Appendix B
Natural Heritage Assessment

Belfountain Transportation Corridor Class Environmental Assessment (EA) Study, Peel Region

Natural Heritage Report

Prepared for:
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Project No. 1337

Date: May, 2014

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

Belfountain Transportation Corridor
Class Environmental Assessment (EA) Study,
Peel Region

Natural Heritage Report

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1.0 Introduction

Natural Resource Solutions Inc. (NRSI) was retained by HDR Corporation in 2012, on behalf of the Region of Peel (Region), to conduct the natural heritage assessment component of the Peel Regional Road Corridor Study Schedule C Class Environmental Assessment (EA). The EA was initiated to study opportunities for rehabilitation/reconstruction of regional road corridor right-of-ways (ROWs) bounded by Winston Churchill Boulevard, Bush Street, Old Main Street, Mississauga Road, and Olde Base Line Road within the Town of Caledon. Winston Churchill Boulevard acts as a boundary road with the adjacent County of Wellington (Town of Erin).

The purpose of the EA is to identify a preferred alternative that would address known road deficiencies that include improper stormwater drainage, deteriorated pavement, minimal road shoulders, and problematic road sightlines. This EA represents a continuation of a previous EA completed for the Mississauga Rd. and Bush St. ROWs (Dillon Consulting 2010), with an expanded study area to encompass the ROWs of Olde Base Line Rd. and Winston Churchill Blvd. as defined and mapped in Section 1.1.

Studies were completed as part of this EA to characterize existing natural heritage features and functions within the study area. These studies, which included description and mapping of existing vegetation communities, inventory of vegetation and breeding bird species, assessment of aquatic habitat features, and documentation of Significant Wildlife Habitat (SWH), supplemented earlier work completed for the 2010 EA. This earlier work included vegetation community mapping, vegetation and tree inventories, and breeding bird surveys within the 2010 EA study area (Dillon Consulting 2010), as well as spring vegetation inventories and breeding amphibian surveys within the ROWs for Olde Base Line Rd. and Winston Churchill Blvd. (i.e., the “expanded study area”) (Dillon Consulting 2011).

Based on existing background information provided in the 2010 EA, information provided by the project team and review agencies (e.g., Credit Valley Conservation (CVC), Ontario Ministry of Natural Resources (OMNR)) and other secondary information sources (see Section 3.1), NRSI produced a Natural Heritage Existing Conditions and Natural Feature Constraints Report, which was submitted in draft to HDR in August 2013. The purpose of this report was to summarize the existing natural features and functions within the study area, and to evaluate the significance and sensitivity of identified features and species which may pose a constraint to road

improvement works. Natural feature constraints were identified to guide selection of the preferred alternative design. Following review and comment provided by the OMNR, CVC, and Niagara Escarpment Commission (NEC) during fall 2013, updates and revisions were made, and a finalized version was submitted to HDR in March 2014.

During November 2013, various road improvement design alternatives were identified for each of Mississauga Rd., Olde Base Line Rd., Winston Churchill Blvd., Bush St., and Old Main St. in the village of Belfountain. For each of these ROWs, alternative road cross-sections, road profiles, and road intersection designs were identified. NRSI undertook preliminary impact assessments for each of these design alternatives to inform the selection of preferred alternative designs. Natural heritage considerations represented one of several evaluation criteria that were considered by HDR in selection of the preferred designs. In February 2014, the preferred alternative designs were selected for each ROW within the study area.

This report updates the 2013 Existing Conditions and Natural Feature Constraints Report to include a detailed impact assessment for each of the preferred alternative designs (incorporating road cross-section, profile and intersection designs) that have been identified for each study area ROW. The impact assessment was completed based on comparison of existing natural features, and their significance and sensitivity, with details of the preferred alternative designs. Road improvement details, including proposed grading limits, culvert locations, stormwater management systems and anticipated tree removals, were provided by HDR.

Various measures are recommended to avoid, minimize or mitigate impact to natural features within the study area. Opportunities for ecological restoration or enhancement have been identified where feasible. General monitoring recommendations have been provided to evaluate the success of implemented mitigation measures during and post-construction. It is anticipated that additional detail regarding recommended restoration/enhancement, and monitoring program design, will be determined during the detailed design stage of development.

1.1 Study Area

The study area is located within the Town of Caledon, Peel Region, and includes the village of Belfountain. The study area includes the ROWs of Mississauga Rd. (including Old Main St. in

Belfountain) from Bush St. to Olde Base Line Rd. (approximately 6.3 km), Olde Base Line Rd. from Mississauga Rd. to Winston Churchill Blvd. (approximately 2.7 km), Winston Churchill Blvd. from Olde Base Line Rd. to Bush St. (approximately 6.0 km), and Bush St. from Winston Churchill Blvd. to Old Main St./Mississauga Rd. (approximately 2.0 km). In addition to the road ROWs, this study has collected information within 120 m on either side of each road ROW in order to address the adjacent lands of off-site natural features. The study area therefore incorporates 120 m of land within the Town of Erin, Wellington County, northwest of the Winston Churchill Blvd. ROW. See Figure 1 for a map of the study area. A larger area (up to 10x10 km around the study area) was also investigated for the presence of existing wildlife species records.

Mississauga Rd. and Winston Churchill Blvd. are two-lane, rural arterial roads running in a northeast-southwest direction (north-south following project mapping orientation). Winston Churchill Blvd. has a posted speed limit of 70 km/h and a 30 m ROW. Mississauga Rd. has speed limit postings that range between 60-70 km/h outside of Belfountain. Within Belfountain, the road is known as Old Main Street, with a posted speed limit ranging between 40-50 km/h. The ROW of Mississauga Rd./Old Main St. ranges between 20-30 m. Bush St. and Olde Base Line Rd. are two-lane, rural roads running in a northwest-southeast direction (east-west following project mapping orientation). Bush St. has posted speed limits ranging from 40 km/h (in Belfountain) to 80 km/h, and ROW widths of 20-30 m along its study area length. Olde Base Line Rd. has a posted speed limit of 60 km/h and a ROW width of 30 m.

For the purposes of this report and ease of mapping, the study area is oriented to project north (i.e., true northwest = project north; true northeast = project east; true southeast = project south; true southwest = project west).

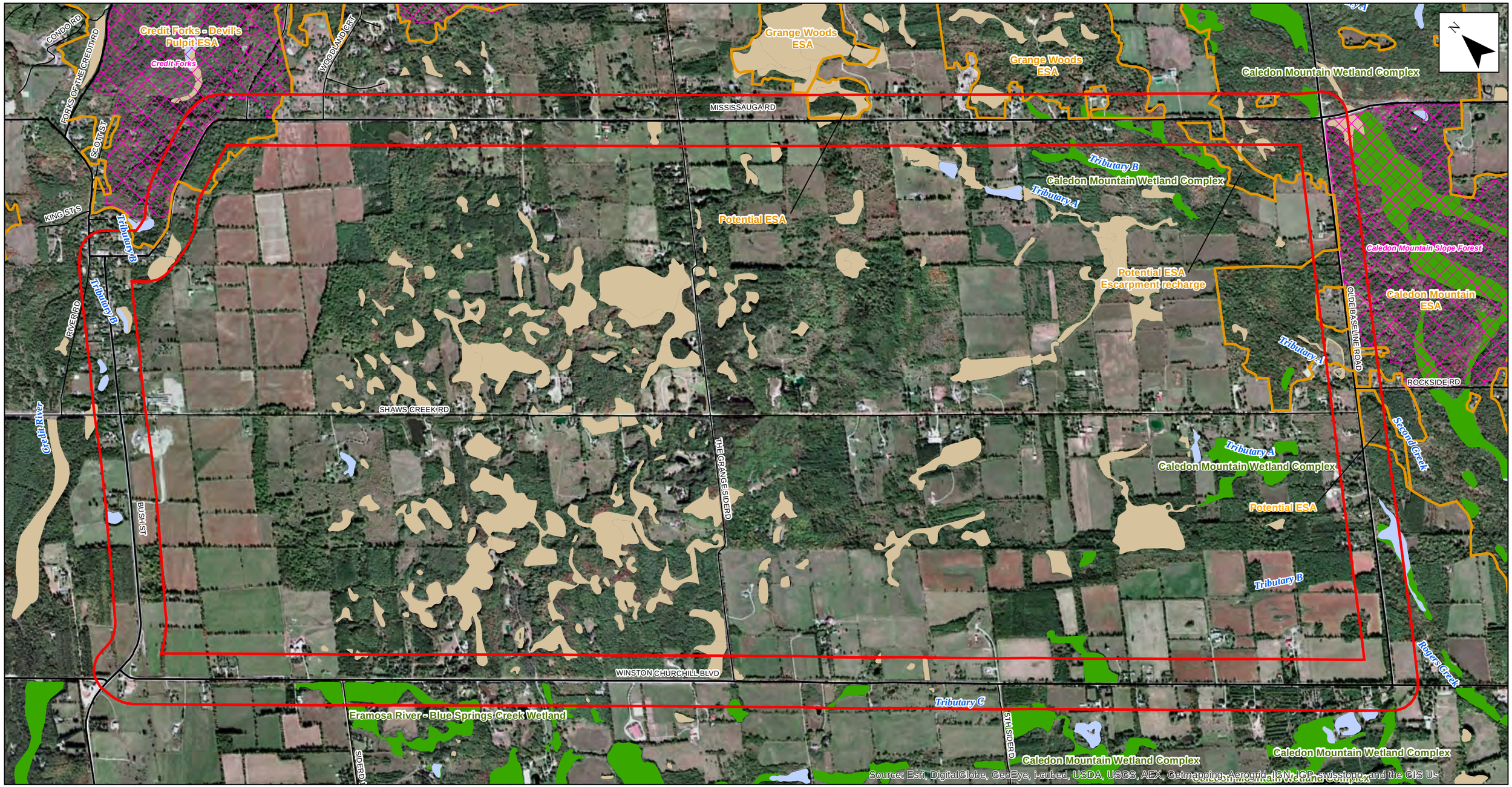


Figure 1

Belfountain Transportation EA

Study Area and Designated Natural Features

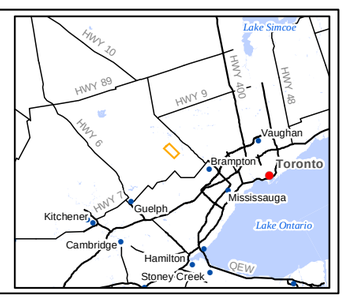
NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

0 100 200 300 400 500 Meters

December 13, 2013. Project No: NRSI-1337.
UTM Zone 17, NAD 83 Scale: 1:17,000 (at 11x17")

Legend

- Study Area
- Highway
- Primary Road
- Secondary Road
- Waterbody
- Environmentally Sensitive Area (ESA)
- Provincially Significant Wetland (PSW)
- Non-Provincially Significant Wetland (PSW)
- ANSI, Life Science



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2.0 Relevant Policies, Legislation, Guidelines and Planning Studies

With respect to the natural environment, all applicable municipal/regional, provincial and federal policies and guidelines are required to be complied with throughout all phases of the project. A summary of policies, legislation, guidelines and planning studies pertinent to this project are summarized in this section.

These relevant policies, legislation, guidelines and planning studies are used to define what are known as „significant" natural areas, features, and habitats. They are further used to guide the layout of the proposed road improvements by establishing boundaries and, where feasible, setbacks (buffers) from any identified significant area, feature, or habitat.

Section 5.0 of this report provides a summary of significant natural areas, features and habitats identified within the study area as it relates to the policies, legislation, guidelines and planning studies discussed in this section.

2.1 Provincial Policy Statement, 2014

The Provincial Policy Statement (PPS) (OMMAH 2014) is issued under the authority of Section 3 of the Planning Act and came into effect on April 30, 2014, replacing the 2005 PPS. Section 3 requires that decisions affecting planning matters shall be consistent with policy statements under the Act. Section 4.4 of the PPS establishes that the PPS is to be read in its entirety and all relevant policies are to be applied to each situation. In this context, 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." These features are broadly defined within the PPS and rely on the OMNR and the municipality to identify and delineate specific natural features. The Natural Heritage Reference Manual (OMNR 2012) and the Significant Wildlife Habitat Technical Guide (OMNR 2000) were prepared by the OMNR to provide guidance on identifying natural features and in interpreting the Natural Heritage sections of the PPS. These features include:

a) Significant wetlands in Ecoregion 5E, 6E and 7E;
b) Significant and other coastal wetlands in Ecoregions 5E, 6E and 7E;
c) Fish habitat;
d) Significant woodlands in Ecoregion 6E and 7E;

e) Significant valleylands in Ecoregion 6E and 7E;
f) Habitat of Endangered species and Threatened species;
g) Significant Wildlife Habitat;
h) Significant Areas of Natural and Scientific Interest (ANSI)

In the case of Significant Wildlife Habitat, regionally-specific designation criteria were followed as outlined in the Peel-Caledon Significant Woodlands and Significant Wildlife Habitat Study final report (North-South Environmental *et al.* 2009) (see Section 3.3).

Section 2.1.4 of the PPS states that development and site alteration shall not be permitted in significant wetlands in Ecoregions 5E, 6E, and 7E, or significant coastal wetlands.

Section 2.1.5.of the PPS states that development or site alteration shall not be permitted in Significant Wildlife Habitat, or other types of significant habitat unless it has been demonstrated that there will be no negative impacts on the features or their ecological functions.

Section 2.1.6.of the PPS states that development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.

Section 2.1.7 of the PPS states that development or site alteration shall not be permitted in habitat of Endangered or Threatened species except in accordance with provincial or federal requirements.

In all cases, development and/or site alteration is not permitted under the PPS on adjacent lands to the natural heritage features and areas identified in policies 2.1.4, 2.1.5 and 2.1.6 unless the ecological function of the adjacent lands has been evaluated and it has been demonstrated that there will be no negative impacts on the natural features or on their ecological functions (OMMAH 2014).

The Natural Heritage Reference Manual (OMNR 2010) provides technical guidance for implementing the natural heritage policies of the PPS. Although the Natural Heritage Reference Manual was based on the 2005 PPS, its guidance may be applied to the 2014 PPS. The

manual represents the province"s recommended technical criteria and guidance for identifying and protecting significant natural features as defined in the PPS.

The Significant Wildlife Habitat Technical Guide (SWHTG) was prepared to assist planning authorities and other participants in the land use planning system (OMNR 2000). The SWHTG is a detailed technical manual that provides information on the identification, description, and prioritization of Significant Wildlife Habitat. The manual is intended for use in the municipal policy and development process under the Planning Act. An addendum to the SWHTG provides further detail on characterizing and identifying Significant Wildlife Habitat in Ecoregion 6E (OMNR 2012a).

Significant wildlife habitats have the potential to occur within the study area, as well as habitats for provincially Endangered or Threatened species that are known from the study area vicinity. The study area is also known to contain fish habitat, as well as portions of two Provincially Significant Wetlands (PSWs): Caledon Mountain PSW Complex and Eramosa River-Blue Springs Creek PSW Complex. Portions of woodlands exist within the study area that may meet significance criteria as outlined in the Natural Heritage Reference Manual (OMNR 2010). Finally, the study area contains portions of two Life Science ANSIs: Caledon Mountain Slope Forest and Credit Forks.

Despite the above policies, it should be noted that as a development under the Class Environmental Assessment process, the Provincial Policy Statement cannot restrict development within defined significant features as would be the case for a development under Planning Act policy. Rather, the policies of the Provincial Policy Statement are recognized and respected to the extent possible within the Class EA process. Natural feature constraints identified by these policies are considered in the evaluation of alternatives and impact assessments.

2.2 Canadian Fisheries Act, 1985

The Canadian *Fisheries Act* (Government of Canada 2013a) provides provisions for the protection of fish and fish habitat. The principle provision (Section 35) states that no one may *carry on any work or undertaking that results in the harmful alteration, disruption or destruction*

(HADD) *of fish habitat*, unless authorized to do so by the Department of Fisheries and Oceans Canada (DFO).

Pursuant to Section 35, Credit Valley Conservation (CVC) has a Level 2 agreement with the DFO which grants them the authority to conduct a technical review of proposed project plans on behalf of DFO to determine the potential for a HADD within their jurisdiction.

CVC shall determine whether impacts to fish and fish habitat can be appropriately mitigated, and if so, issue a Letter of Advice (LOA) with respect to their findings. If impacts to fish and fish habitat cannot be fully mitigated, an Authorization under the Fisheries Act is required. At this time the application is provided to the DFO for review. DFO will provide guidance and input in the preparation of a fish habitat compensation plan. DFO will then issue a Fisheries Act Authorization. Any conditions (i.e. compensation, compliance monitoring, etc.) of this Authorization must be adhered to throughout the course of the project.

As direct fish habitat is present within the study area and has potential to be impacted, the Fisheries Act is a key piece of legislation relevant to the proposed works. It is anticipated that based on the detail provided as part of the selected preferred alternative design, impacts on fisheries will be adequately mitigated and a LOA will be sufficient. However, this ultimately would have to be determined by CVC at the detailed design, permitting and approvals phase of the project.

2.3 Endangered Species Act, 2007

Species designated as Threatened or Endangered in Ontario automatically receive legal protection under the *Endangered Species Act* (ESA) (Government of Ontario 2007) and their habitats are protected generally under the Act (i.e., areas essential for breeding, rearing, feeding, hibernation and migration). The ESA (Subsection 9(1)) states that:

"No person shall,

> *(a) kill, harm, harass, capture or take a living member of a species that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species;*
>
> *(b) possess, transport, collect, buy, sell, lease, trade or offer to buy, sell, lease or trade,*

(i) a living or dead member of a species that is listed on the Species at Risk in Ontario List as an extirpated, endangered or threatened species,

(ii) any part of a living or dead member of a species referred to in subclause (i),

(iii) anything derived from a living or dead member of a species referred to in subclause (i); or

(c) sell, lease, trade or offer to sell, lease or trade anything that the person represents to be a thing described in subclause (b) (i), (ii) or (iii).

Clause 10(1)(a) of the ESA states that:

"No person shall damage or destroy the habitat of a species that is listed on the Species at Risk in Ontario list as an endangered or threatened species"

In order to balance social and economic considerations with protection and recovery goals, the ESA also enables the Minister of Natural Resources to issue permits or enter into agreements with proponents in order to authorize activities that would otherwise be prohibited by subsections 9(1) or 10(1) of the Act provided the legal requirements of the Act are met.

The ESA is of relevance to this EA given the existence of occurrence records for multiple Species at Risk (SAR) within the vicinity (e.g., within 10x10 km area) of the study area. Habitat assessments, including field-based studies, were completed to determine the presence of SAR and their habitat within the study area. Multiple SAR were identified as potentially occurring, or known to occur, in the study area as described below.

2.4 Migratory Birds Convention Act, 1994

The Migratory Birds Convention Act protects migratory birds and is applied through *The Regulations Respecting the Protection of Migratory Birds* that states that:

"no person shall disturb, destroy or take a nest, egg […] of a migratory bird."

This law protects all birds aside from the introduced species European starling (*Sturnus vulgaris*), house sparrow (*Passer domesticus*), and rock pigeon (*Columba livia*). Bird nests that are destroyed during the course of construction and other related activities is referred to as "incidental take" and is illegal except under the authority of a permit obtained through the

Canadian Wildlife Service. Implications of the Migratory Birds Convention Act have potential to occur during the construction phase of the project if road improvement operations result in removal of vegetation.

2.5 Peel Region Official Plan

The Peel Region Official Plan was adopted by municipal council on July 11, 1996 and was approved with modifications from the Minister of Municipal Affairs and Housing on October 22, 1996. An Office Consolidation of the Official Plan was developed in November 2008 (Region of Peel 2008).

The Greenlands system in Peel Region consists of Core Areas, Natural Areas and Corridors, and Potential Natural Areas and Corridors. As defined in Section 2.3.2.2 of the Official Plan and the Official Plan Amendment 21b (Peel Region 2010), Core Areas consist of the following:

- Provincially Significant Wetlands;
- Woodlands that are >16 ha in area and/or meet other significance criteria as outlined in Peel Region (2010);
- Environmentally Sensitive or Significant Areas;
- Provincial Life Science Areas of Natural and Scientific Interest;
- Habitats of vulnerable, threatened, or endangered species;
- Escarpment Natural Areas of the Niagara Escarpment Plan; and,
- Valley and stream corridors shown on Schedule A of the Official Plan associated with the main branches of the Credit River, Etobicoke Creek, Mimico Creek, the west Humber River, and Humber River

These Core Areas are mapped within Schedule A of the Regional Official Plan (Region of Peel 2008). The study area contains portions of several natural features that are designated as Core Areas, including portions of two PSWs (as described above), woodlands greater than 16 ha, three Environmentally Significant or Sensitive Areas (ESAs) (Credit Forks-Devil's Pulpit, Grange Woods and Caledon Mountain), two Life Science ANSIs (as described above), and lands designated Escarpment Natural Area (see Section 2.7). As described in Section 2.1, the study area may also provide habitat for provincially Threatened or Endangered species, as well as species of Special Concern (described as “vulnerable” in the Official Plan), based on the existence of occurrence records for various species in the surrounding vicinity. Core Areas are

protected from development and site alteration as per Section 2.3.2.5 of the Region of Peel Official Plan except for:

a) development permitted within approved Two Zone and/or Special Policy Areas for Flood Plains as outlined in provincial policy areas for Flood Plains as outlined in provincial policy;

b) minor development, minor site alterations and passive recreation;

c) essential servicing;

d) works for conservation purposes or

e) compatible recreation within the Urban System as shown on Schedule D.

These exceptions may be permitted through an approved area municipal official plan or the Niagara Escarpment Plan where applicable, in consultation with the Region, the conservation authorities, the Niagara Escarpment Commission and other relevant agencies, provided that the policies which permit such uses and activities are in conformity with the objectives of this plan (Region of Peel 2008).

Other Regional Official Plan natural feature classifications of relevance to the study area include Natural Areas and Corridors (evaluated non-significant wetlands, woodlands >0.5 ha, and Escarpment Protection Areas as defined in the Niagara Escarpment Plan), and Potential Natural Areas and Corridors (unevaluated wetlands, all other woodlands, potential ESAs).

Figure 2 of the Region of Peel Official Plan identifies areas of provincial interest such as areas within the Greenbelt Plan Area and the Niagara Escarpment Plan Area (Region of Peel 2008). The study area is located within both of these areas and policies related to each are discussed below.

2.6 Wellington County Official Plan

Effective January 1, 1999 Wellington County"s Official Plan was implemented as a way to restructure the County"s affairs and plan for the future. A subsequent amendment to the Official Plan was adopted February 12, 2013.

Because the study area encompasses Winston Churchill Blvd. (a boundary road with Peel Region) and lands 120 m to its west, the Wellington County Official Plan needs to be considered with respect to any proposed development within the County"s jurisdiction.

Section 5.6 of Wellington County"s Official Plan identifies Greenlands and Core Greenlands within its land use mapping.

Core Greenlands differ from Greenlands, as Core Greenlands are lands deemed generally to be more sensitive than Greenlands. Core Greenland designations include;

a. Provincially Significant Wetlands and all other wetlands;
b. Habitat for endangered or threatened species; and
c. Floodway and hazardous lands.

Greenlands are characterized as lands outside of Core Greenlands, but also include;

a. Areas of natural and scientific interest;
b. Streams and valleylands;
c. Woodlands greater than 10 ha;
d. Environmentally Sensitive Areas;
e. Ponds, lakes and reservoirs; and
f. Natural linkages.

2.7 Lower-Tier Municipality Official Plans

The study area falls within the jurisdictions of the Town of Caledon (east of Winston Churchill Blvd.) and the Town of Erin (west of Winston Churchill Blvd.). The Official Plan policies of each Town (Town of Caledon (2008) and Town of Erin (2007), respectively) are therefore considered in this study.

2.8 Niagara Escarpment Plan

The Niagara Escarpment Plan (Niagara Escarpment Commission (NEC) 2005), has the overall purpose of maintaining the Niagara Escarpment and adjacent lands as a continuous natural environment and to ensure that such development that occurs is done in a manner that is compatible with the natural environment (NEC 2005). The Niagara Escarpment Plan area is

divided into various designated land areas, including the following which have been mapped within the study area (NEC 2005):

- Escarpment Natural Area
- Escarpment Protection Area
- Escarpment Rural Area
- Minor Urban Centre (Belfountain)

Section 2.2.1 of the plan discusses general development criteria:

Permitted uses may be allowed provided that:
a) The long term capacity of the site can support the use without a substantial negative impact on Escarpment environmental features such as contours, water quality, water quantity, natural vegetation, soil, wildlife, population, visual attractiveness and cultural heritage features.
b) The cumulative impact of development will not have serious detrimental effects on the Escarpment environment (e.g. water quality, vegetation, soil, wildlife, and landscape).
c) The site is not considered hazardous to life or property due to unstable soil conditions or possible flooding.
d) Development meets applicable federal, provincial and municipal requirements including health and servicing requirements.

As per section 2.6 of the Plan, changes to the natural drainage must be avoided and development is to be located outside of wetlands. The limits of the wetland will be determined by the conservation authority. Development adjacent to wetlands will only be permitted if it does not result in the loss of wetland functions, subsequent development that will negatively affect wetland function, conflict with site specific wetland management practices or loss of wetland contiguous area. A developmental setback from the wetland is to be determined in association with the conservation authority. Furthermore, water resources must be maintained in a clean and healthy manner that will not affect fish resources.

New development adjacent to fish resources must demonstrate:
a) The development shall ensure net gain/no net loss of productive capacity of fish habitat;
b) Maintenance of minimum baseflow of watercourses;
c) Maintenance of existing watercourses in a healthy, natural state;

d) Maintenance of vegetative buffers in accordance with the sensitivity of the fishery resource and development criteria; and
e) Best available construction and management practices shall be used to protect water quality and quantity, both during and after construction. Treatment of surface run-off to maintain water quality and hydrological characteristics in receiving watercourses shall meet the standards established by the OMNR (NEC 2005).

As per section 2.7 of the plan, new development within wooded areas must minimize disturbance and must have a site plan and specific management details regarding the protection of existing trees.

As per Section 2.8 of the plan, development will not be permitted within the regulated habitat of Endangered species and must maintain wildlife corridors and linkages. Wildlife habitat must be enhanced wherever possible.

Section 2.14 of the Plan specifies that development should be directed outside of provincially and regionally significant Life Science ANSIs. Minor encroachments will be considered in relation to:

a) Specific features for which the ANSI was identified;
b) Protection, natural heritage appreciation, scientific study or educational values and their maintenance, and;
c) Whether appropriate mitigative measures can be applied to protect ANSI values.

Sections 1.3, 1.4, and 1.5 further specify permitted uses within Escarpment Natural Area, Escarpment Protection Area, and Escarpment Rural Area, respectively, subject to Part 2 of the Plan. Of permitted activities of relevance to the proposed development, “essential transportation and utility facilities” is considered a permitted use within all three of these policy designation areas (Sections 1.3, 1.4, 1.5 of NEC (2005)). However, the test for being considered “essential”, based on the definition provided in NEC (2005), only needs to be met in Escarpment Natural Areas.

2.9 Greenbelt Plan

The Greenbelt Plan (OMMAH 2005) is designed to identify where urbanization should not occur within Ontario"s Greater Golden Horseshoe Area, in order to provide permanent protection to

the agricultural land base and the ecological features and functions occurring on the landscape. The Greenbelt Plan complements and builds upon the ecological protections provided by the Niagara Escarpment Plan and the Oak Ridges Moraine Conservation Plan to guide development decisions that occur within lands designated as Protected Countryside under the Plan.

As identified in Figure 2 of the Region of Peel Official Plan, much of the study area falls within the Greenbelt Plan area and is subject to the policies of this plan (Region of Peel 2008). Specifically, the study area contains areas designated as Protected Countryside and Natural Heritage System as defined in the Greenbelt Plan (2005). The Protected Countryside is intended to enhance the spatial extent of agriculturally and ecologically protected lands, to supplement those covered by the Niagara Escarpment Plan and the Oak Ridges Moraine Conservation Plan, and to support linkages between these areas and other major watersheds (OMMAH 2005). The Natural Heritage System of the Greenbelt Plan encompasses areas recognized to contain the most sensitive and/or significant natural features or functions.

The Natural Heritage System includes Key Natural Heritage Features and Key Hydrologic Features. Key Natural Heritage Features include the following:

- Significant habitat of Endangered, Threatened, and Special Concern species
- Fish habitat
- Wetlands
- Life Science ANSIs
- Significant Valleylands
- Significant Woodlands
- Significant Wildlife Habitat
- Sand barrens, savannahs and tallgrass prairies
- Alvars

Key Hydrologic Features include the following:

- Permanent and intermittent streams
- Lakes (and their littoral zones)
- Seepage areas and springs
- Wetlands (OMMAH 2005)

Development and site alteration within the Natural Heritage System should demonstrate no negative impacts to key natural heritage features or functions, and that ecological connectivity will be maintained (OMMAH 2005).

2.10 Regulation 160/06 – Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses

In 2013, CVC implemented Ontario Regulation 160/06: *Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses*. The Regulation identifies that; *"no person shall undertake development, or permit another person to undertake development in or on the areas within the jurisdiction of the Authority that are,*

b) river or stream valleys that have depressional features associated with a river or stream, whether or not they contain a watercourse

d) wetlands; or

e) other areas where development could interfere with the hydrologic function of a wetland, including areas within 120 metres of all provincially significant wetlands and areas within 30 metres of all other wetlands"

Portions of two Provincially Significant Wetland (PSW) complexes occur within the study area: Caledon Mountain PSW Complex and Eramosa River-Blue Springs Creek PSW Complex. Other, non-PSW wetlands also exist within the study area. A permit will be required from CVC under the Reg. 160/06 to proceed with any alteration or development within these wetland features, or within their adjacent lands as defined above.

2.11 Municipal Tree Bylaw

The Town of Caledon Tree Bylaw 2000-100 (Town of Caledon 2000) prohibits and regulates the destruction of trees in woodlands within the Municipality of the Town of Caledon. The bylaw aims to protect Caledon"s woodlands and to promote the use of good forestry practices to improve the health and long term sustainability of local woodlands. Exemptions apply to the bylaw and are described in Section 3.2 of the bylaw. Additionally, the details of the Application for Permit to Destroy Trees are outlined in Section 6 of the bylaw.

A regulated tree is defined as […] *"any species of single or multi-stemmed perennial woody plant, which has reached or can reach a height of at least (6) metres at physiological maturity. This definition does not include sumac, hawthorne and wild apple trees, except where these species form an integral component of a forest ecosystem"* […].

A woodland is defined as "[…]*different trees, shrubs, ground vegetation and soil complexes that provide habitat for plants and animals which is a minimum of 0.5 hectares (1.2 acres) in area and contains at least:*

(i) 370 trees measuring more than 5 centimetres dbh; or

(ii) 250 trees measuring more than 12 centimetres dbh; or

(iii) 125 trees measuring more than 20 centimetres dbh […]"

However, Section 3.2 (ix) of the bylaw states that the bylaw does not apply to "*works lawfully undertaken by the Regional Municipality of Peel*". As the proposed road improvements are to be undertaken by the Region within its jurisdiction, the above bylaw does not apply to the proposed undertaking.

3.0 Study Methods

3.1 Collection and Review of Background Information

A review of background information within the study area and surrounding lands (i.e. up to 10x10 km surrounding the study area) was carried out to characterize terrestrial, wetland and aquatic features within the study area. Several sources of existing information, including reports, mapping, and occurrence records, were compiled and reviewed in order to obtain pertinent information to the study area"s natural features. A full set of desktop references can be found in Section 8.0 References.

Initial background information requests were submitted to the CVC on July 27, 2012, and to the OMNR Aurora District on July 27, 2012 and again on June 11, 2013. Initial wildlife species lists were compiled to provide information on species reported from the vicinity of the study area (10 km radius) using various atlases, including the Ontario Mammal Atlas (Dobbyn 1994), The Butterflies of Canada (Layberry *et al.* 1998), Ontario Odonata Summary Atlas (OMNR 2005), and the Ontario Reptile and Amphibian Atlas (Ontario Nature 2012). Data on breeding birds in the area was extracted from the Ontario Breeding Bird Atlas (Bird Studies Canada *et al.* 2008). Since this atlas provides data based on 10x10 km survey squares, information on breeding birds from the squares that overlap the study area (squares #17NJ74, 17NJ75, 17NJ84, 17NJ85) were compiled. These initial species lists were used to guide the scope and type of wildlife surveys required as outlined in the following sections.

All wildlife species known from background information and identified as nationally significant (COSEWIC 2013, Government of Canada 2013b) or provincially significant (OMNR 2013) were cross-referenced with habitats known to occur on the subject property or adjacent lands to ensure that their presence or potential presence is assessed in this EA. This screening exercise is described in further detail in Section 3.2

Methods for gathering background information in regards to aquatic features included consultation with the Aurora District OMNR as well as CVC. The West Credit Subwatershed Study Characterization report (CVC 1998) and the Terra Cotta-Silver Creek Complex Management Plan (CVC 2008), were utilized for determining drainage, fish species, and thermal regime for the tributaries within the study area. In addition, the 2013 DFO Aquatic Species at

Risk mapping, the ESA species status list (OMNR 2013), and the Species at Risk Act public registry (Government of Canada 2013b) were all reviewed to identify species occurrence records for within the study area.

The Natural Heritage Report completed for the Mississauga Rd.-Bush St. Regional Road Class EA (Dillon Consulting 2010), as well as the technical memo summarizing field survey results for the Olde Base Line Rd. and Winston Churchill Blvd. ROWs (Dillon Consulting 2011) were reviewed to identify natural features and species documented within the study area. As described in Section 1.0, field surveys completed as part of these studies included vegetation community mapping, vegetation and tree inventories, and breeding bird surveys within the 2010 EA study area (Dillon Consulting 2010), as well as spring vegetation inventories and breeding amphibian surveys within the ROWs for Olde Base Line Rd. and Winston Churchill Blvd (Dillon Consulting 2011). The results of these studies were fully utilized in assessing the significance and sensitivity of study area natural features and associated development constraints. Other existing information sources, such as the CVC"s Natural Areas Inventory reports (CVC 2011a-d) (including source vegetation and wildlife species lists), Credit Valley Watershed Report Card (CVC 2005), CVC`s Management Plan for Terra Cotta-Silver Creek Complex (CVC 2008), and West Credit Subwatershed Study (CVC 1998) were also reviewed to characterize the study area"s natural features and species.

Additional information was provided through consultation with OMNR and CVC staff. OMNR biologist Mark Heaton provided information on wildlife occurrences throughout the study area, including SAR, and detailed the results of OMNR studies to identify and monitor deer movements across study area ROWs. These studies included the use of motion-sensitive wildlife cameras to record still-photo and video footage of deer road crossings in the study area during winter 2012/2013. Crossing location assessments also incorporated the results of deer-vehicle collision reports for the Region, such as Elchyshyn and Heaton (2009). These studies resulted in accurate identification of road crossing locations, and assessments of crossings as high- or low-density movement paths based on estimations of deer abundance at each location.

Amphibian (anuran and salamander) survey data collected by CVC within the study area between 2009 and 2012 were also used to assess wildlife road crossing locations and movement densities. The CVC data included the results of amphibian call surveys, using a modification of the Marsh Monitoring Program survey protocol (Bird Studies Canada 2009), as

well as surveys for live or road-killed individuals crossing study area ROWs. These studies also included incidental observations of mammal and reptile species within the ROWs. Raw data were provided to NRSI and mapped, showing accurate amphibian observation locations as well as numbers of observations at each location, providing a measure of movement density (see Section 5.1.6.1).

Meetings were held with staff of the OMNR, CVC, Region of Peel, and HDR to collectively present and discuss existing information and additional resources of relevance to the study area"s natural features, significant species, and wildlife movement patterns. This information included anecdotal wildlife observations provided by Mark Heaton based on his familiarity with the study area. These meetings were held on September 17, 2012, April 26, 2013, and July 9, 2013. The minutes of these meetings are compiled in Appendix I.

3.2 Species at Risk Habitat Screening & Assessment

During the collection and review of background information and initial species list compilation, several Species at Risk (SAR) were identified as being reported from within the vicinity of the study area.

For the purposes of this report, NRSI has distinguished between species and habitat that are warranted legislative protection provincially under the ESA and federally under the *Species at Risk Act* (SARA) as well as those that would be considered species of conservation concern. As such, the term Species at Risk will be used to identify species listed as Endangered or Threatened within Ontario and subsequently protected under the ESA. The term species of conservation concern will be used for species designated as Special Concern within Ontario, species that have been assigned a conservation status (S-Rank) of S1 to S3 or SH, and species that are designated federally as Threatened or Endangered by the Committee for the Status of Endangered Wildlife in Canada (COSEWIC) and the SARA, but not provincially by the OMNR.

An initial screening of the SAR records was undertaken to identify which of the reported species have potential to be present within the study area. This screening was carried out by comparing species habitat preferences and spatial distributions obtained through literature review to available information for existing vegetation communities and habitat characteristics to determine if suitable habitats were present within the study area. Results of the screening

exercise are provided in Appendix II. Species with suitable habitat present within the study area, as determined by the SAR screening, are discussed in Section 4.0 under each respective biota (e.g., Birds, Section 4.5.1).

3.3 Significant Wildlife Habitat Screening

Significant Wildlife Habitat is generally designated by criteria identified in the Significant Wildlife Habitat Technical Guide (OMNR 2000a). The SWHTG divides habitat types into four broad categories:

- Seasonal Concentration Areas of Animals;
- Rare Vegetation Communities or Specialized Habitat for Wildlife;
- Habitat for Species of Conservation Concern; and
- Animal Movement Corridors

Habitats identified as SWH are afforded protection under the PPS (OMMAH 2005), Regional, County, and Municipal Official Plans (e.g., Region of Peel 2008), the Niagara Escarpment Plan (NEC 2005) and the Greenbelt Plan (OMMAH 2005), as discussed in Section 2.0.

Specifically for this EA, SWH was identified following criteria provided in the Peel-Caledon Significant Woodlands and Significant Wildlife Habitat Study final report (North-South Environmental *et al.* 2009). The criteria and thresholds for evaluating SWH, as presented in North South Environmental *et al.* (2009), was based on modifications made to SWH criteria outlined in the OMNR"s Significant Wildlife Habitat Technical Guide (OMNR 2000a) following consultation with regional, municipal, public, and other stakeholders.

NRSI conducted a screening exercise that utilized evaluation criteria and thresholds outlined in North-South Environmental *et al.* (2009) to identify the presence of candidate SWH within the study area. NRSI used the results of previous field studies completed within the study area to inform this process. SWH categories designated as candidate were identified for follow-up field investigations by NRSI staff (see Section 3.4.2.2). The results of these field surveys were again assessed against the criteria and thresholds described in North-South Environmental *et al.* (2009) to either confirm or rule out the SWH category. In some cases, existing background data were sufficient to confirm SWH types for the study area. Candidate and confirmed SWH resulting from this screening are further described in Sections 5.1.6.1 and 5.1.6.2.

3.4 Terrestrial Field Surveys

Terrestrial field surveys were undertaken to supplement surveys previously completed within the study area (e.g., Dillon Consulting 2010, 2011). Collectively, the results of these studies were used to characterize natural features and identify SWH and/or significant plant and animal species that might be adversely affected by the proposed undertaking. A variety of field surveys were completed which are described in detail below.

3.4.1 Vegetation

3.4.1.1 Vegetation Community Delineation

Vegetation community data previously collected by CVC was utilized to characterize all natural and anthropogenic features within the study area. NRSI biologists conducted a site visit on August 23, 2012 in order to confirm several vegetation community classifications and to refine community characterizations where further detail was required. The standard Ecological Land Classification (ELC) System for southern Ontario (Lee *et al.* 1998, Lee 2008) was applied during this site visit. Due to the lack of property access, vegetation communities were assessed from the roadside and as such community descriptions are provided at the ecosite level. Details of vegetation communities were recorded including species composition and dominance. The results of vegetation community mapping completed by CVC, and confirmed through NRSI site visits, are discussed in Section 4.4.1.1.

3.4.1.2 Floristic Inventory

An inventory of all flora observed during roadside ELC surveys was conducted concurrently with the ELC surveys on August 23, 2012. These results were collected to supplement earlier vegetation inventories completed within the study area (Dillon Consulting 2010, 2011). Species observed during NRSI surveys are discussed further in Section 4.4.1.2.

3.4.2 Wildlife

3.4.2.1 Breeding Bird Surveys

Breeding bird surveys were conducted by NRSI biologists on June 3 and July 4, 2013. These surveys were conducted at 18 breeding bird point count stations (Figure 2) using standard OBBA call codes (OBBA 2001). Surveys consisted of ten minute point counts and occurred

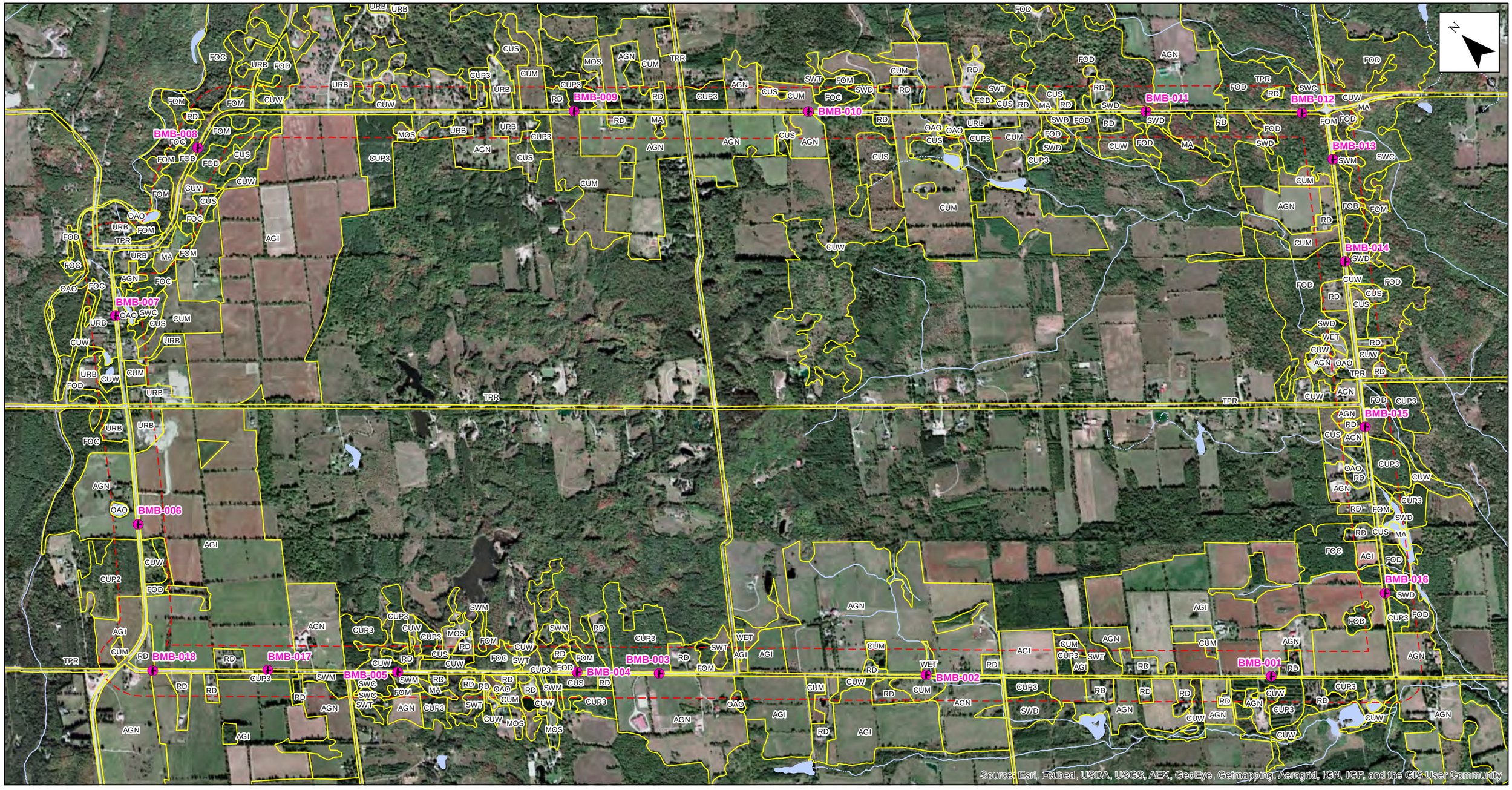


Figure 2

Belfountain Transportation EA

Vegetation Communities (CVC Data) and Survey Locations

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

0 100 200 300 400 Meters

August 14, 2013. Project No: NRSI-1337.
UTM Zone 17, NAD 83 Scale: 1:17,000 (at 11x17")

Legend

- Study Area
- Waterbody
- Permanent Watercourse
- Intermittent Watercourse
- Breeding Bird Survey Station (BMB)
- Ecological Land Classification (CVC)
- (AGI) Intensive agriculture
- (AGN) Non-intensive agriculture
- (CUM) Cultural meadow
- (CUP2) Mixed plantation
- (CUP3) Coniferous plantation
- (CUS) Cultural savannah
- (CUW) Cultural woodland
- (FOC) Coniferous forest
- (FOD) Deciduous forest
- (FOM) Mixed forest
- (MA) Marsh
- (MOS) Manicured open space
- (OAO) Open aquatic
- (RD) Rural development
- (SWC) Coniferous swamp
- (SWD) Deciduous swamp
- (SWM) Mixed swamp
- (SWT) Thicket swamp
- (TPR) Regional road
- (URB) General urban
- (URL) Low density residential
- (WET) Wet meadow

Document Path: X:\1337_PeelRegionClassEA\NRSI_1337_Fig2_ELC_CVC_17K_2013_08_07_GCS.mxd

between dawn and 1000hrs. Point counts were located to survey a wide but representative variety of habitats present in the study area, based on vegetation community mapping. All birds observed, as well as the highest level of breeding evidence exhibited for each species, were recorded on standardized survey forms.

