.6 |
| **Tolerant Groups** | | | | | | | | |
| % *Oligochaetes* | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% |
| % *Diptera* | 45.2% | 41.7% | 18.8% | 38.7% | 30.4% | 50.4% | 22.9% | 40.5% |
| % *Chironomidae* | 41.6% | 41.7% | 13.3% | 38.7% | 25.5% | 50.4% | 20.6% | 35.8% |
| **Functional Feeding Groups** | | | | | | | | |
| % Collector-Filter | 46.2% | 45.5% | 21.5% | 13.8% | 19.3% | 6.9% | 13.3% | 9.7% |
| % Collector-Gatherer | 22.8% | 30.5% | 47.5% | 68.5% | 73.0% | 79.3% | 52.3% | 71.9% |
| % Predators | 14.0% | 11.5% | 23.0% | 6.4% | 2.4% | 10.4% | 29.0% | 0.0% |
| % Scrapers | 13.8% | 12.5% | 7.9% | 0.0% | 5.3% | 3.5% | 3.8% | 3.9% |
| % Shredders | 3.1% | 0.0% | 0.0% | 0.0% | 0.0% | 0.0% | 1.6% | 3.9% |
| **Diversity and Biotic Indices** | | | | | | | | |
| Shannon-Wiener Index | 2.9 | 2.7 | 2.3 | 1.8 | 2.2 | 2.2 | 2.5 | 2.2 |
| Family Biotic Index | 4.58 | 4.5 | 4.5 | 5.6 | 4.9 | 5.0 | 4.4 | 5.7 |
| Family Biotic Index Water Quality | Good | Good | Good | Fair | Good | Good | Good | Fair |
| Biotic Index | 5.5 | 5.6 | 5.3 | 7.3 | 6.3 | 7.2 | 5.6 | 7.6 |
| Biotic Index Water Quality | Good | Fair | Good | Fairly Poor | Fair | Fairly Poor | Fair | Poor |
| Simpsons Diversity Index | 0.94 | 0.93 | 0.90 | 0.87 | 0.85 | 0.87 | 0.9 | 0.9 |

Potentially Unimpaired Potentially Impaired

Overall, the resulting benthic invertebrate community composition metrics fell predominantly within the “Potentially Unimpaired” assessment range across the majority of the assessment criteria throughout both Laurel and Wideman Creek sampling stations.

Taxonomic richness was generally consistent between Spring and Fall monitoring events. Compared to Wideman Creek, Laurel Creek exhibited higher diversity and better water quality. This suggests that there is likely a broader range of benthic invertebrate habitat types available within Laurel Creek. The results of the Shannon Weiner (H') measure of diversity and evenness, and the Simpsons Diversity Index indicates a relatively diverse benthic invertebrate community. No single taxa achieved true dominance across all monitoring stations within both watercourses.

The environmental water quality, as measured by the Family Biotic Index, indicates "Good" water quality within Laurel Creek and "Fair" within Wideman Creek. The genus level Biotic Index within Laurel Creek ranged from "Fairly Poor" to "Good" within Laurel Creek and "Poor" to "Fair" in Wideman Creek. Despite the low taxa richness and proportion of sensitive taxa, the results of both the water quality and genus level Biotic Index support the Potentially Unimpaired conditions within the Creeks. The aquatic habitat conditions within the study area suggest low habitat diversity due to the dominant presence of highly organic substrates and limited riffle habitat.

## 4.0 Conclusions and Recommendations

NRSI was retained by Sunvest Development Corp. to complete pre-construction biological monitoring for the proposed development at 720 Erbsville Road in the City of Waterloo, Ontario. This 2023 pre-construction monitoring report summarizes the findings from surveys completed during the 2023 field season. In 2023, Aquatic Habitat Assessments, Fish Community Composition, Benthic Invertebrate Analysis, Amphibian Surveys, and Breeding Bird Surveys were completed. The pre-construction monitoring provides baseline data against which subsequent monitoring will be compared including during and post-construction. Species of Conservation Concern and regionally significant species were observed during 2023 monitoring.

During the 2023 aquatic habitat and benthic macro-invertebrate monitoring program, the sampled reaches of Laurel Creek were characterized as providing “good” water quality, while Wideman Creek was characterized as “poor” water quality. Both Creeks fell predominantly within the “Potentially Unimpaired” range across all monitoring stations. This assessment is generally consistent with the results of the fish community composition sampling, as the species captured across all monitoring stations were fully or adequately tolerant of environmental changes.

If subsequent years of monitoring are required, it is recommended that they follow this same methodology with a minimum of one year of pre-construction monitoring, consistent with the City of Waterloo requirements for their Development Monitoring Program (1999, 2020) and the ESES (Dougan et al. 2018), required immediately preceding construction.

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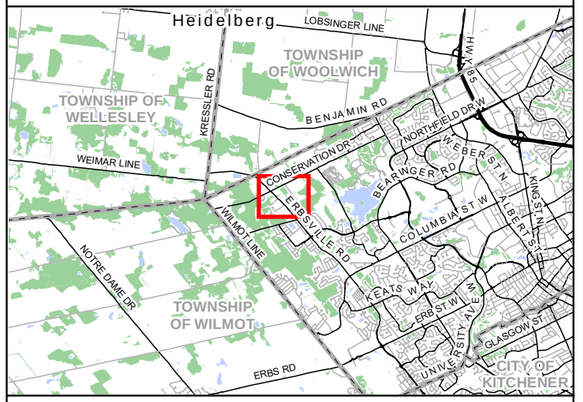
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# MAPS

Map 1

# 720 Erbsville Road, Waterloo

## Study Area and Natural Features




**Legend**

- Subject Property
- Study Area (200m)
- Regal Place Subdivision
- Permanent Watercourse
- Water Body
- Provincially Significant Wetland (PSW)
- Other Wetland (Non-PSW)
- Unevaluated Wetland
- GRCA Regulated Wetland
- GRCA Regulated Floodplain
- GRCA Regulation Limit
- Wooded Area
- Brook Trout Spawning Area (MNRF)
- Brown Trout Spawning Area (MNRF)
- White-tailed Deer Wintering Area (Stratum 2) (MNRF)
- Environmentally Sensitive Policy Area (ESPA) (Region of Waterloo 2015)


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Project: 2520
Date: August 29, 2023

NAD83 - UTM Zone 17
Size: 11x17"
1:4,000

0 50 100 150 200 250 Metres

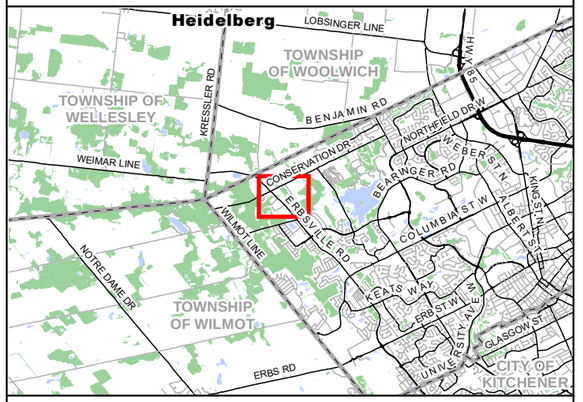
N

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Map 2

# 720 Erbsville Road, Waterloo

## 2023 Monitoring Stations




**Legend**

- Study Area (200m)
- Subject Property
- Permanent Watercourse
- Water Body
- Anuran Call Station (ANR)
- Breeding Bird Monitoring Station (BMB)
- Benthic Sampling (BTH)
- Electrofishing Station (EMS)
- Watercourse Reach
- Reach Break

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Project: 2520
Date: December 4, 2023

NAD83 - UTM Zone 17
Size: 11x17"
1:4,000

0 50 100 150 200 250 Metres

N

Path: X:\2520_720ErbsvilleRdEIS\NRSI_2520_Map2_2023PreconMonitoring_3K_2023_12_04_LEH.mxd

**Map 3**

# 720 Erbsville Road, Waterloo

## Significant Species Observations (2023)




**Legend**

- Subject Property
- Study Area
- Permanent Watercourse
- **Species of Conservation Concern (SCC) Observations**
  - 1: Barn Swallow
  - 2: Eastern Wood-Pewee
- **Regionally Significant Species Observations**
  - 1: American Redstart
  - 2: Ruby-throated Hummingbird


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| | |
|---|---|
| Project: 2520<br>Date: December 5, 2023 | NAD83 - UTM Zone 17<br>Size: 11x17"<br>**1:2,750** |

0 50 100 150 Metres

N

Path: X:\2520_720ErbsvilleRdEIS\NRSI_2520_Map3_PreCon_SigSpecies_4K_2023_12_05_LEH.mxd

**Appendix I**
2023 List of Bird Species Reported from the Study Area

**Bird Species Reported from the Study Area - Degroot Lands (720 Erbsville Road) EIS (Project #2520)**

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | Region of Waterloo Status | Erbsville South Environmental Study | OBBA* | NHIC Data** | NRSI Observed: Highest Level of Breeding Evidence | BMB-001 | BMB-002 | BMB-003 | BMB-004 | Other Observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MNRF 2023a | MECP 2023 | Government of Canada 2023 | | | Martin 1996 | Dougan and Associates 2018 | BSC et al. 2006 | MNRF 2023b | NRSI Results from 2023 | | | | | |
| **Anatidae** | **Ducks, Geese & Swans** | | | | | | | | | | | | | | | |
| *Aix sponsa* | Wood Duck | S5B,S3N | | | | | √* | PO | CO | | | | | | | |
| *Anas platyrhynchos* | Mallard | S5 | | | | | | PR | CO | | | | | | | |
| *Branta canadensis* | Canada Goose | S5 | | | | | | CO | CO | | | | | | | |
| *Lophodytes cucullatus* | Hooded Merganser | S5 | | | | | √ | PO | | | | | | | | |
| **Phasianidae** | **Partridges, Grouse & Turkeys** | | | | | | | | | | | | | | | |
| *Bonasa umbellus* | Ruffed Grouse | S5 | | | | | | | CO | | | | | | | |
| *Meleagris gallopavo* | Wild Turkey | S5 | | | | | | PO | CO | | **PO** | | | | | PO |
| *Phasianus colchicus* | Ring-necked Pheasant | SNA | | | | | | | CO | | | | | | | |
| **Podicipediformes** | **Grebes** | | | | | | | | | | | | | | | |
| *Podilymbus podiceps* | Pied-billed Grebe | S4B,S2N | | | | | √ | | PR | | | | | | | |
| **Columbidae** | **Pigeons & Doves** | | | | | | | | | | | | | | | |
| *Columba livia* | Rock Pigeon | SNA | | | | | | | CO | | | | | | | |
| *Zenaida macroura* | Mourning Dove | S5 | | | | | | PO | CO | | | | | | | |
| **Cuculiformes** | **Cuckoos & Anis** | | | | | | | | | | | | | | | |
| *Coccyzus americanus* | Yellow-billed Cuckoo | S4B | | | | | √ | | PR | | | | | | | |
| *Coccyzus erythropthalmus* | Black-billed Cuckoo | S4S5B | | | | | √ | PO | CO | | | | | | | |
| **Caprimulgidae** | **Goatsuckers** | | | | | | | | | | | | | | | |
| *Chordeiles minor* | Common Nighthawk | S4B | SC | SC | SC | Schedule 1 | √* | | PR | | | | | | | |
| **Apodidae** | **Swifts** | | | | | | | | | | | | | | | |
| *Chaetura pelagica* | Chimney Swift | S3B | THR | T | T | Schedule 1 | | | PR | | | | | | | |
| **Trochilidae** | **Hummingbirds** | | | | | | | | | | | | | | | |
| *Archilochus colubris* | Ruby-throated Hummingbird | S5B | | | | | √ | | PR | | **PO** | | | | PO | |
| **Rallidae** | **Rails, Gallinules & Coots** | | | | | | | | | | | | | | | |
| *Porzana carolina* | Sora | S5B | | | | | √ | | PO | | | | | | | |
| *Rallus limicola* | Virginia Rail | S4S5B | | | | | √ | | PR | | | | | | | |
| **Charadriidae** | **Plovers & Lapwings** | | | | | | | | | | | | | | | |
| *Charadrius vociferus* | Killdeer | S4B | | | | | | PO | CO | | | | | | | |
| **Scolopacidae** | **Sandpipers & Allies** | | | | | | | | | | | | | | | |
| *Actitis macularia* | Spotted Sandpiper | S5B | | | | | | PR | PR | | | | | | | |
| *Scolopax minor* | American Woodcock | S4B | | | | | | | PR | | | | | | | |
| **Ardeidae** | **Herons & Bitterns** | | | | | | | | | | | | | | | |
| *Ardea alba* | Great Egret | S2B,S3M | | | | | √ | OB | | | | | | | | |
| *Ardea herodias* | Great Blue Heron | S4 | | | | | √ | OB | PO | | | | | | | |
| *Botaurus lentiginosus* | American Bittern | S5B | | | | | √ | OB | | | | | | | | |
| *Butorides virescens* | Green Heron | S4B | | | | | √ | OB | PR | | | | | | | |
| *Ixobrychus exilis* | Least Bittern | S4B | THR | T | T | Schedule 1 | √ | | | X | | | | | | |
| **Cathartidae** | **Vultures** | | | | | | | | | | | | | | | |
| *Cathartes aura* | Turkey Vulture | S5B,S3N | | | | | √ | OB | PO | | | | | | | |

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | Region of Waterloo Status | Erbsville South Environmental Study | OBBA* | NHIC Data** | NRSI Observed: Highest Level of Breeding Evidence | BMB-001 | BMB-002 | BMB-003 | BMB-004 | Other Observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Pandionidae** | **Osprey** | | | | | | | | | | | | | | | |
| *Pandion haliaetus* | Osprey | S5B | | | | | √ | OB | CO | | | | | | | |
| **Accipitridae** | **Hawks, Kites, Eagles & Allies** | | | | | | | | | | | | | | | |
| *Accipiter cooperii* | Cooper's Hawk | S4 | NAR | NAR | NS | No schedule | √ | | CO | | | | | | | |
| *Accipiter striatus* | Sharp-shinned Hawk | S5 | NAR | NAR | NS | No schedule | √ | PO | PO | | | | | | | |
| *Buteo jamaicensis* | Red-tailed Hawk | S5 | NAR | NAR | NS | No schedule | | PO | CO | | | | | | | |
| *Buteo lineatus* | Red-shouldered Hawk | S4B,S2N | NAR | NAR | SC | Schedule 3 | √ | OB | | | | | | | | |
| *Circus hudsonius* | Northern Harrier | S5B,S4N | NAR | NAR | NS | No schedule | √ | | PO | | | | | | | |
| *Haliaeetus leucocephalus* | Bald Eagle | S4 | SC | NAR | NS | No schedule | √ | OB | | X | | | | | | |
| **Strigidae** | **Typical Owls** | | | | | | | | | | | | | | | |
| *Bubo virginianus* | Great Horned Owl | S4 | | | | | | PO | CO | | | | | | | |
| *Megascops asio* | Eastern Screech-Owl | S4 | NAR | NAR | NS | No schedule | | | CO | | | | | | | |
| **Alcedinidae** | **Kingfishers** | | | | | | | | | | | | | | | |
| *Megaceryle alcyon* | Belted Kingfisher | S5B,S4N | | | | | √ | | PR | | **PO** | | | | | PO |
| **Picidae** | **Woodpeckers** | | | | | | | | | | | | | | | |
| *Colaptes auratus* | Northern Flicker | S5 | | | | | | PO | CO | | **PO** | | | | PO | |
| *Dryobates pubescens* | Downy Woodpecker | S5 | | | | | | PR | CO | | **PO** | | | PO | | |
| *Dryobates villosus* | Hairy Woodpecker | S5 | | | | | | | CO | | | | | | | |
| *Dryocopus pileatus* | Pileated Woodpecker | S5 | | | | | √ | PO | CO | | | | | | | |
| *Melanerpes carolinus* | Red-bellied Woodpecker | S5 | | | | | √ | PR | PR | | | | | | | |
| *Melanerpes erythrocephalus* | Red-headed Woodpecker | S3 | END | E | E | Schedule 1 | √ | OB | CO | X | | | | | | |
| **Falconidae** | **Caracaras & Falcons** | | | | | | | | | | | | | | | |
| *Falco peregrinus* | Peregrine Falcon | S4 | SC | NAR | NS | No schedule | √ | | PR | | | | | | | |
| *Falco sparverius* | American Kestrel | S4 | | | | | | | CO | | | | | | | |
| **Tyrannidae** | **Tyrant Flycatchers** | | | | | | | | | | | | | | | |
| *Contopus virens* | Eastern Wood-Pewee | S4B | SC | SC | SC | Schedule 1 | | PR | PR | X | **PO** | | | PO | | |
| *Empidonax alnorum* | Alder Flycatcher | S5B | | | | | √ | PR | PR | | | | | | | |
| *Empidonax traillii* | Willow Flycatcher | S4B | | | | | | | PR | | | | | | | |
| *Empidonax virescens* | Acadian Flycatcher | S1B | END | E | E | Schedule 1 | √ | | PO | | | | | | | |
| *Myiarchus crinitus* | Great Crested Flycatcher | S5B | | | | | | PR | PR | | **PO** | | PO | PO | | PO |
| *Sayornis phoebe* | Eastern Phoebe | S5B | | | | | | | CO | | | | | | | |
| *Tyrannus tyrannus* | Eastern Kingbird | S4B | | | | | | PR | PR | | **PO** | | PO | | | |
| **Vireonidae** | **Vireos** | | | | | | | | | | | | | | | |
| *Vireo gilvus* | Warbling Vireo | S5B | | | | | | PO | PR | | | | | | | |
| *Vireo olivaceus* | Red-eyed Vireo | S5B | | | | | | PR | CO | | **PO** | | PO | | | |
| **Corvidae** | **Crows & Jays** | | | | | | | | | | | | | | | |
| *Corvus brachyrhynchos* | American Crow | S5 | | | | | | PO | CO | | **PO** | | PO | | PO | PO |
| *Cyanocitta cristata* | Blue Jay | S5 | | | | | | PR | CO | | **PR** | PO | PR | PR | | |
| **Alaudidae** | **Larks** | | | | | | | | | | | | | | | |
| *Eremophila alpestris* | Horned Lark | S4 | | | | | | PO | PR | | | | | | | |
| **Hirundinidae** | **Swallows** | | | | | | | | | | | | | | | |
| *Hirundo rustica* | Barn Swallow | S4B | SC | SC | T | Schedule 1 | | PR | CO | X | **PO** | | PO | | | |