3.4.2.2 Significant Wildlife Habitat Surveys

The SWH screening exercise described in Section 3.3 resulted in the following candidate SWH categories for the study area, based on criteria described in North-South Environmental *et al.* (2009):

1) Waterfowl nesting habitat
2) Colonial bird nesting sites
3) Raptor wintering areas
4) Snake hibernacula
5) Bat maternal roosts and hibernacula
6) Seeps and springs
7) Highly diverse areas
8) Amphibian breeding habitat (forested and non-forested types)
9) Turtle nesting and overwintering habitat
10) Habitat for area-sensitive forest interior breeding bird species
11) Habitat for open country and early successional breeding bird species
12) Habitat for wetland breeding bird species
13) Raptor nesting habitat
14) Habitat for various species of conservation concern

As candidate SWH types, field surveys were undertaken to either confirm or rule out SWH for the study area. With the exception of numbers 3, 5, and 7, SWH field assessments were undertaken in conjunction with, or based on the results of, other NRSI site investigations. Rationale for not completing field assessments for numbers 3, 5, and 7 are discussed in Section 5.1.6.2. Several candidate SWH categories were addressed through completion of breeding bird surveys, in conjunction with surveys completed during the 2010 EA (Dillon Consulting 2010). Other candidate SWH types were investigated through habitat assessments completed from roadside locations due to property access restrictions.

Candidate and confirmed SWH types identified for the study area are discussed in Section 5.1.6.

3.4.2.3 Other Wildlife

All incidental observations of mammals (as well as evidence such as tracks, scats, dens, etc.), reptiles, amphibians, butterflies and dragonflies were documented on all field visits.

3.5 Aquatic Field Surveys

3.5.1 Surface Water Drainage and Aquatic Habitat Characterization

Detailed aquatic habitat assessments were completed as part of the 2010 EA for watercourses crossing Bush St. and Mississauga Rd. (Dillon Consulting 2010). As the current study area was expanded to include the Olde Base Line Rd. and Winston Churchill Blvd. ROWs, NRSI also collected new information on aquatic crossings in these ROWs, as well as within the Bush St. and Mississauga Rd. ROWs.

Visual surveys of all surface water features including watercourses, dug ponds, and wetlands were conducted throughout the study area on August 23, 2012. Additional surveys were conducted on July 12 and 23, 2013 to ensure that all culvert locations were assessed. Areas surveyed in 2012 were revisited in 2013, as 2012 was a dry year and 2013 was considerably wetter. Surveys were carried out to document existing surface water drainage characteristics as well as to document the presence of fish habitat (direct or indirect) or drainage features which were not fish habitat. Surveys were conducted from within the ROW. See Figure 3 for aquatic habitat assessment locations.

General surface water drainage characteristics within the study area were also documented, including drainage patterns, flow directions, origins of and contributions to stream flow (i.e., groundwater seepages vs. surface runoff), and suspected flow regime (i.e., ephemeral, intermittent, permanent).

Those features identified as fish habitat (direct or indirect) were further surveyed to characterize the habitat present. Aquatic habitat characterization surveys included documenting general

habitat characteristics such as channel dimensions, stream morphology, substrates, in-stream cover, channel gradient, riparian habitat, aquatic vegetation, bank slope and bank stability.

Fish community surveys were not completed as sufficient data was provided by the OMNR and CVC for the watercourses in the study area.

Figure 3

Belfountain Transportation EA

Aquatic Features, Existing Culverts and Assessment Locations

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

0 100 200 300 400 500 Meters

May 12, 2014. Project No: NRSI-1337.
UTM Zone 17, NAD 83 Scale: 1:17,000 (at 11x17")

Legend

- Study Area
- Highway
- Primary Road
- Secondary Road
- Permanent Watercourse
- Intermittent Watercourse
- Ephemeral Watercourse
- Waterbody
- Culvert
- 2* Culvert with Full Assessment
- CVC - Assessed Watercourse Crossing

Document Path: X:\1337_PeelRegionClassEA\NRSI_1337_Fig3_AquaticPoints_17K_2014_05_12_GCS.mxd

4.0 Existing Conditions

4.1 Physiography, Surficial Geology & Soils

Due to the location of the study area, lying within a complex set of physiographical features, the area contains a widespread assortment of drainage and relief patterns as well as soils. Soil drainage is relatively good, with few areas of „poor" drainage mapped throughout the study area (Hoffman and Richards 1953, Sharpe 1980). With features such as the Niagara Escarpment to the east and south of the study area as well as other topographical features, much of Peel Region has a drainage pattern flowing from north to south towards (and into) Lake Ontario (Sharpe 1980).

Surface soil textures throughout the study area range from „light", to „medium", and „heavy", according to Hoffman and Richards (1953). Throughout the study area, the central portion (i.e., Winston Churchill Blvd. and The Grange Sideroad) and lands in the north of the study area are characterized with soil that is „heavy textured limestone till" (Hoffman and Richards 1953). Areas in the east (i.e., the upper portion of Mississauga Rd. and Bush St.) are defined as „poorly drained sands" (Hoffman and Richards 1953), while lands in the central and west portion of the study area are defined as „medium textured shale and limestone till" (Hoffman and Richards 1953). Soils throughout the study area are identified as primarily clays, loams or silts (Sharpe 1980, OMNR 2012a), formed due to glacial ice deposits during the last ice age.

Overall, the study area has little risk of erosion. Lands within the study area ROW "ring" have „moderate-slight" erosional qualities (Hoffman and Richards 1953, Sharpe 1980).

Lands in the eastern and northern portion of the study area are within the West Credit River subwatershed, including Bush St. and a portion of both Mississauga Rd. and Winston Churchill Blvd. These lands are within the upper watershed, lying above the Niagara Escarpment, and are comprised of till plains, moraines, and glacial spillways. The soils within the upper watershed generally consist of coarse materials which are more permeable than the middle and lower watershed (CVC 1998; Chapman and Putnam 1984). The upper watershed has many headwater systems, which is predominantly maintained by groundwater discharge (CVC 1998).

The Cheltenham to Glen Williams subwatershed covers the northern and western part of the study area, including Olde Base Line Rd. and a portion of both Mississauga Rd. and Winston Churchill Blvd. (to just south of The Grange Sideroad). This is the middle portion of the subwatershed and includes the Niagara Escarpment area as well as till plains (Chapman and Putnam 1984). This area is characterized by steep slopes, bedrock, and thin soil conditions. High runoff volumes and velocities are probable within this area (CVC 1998).

4.2 Local and Regional Hydrology

The study area lies within the Credit River watershed, and more specifically within the West Credit River subwatershed and the Cheltenham to Glen Williams subwatershed.

The study area has low lying areas and wetland features. The eastern portion of the study area is known to be a major recharge area due to the significant decrease in topographic relief and the presence of a buried bedrock valley (CVC 1998). The watershed"s local and regional hydrology is further discussed based on subwatershed and tributaries. It should be noted that although the study area falls within the West Credit River subwatershed, the Credit River itself is outside of the study area.

West Credit Subwatershed

Two unnamed tributaries (identified as A and B in this report) are found within the study area which are part of this subwatershed. The two unnamed tributaries drain into the west branch of the Credit River, near Belfountain, upstream of the Forks of the Credit. Tributary A is a headwater tributary which flows north under Bush St. and connects to the west branch of the Credit River less than 150 m to the west of the study area. The origin of flow for this feature is located outside of the study area and is formed through groundwater seepages and runoff.

Tributary B is located within Belfountain and drains under Old Main St. into the Credit River to the north of the study area. This feature has a steep gradient and carries surface runoff from the neighbouring areas to the west branch of the Credit River.

Cheltenham to Glen Williams Subwatershed

Three tributaries to the Credit River fall within the study area. These tributaries are Rogers Creek, Second Creek, and an Unnamed Tributary.

Second Creek

Second Creek and its unnamed tributaries cross the study area three times, twice along Mississauga Rd. (Tributaries A and B) and once along Olde Base Line Rd (Tributary A). All of the unnamed tributaries, along with Second Creek itself, flow in a southwesterly direction through wetlands and numerous online ponds. The unnamed tributaries that cross the study area originate within wetlands to the east of Mississauga Rd. Second Creek connects with the main branch of the Credit River approximately 6 km downstream of the culvert crossing along Olde Base Line Rd.

Unnamed Tributary

Two tributaries to an unnamed watercourse cross under Mississauga Rd. near Olde Base Line Rd. These tributaries flow in a southwesterly direction and converge upstream of a crossing of Olde Base Line Rd., and subsequently drain into the unnamed watercourse approximately 120 m south of the study area. The crossings along Mississauga Rd. are all located within low lying wetland features. The culvert crossing along Olde Base Line Rd. appears to be a constructed drainage feature to carry surface runoff to the unnamed tributary. The unnamed tributary eventually drains into the main branch of the Credit River to the south of the study area.

Rogers Creek

Rogers Creek and its unnamed tributaries cross the study area three times. Tributary A to Rogers Creek crosses under Olde Base Line Rd. and flows in a southwesterly direction. This tributary originates upstream of the crossing location and is formed through agricultural runoff, online ponds, and potentially groundwater seepages. Tributary B to Rogers Creek also crosses under Olde Base Line Rd. and flows in a southwesterly direction. The tributary is a headwater feature and originates through agricultural runoff as well as groundwater features. The third tributary to Rogers Creek (Tributary C) crosses under Winston Churchill Blvd. and flows in a southerly direction. This feature flows through numerous wetland features before its confluence with Rogers Creek.

The study area watercourses described above are mapped on Figure 3.

4.3 Designated Natural Areas

4.3.1 Provincially Significant Wetlands

Portions of two PSW complexes occur within the study area: the Eramosa River-Blue Spring Creek PSW Complex and the Caledon Mountain PSW Complex.

The Eramosa River-Blue Spring Creek PSW is located in the extreme north-western portion of the study area, adjacent to Winston Churchill Blvd. and north of The Grange Sideroad (Figure 1).

The Caledon Mountain PSW is comprised of seven smaller wetlands, being predominantly swamp (95%), and to a lesser extent, marsh (5%; OMNR 2012a). The PSW is important for white-tailed deer (*Odocoileus virginianus*) as well as for fish spawning and rearing, particularly for brook trout (*Salvelinus fontinalis*) (OMNR 2012b). The PSW lies within the south end of the study, along Winston Churchill Blvd. and Mississauga Rd. (Figure 1).

4.3.2 Life Science Areas of Natural and Scientific Interest

Two Life Science Areas of Natural and Scientific Interest (ANSIs) occur within the study area: the Caledon Mountain Slope Forest ANSI and the Credit Forks ANSI.

Caledon Mountain Slope Forest ANSI is a large tract of primarily deciduous forest, harbouring locally significant lands for mammals, predominantly white-tailed deer. The ANSI offers habitat for sizeable populations of amphibians, predominantly salamanders (OMNR 2012a). The Caledon Mountain Slope Forest ANSI is located within the Caledon Mountain ESA (described below), and within the southern end of the study area, adjacent to Olde Base Line Rd (Figure 1).

The Credit Forks ANSI is comprised of 46 individual wetlands, and supports locally significant habitat for white-tailed deer, herpetofauna (specifically snapping turtle (*Chelydra serpentine*)), and supports potential waterfowl breeding and staging habitats (OMNR 2012a). The ANSI is located in the northeastern portion of the study area, along Mississauga Rd. and Bush St. (Figure 1).

4.3.3 Environmentally Significant or Sensitive Areas

Three ESAs occur within the study area: the Grange Woods ESA, Caledon Mountain ESA, and the Credit Forks – Devil"s Pulpit ESA.

The Caledon Mountain ESA is within the Niagara Escarpment Plan Area and is also part of the Region of Peel Core Greenlands System (Region of Peel 2008). The Caledon Mountain ESA abuts the southern end of the study area, along Olde Base Line Rd. (Figure 1).

The Credit Forks – Devil"s Pulpit ESA, located on the Niagara Escarpment, provides some of the most extensive and complimentary views of the escarpment. The Credit Forks – Devil"s Pulpit ESA is a major outlier valley feature, displaying rugged talus slopes. It is one of the most important regions for fish spawning and nursery habitat in the region, and supports a wide diversity of fish species. The Credit Forks – Devil"s Pulpit ESA is located peripherally on the extreme northeastern portion of the study area, along Mississauga Rd. and the Credit River (Figure 1).

The Grange Woods ESA is comprised of seven individual wetlands, largely comprised of swamp (96%), and to a lesser extent marsh (4%) habitat (OMNR 2012a). Hydrologically, the Grange Woods ESA is connected by surface water to adjacent wetlands, up to 0.5 km away (OMNR 2012a). The ESA provides valuable habitat to the flora and fauna of the region, and is locally significant as winter cover for wildlife, specifically white-tailed deer (OMNR 2012a). The Grange Woods ESA is located along the eastern section of the study area, specifically along Mississauga Rd., north of The Grange Sideroad (Figure 1).

4.3.4 Credit Valley Conservation Natural Area Inventory Regions

Three sites identified within the CVC"s Natural Areas Inventory (NAI) fall within the study area: Tenth Line – 5 Sideroad South, Winston Churchill – Ballinafad, and Mississauga Road-Grange Central (see CVC 2011a-c).

The Tenth Line – 5 Sideroad South NAI site consists of 140 ha of rolling topography, mixed with open grassland and interior forest habitats (CVC 2011a). The property is currently entirely private (CVC 2011a). This property has a diverse set of vegetation communities and is similarly diverse in regards to the flora and fauna found within the property. Several SAR and species of

conservation concern have been confirmed to be present throughout this site, including butternut (*Juglans cinerea*), barn swallow (*Hirundo rustica*), Canada warbler (*Cardellina canadensis*), hooded warbler (*Setophaga citrina*), bobolink (*Dolichionyx oryzivorus*), eastern meadowlark (*Sturnella magna*), and western chorus frog (*Pseudacris triseriata*) (CVC 2011a).

The Winston Churchill – Ballinafad NAI site consists of 717 ha and is regarded as an exceptional property with high quality natural areas (CVC 2011b). Ownership is primarily private (83%), versus public (17%; CVC 2011b). This property is regarded as particularly ecologically diverse, due to its size, location and distinct elevational properties (being along the Niagara Escarpment; CVC 2011b). A total of seven SAR and species of conservation concern have been confirmed present on this site: American hart"s-tongue fern (*Asplenium scolopendrium var. americanum*), butternut, barn swallow, Canada warbler, bobolink, eastern meadowlark, and western chorus frog (CVC 2011b). Numerous regionally rare plant and bird species have also been observed throughout the property (CVC 2011b).

The Mississauga Road-Grange Central NAI site is the second largest of the three NAI regions in the study area vicinity at 263 ha (CVC 2011c). This natural area is predominantly swamp and deciduous forest, with scattered mixed and coniferous forest (CVC 2011c). SAR and species of conservation concern found on-site include: butternut, Canada warbler, hooded warbler, and monarch (*Danaus plexippus)* (CVC 2011c).

4.4 Terrestrial Environment

4.4.1 Vegetation

4.4.1.1 Vegetation Communities

Fifteen natural vegetation community types were identified by CVC, and field-verified by NRSI, consisting of deciduous, coniferous and mixed forest, conifer plantation, swamp, marsh, wet meadow, cultural meadow and savannah, and open aquatic. The study area also contained intensively-farmed and non-intensively-farmed agricultural fields, and rural and urban development. A total of 22 land-use types (including developed areas) were identified in total. Figure 2 presents the vegetation communities and other land-use designations identified within the study area.

4.4.1.2 Vascular Flora

A total of 58 species of vascular flora were identified during the roadside evaluation of natural features within the study area. A list of inventoried species is found in Appendix III. Approximately 16% of all inventoried species are considered non-native species.

Based on background information review (OMNR 2012a), seven provincially rare plant species are known historically from the study area vicinity. One of these is the federally and provincially Endangered butternut (*Juglans cinerea*)) (Government of Canada 2013b, OMNR 2013). Seven individuals of this species were observed, but all outside of the ROW (Dillon 2010). No additional butternuts were observed during vegetation inventories completed by NRSI within the study area.

Several plant species designated as regionally significant have been observed in the study area vicinity based on the results of previous inventories (CVC 2011a-c), including raw data provided to NRSI by CVC. Two plant species designated as rare in Peel Region (Varga 2000) were observed during NRSI vegetation inventories within the study area: white spruce (*Picea glauca*) and red pine (*Pinus resinosa*). Each of these species was observed within plantation or residential settings and are not naturally occurring specimens. The observed individuals were therefore not considered significant.

Table 1 summarizes federally, provincially, and regionally significant species known from the study area vicinity, with determinations of whether suitable habitat exists for each within the study area based on the results of vegetation community classifications.

Table 1. Provincially and Regionally Significant Vascular Plants Known from or Observed in the Study Area

Scientific Name	Common Name	S-Rank[1]	SARO[2]	SARA[3]	Peel Status[4]	Habitat Requirements[5]	Suitable Habitat in Study Area?
Anemone americana	Round-lobed Hepatica	S5	-	-	R7	Rich beech-maple forests, as for H. acutiloba, but more often associated on drier sites with aspen, oak, hickory, pine, or even with spruce or cedar.	Yes
Anemone cylindrica	Thimbleweed	S4	-	-	R2	Dry sandy barrens, savannas (jack pine, oak, aspen), dunes; fields, roadsides, shores; borders of forests.	Yes
Aralia racemosa	Spikenard	S5	-	-	R6	Rich usually moist beech-maple and hemlock-hardwoods, especially along edges and clearings and below bluffs; less often in oak forests; conifer (mostly cedar) swamps.	Yes
Asplenium rhizophyllum	Walking Fern	S4	-	-	R3	Mossy boulders and low mossy outcrops of calcareous rocks, usually limestones or dolomites, in moist deciduous forest understories.	Yes
Asplenium scolopendrium var. americanum	Hart"s Tongue Fern	S3	SC	SC	R2	Shaded calcareous rock (limestone and dolostone).	Yes
Asplenium trichomanes ssp. quadrivalens	Limestone Maidenhair	SU	-	-	R4	Rock outcrops, talus boulders, crevices in limestone pavement, in shade or partial shade.	No
Astragalus neglectus	Neglected Milkvetch	S3	-	-	R2	Marshy to dry open, sometimes rocky, clearings, shores, thickets, and river banks; often in calcareous sites.	Yes
Bidens tripartita	Three-lobe Beggar-ticks	S5	-	-	R6	Shores, wet ditches, wet fields, disturbed soil.	Yes
Bidens vulgata	Tall Beggar-ticks	S5	-	-	R1	Swamps and marshy ground, fields, ditches, along rivers and streams; more weedy than most species (except B. frondosa), its habitats	Yes

Scientific Name	Common Name	S-Rank[1]	SARO[2]	SARA[3]	Peel Status[4]	Habitat Requirements[5]	Suitable Habitat in Study Area?
						including railroads, roadsides, yards, and vacant lots.	
Botrychium matricariifolium	Daisy-leaf Grape-fern	S4S5	-	-	R3	Fields, forests, in a diversity of habitats, often, but not restricted to sandy acid soils.	Yes
Brachyelytrum erectum	Bearded Shorthusk	S4S5	-	-	R1	Rich deciduous forests and drier oak or oak-hickory stands.	Yes
Callitriche palustris	Vernal Water-starwort	S5	-	-	R1	In muddy or sandy substrates in shallow water of lakes, ponds, streams, river margins, swamps, ditches, and (often) puddles in old trail roads; often in cold spring-fed waters.	Yes
Cardamine bulbosa	Bulbous Bitter-cress	S4	-	-	E	Wet hollows and streamsides in deciduous forests (occasionally even with cedar or tamarack), swamps, springy places, sometimes in wet ditches.	Yes
Carex albursina	White Bear Sedge	S5	-	-	R10	Rich, often moist beech-maple and mixed deciduous forests; occasionally under oaks or oak-hickory.	Yes
Carex aquatilis	Aquatic Sedge	S5	-	-	R1	Wet meadows, shores, lakes, streams, fens, marshes, and ditches, sometimes in water up to 3 dm deep; predominantly in calcareous habitats.	Yes
Carex atherodes	Awned Sedge	S4S5	-	-	R1	Marshes and wet hollows, often in shallow water at the edges of ponds and lakes.	Yes
Carex cephaloidea	Thin-leaved Sedge	S5	-	-	R2	Rich deciduous forests, stream banks, thickets, less often in meadows.	Yes
Carex comosa	Bristly Sedge	S5	-	-	R7	Marshes and wet shores along lakes, ponds, and rivers; bogs and open spots in swamps.	Yes

Scientific Name	Common Name	S-Rank[1]	SARO[2]	SARA[3]	Peel Status[4]	Habitat Requirements[5]	Suitable Habitat in Study Area?
Carex crinita	Fringed Sedge	S5	-	-	U	Swamps (especially wet borders and clearings), ponds, ditches, and wet hollows in deciduous forests, river borders, and marshes.	Yes
Carex diandra	Lesser Panicled Sedge	S5	-	-	R7	Wet marshy ground, shores, bogs and fens, interdunal swales, springy thickets.	Yes
Carex digitalis	Slender Wood Sedge	S4S5	-	-	R5	Dry (oak-hickory, etc.) or less commonly rich mesic deciduous forests.	No
Carex eburnea	Bristle-leaved Sedge	S5	-	-	R2	Usually under cedar (also fir, jack pine, and white spruce) on moist sandy or calcareous gravelly soil near the shores of Lakes Michigan and Huron.	Yes
Carex flava	Yellow Sedge	S5	-	-	R8	Wet shores, marshes, sedge meadows, fens, and ditches; frequently in open coniferous swamps (cedar, tamarack), often in marly situations.	Yes
Carex hirtifolia	Pubescent Sedge	S5	-	-	R3	Rich deciduous forests (beech-maple, floodplains, moist ravines) and thickets.	Yes
Carex hitchcockiana	Hitchcock"s Sedge	S5	-	-	R6	Rich deciduous forests (beech-maple and alluvial forests).	Yes
Carex laevivaginata	Smooth-sheathed Sedge	S5	-	-	R3	Seepy areas in forests (deciduous, hemlock, or cedar), swales, marshy forest borders, streamsides in forests.	Yes
Carex laxiculmis var. laxiculmis	Spreading Sedge	S4	-	-	R3	Usually in rich deciduous forests, often near streams.	Yes
Carex laxiflora	Loose-flowered Sedge	S5	-	-	R7	Rich deciduous forests and ravines, often beech-maple, occasionally in more open areas or thickets, especially where cut-over.	Yes
Carex leptonervia	Finely-nerved	S5	-	-	R6	Usually in rich deciduous or mixed	Yes

Scientific Name	Common Name	S-Rank[1]	SARO[2]	SARA[3]	Peel Status[4]	Habitat Requirements[5]	Suitable Habitat in Study Area?
	Sedge					forests, but occasionally in cedar swamps (sometimes marly) and bogs; apparently continues to thrive in disturbed areas and clearings.	
Carex lurida	Sallow Sedge	S5	-	-	R1	Marshes, swamps, swamps and clearings, ditches, margins of lakes and streams, typically in acidic, sandy soils.	Yes
Carex projecta	Necklace Sedge	S5	-	-	R4	Swamps and moist thickets or depressions in upland forests, sometimes in wet meadows and ditches or in drier forests, especially northward.	Yes
Carex scabrata	Rough Sedge	S5	-	-	R8	Usually in springy places, stream borders, ravine bottoms, seepy hillsides, or other wet spots in rich deciduous forests.	Yes
Carex sprengelii	Long-beaked Sedge	S5	-	-	R1	Moist to dry forests and thickets, often on river banks; occasionally in open meadows or marshy ground.	Yes
Carex tribuloides	Blunt Broom Sedge	S4S5	-	-	R5	Moist to wet ground generally: marshes, swales, ditches, and shores; swamps, shrub thickets, shaded borders, rarely in drier sites, and very uncommon northwards.	Yes
Carex trisperma var. trisperma	Three-seeded Sedge	S4	-	-	R6	Coniferous bogs and swamps, even in dense shade under cedar, spruce, tamarack, fir, and/or hemlock; less often in swampy mixed forests or boggy hollows in sandy soils.	Yes
Carex tuckermanii	Tuckerman"s Sedge	S4	-	-	R6	Swamps and thickets, less often in wet open ground; particularly characteristic of margins of ponds, wet depressions, streams, and hollows in deciduous or mixed forests.	Yes

Scientific Name	Common Name	S-Rank[1]	SARO[2]	SARA[3]	Peel Status[4]	Habitat Requirements[5]	Suitable Habitat in Study Area?
Carex utriculata	Beaked Sedge	S5	-	-	R4	Common in very wet muddy or sandy places: marshy stream margins, lake shores, river banks; swamps, marshes, ponds, ditches, and bogs; wet trails and clearings in cedar swamps.	Yes
Carex vesicaria	Inflated Sedge	S5	-	-	R1	Swamps and wet thickets, swales and ditches, marshy or boggy shores and ponds, interdunal pools, often forming large tussocks.	Yes
Carex woodii	Wood"s Sedge	S4	-	-	R3	Rich, often moist, deciduous forests, especially beech-maple.	Yes
Caulophyllum giganteum	Giant Blue Cohosh	S5	-	-	R1	Rich deciduous forests.	Yes
Ceratophyllum demersum	Common Hornwort	S5	-	-	R3	Submersed in very shallow to deep (5.5 m) water of ponds and lakes and quiet backwaters of streams and rivers.	Yes
Chrysosplenium americanum	American Golden-saxifrage	S5	-	-	R3	Wet places, often forming large mats along streams and in cold springy spots or muddy hollows, especially in deciduous forests and cedar swamps.	Yes
Cinna latifolia	Slender Wood Reedgrass	S5	-	-	R4	In cedar swamps and other coniferous forests and boggy places, as well as deciduous and mixed forests, especially on wet seepy slopes, in depressions and clearings, and along forest roads.	Yes
Cornus amomum ssp. obliqua	Silky Dogwood	S5	-	-	R5	Wet (very rarely upland) sites: marshes, swamps (including cedar-tamarack), bogs and fens; margins of ponds, lakes, and streams and on banks of streams and rivers.	Yes
Deparia acrostichoides	Silvery Spleenwort	S4	-	-	R5	Rich, moist deciduous or mixed conifer-hardwood forests, often	Yes

Scientific Name	Common Name	S-Rank[1]	SARO[2]	SARA[3]	Peel Status[4]	Habitat Requirements[5]	Suitable Habitat in Study Area?
						around seeps, along streams, and at the base of slopes and bottom of ravines.	
Diplazium pycnocarpon	Glade Fern	S4	-	-	R5	Rich moist deciduous forests, often around seeps, along small streams, and at the bases of slopes.	Yes
Dirca palustris	Eastern Leatherwood	S4?	-	-	R6	Deciduous forests, especially rich moist sites.	Yes
Dryopteris filix-mas	Male Fern	S4	-	-	R1	Northern hardwood or mixed conifer-hardwood forests, usually over calcareous rock outcrops or talus; only rarely in forests lacking exposed bedrock.	No
Dryopteris goldiana	Goldie"s Fern	S4	-	-	R2	Rich, moist deciduous forests, often around the margins of seeps and springs, at the base of slopes, and along smaller streams.	Yes
Dulichium arundinaceum	Three-way Sedge	S5	-	-	R3	Marshes and marshy shores, hollows, ponds, swales, ditches, and river margins, seldom in water over 6 dm deep; also in bogs, on open mats and relic in tamarack swamps.	Yes
Eleocharis intermedia	Matted Spike-rush	S4	-	-	R4	Sandy-mucky shores, stream margins, marshy ground; especially characteristic of exposed mud flats, drying lakes, and beach pools.	No
Eleocharis smallii	Creeping Spike-rush	S5	-	-	R4	Wet places; especially common in shallow water of marshes and along marshy shores and river margins; also in bogs, wet meadows, swamp borders, etc.	Yes
Epilobium coloratum	Purple-leaf Willow-herb	S5	-	-	R6	Wet places, such as shores, stream banks, swamps (including tamarack), meadows, moist spots in forests, and ditches.	Yes

Scientific Name	Common Name	S-Rank[1]	SARO[2]	SARA[3]	Peel Status[4]	Habitat Requirements[5]	Suitable Habitat in Study Area?
Epilobium leptophyllum	Linear-leaved Willow-herb	S5	-	-	R4	Wet ground, including bogs (on mats) and marshes, swamps (cedar, tamarack, or mixed cover, especially on cleared, burned, or otherwise disturbed areas), wet shores and streamsides, sedgy meadows.	Yes
Equisetum fluviatile	Water Horsetail	S5	-	-	R5	Water to 6-8dm deep; also occurring on lake shores, slow moving streams, very wet meadows and swales, ditches, bog margins and sometimes on moist shores.	Yes
Equisetum palustre	Marsh Horsetail	S5	-	-	R3	Lake shores, stream banks, open swamps, fens, ditches; mostly in moist soil or shallow water less than 2 dm deep; often in springy or seepy areas fed by cold ground water.	Yes
Equisetum pratense	Meadow Horsetail	S5	-	-	R7	Moist to wet deciduous or mixed conifer-hardwood forests, often in springy or seepy sites or along streams; conifer swamps.	Yes
Equisetum variegatum ssp. variegatum	Variegated Scouring Rush	S5	-	-	R5	Wet calcareous meadows, both natural, as on wet shores, beaches, and interdunal settings, and artificial, as in borrow pits, roadside banks, and ditches.	Yes
Galium aparine	Catchweed Bedstraw	S5	-	-	R4	Deciduous forests and thickets, especially in disturbed areas.	Yes
Galium circaezans	Wild Licorice	S5	-	-	R1	Forests, ranging from dry oak-hickory to rich beech-maple (rarely in swampy or coniferous sites).	Yes
Galium lanceolatum	Torrey's Wild Licorice	S5	-	-	R2	Deciduous forests (beech-maple more often than oak-hickory or northern hemlock-hardwoods).	Yes
Galium tinctorium	Stiff Marsh Bedstraw	S5	-	-	R3	Marshy ground, wet shores and thickets, cedar and tamarack swamps, peatlands, swamps and	Yes

Scientific Name	Common Name	S-Rank[1]	SARO[2]	SARA[3]	Peel Status[4]	Habitat Requirements[5]	Suitable Habitat in Study Area?
						pond borders.	
Galium trifidum ssp. trifidum	Small Bedstraw	S5	-	-	R4	Shores of lakes and ponds, river banks, fens, swamps, ditches, hummocks in marshes.	Yes
Gaultheria hispidula	Creeping Snowberry	S5	-	-	R4	Forming flat mats in moist forests, thickets, and swamps of cedar, spruce, tamarack, or other conifers; often on mossy logs and hummocks.	Yes
Glyceria borealis	Small Floating Manna-grass	S5	-	-	R	Shallow water (seldom over 6 dm) and wet borders of ponds, lakes, ditches, marshes.	Yes
Glyceria septentrionalis	Floating Manna-grass	S4	-	-	R2	Wet places, including forest pools, swampy hollows, marshes, ditches.	Yes
Hydrophyllum canadense	Blunt-leaf Waterleaf	S4	-	-	R6	Rich deciduous forests, often growing with H. appendiculatum.	Yes
Impatiens pallida	Pale Touch-me-not	S5	-	-	R8	Forests (especially swampy), streamsides, ditches.	Yes
Juglans cinera	Butternut	S3?	END	END		Deciduous forests, with moist, well-drained soil, often near streams. Well-drained gravel sites, requiring sunny openings, near forest edges.	Yes
Juniperus communis	Dwarf Juniper	S5	-	-	R1	Most widespread on or near sandy shores and dunes along the Great Lakes, often associated with pines; also inland and there occurring in a diversity of habitats: old fields and gravelly banks.	Yes
Juniperus virginiana	Eastern Red Cedar	S5	-	-	R5	Stabilized sand dunes, lake shores, open deciduous forests, especially, oak-hickory, and even swamps and open wetlands.	Yes
Lactuca biennis	Tall Blue Lettuce	S5	-	-	R1	Borders of diverse forests and roadsides, trails and recent clearings; often in moist ground, even on floodplains and at edges of swamps;	Yes

Scientific Name	Common Name	S-Rank[1]	SARO[2]	SARA[3]	Peel Status[4]	Habitat Requirements[5]	Suitable Habitat in Study Area?
						fields and disturbed places.	
Lemna trisulca	Star Duckweed	S5	-	-	R4	In similar waters as the other species of Lemna, but in tangled masses beneath the water.	Yes
Lindera benzoin	Spicebush	S5	-	-	R5	Moist rich deciduous forests and swamps, rarely under cedar northward.	Yes
Linnaea borealis ssp. longiflora	Twinflower	S5	-	-	R4	Forests and thickets, neither the wettest nor the driest but ranging from cedar swamps to aspen forests, usually with conifers (most often cedar).	Yes
Liparis loeselii	Loesel‟s Twayblade	S4S5	-	-	R3	Fens (open mat to older tamarack and cedar swamps), marshy shores, beach pools and interdunal swales, marly flats, roadside excavations, ditches, springs and stream beds.	Yes
Lobelia cardinalis	Cardinal Flower	S5	-	-	R2	Swamps and floodplain forests; thickets and open ground along rivers and streams; marshes, wet shores, ditches, and swales.	Yes
Ludwigia palustris	Marsh Seedbox	S5	-	-	R5	Margins of rivers and lakes in shallow water, often fruiting heavily on recently exposed banks; ditches and marshy ground.	No
Lycopodium annotinum	Stiff Clubmoss	S5	-	-	R6	Wet to dry deciduous, mixed conifer-hardwood, or coniferous forests, often on sandy soils.	Yes
Lycopodium clavatum	Running Clubmoss	S5	-	-	R2	Dry to moist deciduous or mixed conifer-hardwood forests, usually on sandy soil.	Yes
Lysimachia thyrsiflora	Water Loosestrife	S5	-	-	R5	Almost any sort of wet place: streamsides and lake margins, bogs and fens, ditches and moist thickets, wet spots in swamps (cedar,	Yes

Scientific Name	Common Name	S-Rank[1]	SARO[2]	SARA[3]	Peel Status[4]	Habitat Requirements[5]	Suitable Habitat in Study Area?
						tamarack, black ash).	
Medeola virginiana	Indian Cucumber-root	S5	-	-	R6	Usually in moist forests or swamps: beech-maple forests (especially at margins of pools), hemlock knolls, cedar swamps, less often in oak or pine forests, typically in acid soils.	Yes
Melica smithii	Smith"s Melic Grass	S4?	-	-	R2	Deciduous forests, especially rich beech-maple-hemlock stands, forested dunes, rarely under white-cedar.	Yes
Menispermum canadense	Canada Moonseed	S4	-	-	R5	A vine climbing on various trees and shrubs in swamps, rich forests, and thickets, especially along rivers.	Yes
Moneses uniflora	One-flowered Wintergreen	S5	-	-	R7	Cedar swamps and other moist coniferous and mixed forests.	Yes
Monotropa hypopithys	American Pinesap	S4	-	-	R4	Coniferous or deciduous forests or even conifer swamps.	Yes
Muhlenbergia frondosa	Wirestem Muhly	S4	-	-	R1	Thickets along streams and rivers on banks, mudflats, and floodplains; also on shores and in disturbed ground.	Yes
Nemopanthus mucronatus	Mountain Holly	S5	-	-	R3	Bogs, especially in a characteristic zone of high shrubs near the outer margin; swamps and thickets; swales, interdunal hollows, and moist places in forests; margins of lakes; moist coniferous forests on sandy banks.	Yes
Oryzopsis racemosa	Black-fruited Mountain-rice	S4	-	-	R5	Usually in moist rich deciduous forests and forested dunes, sometimes in disturbed places; less often associated with jack pine and oak.	Yes
Osmunda claytoniana	Interrupted Fern	S5	-	-	R7	Mostly in mesic to wet forests, usually in sandy, acidic soils.	Yes
Osmunda regalis var.	Royal Fern	S5	-	-	R8	Bogs, acid swamp forests, shrub	Yes

Scientific Name	Common Name	S-Rank[1]	SARO[2]	SARA[3]	Peel Status[4]	Habitat Requirements[5]	Suitable Habitat in Study Area?
spectabilis						swamps, usually in sandy or peaty, acidic soils; often on hummocks in very wet sites, commonly in shade.	
Oxalis acetosella ssp. montana	Mountain Woodsorrel	S5	-	-	R3	Rich hemlock-hardwoods, but also in various sorts of deciduous, mixed, and coniferous forests, even on hummocks in cedar swamps.	Yes
Panax quinquefolius	American ginseng	S3	END	END	R5	Deep leaf litter in rich, moist deciduous woods, especially on rocky, shaded cool slopes in sweet soil.	Yes
Penstemon hirsutus	Hairy Beard-tongue	S4	-	-	R7	Sandy, barren, open, usually dry ground, including prairies, oak savanna and borders, fields, roadsides; stream and river banks, rocky ground.	yes
Phlox divaricata	Wild Blue Phlox	S4	-	-	R7	Rich deciduous forests, usually beech-maple-hemlock but sometimes oak-hickory, especially in moist areas such as ravines and floodplains.	Yes
Physalis virginiana	Virginia Ground-cherry	SU	-	-	R2	Less weedy in habit than some of our species, in prairies, oak and jack pine savannas; also sandy open fields, roadsides, and railroads.	Yes
Pinus resinosa	Red Pine	S5	-	-	R1	Sand dunes, ridges through boggy ground, or rock outcrops; common on well drained sandy plains	No
Poa alsodes	Grove Meadow Grass	S4	-	-	R4	Rich deciduous or mixed forests and thickets.	Yes
Poa saltuensis ssp. languida	Old Pasture Bluegrass	S3	-	-	R1	Deciduous or mixed forests, pine groves, forested dunes, rock openings.	No
Persicaria hydropiperoides	Mild Water-pepper	S5	-	-	R1	Swamps; bogs, fens, and ditches; borders of lakes, ponds, and rivers; often in shallow water.	Yes

Scientific Name	Common Name	S-Rank[1]	SARO[2]	SARA[3]	Peel Status[4]	Habitat Requirements[5]	Suitable Habitat in Study Area?
Persicaria punctata	Dotted Smartweed	S5	-	-	R4	Marshes, edges of lakes and rivers, shores, and mucky hollows, often in very wet places (even cold spring-fed areas) and seems frequently to grow in somewhat more shaded places than other smartweeds.	Yes
Polypodium virginianum	Rock Polypody	S5	-	-	R1	Rock outcrops, especially ledges, boulders, and talus, of both calcareous and acidic rock; also occasional on mossy logs, stumps, and tree bases, and also soil, especially on steep slopes.	No
Potamogeton hillii	Hill"s Pondweed	S2	SC	SC	R1	Highly alkaline waters of ditches, beaver ponds and slow-moving cold waters.	Yes
Potamogeton zostermiformis	Flat-stemmed Pondweed	S5	-	-	R3	Shallow to deep (6.7 m) water of lakes, rivers, streams, and wet swales, including the Great Lakes system.	Yes
Ranunculus flabellaris	Yellow Water-crowfoot	S4?	-	-	R2	Standing water of swamps, forest pools, ponds, ditches, marshes.	Yes
Rhamnus alnifolia	Alder-leaved Buckthorn	S5	-	-	R6	Fens, openings in tamarack and cedar (also sometimes spruce) swamps, peaty streamside thickets, interdunal swales, sedge marshes and mat, sometimes in wet, open deciduous forests, rocky openings and outcrops.	Yes
Ribes glandulosum	Skunk Currant	S5	-	-	R4	Moist or boggy forests and thickets, cedar (and tamarack) swamps, ravines and banks in deciduous forests, with spruce and fir northward.	Yes
Ribes hudsonianum	Northern Black Currant	S5	-	-	R1	Usually in swamps mostly or entirely of cedar, sometimes in other moist, especially coniferous, forests.	Yes

Scientific Name	Common Name	S-Rank[1]	SARO[2]	SARA[3]	Peel Status[4]	Habitat Requirements[5]	Suitable Habitat in Study Area?
Salix amygdaloides	Peach-leaved Willow	S5	-	-	R6	Shores, stream banks, floodplains, swamps, and borders of marshes.	Yes
Salix exigua	Sandbar Willow	S5	-	-	R5	Shores, dunes, stream margins, ditches, only rarely on dry ground; forms large dense thickets from extensive root systems.	Yes
Salix lucida	Shining Willow	S5	-	-	R5	Shores and low dunes, swales, ditches, and wetlands generally.	Yes
Scirpus pendulus	Rufous Bulrush	S5	-	-	R1	Borders and clearings in swamps, roadsides and ditches, shores; apparently a species which thrives in clearings and along moist disturbed roadsides.	Yes
Sisyrinchium montanum	Strict Blue-eyed-grass	S5	-	-	R5	Moist open, often grassy places; sandy, gravelly shores (or in rock crevices); mixed forests, especially in disturbed areas and clearings; old railroad beds, banks of ditches, and roadsides through wet ground.	Yes
Solidago hispida var. hispida	Hairy Goldenrod	S5	-	-	R3	Sandy forests (oak, hickory, jack pine, aspen) and clearings; dunes, sandy or rocky plains, rock outcrops and pavements of all kinds; rarely in moist ground.	No
Spiranthes cernua	Nodding Ladies‟ Tresses	S5	-	-	R2	Moist sand prairies, sandy savannas, areas adjacent to paths in sandy woodlands, shrubby bogs, sandy pannes near lakes, gravelly seeps, limestone glades, bluffs, sandy pits, ditches, and abandoned fields.	Yes
Symphoricarpos albus	Snowberry	S5	-	-	R8	Dry, open sandy or rocky ground, in savanna of oak, aspen, and pine, as on old dunes, jack pine plains, and rock outcrops; river bluffs and shores (occasionally even in moist forests); often at borders of conifer thickets	No

Scientific Name	Common Name	S-Rank[1]	SARO[2]	SARA[3]	Peel Status[4]	Habitat Requirements[5]	Suitable Habitat in Study Area?
						along shores.	
Symphyotrichum urophyllum	Arrow-leaved Aster	S4	-	-	R4	Dry open sandy (sometimes rocky) savannas, with oak, sassafras, aspen, and/or pine (especially jack pine); forested banks and hillsides; stabilized dunes; fields, grassy roadsides, fencerows; rarely in wet areas.	Yes
Triosteum aurantiacum	Coffee Tinker‟s-weed	S5	-	-	R4	Swamps and rich deciduous forests to dry sandy or rocky forests with oak, aspen, sassafras, and/or pines, often at the edges.	Yes
Ulmus thomasii	Rock Elm	S4?	-	-	R	Mixed hardwood forests and moist rich forests along rivers.	Yes
Utricularia vulgaris	Greater Bladderwort	S5	-	-	R4	Lakes of all kinds, interdunal (and other) ponds and swales, wet peatlands and marshes, rivers and streams. Often in water up to 2 m deep.	Yes
Veronica scutellata	Marsh Speedwell	S5	-	-	R2	Marshes, hardwood swamps and wet thickets (e.g., alders and willows); meadows, wet depressions, swales, and ditches; borders of streams, rivers, and ponds.	Yes
Viburnum lantanoides	Hobblebush	S5	-	-	R2	Rich, wet, acidic woods and swamps and stream banks.	Yes
Viola cucullata	Marsh Blue Violet	S5	-	-	R6	Moist hardwoods (including moist spots or trails in beech-maple forests), but more often in swamps (especially cedar) and bogs, often along streams, sometimes on mossy logs; alder thickets, wet meadows, shores.	Yes
Viola renifolia	Kidney-leaved Violet	S5	-	-	R4	Usually in cedar swamps; forests and thickets of other conifers as well.	Yes

Scientific Name	Common Name	S-Rank[1]	SARO[2]	SARA[3]	Peel Status[4]	Habitat Requirements[5]	Suitable Habitat in Study Area?
Viola selkirkii	Selkirk"s Violet	S5	-	-	R4	Deciduous forests, especially beech-maple, frequently on rotting logs or mossy crevices in limestone; less often in coniferous forests and river bottomlands.	Yes
Wolffia Columbiana	Columbia Water-meal	S2	-	-	R3	Quiet waters of ditches, cat-tail marshes, ponds, boggy pools, edges of rivers and lakes, often with other duckweeds.	Yes
Zanthoxylum americanum	Northern Prickly-ash	S5	-	-	R3	Upland deciduous forests, but usually in moist forests and thickets, even swamps, along streams and river banks.	Yes

[1]S Ranks (OMNR 2010): SX (Presumed Extirpated), SH (Possibly Extirpated), S1 (Critically imperiled), S2 (Imperiled), S3 (Vulnerable), S4 (Apparently Secure), S5 (Secure), SNR (Unranked), SU (Unrankable), SNA (Not Applicable)
[2]SARO and [3]COSEWIC Ranks (OMNR 2010, COSEWIC 2012): NAR (Not at Risk), SC (Special Concern), V (Vulnerable), T (Threatened), END (Endangered)
[4]Gleason and Cronquist 1991

4.5 Wildlife

4.5.1 Birds

A total of 136 bird species were reported from the OBBA squares covering the study area (Square 17NJ74, 17NJ75, 17NJ84, 17NJ85) (Bird Studies Canada *et al.* 2008). Of these, 60 species were documented by NRSI biologists within the study area. Three species (American robin (*Turdus migratorius*), European starling, and eastern towhee (*Pipilo erythrophthalmus*)) showed evidence of confirmed breeding in the immediate vicinity (carrying food). Twenty-seven other species showed evidence for probable breeding. See Appendix IV for a complete list of bird species observed by NRSI, including their national, provincial and regional rank, and observed breeding evidence.

Based on a review of background information sources (OBBA, NHIC), 10 federally and/or provincially significant bird species are known from the study area vicinity. The study area contains suitable habitat (considering the exclusion of interior forest habitat within the study area) for seven of these species: barn swallow, bobolink, chimney swift (*Chaetura pelagic*), hooded warbler (*Setophaga citrina*), eastern meadowlark, golden-winged warbler (*Vermivora chysoptera*), Henslow"s sparrow (*Ammodramus henslowii*), and short-eared owl (*Asio flammeus*). Of these, barn swallow, bobolink, chimney swift and eastern meadowlark were observed within the study area.

Barn Swallow

The federally and provincially Threatened barn swallow (Government of Canada 2013b, OMNR 2013) was observed displaying evidence of probable breeding within the study area. The species was observed foraging over agricultural fields and other natural features. Suitable buildings for nesting are present within the study area such as barns and outbuildings. Barn swallow is known to forage as far as 500 m from the nest (G. Buck, OMNR, pers. comm., June 2012) and therefore it is probable to be nesting on or in buildings within the study area, but outside of the ROW. Barn swallows were observed to be widespread throughout the study area, and were sighted flying over lands of intensive agriculture, non-intensive agriculture, and cultural meadow.

Bobolink

The provincially and federally Threatened bobolink (Government of Canada 2013b, OMNR 2013) was observed within the study area during both breeding bird surveys. Across both visits, the species displayed evidence of probable breeding based on the presence of presumed breeding territories within non-intensive agricultural fields.

Chimney Swift

The provincially and federally Threatened chimney swift (Government of Canada 2013b, OMNR 2013) was observed within the study area showing evidence for possible breeding based on presence in suitable breeding habitat. This species was observed foraging within Belfountain, in proximity to buildings with chimneys. Chimney swifts are known to nest within the chimney of Belfountain"s general store (M. Heaton, OMNR, pers. comm., July 2013). Two individuals of this species were observed during the second breeding bird survey visit, on July 4, 2013.

Eastern Meadowlark

The provincially and federally Threatened eastern meadowlark (Government of Canada 2013b, OMNR 2013) was observed within the study area showing evidence for probable breeding based on presence of presumed breeding territories. Eastern meadowlarks were observed in cultural meadow and non-intensive agricultural lands within the study area.

One other significant bird species, eastern wood-pewee (*Contopus virens*), was observed within the study area. Eastern wood-pewee is designated as a species of Special Concern by COSEWIC (COSEWIC 2013) but is not currently afforded protection under the federal Species at Risk Act; the species is not listed on the Species at Risk in Ontario list (OMNR 2013). This species was observed on June 3, 2013 at station BMB-013 (1 individual) and BMB-014 (1 individual), and on July 4, 2013 at station BMB-012 (1 individual) (Figure 2). At each station, this species was observed showing evidence of possible breeding based on presence in suitable habitat and observation of singing males.

Table 2 provides a summary of significant species (SAR and species of conservation concern) known to occur or observed in the study area, their current status ranks, and preferred habitats.

Table 2. Provincially or Federally Significant Bird Species Known from or Observed in the Study Area

Scientific Name	Common Name	SRANK	SARA	SARO	Habitat Requirements	Suitable Habitat in Study Area?	NRSI Observed
Riparia riparia	Bank Swallow	S4B	THR	-	Sand, clay or gravel riverbanks or steep riverbank cliffs; lakeshore bluffs of easily crumbled sand or gravel; gravel pits, road-cuts, grassland or cultivated fields that are close to water	Yes	No
Hirundo rustica	Barn Swallow	S4B	T	THR	farmlands or rural areas; cliffs, caves, rock niches; buildings or other man-made structures for nesting; open country near body of water	Yes	Yes
Dolichonyx oryzivorus	Bobolink	S4B	T	THR	Grassland habitat as well as hayfields within agricultural areas.	Yes	Yes
Setophaga Canadensis	Canada Warbler	S5B	T	SC	An interior forest species; dense, mixed coniferous, deciduous forests with closed canopy, wet bottomlands of cedar or alder; shrubby undergrowth in cool moist mature woodlands; riparian habitat; usually requires at least 30ha.	No	No
Chaetura pelagica	Chimney Swift	S4B, S4N	T	THR	Nests in hollow trees or in urban areas chimneys or decrepit buildings.	Yes	Yes
Sturnella magna	Eastern Meadowlark	S4B	T	THR	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	Yes	Yes
Vermivora chrysoptera	Golden-winged Warbler	S4B	T	SC	early successional habitat; shrubby, grassy abandoned fields with small deciduous trees bordered by low woodland and wooded swamps; alder bogs; deciduous, damp woods; shrubbery clearings in deciduous woods with saplings and grasses; brier-woodland edges; requires >10ha of habitat.	Yes	No

Ammodramus henslowii	Henslow"s Sparrow	SHB	E	END	Large, fallow, grassy area with ground mat of dead vegetation, dense herbaceous vegetation, ground litter and some song perches; neglected weedy fields; wet meadows; cultivated uplands; a moderate amount of moisture needed; requires a minimum tract of grassland of 40ha, but usually in areas >100ha.	Yes, although contiguous suitable habitat extends outside the study area	No
Setophaga citrina	Hooded Warbler	S3B	T	SC	Favours mature, deciduous forest (Carolinian), particularly along stream bottoms, ravine edges and where saplings and shrubbery grow.	Yes	No
Seiurus motacilla	Louisiana Waterthrush	S3B	SC	SC	prefers wooded ravines with running streams; also woodlands swamps; large tracts of mature deciduous or mixed forests; canopy cover is essential; has strong affinity to nest sites; nests on ground.	Yes	No
Asio flammeus	Short-eared Owl	S2N, S4B	SC	SC	Grasslands, open areas or meadows that are grassy or bushy; marshes, bogs or tundra; both diurnal and nocturnal habits; ground nester; destruction of wetlands by drainage for agriculture is an important factor in the decline of this species; home range 25-125ha; requires 75-100ha of contiguous open habitat.	Yes, although contiguous suitable habitat extends outside the study area	No

[1]OMNR 2012a, [2]COSEWIC 2012, [3]OMNR 2012a, [4]OMNR 2000a

[1]S Ranks (OMNR 2010): SX (Presumed Extirpated), SH (Possibly Extirpated), S1 (Critically imperiled), S2 (Imperiled), S3 (Vulnerable), S4 (Apparently Secure), S5 (Secure), SNR (Unranked), SU (Unrankable), SNA (Not Applicable)

[2]SARO and [3]COSEWIC Ranks (OMNR 2012a, COSEWIC 2012): NAR (Not at Risk), SC (Special Concern), V (Vulnerable), T (Threatened), END (Endangered)

4.5.2 Herpetofauna

A total of 28 species of herpetofauna are reported from the vicinity of the study area (within 10x10 km). NRSI biologists recorded one species (green frog (*Rana clamitans melanota*)) within the study area through incidental observation. An individual of this species was heard vocalizing near breeding bird survey station BMB-006 (Figure 2). Breeding habitat for this species is likely to exist within open water pond (OAO) to the north of BMB-006. Appendix V lists all herpetofauna species known from the vicinity or observed within the study area.

Table 3 provides a summary of significant species (SAR and species of conservation concern) known to occur or observed in the study area, their current status ranks, and preferred habitats.

Table 3. Provincially and Federally Significant Herpetofauna Species Known from or Observed in the Study Area

Scientific Name	Common Name	SRANK	SARA	SARO	Habitat Requirements	Suitable Habitat in Study Area?	NRSI Observed
Chelydra serpentina serpentina	Common Snapping Turtle	S3	SC	SC	Typical habitat includes shallow water associated with shorelines of lakes and swamps. During the nesting season turtles choose sandy or gravel areas near water for egg laying.	Yes	No, but confirmed to occur within the study area (M. Heaton, OMNR pers. comm., July 2013)
Ambystoma jeffersonianum	Jefferson Salamander	S2	END	END	Damp, shady deciduous forest, swamps, moist pasture, lakeshores; temporary woodland pools for breeding	Yes	No, but confirmed to occur within the study area (CVC)
Lampropeltis t. triangulum	Eastern Milksnake	S3	SC	SC	Old fields, farm buildings, debris piles with abundant rodent populations.[5]	Yes	No
Pseudacris triseriata	Western Chorus Frog	S3	T	NAR	roadside ditches or temporary ponds in fields; swamps or wet meadows; woodland or open country with cover and moisture; small ponds and temporary pools	Yes	No, but confirmed to occur within the study area (CVC)
Thamnophis sauritus septentrionalis	Northern Ribbonsnake	S3	SC	SC	Sunny grassy areas with low dense vegetation near bodies of shallow permanent quiet water; wet meadows, grassy marshes or sphagnum bogs; borders of ponds, lakes or streams; hibernates in groups.	Yes	No
Apalone spinifera spinifera	Eastern Spiny Softshell	S3	T	THR	Clean unpolluted large river systems, shallow lakes and ponds with muddy bottoms and aquatic vegetation; sandbars, mud flats, grassy beaches, logs or rocks for basking; eggs are laid near water on sandy beaches or gravel banks in areas with sun	No	No
Emydoidea blandingii	Blanding's Turtle (Great Lakes/St Lawrence population)	S3	T	THR	Shallow water marshes, bogs, ponds or swamps, or	Yes	No

[1]S ranks (OMNR 2010): SX (Presumed Extirpated), SH (Possibly Extirpated), S1 (Critically imperiled), S2 (Imperiled), S3 (Vulnerable), S4 (Apparently Secure), S5 (Secure), SNR (Unranked), SU (Unrankable), SNA (Not Applicable)
SARO and COSEWIC Ranks (OMNR 2012, COSEWIC 2012): NAR (Not at Risk), SC (Special Concern), V (Vulnerable), T (Threatened), END (Endangered)
[2]COSEWIC 2012
[3]OMNR 2012a
[5]OMNR 2005

4.5.3 Mammals

A total of 19 mammal species are known to occur in the vicinity of the study area (within 10x10 km). NRSI biologists observed one species (eastern chipmunk (*Tamias striatus*)) within the study area. Northern flying squirrel (*Glaucomys sabrinus*) is known to occur within forested areas within the northeast and southeast corners of the study area, specifically along Bush St. and Mississauga Rd. east and west of Belfountain, and along Mississauga Rd. near Olde Base Line Rd. (M. Heaton, OMNR, pers. comm., April 2013). As described in Section 5.1.6.1, the study area incorporates part of an important regional movement corridor for white-tailed deer. Appendix VI lists all mammal species known from the vicinity or observed within the study area.

Two provincially significant mammal species, little brown myotis (*Myotis lucifuga*) and northern myotis (*Myotis septentrionalis*) are known to occur in the vicinity of the study area (Dobbyn 1994). Both of these species are designated Endangered in Ontario (OMNR 2013) and nationally by COSEWIC (COSEWIC 2013), although they are not currently afforded protection by the federal Species at Risk Act. Suitable habitat for little brown myotis and northern myotis occurs within the forest and woodland communities of the study area, which they may use for maternity colony habitat, roosting, etc.

There have been anecdotal reports of cougar (*Puma concolor)* (provincially Endangered (OMNR 2013)) in the study area vicinity (M. Heaton, OMNR, pers. comm., April 2013). Suitable habitat for cougar may also occur in the relatively large forested areas within and surrounding the study area. This species requires large territories of at least 100km^2. The presence of cougar in southern Ontario has not been confirmed.

4.5.4 Butterflies and Odonata

Thirty-six odonate species are known to occur in the vicinity of the study area (within 10x10 km) (OMNR 2005). Odonate data provided by CVC included a total of 14 odonate species, with an overall total of 50 odonate species reported from the vicinity of the study area. This included the species of conservation concern amber-winged spreadwing (*Lestes eurinus*), lilypad clubtail (*Arigomphus furcifer*), arrowhead spiketail (*Cordulegaster obliqua*) and harpoon clubtail (*Gomphus descriptus*). NRSI biologists did not observe any odonate species during 2012 or 2013 field surveys.

The Butterflies of Canada (Layberry *et al.* 1998) reports 65 species of butterfly within the 10 x 10 km squares overlapping the study area. CVC reported one additional butterfly species known from the study area for an overall total of 66 species of butterfly known from the vicinity of the study area. NRSI biologists did not observe any butterfly species during 2012 or 2013 field surveys. A list of butterflies and odonates can be found in Appendix VII

4.6 Aquatic Environment

4.6.1 Fish Community

NRSI received fisheries background information from OMNR and CVC in 2013 and the relevant information has been summarized here with further data provided in Appendix VIII.

West Credit River Subwatershed

The west branch of the Credit River within the area of Belfountain is considered to be a coldwater fishery. The documented fish community within the west branch of the river includes a variety of species that exhibit varied life history requirements and trophic statuses. Sensitive cool/coldwater species have also been identified within the west branch of the Credit River. These species include brook trout, rainbow trout (*Onchorhynchus mykis*), stocked Atlantic salmon (*Salmo salar*), brown trout (*Salmo trutta*), and mottled sculpin *(Cottus bairdi*) (CVC 1998). Species information from the background data provided by the OMNR (2013) for the West Credit River upstream of Belfountain Dam is listed in Table 4. Additional information was provided by CVC for two sites, one of which was immediately upstream of Belfountain Dam and the second just downstream of the dam. The information provided by CVC has also been listed in Table 4. Redside dace (*Clinostomus elongatus),* which is listed as Endangered under the ESA, has also been observed as occurring within 1 km of the study area within the west branch of the Credit River; however, this species is not known to occur in the portion of the watercourses in the study area. No other SAR fish or mussels were identified as occurring within the study area (DFO 2012).

Brook trout are also found within the unnamed Tributary A to the West Credit River (CVC 2012). Additional species information was not available for this tributary and no information was provided for Tributary B.

Table 4. Fish Species Known From the West Credit River above and below Belfountain Dam

Scientific Name	Common Name	SRANK[1]	Thermal Regime	U/S of Belfountain Dam (OMNR/CVC Data)	D/S of Belfountain Dam (CVC Data)
Salmo salar	Atlantic Salmon		cold	X	X
Rhinichthys obtusus	Blacknose Dace	SNR	cool	X	X
Pimephales notatus	Bluntnose Minnow	S5	warm		X
Culaea inconstans	Brook Stickleback	S5	cool	X	
Salvelinus fontinalis	Brook Trout	S5	cold	X	X
Ameiurus nebulosus	Brown Bullhead	S5	warm	X	
Salmo trutta	Brown Trout	SNA	cold		X
Umbra limi	Central Mudminnow	S5	cool	X	
Luxilus cornutus	Common Shiner	S5	cool	X	X
Semotilus atromaculatus	Creek Chub	S5	cool	X	X
Pimephales promelas	Fathead Minnow	S5	warm	X	
Rhinichthys cataractae	Longnose Dace	S5	cool	X	X
Hypentelium nigricans	Northern Hog Sucker	S4	warm		X
Margariscus nachtriebi	Northern Pearl Dace	S5	cool	X	
Chrosomus eos	Northern Redbelly Dace	S5	cool	X	
Lepomis gibbosus	Pumpkinseed	S5	warm	X	
Oncorhynchus mykiss	Rainbow Trout	S5	cold	X	X
Catostomus commersonii	White Sucker	S5	cool	X	X
Perca flavescens	Yellow Perch	S5	cool	X	

[1]OMNR 2013

Cheltenham to Glen Williams Subwatershed

Both Rogers Creek and Second Creek are considered coldwater fisheries (CVC 2008). The fish community is better documented within Rogers Creek than Second Creek but both have sensitive cool/coldwater species, including brook trout and rainbow trout. No significant species are known from these watercourses. Species information from the background data provided from the OMNR for the two creeks are listed in Table 5.

Table 5. Fish Species Known From Rogers Creek and Second Creek

Scientific Name	Common Name	SRANK[1]	Thermal Regime	Second Creek	Rogers Creek
Rhinichthys obtusus	Blacknose Dace	SNR	cool	X	X
Pimephales notatus	Bluntnose Minnow	S5	warm	X	X
Hybognathus hankinsoni	Brassy Minnow	S5	cool	X	
Culaea inconstans	Brook Stickleback	S5	cool	X	X
Salvelinus fontinalis	Brook Trout	S5	cold	X	X
Ameiurus nebulosus	Brown Bullhead	S5	warm		X
Salmo trutta	Brown Trout	SNA	cold	X	
Umbra limi	Central Mudminnow	S5	cool		X
Luxilus cornutus	Common Shiner	S5	cool	X	
Semotilus atromaculatus	Creek Chub	S5	cool	X	X
Etheostoma flabellare	Fantail Darter	S4	cool	X	
Pimephales promelas	Fathead Minnow	S5	warm	X	X
Micropterus salmoides	Largemouth Bass	S5	warm		X
Hypentelium nigricans	Northern Hog Sucker	S4	warm	X	
Chrosomus eos	Northern Redbelly Dace	S5	cool	X	X
Lepomis gibbosus	Pumpkinseed	S5	warm	X	X
Oncorhynchus mykiss	Rainbow Trout	S5	cold	X	
Catostomus commersonii	White Sucker	S5	cool	X	X

4.6.2 Surface Water Drainage and Aquatic Habitat Characterization

The weather during the August 23, 2012 site visit was 25°C and sunny, with a slight breeze. Aquatic habitat observations were made from the roadside and conducted at all watercourses and culvert crossings that were observed in the study area. Two additional site visits were made on July 12 and 23, 2013 by an NRSI biologist to ensure all culvert locations were assessed. Sites that had been assessed in 2012 were revisited on July 23, 2013 to document conditions during a wet year. Previously by Dillon Consulting (2010), detailed habitat assessments were completed at a subset of watercourses and not all culvert crossing locations.

The information presented below combines the information collected during the 2010 EA (Dillon Consulting 2010) and CVC (2013) field data with 2012 and 2013 NRSI field data.

Surface water drainage and aquatic habitat characterization survey locations are presented on Figure 3. Appendix IX provides photographs of the associated survey locations. A total of 43 crossing locations were assessed within the study area. Of the 43 locations, the majority were

small corrugated steel pipe (CSP) culverts connecting the roadside ditches or low lying areas on both sides of the roads. Table 6 provides information on each of the numbered watercourse and culvert locations and corresponds with the numbering shown on Figure 3 and in Appendix IX. Table 6 also identifies the status of each assessed roadside water feature in terms of whether or not it is a watercourse. In cases where NRSI field data differed from CVC field data, NRSI used CVC"s designation on whether it was considered a regulated watercourse or not. Features not considered watercourses include drainage ditches and equalization culverts. Equalization culverts are culverts that are used to balance the elevation of water on both sides of a road crossing, and also convey surface water; these are confined systems with no positive drainage on either side of the culvert. More detailed information on the aquatic features that have been determined to be direct or indirect fish habitat is summarized below Table 6 and is broken down by subwatershed.

Table 6. Watercourse and Culvert Locations within the Study Area

Number on Figure / Photo Number	HDR/Dillon Culvert No.	Additional Names	Associated Road	Date Assessed	Assessed Previously by Dillon (2010)	Culvert Type[1]	Culvert Size (m)	Culvert Condition (north or east side of road)	Culvert Condition (south or west side of road)	Defined Channel Present	Water Present	Flow	Watercourse?	Flow Regime	Fish Habitat	Description
West Credit Subwatershed																
1	2	--	Bush Street	July 12, 2013	No	CSP	0.9	Good, no rust or damage	Good, no Rust or damage	No	No	No	No	--	None	Tall dense grass species with some scattered shrubs, more deciduous trees on the east/north side.
2	10	Tributary A to West Credit	Bush Street	August 23, 2012 & July 23, 2013	Yes	PVC	0.5	Good, free of obstructions	Good, free of obstructions	Yes	Yes	Yes	Yes	Permanent	Direct	See description in text below this table.
3	14	Tributary B to West Credit	Bush Street	August 23, 2012 & July 23, 2013	Yes	CSP	0.6	Fair, some rust	Good, no damage	Yes	Yes	Yes	Yes	Ephemeral	Indirect	See description in text below this table.
4	16	--	Mississauga Road	July 12, 2013	No	CSP	0.8	Good, no rust or damage, half filled in	Fair, some rust and partially obstructed	No	No	No	No	--	None	Tall grass species and herb species. Mixed forest beyond ROW.
5	17	--	Mississauga Road	July 12, 2013	No	CSP	0.3	Fair- partially collapsed in and some rust	Fair – partially collapsed in and some rust	No	No	No	No	--	None	Dense grasses and herb species with scattered shrubs and mixed deciduous and coniferous tree species. Gravel and pebbles at culvert from road.
6	24	--	Mississauga Road	July 12, 2013	No	CSP	0.4	Good – minor erosion underneath and some rust	Fair – almost completely obstructed	No	No	No	No	--	None	Swale like feature in mowed grass on east side. Dense grape vine, tall grasses and herbs on west side. Pond is visible from road but not connected.
39	WCB-13	--	Winston Churchill Boulevard	August 23, 2012 & July 23, 2013	No	CSP	0.4	Good – minor rust and some dents	Good – minor rust	No	Yes	No	No	--	None	Connecting two marshy areas. Primary vegetation was grass and herb species, and cattails. Beyond ROW more willow species were noted. This area of the project is low lying with lots of wetland features. Area was dry when assessed in 2012.
40	WCB-15	--	Winston Churchill Boulevard	July 23, 2013	No	CSP	0.45	Good – few dents	Good – few dents	No	Yes	Yes	No	--	None	East side of the road side ditch connecting two marshy areas. Horsetail species, as well as other herbs and grass species dominant. west side similar species present and beyond ROW was a mixed woodlot/wetland feature. Stagnant water on west side iron coloured which may indicate seepage within the area.
41	WCB-16	--	Winston Churchill Boulevard	August 23, 2012 & July 23, 2013	No	CSP	0.75	Good – no rust or dents	Good – no rust, few dents	No	Yes	No	Yes	Ephemeral	Indirect	Roadside ditches connecting low lying marshy areas. Cattails and grass species dominant on both sides. Beyond ROW on west side is coniferous woodlot. Stagnant water on both sides of culvert tinted iron coloured with an oily sheen which is often indicative of groundwater. Feature was dry when observed in 2012. Upstream is stagnant pond with algae present. This area was also dry when assessed in 2012.

42	WCB-17	--	Winston Churchill Boulevard	July 23, 2013	No	CSP	0.9	Good – no rust or damage	Good – no rust or damage	No	Yes	Yes	No	--	None	Grassed swale that had been recently mowed. Slight flow at time of assessment heading is west direction. Most likely flowing from dug pond upstream. Watercress noted around culvert opening. Downstream grass and herb species heading into a mixed woodlot beyond the ROW.
43	WCB-18	--	Winston Churchill Boulevard	July 23, 2013	No	CSP	0.9	Good – rust around edges	Did not find.	No	No	No	No	--	None	Grassed swale in between fields. Hedgerow consisting of larger shrubs. Surface run-off collector.
Cheltenham to Glen Williams Subwatershed																
7	37	--	Mississauga Road	July 12, 2013	No	CSP	0.6	Good	Good – some rust, slightly bent in	Yes	Yes	Yes	No	--	None	Slight flow coming from new culvert within mowed pasture. Channel is recently dug out and stone wall is new. Pockets of water on west side of Mississauga going into a reed canary dominant area.
9	43	--	Mississauga Road	July 12, 2013	No	CSP	0.9	Fair – some rust and dents, partially obstructed	Good – slight bend in top	No	Yes	No	No	--	None	Vegetation consists of mowed grass on east side. Some water pockets on west side with vegetation consisting of very dense reed canary grass.
10	44	Tributary A to Second Creek	Mississauga Road	August 23, 2013 & July 23, 2013	Yes	2 CSP	1.2	Good –no obstructions, some rust	Good – no obstructions, some rust	Yes	Yes	Yes	Yes	Permanent	Direct	See description in text below table.
11	47	--	Mississauga Road	July 12, 2013	No	CSP	0.4	Good – slight bend, some rust	Good – minor rust on top	No	Yes	No	No	--	None	Roadside ditch had pockets of stagnant water on the east side of the road. Vegetation primarily staghorn sumac, grape vines and reed canary grass. Beyond ROW is deciduous woodlot. West side vegetation was primarily tall grasses and herbs with a deciduous woodlot beyond the ROW.
12	48	Tributary B to Second Creek	Mississauga Road	August 23, 2012 & July 23, 2013	Yes	CSP	0.4	Good – no rust or dents	Good – no rust or dents	No	Yes	Yes	Yes	Ephemeral	None	See description in text below table.
13	55	Tributary A to Unnamed Creek	Mississauga Road	August 23, 2012 & July 23, 2013	Yes	CSP	0.3	Good – no rust or dents	Good – no rust or dents	No	No	No	No	Ephemeral	None	Roadside ditch comprised of grass and herb species. Beyond ROW is deciduous woodlot of both sides. Same conditions present when assessed in 2012.
14	56	--	Mississauga Road	July 23, 2013	No	CSP	0.4	Poor – heavily rust and partially obstructed	Poor- heavily rusted and partially obstructed	No	No	No	No	--	None	Roadside ditch with grass and herb species crowding the culvert.
16	OBL-11	Tributary A to Unnamed Creek	Olde Base Line Road	August 23, 2012 & July 12, 2013	No	CSP	0.4	Good – no dents or rust	Poor – one side bent in reducing capacity by 50%, some rust	No	No	No	No	Ephemeral	None	Shown as ephemeral tributary on map although no defining features present. Tall herbs, grasses and scatted deciduous trees lining the roadside ditches. Beyond ROW on west side is a deciduous woodlot. Same condition when assessed in 2012.
17	OBL-10	--	Olde Base Line Road	July 12, 2013	No	CSP	0.4	Fair – small dents and some rust	Good – partially obstructed, no rust or dents	No	No	No	No	--	None	Vegetation on both sides is dense herbs and tall grasses with some shrubs. east side beyond ROW is a cedar hedgerow and west side is deciduous woodlot.
18	OBL-9	--	Olde Base Line Road	July 12, 2013	No	CSP	0.4	Poor – top side has rusted out and dirt falling in, culvert blocked	Fair – no rust or dents but completely blocked	No	No	No	No	--	None	Roadside ditch comprised of tall herbs and grasses on both sides. Beyond ROW on east side is a deciduous woodlot.

19	OBL-8	Tributary A to Second Creek	Olde Base Line Road	August 23, 2012 & July 23, 2013	No	Concrete open bottom box	3.0 X 1.4	Good – pooling effect in culvert	Good – buildup of sediment on downstream side	Yes	Yes	Yes	Yes	Intermittent	Direct	See description in text below table.
20	OBL-7	--	Olde Base Line Road	August 23, 2012 & July 23, 2013	No	PVC	0.45	Excellent	Excellent	No	No	No	No	--	None	Roadside ditch with grass and herb species crowding the culvert. Dry when assessed in 2012 as well.
21	OBL-6	--	Olde Base Line Road	July 12, 2013	No	PVC	0.45	Excellent – appears new	Excellent – appears new	No	Yes	Yes	No	--	None	Roadside ditch was flowing during visit from surface runoff. Substrates at culvert with pebbles and gravel from road. Vegetation comprised of herbs and grasses with a deciduous woodlot of the west side. When flowing may provide water to wetland feature further downstream.
22	OBL-5	--	Olde Base Line Road	July 12, 2013	No	CSP	0.45	Fair – top side is bent, partially obstructed	Fair – small cut in to side, some rust	No	No	No	No	--	None	Roadside ditch comprised of herbs and grass species and some deciduous trees.
23	OBL-4	Tributary A to Rogers Creek	Olde Base Line Road	August 23, 2012 & July 23, 2013	No	Concrete open bottom box	3.3 X 1.4	Good – sediment buildup	Good – sediment buildup	Yes	No	No	Yes	Ephemeral	Indirect	See description in text below table.
24	OBL-3	--	Olde Base Line Road	August 23, 2012 & July 23, 2013	No	CSP	0.6	Good – no rust or dents	Good – no rust or dents	No	No	No	No	--	None	Connecting marshy areas. Dominant vegetation grass and herb species with some grape vines. Dry when assessed in 2012 as well.
25	OBL-2	Tributary B to Rogers Creek	Olde Base Line Road	August 23, 2012 & July 23, 2013	No	CSP	0.6	Good – no rust or dents	Good – no rust or dents	Yes	No	No	Yes	Ephemeral	Indirect	See description in text below table.
26	OBL-1	--	Olde Base Line Road	July 23, 2013	No	CSP	0.45	Fair – cut in top and bent inwards, dents, partially obstructed	Not found	No	No	No	No	--	None	Deciduous hedgerow beyond ROW. Ditch comprised of tall herbs and grasses. Runoff from Olde Base Line Road.
27	WCB-1	--	Winston Churchill Boulevard	July 12, 2013	No	2 CSP	0.25	Poor – half-filled in	Poor – grass growing all around and half-filled in	No	No	No	No	--	None	Roadside ditch. Grass species lining ditch. On corner of Base Line and Winston Churchill. Additional plastic culvert running parallel to Windston Churchill on the west side.
28	WCB-2	--	Winston Churchill Boulevard	July 23, 2013	No	CSP	0.4	Poor – obstructed and rusted	Poor – fully collapsed	No	No	No	No	--	None	Connecting mowed road side ditches. Filled in with sediments.
29	WCB-3	--	Winston Churchill Boulevard	July 12, 2013	No	CSP	0.4	Poor – blocked by 50%, rusty and bent inwards	Poor – blocked by 50%	No	No	No	No	--	None	Vegetation is mowed grass and tall grass species on west side. Beyond ROW is corn field. On east side tall grasses dominant with a horse pasture beyond ROW.
30	WCB-4	--	Winston Churchill Boulevard	August 23, 2013 & July 23, 2013	No	CSP	0.4	Good – rusted around diameter, some erosion	Good- no damage, no rust	No	No	No	No	--	None	Mowed grass on east side with pasture beyond ROW. Same species on west side but meadow is beyond ROW. Same conditions when assessed in 2012.
31	WCB-5	--	Winston Churchill Boulevard	July 12, 2013	No	CSP	0.4	Fair – minor rusting and some dents	Good – minor bend	No	No	No	No	--	None	Mowed grass on east side with pasture beyond ROW. Same species on west side but meadow is beyond ROW.
32	WCB-6	--	Winston Churchill Boulevard	August 23, 2012 & July 23, 2013	No	CSP	0.6	Good – some rust	Good – some rust, few dents	Yes	Yes	Yes	Yes	Ephemeral	Indirect	See description in text below table.

33	WCB-7	--	Winston Churchill Boulevard	July 23, 2013	No	CSP	0.4	Good	Good	No	No	No	No	--	None	Roadside ditch with grass and herb species crowding the culvert. Downstream beyond ROW mixed woodlot with grape vine.
34	WCB-8	--	Winston Churchill Boulevard	August 23, 2012 & July 23, 2013	No	PVC	0.6	Excellent	Excellent	No	Yes	No	No	--	None	Roadside ditch with grass and herb species crowding the culvert. Dry when assessed in 2012 as well.
35	WCB-9	Tributary C to Rogers Creek	Winston Churchill Boulevard	August 23, 2012 & July 23, 2013	No	CSP	0.6	Good	Good	Yes	Yes	Yes	Yes	Ephemeral	Direct	See description in text below table.
36	WCB-10	--	Winston Churchill Boulevard	July 23, 2013	No	CSP	0.4	Good – no rust	Good – no rust	No	No	No	No	--	None	Connecting low-lying areas and runoff from ditches. Primary species present are grass and herb species crowding the culvert.
37	WCB-11	--	Winston Churchill Boulevard	August 23, 2012 & July 23, 2013	No	CSP	0.4	Good – partially obstructed	Good – partially obstructed	No	No	No	No	--	None	Connecting low-lying areas and runoff from ditches. Primary species present are grass and herb species crowding the culvert. Same conditions when assessed in 2012.
38	WCB-12	--	Winston Churchill Boulevard	July 23, 2013	No	CSP	0.6	Good	Good	No	Yes	No	No	--	None	East side wetland marshy feature primarily with cattails. South side mowed grass.

[1]Culverts are round unless otherwise noted.

4.6.2.1 West Credit River Subwatershed

Tributary A – Point #2

Tributary A is a permanent, coldwater watercourse that originates west of Bush Street and flows in a northerly direction, under Bush Street through a 0.5 m round, PVC culvert, to the west branch of the Credit River (Erin branch) which is located approximately 200 m downstream. This tributary has been classified as a coldwater watercourse due to known groundwater seeps and discharge areas between Hillsburgh and Belfountain resulting from a decrease in topographic relief and presence of buried bedrock (Dillon Consulting 2010; CVC 1998).

At 13:30 on August 23, 2012, water temperature and air temperature was measured at 25ºC and 13ºC, respectively and the tributary was clear and flowing. Bankfull width ranged from 1 to 1.5 m, with a wetted width of 0.6 to 1.0 m, and depths of 0.05 to 0.1 m. In-stream habitat was provided through pools, riffles, woody debris, vegetation, and cobble. Upstream of the culvert the landowner has ponded the feature causing fine and organic substrates to accumulate. Upstream of the pool, the feature appears to be natural flowing through a riffle-run sequence underneath an excellent canopy cover. Substrates within the riffle and run consisted of gravel (40%), cobble (30%), sand (20%) and a few boulders (10%). Downstream of the culvert the feature appears to have been straightened to run along the side of a property and had a riffle-run sequence with the same substrates as upstream. A man-made cement structure was also observed downstream of the culvert. This structure in higher flows would cause a pooling affect, as was observed during the previous EA (Dillon Consulting 2010). This pooling feature was observed on July 23, 2013 as well. The riparian cover downstream of Bush St. provides good cover and shade. In-stream habitat and cover is provided through the pool feature the landowner created, riffles, woody debris, overhanging and instream vegetation, as well as the cobble. In-stream vegetation was primarily found within the pool area and consisted of watercress and algae.

Additional information on this tributary can be found within the draft Bush Street and Mississauga Road Class EA (Dillon Consulting 2010).

Brook trout were observed within this reach during the previous EA (Dillon Consulting 2010). No brook trout were observed during the NRSI site visit, although the habitat supports suitable spawning and rearing habitat for this species as well as other fish species (direct fish habitat).

The water-cress that was observed is an indicator species and is often associated with groundwater seepages. Groundwater seepages are important as they provide clear, cold baseflow to the tributary.

Tributary B – Point #3

This unnamed tributary is an ephemeral watercourse located beside the Belfountain Church. It crosses under Mississauga Rd. through a 0.6 m round CSP culvert. At the time of the assessment on August 23, 2012, this high gradient feature was dry. Bankfull width ranged from 1-1.25 m with a bank height of 0.2-0.5 m. Substrates within the channel consisted of gravel (40%), cobble (20%), boulder (20%), sand (20%), silt (5%), and detritus (5%). Land use within the immediate area of this feature is residential, although a narrow natural corridor has been maintained. The vegetation within this area consists of herbaceous plants, as well as grass and deciduous trees. Upstream and downstream of the road crossing the feature is covered by a deciduous canopy, which provides good (75%) cover. When re-visited on July 23, 2013, this feature was flowing rapidly. This may be due to the wetter than normal year and heavy rain events within previous days.

Direct fish habitat at this location is non-existent based on the watercourse being ephemeral as well as the steep gradient. This feature, when flowing, may provide indirect fish habitat to the Credit River downstream.

Point #41

Point #41 crosses under Winston Churchill Blvd. through a 0.75m CSP and had water present when assessed on July 23, 2013. This feature was previously assessed on August 23, 2012 and was dry. Cattail and grass species were dominant on both the east and west side of the road. On the 2013 visit, flow was present within the feature, although there was no defined channel present. Stagnant water with an oily sheen was also observed during the assessment. A small stagnant pond was also observed on the east side of the road, although whether it has connectivity to this feature is unknown. Although this feature is ephemeral and would not provide direct fish habitat, it may provide indirect habitat. This feature may also provide connectivity and contribution to the wetland features within the area.

Unmapped Watercourse – CVC-Assessed Watercourse Crossing

An additional regulated watercourse was observed by CVC staff during summer 2013 (HDR label WCB-14). Although NRSI did not investigate this location, it should be noted that it falls to the north of number 39 and is most likely an ephemeral system that provides indirect fish habitat. This feature may also provide connectivity and contribution to the wetland features within the area.

Point #39

Point #39 crosses under Winston Churchill Blvd. through a 0.4 m CSP culvert and had water present when assessed on July 23, 2013. This feature was previously assessed on August 23, 2012 and was dry. The culvert present was connecting two wetland areas that were present on both sides of the road. The primary vegetation within the ROW at the culvert crossing was grass and herb species, as well as cattails. Willow species were noted beyond the ROW. Although this feature is unlikely to provide direct or indirect fish habitat, it may provide connectivity and contribution to the wetland features within the area.

Point #40

Point #40 crosses under Winston Churchill Blvd. through a 0.45 m CSP culvert and had water flowing present when assessed on July 23, 2013. This feature was previously assessed on August 23, 2012 and was dry. The existing culvert connects two wetland areas that exist on both sides of the road. There was stagnant water present on the west side of the road that was iron-coloured which may indicate groundwater seepage within the area. The primary vegetation within the ROW at the culvert crossing was horsetail species, as well as other herbs and grass species. A mixed woodlot/wetland feature was noted beyond the ROW. Although this feature is unlikely to provide direct or indirect fish habitat it may provide connectivity and contribution to the wetland features within the area.

Point #42

Point #42 crosses under Winston Churchill Blvd. through a 0.9 m CSP culvert and had water present with a slight flow when assessed on July 23, 2013. This feature was previously assessed on August 23, 2012 and was dry. Upstream of the culvert was a grassed swale that had been recently mowed. Water-cress was noted around the opening of the culvert, which may be indicative of groundwater seepages. A dug pond was observed upstream of the culvert,

which is likely the origin of flow to this watercourse. Downstream, the species present included grass and herb species that transitioned into a mixed woodlot beyond the ROW. Although this feature is unlikely to provide direct or indirect fish habitat it may provide connectivity and contribution to the wetland features within the area.

4.6.2.2 Cheltenham to Glen Williams Subwatershed

Tributary A to Second Creek (Point #10)

At 13:30 on August 23, 2012, water temperature and air temperature was measured at 25ºC and 16ºC, respectively and the tributary was clear and flowing. Bankfull width ranged from 0.75 to 1.5 m, with a wetted width of 0.6 to 1.0 m, and depths of 0.2 to 0.4 m. Instream habitat was provided through pools, riffles, woody debris, vegetation, and cobble. Throughout the ROW, the feature appears to be natural flowing through a riffle-run sequence underneath a moderate canopy cover consisting of sparse trees, shrubs and various grass species. Substrates within the riffle and run consisted of gravel (40%), cobble (30%), sand (20%) and muck/organic debris (10%). A residential pond exists approximately 20 m upstream of the culvert, although this was not assessed due to property access restrictions. As part of the previous EA (Dillon Consulting 2010), the pond was partially assessed and a perched culvert was noted as being a barrier to upstream fish passage. Downstream of the culvert the feature flows northwest for 50 m into another large online pond. Downstream of the crossing, is a cattail marsh with the channel being less defined.

Additional information on this tributary can be found within the draft Bush Street and Mississauga Road Class EA (Dillon Consulting 2010).

No brook trout were observed during the site visit, although the habitat is suitable for spawning and rearing for this species (direct fish habitat). The water-cress that was observed is an indicator species and is often associated with groundwater seepages. Groundwater seepages are important as they provide clear, cold baseflow to the tributary.

Tributary B to Second Creek (Point #12)

This location was assessed on August 23, 2012 and again on July 23, 2013 where it crosses under Mississauga Rd. This tributary shows up on mapping although there is no defined channel and grass and herb species dominate the area. NRSI"s findings for this feature were similar to findings documented within the 2010 EA (Dillon Consulting 2010). Due to the lack of a

defined channel and the lack of constantly flowing water, this feature does not provide any fish habitat, direct or indirect.

Tributary A to Second Creek (Point #19)

Tributary A to Second Creek crosses the study area a second time at Olde Base Line Rd. This feature crosses under the road on a 45 degree angle through a 3 m x 1.4 m open bottom concrete box culvert. At the time of the first assessment, on August 23, 2012, the tributary was dry and grass species were present within the defined channel. An online pond, located approximately 80 m upstream of the crossing may also control flow to the channel. Bankfull width ranged from 0.75 to 2.0 m. Land use within the area was made up of residential, agricultural and pastures. Canopy cover was moderate. Upstream cover was provided by mature deciduous trees while downstream of the culvert was vegetated by tall grasses and some shrubs. There also was a large step (0.5 m) from the bottom of the culvert to the dirt/gravel on the downstream side. This feature was revisited on July 23, 2013 and was clear and flowing. Water temperature was 23 ºC at 10:30hrs. Wetted width ranged from 1.0 to 1.8 m, and depths of 0.4 to 0.6 m. Young-of-year fish were observed upstream of the culvert within a small pool. In-stream habitat was provided through pools and vegetation. Downstream of the culvert the channel narrows as it does into a grassy feature. As this tributary was dry in 2012 it is either ephemeral or intermittent and provides direct fish habitat.

Tributary A and B to Unnamed Watercourse (Points #13 & 16)

These ephemeral watercourses were dry at the time of assessment on August 23, 2012 and July 23, 2013. They do not appear to provide any fish habitat, direct or indirect. They are characterized by low-lying areas that are dominated by cattails, tall grasses and herb species. Point #13 is believed to be a headwater feature that may connect or provide contribution to the wetland features within the area.

Tributary A to Rogers Creek (Point #23)

Tributary A to Rogers Creek crosses the study area along Olde Base Line Rd. This feature crosses under the road on a 90 degree angle through a 3.3 m x 1.4 m open bottom concrete box culvert. At 15:00 on August 23, 2012, this feature was dry. When revisited on July 23, 2013 the feature was also dry. A pond feature is present approximately 50 m upstream and although it does not appear to be connected to the watercourse, this could not be confirmed.

This tributary is an ephemeral watercourse that had a defined channel upstream. Channel morphology included a bankfull width of 3 m with bankful height ranging from 0.1 to 0.6 m. Bank vegetation consisted of grass and herb species with some roots and grape vines. The feature appears to meander with a low gradient when it is flowing. Substrates within the channel on both the upstream and downstream side of the culvert consisted of gravel (30%), cobble (30%), sand (20%), muck (10%), and detritus (10%). Downstream of the culvert the channel is overgrown with grass and herb species. This feature does not provide direct fish habitat where it crosses the ROW, although it may provide indirect fish habitat when it is flowing.

Tributary B to Rogers Creek (Point #25)

Tributary B to Rogers Creek crosses the project area along Olde Base Line Rd. This feature crosses under the road at a 90 degree angle through a 0.6 m round CSP culvert. At 15:25 on August 23, 2012, this feature was dry. When revisited on July 23, 2013 the feature was also dry. The channel is defined in some locations upstream, but downstream appears to be a slight depression within the deciduous woodlot. When flowing, the bankfull width may be 1.25 m and would flow at a low gradient. The canopy cover for this feature is high (85%) and is provided through mature deciduous trees. The land use in this area is primarily natural with some farming nearby. When flowing, this feature may provide indirect fish habitat.

Point #32

Point #32 crosses under Winston Churchill Blvd. and had water present when assessed on both August 23, 2012 and July 23, 2013. On August 23, 2012, this feature had pools of water at both the upstream and downstream ends of the culvert. On July 23, 2013, this feature was clear and flowing. A cattail marsh is present on the east side of the ROW. From this marsh a defined channel with limited vegetation is present. Downstream of the culvert this small feature has been straightened and flows alongside a cedar hedgerow. Substrates within the channel are primarily organic detritus, muck, and vegetation, with some gravel. Although this feature is ephemeral and would not provide direct fish habitat, it may provide indirect habitat.

Tributary C to Rogers Creek (Point # 35)

Tributary C to Rogers Creek crosses the project area along Winston Churchill Blvd. This feature crosses under the road on a 90 degree angle through a 0.6 m round CSP culvert. At 14:00 on August 23, 2012, this feature was dry. When revisited on July 23, 2013 the feature had a light flow. As mapped, the tributary is shown to cross under the road and continue into a

pasture until crossing under 5th Sideroad. This was not the case when assessed; the channel has been modified to run alongside the road. Pockets of standing water were observed within the pasture but no defined channel was present within the ROW. The grassy roadside ditch had a bankfull width of 1.25 m and a low gradient when flowing. Bank vegetation consisted of grass and herb species, which were growing within some section of the channel. Substrates within the channel on both the upstream and downstream side of the culvert consisted of gravel (40%), cobble (20%), sand (20%), muck (10%), and detritus (10%). Young-of-year fish (cyprinids) where observed immediately downstream of the culvert in a small pool feature. This ephemeral feature provides direct fish habitat when water is present.

Point #24

Point #24 crosses under Olde Base Line Rd. through an approximately 0.4 m CSP culvert and was dry when assessed on July 23, 2013 as well as when assessed in 2012. The culvert present was connecting two wetland areas that were present on both sides of the road. The primary vegetation within the ROW at the culvert crossing was grass and herb species with some grape vines. Although this feature does not provide direct or indirect fish habitat it may provide connectivity and contribution to the wetland features within the area.