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | Region of Waterloo Status | Erbsville South Environmental Study | OBBA* | NHIC Data** | NRSI Observed: Highest Level of Breeding Evidence | BMB-001 | BMB-002 | BMB-003 | BMB-004 | Other Observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Petrochelidon pyrrhonota* | Cliff Swallow | S4S5B | | | | | √* | | CO | | | | | | | |
| *Progne subis* | Purple Martin | S3B | | | | | √* | | CO | | | | | | | |
| *Stelgidopteryx serripennis* | Northern Rough-winged Swallow | S4B | | | | | | | PO | | | | | | | |
| *Tachycineta bicolor* | Tree Swallow | S4S5B | | | | | | PR | CO | | | | | | | |
| **Paridae** | **Chickadees & Titmice** | | | | | | | | | | | | | | | |
| *Poecile atricapillus* | Black-capped Chickadee | S5 | | | | | | PO | CO | | **PO** | PO | PO | | PO | PO |
| **Sittidae** | **Nuthatches** | | | | | | | | | | | | | | | |
| *Sitta canadensis* | Red-breasted Nuthatch | S5 | | | | | √ | | CO | | | | | | | |
| *Sitta carolinensis* | White-breasted Nuthatch | S5 | | | | | | PO | CO | | **PR** | | | PR | | |
| **Certhiidae** | **Creepers** | | | | | | | | | | | | | | | |
| *Certhia americana* | Brown Creeper | S5 | | | | | √ | | CO | | | | | | | |
| **Troglodytidae** | **Wrens** | | | | | | | | | | | | | | | |
| *Thryothorus ludovicianus* | Carolina Wren | S4 | | | | | √ | | PR | | | | | | | |
| *Troglodytes aedon* | House Wren | S5B | | | | | | PR | CO | | **PR** | PR | PR | PO | PR | |
| *Troglodytes hiemalis* | Winter Wren | S5B,S4N | | | | | √ | | PR | | | | | | | |
| **Polioptilidae** | **Gnatcatchers** | | | | | | | | | | | | | | | |
| *Polioptila caerulea* | Blue-gray Gnatcatcher | S4B | | | | | √ | | CO | | | | | | | |
| **Regulidae** | **Kinglets** | | | | | | | | | | | | | | | |
| *Regulus satrapa* | Golden-crowned Kinglet | S5 | | | | | √ | | CO | | | | | | | |
| **Turdidae** | **Thrushes** | | | | | | | | | | | | | | | |
| *Catharus fuscescens* | Veery | S5B | | | | | √ | | CO | | | | | | | |
| *Hylocichla mustelina* | Wood Thrush | S4B | SC | T | T | Schedule 1 | | | CO | X | | | | | | |
| *Sialia sialis* | Eastern Bluebird | S5B,S4N | NAR | NAR | NS | No schedule | √ | | CO | | | | | | | |
| *Turdus migratorius* | American Robin | S5 | | | | | | CO | CO | | **CO** | PO | PO | PO | CO | PO |
| **Mimidae** | **Mockingbirds, Thrashers & Allies** | | | | | | | | | | | | | | | |
| *Dumetella carolinensis* | Gray Catbird | S5B,S3N | | | | | | PR | CO | | **PO** | PO | | | PO | |
| *Toxostoma rufum* | Brown Thrasher | S4B | | | | | √ | PO | PR | | | | | | | |
| **Sturnidae** | **Starlings** | | | | | | | | | | | | | | | |
| *Sturnus vulgaris* | European Starling | SNA | | | | | | PO | CO | | **PO** | | | | PO | |
| **Bombycillidae** | **Waxwings** | | | | | | | | | | | | | | | |
| *Bombycilla cedrorum* | Cedar Waxwing | S5 | | | | | | PR | CO | | **PR** | PO | PR | | | |
| **Passeridae** | **Old World Sparrows** | | | | | | | | | | | | | | | |
| *Passer domesticus* | House Sparrow | SNA | | | | | | PO | CO | | | | | | | |
| **Fringillidae** | **Finches & Allies** | | | | | | | | | | | | | | | |
| *Haemorhous mexicanus* | House Finch | SNA | | | | | | | CO | | | | | | | |
| *Haemorhous purpureus* | Purple Finch | S5 | | | | | √ | | PR | | | | | | | |
| *Spinus pinus* | Pine Siskin | S5 | | | | | √ | | PR | | | | | | | |
| *Spinus tristis* | American Goldfinch | S5 | | | | | | PO | PR | | **PR** | | PR | PO | PO | |
| **Emberizidae** | **New World Sparrows & Allies** | | | | | | | | | | | | | | | |
| *Ammodramus savannarum* | Grasshopper Sparrow | S4B | SC | SC | SC | Schedule 1 | √ | | PR | X | | | | | | |
| *Melospiza georgiana* | Swamp Sparrow | S5B,S4N | | | | | | PR | PR | | | | | | | |
| *Melospiza melodia* | Song Sparrow | S5 | | | | | | PR | CO | | **PO** | PO | PO | | PO | |

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | Region of Waterloo Status | Erbsville South Environmental Study | OBBA* | NHIC Data** | NRSI Observed: Highest Level of Breeding Evidence | BMB-001 | BMB-002 | BMB-003 | BMB-004 | Other Observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Passerculus sandwichensis* | Savannah Sparrow | S5B,S3N | | | | | | | CO | | | | | | | |
| *Pipilo erythrophthalmus* | Eastern Towhee | S4B,S3N | | | | | | | CO | | | | | | | |
| *Pooecetes gramineus* | Vesper Sparrow | S4B | | | | | √ | | PR | | | | | | | |
| *Spizella passerina* | Chipping Sparrow | S5B,S3N | | | | | | PR | CO | | | | | | | |
| *Spizella pusilla* | Field Sparrow | S4B,S3N | | | | | | PR | PR | | | | | | | |
| *Zonotrichia albicollis* | White-throated Sparrow | S5 | | | | | √ | | PR | | | | | | | |
| **Icteridae** | **Troupials & Allies** | | | | | | | | | | | | | | | |
| *Agelaius phoeniceus* | Red-winged Blackbird | S5 | | | | | | PO | CO | | **PO** | | | | PO | PO |
| *Dolichonyx oryzivorus* | Bobolink | S4B | THR | SC | T | Schedule 1 | | | PR | X | | | | | | |
| *Icterus galbula* | Baltimore Oriole | S4B | | | | | | PO | CO | | **PR** | PR | PO | | | |
| *Icterus spurius* | Orchard Oriole | S4B | | | | | √ | | PR | | | | | | | |
| *Molothrus ater* | Brown-headed Cowbird | S5 | | | | | | PO | CO | | **PR** | | PO | | PR | |
| *Quiscalus quiscula* | Common Grackle | S5 | | | | | | PO | CO | | **PO** | | | | PO | |
| *Sturnella magna* | Eastern Meadowlark | S4B,S3N | THR | T | T | Schedule 1 | | | CO | X | | | | | | |
| **Parulidae** | **Wood Warblers** | | | | | | | | | | | | | | | |
| *Cardellina canadensis* | Canada Warbler | S5B | SC | SC | T | Schedule 1 | √ | OB | | X | | | | | | |
| *Geothlypis philadelphia* | Mourning Warbler | S5B | | | | | √ | PR | PR | | | | | | | |
| *Geothlypis trichas* | Common Yellowthroat | S5B,S3N | | | | | | PR | PR | | **PR** | PR | PR | | PR | |
| *Leiothlypis ruficapilla* | Nashville Warbler | S5B | | | | | √ | | CO | | | | | | | |
| *Mniotilta varia* | Black-and-white Warbler | S5B | | | | | √ | | PR | | | | | | | |
| *Parkesia noveboracensis* | Northern Waterthrush | S5B | | | | | √ | | CO | | | | | | | |
| *Seiurus aurocapilla* | Ovenbird | S5B | | | | | √ | | CO | | | | | | | |
| *Setophaga caerulescens* | Black-throated Blue Warbler | S5B | | | | | | | PR | | | | | | | |
| *Setophaga cerulea* | Cerulean Warbler | S2B | THR | E | E | Schedule 1 | √ | | PO | X | | | | | | |
| *Setophaga citrina* | Hooded Warbler | S4B | NAR | NAR | NS | No schedule | √ | | CO | | | | | | | |
| *Setophaga coronata* | Yellow-rumped Warbler | S5B,S4N | | | | | √ | | PO | | | | | | | |
| *Setophaga pensylvanica* | Chestnut-sided Warbler | S5B | | | | | √ | | PR | | | | | | | |
| *Setophaga petechia* | Yellow Warbler | S5B | | | | | | PR | CO | | **PO** | PO | | | PO | |
| *Setophaga pinus* | Pine Warbler | S5B,S3N | | | | | √ | | CO | | | | | | | |
| *Setophaga ruticilla* | American Redstart | S5B | | | | | √ | | PR | | **PR** | | | | PR | |
| *Setophaga virens* | Black-throated Green Warbler | S5B | | | | | √ | | PR | | | | | | | |
| *Vermivora cyanoptera* | Blue-winged Warbler | S4B | | | | | √ | | CO | | | | | | | |
| **Cardinalidae** | **Cardinals, Grosbeaks & Allies** | | | | | | | | | | | | | | | |
| *Cardinalis cardinalis* | Northern Cardinal | S5 | | | | | | PR | CO | | **PO** | PO | PO | | PO | PO |
| *Passerina cyanea* | Indigo Bunting | S5B | | | | | | PR | PR | | | | | | | |
| *Pheucticus ludovicianus* | Rose-breasted Grosbeak | S5B | | | | | | PO | CO | | **PO** | | PO | PO | | |

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | Region of Waterloo Status | Erbsville South Environmental Study | OBBA* | NHIC Data** | NRSI Observed: Highest Level of Breeding Evidence | BMB-001 | BMB-002 | BMB-003 | BMB-004 | Other Observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Piranga olivacea* | Scarlet Tanager | S5B | | | | | √ | | CO | | | | | | | |
| **Total** | | | | | | | | **61** | **113** | **11** | **30** | **11** | **17** | **9** | **17** | **8** |

*OBBA Atlas Square: 17NJ31

**NHIC Atlas Squares: 17NJ3114, 17NJ3113, 17NJ3213, 17NJ3214

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**Appendix II**
2023 Benthic Macro-Invertebrate Raw Data

| GROUP | FAMILY | Genus | BTH001 Riffle 1 Spring 2023 | BTH001 Pool Spring 2023 | BTH001 Riffle 2 Spring 2023 | BTH002 Riffle 1 Spring 2023 | BTH002 Pool Spring 2023 | BTH002 Riffle 2 Spring 2023 | BTH003 Riffle 1 Spring 2023 | BTH003 Pool Spring 2023 | BTH003 Riffle 2 Spring 2023 | BTH004 Riffle 1 Spring 2023 | BTH004 Pool Spring 2023 | BTH004 Riffle 2 Spring 2023 | BTH001 Riffle 1 Fall 2023 | BTH001 Pool Fall 2023 | BTH001 Riffle 2 Fall 2023 | BTH002 Riffle 1 Fall 2023 | BTH002 Pool Fall 2023 | BTH002 Riffle 2 Fall 2023 | BTH003 Riffle 1 Fall 2023 | BTH003 Pool Fall 2023 | BTH003 Riffle 2 Fall 2023 | BTH004 Riffle 1 Fall 2023 | BTH004 Pool Fall 2023 | BTH004 Riffle 2 Fall 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | | | | | | |
| AMPHIPODA | GAMMARIDAE | Gammarus | 4 | 7 | 5 | 5 | 10 | 5 | 10 | 10 | 10 | 35 | 10 | 25 | 35 | 45 | 35 | 25 | 25 | 45 | 35 | 35 | 35 | 17 | 15 | 21 |
| COLEOPTERA | ELMIDAE | Stenelmis | 5 | 15 | | 5 | 10 | 5 | | | | 17 | 15 | 35 | 5 | | | | | | 5 | 10 | 5 | 5 | 5 | 10 |
| | | Dubiraphia | | | | 5 | 10 | 10 | 25 | 35 | 20 | | | | | | | | | | 10 | 10 | 10 | 5 | 10 | 10 |
| | DYTISCIDAE | Agabetes | | 10 | | | | | | | | | | | | | | | | | | | | | | |
| DIPTERA | CERATOPOGIDAE | | | | | | | | 10 | 17 | 10 | | | | 3 | 7 | | 10 | 5 | 10 | 25 | 25 | 25 | | | |
| | CHIRONOMIDAE | Micropsectra | 2 | 3 | 7 | 10 | 5 | 10 | 15 | 17 | 25 | | | | 10 | 5 | 10 | 10 | 10 | 5 | 5 | 15 | 15 | 5 | 5 | 5 |
| | | Chironomus | 4 | 4 | 6 | 10 | 10 | 10 | 5 | 5 | 5 | 15 | 25 | 35 | 7 | 7 | 7 | 25 | 25 | 35 | | | | 25 | 35 | 29 |
| | | Paralauterborniella | 5 | 5 | 5 | 10 | | | | | | 5 | 10 | 10 | 15 | 15 | 15 | 30 | 30 | 30 | 35 | 10 | 17 | 14 | 25 | 5 |
| | | Polypedilum | 5 | 5 | 5 | | | | | | | | | | | | | | | | | | | | | |
| | | Rheotanytarsus | 25 | 10 | 25 | 15 | 10 | 25 | | | | 15 | 25 | 10 | | | | | | | | | | 10 | 15 | 7 |
| | | Tanytarsus | 5 | 35 | 15 | 10 | 7 | 17 | | | | 5 | 10 | 10 | | | | | | | 5 | | | | | |
| | | Stictochironomus | | | | | | | | | | | | | 5 | 5 | 5 | 25 | 35 | 32 | 14 | 5 | 10 | 14 | 25 | 9 |
| | | Larsia | 5 | 18 | 5 | 5 | 5 | 5 | | | | 10 | 10 | 15 | | | | | | | | | | | | |
| | SIMULIDAE | Simulum | | 17 | | | | | 10 | 10 | 10 | | | | 10 | 5 | 5 | | | | | | | | 5 | |
| | TABANIDAE | Tabanus | | | | | | | | | | | | | | | | | | | | | 5 | | | |
| | TIPULIDAE | Tipula | | | | | | | | | | | | | | | | | | | 5 | | 5 | | 25 | |
| EPHEMEROPTERA | EPHEMERELLIDAE | Ephemerella | 4 | 5 | 5 | 5 | 5 | 5 | 25 | 14 | 17 | | | | 5 | 7 | 5 | 10 | 5 | 5 | 25 | 17 | | | | |
| | ISONYCHIIDAE | Isonychia | 5 | 15 | 5 | 10 | 5 | 10 | 10 | 10 | 10 | | | | 10 | 5 | 4 | 5 | 5 | 5 | 25 | 10 | 10 | | 10 | |
| | HEPTAGENIIDAE | Maccaffertium | 3 | 5 | 3 | | | | | | | | | | 5 | | | 5 | 10 | 5 | | | | | | |
| MEGALOPTERA | SIALIDAE | Sialis | 2 | | 2 | | | | 1 | 5 | 5 | | | | | | | 5 | 5 | 25 | 35 | 35 | 35 | | | |
| TRICHOPTERA | LEPTOCERIDAE | Oecetis | 5 | 15 | 5 | 10 | 10 | 10 | 17 | 25 | 35 | | | | | | | | | | | | | | | |
| | PHILOPOTOMIDAE | Chimara | 10 | 15 | 10 | 5 | 5 | 5 | | | | | | | 4 | 7 | 5 | | | | | | | | | |
| | GOERIDAE | Goera | 5 | 5 | 15 | 7 | 17 | 10 | 14 | 14 | 15 | | | | 2 | 5 | 10 | | | | | | | | | |
| | HYDROPTILIDAE | Hydroptilia | 10 | 10 | 10 | | | | | | | | | | | | | | | | | 14 | | | | |
| ISOPODA | ASELLIDAE | Caecidotea | | | | | | | 25 | 35 | 17 | 45 | 55 | 35 | 25 | 28 | 32 | 35 | 25 | 17 | | 7 | | 25 | 35 | 45 |
| GASTROPODA | ANCYLIDAE | Ferrissia | | | | | | | | | | | | | | | | | | | | | | 10 | 10 | 5 |
| | PLANORBIDAE | Gyranulus | | | | 5 | 5 | 5 | | | | | | | | | | | | | | 10 | | | | |
| | PHYSIDAE | Apllexa | 5 | 15 | 10 | | | | | | | | | | | | | | | | 10 | 10 | 18 | 14 | 25 | 35 |
| BIVALVIA | SPHAERIIDAE | Pisidium | 17 | | | 10 | 10 | 10 | | | | | | | | | | | | | | | | | | |
| | TOTALS | | 126 | 214 | 138 | 127 | 124 | 142 | 167 | 197 | 179 | 147 | 160 | 175 | 141 | 141 | 133 | 185 | 180 | 214 | 234 | 213 | 190 | 144 | 245 | 181 |

Appendix VI
Vascular Flora Species Reported from the Study Area

**Plant Species Reported from the Study Area - Erbsville South Environmental Study (Project #2520)**

| | Scientific Name | Common Name | Conservation Status | | | | | | | CC | CW | NativeStatus | Location (ELC polygons) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Global | Federal | | | Provincial | | Local | | | | |
| | | | G Rank | COSEWIC | SARA | SARA Schedule | SARO | SRANK | Waterloo Region | | | | |
| | | | | Government of Canada 2023 | | | MECP 2023 | MNRF 2023a | Richardson & Martin 1999 | Oldham et al. 1998 | | | Dougan and Associates 2018 |
| **Pteridophytes** | | **Ferns & Allies** | | | | | | | | | | | |
| **Dennstaedtiaceae** | | **Bracken Fern Family** | | | | | | | | | | | |
| 1 | *Pteridium aquilinum* | Bracken Fern | G5 | | | | | S5 | | 2 | 3 | N | 21,26,32 |
| **Dryopteridaceae** | | **Wood Fern Family** | | | | | | | | | | | |
| 2 | *Athyrium filix-femina* | Common Lady Fern | G5 | | | | | S5 | | 4 | 0 | I | 7 |
| 3 | *Cystopteris bulbifera* | Bulblet Fern | G5 | | | | | S5 | | 5 | -3 | N | 27 |
| 4 | *Dryopteris carthusiana* | Spinulose Wood Fern | G5 | | | | | S5 | | 5 | -3 | N | 21,24,27,32 |
| 5 | *Dryopteris cristata* | Crested Wood Fern | G5 | | | | | S5 | | 7 | -5 | N | 19,20,27 |
| 6 | *Dryopteris marginalis* | Marginal Wood Fern | G5 | | | | | S5 | | 5 | 3 | N | 24 |
| 7 | *Gymnocarpium dryopteris* | Common Oak Fern | G5 | | | | | S5 | | 7 | 3 | N | 27 |
| 8 | *Matteuccia struthiopteris* | Ostrich Fern | G5 | | | | | S5 | | 5 | 0 | N | 5,7,8,19,21,25,27,29,33 |
| 9 | *Onoclea sensibilis* | Sensitive Fern | G5 | | | | | S5 | | 4 | -3 | N | 1,2,3,4,17,19,21,25,26,27,32,33,37 |
| **Equisetaceae** | | **Horsetail Family** | | | | | | | | | | | |
| 10 | *Equisetum arvense* | Field Horsetail | G5 | | | | | S5 | | 0 | 0 | N | 1,2,4,8,17,19,21,26,27,28,29,32,33 |
| **Lycopodiaceae** | | **Clubmoss Family** | | | | | | | | | | | |
| 11 | *Diphasiastrum digitatum* | Southern Ground-cedar | G5 | | | | | S5 | R* | 3 | 5 | N | 27 |
| **Osmundaceae** | | **Royal Fern Family** | | | | | | | | | | | |
| 12 | *Osmunda regalis* | Royal Fern | G5 | | | | | S5 | | 7 | -5 | N | 25,27,29 |
| 13 | *Osmundastrum cinnamomeum* | Cinnamon Fern | G5 | | | | | S5 | | 7 | -3 | N | 27 |
| **Thelypteridaceae** | | **Beech Fern Family** | | | | | | | | | | | |
| 14 | *Thelypteris palustris* | Marsh Fern | G5 | | | | | S5 | | 5 | -3 | N | 2,19,27 |
| **Gymnosperms** | | **Conifers** | | | | | | | | | | | |
| **Cupressaceae** | | **Cypress Family** | | | | | | | | | | | |
| 15 | *Thuja occidentalis* | Eastern White Cedar | G5 | | | | | S5 | | 4 | -3 | N | 1,2,4,7,8,10,16,17,19,21,27,28,29,32,33,37,42 |
| **Pinaceae** | | **Pine Family** | | | | | | | | | | | |
| 16 | *Larix decidua* | European Larch | G5 | | | | | SE2 | | 0 | 5 | I | 4 |
| 17 | *Larix laricina* | Tamarack | G5 | | | | | S5 | | 7 | -3 | N | 2,19,29 |
| 18 | *Picea abies* | Norway Spruce | G5 | | | | | SE3 | | 0 | 5 | I | 6,16,42 |
| 19 | *Picea glauca* | White Spruce | G5 | | | | | S5 | R+ | 6 | 3 | N | 4,6,17,42 |
| 20 | *Picea pungens* | Blue Spruce | G5 | | | | | SE1 | | 0 | 3 | I | 7,16 |
| 21 | *Pinus nigra* | Black Pine | G5 | | | | | SE3 | | 0 | 5 | I | 6,16 |
| 22 | *Pinus strobus* | Eastern White Pine | G5 | | | | | S5 | | 4 | 3 | N | 2,4,6,21,27,32,33,42 |
| 23 | *Tsuga canadensis* | Eastern Hemlock | G4G5 | | | | | S5 | | 7 | 3 | N | 21,24,27,33 |
| **Dicotyledons** | | **Dicots** | | | | | | | | | | | |
| **Aceraceae** | | **Maple Family** | | | | | | | | | | | |
| 24 | *Acer negundo* | Manitoba Maple | G5 | | | | | S5 | | 0 | 0 | N | 3,7,10,17,23 |
| 25 | *Acer platanoides* | Norway Maple | GNR | | | | | SE5 | | 0 | 5 | I | 16 |
| 26 | *Acer rubrum* | Red Maple | G5 | | | | | S5 | | 4 | 0 | N | 19,25,27,33 |
| 27 | *Acer saccharinum* | Silver Maple | G5 | | | | | S5 | | 5 | -3 | N | 17 |

| | Scientific Name | Common Name | Conservation Status | | | | | | | CC | CW | NativeStatus | Location (ELC polygons) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Global | Federal | | | Provincial | | Local | | | | |
| | | | G Rank | COSEWIC | SARA | SARA Schedule | SARO | SRANK | Waterloo Region | | | | |
| 28 | *Acer saccharum* | Sugar Maple | G5 | | | | | S5 | | 4 | 3 | N | 5,7,21,24,32,33,42 |
| **Anacardiaceae** | | **Sumac or Cashew Family** | | | | | | | | | | | |
| 29 | *Rhus typhina* | Staghorn Sumac | G5 | | | | | S5 | | 1 | 3 | N | 24. |
| 30 | *Toxicodendron radicans* | Poison Ivy | G5 | | | | | S5 | | 2 | 0 | N | 7 |
| **Apiaceae** | | **Carrot or Parsley Family** | | | | | | | | | | | |
| 31 | *Cicuta bulbifera* | Bulb-bearing Water-hemlock | G5 | | | | | S5 | | 5 | -5 | N | 19,27,31 |
| 32 | *Cicuta maculata* | Spotted Water-hemlock | G5 | | | | | S5 | | 6 | -5 | N | 8,37 |
| 33 | *Daucus carota* | Wild Carrot | GNR | | | | | SE5 | | 0 | 5 | I | 10,13,17,18,21,23,26,28,36 |
| 34 | *Sium suave* | Hemlock Water-parsnip | G5 | | | | | S5 | | 4 | -5 | N | 1 |
| **Apocynaceae** | | **Dogbane Family** | | | | | | | | | | | |
| 35 | *Vinca minor* | Periwinkle | GNR | | | | | SE5 | | 0 | 5 | I | 5,6,7,8 |
| **Araliaceae** | | **Ginseng Family** | | | | | | | | | | | |
| 36 | *Aralia hispida* | Bristly Sarsaparilla | G5 | | | | | S5 | R | 8 | 5 | N | 27 |
| 37 | *Aralia nudicaulis* | Wild Sarsaparilla | G5 | | | | | S5 | | 4 | 3 | N | 27 |
| **Asclepiadaceae** | | **Milkweed Family** | | | | | | | | | | | |
| 38 | *Asclepias incarnata* | Swamp Milkweed | G5 | | | | | S5 | | 6 | -5 | N | 2,12,23,31 |
| 39 | *Asclepias syriaca* | Common Milkweed | G5 | | | | | S5 | | 0 | 5 | N | 10,21,32 |
| **Asteraceae** | | **Composite or Aster Family** | | | | | | | | | | | |
| 40 | *Achillea millefolium* | Common Yarrow | G5 | | | | | SE5? | | 0 | 3 | N | 26 |
| 41 | *Ambrosia artemisiifolia* | Common Ragweed | G5 | | | | | S5 | | 0 | 3 | N | 28 |
| 42 | *Arctium lappa* | Great Burdock | G5 | | | | | SE5 | | 0 | 3 | I | 21 |
| 43 | *Arctium minus* | Common Burdock | GNR | | | | | SE5 | | 0 | 3 | I | 17 |
| 44 | *Bidens frondosa* | Devil's Beggarticks | G5 | | | | | S5 | | 3 | -3 | N | 1,2 |
| 45 | *Cichorium intybus* | Chicory | GNR | | | | | SE5 | | 0 | 5 | I | 13,28,36 |
| 46 | *Cirsium arvense* | Creeping Thistle | GNR | | | | | SE5 | | 0 | 3 | I | 13,21,23,36, |
| 47 | *Cirsium vulgare* | Bull Thistle | GNR | | | | | SE5 | | 0 | 3 | I | 10,32 |
| 48 | *Erigeron philadelphicus* | Philadelphia Fleabane | G5 | | | | | S5 | | 1 | -3 | N | 13,21,26,36 |
| 49 | *Eupatorium perfoliatum* | Common Boneset | G5 | | | | | S5 | | 2 | -3 | N | 12,15,19,31,33 |
| 50 | *Eurybia macrophylla* | Large-leaved Aster | G5 | | | | | S5 | | 5 | 5 | N | 21 |
| 51 | *Euthamia graminifolia* | Grass-leaved Goldenrod | G5 | | | | | S5 | | 2 | 0 | N | 21 |
| 52 | *Rudbeckia hirta* | Black-eyed Susan | G5 | | | | | S5 | | 0 | 3 | N | 26 |
| 53 | *Solidago canadensis* | Canada Goldenrod | G5 | | | | | S5 | | 1 | 3 | N | 10,13,14,17,18,21,22,23,26,28,32,33,34,36 |
| 54 | *Solidago rugosa* | Rough-stemmed Goldenrod | G5 | | | | | S5 | | 4 | 0 | N | 19,21,29 |
| 55 | *Symphyotrichum lanceolatum* | Panicled Aster | G5 | | | | | S5 | | 3 | -3 | N | 1,22 |
| 56 | *Symphyotrichum novae-angliae* | New England Aster | G5 | | | | | S5 | | 2 | -3 | N | 17,23 |
| 57 | *Symphyotrichum puniceum* | Swamp Aster | G5 | | | | | S5 | | 6 | -5 | N | 18,21,22,31,37 |
| 58 | *Tanacetum vulgare* | Common Tansy | GNR | | | | | SE5 | | 0 | 5 | I | 23 |
| 59 | *Taraxacum officinale* | Common Dandelion | G5 | | | | | SE5 | | 0 | 3 | I | 2,5,6,7,10,13,17,21,28,32,36 |
| 60 | *Tussilago farfara* | Colt's-foot | GNR | | | | | SE5 | | 0 | 3 | I | 1,17,19,21,22,24 |
| **Balsaminaceae** | | **Touch-me-not Family** | | | | | | | | | | | |
| 61 | *Impatiens capensis* | Spotted Jewelweed | G5 | | | | | S5 | | 4 | -3 | N | 1,8,12,17,19,23,25,27,29,31 |

| | Scientific Name | Common Name | Conservation Status | | | | | | | CC | CW | NativeStatus | Location (ELC polygons) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Global | Federal | | | Provincial | | Local | | | | |
| | | | G Rank | COSEWIC | SARA | SARA Schedule | SARO | SRANK | Waterloo Region | | | | |
| **Berberidaceae** | | **Barberry Family** | | | | | | | | | | | |
| 62 | *Caulophyllum thalictroides* | Blue Cohosh | G4G5 | | | | | S5 | | 5 | 5 | N | 5,24 |
| 63 | *Podophyllum peltatum* | May-apple | G5 | | | | | S5 | | 5 | 3 | N | 34 |
| **Betulaceae** | | **Birch Family** | | | | | | | | | | | |
| 64 | *Alnus incana* | Grey Alder | G5 | | | | | S5 | R* | 6 | -3 | N | 19 |
| 65 | *Betula alleghaniensis* | Yellow Birch | G5 | | | | | S5 | | 6 | 0 | N | 2,19,21,24,27,33 |
| 66 | *Betula papyrifera* | Paper Birch | G5 | | | | | S5 | | 2 | 3 | N | 19,21,32 |
| 67 | *Ostrya virginiana* | Eastern Hop-hornbeam | G5 | | | | | S5 | | 4 | 3 | N | 7,21,24 |
| **Boraginaceae** | | **Borage Family** | | | | | | | | | | | |
| 68 | *Myosotis laxa* | Small Forget-me-not | G5 | | | | | S5 | | 6 | -5 | N | 4,5,8 |
| 69 | *Myosotis scorpioides* | True Forget-me-not | G5 | | | | | SE5 | | 0 | -5 | I | 6,19,29 |
| 70 | *Symphytum officinale* | Common Comfrey | GNR | | | | | SE5 | | 0 | 5 | I | 17 |
| **Brassicaceae** | | **Mustard Family** | | | | | | | | | | | |
| 71 | *Alliaria petiolata* | Garlic Mustard | GNR | | | | | SE5 | | 0 | 0 | I | 3,5,6,7 |
| 72 | *Barbarea vulgaris* | Bitter Wintercress | GNR | | | | | SE5 | | 0 | 0 | I | 7 |
| 73 | *Thlaspi arvense* | Field Penny-cress | GNR | | | | | SE5 | | 0 | 5 | I | 21 |
| **Campanulaceae** | | **Bellflower Family** | | | | | | | | | | | |
| 74 | *Lobelia siphilitica* | Great Blue Lobelia | G5 | | | | | S5 | | 6 | -3 | N | 3 |
| **Caprifoliaceae** | | **Honeysuckle Family** | | | | | | | | | | | |
| 75 | *Lonicera tatarica* | Tatarian Honeysuckle | GNR | | | | | SE5 | | 0 | 3 | I | 3 |
| 76 | *Sambucus canadensis* | Common Elderberry | G5T5 | | | | | S5 | | 5 | -3 | N | 21 |
| 77 | *Triosteum aurantiacum* | Orange-fruited Horse-gentian | G5 | | | | | S4S5 | | 7 | 5 | N | 21 |
| 78 | *Viburnum opulus* | Cranberry Viburnum | G5 | | | | | S5 | | 5 | -3 | I | 1,2,4,21,22,24,28,32 |
| **Caryophyllaceae** | | **Pink Family** | | | | | | | | | | | |
| 79 | *Silene latifolia* | White Campion | G5T5 | | | | | SE5 | | 0 | 5 | I | 7 |
| **Clusiaceae** | | **St. John's-wort Family** | | | | | | | | | | | |
| 80 | *Hypericum perforatum* | Common St. John's-wort | GNR | | | | | SE5 | | 0 | 5 | I | 21 |
| **Cornaceae** | | **Dogwood Family** | | | | | | | | | | | |
| 81 | *Cornus alternifolia* | Alternate-leaved Dogwood | G5 | | | | | S5 | | 6 | 3 | N | 5,7,10,24,28,32, |
| 82 | *Cornus canadensis* | Bunchberry | G5 | | | | | S5 | | 7 | 0 | N | 27 |
| 83 | *Cornus racemosa* | Gray Dogwood | G5 | | | | | S5 | | 2 | 0 | N | 19,21,29,31 |
| 84 | *Cornus sericea* | Red-osier Dogwood | G5 | | | | | S5 | | 2 | -3 | N | 1,2,3,8,12,17,18,19,21,22,23,29,31,33,37 |
| **Cucurbitaceae** | | **Gourd Family** | | | | | | | | | | | |
| 85 | *Echinocystis lobata* | Wild Mock-cucumber | G5 | | | | | S5 | | 3 | -3 | N | 32 |
| **Dipsacaceae** | | **Teasel Family** | | | | | | | | | | | |
| 86 | *Dipsacus fullonum* | Common Teasel | GNR | | | | | SE5 | | 0 | 3 | I | 10,21,34 |
| **Fabaceae** | | **Pea Family** | | | | | | | | | | | |
| 87 | *Lotus corniculatus* | Garden Bird's-foot Trefoil | GNR | | | | | SE5 | | 0 | 3 | I | 13,17,23,28,36 |
| 88 | *Medicago lupulina* | Black Medic | GNR | | | | | SE5 | | 0 | 3 | I | 26 |
| 89 | *Medicago sativa* | Alfalfa | GNR | | | | | SE5 | | 0 | 5 | I | 13,36 |
| 90 | *Melilotus albus* | White Sweet-clover | G5 | | | | | SE5 | | 0 | 3 | I | 13,28,34,36 |
| 91 | *Melilotus officinalis* | Yellow Sweet-clover | GNR | | | | | SE5 | | 0 | 3 | I | 18 |