4.6.2.3 Residential Ponds

Approximately eight residential ponds were documented during the 2010 EA (Dillon Consulting 2010) as occurring close to the study area along Bush St. and Mississauga Rd. Distances of these ponds to the roads ranged from 8 to 50 m. Due to lack of property access, these ponds were not fully assessed as part of this study. However, they are likely to provide direct fish habitat. Based on the hydrogeology of the area and the potential for groundwater upwelling, these ponds may provide coldwater conditions.

5.0 Opportunities and Constraints

The opportunities and constraints analysis is used to identify natural features that are sensitive to disturbance based on the rarity or significance of the feature or the functions/processes and/or have policies inhibiting development to occur within them. These areas are identified as "constraints", and are discussed in the context of natural heritage policies governing their protection. Conversely, the analysis is used to identify areas that are not subject to any of these constraints, and are thus considered "opportunities" for development.

The study area also includes areas not associated with discrete natural features that are covered under natural heritage protection policies of the Niagara Escarpment Plan (NEC 2005) and the Greenbelt Plan (OMMAH 2005). Relevant development constraints associated with these policies are also discussed below.

This analysis is intended to inform development of alternative design options that avoid and minimize impacts to significant and sensitive natural features and their ecological functions. Identification of constraints does not necessarily prohibit development, but recognizes particular natural features for which appropriate mitigation and effectiveness monitoring may be required should avoidance of those features be infeasible.

The following are natural feature constraints identified for the study area based on existing natural heritage policies in force within the study area, and based on consideration of other significant/sensitive species that are known to or may occur within the study area, based on correspondence with regulatory agencies. While the policies governing these development constraint recommendations should be respected, it should be noted that selection of the preferred alternative design following the EA process may render some degree of impact to significant natural features/areas unavoidable. Selection of the preferred alternative design considers multiple socio-economic, environmental and cultural factors, and seeks to avoid or minimize impact across these factors to the degree feasible. Consultation with the appropriate regulatory agencies (e.g., OMNR, CVC, NEC) will be required where impacts to significant natural features/areas are anticipated. If Niagara Escarpment Plan policies requiring avoidance of significant natural features (e.g., PSWs, habitat for provincially Threatened or Endangered species, fish habitat) cannot be met, an amendment to the Niagara Escarpment Plan may be

required. This amendment would require a justification for not meeting the existing policies and demonstration that the overall purpose and objective of the Plan can be met.

5.1 Significant Natural Heritage Features & Habitats

5.1.1 Niagara Escarpment Plan Areas

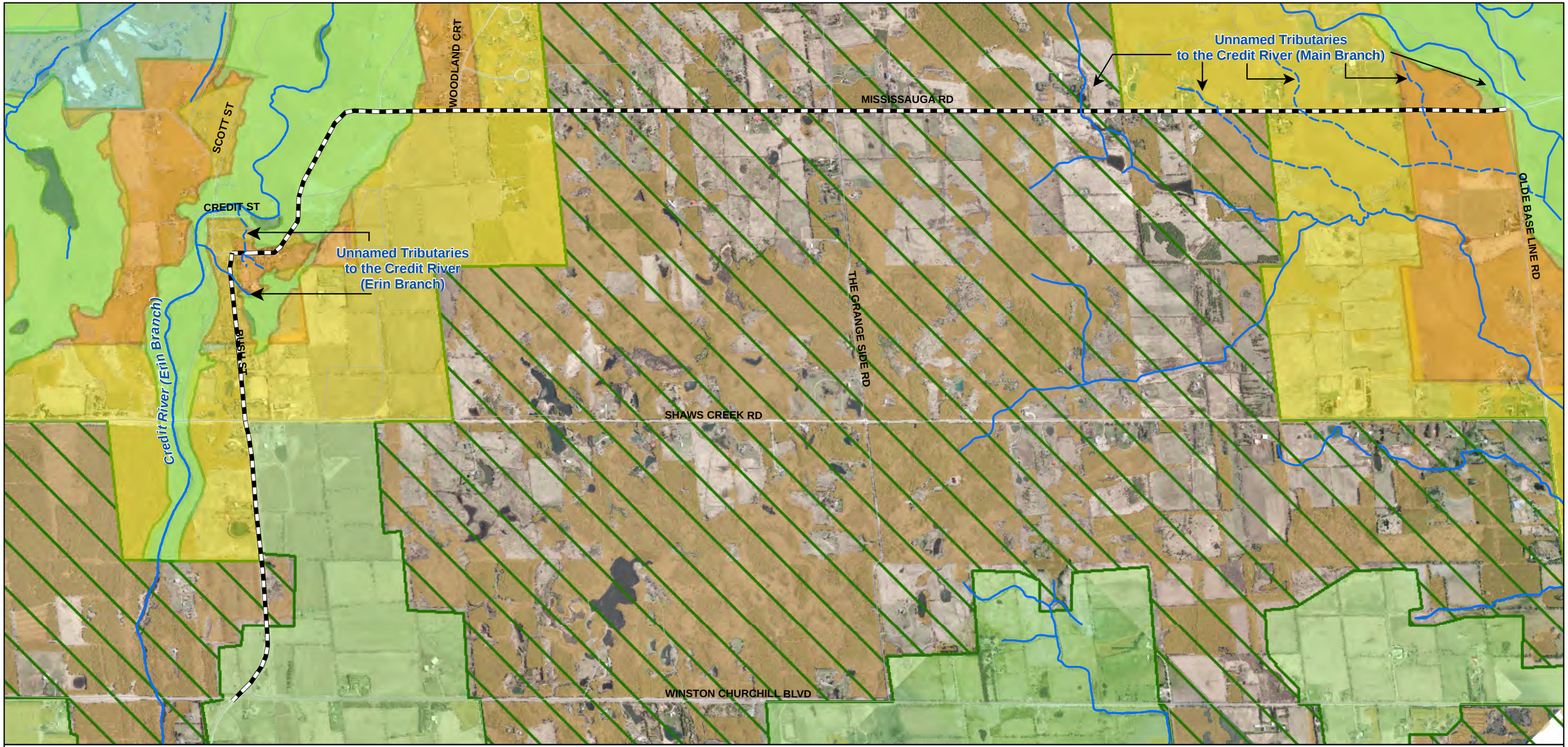
As shown on Figure 4, the study area encompasses parts of three natural heritage-related Niagara Escarpment Plan designation areas: Escarpment Natural Area, Escarpment Protection Area, and Escarpment Rural Area. As "essential transportation" features (V. Restrepo, HDR, pers. comm., July 2013), road improvement activities may be permitted within Escarpment Natural Areas as per Section 1.3 of the Niagara Escarpment Plan (NEC 2005). Improvements may be permitted, provided that various policies are met that seek to avoid, minimize, or mitigate impacts to these designated policy areas. These general policies are described in Section 2.7 of this report. Additional discussion regarding development constraints associated with woodlands, wetlands, habitat for provincially Endangered or Threatened species, and Life Science ANSIs, including vegetated protective setbacks, are described in the following sections.

5.1.2 Greenbelt Designated Areas

Figure 4 shows study area lands designated under the Greenbelt Plan as Protected Countryside and Natural Heritage System. As per Section 4.2.1 of the Greenbelt Plan (OMMAH 2005), any infrastructure expansions/alterations within the Protected Countryside are permitted given the end-use benefit of improved transportation facilities provided to local residents, agriculture, and to the well-being of the local economy.

Impacts to Natural Heritage System features must be minimized to the extent possible. Key Natural Heritage Features and Key Hydrologic Features, as described in Section 2.8, must be avoided unless there is no alternative. Key Natural Heritage Features, as mapped on Figures 5a and 5b, include

- fish habitat,
- PSWs,
- other wetlands,
- Life Science ANSIs,
- Significant Woodlands,
- Significant Wildlife Habitat.



Bush Street and Mississauga Road Class EA
Figure 4: Environmental Policy Areas

Legend

- Roads
- Watercourse
- Ephemeral Watercourse
- Study Alignment

Niagara Escarpment Plan

- Escarpment Natural Area
- Escarpment Protected Area
- Escarpment Rural Area
- Escarpment Recreational Area

Greenbelt Designations

- Greenbelt Protected Countryside
- Greenbelt Natural Heritage System

Region of Peel

- Core Areas of the Greenland System

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0 300 600 900

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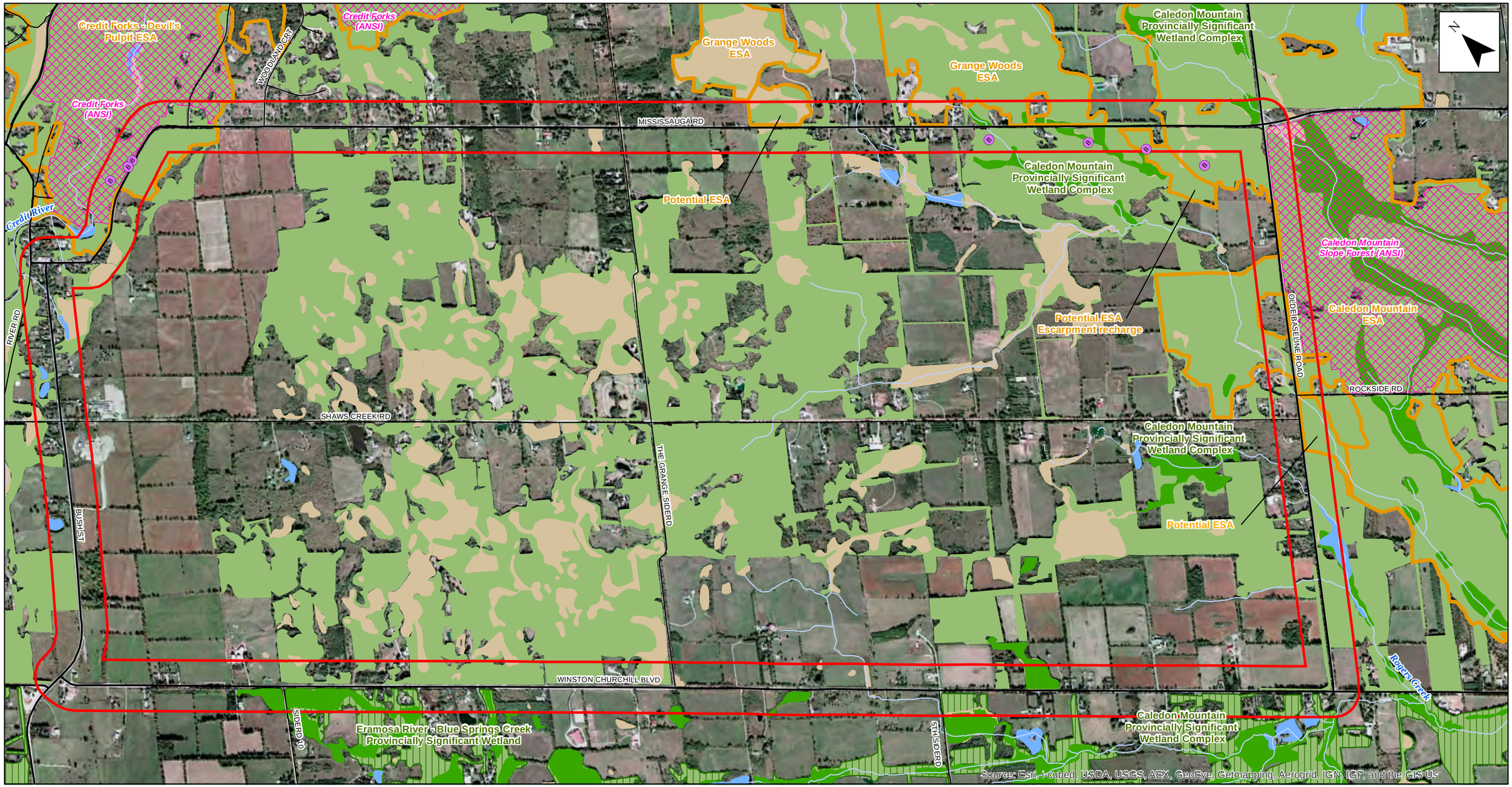

Figure 5a

Belfountain Transportation EA

Natural Feature Constraints - Woodlands, Wetlands and Designated Policy Areas

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

0 100 200 300 400 500 Meters

November 18, 2013. Project No: NRSI-1337.
UTM Zone 17, NAD 83 Scale: 1:17,000 (at 11x17")

Legend

- Study Area
- Primary Road
- Secondary Road
- Permanent Watercourse
- Intermittent Watercourse
- Waterbody
- Significant Woodland (>10ha)
- Core Area Woodland (>16ha)
- ANSI, Life Science
- Environmentally Sensitive Area (ESA)
- Provincially Significant Wetland (PSW)
- Non-Provincially Significant Wetland (PSW)
- Butternut Observation

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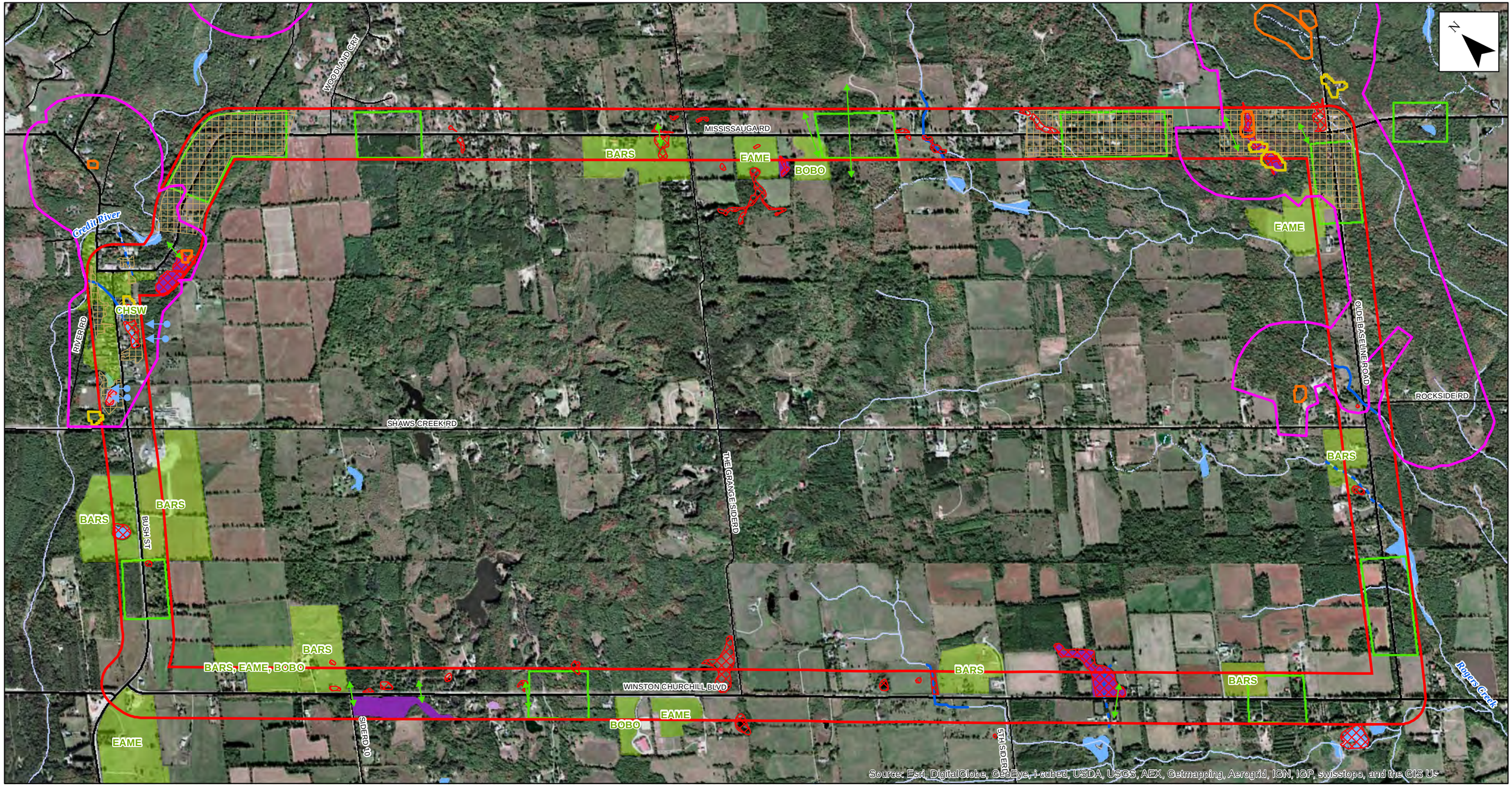

Figure 5b

Belfountain Transportation EA

Natural Feature Constraints - Fish and Wildlife Habitat

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

0 100 200 300 400 500 Meters

December 13, 2013. Project No: NRSI-1337.
UTM Zone 17, NAD 83 Scale: 1:17,000 (at 11x17")

Legend

- Study Area
- Primary Road
- Secondary Road
- Permanent Watercourse
- Intermittent Watercourse
- Waterbody
- Northern Flying Squirrel High-Denisty Areas
- Direct Fish Habitat
- Indirect Fish Habitat
- Species at Risk (SAR)

Jefferson Salamander Habitat

- Confirmed
- Potential
- Regulated Habitat

Significant Wildlife Habitat

- Western Chorus Frog Habitat
- Turtle Overwintering SWH
- Deer Movement Corridor SWH
- Significant Amphibian Crossing
- Amphibian Breeding SWH
- Seeps and Springs SWH

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Key Hydrologic Features, as mapped on Figure 5a, include

- permanent and intermittent streams,
- PSWs,
- other wetlands.

Where impacts are unavoidable, measures must be implemented that effectively mitigate impacts on Natural Heritage System features, while maintaining their ecological functions and connectivity to surrounding natural features.

5.1.3 Wetlands

5.1.3.1 Provincially Significant Wetlands

As described in Section 4.3, the study area contains portions of two PSWs: Caledon Mountain PSW Complex and Eramosa River-Blue Springs Creek PSW Complex. PSWs are protected under Ontario"s Provincial Policy Statement (OMMAH 2014). PSWs are also considered Core Areas of Peel Region"s Greenlands System (Region of Peel 2008) and Core Greenland in Wellington County (Wellington County 2013). PSWs and all other wetlands (including non-provincially significant), are also protected under the Niagara Escarpment Plan (NEC 2005).

As discussed in Section 2.0, areas identified as PSW are a constraint to development under the PPS (OMMAH 2014), CVC"s wetland policy (Ont. Reg. 160/06), Peel Region Official Plan (Region of Peel 2008) and Wellington County Official Plan (Wellington County 2013), Niagara Escarpment Plan (NEC 2005) and Greenbelt Plan (OMMAH 2005). In all cases development within PSWs is to be avoided unless no other alternatives are available. Naturally vegetated buffers are required for wetlands to protect their form and ecological function, as well as to mitigate against negative effects from development activities that may encroach beyond the existing ROW. A 30 m development setback from the defined wetland boundary is considered suitable to adequately buffer the significant and sensitive ecological features and functions of the PSW. However, in some areas existing PSW occurs immediately adjacent to or within 30 m of the existing road. In such cases, any physical separation between road grading limits and PSW should be maintained to buffer the adjacent wetland. Where no buffer is present/feasible, all efforts should be made to avoid impacts to the adjacent PSW.

Although development is to be avoided within PSW, development may be permitted within adjacent lands provided that there will be no negative impact on the PSW or its ecological functions (OMMAH 2014). As these lands are regulated under Reg. 160/06 by CVC, a permit will be required from CVC to proceed with development within these areas. Where there is potential for direct impact to PSWs as a result of the proposed undertaking, an amendment to the Niagara Escarpment Plan may be required as described above.

5.1.3.2 Other Wetlands

Other wetlands present within the study area are protected under the Peel Region Official Plan (Region of Peel 2008), which classifies other wetlands as either "Natural Areas" (evaluated non-significant wetlands) or "Potential Natural Areas" (unevaluated wetlands), and by the Wellington County Official Plan (Wellington County 2013), which defines all wetlands as Core Greenland (see Section 2.6). The Belfountain Wetland Complex, predominantly located north of The Grange Sideroad and with wetland components within the study area, is currently undergoing review of provincial significance by the OMNR but to date is considered non-PSW. OMNR mapping of this complex is ongoing at the time of report preparation.

Development is to be maintained outside of wetlands that are located within the Niagara Escarpment Plan area (NEC 2005). Where there is potential for direct impact to wetlands as a result of the proposed undertaking, an amendment to the Niagara Escarpment Plan may be required as described above. Outside of the Niagara Escarpment Plan area, development within wetlands may be permitted provided that it can be demonstrated that there will be no negative impacts to the feature or its ecological functions. However, as Core Greenlands within Wellington County, all wetlands within that jurisdiction (i.e., west of Winston Churchill Blvd.) should be avoided to the extent feasible as permitted by the regulatory agencies.

Development within any wetlands within CVC"s jurisdiction is regulated through Ont. Reg. 160/06. Development within wetlands is prohibited under this regulation; however, as described in Section 5.1.3.1, wetland development may be permitted by CVC under certain circumstances.

Where road improvements may require encroachment into adjacent natural features, development setbacks of 15 m are recommended from the confirmed boundaries of adjacent non-PSW wetlands to sufficiently protect their ecological form and function. As for PSWs,

where 15 m spacing is not available or where the wetland occurs adjacent to the existing road, all efforts should be made to avoid or minimize impacts to adjacent wetland features.

Development may be permitted within adjacent lands provided that there will be no negative impact on the wetland or its ecological functions (OMMAH 2014). As these lands are regulated under Reg. 160/06 by CVC, a permit will be required from CVC to proceed with development within these areas.

5.1.4 Woodlands

Significant woodlands are protected under the Provincial Policy Statement (OMMAH 2014), but more specific policies outlining definition of significant woodlands, and constraints to development within woodlands, have been identified for Peel Region, the Town of Caledon, and Wellington County (Region of Peel 2008, 2010,, Town of Caledon 2008, Wellington County 2013).

Significant Woodlands are considered Core Areas within Peel"s Greenlands System (Region of Peel 2008). Regional Official Plan Amendment (ROPA) 21 (Region of Peel 2010) provided updates to the criteria of woodland significance based on study results presented in the *Peel-Caledon Significant Woodlands and Significant Wildlife Habitat Study* (North-South Environmental *et al.* 2009). ROPA 21 outlines multiple criteria for the designation of Significant Woodlands within the Region, including woodland size ≥16 ha within the Town of Caledon (Region of Peel 2010). Based on these criteria, Significant Woodlands were identified that occur within the study area and adjacent, as shown on Figure 5a. As shown, the majority of woodlands that occur within the study area are considered Significant Woodland; of these, most woodlands were deemed significant based solely on their size being ≥16 ha. As described in Section 2.5, development and site alteration within Core Areas is prohibited with some exceptions, including “essential servicing”, a category into which the proposed road improvements fall. Nonetheless, all efforts must be made to avoid or minimize impacts to Core Area woodlands as part of any proposed development that encroaches into adjacent natural features.

As described in Section 2.6, woodlands >10 ha are considered Greenlands within the Wellington County Official Plan (Wellington County 2013). Development should occur outside

of Greenlands unless it can be demonstrated that the development will not negatively impact the natural feature or its ecological function (Wellington County 2013).

Development within Niagara Escarpment Plan area woodlands is to be minimized to the extent possible. Woodland management plans are required where development in heavily treed areas is required. Existing tree cover and other stabilizing vegetation is to be maintained on slopes greater than 25% (NEC 2005).

It is recommended that a 10 m development setback from the defined dripline edge of the Significant Woodland be established where possible. This setback is considered suitable to effectively buffer the woodland and its ecological functions from construction and operational disturbances. Where a setback of this width is not feasible, such as where the woodland edge occurs immediately adjacent to the road, all efforts should be made to minimize the amount of vegetation clearing and disturbance to the adjacent woodland.

5.1.5 Habitat of Endangered Species and Threatened Species

Based on the results of previous studies completed within the study area, and NRSI field work completed in 2012 and 2013, six species regulated under Ontario's *Endangered Species Act* (i.e., designated as provincially Endangered or Threatened) are known to occur within the study area:

- Barn Swallow
- Eastern Meadowlark
- Bobolink
- Chimney Swift
- Butternut
- Jefferson Salamander

<u>Jefferson Salamander</u>

The OMNR has defined regulated habitat for Jefferson salamander that applies to Peel Region. Jefferson salamander regulated habitat has been defined in Ontario Regulation 242/08 as follows:

- a wetland, pond or vernal or other temporary pool that is being used by a Jefferson salamander or Jefferson dominated polyploid or was used by a

Jefferson salamander or Jefferson dominated polyploid at any time during the previous five years,

- an area that is within 300 metres of a wetland, pond or vernal or other temporary pool described in subparagraph i and that provides suitable foraging, dispersal, migration or hibernation conditions for Jefferson salamanders or Jefferson dominated polyploids,
- a wetland, pond or vernal or other temporary pool that,
    A. would provide suitable breeding conditions for Jefferson salamanders or Jefferson dominated polyploids,
    B. is within one kilometre of an area described in subparagraph i, and
    C. is connected to the area described in subparagraph i by an area described in subparagraph iv, and
- an area that provides suitable conditions for Jefferson salamanders or Jefferson dominated polyploids to disperse and is within one kilometre of an area described in subparagraph

The habitat regulation for Jefferson salamander also includes migration routes between suitable habitats including crossings of roads and associated features (e.g., gravel shoulders). Jefferson salamander regulated habitat has been identified and mapped within the study area and surrounding vicinity by the OMNR, and is shown on Figure 5b. Approximately 3,830 m of study area road coincides with mapped Jefferson salamander regulated habitat. Specifically, regulated habitat features located within the study area include confirmed breeding ponds, potential breeding ponds (i.e., suitable habitat), and areas within 300 m of these features including corridors of suitable habitat that provide dispersal and migration opportunities. All areas of regulated habitat are subject to the policies of the *Endangered Species Act* as described in Section 2.3. Regulated habitat within the study area includes known Jefferson salamander road crossing locations; specifically, on Mississauga Rd. adjacent to a known breeding pond location, and on Old Main St. in Belfountain between areas of suitable habitat (M. Heaton, OMNR, pers. comm., July 2013). Recommended measures to mitigate impact Jefferson salamander at these known crossing locations are described below.

<u>Barn Swallow, Bobolink and Eastern Meadowlark</u>

Several individuals of foraging barn swallows, and breeding bobolink and eastern meadowlark were observed within multiple agricultural fields located within the study area as shown on

Figure 5b. Bobolink and eastern meadowlark are grassland bird species that have increasingly relied on modified cultural landscapes (e.g., old fields, meadows, hay fields) as native grassland habitats have largely been lost through agricultural and other land uses. These species were observed within fields considered "low intensity agriculture" within the study area. Barn swallows may forage over high or low intensity agricultural fields, preferentially close to a water source. These species, and their general habitats, are protected under the *Endangered Species Act*. However, the proposed development alternatives are not anticipated to cause significant impact to these species or their habitats as any habitat loss that may be required through road improvements would be considered negligible relative to existing habitat areas.

Chimney Swift

As described in Section 4.5.1, chimney swifts are known to nest within the chimney of Belfountain's general store (M. Heaton, OMNR, pers. comm., July 2013), and were observed by NRSI biologists within the village of Belfountain. The general store chimney is therefore considered sensitive nesting/roosting habitat for the provincially Threatened chimney swift, and subject to the protection policies of the *Endangered Species Act*. However, because the proposed development alternatives will not impact the known nesting/roosting chimney, there will be no impact to this species or its general habitat.

Butternut

Seven individuals of the provincially Endangered butternut were inventoried within the study area in completion of the 2010 EA (Dillon 2010) and are shown on Figure 5a. No other butternuts were observed during 2011 (Dillon) or 2012-2013 (NRSI) site visits elsewhere within the study area. Policies governing the protection of butternuts under the *Endangered Species Act* are described in Ontario Regulation 242/08. Prior to any potential impact to butternuts, a Butternut Health Assessment must be completed by a certified assessor, with a report submitted to the OMNR, to determine each tree's status as a Category 1, 2 or 3 tree (see Ontario Regulation 242/08 (OMNR 2013) for policies associated with each butternut tree category). Butternut Health Assessments have not been completed to date on known butternut trees within the study area. Any butternuts that may be potentially impacted by the proposed development will require a Butternut Health Assessment to determine its status under Ontario Regulation 242/08 of the *Endangered Species Act*. This work is anticipated to occur during the Detailed Design stage of development.

As provincially Threatened and Endangered species, the species listed above, including their regulated or general habitats, are protected under the *Endangered Species Act*. Activities that may potentially impact bobolink, eastern meadowlark or butternut and their general habitats must be registered with the OMNR, with provision of mitigation and monitoring plans to the satisfaction of the OMNR, as described in Ontario Regulation 242/08 (OMNR 2013). No impact to barn swallow or chimney swift nesting habitat is anticipated based on the proposed road development plans. Potential impact to Jefferson salamander and its regulated habitat will require a permit under Section 17(2)(c) of the *Endangered Species Act* demonstrating a strategy to achieve overall benefit to the species, in consultation with the OMNR.

Policies for the protection of habitat for provincially Threatened and Endangered species have also been established in the Provincial Policy Statement, upper and lower-tier Official Plans, Greenbelt Plan and Niagara Escarpment Plan (Section 2.0). However, these policies are to be applied in the context of the EA process such that, while all efforts will be made to respect these policies, they will be considered in light of other design considerations during selection of the preferred alternative design. Nonetheless, any development that may impact habitat of Endangered and Threatened species must be planned in consultation with the OMNR as described above. Furthermore, where direct impact to habitat for Endangered or Threatened species is anticipated, an amendment to the Niagara Escarpment Plan may be required as described above.

5.1.6 Significant Wildlife Habitat

5.1.6.1 Confirmed Significant Wildlife Habitat

Based on background information review, project team consultation, and desktop analysis, six SWH categories were confirmed for the study area:

- Deer Wintering Area
- Western Chorus Frog Habitat
- Turtle Overwintering Habitat
- Animal Movement Corridors
- Seeps and Springs
- Amphibian Breeding Habitat

As described in Section 2.0, SWH is protected under the Provincial Policy Statement (OMMAH 2014), Regional, County, and Municipal Official Plans (e.g., Region of Peel 2008), the Niagara Escarpment Plan (NEC 2005), and is considered a Key Natural Heritage Feature under the Greenbelt Plan (OMMAH 2005). SWH is also designated as Greenland within the Wellington County Official Plan (Wellington County 2013). Based on these policies, development should not occur within SWH unless it can be demonstrated that there will be no negative impact to the functioning of the habitat. Impacts to general wildlife habitat, including linkages, are to be minimized, and where possible, enhanced, within the Niagara Escarpment Plan area (NEC 2005).

Deer Wintering Habitat

Deer overwintering habitats are vital to the sustainability of local deer populations given their specific characteristics that enhance the survivability of deer through the winter. Deer move into overwintering areas (or "yards") with the onset of snow cover, and aggregate in these areas while maintaining a network of trails to known foraging locations. Deer yards are situated in large coniferous forest interiors, which provide sufficient protection from winds, provide cover, and feature less snow cover due to snow being held on conifer branches (OMNR 2012a). Deer yards draw deer from areas of the surrounding landscape up to 10 times the size of the yard itself; therefore, impacts to deer yards can cause significant impacts on deer populations on a regional scale (OMNR 2012a).

As shown on Figure 5b, deer wintering habitat has been identified within coniferous forest located south of the study area, south of Olde Base Line Rd. and west of Mississauga Rd. Deer wintering habitat has also been identified within the Credit River valley, north of the study area. These habitat areas occur within lands also designated as Core Areas of Peel"s Greenlands System, Wellington County"s Core Greenlands, and as part of the Caledon Mountain PSW Complex, Caledon Mountain ESA, and Caledon Mountain Slope Forest ANSI. These habitats are therefore protected under various levels of policy. Furthermore, the proposed road improvements are not anticipated to cause any significant impact to this SWH type.

Western Chorus Frog Habitat

Western chorus frog is designated as Threatened federally and is listed under Schedule 1 of the Species at Risk Act; however, it is considered Not at Risk provincially. This species is therefore considered a species of conservation concern (OMNR 2010) in Ontario. Previous studies

completed by CVC have confirmed presence of western chorus frog at multiple locations within the study area, including those reported in the 2010 EA report (Dillon Consulting 2010), and as shown on Figure 5b: these locations include marsh habitat located behind houses fronting Old Main St. in Belfountain, within deciduous swamp associated with a small Credit River tributary, adjacent to Mississauga Rd. near Olde Base Line Rd. (also comprising both known and potential Jefferson salamander breeding ponds), and swamp thicket and coniferous swamp habitat located adjacent to Winston Churchill Blvd.

The marsh habitat location is sufficiently removed from the ROW that no direct impacts will be imposed on it from the proposed undertaking. However, road improvements have the potential to impact the habitat locations on Mississauga Rd near Olde Base Line Rd., and on Winston Churchill Blvd. Road improvements should be designed to avoid encroachment into these wetland habitat features. Construction and operational design of road improvements, such as stormwater drainage, should ensure no indirect impacts to these features. If habitat impacts associated with a preferred alternative design cannot be avoided, appropriate mitigation measures must be identified.

Turtle Overwintering Habitat

Turtles generally overwinter at the bottom of ponds that are sufficiently deep so as not to completely freeze during the winter. Some species that can tolerate low oxygen conditions may also hibernate while completely or partially buried in the pond sediments. Depending on species, overwintering may be communal (OMNR 2012a).

The study area is known to contain one pond that provides turtle overwintering habitat. This pond is located immediately north of Bush St. at the west end of Belfountain (M. Heaton, OMNR, pers. comm., July 2013) (Figure 5b). An additional suspected turtle overwintering pond was located on a residential property fronting the west side of Winston Churchill Blvd. (Figure 5b). Snapping turtle has been regularly observed at this pond location, including following spring emergence, as reported by a local resident. Potential road improvement developments that may encroach beyond the existing ROW should be designed to avoid impacts to these habitats

Seeps and Springs

Seepage areas and groundwater springs can provide important wildlife habitat due to the diversity of plant species that often grow in the moist environment around them. They also provide a source of drinking water in otherwise dry forested areas, particularly in the winter as they typically don"t freeze. Found in headwater areas, seeps and springs are often located in proximity to upland areas that function as groundwater recharge areas due to permeable soils (OMNR 2000).

Several groundwater seepage areas are found in the west end of Belfountain as shown on Figure 5b. These seepage areas provide groundwater inputs to adjacent wetland communities (M. Heaton, OMNR, pers. comm., October 2013), thereby helping to sustain these features. Groundwater seepage areas near Belfountain are known to provide coldwater inputs to Tributary A of the West Credit River, which originates in a coniferous swamp adjacent to the village and provides brook trout habitat (see Section 5.1.9). The seepage areas providing input to the coniferous swamp are well set back from Bush St. behind residential properties and will not be impacted by the proposed road developments. However, known seepage locations along an embankment immediately north of Bush St. may potentially be impacted by road developments, particularly if encroachment beyond the existing graded footprint is required. Road improvement designs should seek to avoid impact to these groundwater seepage areas.

Animal Movement Corridors

Movement corridors for white-tailed deer and amphibians (various salamander and anuran species) have been identified in the study area based on previous studies completed by CVC and the OMNR (M. Heaton, OMNR, pers. comm., April 2013) and as documented in the 2010 EA report (Dillon Consulting 2010). While specific criteria do not currently exist for this SWH type (North-South Environmental *et al.* 2009), these wildlife corridors are noted to be of particular importance at both regional and local scales, particularly for deer (M. Heaton, OMNR, pers. comm., April 2013).

Deer Movement Corridors

Deer seasonally migrate between summer ranges and overwintering deer yards. The same migration trails are used on an annual basis and by successive generations (OMNR 2012a). Trails are successively used because they meet important ecological requirements, such as the provision of protective cover provided by an undisturbed understory (OMNR 2012a). Juvenile deer learn these trails from their mothers (M. Heaton, OMNR, pers. comm., July 2013);

consequently, maintenance of the form and ecological functioning of these corridors is vital to ensure continued success of regional deer populations.

Figure 6 shows the locations of local deer movement paths where they cross the study area ROWs. These movement paths were identified by OMNR based on aerial photo interpretation, local knowledge, analysis of deer-vehicle collision data, and wildlife camera and track studies completed during winter 2012/2013. These paths represent localized movements between suitable habitats, such as between woodlands and foraging habitats in agriculture fields and cultural meadows. Localized movement paths have been designated by OMNR as either low-density or high-density based on estimates of number of individuals crossing. High-density crossings were defined as habitual crossing sites where >2 deer were recorded on several occasions, and where winter track surveys showed a density of >2 deer. Other, non-habitual deer crossing locations that did not meet these criteria were considered low-density crossings (M. Heaton, OMNR, pers. comm., November 2013). As shown on Figure 6, two locations within the study area were considered high-density crossings. Both of these paths cross Olde Base Line Rd. and channel deer between overwintering habitat to the south of the study area and agricultural foraging habitats on the north side of Olde Base Line Rd. At both of these locations, deer are funnelled through a distinct crossing point (e.g., opening in a fence along the field perimeter), whereby they disperse upon entering forest habitat when travelling south, or converge from different directions when travelling north (M. Heaton, OMNR, pers. comm., July 2013). All other movement paths within the study area are considered low density by comparison. Figure 6 also shows the location of the large, regional-scale movement corridor that crosses through the southeast corner of the study area, following along the forested brow and face of the Niagara Escarpment. This important, regional-scale movement corridor is very old and well established, connecting deer from the surrounding landscape to overwintering habitats.

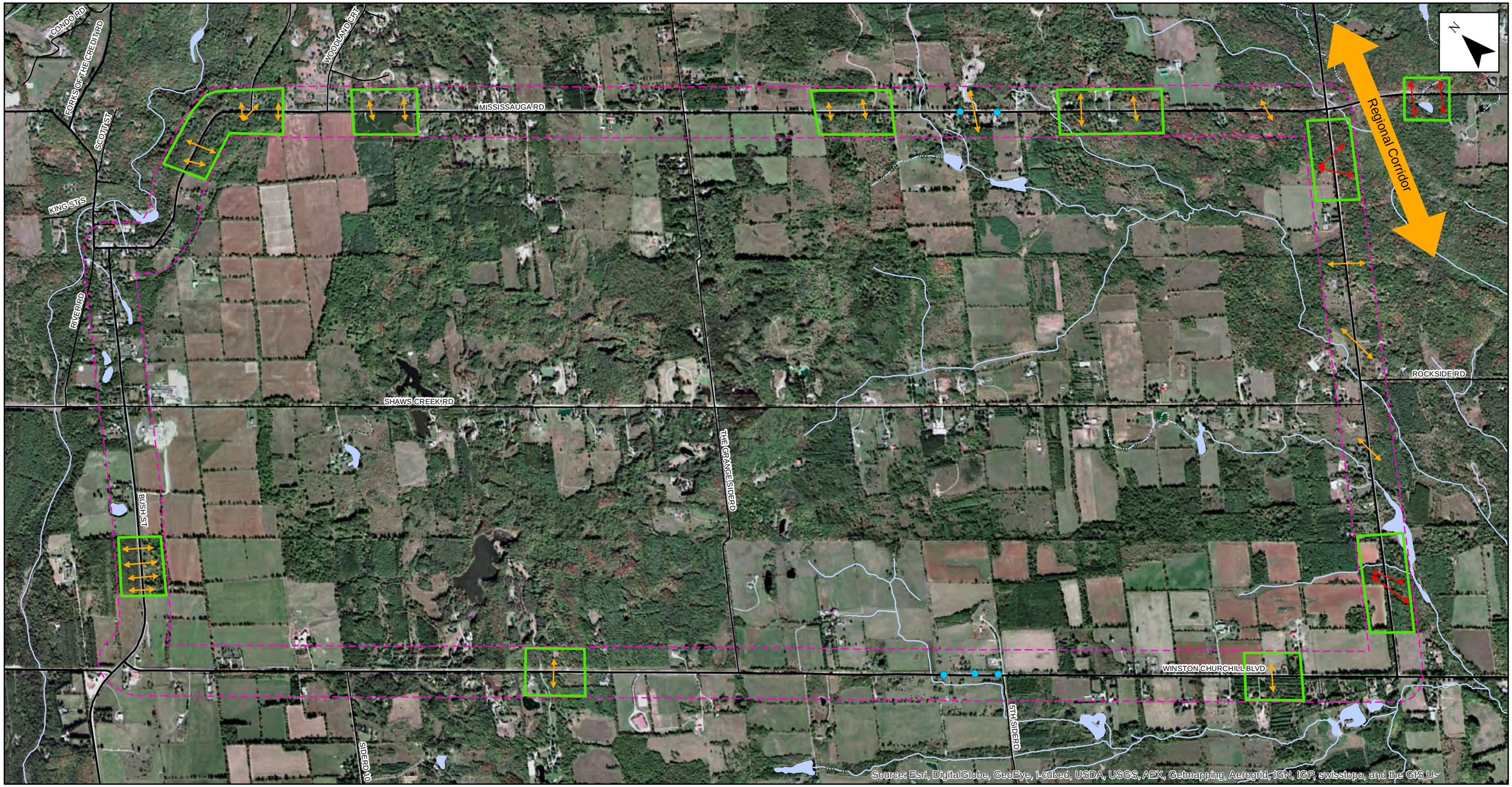

Figure 6

Belfountain Transportation EA

Deer Road Crossings and Proposed Mitigation Locations

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

0 100 200 300 400 Meters

December 20, 2013. Project No: NRSI-1337
UTM Zone 17, NAD 83 Scale: 1:17,000 (at 11x17")

Legend

- Study Area
- Highway
- Primary Road
- Secondary Road
- Waterbody
- Permanent Watercourse
- Intermittent Watercourse
- Mammal Mortality Location
- Deer Crossing
- Deer Crossing (High Denisty)
- Deer Movement Corridor SWH

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Within the study area and immediate vicinity, the regional-scale deer movement corridor includes the forested habitat that runs in a roughly northeast-southwest orientation through the southeast corner of the study area, following the escarpment. These forests, and the movement corridor contained within them, have been designated parts of the Grange Woods and Caledon Mountain ESAs, and the Caledon Mountain Slope Forest Life Science ANSI, and are considered Core Areas under the Region"s Official Plan (Region of Peel 2008). Consequently, this regional-scale movement corridor is protected under various policies, and the proposed road improvements are not anticipated to cause significant direct impact to the corridor habitat.

Due to the difficulty in identifying discrete ecological features associated with localized deer movement paths, such as due to the rather diffuse nature of movement paths across ROWs in some areas, and because specific habitat criteria haven"t been defined for this SWH type in North-South Environmental *et al.* (2009), specific habitat blocks (e.g., ELC polygons) have not been identified as SWH on Figure 6. Rather, known movement paths are shown as informed by OMNR. However, as described in Section 6.0, particular ROW sections of the study area that have higher concentrations of movement (i.e., "hotspots") have been identified for consideration of mitigation measures. These areas have been identified on Figure 6 as containing the multiple deer movement paths that comprise each "hotspot". Given the importance of the biological communities within these areas, each defined hotspot has also been considered SWH for deer movement corridors and is shown as such on Figure 5b. These areas have been given closer scrutiny as part of impact assessment of the preferred design alternatives to ensure that existing movement paths are not disrupted, and that safety of motorists and wildlife are maximized in those areas.

Amphibian Movement Corridors

Amphibians need to move between habitats as parts of their life cycle, such as between aquatic breeding ponds and terrestrial summer habitats, and to disperse to other nearby ponds (OMNR 2012a). On a landscape scale, amphibian population groups (collectively, a metapopulation) require regular recruitment of individuals from neighbouring areas in order to sustain a given population. Breeding and overwintering ponds require appropriate connecting habitats to upland areas in order to provide that habitat function. Amphibian movement corridors must be forested (typically with deciduous trees), maintain suitably moist, interior habitat conditions, and provide appropriate ground cover (e.g., downed logs) and closed canopy (>60%) (OMNR 2012a). While most amphibians follow diffuse movement patterns through these areas, some species (e.g.

wood frog (*Rana sylvatica*), spotted salamander (*Ambystoma maculatum*)) follow distinct trails (OMNR 2012a).

Data provided by CVC was used to plot local amphibian movement paths across the study area ROWs based on roadside data (live and dead individual observations) collected between 2009 and 2012 (see Section 3.1). Figure 7 displays amphibian observation locations (separated between anuran and salamander observations) as well as movement path locations that approximately correspond to areas of highest density of amphibian roadside observations. There are several areas which are considered amphibian movement hotspots throughout the study area ROWs but the majority of crossings are along Mississauga Rd. and Winston Churchill Blvd. The majority of these crossings are relatively localized and between aquatic and terrestrial habitats separated by the ROW, although at least one movement path, located on Mississauga Rd. is known to be of a larger scale (M. Heaton, OMNR, pers. comm., July 2013).

As with localized deer movement paths, discrete habitat units were not identified as the amphibian movement corridor SWH. However, the areas identified as hotspots (identified travel corridors) on Figure 7 have been focused on for consideration of mitigation opportunities as part of impact assessments of the preferred design alternative (see Section 7.3). The natural features containing these amphibian crossing hotspots are important to maintaining the movement pathway, and as such these hotspot movement paths are shown on Figure 5b as amphibian movement corridor SWH.

Amphibian Breeding Habitat

Amphibians require aquatic habitats to reproduce, and concentrate in breeding ponds during spring. Suitable aquatic habitats must be unpolluted, shallow, and maintain surface water long enough through the spring for juveniles to mature. Woody debris and vegetation are also important components to provide calling sites and egg-laying structures (OMNR 2011). Amphibians disperse into adjacent terrestrial areas following breeding. These terrestrial habitats must provide dense canopy coverage, moist conditions and cover habitat. Breeding ponds must be sufficiently close to summer habitats to provide habitat function.