| | | | Conservation Status | | | | | | | CC | CW | NativeStatus | Location (ELC polygons) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Global | Federal | | | Provincial | | Local | | | | |
| | Scientific Name | Common Name | G Rank | COSEWIC | SARA | SARA Schedule | SARO | SRANK | Waterloo Region | | | | |
| 92 | *Robinia pseudoacacia* | Black Locust | G5 | | | | | SE5 | | 0 | 3 | I | 7,10 |
| 93 | *Vicia cracca* | Tufted Vetch | GNR | | | | | SE5 | | 0 | 5 | I | 13,17,23,36 |
| **Fagaceae** | | **Beech Family** | | | | | | | | | | | |
| 94 | *Fagus grandifolia* | American Beech | G5 | | | | | S4 | | 6 | 3 | N | 24,33 |
| 95 | *Quercus rubra* | Northern Red Oak | G5 | | | | | S5 | | 6 | 3 | N | 34,42 |
| **Geraniaceae** | | **Geranium Family** | | | | | | | | | | | |
| 96 | *Geranium maculatum* | Spotted Geranium | G5 | | | | | S5 | | 6 | 3 | N | 21 |
| 97 | *Geranium robertianum* | Herb-Robert | G5 | | | | | S5 | | 2 | 3 | I | 10,21,24,32 |
| **Grossulariaceae** | | **Currant Family** | | | | | | | | | | | |
| 98 | *Ribes americanum* | Wild Black Currant | G5 | | | | | S5 | | 4 | -3 | N | 1,4,7,8,17,21,22, |
| 99 | *Ribes cynosbati* | Prickly Gooseberry | G5 | | | | | S5 | | 4 | 3 | N | 33 |
| 100 | *Ribes triste* | Swamp Red Currant | G5 | | | | | S5 | | 6 | -5 | N | 17 |
| **Hippocastanaceae** | | **Buckeye Family** | | | | | | | | | | | |
| 101 | *Aesculus glabra* | Ohio Buckeye | G5 | | | | | S1 | | 10 | 0 | N | 6 |
| **Juglandaceae** | | **Walnut Family** | | | | | | | | | | | |
| 102 | *Juglans cinerea* | Butternut | G4 | E | E | Schedule 1 | END | S2? | | 6 | 3 | N | 7,10 |
| 103 | *Juglans nigra* | Black Walnut | G5 | | | | | S4? | R+* | 5 | 3 | N | 7, 27,34,42 |
| **Lamiaceae** | | **Mint Family** | | | | | | | | | | | |
| 104 | *Ajuga reptans* | Creeping Bugleweed | GNR | | | | | SE2 | | 0 | 5 | I | 27 |
| 105 | *Glechoma hederacea* | Ground Ivy | GNR | | | | | SE5 | | 0 | 3 | I | 7 |
| 106 | *Lycopus americanus* | American Water-horehound | G5 | | | | | S5 | | 4 | -5 | N | 12 |
| 107 | *Lycopus uniflorus* | Northern Water-horehound | G5 | | | | | S5 | | 5 | -5 | N | 2,31 |
| 108 | *Prunella vulgaris* | Self-heal | G5 | | | | | S5 | | 0 | 0 | N | 17,27,29,32 |
| 109 | *Scutellaria galericulata* | Hooded Skullcap | G5 | | | | | S5 | | 6 | -5 | N | 12,19,23,31 |
| 110 | *Scutellaria lateriflora* | Mad Dog Skullcap | G5 | | | | | S5 | | 5 | -5 | N | 27 |
| **Magnoliaceae** | | **Magnolia Family** | | | | | | | | | | | |
| 111 | *Liriodendron tulipifera* | Tulip Tree | G5 | | | | | S4 | | 8 | 3 | N | 42 |
| **Oleaceae** | | **Olive Family** | | | | | | | | | | | |
| 112 | *Fraxinus nigra* | Black Ash | G5 | T | NS | No schedule | END | S4 | | 7 | -3 | N | 21,27,29 |
| 113 | *Fraxinus pennsylvanica* | Green Ash | G5 | | | | | S4 | | 3 | -3 | N | 2,4,5,7,10,17,21,28,32,33,34,42 |
| 114 | *Syringa vulgaris* | Common Lilac | GNR | | | | | SE5 | | 0 | 5 | I | 7,42 |
| **Onagraceae** | | **Evening-primrose Family** | | | | | | | | | | | |
| 115 | *Epilobium ciliatum ssp. glandulosum* | Glandular Willowherb | G5T5 | | | | | SU | | 3 | -3 | I | 23,31 |
| **Papaveraceae** | | **Poppy Family** | | | | | | | | | | | |
| 116 | *Chelidonium majus* | Greater Celandine | G5 | | | | | SE5 | | 0 | 5 | I | 7 |
| 117 | *Sanguinaria canadensis* | Bloodroot | G5 | | | | | S5 | | 5 | 3 | N | 7 |
| **Plantaginaceae** | | **Plantain Family** | | | | | | | | | | | |
| 118 | *Plantago lanceolata* | English Plantain | G5 | | | | | SE5 | | 0 | 3 | I | 13,36 |
| 119 | *Plantago major* | Common Plantain | G5 | | | | | SE5 | | 0 | 3 | N | 13,26,36 |
| **Polygalaceae** | | **Milkwort Family** | | | | | | | | | | | |
| 120 | *Polygaloides paucifolia* | Gay-wing Milkwort | G5 | | | | | S5 | | 6 | 3 | N | 33 |
| **Polygonaceae** | | **Smartweed Family** | | | | | | | | | | | |
| 121 | *Persicaria amphibia* | Water Smartweed | G5 | | | | | S5 | | 5 | -5 | N | 31 |

| | Scientific Name | Common Name | Conservation Status | | | | | | | CC | CW | NativeStatus | Location (ELC polygons) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Global | Federal | | | Provincial | | Local | | | | |
| | | | G Rank | COSEWIC | SARA | SARA Schedule | SARO | SRANK | Waterloo Region | | | | |
| 122 | *Rumex crispus* | Curly Dock | GNR | | | | | SE5 | | 0 | 0 | I | 14,18,22,23,29 |
| **Primulaceae** | | **Primrose Family** | | | | | | | | | | | |
| 123 | *Lysimachia borealis* | Northern Starflower | G5 | | | | | S5 | | 6 | 0 | N | 19,27 |
| 124 | *Lysimachia ciliata* | Fringed Loosestrife | G5 | | | | | S5 | | 4 | -3 | N | 1,4,29 |
| **Pyrolaceae** | | **Wintergreen Family** | | | | | | | | | | | |
| 125 | *Pyrola elliptica* | Shinleaf | G5 | | | | | S5 | | 5 | 5 | N | 19,33 |
| **Ranunculaceae** | | **Buttercup Family** | | | | | | | | | | | |
| 126 | *Actaea pachypoda* | White Baneberry | G5 | | | | | S5 | | 6 | 5 | N | 24 |
| 127 | *Actaea rubra* | Red Baneberry | G5 | | | | | S5 | | 6 | 3 | N | 27 |
| 128 | *Anemonastrum canadense* | Canada Anemone | G5 | | | | | S5 | | 3 | -3 | N | 10 |
| 129 | *Caltha palustris* | Yellow Marsh Marigold | G5 | | | | | S5 | | 5 | -5 | N | 1,3,8,19,27 |
| 130 | *Coptis trifolia* | Goldthread | G5 | | | | | S5 | | 7 | -3 | N | 19,27, |
| 131 | *Ranunculus abortivus* | Kidney-leaved Buttercup | G5 | | | | | S5 | | 2 | 0 | N | 27 |
| 132 | *Ranunculus acris* | Tall Buttercup | G5 | | | | | SE5 | | 0 | 0 | I | 13,36 |
| 133 | *Ranunculus bulbosus* | Bulbous Buttercup | GNR | | | | | SE3 | | 0 | -3 | I | 3 |
| **Rhamnaceae** | | **Buckthorn Family** | | | | | | | | | | | |
| 134 | *Frangula alnus* | Glossy Buckthorn | GNR | | | | | SE5 | | 0 | 0 | I | 19 |
| 135 | *Rhamnus cathartica* | Common Buckthorn | GNR | | | | | SE5 | | 0 | 0 | I | 1,3,4,7,8,10,17,21,23,24,28,32,33,34,42 |
| **Rosaceae** | | **Rose Family** | | | | | | | | | | | |
| 136 | *Agrimonia gryposepala* | Hooked Agrimony | G5 | | | | | S5 | | 2 | 3 | N | 4,10,33 |
| 137 | *Fragaria virginiana* | Wild Strawberry | G5 | | | | | S5 | | 2 | 3 | N | 4,5,17,21,22,24,26,32,33,34 |
| 138 | *Geum aleppicum* | Yellow Avens | G5 | | | | | S5 | | 2 | 0 | N | 10,17 |
| 139 | *Geum canadense* | White Avens | G5 | | | | | S5 | | 3 | 0 | N | 4,10,34 |
| 140 | *Geum urbanum* | Wood Avens | G5 | | | | | SE3 | | 0 | 5 | I | 21,34 |
| 141 | *Prunus serotina* | Black Cherry | G5 | | | | | S5 | | 3 | 3 | N | 5,6,7,10,21,24,32,33 |
| 142 | *Prunus virginiana* | Choke Cherry | G5 | | | | | S5 | | 2 | 3 | N | 4,5,7,21,24,27,32,34 |
| 143 | *Rosa multiflora* | Multiflora Rose | GNR | | | | | SE5 | | 0 | 3 | I | 22 |
| 144 | *Rubus allegheniensis* | Allegheny Blackberry | G5 | | | | | S5 | | 2 | 3 | N | 21,24,26,32 |
| 145 | *Rubus idaeus ssp. strigosus* | Wild Red Raspberry | G5T5 | | | | | S5 | | 2 | 3 | N | 3,7,10,21,23,32 |
| 146 | *Rubus pubescens* | Dewberry | G5 | | | | | S5 | | 4 | -3 | N | 1,2,4,19,21,27 |
| 147 | *Spiraea alba* | White Meadowsweet | G5 | | | | | S5 | | 3 | -3 | N | 1,19,23,31,37 |
| **Rubiaceae** | | **Madder Family** | | | | | | | | | | | |
| 148 | *Galium odoratum* | Sweet Bedstraw | GNR | | | | | SE1 | | 0 | 5 | I | 8 |
| 149 | *Mitchella repens* | Partridge-berry | G5 | | | | | S5 | | 6 | 3 | N | 27 |
| **Salicaceae** | | **Willow Family** | | | | | | | | | | | |
| 150 | *Populus balsamifera* | Balsam Poplar | G5 | | | | | S5 | | 4 | -3 | N | 3,4,17,29,31,32,37 |
| 151 | *Populus deltoides* | Eastern Cottonwood | G5 | | | | | S5 | R+ | 4 | 0 | N | 3,4,5,8,42 |
| 152 | *Populus tremuloides* | Trembling Aspen | G5 | | | | | S5 | | 2 | 0 | N | 2,3,4,5,6,17,19,21,23,24,26,27,28,32,33 |
| 153 | *Salix amygdaloides* | Peach-leaved Willow | G5 | | | | | S5 | | 6 | -3 | N | 17 |
| 154 | *Salix bebbiana* | Bebb's Willow | G5 | | | | | S5 | | 4 | -3 | N | 12,17,31 |
| 155 | *Salix discolor* | Pussy Willow | G5 | | | | | S5 | | 3 | -3 | N | 1 |
| 156 | *Salix eriocephala* | Heart-leaved Willow | G5 | | | | | S5 | | 4 | -3 | N | 12,19,22 |

| | Scientific Name | Common Name | Conservation Status | | | | | | | CC | CW | NativeStatus | Location (ELC polygons) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Global | Federal | | | Provincial | | Local | | | | |
| | | | G Rank | COSEWIC | SARA | SARA Schedule | SARO | SRANK | Waterloo Region | | | | |
| 157 | *Salix interior* | Sandbar Willow | G5 | | | | | S5 | | 1 | -3 | N | 31 |
| 158 | *Salix nigra* | Black Willow | G5 | | | | | S4 | | 6 | -5 | N | 31 |
| 159 | *Salix petiolaris* | Meadow Willow | G5 | | | | | S5 | | 3 | -3 | N | 12,31 |
| **Saxifragaceae** | | **Saxifrage Family** | | | | | | | | | | | |
| 160 | *Mitella nuda* | Naked Mitrewort | G5 | | | | | S5 | | 6 | -3 | N | 19,27,33 |
| **Scrophulariaceae** | | **Figwort Family** | | | | | | | | | | | |
| 161 | *Chelone glabra* | White Turtlehead | G5 | | | | | S5 | | 7 | -5 | N | 23 |
| 162 | *Verbascum thapsus* | Common Mullein | GNR | | | | | SE5 | | 0 | 5 | I | 23 |
| 163 | *Veronica officinalis* | Common Speedwell | G5 | | | | | SE5 | | 0 | 5 | N | 12 |
| **Solanaceae** | | **Nightshade Family** | | | | | | | | | | | |
| 164 | *Physalis heterophylla* | Clammy Ground-cherry | G5 | | | | | S4 | | 3 | 5 | N | 7 |
| 165 | *Solanum dulcamara* | Bittersweet Nightshade | GNR | | | | | SE5 | | 0 | 0 | I | 1,3,10,19,21,23,25,27,29,31,32 |
| **Tiliaceae** | | **Linden Family** | | | | | | | | | | | |
| 166 | *Tilia americana* | American Basswood | G5 | | | | | S5 | | 4 | 3 | N | 7,10,21,23,24,34 |
| 167 | *Tilia cordata* | Little-leaf Linden | GNR | | | | | SE1 | | 0 | 5 | I | 6 |
| **Ulmaceae** | | **Elm Family** | | | | | | | | | | | |
| 168 | *Ulmus americana* | American Elm | G5 | | | | | S5 | | 3 | -3 | N | 6 |
| 169 | *Ulmus pumila* | Siberian Elm | GNR | | | | | SE3 | | 0 | 3 | I | 17 |
| **Urticaceae** | | **Nettle Family** | | | | | | | | | | | |
| 170 | *Boehmeria cylindrica* | False Nettle | G5 | | | | | S5 | | 4 | -5 | N | 27 |
| 171 | *Laportea canadensis* | Wood Nettle | G5 | | | | | S5 | | 6 | -3 | N | 25 |
| 172 | *Pilea pumila* | Dwarf Clearweed | G5 | | | | | S5 | | 5 | -3 | N | 31 |
| 173 | *Urtica dioica* | Stinging Nettle | G5 | | | | | S5 | | 2 | 0 | N | 1,3,23,27,31 |
| **Verbenaceae** | | **Vervain Family** | | | | | | | | | | | |
| 174 | *Verbena hastata* | Blue Vervain | G5 | | | | | S5 | | 4 | -3 | N | 12 |
| **Violaceae** | | **Violet Family** | | | | | | | | | | | |
| 175 | *Viola cucullata* | Marsh Blue Violet | G4G5 | | | | | S5 | | 5 | -5 | N | 5,6 |
| 176 | *Viola nephrophylla* | Northern Bog Violet | G5 | | | | | S5 | R | 7 | -3 | N | 1,3 |
| 177 | *Viola sororia* | Woolly Blue Violet | G5 | | | | | S5 | | 4 | 0 | N | 5,6 |
| **Vitaceae** | | **Grape Family** | | | | | | | | | | | |
| 178 | *Parthenocissus quinquefolia* | Virginia Creeper | G5 | | | | | S4? | R+ | 6 | 3 | N | 3,19 |
| 179 | *Parthenocissus vitacea* | Thicket Creeper | G5 | | | | | S5 | | 4 | 3 | N | 1,8,24,27,28,32,34 |
| 180 | *Vitis riparia* | Riverbank Grape | G5 | | | | | S5 | | 0 | 0 | N | 17,21,23,24,28,32 |
| **Alismataceae** | | **Water-plantain Family** | | | | | | | | | | | |
| 181 | *Sagittaria latifolia* | Broad-leaved Arrowhead | G5 | | | | | S5 | | 4 | -5 | N | 12,18,19,30,31 |
| **Araceae** | | **Arum Family** | | | | | | | | | | | |
| 182 | *Arisaema triphyllum* | Jack-in-the-pulpit | G5 | | | | | S5 | | 5 | -3 | N | 7,19,24,27,32 |
| **Cyperaceae** | | **Sedge Family** | | | | | | | | | | | |
| 183 | *Carex aquatilis* | Water Sedge | G5 | | | | | S5 | | 7 | -5 | N | 29 |
| 184 | *Carex arctata* | Drooping Woodland Sedge | G5 | | | | | S5 | | 5 | 5 | N | 33 |
| 185 | *Carex aurea* | Golden Sedge | G5 | | | | | S5 | | 4 | -3 | N | 12,32 |
| 186 | *Carex comosa* | Bristly Sedge | G5 | | | | | S5 | | 5 | -5 | N | 25 |