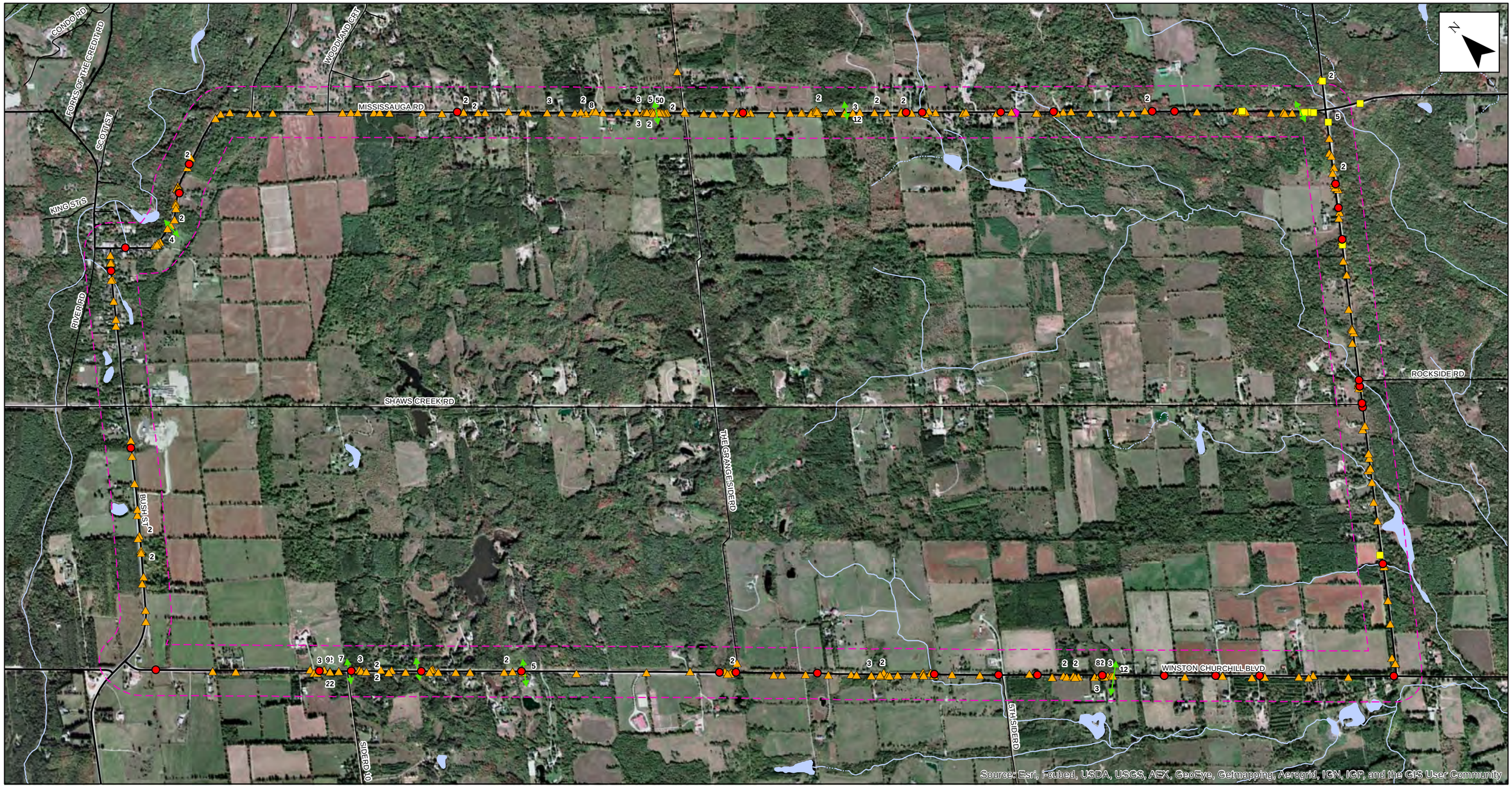

Figure 7

Belfountain Transportation EA

Amphibian Road Crossings and Proposed Mitigation Locations

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

0 100 200 300 400 Meters

August 15, 2013. Project No: NRSI-1337
UTM Zone 17, NAD 83 Scale: 1:17,000 (at 11x17")

Legend

- Study Area
- Highway
- Primary Road
- Secondary Road
- Waterbody
- Permanent Watercourse
- Intermittent Watercourse
- Amphibian Crossing
- Culvert
- Salamander Mortality
- Frog/Toad Mortality
- Reptile Mortality

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Several wetlands in the study area support breeding amphibian species. Amphibian call surveys have been completed in several of these wetlands by CVC (2009-2012) and as part of the 2010 EA and supplementary studies (Dillon Consulting 2010, 2011). Amphibian call survey data collected to date were analyzed by CVC and, based on criteria of significance identified in North-South Environmental *et al.* (2009), they mapped the locations of wetland features containing significant populations of breeding amphibians. These are significant wildlife habitat and are shown on Figure 5b.

Several of these wetlands occur near or immediately adjacent to existing roads within the study area. Road improvements should be designed to avoid encroachment into these wetland habitat features. Construction and operational design of road improvements, such as stormwater drainage, should ensure no indirect impacts to these features. If habitat impacts associated with a preferred alternative design cannot be avoided, appropriate mitigation measures must be identified.

5.1.6.2 Candidate Significant Wildlife Habitat

Based on the results of background information review and project team consultation, excluding the confirmed SWH types described above, 12 candidate SWH types were identified for the study area as part of initial SWH screening, following criteria identified in North-South Environmental *et al.* (2009) (see Appendix X for SWH screening details):

- Waterfowl nesting habitat
- Colonial bird nesting sites
- Raptor wintering areas
- Snake hibernacula
- Bat maternal roosts and hibernacula
- Highly diverse areas
- Turtle nesting areas
- Habitat for area-sensitive forest interior breeding bird species
- Habitat for open country and early successional breeding bird species
- Habitat for wetland breeding bird species
- Raptor nesting habitat
- Habitat for various species of conservation concern

Based on the results of NRSI field surveys completed in 2012 and 2013, a number of candidate SWH types were determined to not be present within the study area by not meeting the criteria established in North-South Environmental *et al.* (2009).

Suitable areas of forest/meadow complex that could potentially provide significant raptor overwintering habitat were noted. However, the study area is not known to harbour diverse or abundant populations of overwintering raptors (M. Heaton, OMNR, pers. comm., July 2013), so this type of SWH is unlikely to be present in the study area.

The marsh habitat located behind houses that front the south side of Old Main St. in Belfountain is the most likely location within the study area to potentially provide significant marsh bird breeding habitat. This SWH type requires sufficient numbers of pairs of primarily marsh-breeding species such as common gallinule (*Gallinula galeata*), Virginia rail (*Rallus limicola*), marsh wren (*Cistothorus palustris*), and sora (*Porzana carolina*) to be confirmed as significant. This marsh is located on private property and could not be investigated as part of NRSI field studies; however, it is not believed to contain the suitable diversity or abundance of marsh-breeding birds to afford it significance (M. Heaton, OMNR, pers. comm., July 2013). This habitat is well separated from the road and is therefore not likely to experience any impacts associated with road improvements in the study area.

The following candidate SWH types remain which require targeted surveys and/or desktop analysis to either confirm or rule out their occurrence in the study area:

- Snake hibernacula
- Bat maternal roosts and hibernacula

Two locations within the study area, old barn and silo foundations and an area of exposed rock fissures, were identified that may provide snake hibernaculum habitat. However, only one of these locations, featuring the rock fissures, is located in close proximity to a ROW (near the intersection of Mississauga Rd. and Olde Base Line Rd.), which could potentially be impacted by development outside the existing ROW. This feature should be studied further during the detailed design stage to assess its significance as wildlife habitat if there is potential for impacts based on the preferred alternative design.

The SWH category Highly Diverse Areas was not assessed as this category of significance is considered to be captured by the criteria defining Significant Woodlands in the Region and Town of Caledon (North-South Environmental *et al.* 2009).

The forests of the study area may provide suitable bat maternity colony habitat, particularly within mixed or deciduous forests with a sufficient density of cavity trees. Bat habitat assessments and targeted bat surveys were not completed at this level of the study. Any road improvements that require the removal of mature trees with suitable cavities will have to undertake additional field studies to investigate the presence of significant bat maternity colony habitat (i.e., during detailed design stage). Because two bat SAR are known from the study area vicinity (little brown myotis and northern myotis; see Section 4.5.3), any proposed removals of trees with cavities (i.e., potential habitat) would require surveys to investigate the presence of these species as well.

Among species of conservation concern known from the study area vicinity, additional targeted field surveys are required to assess the presence of the provincially rare (NHIC rank S1-S3) odonate species harpoon clubtail (*Gomphus descriptus*), unicorn clubtail (*Arigomphus villosipes*), amber-winged spreadwing (*Lestes eurinus*), and arrowhead spiketail (*Cordulegaster obliqua*) and to confirm this SWH type during the detailed design stage. Although hooded warbler was not observed during field surveys completed by Dillon (2010) or NRSI (2013), this species has been identified in forests of the study area vicinity through other wildlife inventory studies (CVC 2011a-c). Impact analyses for evaluation of design alternatives, and on the preferred alternative design, should consider opportunities to avoid potential hooded warbler habitat.

5.1.7 Areas of Natural or Scientific Interest (ANSI)

As described in Section 4.3.2, portions of two Life Science ANSIs occur within the study area: Caledon Mountain Slope Forest and Credit Forks. Provincially significant ANSIs are protected under the Provincial Policy Statement (OMMAH 2014), while both provincial and regional ANSIs are protected under the Niagara Escarpment Plan (NEC 2005). They are also considered Key Natural Heritage Features under the Greenbelt Plan, Core Areas of the Region"s Greenlands System, and Greenlands (both provincially and regionally significant ANSIs) within Wellington County"s Official Plan. Under these policies, development or site alteration is not permitted within ANSIs unless it can be demonstrated that there will be no negative impact to the

significant features and functions of the ANSI (OMMAH 2014, OMMAH 2005, Region of Peel 2008, Wellington County 2013, NEC 2005).

Where road improvements may require widening of the existing graded footprint, development setbacks of 10 m are recommended from the confirmed boundaries of the ANSI to sufficiently protect the sensitive ecological form and function of the ANSI natural feature(s). Where 10 m spacing is not available or where the ANSI natural features occur adjacent to the existing road, all efforts should be made to avoid or minimize impacts to adjacent ANSI natural features.

5.1.8 Environmentally Sensitive or Significant Areas

As described in Section 4.3.3, portions of three ESAs occur within the study area: Credit Forks-Devil"s Pulpit, Grange Woods and Caledon Mountain. These ESAs are protected under policies of the Region"s Official Plan, whereby they are considered Core Areas of the Region"s Greenlands System (Region of Peel 2008). As described in Section 2.5, development and site alteration are not permitted in Core Areas, although “essential servicing”, such as improvements to the regional road networks, are permitted within these areas (Region of Peel 2008). Nevertheless, all efforts should be made to avoid direct impacts to ESAs, and to Potential ESAs pending further evaluations of their significance. If impacts associated with the preferred alternative design are unavoidable, measures must be taken to minimize or mitigate impacts to the ESA natural features such that the natural feature form and function are sufficiently maintained.

5.1.9 Fish Habitat

Fish Habitat is defined by the federal Department of Fisheries and Oceans as: “spawning grounds and nursery, rearing, food supply migration and any other areas on which fish depend directly or indirectly in order to carry out their life processes” (Beach and Beirnes 2007).

Of the 43 culvert locations present within the study area, nine locations meet the definition of either direct or indirect fish habitat. These watercourses, are shown on Figure 5b. The unnamed Tributary A to the West Credit River is documented to contain brook trout spawning. As brook trout are a coldwater and therefore sensitive species, impacts to this feature should be avoided. Tributary A to Second Creek is also a permanent cool to cold watercourse which provides direct fish habitat. Although no significant species were observed there is potential for them to reside downstream.

Approximately eight residential ponds were observed within the study area. Although these ponds were not specifically assessed as part of this study due to lack of property access, they may provide direct fish habitat. Due to the potential for groundwater upwelling in the area, they may also provide coldwater conditions.

In regards to fish habitat significance, disturbance to tributaries that are direct fish habitat should be avoided if possible, but if work in or adjacent to these features is necessary as part of the preferred alternative, an authorization under the Fisheries Act may be required. Policies of the Niagara Escarpment Plan regarding new development adjacent to fish resources (NEC 2005) must also be considered (see Section 2.8). Direct impact to fish habitat is not permitted under the policies of the Niagara Escarpment Plan. Where impact cannot be avoided, an amendment to the Niagara Escarpment Plan may be required. These cool-cold watercourses provide good habitat for brook trout and other sensitive species. If the work is to occur within these areas, it is recommended that the size of existing culverts be increased and/or replaced with open bottom culverts to facilitate improved fish passage. Timing windows provided through DFO will also need to be followed. For watercourses that are permanently wet, proper channel de-watering procedures will be required.

5.1.10 Regionally Significant Species

Although not considered a SAR or species of conservation concern in Ontario, northern flying squirrel is considered a significant species in Peel Region, where its populations are closely associated with the forests of the Niagara Escarpment. Northern flying squirrel is of particular interest within the study area due to its observed densities in particular locations within the study area as well as the potential for impacts to this species associated with potential road widening (M. Heaton, OMNR, pers. comm., April 2013). Currently, the study area ROWs, where they occur in proximity to high density flying squirrel areas (Figure 5b), are sufficiently narrow to allow individuals to glide from one area of suitable habitat to another across the ROW. Potential road widening in these high density locations may inhibit this movement, thereby fragmenting habitat for this species and affecting the success of local populations. Northern flying squirrels are known to be able to glide across a maximum span of approximately 23 m. Design alternative considerations for the proposed undertaking should seek to avoid road widenings of

greater than this distance within identified areas of high flying squirrel density, as permitted by the regulatory agencies.

Several species of regionally significant flora that are known to occur in the study area vicinity (e.g., CVC 2011a-c) have suitable habitat within the study area, as shown in Table 1. Detailed analysis of which regionally significant flora species occur within the study area, and may be impacted by proposed road developments, will occur as part of future vegetation surveys during the detailed design stage. Thus, regionally significant flora species should be considered a general constraint to be addressed more fully during the detailed design stage. Impacts to regionally significant flora species should be avoided; otherwise, impacts should be sufficiently minimized or mitigated. Proposed strategies may include transplantation, as well as monitoring and contingency plans to ensure success of re-establishment.

5.2 Summary of Constraints

Table 7 provides a summary of natural features identified as constraints to development within the study area. However, as described above, these constraints should be considered in the context of the EA process, whereby selection of the preferred alternative design will consider multiple factors that may render some impact to natural features unavoidable. Consultation with the appropriate regulatory agencies (e.g., OMNR, CVC, NEC), including potential permitting and Niagara Escarpment Plan amendments, will be required where impacts to significant natural features/areas are anticipated.

In Table 7, each natural feature constraint was given a constraint level (primary, secondary, or tertiary) based on the relative degree of protection afforded by the governing policy (e.g., most restrictive policies regarding development/site alteration = primary constraint, where more development/site alteration may be permitted = secondary constraint, etc.). These constraint levels are intended to further inform the design alternative selection process by prioritizing protection of the most sensitive natural features. Identified natural feature constraints, including their constraint level, are mapped on Figure 8. Where two policy designations with different constraint levels overlap, the highest constraint level is shown. For example, several features that would otherwise be considered a “secondary” constraint based on certain protection policies are considered “primary” constraints because they are also considered Key Natural Heritage Features or Key Hydrologic Features under the Greenbelt Plan (OMMAH 2005), which affords these features greater protection.

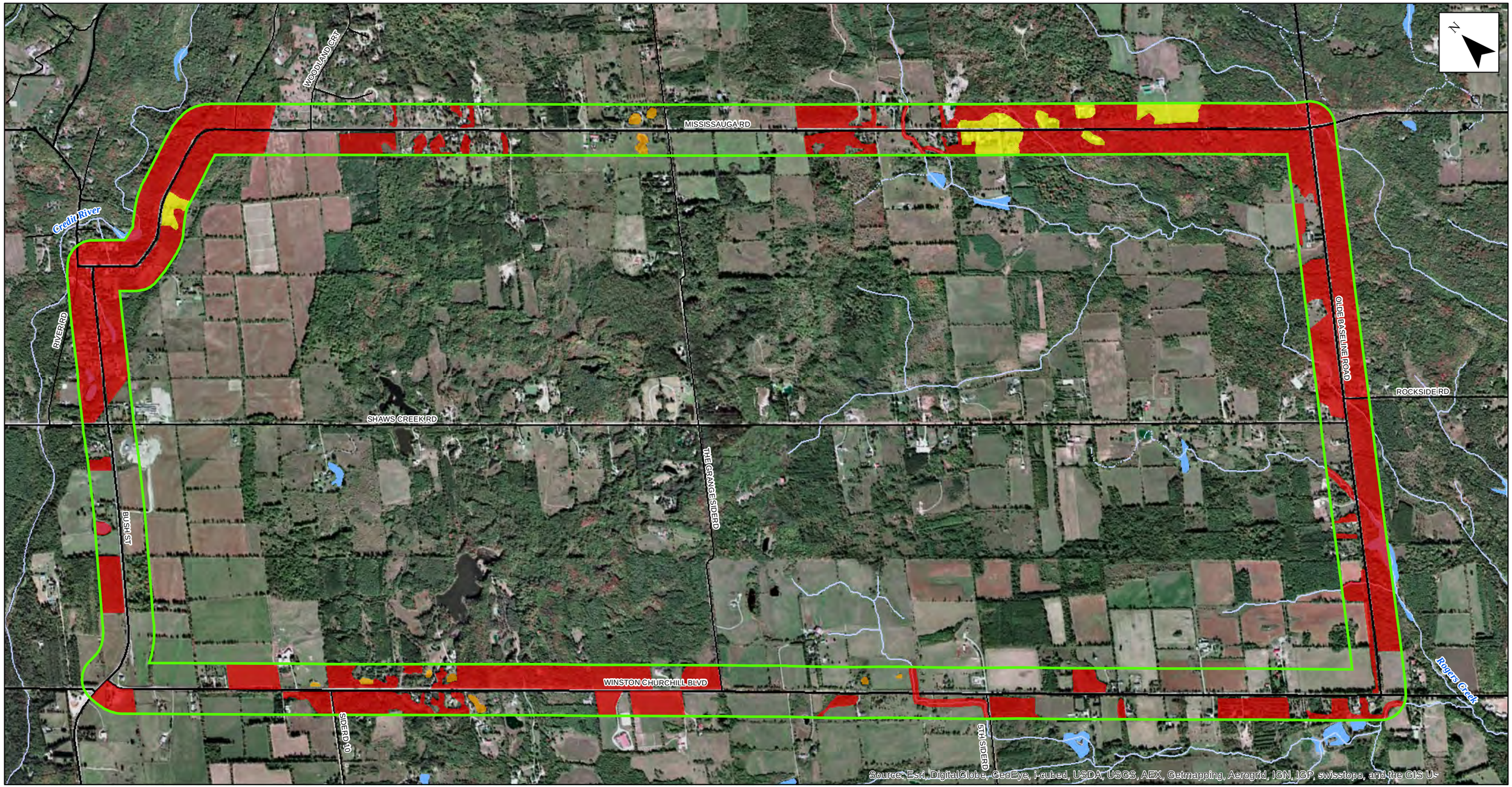

Figure 8

Belfountain Transportation EA

Constraint Level

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

0 100 200 300 400 500 Meters

December 18, 2013. Project No: NRSI-1337.
UTM Zone 17, NAD 83 Scale: 1:17,000 (at 11x17")

Legend

- Study Area
- Primary Road
- Secondary Road
- Permanent Watercourse
- Intermittent Watercourse
- Waterbody
- Primary Constraint
- Secondary Constraint
- Tertiary Constraint

Document Path: X:\1337_PeelRegionClassEA\NRSI_1337_Fig8_ConstraintLevel_17K_2013_12_18_MAW.mxd

Table 7. Summary of Study Area Natural Heritage Constraints

Natural Feature Constraint	Features within the Study Area	Constraint Level	Constraint Occurrence Among Associated Road Segments				Regulatory and Permitting Considerations	Project Considerations
			Winston Churchill Blvd	Olde Base Line Rd	Bush St	Mississauga Rd		
General planning policy areas	Niagara Escarpment Plan: • Escarpment Natural Area • Escarpment Protection Area • Escarpment Rural Area	Escarpment Natural Area (Secondary) Escarpment Protection Area, Escarpment Rural Area (Tertiary)	✓	✓	✓	✓	▪ Niagara Escarpment Plan, 2005	▪ Development within lands designated as Escarpment Natural Area should be avoided unless no alternative is feasible. ▪ In general, impacts to designated policy areas should be avoided if possible. Otherwise, development plans should be designed to minimize impact, and appropriate mitigation measures should be implemented
	Greenbelt Plan Area: • Protected Countryside • Natural Heritage System	Key Natural Heritage Features and Key Hydrologic Features (Primary) Protected Countryside (Tertiary)	✓	✓	✓	✓	▪ Greenbelt Plan, 2005	▪ Development/alteration within Key Natural Heritage Features and Key Hydrologic Features should be avoided unless there is no alternative feasible. ▪ In general, impacts to designated policy areas should be avoided if possible. Otherwise, development plans should be designed to minimize impact, and appropriate mitigation measures should be implemented
	Peel Region Official Plan: • Greenlands System Core Areas • Greenlands System Natural Areas and Corridors • Potential Natural Areas and Corridors	Core Areas: Secondary, unless considered Primary for a particular natural feature under different policy Natural Areas and Corridors, Potential Natural Areas and Corridors: Tertiary, unless considered Secondary for a particular natural feature under different policy	✓	✓	✓	✓	▪ Region of Peel Official Plan, 2008	▪ “Essential servicing” is a permitted activity within Peel Region Greenland Core Areas; however, impacts should be avoided to the extent feasible. ▪ Natural features designated as Core Areas are also subject to other policies that govern their protection (e.g., Provincial Policy Statement). The more restrictive policies should apply for a given natural feature type (e.g,. wetland, woodland) ▪ In general, impacts to natural features designated within the Region”s Greenlands System should be avoided if possible. Otherwise, development plans should be designed to minimize impact, and appropriate mitigation measures should be implemented
	Wellington County Official Plan: • Core Greenlands • Greenlands	PSWs, habitat for Endangered or Threatened Species: (Primary) Greenlands (Tertiary, unless considered Secondary for a particular natural feature under different policy)	✓				▪ Wellington County Official Plan, 2013	▪ Development and site alteration should be maintained outside of PSWs, or habitat for Endangered or Threatened species. ▪ Impacts to natural features designated as Greelands should be avoided if possible. Otherwise, development plans should be designed to minimize impact, and appropriate mitigation measures should be implemented ▪ Natural features designated as Core Greenlands or Greenlands are also subject to other policies that govern their protection (e.g., Provincial Policy Statement). The more restrictive policies should apply for a given natural feature type (e.g,. wetland, woodland)
Wetlands	Provincially Significant Wetlands: • Caledon Mountain • Eramosa River-Blue Springs Creek	Primary	✓	✓		✓	▪ Provincial Policy Statement (OMMAH 2005) ▪ Peel Region Official Plan (Region of Peel 2008) (as Core Area) ▪ Wellington County Official Plan (Wellington County 2013) (as Core Greenland) ▪ Greenbelt Plan (OMMAH 2005) (as Key Natural Heritage Feature) ▪ Niagara Escarpment Plan (NEC 2005) ▪ CVC Ont. Reg. 160/06	▪ Development and site alteration should be restricted to outside of PSWs. ▪ A development setback of 30 m should be applied from the confirmed boundary of the PSW. ▪ Where the PSW occurs within 30 m of the existing ROW, any existing spacing should be considered a buffer to development. Otherwise, development design and construction practices should be undertaken to ensure no direct or indirect impact to the PSW. ▪ Where impacts are unavoidable, appropriate mitigation measures should be enacted to ensure no negative impact to the feature and its ecological functions. Where policies of the Niagara Escarpment Plan cannot be met (e.g., avoiding impacts to wetlands), an amendment to the Niagara Escarpment Plan may be required. ▪ Any enacted mitigation measures should be monitored for effectiveness.
	Other wetlands (non-	Secondary	✓	✓	✓	✓	▪ Peel Region Official Plan	▪ Development and site alteration should be restricted to outside of wetlands.

Natural Feature Constraint	Features within the Study Area	Constraint Level	Constraint Occurrence Among Associated Road Segments				Regulatory and Permitting Considerations	Project Considerations
			Winston Churchill Blvd	Olde Base Line Rd	Bush St	Mississauga Rd		
	PSW)						(Region of Peel 2008) (as Natural Areas, Potential Natural Areas) ▪ Wellington County Official Plan (Wellington County 2013) (as Core Greenland) ▪ Greenbelt Plan (OMMAH 2005) (as Key Natural Heritage Feature, Key Hydrologic Feature) ▪ Niagara Escarpment Plan (NEC 2005) ▪ CVC Ont. Reg. 160/06	▪ A development setback of 15 m should be applied from the confirmed boundary of the wetland. ▪ Where the wetland occurs within 15 m of the existing ROW, any existing spacing should be considered a buffer to development. Otherwise, development design and construction practices should be undertaken to ensure no direct or indirect impact to the wetland. ▪ Where impacts are unavoidable, appropriate mitigation measures should be enacted to ensure no negative impact to the feature and its ecological functions. Where policies of the Niagara Escarpment Plan cannot be met (e.g., avoiding impacts to wetlands), an amendment to the Niagara Escarpment Plan may be required. ▪ Any enacted mitigation measures should be monitored for effectiveness.
Woodland	Significant Woodlands • Peel Region: According to criteria in North-South Environmental *et al.* (2009) for Town of Caledon • ≥10 ha in Wellington County Greenlands System	Secondary	✓	✓	✓	✓	▪ Provincial Policy Statement (OMMAH 2005) ▪ Peel Region Official Plan Amendment 21 (Region of Peel 2010) ▪ Wellington County Official Plan (Wellington County 2013) (as Core Greenland) ▪ Greenbelt Plan (OMMAH 2005) (as Key Natural Heritage Feature) ▪ Niagara Escarpment Plan (NEC 2005)	▪ "Essential servicing" is a permitted activity within Significant Woodlands in Peel Region (as per its designation as Greenland Core Area); however, impacts should be avoided to the extent feasible. ▪ As Greenland in Wellington County, development and site alteration should be directed outside of the woodland. ▪ Development within Niagara Escarpment Plan area woodlands is to be minimized to the extent possible. ▪ A development setback of 10 m should be applied from the confirmed dripline boundary of the Significant Woodland. ▪ Where the woodland dripline boundary occurs within 10 m of the existing ROW, any existing spacing should be considered a buffer to development. Otherwise, development design and construction practices should be undertaken to ensure no direct or indirect impact to the woodland. ▪ Where impacts are unavoidable, appropriate mitigation measures should be enacted to ensure no negative impact to the feature and its ecological functions. ▪ Any enacted mitigation measures should be monitored for effectiveness
	Other Woodlands: • <30 ha in Peel Region Greenlands System • <10 ha in Wellington County Greenlands System	Tertiary	✓	✓	✓	✓	▪ Peel Region Official Plan (Region of Peel 2008) (as Core Area) ▪ Wellington County Official Plan (Wellington County 2013) (as Core Greenland ▪ Niagara Escarpment Plan (NEC 2005)	▪ Development and site alteration should be maintained outside of woodlands. Otherwise, development design and construction practices should be undertaken to minimize direct and indirect impacts to the woodland. ▪ Development within Niagara Escarpment Plan area woodlands is to be minimized to the extent possible. ▪ Where impacts are unavoidable, appropriate mitigation measures should be enacted to ensure no negative impact to the feature and its ecological functions. ▪ Any enacted mitigation measures should be monitored for effectiveness. ▪ A Tree Protection Plan should be developed that specifies protection for the outer edge of retained trees. ▪ Tree protection fencing should be established around the dripline +1 m from retained trees.
Fish Habitat		Primary	✓	✓	✓	✓	▪ Federal Fisheries Act (1985) ▪ Niagara Escarpment Plan (NEC 2005)	▪ Disturbance to direct fish habitat should be avoided. ▪ If disturbance to direct fish habitat cannot be avoided, an authorization under the federal Fisheries Act may be required. Where policies of the Niagara Escarpment Plan cannot be met (e.g., avoiding impacts to fish habitat), an amendment to the Niagara Escarpment Plan may be required. ▪ DFO timing windows and proper de-watering measures must be followed for any works that may impact direct fish habitat ▪ Within the Niagara Escarpment Plan area, development may occur adjacent to fish habitat provided that the following conditions are met: ○ The development shall ensure net gain/no net loss of productive capacity of fish habitat; ○ Maintenance of minimum baseflow of watercourses; ○ Maintenance of existing watercourses in a healthy, natural state; ○ Maintenance of vegetative buffers in accordance with the sensitivity of the fishery resource and development criteria; and ○ Best available construction and management practices shall be used to protect water quality and quantity, both during and after construction. Treatment of surface run-off to maintain water quality and

Natural Feature Constraint	Features within the Study Area	Constraint Level	Constraint Occurrence Among Associated Road Segments				Regulatory and Permitting Considerations	Project Considerations
			Winston Churchill Blvd	Olde Base Line Rd	Bush St	Mississauga Rd		
								hydrological characteristics in receiving watercourses shall meet the standards established by the OMNR (NEC 2005).
Designated Natural Areas	Life Science ANSIs: • Caledon Mountain Slope Forest • Credit Forks	Secondary		✓		✓	• Provincial Policy Statement (OMMAH 2005) • Peel Region Official Plan (Region of Peel 2008) (as Core Area) • Greenbelt Plan (OMMAH 2005) (as Key Natural Heritage Feature) • Niagara Escarpment Plan (NEC 2005)	▪ Any development plans should be designed to avoid habitat removal and disturbance within ANSIs to the extent possible. ▪ Development is to be maintained outside of provincially or regionally significant ANSIs. Where policies of the Niagara Escarpment Plan cannot be met (e.g., avoiding impacts to ANSIs), an amendment to the Niagara Escarpment Plan may be required. ▪ If the outer boundary of the ANSI within the study area consists of woodland or wetland, a development setback should be applied as described above for that feature type.
	Environmentally Sensitive or Significant Areas: • Credit Forks-Devil"s Pulpit • Grange Woods • Caledon Mountain Potential ESAs	Secondary		✓		✓	• Peel Region Official Plan (Region of Peel 2008) (as Core Areas, Potential Natural Areas)	▪ Any development plans should be designed to avoid habitat removal and disturbance within ESAs, or within Potential ESAs pending further evaluation, to the extent possible. ▪ If the outer boundary of the ESA within the study area consists of woodland or wetland, a development setback should be applied as described above for that feature type.
Wildlife Habitat	Habitat for Provincially Endangered and Threatened Species	Primary					• Endangered Species Act, 2007 • Provincial Policy Statement (OMMAH 2005) • Peel Region Official Plan (Region of Peel 2008) (as Core Area) • Wellington County Official Plan (Wellington County 2013) (as Core Greenland) • Greenbelt Plan (OMMAH 2005) (as Key Natural Heritage Feature) • Niagara Escarpment Plan (NEC 2005)	▪ The proposed road developments may impact Jefferson Salamander (provincially Endangered) and its regulated habitat within the study area if not appropriately mitigated. ○ A permit under Section 17(2)(c)) of the Endangered Species Act may be required to demonstrate a strategy for overall benefit to the species, in consultation with the OMNR. ▪ Breeding habitat for the provincially Threatened Bobolink and Eastern Meadowlark occur within study area agricultural fields, although these species are not anticipated to be significantly impacted by the proposed road developments. ○ Nonetheless, where potential impact to these species or their general habitats may occur, submission of a Notice of Activity to the OMNR may be required, with subsequent development of a suitable mitigation plan in conjunction with the OMNR. ▪ Butternuts (provincially Endangered) that may be potentially impacted should be evaluated by a certified Butternut Health Assessor to determine each tree"s status and protections under the Endangered Species Act, Ontario Regulation 242/08. This work may occur during Detailed Design once a preferred alternative design has been selected. ▪ No development or site alteration is to occur within the habitat for a provincially Endangered or Threatened species unless permitted by the OMNR through the processes described above. Where policies of the Niagara Escarpment Plan cannot be met (e.g., avoiding impacts to habitat for Endangered or Threatened species), an amendment to the Niagara Escarpment Plan may be required.
	Confirmed Significant Wildlife Habitat	Secondary	✓	✓	✓	✓	• Provincial Policy Statement (OMMAH 2005) • Wellington County Official Plan (Wellington County 2013) (as Greenland) • Greenbelt Plan (OMMAH 2005) (as Key Natural Heritage Feature) • Niagara Escarpment Plan (NEC 2005)	• Development and site alteration should be maintained outside of areas identified as SWH unless there is no feasible alternative. • For local deer and amphibian movement corridors, mitigation measures should be considered to maintain habitat connectivity and optimize motorist and wildlife safety, particularly in areas mapped as movement "hotspots" • Otherwise, development design and construction practices should be undertaken to ensure no direct or indirect impact to the SWH features.

Natural Feature Constraint	Features within the Study Area	Constraint Level	Constraint Occurrence Among Associated Road Segments				Regulatory and Permitting Considerations	Project Considerations
			Winston Churchill Blvd	Olde Base Line Rd	Bush St	Mississauga Rd		
	Regionally Significant Species	Tertiary	✓	✓	✓	✓	• Niagara Escarpment Plan (NEC 2005)	• Within Niagara Escarpment Plan areas, developments should be designed to minimize impacts to, and where possible enhance, wildlife habitat. • Avoid road widening and tree removal within areas of high density Northern Flying Squirrel populations, and maintain a minimum of 23 m distance between areas of suitable habitat on either side of the road to permit gliding.. • Several regionally significant plant species may occur within the study area. Consideration must be given to avoiding impact to these species, or mitigating impact such as by re-locating vulnerable individuals. A more specific analysis of regionally significant plant species that may be impacted will be completed as part of the impact assessment of the preferred alternative design.

5.3 Opportunities

The majority of road improvement work is anticipated to occur within the existing ROW and without direct impact to natural features. However, some works such as road widening may require construction activities outside of the existing ROW at various locations within the study area. Opportunities for these works to occur without direct impacts to natural features lie in areas outside of protected natural features (e.g., PSW, Significant Woodlands) and their protective buffers (if present). These include areas of agricultural lands, culturally-influenced features, and any natural features not under a protective policy designation. However, as shown on Figures 4 and 5, the majority of the study area falls under some form of environmental protection policy. Therefore, in all cases, any works that are to encroach into existing natural features, within or outside the ROW, should be designed to minimize their impacts to the adjacent natural features to the extent possible. It should be noted that if any works are proposed on private land outside of the ROW and a Development Permit is required, the private landowner would have to consent to the permit application.

It is recognized that the selected preferred alternative design may render some impact to protected natural features as unavoidable. Where feasible, the preferred alternative should at least avoid features identified as primary constraints on Figure 8.

6.0 Evaluation of Alternatives

The purpose of the EA is to evaluate improvements to the roads in the study area considering re-engineering of each of the following::

- ROW cross-section
- ROW vertical profile
- Intersection design

The evaluation of improvements is organized by the study area ROWs, which were broken-down into the following major road segments/areas:

- Belfountain village, containing Old Main St./Mississauga Rd. to approximately 580 m north of Caledon Mountain Dr., and Bush St. to approximately 150 m east of Shaw"s Creek Rd.
- Mississauga Rd. outside of the Belfountain village evaluation area
- Old Base Lind Rd.
- Winston Churchill Blvd.
- Bush St. outside of the Belfountain village evaluation area

A varying number of design options were created and evaluated for each of the three engineering improvement evaluation categories across these five major road segments/areas. Several evaluation criteria (e.g., natural environment, socio-economic, capital costs) were considered by the project team, coordinated by HDR, to select a preferred alternative design for each road segment.

NRSI evaluated each of the identified alternatives in relation to the natural features and functions present. Evaluation of natural environment considerations included preliminary impact analysis using the following evaluation criteria:

- terrestrial habitat;
- aquatic environment;
- wetlands and watercourses;
- Species at Risk;
- species of conservation concern and regionally significant species;
- wildlife movement corridors;

- stormwater management;
- natural hazards; and,
- Niagara Escarpment Plan policy conflicts.

Details on each of the proposed alternatives considered for evaluation as well as NRSI"s impact analysis, are summarized in the main body of the Environmental Study Report (ESR). Section 7.1 (below) provides a brief description of the selected preferred alternative designs for each road segment. Please refer to the ESR for further details regarding the evaluation of design alternatives.

7.0 Impact Assessment and Recommendations

7.1 Description of Proposed Works

Table 8 summarizes the preferred alternative designs for each road segment based on an evaluation of each of the alternatives as presented in the ESR. For each major road segment/area, a preferred design was selected based on each of the three improvement categories (ROW cross-section, ROW profile, and intersection design). Please refer to the ESR for additional details regarding the proposed development.

Table 8. Preferred Alternatives for Road Improvement Designs

Road Segment/Area	Road Sub-Segment	Preferred Alternative Description
Right-of-Way Cross-Section		
Bush St.	-	11.4 m platform rural road
Belfountain Village	Bush St., between Shaw"s Creek Rd. and Old Main St.	9.3 m platform semi-rural road with sidewalk
	Old Main St. between Bush St. and community hall	11.7 m platform semi-rural road with sidewalk and parking
	Old Main St. between community hall and 580 m north of Caledon Mountain Dr.	9.3 m platform semi-rural road with paved shoulder
Mississauga Rd.	-	11.4 m platform semi-rural road
Olde Base Line Rd.	-	11.4 m platform rural road where feasible; otherwise, 11.4 m platform semi-rural road where rural road cross-section results in significant impacts beyond existing ROW (see ESR for specific locations)
Winston Churchill Blvd.	-	11.4 m platform rural road where feasible; otherwise, 11.4 m platform semi-rural road where rural road cross-section results in significant impacts beyond existing ROW (see ESR for specific locations)
Right-of-Way Vertical Profile		
Bush St.	Winston Churchill Blvd. to Shaw"s Creek Rd.	80 km/h design speed; 70 km/h posted speed
	Shaw"s Creek Rd. to 150 m east of Shaw"s Creek Rd.	60 km/h design speed; 50 km/h posted speed
Mississauga Rd.	580 m north of Caledon Mountain Dr. to Caledon Mountain Dr.	60 km/h design speed; 50 km/h posted speed
	Caledon Mountain Dr. to The Grange Sideroad	70 km/h design speed; 60 km/h posted speed
	The Grange Sideroad to Olde Base Line Rd.	70 km/h design speed; 60 km/h posted speed
Olde Base Line Rd.	-	60 km/h design speed; 50 km/h posted speed
Winston Churchill Blvd.	Olde Base Line Rd. to Sideroad 10	70 km/h design speed; 60 km/h posted speed

	Sideroad 10 to Bush St.	70 km/h design speed; 60 km/h posted speed
Intersection Design		
Winston Churchill Blvd./Bush St. Intersection	-	Operational improvements including stop control on both Winston Churchill Blvd. approaches
Mississauga Rd./Olde Base Line Rd. Intersection	-	Operational improvements including all-way stop control
Winston Churchill Blvd./Olde Base Line Rd. Intersection	-	Operational improvements including all-way stop control

The 11.4 m platform rural road cross-sections will comprise 3.5 m wide paved road lanes ("vehicle zones") in each direction, 1.7 m paved shoulders, 0.5 m rounded platform edges and graded roadside drainage ditches that range in width from 5.8 m to 9.3 m to the ROW boundary. The 11.4 m platform semi-rural road cross-sections will comprise 3.5 m wide paved road lanes ("vehicle zones") in each direction, 1.7 m paved shoulders, 0.5 m mountable curbs, and roadside areas graded to match existing grade to a width of 4.3 m from the mountable curb. Semi-rural ROW cross-sections incorporate underground stormwater infrastructure (e.g., catch basin and sub-drain under mountable curbs). See the ESR for further details about the selected ROW cross-sections.

See the ESR for details of proposed road profile grades and design plans associated with the preferred alternative vertical ROW profiles and intersection designs.

7.2 Approach to Impact Analysis

The analysis of potential impacts was determined by reviewing proposed engineering plans, including overlaying the plans onto the existing natural features to determine the extent of any overlap directly with natural features. The outcome of this process was based primarily on the resilience of the identified natural features to withstand predicted disturbances caused by design, construction and operation of the development. In this manner, both the significance and sensitivity of the affected natural features to disturbance were considered. The following is a description of the types of impacts which will be discussed.

- Direct Impacts – associated with the disruption or displacement of natural features, caused by the actual "footprint" of the undertaking; and
- Indirect Impacts – associated with changes in site conditions such as drainage and water quantity/quality.

The following road segments/areas are considered separately based on their specific development constraints, design plans, and other evaluation considerations:

- Belfountain village, containing Old Main St./Mississauga Rd. to approximately 580 m north of Caledon Mountain Dr (specifically, station 26+000 as per Mississauga Rd./Old Main St. Plate 20), and Bush St. to approximately 150 m east of Shaw"s Creek Rd (specifically, station 11+600 as per Bush St Plate 6).
- Mississauga Rd. outside of the Belfountain village evaluation area
- Old Base Lind Rd.
- Winston Churchill Blvd.
- Bush St. outside of the Belfountain village evaluation area

These road segment/areas are therefore considered separately within the analysis of direct, indirect, and induced impacts, including recommendations for impact avoidance and mitigation.

For the purposes of this impact assessment, the Bush St. segment includes the Winston Churchill Blvd./Bush St. intersection; the Olde Base Line Rd. segment includes the Mississauga Rd./Olde Base Line Rd. intersection, and the Winston Churchill Blvd. segment includes the Olde Base Line Rd./Winston Churchill Blvd. intersection.

7.3 Direct Impacts and Mitigations

7.3.1 Vegetation Removal and Designated Natural Area Encroachment

7.3.1.1 Bush Street

The proposed grading limits associated with improvements to Bush St. (outside of Belfountain) are shown on Bush St. Plates 1-6 of the ESR. Most grading along the north side of Bush St. will be limited to within approximately 2-4 m of the existing gravel shoulder, with a small number of wider encroachments of up to approximately 10 m from the existing gravel shoulder. Most grading along the south side of Bush St. is expected to extend approximately 8-10 m from the existing gravel shoulder, and ranging up to approximately 12 m in specific locations. All proposed grading is to occur within the existing ROW. The majority of natural feature encroachment will therefore be within narrow bands of cultural meadow that line the majority of the road shoulder (not mapped on Figure 2 due to map scale). Most areas of encroachment

occur adjacent to culturally influenced land uses and vegetation communities, including active agricultural fields, manicured residential properties, and cultural meadow.

Approximately 25 trees within the ROW will require removal to accommodate proposed grading, based on air photo interpretation. The majority of trees to be removed occur along the south side of the ROW. A detailed tree inventory, identifying trees to be retained and removed, including information such as species, diameter-at-breast-height (DBH), overall health and hazard rating, will be completed during the detailed design phase. Detailed measures to protect retained adjacent trees during construction activities (e.g., installation of tree protection fencing, grading setbacks) will be determined during the detailed design phase. No federally, provincially, or regionally significant tree species have been identified in or within 10 m of areas to be graded.

Several species of regionally significant vegetation species are known to occur in the study area vicinity (CVC 2011a-c) and have potential to occur within the study area based on presence of suitable habitat (Table 1). The proposed undertaking presents the potential to damage or destroy individuals of these significant species if appropriate measures for avoidance or mitigation are not implemented. A detailed assessment of potential for impact to these species will be completed as part of the future detailed design phase, based on finalized grading and road development plans. Specifically, three-season inventories should be completed during detailed design to identify and map the locations of regionally significant vegetation species within the study area. In general, measures should be taken to mitigate construction-stage impacts to significant vegetation species such as by installing protective fencing to avoid inadvertent damage or destruction. This may comprise brightly coloured snow fencing to clearly demarcate no-touch limits around protected vegetation. Where avoidance is not possible due to grading requirements, efforts should be made to transplant individuals, where possible, to suitable habitat within nearby protected areas. Vegetation transplantations must be monitored for success of establishment, as described further in Section 9.0.

Road grading is to occur adjacent to small portions of Significant Woodland along the north side of Bush St. as shown on Figure 5a (e.g., at stations 10+600, 10+700 (Bush St. plate 3); station 11+200 (Bush St. plate 5); station 11+500 (Bush St. plate 6). However, no encroachment into the woodlands, and no tree removals, are anticipated. No direct impacts to any other regionally-designated Core Areas will occur.

7.3.1.2 Village of Belfountain

The ROWs within the majority of the village area occur adjacent to built environments and are highly spatially constrained. Slightly wider grading limits are proposed for the south end of the village between stations 26+100 and 26+000 (Mississauga Rd./Old Main St. Plate 20), to approximately 4 m, affecting culturally influenced vegetation communities. Therefore, no significant impacts to natural features associated with proposed road grading are anticipated.

Approximately eight trees within the ROW have been identified as requiring removal to accommodate proposed grading, based on air photo interpretation. A detailed tree inventory, identifying trees to be retained and removed, including information such as species, diameter-at-breast-height (DBH), overall health and hazard rating, will be completed during the detailed design phase. Detailed measures to protect retained adjacent trees during construction activities (e.g., installation of tree protection fencing, grading setbacks) will be determined during the detailed design phase. No federally, provincially, or regionally significant tree species have been identified in or within 10 m of areas to be graded.