| | Scientific Name | Common Name | Conservation Status | | | | | | | CC | CW | NativeStatus | Location (ELC polygons) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Global | Federal | | | Provincial | | Local | | | | |
| | | | G Rank | COSEWIC | SARA | SARA Schedule | SARO | SRANK | Waterloo Region | | | | |
| 187 | *Carex gracilescens* | Slender Loose-flowered Sedge | G5 | | | | | S4 | | 7 | 5 | N | 12 |
| 188 | *Carex gracillima* | Graceful Sedge | G5 | | | | | S5 | | 4 | 3 | N | 4,5,10,27,32,33 |
| 189 | *Carex hystericina* | Porcupine Sedge | G5 | | | | | S5 | | 5 | -5 | N | 12,15,18 |
| 190 | *Carex intumescens* | Bladder Sedge | G5 | | | | | S5 | | 6 | -3 | N | 27,29 |
| 191 | *Carex lacustris* | Lake Sedge | G5 | | | | | S5 | | 5 | -5 | N | 3 |
| 192 | *Carex lupulina* | Hop Sedge | G5 | | | | | S5 | | 6 | -5 | N | 1 |
| 193 | *Carex pensylvanica* | Pennsylvania Sedge | G5 | | | | | S5 | | 5 | 5 | N | 33 |
| 194 | *Carex pseudocyperus* | Cyperus-like Sedge | G5 | | | | | S5 | | 6 | -5 | N | 18,27,29 |
| 195 | *Carex radiata* | Eastern Star Sedge | G4 | | | | | S5 | | 4 | 0 | N | 19 |
| 196 | *Carex retrorsa* | Retrorse Sedge | G5 | | | | | S5 | | 5 | -5 | N | 31 |
| 197 | *Carex scabrata* | Eastern Rough Sedge | G5 | | | | | S5 | R | 8 | -5 | N | 27 |
| 198 | *Carex stipata* | Awl-fruited Sedge | G5 | | | | | S5 | | 3 | -5 | N | 14,15,27,29,31 |
| 199 | *Carex stricta* | Tussock Sedge | G5 | | | | | S5 | | 4 | -5 | N | 3,4,8 |
| 200 | *Carex vulpinoidea* | Fox Sedge | G5 | | | | | S5 | | 3 | -5 | N | 12,14,18 |
| 201 | *Schoenoplectus tabernaemontani* | Soft-stemmed Bulrush | G5 | | | | | S5 | | 5 | -5 | N | 12,14,18,31 |
| 202 | *Scirpus atrovirens* | Dark-green Bulrush | G5 | | | | | S5 | | 3 | -5 | N | 1,12,14,15,18,22,23,29 |
| 203 | *Scirpus cyperinus* | Cottongrass Bulrush | G5 | | | | | S5 | | 4 | -5 | N | 31 |
| **Juncaceae** | | **Rush Family** | | | | | | | | | | | |
| 204 | *Juncus canadensis* | Canada Rush | G5 | | | | | S5 | R | 6 | -5 | N | 12,18 |
| 205 | *Juncus effusus ssp. solutus* | Soft Rush | G5T5 | | | | | S5? | | 4 | -5 | N | 12,14,15,31 |
| 206 | *Juncus tenuis* | Path Rush | G5 | | | | | S5 | | 0 | 0 | N | 15 |
| **Lemnaceae** | | **Duckweed Family** | | | | | | | | | | | |
| 207 | *Lemna minor* | Lesser Duckweed | G5 | | | | | S5 | | 5 | -5 | N | 19,30 |
| **Liliaceae** | | **Lily Family** | | | | | | | | | | | |
| 208 | *Asparagus officinalis* | Garden Asparagus | G5 | | | | | SE5 | | 0 | 3 | I | 7 |
| 209 | *Clintonia borealis* | Blue Bead-lily | G5 | | | | | S5 | | 7 | 0 | N | 27. |
| 210 | *Convallaria majalis* | European Lily-of-the-valley | G5 | | | | | SE5 | | 0 | 5 | I | 4. |
| 211 | *Erythronium americanum* | Yellow Trout-lily | G5 | | | | | S5 | | 5 | 5 | N | 7 |
| 212 | *Hemerocallis fulva* | Orange Daylily | GNA | | | | | SE5 | | 0 | 5 | I | 7,23,28 |
| 213 | *Maianthemum canadense* | Wild Lily-of-the-valley | G5 | | | | | S5 | | 5 | 3 | N | 19,24,27,32,33 |
| 214 | *Maianthemum racemosum* | Large False Solomon's Seal | G5 | | | | | S5 | | 4 | 3 | N | 24,27,32,33 |
| 215 | *Maianthemum stellatum* | Star-flowered False Solomon's Seal | G5 | | | | | S5 | | 6 | 0 | N | 8 |
| 216 | *Polygonatum biflorum* | Giant Solomon's Seal | G5 | | | | | S4 | | 8 | 3 | N | 7 |
| 217 | *Trillium erectum* | Red Trillium | G5 | | | | | S5 | | 6 | 3 | N | 5,7 |
| 218 | *Trillium grandiflorum* | White Trillium | G5 | | | | | S5 | | 5 | 3 | N | 7 |
| **Orchidaceae** | | **Orchid Family** | | | | | | | | | | | |
| 219 | *Epipactis helleborine* | Eastern Helleborine | GNR | | | | | SE5 | | 0 | 3 | I | 24,33, |
| **Poaceae** | | **Grass Family** | | | | | | | | | | | |
| 220 | *Agrostis gigantea* | Redtop | G4G5 | | | | | SE5 | | 0 | -3 | I | 14,15 |
| 221 | *Agrostis stolonifera* | Creeping Bentgrass | G5 | | | | | SE5 | | 0 | -3 | N | 31 |
| 222 | *Bromus inermis* | Smooth Brome | GNR | | | | | SE5 | | 0 | 5 | I | 13,17,23,26,28,34,36 |

| | Scientific Name | Common Name | Conservation Status | | | | | | | CC | CW | NativeStatus | Location (ELC polygons) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Global | Federal | | | Provincial | | Local | | | | |
| | | | G Rank | COSEWIC | SARA | SARA Schedule | SARO | SRANK | Waterloo Region | | | | |
| 223 | *Calamagrostis canadensis* | Bluejoint Reedgrass | G5 | | | | | S5 | X | 4 | -5 | N | 31 |
| 224 | *Cinna latifolia* | Drooping Woodreed | G5 | | | | | S5 | | 7 | -3 | N | 31 |
| 225 | *Dactylis glomerata* | Orchard Grass | GNR | | | | | SE5 | | 0 | 3 | I | 13,17,34,36 |
| 226 | *Elymus repens* | Creeping Wildrye | GNR | | | | | SE5 | | 0 | 3 | I | 22,23 |
| 227 | *Elymus virginicus* | Virginia Wildrye | G5 | | | | | S5 | | 5 | -3 | N | 1 |
| 228 | *Glyceria grandis* | Tall Mannagrass | G5 | | | | | S5 | | 5 | -5 | N | 14,29,31 |
| 229 | *Glyceria striata* | Fowl Mannagrass | G5 | | | | | S5 | | 3 | -5 | N | 1,25,27,29 |
| 230 | *Leersia oryzoides* | Rice Cutgrass | G5 | | | | | S5 | | 3 | -5 | N | 15,19,30,31 |
| 231 | *Muhlenbergia frondosa* | Wirestem Muhly | G5 | | | | | S4 | R* | 5 | -3 | N | 32 |
| 232 | *Phalaris arundinacea* | Reed Canary Grass | G5 | | | | | S5 | | 0 | -3 | N | 1,14,17,18,21,22,23,29,30,31 |
| 233 | *Phleum pratense* | Common Timothy | GNR | | | | | SE5 | | 0 | 3 | I | 13,17,23,34,36 |
| 234 | *Phragmites australis* | Common Reed | G5 | | | | | SU | | 0 | -3 | N | 12,15,22 |
| 235 | *Poa compressa* | Canada Bluegrass | GNR | | | | | SE5 | | 0 | 3 | I | 34 |
| 236 | *Poa pratensis* | Kentucky Bluegrass | G5 | | | | | S5 | | 0 | 3 | N | 6,10,14,16,32,34 |
| **Typhaceae** | | **Cattail Family** | | | | | | | | | | | |
| 237 | *Typha angustifolia* | Narrow-leaved Cattail | G5 | | | | | SE5 | | 0 | -5 | I | 12,15,17,18,19,22,31 |
| 238 | *Typha latifolia* | Broad-leaved Cattail | G5 | | | | | S5 | | 1 | -5 | N | 14,15,19,23,29,31 |
| **Total** | | | | | | | | | | | | | **238** |

*NHIC Atlas Squares: 17NJ31

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Appendix VII
Wildlife Species Reported from the Study Area

**Bird Species Reported from the Study Area - Degroot Lands (720 Erbsville Road) EIS (Project #2520)**

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | Region of Waterloo Status | Erbsville South Environmental Study | OBBA* | NHIC Data** | NRSI Observed: Highest Level of Breeding Evidence | BMB-001 | BMB-002 | BMB-003 | BMB-004 | Other Observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MNRF 2023a | MECP 2023 | Government of Canada 2023 | | | Martin 1996 | Dougan and Associates 2018 | BSC et al. 2006 | MNRF 2023b | NRSI Results from 2023 | | | | | |
| **Anatidae** | **Ducks, Geese & Swans** | | | | | | | | | | | | | | | |
| *Aix sponsa* | Wood Duck | S5B,S3N | | | | | √* | PO | CO | | | | | | | |
| *Anas platyrhynchos* | Mallard | S5 | | | | | | PR | CO | | | | | | | |
| *Branta canadensis* | Canada Goose | S5 | | | | | | CO | CO | | | | | | | |
| *Lophodytes cucullatus* | Hooded Merganser | S5 | | | | | √ | PO | | | | | | | | |
| **Phasianidae** | **Partridges, Grouse & Turkeys** | | | | | | | | | | | | | | | |
| *Bonasa umbellus* | Ruffed Grouse | S5 | | | | | | | CO | | | | | | | |
| *Meleagris gallopavo* | Wild Turkey | S5 | | | | | | PO | CO | | **PO** | | | | | PO |
| *Phasianus colchicus* | Ring-necked Pheasant | SNA | | | | | | | CO | | | | | | | |
| **Podicipediformes** | **Grebes** | | | | | | | | | | | | | | | |
| *Podilymbus podiceps* | Pied-billed Grebe | S4B,S2N | | | | | √ | | PR | | | | | | | |
| **Columbidae** | **Pigeons & Doves** | | | | | | | | | | | | | | | |
| *Columba livia* | Rock Pigeon | SNA | | | | | | | CO | | | | | | | |
| *Zenaida macroura* | Mourning Dove | S5 | | | | | | PO | CO | | | | | | | |
| **Cuculiformes** | **Cuckoos & Anis** | | | | | | | | | | | | | | | |
| *Coccyzus americanus* | Yellow-billed Cuckoo | S4B | | | | | √ | | PR | | | | | | | |
| *Coccyzus erythropthalmus* | Black-billed Cuckoo | S4S5B | | | | | √ | PO | CO | | | | | | | |
| **Caprimulgidae** | **Goatsuckers** | | | | | | | | | | | | | | | |
| *Chordeiles minor* | Common Nighthawk | S4B | SC | SC | SC | Schedule 1 | √* | | PR | | | | | | | |
| **Apodidae** | **Swifts** | | | | | | | | | | | | | | | |
| *Chaetura pelagica* | Chimney Swift | S3B | THR | T | T | Schedule 1 | | | PR | | | | | | | |
| **Trochilidae** | **Hummingbirds** | | | | | | | | | | | | | | | |
| *Archilochus colubris* | Ruby-throated Hummingbird | S5B | | | | | √ | | PR | | **PO** | | | | PO | |
| **Rallidae** | **Rails, Gallinules & Coots** | | | | | | | | | | | | | | | |
| *Porzana carolina* | Sora | S5B | | | | | √ | | PO | | | | | | | |
| *Rallus limicola* | Virginia Rail | S4S5B | | | | | √ | | PR | | | | | | | |
| **Charadriidae** | **Plovers & Lapwings** | | | | | | | | | | | | | | | |
| *Charadrius vociferus* | Killdeer | S4B | | | | | | PO | CO | | | | | | | |
| **Scolopacidae** | **Sandpipers & Allies** | | | | | | | | | | | | | | | |
| *Actitis macularia* | Spotted Sandpiper | S5B | | | | | | PR | PR | | | | | | | |
| *Scolopax minor* | American Woodcock | S4B | | | | | | | PR | | | | | | | |
| **Ardeidae** | **Herons & Bitterns** | | | | | | | | | | | | | | | |
| *Ardea alba* | Great Egret | S2B,S3M | | | | | √ | OB | | | | | | | | |
| *Ardea herodias* | Great Blue Heron | S4 | | | | | √ | OB | PO | | | | | | | |
| *Botaurus lentiginosus* | American Bittern | S5B | | | | | √ | OB | | | | | | | | |
| *Butorides virescens* | Green Heron | S4B | | | | | √ | OB | PR | | | | | | | |
| *Ixobrychus exilis* | Least Bittern | S4B | THR | T | T | Schedule 1 | √ | | | X | | | | | | |
| **Cathartidae** | **Vultures** | | | | | | | | | | | | | | | |
| *Cathartes aura* | Turkey Vulture | S5B,S3N | | | | | √ | OB | PO | | | | | | | |

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | Region of Waterloo Status | Erbsville South Environmental Study | OBBA* | NHIC Data** | NRSI Observed: Highest Level of Breeding Evidence | BMB-001 | BMB-002 | BMB-003 | BMB-004 | Other Observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Pandionidae** | **Osprey** | | | | | | | | | | | | | | | |
| *Pandion haliaetus* | Osprey | S5B | | | | | √ | OB | CO | | | | | | | |
| **Accipitridae** | **Hawks, Kites, Eagles & Allies** | | | | | | | | | | | | | | | |
| *Accipiter cooperii* | Cooper's Hawk | S4 | NAR | NAR | NS | No schedule | √ | | CO | | | | | | | |
| *Accipiter striatus* | Sharp-shinned Hawk | S5 | NAR | NAR | NS | No schedule | √ | PO | PO | | | | | | | |
| *Buteo jamaicensis* | Red-tailed Hawk | S5 | NAR | NAR | NS | No schedule | | PO | CO | | | | | | | |
| *Buteo lineatus* | Red-shouldered Hawk | S4B,S2N | NAR | NAR | SC | Schedule 3 | √ | OB | | | | | | | | |
| *Circus hudsonius* | Northern Harrier | S5B,S4N | NAR | NAR | NS | No schedule | √ | | PO | | | | | | | |
| *Haliaeetus leucocephalus* | Bald Eagle | S4 | SC | NAR | NS | No schedule | √ | OB | | X | | | | | | |
| **Strigidae** | **Typical Owls** | | | | | | | | | | | | | | | |
| *Bubo virginianus* | Great Horned Owl | S4 | | | | | | PO | CO | | | | | | | |
| *Megascops asio* | Eastern Screech-Owl | S4 | NAR | NAR | NS | No schedule | | | CO | | | | | | | |
| **Alcedinidae** | **Kingfishers** | | | | | | | | | | | | | | | |
| *Megaceryle alcyon* | Belted Kingfisher | S5B,S4N | | | | | √ | | PR | | **PO** | | | | | PO |
| **Picidae** | **Woodpeckers** | | | | | | | | | | | | | | | |
| *Colaptes auratus* | Northern Flicker | S5 | | | | | | PO | CO | | **PO** | | | | PO | |
| *Dryobates pubescens* | Downy Woodpecker | S5 | | | | | | PR | CO | | **PO** | | | PO | | |
| *Dryobates villosus* | Hairy Woodpecker | S5 | | | | | | | CO | | | | | | | |
| *Dryocopus pileatus* | Pileated Woodpecker | S5 | | | | | √ | PO | CO | | | | | | | |
| *Melanerpes carolinus* | Red-bellied Woodpecker | S5 | | | | | √ | PR | PR | | | | | | | |
| *Melanerpes erythrocephalus* | Red-headed Woodpecker | S3 | END | E | E | Schedule 1 | √ | OB | CO | X | | | | | | |
| **Falconidae** | **Caracaras & Falcons** | | | | | | | | | | | | | | | |
| *Falco peregrinus* | Peregrine Falcon | S4 | SC | NAR | NS | No schedule | √ | | PR | | | | | | | |
| *Falco sparverius* | American Kestrel | S4 | | | | | | | CO | | | | | | | |
| **Tyrannidae** | **Tyrant Flycatchers** | | | | | | | | | | | | | | | |
| *Contopus virens* | Eastern Wood-Pewee | S4B | SC | SC | SC | Schedule 1 | | PR | PR | X | **PO** | | | PO | | |
| *Empidonax alnorum* | Alder Flycatcher | S5B | | | | | √ | PR | PR | | | | | | | |
| *Empidonax traillii* | Willow Flycatcher | S4B | | | | | | | PR | | | | | | | |
| *Empidonax virescens* | Acadian Flycatcher | S1B | END | E | E | Schedule 1 | √ | | PO | | | | | | | |
| *Myiarchus crinitus* | Great Crested Flycatcher | S5B | | | | | | PR | PR | | **PO** | | PO | PO | | PO |
| *Sayornis phoebe* | Eastern Phoebe | S5B | | | | | | | CO | | | | | | | |
| *Tyrannus tyrannus* | Eastern Kingbird | S4B | | | | | | PR | PR | | **PO** | | PO | | | |
| **Vireonidae** | **Vireos** | | | | | | | | | | | | | | | |
| *Vireo gilvus* | Warbling Vireo | S5B | | | | | | PO | PR | | | | | | | |
| *Vireo olivaceus* | Red-eyed Vireo | S5B | | | | | | PR | CO | | **PO** | | PO | | | |
| **Corvidae** | **Crows & Jays** | | | | | | | | | | | | | | | |
| *Corvus brachyrhynchos* | American Crow | S5 | | | | | | PO | CO | | **PO** | | PO | | PO | PO |
| *Cyanocitta cristata* | Blue Jay | S5 | | | | | | PR | CO | | **PR** | PO | PR | PR | | |
| **Alaudidae** | **Larks** | | | | | | | | | | | | | | | |
| *Eremophila alpestris* | Horned Lark | S4 | | | | | | PO | PR | | | | | | | |
| **Hirundinidae** | **Swallows** | | | | | | | | | | | | | | | |
| *Hirundo rustica* | Barn Swallow | S4B | SC | SC | T | Schedule 1 | | PR | CO | X | **PO** | | PO | | | |

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | Region of Waterloo Status | Erbsville South Environmental Study | OBBA* | NHIC Data** | NRSI Observed: Highest Level of Breeding Evidence | BMB-001 | BMB-002 | BMB-003 | BMB-004 | Other Observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Petrochelidon pyrrhonota* | Cliff Swallow | S4S5B | | | | | √* | | CO | | | | | | | |
| *Progne subis* | Purple Martin | S3B | | | | | √* | | CO | | | | | | | |
| *Stelgidopteryx serripennis* | Northern Rough-winged Swallow | S4B | | | | | | | PO | | | | | | | |
| *Tachycineta bicolor* | Tree Swallow | S4S5B | | | | | | PR | CO | | | | | | | |
| **Paridae** | **Chickadees & Titmice** | | | | | | | | | | | | | | | |
| *Poecile atricapillus* | Black-capped Chickadee | S5 | | | | | | PO | CO | | **PO** | PO | PO | | PO | PO |
| **Sittidae** | **Nuthatches** | | | | | | | | | | | | | | | |
| *Sitta canadensis* | Red-breasted Nuthatch | S5 | | | | | √ | | CO | | | | | | | |
| *Sitta carolinensis* | White-breasted Nuthatch | S5 | | | | | | PO | CO | | **PR** | | | PR | | |
| **Certhiidae** | **Creepers** | | | | | | | | | | | | | | | |
| *Certhia americana* | Brown Creeper | S5 | | | | | √ | | CO | | | | | | | |
| **Troglodytidae** | **Wrens** | | | | | | | | | | | | | | | |
| *Thryothorus ludovicianus* | Carolina Wren | S4 | | | | | √ | | PR | | | | | | | |
| *Troglodytes aedon* | House Wren | S5B | | | | | | PR | CO | | **PR** | PR | PR | PO | PR | |
| *Troglodytes hiemalis* | Winter Wren | S5B,S4N | | | | | √ | | PR | | | | | | | |
| **Polioptilidae** | **Gnatcatchers** | | | | | | | | | | | | | | | |
| *Polioptila caerulea* | Blue-gray Gnatcatcher | S4B | | | | | √ | | CO | | | | | | | |
| **Regulidae** | **Kinglets** | | | | | | | | | | | | | | | |
| *Regulus satrapa* | Golden-crowned Kinglet | S5 | | | | | √ | | CO | | | | | | | |
| **Turdidae** | **Thrushes** | | | | | | | | | | | | | | | |
| *Catharus fuscescens* | Veery | S5B | | | | | √ | | CO | | | | | | | |
| *Hylocichla mustelina* | Wood Thrush | S4B | SC | T | T | Schedule 1 | | | CO | X | | | | | | |
| *Sialia sialis* | Eastern Bluebird | S5B,S4N | NAR | NAR | NS | No schedule | √ | | CO | | | | | | | |
| *Turdus migratorius* | American Robin | S5 | | | | | | CO | CO | | **CO** | PO | PO | PO | CO | PO |
| **Mimidae** | **Mockingbirds, Thrashers & Allies** | | | | | | | | | | | | | | | |
| *Dumetella carolinensis* | Gray Catbird | S5B,S3N | | | | | | PR | CO | | **PO** | PO | | | PO | |
| *Toxostoma rufum* | Brown Thrasher | S4B | | | | | √ | PO | PR | | | | | | | |
| **Sturnidae** | **Starlings** | | | | | | | | | | | | | | | |
| *Sturnus vulgaris* | European Starling | SNA | | | | | | PO | CO | | **PO** | | | | PO | |
| **Bombycillidae** | **Waxwings** | | | | | | | | | | | | | | | |
| *Bombycilla cedrorum* | Cedar Waxwing | S5 | | | | | | PR | CO | | **PR** | PO | PR | | | |
| **Passeridae** | **Old World Sparrows** | | | | | | | | | | | | | | | |
| *Passer domesticus* | House Sparrow | SNA | | | | | | PO | CO | | | | | | | |
| **Fringillidae** | **Finches & Allies** | | | | | | | | | | | | | | | |
| *Haemorhous mexicanus* | House Finch | SNA | | | | | | | CO | | | | | | | |
| *Haemorhous purpureus* | Purple Finch | S5 | | | | | √ | | PR | | | | | | | |
| *Spinus pinus* | Pine Siskin | S5 | | | | | √ | | PR | | | | | | | |
| *Spinus tristis* | American Goldfinch | S5 | | | | | | PO | PR | | **PR** | | PR | PO | PO | |
| **Emberizidae** | **New World Sparrows & Allies** | | | | | | | | | | | | | | | |
| *Ammodramus savannarum* | Grasshopper Sparrow | S4B | SC | SC | SC | Schedule 1 | √ | | PR | X | | | | | | |
| *Melospiza georgiana* | Swamp Sparrow | S5B,S4N | | | | | | PR | PR | | | | | | | |
| *Melospiza melodia* | Song Sparrow | S5 | | | | | | PR | CO | | **PO** | PO | PO | | PO | |

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | Region of Waterloo Status | Erbsville South Environmental Study | OBBA* | NHIC Data** | NRSI Observed: Highest Level of Breeding Evidence | BMB-001 | BMB-002 | BMB-003 | BMB-004 | Other Observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Passerculus sandwichensis* | Savannah Sparrow | S5B,S3N | | | | | | | CO | | | | | | | |
| *Pipilo erythrophthalmus* | Eastern Towhee | S4B,S3N | | | | | | | CO | | | | | | | |
| *Pooecetes gramineus* | Vesper Sparrow | S4B | | | | | √ | | PR | | | | | | | |
| *Spizella passerina* | Chipping Sparrow | S5B,S3N | | | | | | PR | CO | | | | | | | |
| *Spizella pusilla* | Field Sparrow | S4B,S3N | | | | | | PR | PR | | | | | | | |
| *Zonotrichia albicollis* | White-throated Sparrow | S5 | | | | | √ | | PR | | | | | | | |
| **Icteridae** | **Troupials & Allies** | | | | | | | | | | | | | | | |
| *Agelaius phoeniceus* | Red-winged Blackbird | S5 | | | | | | PO | CO | | **PO** | | | | PO | PO |
| *Dolichonyx oryzivorus* | Bobolink | S4B | THR | SC | T | Schedule 1 | | | PR | X | | | | | | |
| *Icterus galbula* | Baltimore Oriole | S4B | | | | | | PO | CO | | **PR** | PR | PO | | | |
| *Icterus spurius* | Orchard Oriole | S4B | | | | | √ | | PR | | | | | | | |
| *Molothrus ater* | Brown-headed Cowbird | S5 | | | | | | PO | CO | | **PR** | | PO | | PR | |
| *Quiscalus quiscula* | Common Grackle | S5 | | | | | | PO | CO | | **PO** | | | | PO | |
| *Sturnella magna* | Eastern Meadowlark | S4B,S3N | THR | T | T | Schedule 1 | | | CO | X | | | | | | |
| **Parulidae** | **Wood Warblers** | | | | | | | | | | | | | | | |
| *Cardellina canadensis* | Canada Warbler | S5B | SC | SC | T | Schedule 1 | √ | OB | | X | | | | | | |
| *Geothlypis philadelphia* | Mourning Warbler | S5B | | | | | √ | PR | PR | | | | | | | |
| *Geothlypis trichas* | Common Yellowthroat | S5B,S3N | | | | | | PR | PR | | **PR** | PR | PR | | PR | |
| *Leiothlypis ruficapilla* | Nashville Warbler | S5B | | | | | √ | | CO | | | | | | | |
| *Mniotilta varia* | Black-and-white Warbler | S5B | | | | | √ | | PR | | | | | | | |
| *Parkesia noveboracensis* | Northern Waterthrush | S5B | | | | | √ | | CO | | | | | | | |
| *Seiurus aurocapilla* | Ovenbird | S5B | | | | | √ | | CO | | | | | | | |
| *Setophaga caerulescens* | Black-throated Blue Warbler | S5B | | | | | | | PR | | | | | | | |
| *Setophaga cerulea* | Cerulean Warbler | S2B | THR | E | E | Schedule 1 | √ | | PO | X | | | | | | |
| *Setophaga citrina* | Hooded Warbler | S4B | NAR | NAR | NS | No schedule | √ | | CO | | | | | | | |
| *Setophaga coronata* | Yellow-rumped Warbler | S5B,S4N | | | | | √ | | PO | | | | | | | |
| *Setophaga pensylvanica* | Chestnut-sided Warbler | S5B | | | | | √ | | PR | | | | | | | |
| *Setophaga petechia* | Yellow Warbler | S5B | | | | | | PR | CO | | **PO** | PO | | | PO | |
| *Setophaga pinus* | Pine Warbler | S5B,S3N | | | | | √ | | CO | | | | | | | |
| *Setophaga ruticilla* | American Redstart | S5B | | | | | √ | | PR | | **PR** | | | | PR | |
| *Setophaga virens* | Black-throated Green Warbler | S5B | | | | | √ | | PR | | | | | | | |
| *Vermivora cyanoptera* | Blue-winged Warbler | S4B | | | | | √ | | CO | | | | | | | |
| **Cardinalidae** | **Cardinals, Grosbeaks & Allies** | | | | | | | | | | | | | | | |
| *Cardinalis cardinalis* | Northern Cardinal | S5 | | | | | | PR | CO | | **PO** | PO | PO | | PO | PO |
| *Passerina cyanea* | Indigo Bunting | S5B | | | | | | PR | PR | | | | | | | |
| *Pheucticus ludovicianus* | Rose-breasted Grosbeak | S5B | | | | | | PO | CO | | **PO** | | PO | PO | | |

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | Region of Waterloo Status | Erbsville South Environmental Study | OBBA* | NHIC Data** | NRSI Observed: Highest Level of Breeding Evidence | BMB-001 | BMB-002 | BMB-003 | BMB-004 | Other Observations |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Piranga olivacea* | Scarlet Tanager | S5B | | | | | √ | | CO | | | | | | | |
| **Total** | | | | | | | | **61** | **113** | **11** | **30** | **11** | **17** | **9** | **17** | **8** |

*OBBA Atlas Square: 17NJ31

**NHIC Atlas Squares: 17NJ3114, 17NJ3113, 17NJ3213, 17NJ3214

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**Reptile and Amphibian Species Reported from the Study Area - 720 Erbsville EIS (Project #2520)**

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | Region of Waterloo Status | ORAA* | NHIC Data** | Erbsville South Environmental Study | NRSI Observed | Anuran Call Survey |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | MNRF 2023a | MECP 2023 | Government of Canada 2023 | | | RMOW 1985 | Ontario Nature 2019 | MNRF 2023b | Dougan and Associates 2018 | NRSI Results from 2023 | |
| **Turtles** | | | | | | | | | | | | |
| *Chelydra serpentina* | Snapping Turtle | S4 | SC | SC | SC | Schedule 1 | C | X | X | X | | |
| *Chrysemys picta marginata* | Midland Painted Turtle | S4 | | SC | SC | Schedule 1 | C | X | X | X | | |
| *Emydoidea blandingii* | Blanding's Turtle (Great Lakes / St. Lawrence population) | S3 | THR | E | E | Schedule 1 | √ | X | X | X | | |
| *Graptemys geographica* | Northern Map Turtle | S3 | SC | SC | SC | Schedule 1 | | X | X | | | |
| *Trachemys scripta* | Pond Slider | SNA | | | | | | X | | | | |
| **Snakes** | | | | | | | | | | | | |
| *Lampropeltis triangulum* | Milksnake | S4 | NAR | SC | SC | Schedule 1 | √ | | X | X | | |
| *Storeria dekayi* | Dekay's Brownsnake | S5 | NAR | NAR | NS | No schedule | C* | X | | | | |
| *Storeria occipitomaculata* | Red-bellied Snake | S5 | | | | | C* | X | | | | |
| *Thamnophis sirtalis sirtalis* | Eastern Gartersnake | S5 | | | | | C | X | | X | | |
| **Salamanders** | | | | | | | | | | | | |
| *Ambystoma jeffersonianum* | Jefferson Salamander | S2 | END | E | E | Schedule 1 | √ | X | | | | |
| *Ambystoma laterale* | Blue-spotted Salamander | S4 | | | | | C | X | | | | |
| *Ambystoma maculatum* | Spotted Salamander | S4 | | | | | √ | X | | | | |
| *Necturus maculosus* | Mudpuppy | S4 | NAR | NAR | NS | No schedule | √ | X | | | | |
| *Notophthalmus viridescens viridescens* | Red-spotted Newt | S5 | | | | | √ | X | | X | | |
| *Plethodon cinereus* | Eastern Red-backed Salamander | S5 | | | | | C | X | | | | |
| **Frogs and Toads** | | | | | | | | | | | | |
| *Anaxyrus americanus* | American Toad | S5 | | | | | C | X | | X | | |
| *Hyla versicolor* | Gray Treefrog | S5 | | | | | C | X | | X | | |
| *Pseudacris triseriata pop. 2* | Western Chorus Frog (Great Lakes / St. Lawrence - Canadian Shield population) | S4 | NAR | T | T | Schedule 1 | | X | X | | | |
| *Pseudacris crucifer* | Spring Peeper | S5 | | | | | C | X | | X | **X** | X |
| *Lithobates catesbeianus* | American Bullfrog | S4 | | | | | √ | X | | | | |
| *Lithobates clamitans* | Green Frog | S5 | | | | | C | X | | X | **X** | X |
| *Lithobates palustris* | Pickerel Frog | S4 | NAR | NAR | NS | No schedule | √ | X | | | | |
| *Lithobates pipiens* | Northern Leopard Frog | S5 | NAR | NAR | NS | No schedule | C | X | | X | | |
| *Lithobates sylvaticus* | Wood Frog | S5 | | | | | C | X | | | | |
| **Total** | | | | | | | | **23** | **6** | | **11** | **2** |

*ORAA Atlas Square: 17NJ31
**NHIC Atlas Squares: Square # 17NJ31

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**Mammal Species Reported from the Study Area - Erbsville South Environmental Study (Project #2520)**

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | Region of Waterloo Status | Ontario Mammal Atlas | Erbsville South Environmental Study |
|---|---|---|---|---|---|---|---|---|---|
| | | MNRF 2023a | MECP 2023 | Government of Canada 2023 | | | RMOW 1985 | Dobbyn 1994 | Dougan and Associates 2018 |
| **Didelphimorphia** | **Opossums** | | | | | | | | |
| *Didelphis virginiana* | Virginia Opossum | S4 | | | | | R | X | |
| **Eulipotyphla** | **Shrews, Moles, Hedgehogs, and Allies** | | | | | | | | |
| *Blarina brevicauda* | Northern Short-tailed Shrew | S5 | | | | | | X | |
| *Condylura cristata* | Star-nosed Mole | S5 | | | | | | X | |
| *Parascalops breweri* | Hairy-tailed Mole | S4 | | | | | R | X | |
| *Sorex cinereus* | Masked Shrew | S5 | | | | | G | X | |
| *Sorex fumeus* | Smoky Shrew | S5 | | | | | R | X | |
| *Sorex palustris* | Water Shrew | S5 | | | | | R | X | |
| **Chiroptera** | **Bats** | | | | | | | | |
| *Eptesicus fuscus* | Big Brown Bat | S4 | | | | | | X | |
| *Lasionycteris noctivagans* | Silver-haired Bat | S4 | | E | NS | No schedule | | X | |
| *Lasiurus borealis* | Eastern Red Bat | S4 | | E | NS | No schedule | | X | |
| *Lasiurus cinereus* | Hoary Bat | S4 | | E | NS | No schedule | | X | |
| *Myotis leibii* | Eastern Small-footed Myotis | S2S3 | END | | | | | X | |
| *Myotis lucifugus* | Little Brown Myotis | S3 | END | E | E | Schedule 1 | | X | |
| *Myotis septentrionalis* | Northern Myotis | S3 | END | E | E | Schedule 1 | | X | |
| *Perimyotis subflavus* | Tri-colored Bat | S3? | END | E | E | Schedule 1 | | X | |
| **Lagomorpha** | **Rabbits and Hares** | | | | | | | | |
| *Lepus americanus* | Snowshoe Hare | S5 | | | | | S | X | |
| *Lepus europaeus* | European Hare | SNA | | | | | | X | |
| *Sylvilagus floridanus* | Eastern Cottontail | S5 | | | | | | X | X |
| **Rodentia** | **Rodents** | | | | | | | | |
| *Castor canadensis* | Beaver | S5 | | | | | S | X | X |
| *Erethizon dorsatum* | Porcupine | S5 | | | | | S | X | |
| *Glaucomys sabrinus* | Northern Flying Squirrel | S5 | | | | | R | X | |
| *Marmota monax* | Woodchuck | S5 | | | | | | X | X |
| *Microtus pennsylvanicus* | Meadow Vole | S5 | | | | | | X | X |
| *Mus musculus* | House Mouse | SNA | | | | | | X | |
| *Napaeozapus insignis* | Woodland Jumping Mouse | S5 | | | | | | X | |
| *Ondatra zibethicus* | Muskrat | S5 | | | | | | X | X |
| *Peromyscus leucopus* | White-footed Mouse | S5 | | | | | | X | |
| *Peromyscus maniculatus* | Deer Mouse | S5 | | | | | | X | |
| *Rattus norvegicus* | Norway Rat | SNA | | | | | | X | |
| *Sciurus carolinensis* | Eastern Gray Squirrel | S5 | | | | | | X | X |
| *Synaptomys cooperi* | Southern Bog Lemming | S4 | | | | | R | X | |
| *Tamias striatus* | Eastern Chipmunk | S5 | | | | | | X | |
| *Tamiasciurus hudsonicus* | Red Squirrel | S5 | | | | | | X | |
| *Zapus hudsonius* | Meadow Jumping Mouse | S5 | | | | | | X | |
| **Canidae** | **Canines** | | | | | | | | |
| *Canis latrans* | Coyote | S5 | | | | | S | X | X |
| *Vulpes vulpes* | Red Fox | S5 | | | | | | X | |
| **Felidae** | **Felines** | | | | | | | | |
| *Lynx rufus* | Bobcat | S4 | | | | | R | X | |
| **Mephitidae** | **Skunks and Stink Badgers** | | | | | | | | |
| *Mephitis mephitis* | Striped Skunk | S5 | | | | | | X | X |
| **Mustelidae** | **Weasels and Allies** | | | | | | | | |
| *Mustela richardsonii* | American Ermine | S5 | | | | | | | |