Several species of regionally significant vegetation species are known to occur in the study area vicinity (CVC 2011a-c) and have potential to occur within the study area based on presence of suitable habitat (Table 1). The proposed undertaking presents the potential to damage or destroy individuals of these significant species if appropriate measures for avoidance or mitigation are not implemented. A detailed assessment of potential for impact to these species will be completed as part of the future detailed design phase, based on finalized grading and road development plans. Specifically, three-season inventories should be completed during detailed design to identify and map the locations of regionally significant vegetation species within the study area. In general, measures should be taken to mitigate construction-stage impacts to significant vegetation species such as by installing protective fencing to avoid inadvertent damage or destruction. This may comprise brightly coloured snow fencing to clearly demarcate no-touch limits around protected vegetation. Where avoidance is not possible due to grading requirements, efforts should be made to transplant individuals, where possible, to suitable habitat within nearby protected areas. Vegetation transplantations must be monitored for success of establishment, as described further in Section 9.0.

Road grading is to occur adjacent to small portions of Significant Woodland as shown on Figure 5a. A portion of this woodland is also considered part of the Credit Forks ANSI and Credit

Forks-Devil"s Pulpit ESA (Figure 5a). However, no encroachment into the woodlands/ANSI/ESA, and no tree removals, are anticipated. Non-provincially significant wetland occurs south of Bush St. and west of Old Main St. as shown on Figure 5a. These features are located approximately 20 m or more from the proposed grading limits and are predominantly located behind residential properties fronting these roads. Proposed site grading will not directly impact these wetland features.

The south end of the village contains a small area of larger contiguous woodland east of Old Main St. that is designated Escarpment Natural Area (Figure 4). As described above, no woodland encroachment is anticipated in this area; therefore, no direct impacts to Escarpment Natural Area will occur.

7.3.1.3 Mississauga Road

The proposed grading limits associated with improvements to Mississauga Rd. (outside of Belfountain) are shown on Mississauga Rd./Old Main St. Plates 1-20 of the ESR. The majority of proposed grading is within approximately 2-4 m of the existing gravel shoulder, with localized areas of wider grading (up to approximately 12 m but predominantly within approximately 6-8 m of the existing shoulder) associated with proposed changes to road profile. The majority of proposed grading is to occur within the existing ROW, with the exception of areas shown on Plates 2, 9, 11, 12, 14, 17, and 18. The majority of natural feature encroachment will be within narrow bands of culturally-influenced areas of grassy meadow and shrub thicket located immediately adjacent to the existing road within the ROW. However, although relatively few tree removals have been anticipated based on air photo interpretation (approximately 41 along the road corridor), proposed grading along much of the corridor would occur immediately adjacent to significant natural features including Significant Woodland (including areas of ANSI and ESA) and wetland (PSW and non-PSW). Several young trees or shrubs that were not identified via air photo interpretation may require removal to accommodate proposed road grading.

Proposed road grading is anticipated to remain outside of, and not directly impact, adjacent Significant Woodlands along the Mississauga Rd. corridor, which includes portions of the Grange Woods ESA, Credit Forks-Devil"s Pulpit ESA, and Credit Forks ANSI. However, the proposed grading limits occur immediately outside of these woodland features, and may occur within the driplines of several woodland edge trees. Grading within tree driplines has the

potential to negatively impact the adjacent trees through disturbances to the root zones. Where possible, grading limits should be maintained outside of tree driplines with an emphasis to protect the trees comprising edges of significant woodland features.

A detailed tree inventory, identifying trees to be retained and removed, including information such as species, diameter-at-breast-height (DBH), overall health and hazard rating, will be completed during the detailed design phase. Detailed measures to protect retained adjacent trees during construction activities (e.g., installation of tree protection fencing, grading setbacks) will be determined during the detailed design phase.

Proposed grading is to occur immediately adjacent to PSW and non-PSW features, and may require minor encroachment into adjacent wetland (e.g., at stations 22+500-22+700; 21+200-21+300; 20+700). The potential direct impacts are anticipated to be relatively minor and not significantly impact the form or function of the adjacent wetlands. However, an encroachment of up to approximately 8-10 m from the existing road surface is proposed into the wetland located at 20+700, which is habitat for the Endangered Jefferson salamander and is considered significant amphibian breeding habitat (see Section 7.3.2.3). All measures should be taken to avoid or minimize encroachment into this wetland, such as through installation of retaining walls as is proposed adjacent the wetland as shown at station 23+500 (Plates 11-12). The precise amount of encroachment, and necessary mitigation measures, will be refined during the detailed design phase (e.g., through detailed wetland boundary mapping). Within the Niagara Escarpment Plan area, direct impacts to wetlands (e.g., through road grading) are prohibited. Where impacts are considered unavoidable, an amendment to the Niagara Escarpment Plan may be required (NEC 2005). Furthermore, an OMNR permit under Section 17(2)(c) of the ESA may be required where there is potential for impact to Jefferson salamander or its regulated habitat.

Six butternuts have been identified within 120 m of Mississauga Rd. (Figure 5a). As described in the 2010 EA (Dillon 2010), these butternuts occur outside of the ROW. Since grading is to remain within the ROW where the butternuts occur closest to the road (Plate 19) and the other mapped butternuts occur well outside of proposed grading limits, no direct impacts to the butternuts are anticipated. No other federally, provincially, or regionally significant tree species have been identified in or within 10 m of areas to be graded.

Several species of regionally significant vegetation species are known to occur in the study area vicinity (CVC 2011a-c) and have potential to occur within the study area based on presence of suitable habitat (Table 1). The proposed undertaking presents the potential to damage or destroy individuals of these significant species if appropriate measures for avoidance or mitigation are not implemented. A detailed assessment of potential for impact to these species will be completed as part of the future detailed design phase, based on finalized grading and road development plans. Specifically, three-season inventories should be completed during detailed design to identify and map the locations of regionally significant vegetation species within the study area. In general, measures should be taken to mitigate construction-stage impacts to significant vegetation species such as by installing protective fencing to avoid inadvertent damage or destruction. This may comprise brightly coloured snow fencing to clearly demarcate no-touch limits around protected vegetation. Where avoidance is not possible due to grading requirements, efforts should be made to transplant individuals, where possible, to suitable habitat within nearby protected areas. Vegetation transplantations must be monitored for success of establishment, as described further in Section 9.0.

The north end of Mississauga Rd. occurs within Escarpment Natural Area, while smaller areas of the ROW occur within or adjacent to Escarpment Protection Area. As described above, proposed road grading is anticipated to remain outside of woodlands within these areas, although minor encroachments into adjacent wetlands may occur. Where possible, road improvements should be designed to maintain grading limits outside of wetlands, such as through the placement of retaining walls. Altogether, the proposed undertaking is not anticipated to cause significant direct impact to these protected natural features. However, an amendment to the Niagara Escarpment Plan may be required where impacts to significant natural features (e.g., wetlands) cannot be avoided. The need for an amendment will be investigated during the detailed design phase.

7.3.1.4 Olde Base Line Rd.

The majority of proposed grading is within approximately 2-4 m of the existing gravel shoulder within areas of semi-rural cross-section, and approximately 8-10 m from the existing shoulder within the rural cross-section area. Grading limits extend up to approximately 10-12 m from the existing road surface to accommodate proposed changes to road profile. The majority of proposed grading is to occur within the existing ROW, with the exception of areas shown on Olde Base Line Rd. Plates 3 and 7. The majority of natural feature encroachment will be within

narrow bands of culturally-influenced areas of grassy meadow and shrub thicket located immediately adjacent to the existing road within the ROW. Most grading limits will be maintained outside of the adjacent Significant Woodland, part of which is also considered the Caledon Mountain ESA and Caledon Mountain Slope Forest ANSI. However, selected trees along the woodland edge have been identified for expected removal due to grading requirements, as shown on Plates 1-10. Altogether, approximately 53 trees are anticipated to require removal, based on air photo interpretation, including trees located outside of the woodland. The number of trees identified for removal along the woodland edge is considered negligible in relation to the number of trees being retained along the existing edge. Several young trees or shrubs that were not identified via air photo interpretation may require removal to accommodate proposed road grading. No federally, provincially, or regionally significant tree species have been identified in or within 10 m of areas to be graded.

Proposed grading along much of the corridor would occur immediately adjacent, or in close proximity to significant natural features including Significant Woodland (including areas of ANSI and ESA) and wetland (PSW and non-PSW). Grading may therefore occur within the driplines of several woodland edge trees. Grading within tree driplines has the potential to negatively impact the adjacent trees through disturbances to the root zones. Where possible, grading limits should be maintained outside of tree driplines with an emphasis to protect the trees comprising edges of significant woodland features.

A detailed tree inventory, identifying trees to be retained and removed, including information such as species, diameter-at-breast-height (DBH), overall health and hazard rating, will be completed during the detailed design phase. Detailed measures to protect retained adjacent trees during construction activities (e.g., installation of tree protection fencing, grading setbacks) will be determined during the detailed design phase.

Proposed grading may require encroachment into a small area of PSW (Caledon Mountain PSW complex) and non-PSW located near station 30+600 to 30+700 (Plate 3) and as shown on Figure 5a. The potential direct impacts are anticipated to be relatively minor and not significantly impact the form or function of the adjacent wetlands. Nevertheless, all measures should be taken to avoid or minimize encroachment into this wetland, such as through installation of retaining walls as is proposed adjacent the wetland as shown at Mississauga Rd. station 23+500 (Plates 11-12). The precise amount of encroachment, and necessary mitigation

measures, will be refined during the detailed design phase (e.g., through detailed wetland boundary mapping).

Several species of regionally significant vegetation species are known to occur in the study area vicinity (CVC 2011a-c) and have potential to occur within the study area based on presence of suitable habitat (Table 1). The proposed undertaking presents the potential to damage or destroy individuals of these significant species if appropriate measures for avoidance or mitigation are not implemented. A detailed assessment of potential for impact to these species will be completed as part of the future detailed design phase, based on finalized grading and road development plans. Specifically, three-season inventories should be completed during detailed design to identify and map the locations of regionally significant vegetation species within the study area. In general, measures should be taken to mitigate construction-stage impacts to significant vegetation species such as by installing protective fencing to avoid inadvertent damage or destruction. This may comprise brightly coloured snow fencing to clearly demarcate no-touch limits around protected vegetation. Where avoidance is not possible due to grading requirements, efforts should be made to transplant individuals, where possible, to suitable habitat within nearby protected areas. Vegetation transplantations must be monitored for success of establishment, as described further in Section 9.0.

A large proportion of Olde Base Lind Rd. falls within or adjacent to areas designated as Escarpment Natural Area and Escarpment Protection Area (Figure 4). As described above, relatively minor encroachment into areas of woodland and wetland adjacent to the road are anticipated due to grading. Where feasible, grading limits should be maintained outside of wetland and Significant Woodland features, including woodland edge driplines. Tree protection measures as outlined in a Tree Protection Plan to be completed during the detailed design phase should be implemented to protect retained adjacent trees. However, the proposed undertaking is not anticipated to cause significant direct impact to these features. The precise amount of encroachment, and necessary mitigation measures, will be refined during the detailed design phase (e.g., through detailed wetland boundary mapping).

7.3.1.5 Winston Churchill Boulevard

The majority of proposed grading is within approximately 2-4 m of the existing gravel shoulder, with localized areas of wider grading (up to approximately 8-10 m from the existing shoulder) associated with proposed changes to road profile. The majority of proposed grading is to occur

within the existing ROW, with the exception of areas shown on Winston Churchill Blvd. Plates 5, 6, 7, and 16-18. The majority of natural feature encroachment will be within narrow bands of culturally-influenced areas of manicured grass, grassy meadow and shrub thicket located immediately adjacent to the existing road within the ROW. Grading limits are anticipated to be maintained outside of Significant Woodlands located adjacent to the ROW. Approximately 54 trees are expected to require removal, based on air photo interpretation, due to road grading requirements. These trees are predominantly located within the roadside ROW and are not associated with a woodland edge. Several other shrubs and young trees that were not identified by air photo interpretation will also require removal to accommodate road grading. No federally, provincially, or regionally significant tree species have been identified in or within 10 m of areas to be graded.

Proposed grading along much of the corridor would occur immediately adjacent, or in close proximity to significant natural features including Significant Woodland and wetland (PSW and non-PSW). Grading may therefore occur within the driplines of several woodland edge trees. Grading within tree driplines has the potential to negatively impact the adjacent trees through disturbances to the root zones. Where possible, grading limits should be maintained outside of tree driplines with an emphasis to protect the trees comprising edges of significant woodland features.

A detailed tree inventory, identifying trees to be retained and removed, including information such as species, diameter-at-breast-height (DBH), overall health and hazard rating, will be completed during the detailed design phase. Detailed measures to protect retained adjacent trees during construction activities (e.g., installation of tree protection fencing, grading setbacks) will be determined during the detailed design phase.

Proposed grading may require encroachment into a small area of PSW (Caledon Mountain and Eramosa River/Blue Springs Creek PSW complexes) located near stations 41+400 (Plate 5), 44+900 to 45+200 (Plates 17-18) and as shown on Figure 5a. The potential direct impacts are anticipated to be relatively minor and not significantly impact the form or function of the adjacent wetlands. Nevertheless, all measures should be taken to avoid or minimize encroachment into these wetland, such as through installation of retaining walls as is proposed adjacent the wetland as shown at station 23+500 (Mississauga Rd. Plates 11-12). The precise amount of

encroachment, and necessary mitigation measures, will be refined during the detailed design phase (e.g., through detailed wetland boundary mapping).

Several species of regionally significant vegetation species are known to occur in the study area vicinity (CVC 2011a-c) and have potential to occur within the study area based on presence of suitable habitat (Table 1). The proposed undertaking presents the potential to damage or destroy individuals of these significant species if appropriate measures for avoidance or mitigation are not implemented. A detailed assessment of potential for impact to these species will be completed as part of the future detailed design phase, based on finalized grading and road development plans. Specifically, three-season inventories should be completed during detailed design to identify and map the locations of regionally significant vegetation species within the study area. In general, measures should be taken to mitigate construction-stage impacts to significant vegetation species such as by installing protective fencing to avoid inadvertent damage or destruction. This may comprise brightly coloured snow fencing to clearly demarcate no-touch limits around protected vegetation. Where avoidance is not possible due to grading requirements, efforts should be made to transplant individuals, where possible, to suitable habitat within nearby protected areas. Vegetation transplantations must be monitored for success of establishment, as described further in Section 9.0.

A large proportion of Winston Churchill Blvd. falls within or adjacent to areas designated as Greenbelt Natural Heritage System (Figure 4). Fish habitat, wetlands, Significant Woodlands, SWH, habitat for Threatened or Endangered species, and permanent or intermittent watercourses within these areas are therefore considered Key Natural Heritage Features or Key Hydrologic Features (see Section 2.9). As described within Section 7.0, no impacts to Significant Woodlands, SWH, or to habitat for Endangered or Threatened species are anticipated. The proposed undertaking may require minor encroachment into areas of adjacent wetland as described above; however, these impacts are not considered significant to the form or function of the wetlands. Altogether, the proposed undertaking is not expected to cause significant impact to the Greenbelt Natural Heritage System features located adjacent to the ROW.

7.3.2 Impacts to Wildlife and Their Habitats

General Wildlife Impacts

Throughout the study area, the majority of natural feature removal will be restricted to narrow bands of grassy meadow or shrub thicket within the existing ROWs, as well as specific roadside tree removals required to accommodate road grading. Impact analysis and associated mitigation measure recommendations are provided below for significant species that are known to, or may occur within the study area. The majority of wildlife species that may be impacted are common and ubiquitous on the surrounding landscape. The proposed undertaking may displace certain wildlife from roadside areas that are to be cleared and graded (e.g., roadside shrubs or trees used as bird nesting habitat). However, displaced species are expected to re-establish within the abundance of suitable habitat available on the surrounding landscape, given their tolerance of human-altered (i.e., roadside) environments. Mitigation measures addressing potential impacts to specific species groups or habitat functions (e.g., federally, provincially or regionally significant species, amphibian and white-tailed deer road crossings) are described below.

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. Vegetation clearing is therefore recommended to occur outside the bird nesting season (May 1-July 31) so as to limit disturbances to nesting activities of birds within meadow feature, and to avoid destruction of active nests. The destruction of migratory birds and their nests is prohibited under the federal *Migratory Birds Convention Act*, 1994. If vegetation clearing cannot be avoided during the bird breeding season, a qualified avian biologist must be retained to carry out a nest search ahead of clearing activities.

7.3.2.1 Bush Street

Species at Risk

Jefferson Salamander

The eastern extent of the Bush St. corridor that occurs outside of Belfountain (i.e., east of Shaw"s Creek Rd.) falls within regulated habitat for Jefferson salamander as shown on Figure 5b. Regulated habitat at this location includes a potential breeding pond located immediately east of Shaw"s Creek Rd., approximately 145 m north of Bush St. This pond is located well outside of areas of proposed grading and will not be directly impacted. However, because the

proposed development is to occur within regulated habitat as mapped by the MNR, an MNR permit under Section 17(2)(c) of the ESA must be authorized to demonstrate a mitigation plan and strategy for overall benefit to the species to the satisfaction of the MNR. All necessary ESA permitting will occur during the detailed design stage.

Jefferson salamanders are not known to cross Bush St. west of Belfountain due to a lack of suitable habitat south of the road. Therefore, road crossing mitigation measures are not warranted at this location, although they are proposed at other locations within the study area, as described below. Proposed site grading within this area of regulated habitat will be limited to within approximately 2-4 m of the existing gravel road shoulder and is not anticipated to negatively impact Jefferson salamanders or their habitat. However, all on-site construction personnel should be provided with training materials, including full-colour photographs, to allow them to identify Jefferson salamanders or the very similar-appearing blue-spotted salamander (*Ambystoma laterale*) and with which Jefferson salamanders may hybridize. All on-site personnel will be trained to follow established sighting protocols for Species at Risk. In the event a potential Jefferson salamander is observed within the work zone, all construction activity will cease until the individual has left the zone under its own power and the MNR has been notified. If the individual does not leave the work zone under its own power, the MNR will coordinate its relocation to adjacent suitable habitat outside of the work zone.

Barn Swallow

Agricultural fields adjacent to the Bush St. ROW were observed to function as barn swallow foraging habitat as shown on Figure 5b. However, no nesting structures will be impacted by the proposed undertaking. Furthermore, the proposed development is not anticipated to impact barn swallow foraging habitat due to the negligible loss of habitat resulting from grading activities.

Little Brown Myotis

The ROW may contain cavity trees that provide suitable habitat for little brown myotis. Proposed tree removal may therefore impact this species or its habitat. A tree cavity assessment, following MNR field-assessment criteria, should be completed in conjunction with a tree inventory during the detailed design stage to assess the potential for impact to this species.

Significant Wildlife Habitat

Seeps and Springs

As described in Section 5.1.6.1, groundwater seepage SWH is known to occur along a steep embankment immediately north of Bush St., located between stations 11+500 and 11+600 on Bush St. Plate 6 (see ESR). However, as shown on Plate 6, the proposed grading is to match the existing slope adjacent to the steep embankment. Consequently, road redevelopment at this location will not require grading into the adjacent wetland. No direct impacts to the groundwater seepage area are therefore anticipated.

Turtle Overwintering

As shown on Figure 5b, a suspected snapping turtle overwintering pond is located approximately 30 m north of Bush St. between stations 11+500 and 11+600 on Bush St. Plate 6 (see ESR). However, as shown on Plate 6, the proposed road grading adjacent to this pond is to match the existing slope adjacent to the steep embankment. Therefore, there will be no direct impacts to the turtle overwintering pond.

Amphibian Breeding Habitat

The turtle overwintering pond described above has also been confirmed as significant amphibian breeding habitat (Figure 5b). As described above, the proposed road improvements adjacent to this pond are to match existing grade. Therefore, there will be no direct impacts to the amphibian breeding habitat.

Two other ponds occur adjacent to Bush St west of Shaw"s Creek Rd. that provide significant amphibian breeding habitat (Figure 5b). The pond located north of Bush St. occurs approximately 35 m away from the limits of proposed grading and will not be directly impacted. Grading limits are proposed to extend to within approximately 5 m of the pond located south of Bush St as shown on Bush St. Plate 3. While no direct impacts to the pond or its amphibian breeding habitat are anticipated, the close proximity of the proposed grading increases the potential for indirect impacts associated with construction. See below for recommended measures to avoid indirect impacts to this pond and other adjacent aquatic features.

Wildlife Movement Corridors

Significant deer movement corridor habitat has been identified between two areas of woodland on either side of Bush St. as shown on Figure 5b. Proposed road grading adjacent to these woodlands is anticipated to require removal of approximately eight trees within the ROW. The

proposed road improvements are therefore not anticipated to cause significant direct impacts to the deer movement corridor habitat at this location.

No significant amphibian movement corridors occur across Bush St. outside of Belfountain.

Species of Conservation Concern and Regionally Significant Species

Northern Flying Squirrel

Outside Belfountain, a small area of woodland north of Bush St. and east of Shaw"s Creek Rd. provides habitat for northern flying squirrel (Figure 5b). This woodland occurs adjacent to the steep embankment shown on Bush St. Plate 6 and the turtle overwintering pond/amphibian breeding habitat described above. Proposed road improvements adjacent to this woodland are to match existing grade due to the steep slope and no tree removals are anticipated. Consequently, no direct impacts to northern flying squirrel habitat are anticipated.

Hooded Warbler

No encroachments into the woodlands are proposed. Therefore, no impact to potential hooded warbler habitat is anticipated.

Significant Odonate Species

Significant odonate species known from the vicinity may use the watercourse habitat within the ROW. No significant direct impact to this feature, and its capacity to provide habitat for significant odonate species, is anticipated.

7.3.2.2 Village of Belfountain

Species at Risk

Jefferson Salamander

Almost the entirety of the village of Belfountain falls within regulated habitat for Jefferson salamander (Figure 5b). Regulated habitat within the village includes a confirmed breeding pond, a potential breeding pond, and surrounding areas that may support dispersal. Because the proposed development is to occur within regulated habitat as mapped by the MNR, an MNR permit under Section 17(2)(c) of the ESA must be authorized to demonstrate a mitigation plan and strategy for overall benefit to the species to the satisfaction of the MNR. All necessary ESA permitting will occur during the detailed design stage.

Proposed road grading will not directly impact confirmed or potential breeding ponds. However, proposed road improvements have potential to impact Jefferson salamanders at a known crossing location across Old Main St. within the village. In order to avoid potential direct impacts to Jefferson salamander at this location, construction activities should be timed to occur outside of the period March 15 to April 30, which generally represents the peak period for breeding and spring-based movements for the species. If this construction timing is not feasible, all on-site construction personnel should be provided with training materials, including full-colour photographs, to allow them to identify Jefferson salamanders or the very similar-appearing blue-spotted salamander (*Ambystoma laterale*) and with which Jefferson salamanders may hybridize. All on-site personnel will be trained to follow established sighting protocols for Species at Risk. In the event a potential Jefferson salamander is observed within the work zone, all construction activity will cease until the individual has left the zone under its own power and the MNR has been notified. If the individual does not leave the work zone under its own power, the MNR will coordinate its relocation to adjacent suitable habitat outside of the work zone.

As shown on Figure 5b, amphibians are known to cross Old Main St. between an adjacent wetland to the west and mixed forest to the east. Although Jefferson salamander has not been observed crossing the road at this location, the species is known to breed in the adjacent wetland and there is potential for road mortality if not appropriately mitigated. Mississauga Rd./Old Main St. Plate 20 shows a proposed 2.4 m x 1.5 m embedded wildlife crossing structure near station 26+000, which connects areas of cultural meadow and coniferous forest on the west with deciduous and mixed forest on the east. The passage will extend the approximately 15 m width of proposed grading at this location. Based on an openness ratio formula of (height x width)/length, these dimensions provide an openness ratio of 0.24, which is considered suitable for passage of amphibians and reptiles. This wildlife passage should be located as close to the existing amphibian crossing location as is technically feasible to maximize its usefulness as a safe road crossing measure (i.e., closer to station 26+100).

Installation of the wildlife passage must also include associated funnel fencing to divert amphibian (and Jefferson salamander) movement away from the road surface and toward the wildlife passage. The construction of the funnel fencing should consider materials that will suitably weather a cold winter climate. Additionally, the fence should be designed to inhibit animals from climbing over the fence (e.g., by having a smooth surface and an upper lip that

angles back away from the road; e.g., see TRCA 2013), and adjacent vegetation that animals can climb should be periodically cleared away. The funnel fence should be at least 0.5 m high to prevent animals from jumping over onto the road surface. To encourage movement of amphibians toward culverts, diversion wing walls should be constructed on either side of the tunnel opening either vertically or at an angle of 45° (MTO 2006).

Culvert substrate should be natural to provide familiar scents, with a sandy loam recommended to hold the moisture (MTO 2006). Natural cover objects, such as rocks and branches should also be placed within, and leading up to entrances to the wildlife passage to entice use by amphibians and other small animals. Installing wildlife passages with an open grated top flush with the road surface (e.g., ACO wildlife tunnels) will provide more ambient light to the passage and help maintain appropriate temperature and moisture conditions conducive to amphibian requirements (TRCA 2013).

Location, design and construction details of the wildlife passage and associated funnel fencing, such as to address private property constraints, will be determined during the detailed design phase.

Chimney Swift

As described in Section 5.1.5, the proposed undertaking will not directly impact a known chimney swift nesting structure within the village. Therefore, no impacts to this species are anticipated.

Little Brown Myotis

The ROW may contain cavity trees that provide suitable habitat for little brown myotis. Proposed tree removal may therefore impact this species or its habitat. A tree cavity assessment, following MNR field-assessment criteria, should be completed in conjunction with a tree inventory during the detailed design stage to assess the potential for impact to this species.

Significant Wildlife Habitat

Amphibian Breeding Habitat

Significant amphibian breeding habitat occurs south of Bush St. and west of Old Main St. as shown on Figure 5b. These habitats are located approximately 20 m or more from the proposed

grading limits and are predominantly located behind residential properties fronting these roads. Therefore, no direct impacts to these habitats will occur.

Wildlife Movement Corridors

A significant amphibian movement corridor has been identified crossing Old Main St., between an area of wetland and forest, as shown on Figure 5b. Due to the highly constrained and minor grading plans within the village, any direct impact to this amphibian crossing location over existing conditions is considered negligible. However, amphibian road mortality and habitat fragmentation remains a concern at this location, particularly in relation to Jefferson salamander (see above). The proposed installation of a wildlife passage as shown on Mississauga Rd./Old Main St. Plate 20 is anticipated to mitigate these impacts provided that the above recommendations are implemented.

No significant deer movement corridors occur within the village of Belfountain.

Species of Conservation Concern and Regionally Significant Species

Northern Flying Squirrel

Woodland areas within the village have been identified as habitat for northern flying squirrel as shown on Figure 5b. No encroachments into the woodlands are anticipated. Therefore, no impacts to northern flying squirrels or their habitat are expected.

Western Chorus Frog

No direct impacts to western chorus frog habitat are expected (see Section 7.3.1.2 - wetlands).

Hooded Warbler

No encroachments into the woodlands are anticipated. Therefore, no impacts to potential hooded warbler habitat are anticipated.

Significant Odonate Species

Significant odonate species known from the vicinity may use wetland or watercourse habitats within the village. No significant direct impacts to these features, and their capacity to provide habitat for significant odonate species, are anticipated.

7.3.2.3 Mississauga Road

Species at Risk

Jefferson Salamander

The south end of Mississauga Rd. falls within regulated habitat for Jefferson salamander (Figure 5b). Regulated habitat within this area includes a known breeding wetland, two potential breeding wetlands, and surrounding potential dispersal areas. Because the proposed development is to occur within regulated habitat as mapped by the MNR, an MNR permit under Section 17(2)(c) of the ESA must be authorized to demonstrate a mitigation plan and strategy for overall benefit to the species to the satisfaction of the MNR. All necessary ESA permitting will occur during the detailed design stage.

Proposed road grading will extend into the confirmed Jefferson salamander breeding wetland by approximately 8-10 m on either side of the existing road. Habitat loss and degradation has been identified as a primary threat to the survival and recovery of Jefferson salamanders (Jefferson Salamander Recovery Team 2010). All direct impact to the habitat of Endangered species should be avoided to the extent feasible, such as through construction of retaining walls (see Section 7.3.1.3). All direct impact to the habitat of Endangered species should be avoided to the extent feasible, such as through construction of retaining walls (see Section 7.3.1.3). Details of the amount of habitat that may be impacted will be determined during the detailed design stage. As described above, direct impacts to Jefferson salamander regulated habitat are not permitted under the Niagara Escarpment Plan unless an amendment to the Plan is approved.

A proposed wildlife passage culvert (1.5 m high x 2.4 m wide x approximately 23 m long) has been identified near station 20+700 (Plate 2) as a means of maintaining connectivity of Jefferson salamander habitat across Mississauga Rd. and mitigating road mortality impacts. This passage has been located to allow passage under the road between the confirmed and potential breeding wetlands on each side of the road. Based on an openness ratio formula of (height x width)/length, these dimensions provide an openness ratio of 0.24, which is considered suitable for passage of amphibians and reptiles.

Installation of the wildlife passage must also include associated funnel fencing to divert amphibian (and Jefferson salamander) movement away from the road surface and toward the wildlife passage. The construction of the funnel fencing should consider materials that will

suitably weather a cold winter climate. Additionally, the fence should be designed to inhibit animals from climbing over the fence (e.g., by having a smooth surface and an upper lip that angles back away from the road; e.g., see TRCA 2013), and adjacent vegetation that animals can climb should be periodically cleared away. The funnel fence should be at least 0.5 m high to prevent animals from jumping over onto the road surface. To encourage movement of amphibians toward culverts, diversion wing walls should be constructed on either side of the tunnel opening either vertically or at an angle of 45° (MTO 2006).

Culvert substrate should be natural to provide familiar scents, with a sandy loam recommended to hold the moisture (MTO 2006). Natural cover objects, such as rocks and branches should also be placed within, and leading up to entrances to the wildlife passage to entice use by amphibians and other small animals. Installing wildlife passages with an open grated top flush with the road surface (e.g., ACO wildlife tunnels) will provide more ambient light to the passage and help maintain appropriate temperature and moisture conditions conducive to amphibian requirements (TRCA 2013). The wildlife passage must also be located and installed to provide moisture conditions most similar to outside ambient conditions (i.e., not inundated in water and not completely dry) that would be conducive to amphibian (and Jefferson salamander) passage.

As shown on Figure 7, a significant amphibian crossing has been documented across Mississauga Rd. just north of the intersection with Olde Base Line Rd. (near station 20+400), and salamander mortalities have been observed at this location. One additional wildlife passage culvert is therefore recommended at this location due to the potential for road mortality and habitat fragmentation impacts to Jefferson salamander and other amphibian species. As is proposed near station 20+700, the openness ratio must be appropriate for passage of amphibians and other small wildlife. Additional measures to optimize potential for wildlife use, including funnel fencing, appropriate surface substrates, and top-of-culvert grating flush with the road surface, should also be considered.

Location, design and construction details of proposed and recommended wildlife passages and associated funnel fencing, such as to address private property constraints, will be determined during the detailed design phase.

Proposed road improvement construction activities also have the potential to cause injury or mortality to Jefferson salamanders. In order to avoid potential direct impacts to Jefferson

salamander, construction activities within areas of regulated habitat should be timed to occur outside of the period March 15 to April 30, which generally represents the peak period for breeding and spring-based movements for the species. If this construction timing is not feasible, all on-site construction personnel should be provided with training materials, including full-colour photographs, to allow them to identify Jefferson salamanders or the very similar-appearing blue-spotted salamander (*Ambystoma laterale*) and with which Jefferson salamanders may hybridize. All on-site personnel will be trained to follow established sighting protocols for Species at Risk. In the event a potential Jefferson salamander is observed within the work zone, all construction activity will cease until the individual has left the zone under its own power and the MNR has been notified. If the individual does not leave the work zone under its own power, the MNR will coordinate its relocation to adjacent suitable habitat outside of the work zone.

Bobolink, Eastern Meadowlark and Barn Swallow

A few agricultural fields adjacent to Mississauga Rd. have been identified as breeding habitat for bobolink and eastern meadowlark, and as foraging habitat for barn swallow (Figure 5b). Potential loss of habitat associated with proposed grading limits is considered negligible in relation to the amount of adjacent, unimpacted habitat. Therefore, no impacts to these species are anticipated.

Little Brown Myotis

The ROW and surrounding woodlands may contain cavity trees that provide suitable habitat for little brown myotis. Proposed tree removal may therefore impact this species or its habitat. A tree cavity assessment, following MNR field-assessment criteria, should be completed in conjunction with a tree inventory during the detailed design stage to assess the potential for impact to this species.

Significant Wildlife Habitat

Amphibian Breeding Habitat

Significant amphibian breeding habitat occurs at various locations within 120 m of Mississauga Rd. as shown on Figure 5b. Most areas of significant habitat will not be directly impacted by proposed road grading. However, there is potential for certain habitats to be directly impacted, such as at station 20+700 (see above for Jefferson salamander). The precise amount of encroachment, and necessary mitigation measures, will be refined during the detailed design

phase (e.g., through detailed wetland boundary mapping). Loss and degradation (e.g., through sedimentation and erosion) of these features may impair their function to support significant diversity and abundance of breeding amphibians if not properly mitigated. Road improvement design should avoid direct impacts to these habitat features to the extent feasible, such as through construction of retaining walls where necessary.

Wildlife Movement Corridors

Five significant amphibian movement corridors have been identified crossing Mississauga Rd. between areas of wetland and upland forest (Figure 5b). The relatively limited amount of road grading required in these locations is not anticipated to cause significant direct impacts to these corridor habitats, although the slightly wider road surface may marginally increase the potential for amphibian road mortality. A wildlife passage to be installed at the most sensitive of these crossing locations, at station 20+700, is anticipated to benefit Jefferson salamander and other amphibian and reptile species by mitigating habitat fragmentation and road mortality impacts (see above). Road signage, warning motorists of amphibian crossings, should be considered at this and other significant crossing locations within the ROW (to be determined at the detailed design stage) to further mitigate potential road mortality impacts.

The Mississauga Rd. ROW also contains three areas of significant deer movement corridor habitat, plus one additional area outside study area south of Olde Base Line Rd. (Figure 5b). The relatively limited amount of road grading required in these locations and limited removal of vegetation is not anticipated to cause significant direct impacts to these corridor habitats or to deer movement patterns in these areas. Although the proposed road improvements are anticipated to have a negligible impact on existing deer crossing activity, the undertaking presents opportunities to improve existing impacts associated with deer-motor vehicle collisions. Because all of these locations are considered low-density deer crossing areas, increased deer crossing signage, at strategic locations to be determined during the detailed design phase, may be considered as an appropriate measure to effectively mitigate this impact.

Species of Conservation Concern and Regionally Significant Species

Northern Flying Squirrel

Woodland areas within the north and south ends of Mississauga Rd. have been identified as habitat for northern flying squirrel as shown on Figure 5b. Although targeted tree removals immediately adjacent to the road are expected, no encroachments into the woodlands are

anticipated. The opening occupied by the road corridor between woodland areas will be maintained within the distance required (approximately 23 m) to allow northern flying squirrels to glide from one side to the other. Therefore, no impacts to northern flying squirrels or their habitat are expected.

Western Chorus Frog

See “Amphibian Breeding Habitat” and “Wildlife Movement Corridors” above.

Hooded Warbler

No encroachments into the woodlands are anticipated. Therefore, no impacts to potential hooded warbler habitat is anticipated.

Significant Odonate Species

Significant odonate species known from the vicinity may use wetland or watercourse habitats within the ROW. As described above, based on the proposed grading plan there is potential for minor encroachments into wetland features immediately adjacent to the road. Detailed wetland boundary evaluations should be completed during the detailed design phase to confirm the amount of wetland habitat removal necessary to accommodate the final grading plan. Wetland encroachment should be avoided or minimized to the extent feasible. However, the amount of potential habitat loss is considered minor in relation to the amount of unaffected habitat on the surrounding landscape.

7.3.2.4 Olde Base Line Rd.

Species at Risk

Jefferson Salamander

All of Olde Base Line Rd. east of Rockside Rd. falls within regulated habitat for Jefferson salamander (Figure 5b). Because the proposed development is to occur within regulated habitat as mapped by the MNR, an MNR permit under Section 17(2)(c) of the ESA must be authorized to demonstrate a mitigation plan and strategy for overall benefit to the species to the satisfaction of the MNR. All necessary ESA permitting will occur during the detailed design stage.

Proposed grading along the road corridor will not impact any confirmed or potential breeding habitats; based on the limited amount of potential habitat loss in relation to extant habitat in the

surrounding area, significant impacts to potential dispersal habitat are not anticipated. However, as shown on Figure 7, salamander mortality has been recorded just west of the intersection with Mississauga Rd. adjacent to an area of wetland. Although the proposed undertaking is not anticipated to significantly increase the potential for road mortality and habitat fragmentation impacts relative to existing conditions, the road improvement works provide an opportunity to install measures to mitigate these impacts.

A wildlife passage culvert suitable for use by amphibians and other small wildlife (e.g., 1.5 m high x 2.4 m wide) is recommended to be located between Olde Base Line Rd. station 32+600 and the intersection with Mississauga Rd. as a means of maintaining connectivity of Jefferson salamander and general amphibian habitat across Mississauga Rd. and mitigating documented road mortality impacts. A wildlife passage at this location would connect upland forest and wetland habitats (including potential Jefferson salamander breeding ponds) north of Olde Base Line Rd. with PSW and non-PSW wetlands south of Olde Base Line Rd.

Installation of the wildlife passage must also include associated funnel fencing to divert amphibian (and Jefferson salamander) movement away from the road surface and toward the wildlife passage. The construction of the funnel fencing should consider materials that will suitably weather a cold winter climate. Additionally, the fence should be designed to inhibit animals from climbing over the fence (e.g., by having a smooth surface and an upper lip that angles back away from the road; e.g., see TRCA 2013), and adjacent vegetation that animals can climb should be periodically cleared away. The funnel fence should be at least 0.5 m high to prevent animals from jumping over onto the road surface. To encourage movement of amphibians toward culverts, diversion wing walls should be constructed on either side of the tunnel opening either vertically or at an angle of 45° (MTO 2006).

Culvert substrate should be natural to provide familiar scents, with a sandy loam recommended to hold the moisture (MTO 2006). Natural cover objects, such as rocks and branches should also be placed within, and leading up to entrances to the wildlife passage to entice use by amphibians and other small animals. Installing wildlife passages with an open grated top flush with the road surface (e.g., ACO wildlife tunnels) will provide more ambient light to the passage and help maintain appropriate temperature and moisture conditions conducive to amphibian requirements (TRCA 2013). The wildlife passage must also be located and installed to provide

moisture conditions most similar to outside ambient conditions (i.e., not inundated in water and not completely dry) that would be conducive to amphibian (and Jefferson salamander) passage.

Location, design and construction details of the wildlife passage and associated funnel fencing, such as to address private property constraints, will be determined during the detailed design phase.

Proposed road improvement construction activities also have the potential to cause injury or mortality to Jefferson salamanders. In order to avoid potential direct impacts to Jefferson salamander, construction activities within areas of regulated habitat should be timed to occur outside of the period March 15 to April 30, which generally represents the peak period for breeding and spring-based movements for the species. If this construction timing is not feasible, all on-site construction personnel should be provided with training materials, including full-colour photographs, to allow them to identify Jefferson salamanders or the very similar-appearing blue-spotted salamander (*Ambystoma laterale*) and with which Jefferson salamanders may hybridize. All on-site personnel will be trained to follow established sighting protocols for Species at Risk. In the event a potential Jefferson salamander is observed within the work zone, all construction activity will cease until the individual has left the zone under its own power and the MNR has been notified. If the individual does not leave the work zone under its own power, the MNR will coordinate its relocation to adjacent suitable habitat outside of the work zone.

Eastern Meadowlark and Barn Swallow

Two agricultural fields adjacent to Mississauga Rd. have been identified as breeding habitat for eastern meadowlark, and as foraging habitat for barn swallow (Figure 5b). Potential loss of habitat associated with proposed grading limits is considered negligible in relation to the amount of adjacent, unimpacted habitat. Therefore, no impacts to these species are anticipated.

Little Brown Myotis

The ROW and surrounding woodlands may contain cavity trees that provide suitable habitat for little brown myotis. Proposed tree removal may therefore impact this species or its habitat. A tree cavity assessment, following MNR field-assessment criteria, should be completed in conjunction with a tree inventory during the detailed design stage to assess the potential for impact to this species.

Significant Wildlife Habitat

Amphibian Breeding Habitat

Significant amphibian breeding habitat adjacent to the Olde Base Line Rd. corridor is restricted to a small pond located north of the ROW (Figure 5b). This pond is located over 30 m from the limits of proposed grading. Therefore, no direct impacts to significant amphibian breeding habitat will occur.

Wildlife Movement Corridors

No significant amphibian movement corridors across Olde Base Line Rd. have been identified (Figure 5b). However, as described above, salamander mortality has occurred at a location immediately west of the intersection with Mississauga Rd., making this location a potentially sensitive crossing area for Jefferson salamander. A wildlife passage has therefore been proposed for this location as described above under discussion of impacts to Jefferson salamander.

The Olde Base Line Rd. ROW also contains two areas of significant deer movement corridor habitat, both of which are considered high-density crossing areas (see Figures 5b, 6). The relatively limited amount of road grading required in these locations is not anticipated to cause significant direct impacts to these corridor habitats or to deer movement patterns in these areas. Although the proposed road improvements are anticipated to have a negligible impact on existing deer crossing activity, the undertaking presents opportunities to mitigate existing impacts associated with deer-motor vehicle collisions.

Based on discussions with the OMNR (see Appendix I), the installation of improved, seasonally-flashing deer crossings signs at strategic locations, in conjunction with the proposed 10 km/h reduction in speed limit along Olde Base Line Rd. (to 50 km/h), was determined to be the most feasible and effective means of mitigating deer-vehicle impacts within the ROW. Deer crossing signs should be located at the east and west approaches to each wildlife corridor area shown on Figure 5b. The specific locations of these signs should be determined during the detailed design stage in consultation with the OMNR. Improved signage should include seasonally flashing lights, which are timed to flash during the October-November breeding period when deer frequently run across roads without looking for or heeding oncoming traffic. Improved

signage should also be bigger than existing signs to increase the degree to which they are noticed by motorists.

Vegetation removal required within roadside areas to be graded (e.g., shrubs, some trees) is expected to increase the visibility of deer approaching the road from adjacent woodlands. The reduction in speed limit, if effectively enforced by local authorities, is anticipated to further increase the reaction time of motorists to react to deer road crossings and to potentially lessen the severity of collisions. During winter, it is recommended that snow banks along Olde Base Line Rd. be removed to increase motorists‟ field of view, as deer may unexpectedly jump over roadside snow banks. Opportunities to increase the local harvest of deer should be explored with MNR as a means to limit localized overpopulation and decrease road-vehicle collision potential, as recommended in Elchyshyn and Heaton (2009). These measures, if implemented, are anticipated to reduce the number of deer-vehicle collisions along Olde Base Line Rd. The effectiveness of these measures should be monitored, and mitigation strategies revised as needed, as described in Section 9.0.

Species of Conservation Concern and Regionally Significant Species

Northern Flying Squirrel

Woodland at the east end of Olde Base Line Rd. been identified as habitat for northern flying squirrel as shown on Figure 5b. No significant encroachment into the adjacent woodlands in this location is anticipated. The opening occupied by the road corridor between woodland areas will be maintained within distance required (approximately 23 m) to allow northern flying squirrels to glide from one side to the other. Therefore, no impacts to northern flying squirrels or their habitat are expected.

Hooded Warbler

No significant encroachments into the woodlands are anticipated. Therefore, no impacts to potential hooded warbler habitat are anticipated.

Significant Odonate Species

Significant odonate species known from the vicinity may use wetland or watercourse habitats within the ROW. As described above, based on the proposed grading plan there is potential for minor encroachments into a wetland feature immediately adjacent to the road located near stations 30+600 to 30+700. Detailed wetland boundary evaluations should be completed during

the detailed design phase to confirm the amount of wetland habitat removal necessary to accommodate the final grading plan. Wetland encroachment should be avoided or minimized to the extent feasible. However, the amount of potential habitat loss is considered minor in relation to the amount of unaffected habitat on the surrounding landscape.

7.3.2.5 Winston Churchill Boulevard

Bobolink, Eastern Meadowlark and Barn Swallow

A few agricultural fields adjacent to Mississauga Rd. have been identified as breeding habitat for bobolink and eastern meadowlark, and as foraging habitat for barn swallow (Figure 5b). Potential loss of habitat associated with proposed grading limits is considered negligible in relation to the amount of adjacent, unimpacted habitat. Therefore, no impacts to these species are anticipated.

Little Brown Myotis

The ROW and surrounding woodlands may contain cavity trees that provide suitable habitat for little brown myotis. Proposed tree removal may therefore impact this species or its habitat. A tree cavity assessment, following MNR field-assessment criteria, should be completed in conjunction with a tree inventory during the detailed design stage to assess the potential for impact to this species.