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | Region of Waterloo Status | Ontario Mammal Atlas | Erbsville South Environmental Study |
|---|---|---|---|---|---|---|---|---|---|
| *Mustela frenata* | Long-tailed Weasel | S4 | | | | | S | X | |
| *Neovison vison* | American Mink | S4 | | | | | S | X | X |
| *Taxidea taxus jacksoni* | American Badger (Southwestern Ontario population) | S1 | END | E | E | Schedule 1 | | X | |
| **Procyonidae** | **Raccoons and Allies** | | | | | | | | |
| *Procyon lotor* | Northern Raccoon | S5 | | | | | | X | X |
| **Ursidae** | **Bears** | | | | | | | | |
| *Ursus americanus* | American Black Bear | S5 | NAR | NAR | NS | No schedule | | X | |
| **Artiodactyla** | **Deer and Bison** | | | | | | | | |
| *Odocoileus virginianus* | White-tailed Deer | S5 | | | | | | X | X |
| **Total** | | | | | | | | **45** | **12** |

*Mammal Atlas Square Numbers: NU
**NHIC Atlas Squares: 17NJ31

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**Butterfly Species Reported from the Study Area - Erbsville South Environmental Study (Project #2520)**

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | Region of Waterloo Status | TEA Atlas* | Erbsville South Environmental Study |
|---|---|---|---|---|---|---|---|---|---|
| | | MNRF 2023a | MECP 2023 | Government of Canada 2023 | | | Linton 2012 | Macnaughton et al. 2020 | Dougan and Associates 2018 |
| **Hesperiidae** | **Skippers** | | | | | | | | |
| *Anatrytone logan* | Delaware Skipper | S4 | | | | | C | X | |
| *Ancyloxypha numitor* | Least Skipper | S5 | | | | | UC | X | |
| *Carterocephalus palaemon* | Arctic Skipper | S5 | | | | | R | X | |
| *Epargyreus clarus* | Silver-spotted Skipper | S4 | | | | | UC | X | |
| *Erynnis baptisiae* | Wild Indigo Duskywing | S4 | | | | | UK | X | |
| *Erynnis juvenalis* | Juvenal's Duskywing | S5 | | | | | R | X | X |
| *Euphyes vestris* | Dun Skipper | S5 | | | | | VC | X | |
| *Hylephila phyleus* | Fiery Skipper | SNA | | | | | R | X | |
| *Poanes hobomok* | Hobomok Skipper | S5 | | | | | C | X | X |
| *Poanes viator* | Broad-winged Skipper | S4 | | | | | C | X | |
| *Polites mystic* | Long Dash Skipper | S5 | | | | | UC | X | |
| *Polites peckius* | Peck's Skipper | S5 | | | | | VC | X | |
| *Polites themistocles* | Tawny-edged Skipper | S5 | | | | | C | X | |
| *Pompeius verna* | Little Glassywing | S4 | | | | | UC | X | |
| *Thymelicus lineola* | European Skipper | SNA | | | | | VC | X | |
| *Wallengrenia egeremet* | Northern Broken Dash | S5 | | | | | C | X | |
| **Papilionidae** | **Swallowtails** | | | | | | | | |
| *Battus philenor* | Pipevine Swallowtail | SNA | | | | | | X | |
| *Papilio cresphontes* | Giant Swallowtail | S4 | | | | | UC | X | |
| *Papilio glaucus* | Eastern Tiger Swallowtail | S5 | | | | | VC | X | |
| *Papilio polyxenes* | Black Swallowtail | S5 | | | | | VC | X | |
| **Pieridae** | **Whites and Sulphurs** | | | | | | | | |
| *Colias eurytheme* | Orange Sulphur | S5 | | | | | VC | X | |
| *Colias philodice* | Clouded Sulphur | S5 | | | | | | X | |
| *Pieris oleracea* | Mustard White | S4 | | | | | PE | X | |
| *Pieris rapae* | Cabbage White | SNA | | | | | VC | X | |
| **Lycaenidae** | **Harvesters, Coppers, Hairstreaks, Blues** | | | | | | | | |
| *Celastrina ladon* | Spring Azure | SU | | | | | C | X | X |
| *Celastrina lucia* | Northern Spring Azure | S5 | | | | | | X | |
| *Celastrina neglecta* | Summer Azure | S5 | | | | | VC | X | |
| *Celastrina sp.* | Azure species | SNA | | | | | | X | |
| *Cupido comyntas* | Eastern Tailed Blue | S5 | | | | | UC | X | |
| *Glaucopsyche lygdamus* | Silvery Blue | S5 | | | | | | X | |
| *Lycaena hyllus* | Bronze Copper | S5 | | | | | VC | X | |
| *Satyrium acadica* | Acadian Hairstreak | S4 | | | | | UC | X | |
| *Satyrium calanus* | Banded Hairstreak | S4 | | | | | UC | X | |
| *Satyrium edwardsii* | Edwards' Hairstreak | S4 | | | | | R | X | |
| **Nymphalidae** | **Brush-footed Butterflies** | | | | | | | | |
| *Aglais milberti* | Milbert's Tortoiseshell | S5 | | | | | UC | X | X |
| *Boloria bellona* | Meadow Fritillary | S5 | | | | | VC | X | |
| *Cercyonis pegala* | Common Wood-Nymph | S5 | | | | | VC | X | |
| *Chlosyne harrisii* | Harris's Checkerspot | S4 | | | | | | X | |
| *Chlosyne nycteis* | Silvery Checkerspot | S5 | | | | | R | X | |
| *Coenonympha tullia* | Common Ringlet | S5 | | | | | C | X | |
| *Danaus plexippus* | Monarch | S2N,S4B | SC | E | SC | Schedule 1 | VC | X | X |
| *Euphydryas phaeton* | Baltimore Checkerspot | S4 | | | | | R | X | |

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | Region of Waterloo Status | TEA Atlas* | Erbsville South Environmental Study |
|---|---|---|---|---|---|---|---|---|---|
| *Lethe anthedon* | Northern Pearly-Eye | S5 | | | | | C | X | |
| *Lethe appalachia* | Appalachian Brown | S4 | | | | | UC | X | |
| *Lethe eurydice* | Eyed Brown | S5 | | | | | VC | X | X |
| *Libytheana carinenta* | American Snout | SNA | | | | | R | X | |
| *Limenitis archippus* | Viceroy | S5 | | | | | VC | X | X |
| *Limenitis arthemis arthemis* | White Admiral | S5 | | | | | C | X | |
| *Limenitis arthemis astyanax* | Red-spotted Purple | S5 | | | | | C | X | |
| *Megisto cymela* | Little Wood-Satyr | S5 | | | | | VC | X | |
| *Nymphalis antiopa* | Mourning Cloak | S5 | | | | | VC | X | X |
| *Nymphalis l-album* | Compton Tortoiseshell | S5 | | | | | UC | X | |
| *Phyciodes cocyta* | Northern Crescent | S5 | | | | | UC | X | |
| *Phyciodes tharos* | Pearl Crescent | S4 | | | | | C | X | X |
| *Polygonia comma* | Eastern Comma | S5 | | | | | VC | X | |
| *Polygonia interrogationis* | Question Mark | S5 | | | | | VC | X | |
| *Polygonia progne* | Gray Comma | S5 | | | | | UC | X | |
| *Speyeria cybele* | Great Spangled Fritillary | S5 | | | | | VC | X | |
| *Vanessa atalanta* | Red Admiral | S5B | | | | | VC | X | |
| *Vanessa cardui* | Painted Lady | S5B | | | | | C | X | X |
| *Vanessa virginiensis* | American Lady | S5 | | | | | C | X | |
| **Total** | | | | | | | | **61** | **10** |

*TEA Atlas Square: 17NJ31
**NHIC Atlas Square: Square # 17NJ31

**References**


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**Odonate Species Reported from the Study Area - Erbsville South Environmental Study (Project #2520)**

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | Region of Waterloo Status | Odonate Atlas* | Erbsville South Environmental Study |
|---|---|---|---|---|---|---|---|---|---|
| | | MNRF 2023 | MECP 2023 | Government of Canada 2023 | | | Region of Waterloo 1985 | OOAD 2023 | Dougan and Associates 2018 |
| **Calopterygidae** | **Broadwinged Damselflies** | | | | | | | | |
| *Calopteryx maculata* | Ebony Jewelwing | S5 | | | | | X | X | X |
| **Lestidae** | **Spreadwings** | | | | | | | | |
| *Lestes congener* | Spotted Spreadwing | S5 | | | | | Expected | X | |
| *Lestes disjunctus* | Northern Spreadwing | S5 | | | | | Expected | X | |
| *Lestes eurinus* | Amber-winged Spreadwing | S4 | | | | | Expected | X | |
| *Lestes rectangularis* | Slender Spreadwing | S5 | | | | | X | X | |
| *Lestes unguiculatus* | Lyre-tipped Spreadwing | S5 | | | | | X | X | |
| **Coenagrionidae** | **Narrow-winged Damselflies** | | | | | | | | |
| *Enallagma carunculatum* | Tule Bluet | S5 | | | | | X | X | |
| *Enallagma civile* | Familiar Bluet | S5 | | | | | X | X | |
| *Enallagma ebrium* | Marsh Bluet | S5 | | | | | X | X | |
| *Enallagma exsulans* | Stream Bluet | S5 | | | | | X | X | |
| *Enallagma geminatum* | Skimming Bluet | S4 | | | | | X | X | |
| *Enallagma signatum* | Orange Bluet | S4 | | | | | X | X | |
| *Ischnura posita* | Fragile Forktail | S4 | | | | | X | X | |
| *Ischnura verticalis* | Eastern Forktail | S5 | | | | | X | X | |
| *Nehalennia irene* | Sedge Sprite | S5 | | | | | X | X | |
| **Aeshnidae** | **Darners** | | | | | | | | |
| *Aeshna constricta* | Lance-tipped Darner | S5 | | | | | Expected | X | |
| *Aeshna tuberculifera* | Black-tipped Darner | S4 | | | | | X | X | |
| *Anax junius* | Common Green Darner | S5 | | | | | X | X | X |
| **Cordulegasteridae** | **Spiketails** | | | | | | | | |
| *Cordulegaster diastatops* | Delta-spotted Spiketail | S4 | | | | | Possible | X | X |
| **Corduliidae** | **Emeralds** | | | | | | | | |
| *Epitheca princeps* | Prince Baskettail | S5 | | | | | X | X | |
| *Somatochlora walshii* | Brush-tipped Emerald | S4 | | | | | X | X | |
| **Libellulidae** | **Skimmers** | | | | | | | | |
| *Celithemis elisa* | Calico Pennant | S5 | | | | | Expected | X | |
| *Erythemis simplicicollis* | Eastern Pondhawk | S5 | | | | | X | X | |
| *Leucorrhinia intacta* | Dot-tailed Whiteface | S5 | | | | | X | X | |
| *Libellula luctuosa* | Widow Skimmer | S5 | | | | | X | X | |
| *Libellula pulchella* | Twelve-spotted Skimmer | S5 | | | | | X | X | |
| *Pachydiplax longipennis* | Blue Dasher | S5 | | | | | X | X | |
| *Pantala hymenaea* | Spot-winged Glider | S4 | | | | | Expected | X | |
| *Plathemis lydia* | Common Whitetail | S5 | | | | | X | X | |
| *Sympetrum obtrusum* | White-faced Meadowhawk | S5 | | | | | X | X | |
| *Sympetrum rubicundulum* | Ruby Meadowhawk | S5 | | | | | X | X | |
| *Sympetrum semicinctum* | Band-winged Meadowhawk | S4 | | | | | X | X | |
| *Sympetrum vicinum* | Autumn Meadowhawk | S5 | | | | | X | X | |
| *Tramea lacerata* | Black Saddlebags | S4 | | | | | X | X | |
| **Total** | | | | | | | | **34** | **3** |

**Odonate Atlas Square Numbers: Square(s) 17NJ31*

**References**


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**Fish Species Reported from the Study Area - 720 Erbsville EIS (Project #2520)**

| Scientific Name | Common Name | SRANK | SARO | COSEWIC | SARA | SARA Schedule | ARA Data | Erbsville South Environmental Study | Pre-construction Monitoring |
|---|---|---|---|---|---|---|---|---|---|
| | | MNRF 2023a | MECP 2023 | Government of Canada 2023 | | | MNRF 2023 | Dougan and Associates 2018 | NRSI 2023 |
| **Leuciscidae** | **Minnows** | | | | | | | | |
| Campostoma anomalum | Central Stoneroller | S4 | NAR | NAR | NS | No schedule | | X | |
| *Chrosomus eos* | Northern Redbelly Dace | S5 | | | | | X | X | X |
| *Hybognathus hankinsoni* | Brassy Minnow | S5 | | | | | X | X | X |
| *Luxilus cornutus* | Common Shiner | S5 | | | | | X | X | |
| *Notropis rubellus* | Rosyface Shiner | S4 | NAR | NAR | NS | No schedule | | X | |
| *Pimephales notatus* | Bluntnose Minnow | S5 | NAR | NAR | NS | No schedule | X | X | X |
| *Pimephales promelas* | Fathead Minnow | S5 | | | | | X | X | X |
| *Rhinichthys atratulus* | Blacknose Dace | SNR | | | | | X | X | X |
| *Rhinichthys cataractae* | Longnose Dace | S5 | | | | | | X | |
| *Semotilus atromaculatus* | Creek Chub | S5 | | | | | X | X | X |
| **Catostomidae** | **Suckers** | | | | | | | | |
| *Catostomus commersonii* | White Sucker | S5 | | | | | X | X | X |
| **Umbridae** | **Mudminnows** | | | | | | | | |
| *Umbra limi* | Central Mudminnow | S5 | | | | | X | X | |
| **Salmonidae** | **Trouts and Salmons** | | | | | | | | |
| *Salmo trutta* | Brown Trout | SNA | | | | | | X | |
| **Gasterosteidae** | **Sticklebacks** | | | | | | | | |
| *Culaea inconstans* | Brook Stickleback | S5 | | | | | X | X | X |
| **Centrarchidae** | **Sunfishes and Basses** | | | | | | | | |
| *Lepomis gibbosus* | Pumpkinseed | S5 | | | | | X | X | X |
| *Micropterus salmoides* | Largemouth Bass | S5 | | | | | | X | X |
| *Pomoxis nigromaculatus* | Black Crappie | S4 | | | | | | X | |
| **Percidae** | **Perches and Darters** | | | | | | | | |
| *Etheostoma nigrum* | Johnny Darter | S5 | | | | | | X | |
| *Etheostoma caeruleum* | Rainbow Darter | S4 | | | | | X | X | |
| *Etheostoma exile* | Iowa Darter | S5 | | | | | X | X | X |
| **Total** | | | | | | | **12** | **20** | **11** |

*NHIC Atlas Squares: Square # 17NJ31

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**Legend: Wildlife Species Lists**

## Provincial Ranks

### SRANK

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **S1** | Critically Imperiled | **S4** | Apparently Secure | **S#?** | Uncertain Rank | **SNR** | Unranked | **NP** | Not Provided |
| **S2** | Imperiled | **S5** | Secure | **SX** | Presumed Extirpated | **SU** | Unrankable | | |
| **S3** | Vulnerable | **S#S#** | Status is Between Ranks | **SH** | Possibly Extirpated (Historical) | **SNA** | Not Applicable | | |

**Breeding Status Qualifiers**

| | | | | | |
|---|---|---|---|---|---|
| **B** | Breeding | **N** | Non-breeding | **M** | Migrant |

### SARO

| | | | | | |
|---|---|---|---|---|---|
| **END** | Endangered | **SC** | Special Concern | **DD** | Data Deficient |
| **THR** | Threatened | **NAR** | Not at Risk | **EXP** | Extirpated |

## Federal Ranks

### COSEWIC and SARA

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| **E** | Endangered | **SC** | Special Concern | **NS** | No Status | **N-A** | Non-Active | **EX** | Extirpated |
| **T** | Threatened | **NAR** | Not at Risk | **DD** | Data Defficient | **X** | Extinct | | |

### SARA Schedule

| | |
|---|---|
| **Schedule 1** | Extirpated, Endangered, Threatened, Special Concern Species officially protected under SARA |
| **Schedule 2** | Endangered, Threatened species not yet re-assessed using revised criteria; may be considered for inclusion to Schedule 1 |
| **Schedule 3** | Special Concern species not yet re-assessed using revised criteria; may be considered for inclusion to Schedule 1 |

## Regional Status

### Region of Waterloo Status

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| √ | Regionally Significant | **UC** | Uncommon | **S** | Scarce | **C*** | Thought to be common, difficult to find |
| **VC** | Very Common | **G** | General | **R** | Rare | **UK** | Unknown |
| **C** | Common | **O** | Occasional | **PE** | Possible Extirpated | **NRA** | No Rank Assigned (<5 records and records over 40 years old) |

**Bird Species Only:**

| | |
|---|---|
| √* | Significant when nesting in natural circumstances |

## Other

### Bird Breeding Evidence Codes

**OB** **Observed**

- Species observed (no evidence of breeding)

**PO** **Possible**

- Species observed in its breeding season in suitable nesting habitat
- Singing male(s) present, or breeding calls heard, in suitable nesting habitat in breeding season

**PR** **Probable**

- ≥ 7 individuals singing or producing other sounds associated with breeding (e.g. drumming) heard during the same visit in suitable nesting habitat during the species' breeding season
- Pair observed in their breeding season in suitable nesting habitat
- Permanent territory presumed through registration of territorial song, or the occurrence of an adult bird, at the same place, in breeding habitat, during its breeding season, on at least 2 days a week or more apart.
- Courtship or display, including interaction between a male and female or 2 males including courtship feeding or copulation
- Visiting probable nest site
- Agitated behaviour or anxiety calls of an adult
- Brood patch on adult female or cloacal protuberance on adult male
- Nest-building or excavation of nest hole, except by a wren of woodpecker

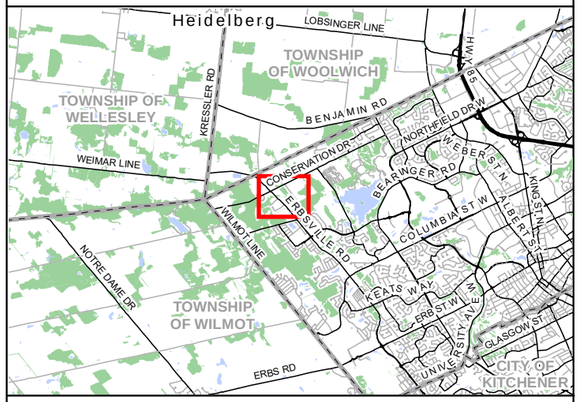
**CO** **Confirmed**

- Distraction display or injury feigning
- Used nest or egg shells found (occupied or laid within the period of the survey)
- Recently fledged young or downy young
- Adults leaving or entering nest site in circumstances indicating occupied nest
- Adult carrying fecal sac
- Adult carrying food for young
- Nest containing eggs
- Nest with young seen or heard

# MAPS

**Map 1**

# 720 Erbsville Road
# Environmental Impact Study
## Study Area and Natural Features




**Legend**

- Subject Property
- Study Area (200m)
- Regal Place Subdivision
- Permanent Watercourse
- Water Body
- Provincially Significant Wetland (PSW)
- Other Wetland (Non-PSW)
- Unevaluated Wetland
- GRCA Regulated Wetland
- GRCA Regulated Floodplain
- GRCA Regulation Limit
- Wooded Area
- Brook Trout Spawning Area (MNRF)
- Brown Trout Spawning Area (MNRF)
- White-tailed Deer Wintering Area (Stratum 2) (MNRF)
- Environmentally Sensitive Policy Area (ESPA) (Region of Waterloo 2015)


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Date: August 29, 2023

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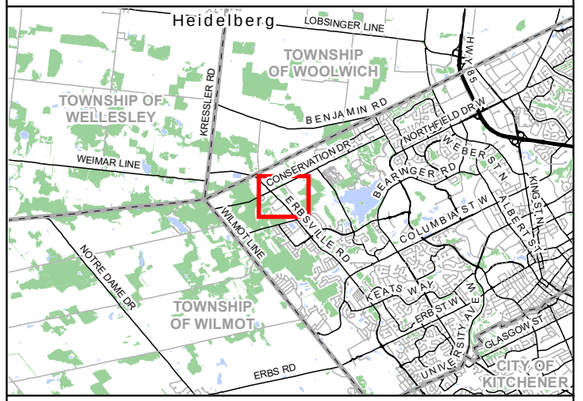
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# Map 2

# 720 Erbsville Road Environmental Impact Study

## Terrestrial Field Surveys




### Legend

- Study Area (200m)
- Subject Property
- Permanent Watercourse
- Water Body

**Stantec**

- Photographic Edge Monitoring Station
- Vegetation Monitoring Transect

**Dougan and Associates & NRSI**

- Anuran Call Station (ANR)

**NRSI**

- Breeding Bird Monitoring Station (BMB)
- Bat Habitat Assessment Area
- Bat Exit Survey Location (Summer Kitchen)
- Bat Acoustic Monitoring Station
- Bat Exit Survey Visual Monitoring Station
- Tree Inventory/Tally Area

**Dougan and Associates**

- Salamander Trap Placement (SAL)
- Turtle Basking Survey (BAS)
- Snake Board (SNK)
- Breeding Bird Survey (BBS) Transect
- Road Mortality Survey


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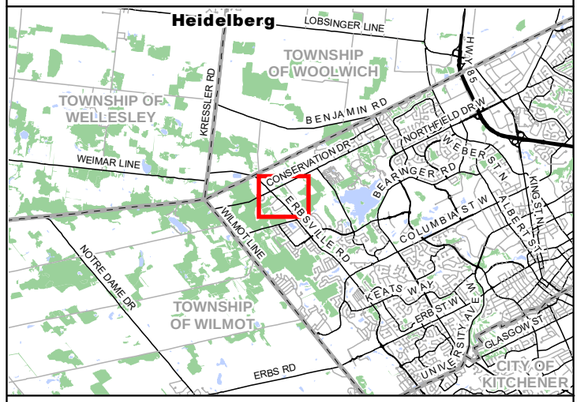
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Map 3

# 720 Erbsville Road
# Environmental Impact Study
## Aquatic Field Surveys




**Legend**

- Study Area (200m)
- Subject Property
- Water Body
- Beaver Dam
- Watercourse Reach
- Reach Break

**C. Portt & Associates / NRSI**

- Benthic Sampling (BTH)
- Electrofishing Station (EMS)

**C. Portt & Associates**

- Temperature Logger (TMP)
- Spawning Survey (2013)
- Spawning Survey (2014)

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Map 4

# 720 Erbsville Road Environmental Impact Study

## Vegetation Communities and Significant Species Observations




**Legend**

- Subject Property
- Study Area
- Building Foundation
- Dripline (NRSI, 2020)
- Dripline (Dougan & Associates, 2014) / ESPA (#80) Boundary
- Surveyed Wetland Boundary (GRCA Confirmed June 12, 2023)
- Permanent Watercourse
- Laurel Creek Linkage
- Southeastern Hedgerow Linkage
- Wideman Creek Linkage

**Species at Risk (SAR) Observations**

1: Black Ash
2: Blanding's Turtle
3: Candidate Bat SAR Roosting Tree

**Species of Conservation Concern (SCC) Observations**

4: Barn Swallow
5: Snapping Turtle
6: Eastern Wood-Pewee

**Regionally Significant Species Observations**

7: Canada Rush
8: Eastern Cottonwood
9: Northern Bog Violet
10: Virginia Creeper
11: White Spruce
12: American Redstart
13: Ruby-throated Hummingbird
14: Eastern Milksnake
15: Red-spotted Newt

- Ecological Land Classification (Dougan and Associates 2018)

(AG) Agricultural
(ANTH) Anthropogenic
(CUT1) Mineral Cultural Thicket Ecosite
(CUW1) Mineral Cultural Woodland Ecosite
(FOD8-1) Fresh - Moist Poplar Deciduous Forest Type
(FOM) Mixed Forest
(HR) Hedgerow
(SAS1) Submerged Shallow Aquatic Ecosite
(SWC4-2) Tamarack Organic Coniferous Swamp Type
(SWD7) Birch - Poplar Organic Deciuous Swamp Ecosite
(SWM) Mixed Swamp
(SWT2-2) Willow Organic Thicket Swamp Type
(SWT3-2) Willow Organic Thicket Swamp Type

Species observations are approximate. Plant and bird species are shown within the centroid of the ELC community.


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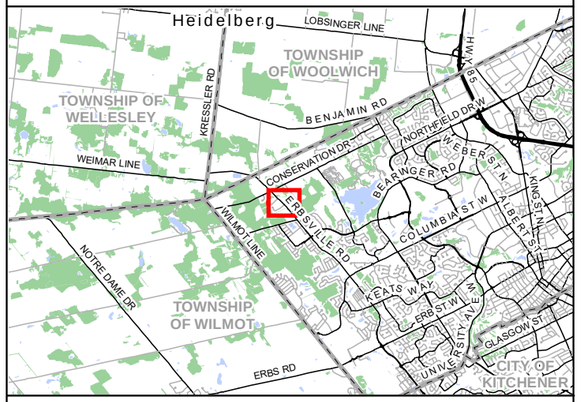
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# 720 Erbsville Road Environmental Impact Study

**Map 5**

## Natural Heritage Constraints




### Legend

- Subject Property
- Surveyed Wetland Boundary (GRCA Confirmed June 12, 2023)
- Wetland Buffer (30m)
- Dripline (Dougan & Associates, 2014)
- Dripline Buffer (10m)
- Existing Floodline
- Watercourse Buffer (30m)
- Permanent Watercourse
- Laurel Creek Corridor
- Southeastern Hedgerow Corridor
- Wideman Creek Corridor
- Ecological Land Classification (Dougan and Associates 2018)

**Species at Risk (SAR)**

- Candidate Bat SAR Roosting Tree
- Category 2 Blanding's Turtle Habitat
- Category 3 Blanding's Turtle Habitat
- Black Ash Habitat

**Confirmed Significant Wildlife Habitat**

- Amphibian Breeding Habitat (Woodland)
- Turtle Wintering Habitat
- Seeps and Springs
- Habitat for SCC: Snapping Turtle
- Deer Winter Congregation Areas (MNRF)

**Candidate Significant Wildlife Habitat**

- Bat Maternity Colonies


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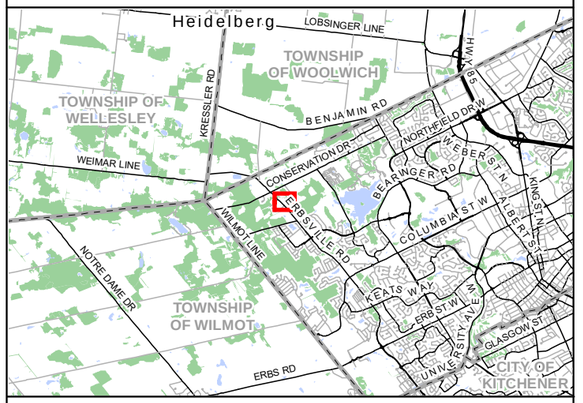
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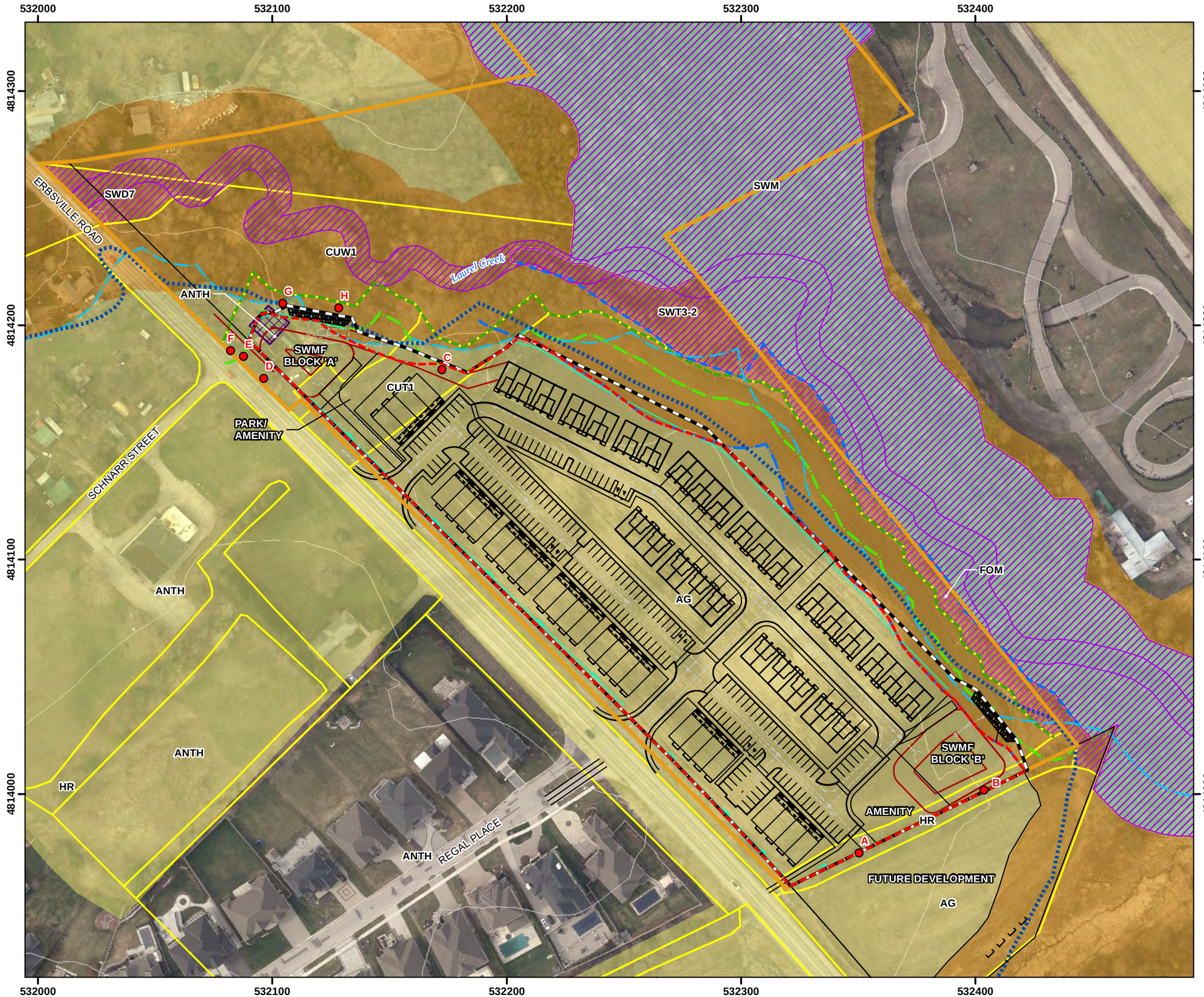
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# Map 6

# 720 Erbsville Road Environmental Impact Study

## Proposed Development




## Legend

- Subject Property
- Existing House to be Removed
- Limit of Grading
- Limit of Residential Zone
- Proposed Development
- Proposed Grading
- Proposed Swale
- Proposed Servicing
- Existing Floodline
- Surveyed Wetland Boundary (GRCA Confirmed June 12, 2023)
- Wetland Buffer (30m)
- Dripline (Dougan & Associates, 2014)
- Dripline Buffer (10m)
- Watercourse Buffer (30m)
- Ecological Land Classification (Dougan and Associates 2018)
- Significant Wildlife Habitat

**Species at Risk (SAR)**

- Candidate Bat SAR Roosting Tree
- Category 2 Blanding's Turtle Habitat
- Category 3 Blanding's Turtle Habitat
- Black Ash Habitat

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| | |
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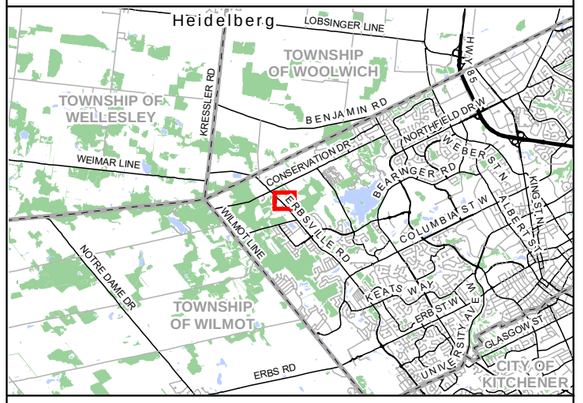
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Map 7

# 720 Erbsville Road Environmental Impact Study

## Proposed Enhancements




**Legend**

- Subject Property
- Buffer Encroachment (0.11ha)
- Buffer Enhancements (0.64ha)
- Buffer Gain (0.03ha)
- Laurel Creek Corridor
- Wideman Creek Corridor
- Limit of Grading
- Limit of Residential Zone
- Proposed Development
- Proposed Grading
- Proposed Swale
- Proposed Servicing
- Existing Floodline
- Surveyed Wetland Boundary (GRCA Confirmed June 12, 2023)
- Wetland Buffer (30m)
- Dripline (Dougan & Associates, 2014)
- Dripline Buffer (10m)
- Watercourse Buffer (30m)
- Permanent Watercourse
- Ecological Land Classification (Dougan and Associates 2018)


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Project: 2520
Date: January 23, 2024

NAD83 - UTM Zone 17
Size: 11x17"
1:1,600

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N

532000 532100 532200 532300 532400

4814300 4814200 4814100 4814000

ERBSVILLE ROAD
SCHNARR STREET
REGAL PLACE
Laurel Creek
Wideman Creek
SWD7
CUW1
SWM
ANTH
SWMF BLOCK 'A'
CUT1
PARK/ AMENITY
SWT3-2
AG
FOM
SWMF BLOCK 'B'
AMENITY
HR
FUTURE DEVELOPMENT

Path: X:\2520_720ErbsvilleRdEIS\NRSI_2520_Map7_ProposedEnhancement_2024_01_23_LEH.mxd