Significant Wildlife Habitat

Amphibian Breeding Habitat

Significant amphibian breeding habitat occurs at various locations within 120 m of Winston Churchill Blvd. as shown on Figure 5b. Most areas of significant habitat will not be directly impacted by proposed road grading. However, there is potential for certain habitats to be directly impacted, such as near stations 41+400 (Plate 5), 44+900 to 45+200 (Plates 17-18). The precise amount of encroachment, and necessary mitigation measures, will be refined during the detailed design phase (e.g., through detailed wetland boundary mapping). As described in Section 7.3.2.5, retaining walls are recommended as means to avoid or minimize grading encroachment into these wetlands. However, these minor encroachments are not anticipated to significantly impact the form of function of these wetlands to support amphibian breeding habitat provided that suitable mitigation measures (e.g., sedimentation and erosion controls) are implemented.

Wildlife Movement Corridors

Four significant amphibian movement corridors across Winston Churchill Blvd. have been mapped (Figure 5b). The relatively limited amount of road grading required in these locations is not anticipated to cause significant direct impacts to these corridor habitats, although the slightly wider road surface may marginally increase the potential for amphibian road mortality. Road signage, warning motorists of amphibian crossings, should be considered significant crossing locations within the ROW, such as between approximately station 44+000 and Sideroad 10 (to be determined at the detailed design stage), to further mitigate potential road mortality impacts.

The Winston Churchill Blvd. ROW also contains two areas of significant but low-density deer movement corridor habitat (see Figures 5b, 7). The relatively limited amount of road grading required in these locations is not anticipated to cause significant direct impacts to these corridor habitats or to deer movement patterns in these areas. Although the proposed road improvements are anticipated to have a negligible impact on existing deer crossing activity, the undertaking presents opportunities to improve existing impacts associated with deer-motor vehicle collisions. Because all of these locations are considered low-density deer crossing areas, increased deer crossing signage, at strategic locations to be determined during the detailed design phase, in combination with the proposed 10 km/h posted speed limit reduction (to 60 km/h), may be considered as an appropriate measure to effectively mitigate this impact.

Turtle Overwintering

As shown on Figure 5b and Winston Churchill Plate 15, a suspected snapping turtle overwintering pond is located at station 44+300. The edge of the pond is setback by a minimum of approximately 6 m from the proposed grading limits in this location. Therefore, there will be no direct impacts to the turtle overwintering pond.

Species of Conservation Concern and Regionally Significant Species

Western Chorus Frog

See “Amphibian Breeding Habitat” and “Wildlife Movement Corridors” above.

Hooded Warbler

No encroachments into the woodlands are anticipated. Therefore, no impacts to potential hooded warbler habitat are anticipated.

Significant Odonate Species

Significant odonate species known from the vicinity may use wetland or watercourse habitats within the ROW. As described above, based on the proposed grading plan there is potential for minor encroachments into wetland features immediately adjacent to the road. Detailed wetland boundary evaluations should be completed during the detailed design phase to confirm the amount of wetland habitat removal necessary to accommodate the final grading plan. Wetland encroachment should be avoided or minimized to the extent feasible. However, the amount of potential habitat loss is considered minor in relation to the amount of unaffected habitat on the surrounding landscape.

7.3.3 Impacts to Aquatic Natural Features and Fish Habitat

Generally, wherever possible, construction activities at or near watercourses should be conducted in dry conditions in order to avoid or minimize impacts to aquatic resources and fish habitat.

Existing condition hydraulic assessments for Mississauga Road/Old Main Street and Bush Street were previously conducted and contained in the report “Bush Street and Mississauga Road Class EA Existing Conditions Drainage Report - Draft, June 2010” prepared by Dillon Consulting Limited. Although specific recommendations for culvert upgrades were not included in the above study, culvert upgrade recommendations on these corridors were based on the Fluvial Geomorphic Assessment or made solely to upgrade to minimum size requirements. Existing and proposed hydraulic assessments were completed for Olde Base Line Road and Winston Churchill Boulevard and are documented the “Drainage and Hydrology Report – Olde Base Line Road and Winston Churchill Boulevard, Town of Caledon, Region of Peel” dated May 2014 prepared by HDR (HDR 2014a). Further hydraulic analysis will be conducted during detailed design to verify the culvert opening size to ensure that CVC flow passage criteria has been met.

7.3.3.1 Bush Street

As shown on Figure 3 (#1), only one culvert crossing occurs within the Bush Street corridor outside of Belfountain. As shown on Bush Street Plate 5 the culvert is to be maintained. As there is no direct or indirect fish habitat associated with this watercourse crossing there are no impacts to aquatic features anticipated.

7.3.3.2 Village of Belfountain

Two unnamed tributaries to the West Credit River, identified as A and B, are located within the Village of Belfountain (Figure 3, #2 and 3).

As shown on Bush Street Plate 8 (12+000), it is proposed that the current 500 mm HDPE culvert located at Tributary A to the West Credit River, be replaced with a 1500 mm x 900 mm open bottom concrete box culvert to comply with the minimum span recommended by the geomorphic assessment and to meet the CVC requirement of open bottom culverts at all designated watercourses. The proposed culvert replacement will result in a temporary disturbance to fish habitat within the vicinity of the crossing structure during construction. As this feature is direct fish habitat the replacement of the culvert can result in serious harm to fish and may be subject to approval under the federal *Fisheries Act*. However, an open bottom culvert of this size will allow for greater fish habitat benefit and will improve the potential for groundwater inputs.

Tributary B provides indirect fish habitat to the West Credit River. As shown on Mississauga Road/ Old Main Street Plate 21 (26+380), it is proposed that the 600 mm CSP culvert be replaced with a 1500mm x 900 mm open bottom concrete box culvert to comply with the minimum span recommended by the geomorphic assessment and to meet the CVC requirement of open bottom culverts at all designated watercourse crossing locations. No direct impact to fish habitat is expected as a result of this replacement if the work is conducted during dry conditions, with proper sediment and erosion controls implemented as described further in the ESR and will be described more so in detail design. If the work is being conducted where water is still present, please refer to Section 7.4.2 on how to mitigate indirect impacts to aquatic features.

7.3.3.3 Mississauga Road

Twelve culvert crossings were identified by NRSI along the Mississauga Rd. study area ROW (#4 to 15 on Figure 3). Of these culverts, only one (Tributary A to Second Creek, #10 on Figure 3) provides permanent flow and direct fish habitat as well as containing areas of groundwater discharge immediately upstream and downstream of the culvert. Additionally, two culverts (#12 and 13 on Figure 3) are believed to provide connectivity to the wetland features within the area, while culvert #12 also conveys a watercourse feature.

As shown on Mississauga Road/Old Main Street Plate 7 (22+220), it is proposed that the two 1200 mm CSP culverts (conveying Tributary A) be upgraded to a 6000 mm x 1500 mm open bottom concrete box culvert to comply with the minimum span recommended by the geomorphic assessment and to meet the CVC requirement of open bottom culverts at all designated watercourse crossing locations. The proposed extension will result in a temporary disturbance to fish habitat, as well as a loss of fish habitat and potential groundwater area. As this feature provides direct fish habitat the proposed culvert replacement can result in serious harm to fish and may be subject to approval under the federal *Fisheries Act*. Generally if work is being conducted that will disrupt the watercourse, a single crossing is preferred over dual culverts. The installation of an open bottom culvert is preferred in order to benefit fish habitat and to maintain and improve for groundwater inputs.

The 400 mm CSP culvert at Tributary B to Second Creek (Mississauga Road Plate 5; #12 on Figure 3) is proposed to be removed and upgraded to a 1200 mm x 600 mm open bottom concrete box culvert to comply with the minimum span recommended by the geomorphic assessment and to meet the CVC requirement of open bottom culverts at all designated watercourse crossing locations.. This tributary is considered an ephemeral watercourse and at the road crossing does not provide any direct or indirect fish habitat. As this culvert connects wetland features and provides wetland contribution (as groundwater indicator species were identified) there may be direct impacts to the aquatic feature. As this area has groundwater indicators within the area, an open bottom culvert is preferred in order to not affect the inputs.

The approximately 300 mm CSP culvert at Point #13 on Figure 3 (Mississauga Rd. Plate 4) is proposed to be removed and replaced with a 600 mm CSP culvert. This drainage feature was assessed to be ephemeral and not providing any direct or indirect fish habitat at this location. As wetlands are present within the area it is believed that the culvert provides connectivity to these features. As the culvert location was dry during all assessments and no groundwater indicators were noted in the area the proposed change to the culvert size is not expected to result in significant impacts to the wetland features.

The remaining proposed changes to culverts within the Mississauga Rd. ROW are not expected to result in any direct or indirect impacts to fish habitat or other aquatic features. As in all cases,

the work should be conducted during dry conditions, with proper sediment and erosion controls implemented as described further in the ESR.

7.3.3.4 Olde Base Line Road

Eleven culvert crossing are located within the Olde Base Line Rd. ROW (Culverts #16-26 on Figure 3). Of these culverts, only three convey watercourses (#19, 23, and 25 on Figure 3) that provide direct or indirect fish habitat. An additional culvert crossing (#24 on Figure 3) is believed to provide connectivity to the wetland features within the area.

As shown on Olde Base Line Road Plate 5 (31+400), it is proposed that the existing 3.05 m x 1.4 m concrete box culvert (#19 on Figure 3) be maintained. This culvert conveys Tributary A to Second Creek (#19 on Figure 3) which is considered an intermittent watercourse providing direct fish habitat. As the existing culvert will be maintained, no direct impacts to fish habitat or other aquatic features are anticipated. Proposed road grading within this area is also minimal and no direct impacts are expected.

Tributary A to Rogers Creek (culvert #23 on Figure 3) is considered an ephemeral watercourse that may provide indirect fish habitat when flowing. The existing 3.30 m x 1.20 m concrete box culvert is proposed to be extended to accommodate planned road grading at this location (Olde Base Line Road Plate 4, 30+980). Extension of the existing culvert will require removal of potential indirect fish habitat. As the potential for impacts at this location are minimal, no impacts to fish habitat are anticipated. In order to mitigate the potential impacts, the work should be conducted during dry conditions, with proper sediment and erosion controls implemented as described further in the ESR.

As shown on Olde Base Line Road Plate 3, it is proposed that the existing 600 mm CSP culvert (culvert #25 on Figure 3) be removed and upgraded to a 3000 mm x 1200 mm open bottom concrete box culvert based on geomorphic and hydraulic assessments. An open bottom culvert is proposed to comply with CVC requirements at all designated watercourse crossing locations. This culvert conveys Tributary B to Rogers Creek, which is considered an ephemeral watercourse that may provide indirect fish habitat when flowing. All grading will be done within the ROW. As this watercourse only provides potential indirect fish habitat when flowing, the

proposed undertaking is not anticipated to significantly impact the aquatic feature or downstream fish habitat.

The 600mm CSP culvert at Point #24 on Figure 3 (Mississauga Plate 4) is proposed to be extended to allow for grading. This drainage feature was assessed to provide a link between the wetland features on both sides of the roadway. A minor amount of habitat removal may be required associated with the proposed culvert extension and adjacent road grading.
As the culvert location was dry during all assessments and no groundwater indicators were noted in the area, the proposed change to the culvert size is not expected to result in significant impacts to the wetland features.

The remaining proposed changes to culverts within the Olde Base Line Rd. ROW are not expected to result in any direct or indirect impacts to fish habitat or other aquatic features. The proposed culvert replacements will improve surface runoff as many of the existing culverts are severely degraded or partially filled in. As in all cases, the work should be conducted during dry conditions, with proper sediment and erosion controls implemented as described further in the ESR.

7.3.3.5 Winston Churchill Boulevard

Eighteen culvert crossings are located within the Winston Churchill Blvd ROW (culverts #27-43, including additional CVC culvert assessment location, as shown on Figure 3). Of these culverts, four convey ephemeral watercourses that provide direct or indirect fish habitat when water is flowing and an additional three provide connectivity between wetlands.

As shown on Winston Churchill Blvd Pate 5 (41+400; #32 on Figure 3), it is proposed that the existing 600 mm CSP culvert be replaced and extended slightly with an 1800 x 610 mm open bottom concrete box culvert based on geomorphic and hydraulic assessments. An open bottom culvert is proposed to comply with CVC requirements at designated watercourse crossing locations. As this is an ephemeral system that provides indirect fish habitat when flowing, direct impacts can be avoided if the work is conducted during dry conditions. This ephemeral watercourse also provides connectivity between wetland features. Grading impacts are considered to be minor at this location. Due to the ephemeral nature of this watercourse and the indirect habitat provided at this location, impacts to aquatic resources and fish habitat are

not anticipated based on the proposed undertaking. The work should be conducted during dry conditions, with proper sediment and erosion controls implemented as described further in the ESR.

The culvert crossing at Tributary C to Rogers Creek (#35 on Figure 3) is located on Winston Churchill Blvd. Plate 8 (42+200). The proposed changes to this crossing location include replacement and extension of the 1400 mm x 900 mm CSP culvert with a 6000 mm x 1500 open bottom box culvert based on geomorphic and hydraulic assessments. An open bottom culvert is proposed to comply with CVC requirements at designated watercourse crossing locations. The length of the new culvert will require a minor amount of direct fish habitat removal. As the watercourse is ephemeral at this location, work should be completed during dry conditions to avoid impact to fish habitat. As the potential for impacts at this location is minimal, no impacts to fish habitat are anticipated.

The CVC-assessed watercourse at Winston Churchill Boulevard station 44+310 and as indicated on Figure 3, is considered to be ephemeral and may provide indirect fish habitat, as well as connectivity between wetland features. It is proposed that the 450 mm CSP culvert be upgraded to a 1800 mm X 900 mm open bottom box culvert based on geomorphic and hydrologic assessments. An open bottom culvert is proposed to comply with CVC requirements at designated watercourse crossing locations. The new culvert will also be slightly longer than the previous to accommodate the new grading limits. As this watercourse only provides potential indirect fish habitat when flowing, the proposed undertaking is not anticipated to significantly impact the aquatic feature or downstream fish habitat. As in all cases, the work should be conducted during dry conditions, with proper sediment and erosion controls implemented as described further in the ESR.

The watercourse conveyed by culvert #41 (Figure 3) is ephemeral and may provide indirect fish habitat when flowing. it is proposed that the current 750 mm CSP culvert be upgraded and extended to a 3000 mm X 1200 mm open bottom box culvert based on geomorphic and hydraulic assessments. . An open bottom culvert is proposed to comply with CVC requirements at designated watercourse crossing locations. The proposed culvert extension is to accommodate proposed road widening and grading at this location. As this watercourse only provides potential indirect fish habitat when flowing, the proposed undertaking is not anticipated to significantly impact the aquatic feature or downstream fish habitat. In order to mitigate the

potential impacts, the work should be conducted during dry conditions, with proper sediment and erosion controls implemented as described further in the ESR.

The 400 mm CSP culvert at Point 39 on Figure 3 (Winston Churchill Plate 15) is proposed to be removed and upgraded to a 600 mm CSP culvert. This culvert provides connectivity to the wetland feature within the area. As this culvert connects wetland features, consideration of an open bottom or arch culvert is preferred in order to not directly affect potential groundwater inputs. As in all cases, the work should be conducted during dry conditions, with proper sediment and erosion controls implemented as described further in the ESR.

The 450 mm CSP culvert at Point 40 on Figure 3 (Winston Churchill Plate 16) is proposed to be removed and upgraded to a 600 mm CSP culvert. This culvert provides connectivity to the wetland feature within the area. As this culvert connects wetland features, consideration of an open bottom or arch culvert is preferred in order to not directly affect the potential groundwater inputs. As in all cases, the work should be conducted during dry conditions, with proper sediment and erosion controls implemented as described further in the ESR.

The 900 mm CSP culvert at Point 42 on Figure 3 (Plate 18) is proposed to be extended to allow for grading. As groundwater indicators were noted at the opening of the culvert, consideration of an open bottom or arch culvert is preferred in order to not directly affect the groundwater inputs. As in all cases, the work should be conducted during dry conditions, with proper sediment and erosion controls implemented as described further in the ESR.

The remaining proposed changes to culverts within the Winston Churchill Blvd. ROW are not expected to result in any direct or indirect impacts to fish habitat or other aquatic features. The proposed culvert replacements will improve surface runoff as many of the existing culverts are severely degraded or partially filled in. As in all cases, the work should be conducted during dry conditions, with proper sediment and erosion controls implemented as described further in the ESR.

7.4 Indirect Impacts and Mitigations

7.4.1 Disturbance to Protected Natural Features and Wildlife Habitats

Vegetation clearing, grading and other construction activities have the potential to inadvertently destroy, damage and degrade the edges of adjacent protected natural features unless the boundaries of these features are clearly marked. For example, construction activities can cause scarring and decreased health of adjacent retained trees whose branches or root systems have been damaged by machinery or affected by construction-related dust and sedimentation. Damage to trees and other vegetation can also be caused by the compaction of soils within tree rooting zones along wetland or woodland edges.

Direct damage and indirect disturbances can cause stresses on the natural features that weaken their ecological integrity. In these states, natural features are more prone to establishment and proliferation of invasive, non-native species such as common buckthorn (*Rhamnus cathartica*). Proliferation of invasive, non-native species within natural communities decreases their ecological value such as by suppressing native species, diminishing biodiversity and reducing habitat suitability.

To limit ecological impacts during construction, efforts should be made to clearly demarcate the limits of grading so as to prevent unnecessary encroachment into the surrounding natural features. These boundaries should be clearly marked using brightly coloured snow fencing or silt fencing erected for the purposes of on-site stormwater runoff control. Tree protection fencing and other measures to protect trees to be retained outside the grading limits are to follow detailed Tree Protection Plans that will be developed as part of the detailed design phase.

Road improvement works may cause disturbances to certain wildlife species in the adjacent natural features due to excessive noise, vibration, dust, unnatural lighting and human presence, causing wildlife to leave or avoid the area.

During construction, activities such as tree clearing and grubbing, dust can potentially result in the following:

- Changes in vegetation due to increased heat absorption and decreased transpiration,
- Adverse effects to plants and/or wildlife in aquatic or wetland systems that are not adapted to high levels of sedimentation, and

- Immediate visual impacts.

Impacts due to dust should be mitigated for by moistening areas of bare, dry soil with water as needed during construction activities to reduce the amount of dust produced.

Excessive noise, vibrations and human presence as a result of site preparation and construction activities may cause wildlife to temporarily avoid the area. These impacts can be mitigated for by restricting the daily timing of construction activities to between 7:00hr and 19:00hr. This timing restriction should also apply to the use of generators or pumps insofar as possible.

Lighting associated with construction activities should be turned off following daily cessation of activities or directed away from adjacent natural features to reduce the impacts resulting from artificial lighting on natural features and wildlife.

Such impacts resulting from dust, noise, vibrations and artificial light are expected to be temporary, minimal and localized during the planned road works. Significant effects on wildlife are not anticipated and it is expected that displaced wildlife species will return to the vicinity of the subject property following construction.

Construction activities may cause temporary, localized disturbances to deer and amphibian movement activities where regular road crossing locations are affected. In particular, construction activities may deter wildlife from crossing at usual locations. Amphibians that cross within construction zones, particularly near adjacent wetlands, are vulnerable to injury or mortality due to construction activities. On-site personnel should be trained to watch for, and avoid, local wildlife that may attempt to cross the construction zone in order to avoid injury or mortality to the animal. See Section 7.3.2 for recommended measures to avoid construction-stage impacts to Jefferson salamanders. However, no significant impacts to wildlife movement corridors are expected, as animals may cross the ROW at an alternate location or may cross at night following the cessation of daily construction activities.

7.4.2 Disturbance to Aquatic Features and Fish Habitat

Construction activities may cause temporary, localized disturbances to watercourses when removing and replacing the culverts within tributaries that provide direct or indirect fish habitat.

In particular, replacing the culverts may require in-water work to be conducted. If this is the case, timing windows provided by through discussions with OMNR and DFO will be adhered to, as to avoid critical spawning/migration periods for fish. In general, construction activities near water or in-water should take place within the low flow period in the late summer months to avoid or minimize impacts.

Only two of the culverts being proposed for replacement (Tributary A to West Credit River within Belfountain and Tributary A to Second Creek at Mississauga Road) convey permanent watercourses. Temporary disruption of substrates/habitat is likely to occur at these locations within the vicinity of the proposed works. During in-water work, there is also potential for fish to display avoidance behaviour of the actively disturbed area; this can result in the temporary displacement of fish during the construction phase of the project. Fish passage within the channel may also become temporarily (i.e., days) restricted as a result of construction activities. With the potential for disruption of sediments, there is an increased risk of sedimentation. Mitigation measures include conducting in-water work when flows are low or absent, or by working in dry conditions using accepted methods to bypass flows such as damming (i.e., cofferdam) and pumping the water around the in-water construction area or using a diversion channel.

The completion of the in-water work will also require minor, isolated, short-term in-stream surface/groundwater dewatering. Prior to dewatering, the work area must first be isolated with the installation of a water containment structure. The structure will be temporary and will form an impermeable barrier around the de-watered area to prevent escape of debris and sediment to the exterior water body. Impacts associated with the structure are limited and include the potential for excess sediment to be suspended and carried downstream by stream flow during the installation and removal of the structure. Depending on the size and type of structure utilized it has potential to strand fish within the enclosure. In the event surface water dewatering is required, a fish salvage plan should be developed to remove and release fish away from the active work area. The dewatered water should be of a quality that will not impact the receiving watercourse. There are a variety of methods that can ensure the water is properly filtered before re-entering the watercourse. This method will be determined during the detail design stage of the project.

For the remaining culverts, the work should be able to be conducted in the dry as they are either ephemeral or intermittent watercourses or they are not considered watercourses and do not provide fish habitat. Construction activities, including removing, replacing, and/or extending the culverts should still be conducted during the low flow period in the late summer as to ensure there is no flowing water. If the ephemeral or intermittent watercourses are flowing during construction the same mitigations mentioned above for the two permanent systems will need to be undertaken.

Clearing, grubbing, and grading activities should be timed to avoid seasonally wet periods (i.e., spring), wherever possible. Construction should avoid high volume rain events (20 mm in 24 hours) and significant snow melts/thaws, resuming once soils have stabilized as to not increase risk of erosion, soil compaction, or the potential for sediment release into nearby watercourses. A Flood Response Plan should be developed to deal with on-site flooding as to mitigate any possible effects to the aquatic environment.

To minimize the potential for construction related sediment release into nearby watercourses, comprehensive planning to control erosion and sedimentation will be developed during the detailed design stage. The plan will minimize sediment and erosion impacts to the stream through the incorporation of specific elements. The goal of the plan is to preserve and protect the locations that have potential to be affected by the construction. On all sites, multiple layers of protection are to be employed prior to the commencement of construction along with a process for monitoring and maintenance to ensure that the measures are functioning within approved limits. Where erosion and sediment control measures are found to be in an unacceptable condition they are to be repaired or replaced. Please refer to the Draft Stormwater Management Report (HDR 2014b) for recommendations to mitigate sedimentation and erosion impacts associated with the proposed road improvement undertaking.

Indirect impacts may also occur through faulty construction equipment (i.e., cranes, backhoes, etc.). Machinery should arrive on site in clean condition and is to be checked and maintained free of fluid leaks. Machinery must be refueled, washed and serviced a minimum of 30 m from the permanent watercourses and other drainage features as to prevent any deleterious substances from entering. Fuel and other construction related materials should also be located away from the two permanent watercourses (i.e. 30 m away). A Spill Response Plan (SRP) must be developed prior to commencement of construction. This SRP should provide a detailed

response system to deal with events such as the release of petroleum, oils and lubricants or other hazardous liquids and chemicals. A spill kit must also be kept on site at all times and on-site workers must be trained in the use of this kit and be fully aware of the SRP.

7.4.3 Impacts to Hydrological Regimes and Water Quality

Water quality improvement measures should be employed as recommended in the draft Stormwater Management Plan (HDR 2014b) (e.g., installation of oil-grit separators (OGS) where drainage outlets occur in proximity to identified sensitive aquatic and wetland features). The proposed stormwater management system was designed to maintain existing drainage patterns within the study area, and is not anticipated to alter the hydrological regime of wetlands within the study area (see Stormwater Management Report (HDR 2014b) for further details).

The proposed undertaking is expected to result in a 33% increase in impervious surface area over existing conditions within the study area. Therefore, stormwater management measures have been proposed as described in the Draft Stormwater Management Report (HDR 2014b). These stormwater management measures (water quantity and quality control) are specifically intended to account for the increased area of impervious (paved) surface within the study area as opposed to the existing area of impervious surface.

Based on a screening of stormwater management options for the study area, oil-grit separators (OGS) and grassed swales were determined to provide the most feasible options for water quantity and/or quality control (HDR 2014b). Road surface runoff will be conveyed by existing drainage ditches, proposed grass swales (for ROW rural cross-sections) and subsurface infrastructure (i.e., catch basins, storm sewers, subdrains; for ROW semi-rural cross-sections), and existing and proposed culverts.

Where feasible, existing stormwater ditches will be re-graded to flat-bottomed grassed swale systems to provide water quality improvement functions via flow control and surface and subsurface filtration of sediments. Proposed locations for grassed swales are listed in Table 3-3 of HDR (2014b). OGS units are recommended as a means of water quality control to account for the additional impervious surface area within the study area. OGS units are proposed to occur adjacent to sensitive aquatic and wetland habitat features, including watercourses providing direct fish habitat, selected areas of indirect fish habitat, and PSWs (see Table 3-2 of

HDR (2014b) for locations). Where these systems occur as part of a treatment train, water quality criteria will be met based on Enhanced (Level 1) protection as outlined in the Ministry of the Environment"s Stormwater Management Practices Manual (HDR 2014b). Otherwise, where these systems occur individually within the study area, a net improvement in water quality over existing conditions is anticipated. At a minimum, it is recommended that Enhanced (Level 1) protection (via treatment trains) be provided adjacent to PSWs and watercourses conveying fish habitat.

As stated in HDR (2014b), the stormwater management strategy comprising use of grassed swales and OGS units would provide water quality treatment to a total of 8.96 ha of pavement area. This treated pavement area significantly exceeds the additional pavement area of 4.46 ha, representing a 101% increase in treated pavement area. Therefore, proposed water quality control measures should be suitable to mitigate impact on a study area-wide basis.

As described above, OGS units are planned to be located at stormwater discharge points near sensitive aquatic and wetland habitats, and treatment trains capable of providing an Enhanced level (Level 1) of water quality protection to these features is recommended. By providing Enhanced levels of water quality treatment at these discharge locations, water quality impacts to significant habitat for Jefferson salamander and at amphibian breeding SWH is not anticipated.

The proposed undertaking may cause a slight increase in the quantity of stormwater runoff due to the increase in impervious surface. However, the increase in stormwater runoff to adjacent natural features is considered to be negligible, as the proportion of hydrological inputs to natural features derived from road surfaces is relatively small compared to groundwater and surface water contributions derived from elsewhere within the drainage catchment area. The proposed undertaking is therefore not anticipated to significantly impact adjacent natural features through changes to water inputs provided that an approved sediment and erosion control plan is implemented and corresponding mitigation measures are maintained and monitored.

Replacement culverts located adjacent to wetlands must be sized appropriately to ensure no alteration of hydrological regime (i.e., through increased or decreased water inputs) associated with the new structure. Culvert sizing details are to be confirmed during the Detailed Design stage, if necessary, to ensure maintenance of existing hydrological flow. Proper culvert sizing within areas of Jefferson salamander regulated habitat are particularly important to avoid the

loss and degradation of wetland and aquatic habitats. Seven culverts (numbers 2, 3, 14, 16, 17, 18, and 19 on Figure 3) occur within Jefferson salamander regulated habitat, five of which (2, 14, 16, 17, and 18) will be enlarged in diameter. Additionally, wildlife passage culverts installed adjacent to Jefferson salamander wetland breeding habitats should be situated at an elevation such that the culvert is not flooded or contributes to additional wetland drainage.

Please refer to the Draft Stormwater Management Report (HDR 2014b) for additional details and recommendations to mitigate water quality and quantity-based impacts associated with the proposed road improvement undertaking.

7.5 Impact Assessment Summary

A summary of potential impacts associated with proposed road improvements, with associated recommended mitigations and significance of impacts once mitigated, are presented in Table 9. Impacts and mitigations are presented for the study area as a whole, as well as they apply specifically to individual study area ROW segments/areas.

Table 9. Summary of potential development impacts, with associated recommended mitigation measures and resulting significance of impact.

Potential Impact	Recommended Mitigation Measure(s)	Potential Residual Impact	Detailed Design Stage Recommendations
Bush Street			
Vegetation/habitat removal	• The majority of areas to be directly impacted by site grading and vegetation removal are culturally influenced.	• No significant impact	• Detailed tree inventory and protection measures to be determined as part of a Tree Management Plan
Construction-stage impacts to crossing Jefferson Salamanders and other amphibians	• A permit under Section 17(2)(c) of the Endangered Species Act may be required where the proposed undertaking may cause impact to regulated habitat for Jefferson Salamander • Provide construction personnel with materials to assist in the identification of Jefferson Salamanders. If any potential Jefferson Salamanders are observed, all work is to stop until the individual leaves the work zone and the OMNR has been notified.	• No significant impact	• Strategies to minimize impact and provide Overall Benefit to Jefferson Salamander to be determined in development of ESA "C" permit application • Construction Sightings Protocol to be developed
Village of Belfountain			
Vegetation/habitat removal	• The majority of areas to be directly impacted by site grading and vegetation removal are culturally influenced. No significant encroachment into Significant Woodland/ESAs/ANSIs are anticipated.	• No significant impact	• Detailed tree inventory and protection measures to be determined as part of a Tree Management Plan
Construction-stage impacts to crossing Jefferson Salamanders and other amphibians	• A permit under Section 17(2)(c) of the Endangered Species Act may be required where the proposed undertaking may cause impact to regulated habitat for Jefferson Salamander • Avoid construction during peak amphibian movement period of March 15 – April 30. • Provide construction personnel with materials to assist in the identification of Jefferson Salamanders. If any potential Jefferson Salamanders are observed, all work is to stop until the individual leaves the work zone and the OMNR has been notified.	• No significant impact	• Strategies to minimize impact and provide Overall Benefit to Jefferson Salamander to be determined in development of ESA "C" permit application • Construction Sightings Protocol to be developed

Potential Impact	Recommended Mitigation Measure(s)	Potential Residual Impact	Detailed Design Stage Recommendations
Jefferson Salamander and general amphibian road mortality and habitat fragmentation	• A wildlife passage culvert has been proposed near station 26+000. It is recommended that this wildlife passage be situated as close as possible to the existing, documented amphibian crossing location. • Funnel fencing is to be installed on either side of each wildlife passage opening according to design plans established during the detailed design stage. • Suitable ground substrates and cover objects should be established within around the openings of the wildlife passage to enhance their attractiveness to wildlife.	• No significant impact	• Effectiveness monitoring of wildlife passage and funnel fencing to be completed as detailed in a Post-Construction Monitoring Plan developed in conjunction with applicable agencies
Impacts to Fish and Fish Habitat	• Concrete open-bottom culverts and/or increases in the diameter of replacement culverts have been recommended. See above for detailed recommendations.	• No significant impact	
Mississauga Road			
Vegetation/habitat removal	• The majority of areas to be directly impacted by site grading and vegetation removal are culturally influenced. No significant encroachment into Significant Woodland/ESAs/ANSIs are anticipated. • Grading limits are to be maintained outside of tree driplines to the extent feasible. • Tree protection measures will be implemented as detailed within a Tree Management Plan to be developed during the detailed design stage. • Restoration/enhancement plantings along adjacent natural feature boundaries will help mitigate and buffer negative impacts associated with the proposed undertaking. • Road grading limits should be maintained outside of wetland boundaries, such as through the use of retaining walls.	• No significant impact	• Detailed tree inventory and protection measures to be determined as part of a Tree Management Plan • Vegetation Restoration Planting Plan and/or Woodland Edge Management Plan to be developed • Wetland boundaries to be accurately mapped and reviewed by agencies, where they occur adjacent to proposed road construction limits

Potential Impact	Recommended Mitigation Measure(s)	Potential Residual Impact	Detailed Design Stage Recommendations
Construction-stage impacts to crossing Jefferson Salamanders and other amphibians	• A permit under Section 17(2)(c) of the Endangered Species Act may be required where the proposed undertaking may cause impact to regulated habitat for Jefferson Salamander • Avoid construction during peak amphibian movement period of March 15 – April 30. • Provide construction personnel with materials to assist in the identification of Jefferson Salamanders. If any potential Jefferson Salamanders are observed, all work is to stop until the individual leaves the work zone and the OMNR has been notified.	• No significant impact	• Strategies to minimize impact and provide Overall Benefit to Jefferson Salamander to be determined in development of ESA "C" permit application • Construction Sightings Protocol to be developed
Jefferson Salamander and general amphibian road mortality and habitat fragmentation	• A wildlife passage culvert has been proposed near station 20+700. One additional wildlife passage near station 20+400 is recommended to further mitigate potential for Jefferson Salamander and general amphibian road mortality and habitat fragmentation. • Funnel fencing is to be installed on either side of each wildlife passage opening according to design plans established during the detailed design stage. • Suitable ground substrates and cover objects should be established within around the openings of the wildlife passage to enhance their attractiveness to wildlife. • Road signs alerting motorists to the potential for amphibian crossings should be considered at significant amphibian crossing locations along the study area ROW.	• No significant impact	• Effectiveness monitoring of wildlife passage and funnel fencing to be completed as detailed in a Post-Construction Monitoring Plan developed in conjunction with applicable agencies • Appropriate road sign locations to be determined in consultation with agencies, municipality
Deer/motor vehicle collisions	• Road signs alerting motorists to the potential for deer crossings should be considered at significant crossing locations along the study area ROW.	• No significant impact	• Appropriate road sign locations to be determined in consultation with agencies, municipality
Impacts to Fish and Fish Habitat	• Concrete open-bottom culverts and/or increases in the diameter of replacement culverts have been recommended. See above for detailed recommendations.	• No significant impact	
Olde Base Line Road			

Potential Impact	Recommended Mitigation Measure(s)	Potential Residual Impact	Detailed Design Stage Recommendations
Vegetation/habitat removal	• The majority of areas to be directly impacted by site grading and vegetation removal are culturally influenced. No significant encroachment into Significant Woodland/ESAs/ANSIs are anticipated. • Grading limits are to be maintained outside of tree driplines to the extent feasible. • Tree protection measures will be implemented as detailed within a Tree Management Plan to be developed during the detailed design stage. • Restoration/enhancement plantings along adjacent natural feature boundaries will help mitigate and buffer negative impacts associated with the proposed undertaking. • Road grading limits should be maintained outside of wetland boundaries, such as through the use of retaining walls.	• No significant impact	• Detailed tree inventory and protection measures to be determined as part of a Tree Management Plan • Vegetation Restoration Planting Plan and/or Woodland Edge Management Plan to be developed • Wetland boundaries to be accurately mapped and reviewed by agencies, where they occur adjacent to proposed road construction limits
Construction-stage impacts to crossing Jefferson Salamanders and other amphibians	• A permit under Section 17(2)(c) of the Endangered Species Act may be required where the proposed undertaking may cause impact to regulated habitat for Jefferson Salamander • Avoid construction during peak amphibian movement period of March 15 – April 30. • Provide construction personnel with materials to assist in the identification of Jefferson Salamanders. If any potential Jefferson Salamanders are observed, all work is to stop until the individual leaves the work zone and the OMNR has been notified.	• No significant impact	• Strategies to minimize impact and provide Overall Benefit to Jefferson Salamander to be determined in development of ESA "C" permit application • Construction Sightings Protocol to be developed
Jefferson Salamander and general amphibian road mortality and habitat fragmentation	• A wildlife passage culvert is recommended near station 32+600 to mitigate potential for Jefferson Salamander and general amphibian road mortality and habitat fragmentation. • Funnel fencing is to be installed on either side of each wildlife passage opening according to design plans established during the detailed design stage. • Suitable ground substrates and cover objects should be established within around the openings of the wildlife passage to enhance their attractiveness to wildlife.	• No significant impact	• Effectiveness monitoring of wildlife passage and funnel fencing to be completed as detailed in a Post-Construction Monitoring Plan developed in conjunction with applicable agencies

Potential Impact	Recommended Mitigation Measure(s)	Potential Residual Impact	Detailed Design Stage Recommendations
Deer/motor vehicle collisions	• Seasonally-flashing deer crossing signs, larger than the standard existing signs, should be installed at the east and west approaches of each high-density deer crossing location. • Recommended lowered speed limits should be effectively enforced.	• No significant impact	• Appropriate road sign locations to be determined in consultation with agencies, municipality
Impacts to Fish and Fish Habitat	• Concrete open-bottom culverts and/or increases in the diameter of replacement culverts have been recommended. See above for detailed recommendations.	• No significant impact	
Winston Churchill Boulevard			
Vegetation/habitat removal	• The majority of areas to be directly impacted by site grading and vegetation removal are culturally influenced. No encroachment into Significant Woodlands are anticipated. • Grading limits should be maintained outside of tree driplines to the extent feasible. • Tree protection measures will be implemented as detailed within a Tree Management Plan to be developed during the detailed design stage. • Restoration/enhancement plantings along adjacent natural feature boundaries will help mitigate and buffer negative impacts associated with the proposed undertaking. • Road grading limits should be maintained outside of wetland boundaries, such as through the use of retaining walls.	• No significant impact	• Detailed tree inventory and protection measures to be determined as part of a Tree Management Plan • Vegetation Restoration Planting Plan and/or Woodland Edge Management Plan to be developed • Wetland boundaries to be accurately mapped and reviewed by agencies, where they occur adjacent to proposed road construction limits
Amphibian road mortality and habitat fragmentation	• Road signs alerting motorists to the potential for amphibian crossings should be considered at significant amphibian crossing locations along the study area ROW.	• No significant impact	• Appropriate road sign locations to be determined in consultation with agencies, municipality
Deer/motor vehicle collisions	• Seasonally-flashing deer crossing signs, larger than the standard existing signs, should be installed at the east and west approaches of each high-density deer crossing location. • Recommended lowered speed limits should be effectively enforced.	• No significant impact	• Appropriate road sign locations to be determined in consultation with agencies, municipality

Potential Impact	Recommended Mitigation Measure(s)	Potential Residual Impact	Detailed Design Stage Recommendations
Impacts to Fish and Fish Habitat	• Concrete open-bottom culverts and/or increases in the diameter of replacement culverts have been recommended. See above for detailed recommendations.	• No significant impact	
Study Area-Wide			
Vegetation/habitat removal	• Protective fencing should be established around regionally significant plant species during construction to avoid impacts; where avoidance is not possible, regionally significant plant species should be relocated to suitable areas of habitat restoration, where feasible. All transplanted individuals must be monitored prior to at least one year prior to their relocation to ensure proper re-establishment.	• No significant impact	• Detailed three-season surveys are to be completed during the detailed design stage to identify and map regionally significant plant species within the study area. • Tree inventory work completed during Detailed Design should include inventories for snags and cavity trees to assess potential for impacts to Little Brown Myotis habitat. • Follow-up surveys should be implemented to verify the presence of, and potential for impact to the following Candidate Significant Wildlife Habitat types: o Snake hibernacula o Bat maternal roosts o Habitat for significant odonate species
Bird nesting disruption and avoidance, and active nest destruction	• Time vegetation removal activities to occur outside the typical bird breeding season (May 1 – July 31) • If vegetation removal must occur during the bird breeding season, retain an avian biologist to survey for active nests just prior to vegetation removal activities	• No significant impact	

Potential Impact	Recommended Mitigation Measure(s)	Potential Residual Impact	Detailed Design Stage Recommendations
Wildlife avoidance of the area, and other impacts associated with construction	• Restrict the daily timing of construction activities to between 7:00 am and 7:00 pm. • Moisten bare dirt surfaces with water to limit impacts caused by dust. • Direct night-time lighting away from adjacent natural features. • These construction-related impacts are expected to be temporary, minimal and localized.	• No significant impact	
Deer/motor vehicle collisions	• Snow banks should be removed by snow plows in winter to increase visibility for both crossing deer and motorists. • An increase in the annual sustainable deer hunt for the study area vicinity should be explored with OMNR as a means to control local deer populations.	• No significant impact	
Impacts to fish and fish habitat	• All in-water work should occur during dry and/or low flow conditions to avoid or minimize impact to fish and fish habitat within and downstream of the construction site. • Specific timing windows are to be determined in consultation with the OMNR and DFO. • Where feasible, culvert replacements should comprise arch/open bottom culverts to provide better fish habitat, connectivity, and improve the potential for groundwater inputs. • Where impacts to fish and fish habitat may occur, a DFO Fisheries Act Authorization may be required. • Any fish that may be caught within areas impounded and de-watered for in-water construction activities should be captured and relocated prior to construction.	• No significant impact	• Where necessary, fish and wildlife salvage plans should be created for watercourse areas to be de-watered for in-water construction work.
Damage or other disturbance to the adjacent natural features	• Clearly demarcate the limits of construction with silt fencing or brightly coloured snow fencing around the limits of the construction zone.	• No significant impact	
Erosion and sedimentation	• A Sediment and Erosion Control Plan should be developed and implemented, as detailed in the ESR. • 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. • Construction activities should be timed to occur outside of seasonally wet periods, during heavy rain, or during periods of rapid snowmelt.	• No significant impact	• Sediment and Erosion Control Plan to be developed as described in the ESR.

Potential Impact	Recommended Mitigation Measure(s)	Potential Residual Impact	Detailed Design Stage Recommendations
Alterations to hydrological regime of watercourses and wetlands	• Increased stormwater runoff associated with increased areas of impervious surface are not anticipated to cause significant increases to natural feature hydrological inputs, due to the relatively small hydrological contributions provided by road surfaces versus surrounding areas of catchment. • Replacement culverts must be properly sized to prevent increases or decreases in hydrological flow to wetland features, particularly those wetlands that provide significant habitat for Jefferson salamander, western chorus frog, or where they provide significant amphibian breeding habitat.	• No significant impact	
Impacts to water quality of watercourses and wetlands	• Treatment trains comprising OGS units and grassed swales are designed to provide an Enhanced (Level 1) level of water quality treatment to intercepted stormwater runoff. • Where only one component (OGS unit or grassed swale) has been proposed, water quality improvements are anticipated over existing conditions. • Treated pavement area significantly exceeds the area of new pavement proposed for the study area, representing an 101% increase in treated pavement area. • At a minimum, the most sensitive natural features (i.e., PSWs, including Jefferson salamander breeding habitat, fish habitat) should receive an Enhanced level of water quality treatment. • Construction machinery should arrive on-site in a clean state and should be refueled and washed at least 30 m away from permanent watercourses or wetlands. • A Spill Response Plan should be developed and implemented as necessary during site construction. • Water removal required for in-water construction de-watering purposes must be adequately filtered prior to discharge into the receiving watercourse, and monitored for pertinent water quality parameters, following established protocols and standards.	• No significant impact	• A water quality monitoring program may be considered within the framework of a Post-Construction Monitoring Program to be determined in consultation with the applicable agencies

8.0 Restoration and Enhancement of Natural Features

The proposed undertaking provides opportunities for restoration and enhancement of natural features within and adjacent to the ROW that may be impacted through site grading or construction-related activities. As described in Section 7.3.1, areas to be removed due to grading predominantly comprise narrow bands of cultural meadow, shrub thicket, and manicured grass. These areas also include various trees requiring removal within and outside the ROW as shown on the ESR design plates. There are also several areas where road grading is in close proximity to wetlands and woodlands.

Where site grading is within or adjacent to natural features, the road banks and ditches should be restored and stabilized with native ground cover species, such as grasses, sedges and herbaceous plants following construction. It is recommended that these areas be re-seeded with a native seed mix to mitigate the potential for erosion, provide native meadow habitat and to reduce the potential for introduction and establishment of non-native and aggressive species of plants.

Where grading is in close proximity or encroaches into woodlands and wetlands, any opportunities for edge restoration should be taken advantage of. Plantings of native trees, shrubs and herbaceous plants along the edges can help to mitigate edge effects and provide some buffering capacity between the natural feature and the road. Specific edge restoration plans using local species suited to the site conditions can be prepared at the detailed design stage when the details of the road design are known.

Trees removed due to road grading should be compensated for using native species local to Peel Region that are suitable for the existing conditions (e.g., slope, soils) and should exclude species that are prone to disease and structural failure (e.g., ash (*Fraxinus*)) as well as any species that are rare or difficult to grow and maintain or that may pose a hazard to use of the adjacent roadway. Areas suitable for plantings to provide the most ecological value should be identified in the study area taking into account proximity to other natural features, provision of wildlife habitat, current and future road design and services and potential effects on driver visibility. A mix of woody species (i.e., trees and shrubs) should be used for diversity. A

detailed tree inventory and Tree Protection Plan is to be developed during the detailed design stage to more accurately assess tree removal and compensation requirements.

Where feasible, opportunities for restoration of riparian habitat should be investigated as a means to maintain and protect the natural functions of the watercourse. For example, natural vegetation should be established within any areas of disturbance along watercourse banks to provide soil stability, provide overhead cover, and to provide a source of large woody debris, detritus and nutrients. Increased overhead cover may function to decrease sun exposure of the watercourse, thereby maintaining lower water temperatures that are required by cold/coolwater fish species. Plantings should consist primarily of graminoid and forb species native to the area. Annual nurse crop (oats or rye) can also be used to stabilize the site quickly after grading and planting. Detailed planting plans will be developed during the detailed design stage.

9.0 Monitoring

The following are general recommendations for monitoring. Specific monitoring plans will be developed in the detailed design phase of the project.

9.1.1 Prior to Construction

- On-site inspections should occur of prior to construction to ensure that erosion and sediment control measures (e.g., silt fencing) are installed properly as outlined in the Erosion and Sedimentation Control Plan to be developed during the detailed design phase.
- Tree protection measures, such as protection fencing, is to be installed and inspected by a certified arborist prior to construction, based on Tree Protection Plan specifications developed during the detailed design phase.
- If vegetation removal within the core bird nesting period (May 1 – July 31) cannot be avoided, bird nest searches should occur prior to the removal of any trees so as to not to contravene the *Migratory Birds Convention Act*, 1994.

9.1.2 During Construction

- Frequent monitoring of erosion and sediment control and tree protection measures is recommended during active construction to ensure maintenance and effectiveness. Damaged or removed fencing should be replaced immediately.
- Any tree limbs or roots (of trees to be retained) disrupted during construction should be pruned by a certified arborist.
- Fuelling of machinery is to be undertaken at designated locations away from wetlands and watercourses.
- Storage of machinery and material, fill, etc. in designated areas.
- A monitoring program for extracted groundwater and surface water discharge water quality and quantity should be developed and implemented in accordance with a Ministry of the Environment Permit To Take Water.

9.1.3 Post-Construction Monitoring

In order to detect any potential negative impacts to terrestrial and aquatic natural features and species, it is critical to conduct post-construction monitoring, as well as ensure there are strategic procedures developed to react immediately to any negative effects resulting from the development. Detailed post-construction monitoring plans will be developed during the detailed

design phase in consultation with the OMNR, CVC and NEC, and should include, but may not be limited to, the following:

- Monitoring of restoration/enhancement plantings and transplanted significant vegetation species to track success of establishment and overall health;
- Deer-vehicle collision data collection and monitoring, such as provided by local law enforcement authorities;
- Effectiveness monitoring of installed wildlife passages, which may include the following:
    - Wildlife camera studies to monitor the use of wildlife passages by amphibians and other small wildlife
    - Road mortality studies to compare post-mitigation data with pre-construction/mitigation data collected by CVC within the study area
    - Pitfall trapping along funnel fencing to evaluate efficacy/use of these features
    - Area searches for target wildlife species, including around entrances to wildlife passages, funnel fencing, and surrounding habitat

10.0 Summary

NRSI was retained by HDR Corporation, on behalf of the Region of Peel, to conduct the natural heritage assessment component of the Peel Regional Road Corridor Study Schedule C Class Environmental Assessment (EA). The EA was initiated to study opportunities for rehabilitation/reconstruction of the regional road corridor bounded by Winston Churchill Boulevard, Bush Street, Old Main Street, Mississauga Road, and Olde Base Line Road within the Town of Caledon.

The study area is located in an area of high ecological significance, comprising lands designated Escarpment Natural Area, Escarpment Protection Area, and Escarpment Rural Area under the Niagara Escarpment Plan, and Protected Countryside and Natural Heritage System under the Greenbelt Plan. The study area also contains several Core Areas under Peel Region"s Greenlands system, as well as Wellington County Greenlands features within the Winston Churchill Blvd. ROW. Other important natural area designations and features within the study area include components of three PSW complexes, several non-PSW wetlands, two Life Science ANSIs, and two ESAs.

Based upon the criteria described within ROPA 21 (Region of Peel 2010), the majority of woodlands that extend into the study area are considered Significant Woodlands.

Based on previous studies completed within the study area ROWs and NRSI field work completed during 2012-2013, six provincial SAR are known from the study area:

- Barn Swallow
- Eastern Meadowlark
- Bobolink
- Chimney Swift
- Butternut
- Jefferson Salamander

The study area includes areas designated as regulated habitat for Jefferson salamander. Development or site alterations within Jefferson salamander regulated habitat are to be avoided unless permitted by the OMNR and NEC. The proposed road improvements are not anticipated to cause significant impact to bobolink and eastern meadowlark, although the OMNR will require

notification of any impacts to habitat for these species. Butternuts that have been recorded outside of the study area ROW are not anticipated to be impacted by the proposed undertaking. The proposed developments are not anticipated to impact barn swallow or chimney swift.

Nine watercourse crossings at ROW culverts were determined to represent either direct or indirect fish habitat. Tributary A to the West Credit River was confirmed to provide sensitive cold/coolwater habitat for brook trout. Tributary A to Second Creek was also observed to provide cold/coolwater habitat, although no sensitive species were observed within it. Approximately eight other residential ponds occur in the study area that may provide direct fish habitat and coldwater conditions. Specific ponds may require future assessment as part of impact analysis associated with the preferred alternative design.

Based on previous studies, and desktop and field-based analysis, the following SWH types were confirmed to occur within the study area:

- Deer Wintering Area
- Western Chorus Frog Habitat
- Turtle Overwintering Habitat
- Animal Movement Corridors (deer and amphibians)
- Seeps and Springs
- Amphibian Breeding Habitat

Several other candidate SWH types were identified for the study area, some of which (e.g., snake hibernacula, bat maternity colony habitat) will require additional assessment during the detailed design phase to confirm their status as SWH, to more fully assess potential for impact, and to recommend appropriate mitigation measures.

Significant and sensitive natural areas and features were identified as development constraints and mapped. In some cases, protective setbacks were recommended from the boundaries of these features where feasible. These development constraints were further described in terms of their relative constraint level, which was determined in the context of their associated protection policies (e.g., features in which development should not occur vs. features in which development can occur if it can be demonstrated no negative impact).

Preferred alternative designs have been selected for the study area ROWs that balance the considerations of multiple evaluation criteria, including natural environment. The details of the preferred alternative designs are presented in the ESR.

The proposed road improvements have been designed to minimize encroachment into adjacent natural features. The majority of grading will occur within culturally-influenced features including narrow grassy meadow, shrub thicket, and manicured grass within and/or immediately adjacent to the ROW. No significant woodland encroachments are anticipated, and the majority of trees anticipated for removal are isolated individuals located within the ROW. Grading limits should be maintained outside of woodland edge driplines to the extent possible.

Road grading and vegetation removal should be maintained outside of wetland areas, such as through the use of retaining walls. By doing so, direct impacts to Jefferson salamander, western chorus frog, and to significant amphibian breeding habitat will be avoided.

The proposed undertaking provides opportunity to mitigate existing amphibian road mortality and habitat fragmentation impacts through installation and monitoring of wildlife passage culverts at significant habitat and crossing locations. Recommendations have also been provided to mitigate existing road hazards associated with deer-vehicle collisions. Through a combination of seasonally-flashing and prominent signs, decreased and enforced speed limits, and improved visibility through roadside vegetation clearing and snow bank removal, the potential for deer-vehicle collisions along study area roads is expected to decrease.

Culvert upgrades and replacements are recommended to comprise an enlarged diameter and/or open bottom design to offset potential habitat removal caused by installation of new and extended culverts. Open-bottomed designs will provide enhanced habitat and better connectivity over several existing culvert designs.

Various other measures have been recommended which, if properly implemented, are anticipated to effectively mitigate the potential for significant impact to study area natural features. Several recommendations have been provided in Table 9 for follow-up measures to be implemented as part of Detailed Design. These include the development of vegetation restoration and enhancement planting plans and a comprehensive Monitoring Plan.

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APPENDIX I
Agency Meeting Minutes

Meeting Notes

Belfountain Transportation EA

Agency Meeting Regarding Natural Heritage Issues

April 26, 2013, 2:00-4:00 pm

Location: CVC Office, 1255 Old Derry Road, Mississauga,

Attendees:

CVC- Liam Murray- Manager of Planning Ecology, Jacob Killis - Planner

MNR – Mark Heaton

NRSI – Valerie Stevenson- PM, Ryan Archer – Terrestrial Biologist

HDR – Tyrone Gan – Project Manager

Peel Region Project Manager – Gino Dela Cruz

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1) Outstanding data requests (NRSI)

From CVC:

- West Credit River Subwatershed Study – CVC indicated that this document is not ready for external release at this time. Jacob to provide the document when available. [CVC subsequently provided a link to the Subwatershed Study report on May 1, 2013.]
- CVC ELC data – NRSI inquired whether there were ways to convert CVC's vegetation community codes to standard ELC codes. Jacob stated that he would ask the Natural Heritage Ecologist (Heather Lynn) to help out with this. [CVC staff subsequently contacted NRSI on this matter on May 1, 2013. It was reiterated that CVC uses the 1998 ELC codes and that CVC does not possess a conversion table to 2008 codes. It was suggested that Harold Lee at the OMNR be contacted for further information.]
- Supplemental 2013 amphibian survey data – Liam suggested that it be assumed that this data will not be available within our preferred timelines. Liam will look into determining what can be passed along. [CVC staff subsequently contacted NRSI on May 1, 2013 to indicate that no additional amphibian monitoring data was collected in 2013, and as such, no additional data will be provided to NRSI.]

From MNR:

- Fisheries data is available, but is large (>10 MB), complicating the data transfer process. Data was provided on USB stick. NRSI to mail back stick.
- Mark confirmed that there is no regulated habitat for Redside Dace within the study area; regulated habitat is much farther downstream. Peel Region has mapping showing occupied and recovery reaches for Redside Dace, although this mapping is not available to consultants

- There are no changes to current mapping of Jefferson Salamander regulated habitat in the vicinity of the study area. Mark confirmed that there are no confirmations of any other breeding ponds in the expanded EA study area. However, new information could come in at a later date to refine this understanding.
- NRSI inquired about whether MNR can provide any additional information about other general wildlife observations in the study area. Mark noted that the Cougar record for the study area vicinity is an anecdotal record. For other records, Mark suggested that NRSI submit a formal data request letter to MNR Aurora District (ESA Aurora contact). Note: this will be the third formal request for data from MNR.
- Mark identified areas on the study area map in which Northern Flying Squirrel observations have been confirmed. Mark noted that the study area vicinity is an area of relatively high density for flying squirrels.

2) Existing conditions based on work carried out to date (NRSI)

- Valerie provided a brief overview of field work that has been completed to date, and field work to be completed during spring/summer 2013, by NRSI.
    - NRSI biologists revised and updated ELC vegetation community mapping and completed aquatic habitat assessments for the study area during Fall 2012
    - Breeding bird surveys are to be completed during late spring/early summer 2013
    - A tree inventory/assessment will be completed following selection of a preferred alternative design layout.
- CVC indicated that they will be identifying what they consider to be watercourses and not watercourses within the study area at each culvert location. That information will be provided to NRSI and coupled with NRSI's aquatic habitat assessment data. CVC requested that mapping of locations of all existing crossing structures be provided to CVC. NRSI requested that this mapping be provided to NRSI as well.

3) Issues raised at the TAC Meeting

This discussion focused on the issue of White-tailed Deer movements within and outside the study area, studies of deer-vehicle collisions and how these inform movement patterns, and potential methods to mitigate impacts to deer movement corridors and lessen hazards for motorists.

- MNR is continuing to collect data on deer movement within the study area, with one camera still mounted. This data will be used to supplement earlier data sets that have been reported on (e.g., 2001-2007 Motor Vehicle Accident Report for Caledon). A digital copy of this report will be provided by MNR. This report maps the locations and frequency of deer-vehicle collisions along the ROWs. MNR data mapping is accurate to approximately 250 m along the ROWs. New collision data (2008-2012) is available from Peel Region. The Region is to provide to MNR to include in their data. An additional collision report prepared by the Region in 1998 will also be provided.

- Mark identified areas on the study area map where deer movement corridors have been identified based on the collected data. These movement corridors were identified and explained relative to overwintering and foraging habitats that are known to exist within and adjacent to the study area. It was noted that deer crossing locations are often dictated by the absence of a movement impediment (i.e. a break in a fenceline). Mark explained how movement corridors within the study area make up part of a large regional-scale animal movement corridor that cuts through part of the study area.
- Deer movement is a major issue in this study area, although it certainly isn't unique to this study area on the surrounding landscape.
- Mark explained that speed is a major factor in deer-vehicle collisions; there is a higher rate of accidents in 80 km/h zones vs. 50 km/h zones. Consequently, measures to lower vehicle speeds may mitigate the risk of collisions.
- Another important factor is time of year: female deer on are the run between late October and November and do not look or slow down before crossing a road at this time of year. At other times of year they tend to walk and approach roads cautiously before crossing. As such, mitigation measures may include educating the public about higher risk times of year (e.g., in the form of newspaper announcements) as well as deer crossing signs that flash at peak movement times of year.
- There was some discussion about the effectiveness of deer crossing signs. Mark recommended overlaying the location of these signs with locations of deer-vehicle collisions to help inform their effectiveness. Mark also described proximity-sensitive signs that can begin flashing when deer approach, and suggested that NRSI can research their effectiveness. The group agreed that deer crossing signs that flash during peak movement periods would be more noticeable and effective than standard deer crossing signs.
- The Road Ecology group at the Royal Ontario Museum was mentioned as an excellent source for information for the literature review to be completed by NRSI that will focus on mitigating measures for wildlife crossings.
- Mark described the use of animal movement passages (overpasses or underpasses) as another form of mitigation that can be considered. These will have to be considered if/where they are cost-effective, and would have to be paired with funnel fencing to direct deer to the crossing location. This may be considered in combination with wildlife passage structures for Jefferson Salamander where their regulated habitat exists within the study area. Mark highlighted on the study area map where an ideal location would be for an underpass structure that would accommodate amphibians and deer. Examples of underpasses on recent projects include Stouffville Road and HWY 26 between Stayner and Collingwood.
- The group discussed whether improved lighting may help mitigate the potential for deer-vehicle collisions. Improved road illumination may provide drivers with slightly more advance warning of crossing deer. Deer may also be deterred from crossing at a well-lit location; however, they would likely just cross at a nearby darker area, thus not solving the problem.
- The point was raised that a roundabout at the intersection of Mississauga Rd. and Olde Baseline Rd. might help to slow traffic approaching the intersection, around which deer

are known to cross. A combination of vehicle-slowing measures, targeted crossing locations directed by funnel fencing, improved sightlines and improved road illumination at those targeted crossing locations may help to mitigate the potential for vehicle collisions.

- It was noted that speeding is a problem throughout the study area ROWs, but particularly on Olde Baseline Rd. and Mississauga Rd.
- Mark described how deer tend to approach roads by bounding during periods of deep snow, rather than by walking, which can increase the potential for deer-vehicle collisions. He suggested that having snow plow operators instructed to remove snow banks along the roadsides could be a relatively easy and inexpensive way to reduce this risk.
- MNR will be providing camera locations and data but no video files.

- Mark suggested that NRSI mapping show the boundaries of Policy Areas. Valerie clarified that these boundaries will be shown on a separate map.
- Steve Varga with the MNR Aurora District is to confirm whether wetlands located in and adjacent to the western half of the study area are to be considered Provincially Significant Wetlands.
- Mark ended the meeting by showing video footage of deer crossings captured by MNR cameras, highlighting their behaviour when approaching roadsides as they tend to look for vehicles coming before they cross.
- HDR to provide culvert information to CVC and NRSI.

Meeting Notes

Belfountain Transportation EA

Agency Meeting Regarding Natural Heritage Issues

July 9, 2013, 1:00 – 2:00 pm

Location: Region of Peel office,

Attendees:

CVC- Heather Lynn, Liam Marray

MNR – Mark Heaton

NRSI –Ryan Archer

HDR – Veronica Restrepo

Peel Region– Gino Dela Cruz

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1) Deer movement corridors (Mark Heaton)

- Mark provided updates to the preliminary deer movement corridor locations that had been provided during the April 2013 agency meeting. These updates were based on data gathered as part of roadside track surveys and wildlife camera studies completed during winter 2013. These updates effectively refined earlier knowledge of deer movement corridor locations in the study area, such as the addition of corridor locations and the elimination of some areas that had been considered corridors. The within-year use of certain deer crossings was also discussed, such as certain corridors that are used year-round. These crossing locations were transcribed onto a study area map.
- Crossing locations were identified as high-density or low-density based on the winter 2013 roadside survey results. Two high-density crossings were identified on Olde Baseline Rd.; all others were considered low-density crossings.
- Mark provided further explanation of deer movement characteristics at certain crossing locations, particularly the Olde Baseline Rd. high-density crossing locations where deer disperse into overwintering forest habitat following their crossing at specific roadside access locations.
- Mark clarified and confirmed deer overwintering habitats located adjacent to the study area.
- Most deer movement corridors were described as being local in nature, although crossings across Olde Baseline Rd. were described as being part of the large, regional movement corridor in that area.

2) Candidate/confirmed Significant Wildlife Habitat (Ryan)

- Ryan provided an overview of the results of Significant Wildlife Habitat (SWH) screening for the study area, including a description of confirmed and candidate SWH for the study area. Ryan listed these for the group to provide further information/input.

- Additional input on candidate SWH were provided:
    - M. Heaton clarified the locations of deer overwintering habitat around the study area (see above).
    - M. Heaton commented on raptor overwintering candidate SWH, stating that the area is not known for a diversity and abundance of overwintering raptors.
    - M. Heaton and H. Lynn commented on the presence of snake hibernaculum habitat, confirming NRSI-identified locations and identifying an area of fissured rock near the intersection of Mississauaga Rd. and Olde Baseline Rd. that could potentially provide habitat.
    - M. Heaton indicated that seeps/springs occur within known deer habitat, outside the study area, which lends to the importance of that habitat for overwintering.
    - H. Lynn described the data collected on amphibian breeding within the study area, and indicated that CVC can provide further information to more fully address this SWH type against the significance criteria.
    - M. Heaton confirmed the occurrence of turtle overwintering within a pond located west of Bush St., south of Belfountain.
    - M. Heaton confirmed that the study area does not contain significant marsh bird breeding habitat.

3) Amphibian Surveys (Heather)

- Heather provided an overview of the field studies completed by CVC to gather the amphibian data used in the Belfountain Transportation EA natural features assessments.
- Heather identified areas of importance for amphibian crossing within the study area based on mapped amphibian observations collected as part of these studies.
- Mark also provided additional information on the nature of amphibian crossings within the study area, describing one particular corridor across Mississauga Rd. as a larger-scale movement corridor while other corridors in the study area are generally shorter and more localized between suitable habitats.
- Additional detail was provided about Jefferson Salamander ROW crossings. Jefferson Salamander has been observed within both the northeast and northwest (Belfountain) corners of the study area, but have been only observed crossings at the northeast corner. M. Heaton suspected that they do cross at the northwest corner in Belfoutain even though they haven't been observed doing this, perhaps at a lower frequency.
- Other amphibian species were identified as having been observed crossing within the northwest (Belfountain) corner of the study area, such as Spotted Salamander.

4) Outstanding Data Requests (Ryan)

- The only outstanding data request identified was the Rockford Quarry Natural Environment reports to have been provided by Peel Region. Gino indicated that they were not able to obtain a copy of these reports.

5) Other Items

- Ryan briefly identified Species at Risk that had been observed within the study area based on 2013 field surveys, including Bobolink, Eastern Meadowlark, Chimney Swift and Barn Swallow.
- Mark indicated that the Chimney Swifts observed in Belfountain actively nest in the chimney of the village's general store.
- Mark suggested that, while important to note, these Species of Risk are likely going to be of less consequence to the project than other matters including mitigation for wildlife crossings across the ROWs.

Meeting Notes

Belfountain Transportation EA

Agency Meeting Regarding Natural Heritage Issues

September 17th 2012, 1:00-3:00pm

Location: CVC Office, 1255 Old Derry Road, Mississauga,

Attendees:

CVC- Heather Lynn- Natural Heritage Biologist, Liam Murray- Manager of Planning Ecology

MNR – Mark Heaton

NRSI – Valerie Stevenson- PM, Jessica Linton – Terrestrial Biologist

HDR – Nathalie –Project Engineer, Anthony Reitmeier – SWM Engineer

Peel Region Project Manager – Hitesh Topiwala

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1) Overview of natural features, habitats and species within the study area (Provided by NRSI, with input from MNR, and CVC)

- **Watercourses**- several tributaries to the Credit River (Erin Branch) including Second Creek and Roger's Creek are located in the study area. The East Branch of the Credit River itself is not in the immediate study area, but is located adjacent/downstream
- **Fish habitat**- all tributaries located in the study area are managed as coldwater fish habitat with presence of brook trout (spawning) in the one Credit River Tributary located in the south of Belfountain, crossing Bush Street
- **Significant Aquatic Species** – spawning Brook Trout in coldwater tributary of the Credit, Atlantic Salmon present in the adjacent/downstream Credit River- stocked by MNR, Redside Dace in Credit River near the Forks but not within the Belfountain reach. MNR to confirm if tributaries in the study area are considered recovery habitat.
- **Areas of Natural and Scientific Interest-** 2 have been identified -Caledon Mountain Slope Forest- life Science (southeast portion of study area), Credit Forks- life Science (northeast portion of study area)
- **ESA's –** Grange Woods ESA, Dufferin Lake ESA, Credit Forks – Devil's Pulpit ESA, Caledon Mountain ESA.
- **Provincially Significant Wetlands**- Caledon Mountain Wetland (western portion of study area), Eramosa Blue Springs Creek Wetland (very small parcel in westerly portion of the property). Portions of the West Credit River PSW complex may be present within the study area. CVC noted that Winston Church Blvd is the divide between MNR districts (Guelph and Aurora). The Caledon Mountain wetland complex is being re-evaluated by MNR and there have been significant updates to the mapped wetlands. Aurora District MNR (Steve Varga) should be contacted for the most current information and mapping.
- **Non-PSW Wetland** – several parcels are located within the study area

- **Rare Vegetation Communities** – record of 1 is present (Bulbet fern-herb Robert Open Shaded Limestone/Dolostone Cliff face type) - was not observed during field studies.
- **Woodlands**- Several woodlands are present within the study area
- **Species at Risk Habitat & Species of Conservation Concern – see attached table**
- **Significant Wildlife Habitat**- likely animal movement corridors, seasonal concentration of animals, specialized habitats, habitat of species of CC. These will be identified and mapped through a desktop exercise with CVC, MNR, and NRSI after all data is received.
- **Niagara Escarpment Plan Areas**
- **Greenbelt Plan Areas**
- **Region of Peel Core Greenland's**

2) Summary of what info/data NRSI have and what work we will be conducting as part of the EA (NRSI)

The study will focus on confirming and updating background information collected as part of the Class EA completed by Dillon in 2010 as well as gathering data pertaining to the extended study area. This will include review of all available data from the CVC, MNR, NHIC's Biodiversity Explorer, as well as associated databases, reports and websites. Additional data not previously received (i.e. Jefferson Salamander ESA regulated habitat mapping, CVC amphibian survey data etc.) will also be obtained. (CVC noted that all amphibian data up to 2009 or 2010 was provided to Dillon and included in 2010 Dillon report).

Findings of this review will provide further detail on identified significant natural heritage features, potential for SAR and any other sensitive species which may occur within the study area.

The field investigations proposed have considered the studies completed by Dillon and have been tailored to fill in data gaps. Proposed field survey methods are consistent with those employed during the previous study

Background Records Review

NRSI will collect, review and synthesize all available records and information.

Background data requests were submitted to CVC and MNR on July 27, 2012. A further refined data request was submitted to CVC last week. CVC is currently pulling the request together.

Field Surveys

Ecological Land Classification (ELC)

- ELC was conducted by Dillon in 2010 on Bush Street and Mississauga Road within 120m of the ROW as part of the EA. The surveys were completed from the ROW since no land access was provided.
- No formal ELC was completed in 2011, although vegetation communities were mapped for Olde Baseline Road and Winston Churchill Road within 120m of the ROW and provided in the Dillon technical memo, presumably through desktop analysis
- Available ELC mapping from Dillon will be refined in the field and any identified gaps will be filled. This survey is taking place this week from within the ROW as no property access was granted. ELC mapping provided by CVC will also help refine the delineation of vegetation communities

Vascular Plant Surveys

- Botanical surveys were carried out by Dillon in 2010 on Bush Street and Mississauga Road within 120m of the ROW as part of the EA, occurred concurrently with ELC surveys
- Botanical surveys were carried out by Dillon in 2011 for Olde Baseline Road and Winston Churchill Road within the ROW as there was no property access was granted. Results are provided in the Dillon technical memo
- Surveys included notations of observed Butternut locations
- NRSI- additional vascular surveys to supplement existing plant lists will be carried out this week throughout the study area. Surveys will be limited to ROW as no property access was granted. Particular focus will be made on documenting additional locations of Butternut trees and any endangered, threatened or locally rare species.
- As requested by MNR- NRSI will make note of all non-native species as well (i.e. phragmities)

Tree Inventory

- A tree inventory was carried by Dillon in 2010 out on all individual trees within the ROW on Bush Street and Mississauga Road as part of the EA
- NRSI- will complete a tree inventory in 2012/2013 on all individual trees within the ROW of Olde Baseline Road and Winston Churchill Road that have potential to be impacted

Breeding Birds

- Breeding bird surveys were carried out in accordance with the OBBA by Dillon in 2010 on Bush Street and Mississauga Road as part of the EA

- NRSI- will undertake breeding bird surveys in the spring of 2013 on Olde Baseline Road and Winston Churchill Road – by roadside survey

Breeding Amphibians

- Breeding amphibian surveys were carried out in accordance with the Marsh Monitoring Program by Dillon in 2010 on Bush Street and Mississauga Road as part of the EA
- Breeding amphibian surveys were carried out by Dillon in 2011 for Olde Baseline Road and Winston Churchill Road. Results are provided in the Dillon technical memo

Incidental Wildlife Surveys

- Incidental wildlife observation were documented by Dillon in 2010 on Bush Street and Mississauga Road as part of the EA
- Incidental wildlife observation were documented by Dillon in 2011 on Olde Baseline Road and Winston Churchill Road, although they focused on SAR species
- NRSI- will document Incidental wildlife observations during all surveys

Fisheries

- Aquatic habitat surveys were carried out by Dillon in 2010 on Bush Street and Mississauga Road as part of the EA. No fish community surveys were carried out.
- NRSI- will be conducting aquatic habitat surveys on Olde Baseline Road and Winston Churchill Boulevard as well as confirmatory survey of features identified on Bush Street and Mississauga Road. No fish community surveys are proposed.

Significant Wildlife Habitat

- A desktop screening exercise will be completed to identify the presence of SWH, Candidate Significant Wildlife Habitats will be further examined in the field and mapped using standard MNR criteria. The form, attributes, and function of each habitat will be described in detail and photographic records will be taken. The Peel – Caledon Significant Woodlands and Significant Wildlife habitat study should be utilized.
- Results from the CVC and MNR wildlife mortality and movement surveys will be reviewed and summarized including relevant mapping and lists of species observed. The existing data will be used to identify areas of concentrated wildlife mortality and migration corridors for Jefferson salamander and other amphibians identifying suitable locations for wildlife culvert crossings.
- NRSI will liaise with CVC and MNR when mapping these areas

Species at Risk Habitat

- A desktop screening exercise will be completed to identify the presence of SAR habitat. Identified habitats will be further examined in the field and mapped using standard MNR criteria. The form, attributes, and function of each habitat will be described in detail and photographic records will be taken. No locations of occurrences or habitat will be disclosed in the report.
- Jefferson salamander regulated habitat mapping is required from MNR
- NRSI will liaise with CVC and MNR when mapping remaining SAR habitats

3) Summary of info/data that MNR/CVC have (CVC, MNR)

CVC Data/Studies

- Refer to presentation- have been working in this area for the last several years
- Have been collecting wildlife road mortality data, wildlife movement study data, vernal pool inventory -7 year's worth of studies
- No genotyping necessary as all species are pure Jefferson salamanders
- Have been conducting NAI the last few years (birds, vegetation and odonates)
- Abundant fish collection records are available for the study area
- CVC recently completed some updates and refinements to the West Credit Wetland Complex (this data may not have made it to MNR yet)

MNR Data/Studies

- MNR have recently re-evaluated the Caledon Mountain Wetland Complex. They should be contacted for the data and mapping.
- Deer wintering areas & associated movement corridors are present- mostly concentrated in valleylands of the West Credit River as well as the Belfountain PSW- confier areas. No formal mapping yet of these areas- CVC and MNR will be completing movement surveys this winter (2013) if there is snow.
- Redside Dace is known to be present in the West Credit River in the reach at the Forks of the Credit
- Atlantic Salmon is present within the Belfountain reach (upstream and downstream of Belfountain dam, fish are stocked in these locations
- Have wetland mapping in Land Information Ontario- although CVC and MNR has more up to date mapping based on recent surveys
- Draft regulated Jefferson habitat mapping available, final will be provided once MNR receives CVC's Jefferson data
- Snapping turtle nesting habitat is present within the study area
- Flying squirrel may be in the areas of credit forks and lower end of Caledon mountain ANSI, they have minimum glide distance so may pose a constraint to development if road is widened. They are anticipated to occur in northeast corner of the study area- have to do further surveys next spring to confirm

presence and use of that area (small mammal trapping and discussions with land owners)

- MNR has previously provided region with a screening memo on SAR that included draft regulated habitat mapping
- Porcupine, raccoon, fox, coyote, cougar observations in the study area.
- MNR does not have any overwintering habitat mapping
- MNR has identified potential congregation areas of deer but require additional work to be completed this winter. Valley lands of the west credit river are a main movement route for deer. Large mammal movement corridors and overwintering areas are present

➢ What further studies are ongoing and will be occurring in 2012/2013 by CVC and MNR?

- CVC will be completing additional amphibian work in spring of 2013 (western chorus frog, road mortality)
- CVC & MNR will be conducting deer surveys in the winter to note areas of deer concentration and movement corridors
- Jefferson salamander work in the spring focused on Bush Street
- Small mammal trapping for flying squirrel in spring in the northeastern portion of the study area (already completed by MNR as per comments from MNR)

➢ How will the CVC/MNR data be provided to us, in what form?

- Wildlife occurrence locations will be provided to NRSI including location, date, species etc.
- Regulated Jefferson habitat will be mapped

➢ Identify timeline as to when can we expect the CVC/MNR data

- Background data request from CVC should be provided soon (fall 2012)
- CVC occurrence records as part of the amphibian work will be provided to us in the next couple months (fall 2012)
- CVC Jefferson data will be provided to MNR so MNR can update reg mapping, reg mapping with then be provided to NRSI from MNR (fall 2012)
- Peel Region to provide data that was previously submitted from MNR (SAR species screening letter & old reg mapping)
- Findings of spring field work conducted by MNR and CVC will need to be provided to NRSI immediately after collection

4) Discuss issue regarding property access; identify properties where access is required.

The Region has made it clear that we need to identify when, where and what surveys will need to be conducted on private property now. Based on discussions it was

identified that we are not going to request access. If there is a specific location of encroachment that will require more detailed work then permission will have to be requested at that time.

5) Discuss preliminary recommendations for mitigation from MNR, CVC (i.e. culvert design, wildlife crossing structures, timing windows, barriers etc.)
    - Reduced speed zones in particular areas at certain times of the year (related to wildlife crossings), increased lighting and signage, NRSI to conduct a literature review, CVC notes to reference the Road Ecology group- NRSI will brief our recommendations with CVC & MNR (e.g. regional road 109 for frogs and turtles)

6) Determine reporting protocol for confidential information - how would MNR/CVC like confidential data be presented? (i.e. separate confidential memo). Discuss what types of info can be included in the main EA report.

    With regard to reporting, it is understood that locations of SAR habitat are not to be presented. Any SAR data will be generalized (i.e. not Jefferson but amphibians) No SAR habitat locations will be mapped but discussed that the species and its habitat are present. A separate confidential memo will be provided that addresses any SAR specific issues.

7) Review of action items
    i. CVC to provide a copy of their presentation that contains list of significant features, habitats and species
    ii. MNR to follow up on record of Northern Brook Lamprey if it is a valid record and if so, for what reach of the Credit River.
    iii. MNR to provide further detail on Redside Dace habitat within regard to the tributaries within the study area, are they considered as part of the Redside Dace recovery strategy as contributing habitat?
    iv. CVC to send NRSI the ELC code list that they use
    v. CVC to provide updated wetland mapping based on their recent NAI work
    vi. CVC to provide ELC mapping for the study area based on recent NAI work
    vii. Peel Region to provide available natural environment reports from the Rockford Quarry
    viii. CVC to provide results of their studies (Oct 2012)
    ix. CVC to provide Jefferson salamander data to MNR for MNR to revise regulated mapping for Jefferson's
    x. MNR to update Jefferson regulated habitat mapping based on the data provided from CVC, provide mapping to NRSI when complete
    xi. NRSI to follow up with Mark at MNR regarding request for specific data
    xii. Peel Region to provide NRSI with Screening memo that MNR had provided during the initial EA
    xiii. Working meeting with MNR, CVC, and NRSI to be scheduled to discuss Significant Wildlife Habitat including animal movement corridors. All

Significant Wildlife Habitats will be delineated prior to meeting. All available wildlife data must be received prior to this exercise being conducted.

APPENDIX II

Species at Risk and Species of Conservation Concern Habitat Screening

Belfountain Transportation EA – Summary of Species at Risk and Species of Conservation Concern known to occur in the Study Area

Scientific Name	Common Name	SRANK[1]	COSEWIC[2]	SARA[3]	ESA/SARO[4]	Record Source
Vegetation						
Panax quinquefolius	American ginseng	S3	END	END-Schedule 1	END	Credit Valley Conservation (2012)
Juglans cinera	butternut	S3?	END	END-Schedule 1	END	Dillon Natural Environment Existing Conditions Report (2010) Credit Valley Conservation (2012)
Asplenium scolopendrium var. americanum	hart's tongue fern	S3	SC	SC-Schedule 1	SC	OMNR: NHIC Biodiversity Explorer (1993)
Potamogeton hillii	hill's pondweed	S2	SC	SC-Schedule 1	SC	OMNR: NHIC Biodiversity Explorer (1983)
Birds						
Hirundo rustica	barn swallow	S4B	THR	NAR	THR	Dillon Memo (2012), Credit Valley Conservation (2012)
Dolichonyx oryzivorus	bobolink	S4B	THR	NAR	THR	Ontario Breeding Bird Atlas (2001-2005), Credit Valley Conservation (2012)
Cardellina canadensis	Canada warbler	S4B	THR	THR-Schedule 1	SC	Ontario Breeding Bird Atlas (2001-2005), Credit Valley Conservation (2012)
Chaetura pelagic	chimney swift	S4B,S4N	THR	THR-Schedule 1	THR	Ontario Breeding Bird Atlas (2001-2005)

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Scientific Name	Common Name	SRANK[1]	COSEWIC[2]	SARA[3]	ESA/SARO[4]	Record Source
Sturnella magna	eastern meadowlark	S4B	THR	NAR	THR	Ontario Breeding Bird Atlas (2001-2005), Credit Valley Conservation (2012)
Vermivora chrysoptera	golden-winged warbler	S4B	THR	THR-Schedule 1	SC	Ontario Breeding Bird Atlas (2001-2005)
Ammodramus henslowii	henslow's sparrow	SHB	END	END-Schedule 1	END	OMNR: NHIC Biodiversity Explorer (1984)
Setophaga citrina	hooded warbler	S3B	THR	THR-Schedule 1	SC	Credit Valley Conservation (2012)
Seiurus motacilla	Louisiana waterthrush	S3B	SC	SC-Schedule 1	SC	Credit Valley Conservation (2012)
Asio flammeus	short-eared owl	S2n, S4B	SC	SC-Schedule 1	SC	Ontario Breeding Bird Atlas (2001-2005)
Herpetofauna						
Chelydra serpentina serpentina	common snapping turtle	S3	SC	SC-Schedule 1	SC	Credit Valley Conservation (2012)
Lampropeltis t. triangulum	eastern milksnake	S3	SC	SC - Schedule 1	SC	OMNR: NHIC Biodiversity Explorer (1992)
Thamnophis sauritus septentrionalis	eastern ribbonsnake	S3	SC	THR-Schedule 1	SC	OMNR: NHIC Biodiversity Explorer (1971)
Ambystoma jeffersonianum	jefferson salamander	S2	END	THR-Schedule 1	THR	OMNR: NHIC Biodiversity Explorer (2003), Credit Valley Conservation (2012)
Pseudacris triseriata	western chorus frog	S3	THR	THR-Schedule 1	NAR	Credit Valley Conservation (2012)

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Scientific Name	Common Name	SRANK[1]	COSEWIC[2]	SARA[3]	ESA/SARO[4]	Record Source
Mammals						
Myotis lucifuga	little brown bat	S5	END	NAR	NAR	Ontario Mammal Atlas (1970-1993)
Myotis septentrionalis	northern long-eared bat	S3	NAR	NAR	NAR	Credit Valley Conservation (2012)
Puma concolor	cougar	SU	NAR	NAR	END	OMNR (2012)
Insects						
Danaus plexippus	monarch	S4	SC	SC Schedule 1	SC	Dillon Natural Environment Existing Conditions Report (2010)
Gomphus descriptus	harpoon clubtail	S3	NAR	NAR	NAR	Credit Valley Conservation (2012)
Arigomphus villosipes	unicorn clubtail	S2/S3	NAR	NAR	NAR	Credit Valley Conservation (2012)
Lestes eurinus	amber-winged spreadwing	S3	NAR	NAR	NAR	Credit Valley Conservation (2012)
Cordulegaster oblique	arrowhead spiketail	S2	NAR	NAR	NAR	Credit Valley Conservation (2012)
Fish						
Salmo salar	Atlantic Salmon	SX/S1	END	END-Schedule 1	END	OMNR (2012)
Clinostomus elongates	Redside Dace	S2	END	NAR	END	OMNR: NHIC Biodiversity Explorer (1985)
Icthyomyzon fossor	Northern Brook Lamprey	S3	SC	SC-Schedule 1	SC	OMNR: NHIC Biodiversity Explorer (1982)

1 S-Rank (Provincial Rank) (OMNR 2012a)
- S1- Critically Imperiled
- S2- Imperiled
- S3- Vulnerable
- S4- Apparently Secure
- S5- Secure
- SU- Status Unknown
- NA- Not Applicable: A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

2COSEWIC-Committee on the Status of Endangered Wildlife in Canada (COSEWIC 2012)

3 SARA – Species at Risk Public Registry (Government of Canada 2012)

4 ESA – Endangered Species Act, Species at Risk in Ontario (OMNR 2012b)
- END - Endangered
- THR- Threatened
- SC- Special Concern
- NAR- Not at Risk

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Gomphus descriptus	harpoon clubtail	S3	NAR	NAR	NAR	Credit Valley Conservation (2012)
Arigomphus villosipes	unicorn clubtail	S2/S3	NAR	NAR	NAR	Credit Valley Conservation (2012)
Lestes eurinus	amber-winged spreadwing	S3	NAR	NAR	NAR	Credit Valley Conservation (2012)
Cordulegaster oblique	arrowhead spiketail	S2	NAR	NAR	NAR	Credit Valley Conservation (2012)
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Clinostomus elongates	Redside Dace	S2	END	NAR	END	OMNR: NHIC Biodiversity Explorer (1985)
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- S1- Critically Imperiled
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- S4- Apparently Secure
- S5- Secure
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3 SARA – Species at Risk Public Registry (Government of Canada 2012)

4 ESA – Endangered Species Act, Species at Risk in Ontario (OMNR 2012b)
- END - Endangered
- THR- Threatened
- SC- Special Concern
- NAR- Not at Risk

APPENDIX III
Vegetation Species List

Appendix III. Vascular Flora Recorded From the Study Area

Scientific Name	Common Name	SRANK	COSEWIC	SARO List	Rare - Peel Region (Varga 2000)
PTERIDOPHYTES	**FERNS & ALLIES**				
Dryopteridaceae	**Wood Fern Family**				
Onoclea sensibilis	Sensitive Fern	S5			X
GYMNOSPERMS	**CONIFERS**				
Cupressaceae	**Cypress Family**				
Thuja occidentalis	White Cedar	S5			X
Pinaceae	**Pine Family**				
Larix laricina	Tamarack	S5			X
Picea glauca	White Spruce	S5			R3
Pinus resinosa	Red Pine	S5			R1
Pinus strobus	Eastern White Pine	S5			X
Pinus sylvestris	Scot's Pine	SE5			X
Tsuga canadensis	Eastern Hemlock	S5			X
DICOTYLEDONS	**DICOTS**				
Aceraceae	**Maple Family**				
Acer saccharum ssp. saccharum	Sugar Maple	S5			X
Acer X freemanii	Freeman's Maple				XSR
Anacardiaceae	**Sumac or Cashew Family**				
Rhus hirta	Staghorn Sumac	S5			X
Apiaceae	**Carrot or Parsley Family**				
Daucus carota	Wild Carrot	SE5			X
Asclepiadaceae	**Milkweed Family**				
Asclepias incarnata ssp. incarnata	Swamp Milkweed	S5			X
Asclepias syriaca	Common Milkweed	S5			X
Asteraceae	**Composite or Aster Family**				
Bidens cernua	Stick-tight	S5			X
Eupatorium maculatum ssp. maculatum	Spotted Joe-pye-weed	S5			X

Euthamia graminifolia	Flat-topped Bushy Goldenrod	S5			X
Hieracium caespitosum ssp. caespitosum	Field Hawkweed	SE5			X
Solidago altissima var. altissima	Tall Goldenrod	S5			X
Solidago canadensis	Canada Goldenrod	S5			X
Solidago nemoralis ssp. nemoralis	Gray Goldenrod	S5			X
Solidago rugosa ssp. rugosa	Rough Goldenrod	S5			U
Sonchus arvensis ssp. arvensis	Field Sow-thistle	SE5			X
Symphyotrichum lanceolatum var. lanceolatum	Tall White Aster	S5			X
Symphyotrichum puniceum var. puniceum	Purple-stemmed Aster	S5			X
Balsaminaceae	**Touch-me-not Family**				
Impatiens capensis	Spotted Touch-me-not	S5			X
Betulaceae	**Birch Family**				
Betula papyrifera	White Birch	S5			X
Carpinus caroliniana ssp. virginiana	Blue Beech	S5			X
Caprifoliaceae	**Honeysuckle Family**				
Viburnum lentago	Nannyberry	S5			X
Cornaceae	**Dogwood Family**				
Cornus foemina ssp. racemosa	Red Panicled Dogwood	S5			X
Cornus stolonifera	Red-osier Dogwood	S5			X
Fagaceae	**Beech Family**				
Quercus macrocarpa	Bur Oak	S5			X
Lamiaceae	**Mint Family**				
Mentha arvensis ssp. borealis	American Wild Mint	S5			X
Lythraceae	**Loosestrife Family**				
Lythrum salicaria	Purple Loosestrife	SE5			X
Oleaceae	**Olive Family**				
Fraxinus americana	White Ash	S5			X
Fraxinus pennsylvanica	Green Ash	S5			X
Rhamnaceae	**Buckthorn Family**				
Rhamnus cathartica	Common Buckthorn	SE5			X

Rosaceae	**Rose Family**				
Crataegus species	Hawthorn species				
Malus domestica					
Prunus serotina	Black Cherry	S5			X
Salicaceae	**Willow Family**				
Populus balsamifera ssp. balsamifera	Balsam Poplar	S5			X
Populus deltoides ssp. deltoides	Eastern Cottonwood	SU			X
Populus tremuloides	Trembling Aspen	S5			X
Salix species	Willow species				
Salix bebbiana	Long-beaked Willow	S5			X
Salix discolor	Pussy Willow	S5			X
Salix eriocephala	Heart-leaved Willow	S5			X
Salix fragilis	Crack Willow	SE5			X
Salix X sepulcralis	Hybrid Willow	SE2			XSR
Tiliaceae	**Linden Family**				
Tilia americana	American Basswood	S5			X
Ulmaceae	**Elm Family**				
Ulmus americana	White Elm	S5			X
Verbenaceae	**Vervain Family**				
Verbena hastata	Blue Vervain	S5			X
Vitaceae	**Grape Family**				
Vitis riparia	Riverbank Grape	S5			X
MONOCOTYLEDONS	**MONOCOTS**				
Cyperaceae	**Sedge Family**				
Scirpus atrovirens	Dark-green Bulrush	S5			X
Poaceae	**Grass Family**				
Bromus inermis ssp. inermis	Awnless Brome	SE5			X
Phalaris arundinacea	Reed Canary Grass	S5			X
Typhaceae	**Cattail Family**				
Typha angustifolia	Narrow-leaved Cattail	S5			X
Typha latifolia	Broad-leaved Cattail	S5			X

APPENDIX IV
Bird Species List

Appendix 4. Birds Recorded From the Study Area

Scientific Name	Common Name	CODE	GRANK	SRANK	COSEWIC	SARO	SARA Schedule	OBBA				CVC Observations	NRSI Observed
								17NJ74	17NJ75	17NJ84	17NJ85		
	DUCKS, GEESE & SWANS												
Branta canadensis	Canada Goose	CAGO	G5	S5				**FY**	**FY**	**FY**	**FY**		P
Cygnus columbianus	Tundra Swan	TUSW	G5	S4								X	
Aix sponsa	Wood Duck	WODU	G5	S5				**AE**	**FY**	**FY**	**FY**		
Anas rubripes	American Black Duck	ABDU	G5	S4					**NE**				
Anas platyrhynchos	Mallard	MALL	G5	S5				**FY**	**FY**	**FY**	**FY**		X
Anas discors	Blue-winged Teal	BWTE	G5	S4					**FY**	**H**	**H**		
Anas crecca	Green-winged Teal	GWTE	G5	S4						**H**			
Lophodytes cucullatus	Hooded Merganser	HOME	G5	S5B, S5N				**T**	**H**				
Mergus merganser	Common Merganser	COME	G5	S5B, S5N				**H**					
	PARTRIDGES, GROUSE & TURKEYS												
Phasianus colchicus	Ring-necked Pheasant	RIPH	G5	SNA				**H**					
Bonasa umbellus	Ruffed Grouse	RUGR	G5	S4				**FY**	**FY**	**H**	**H**		
Meleagris gallopavo	Wild Turkey	WITU	G5	S5				**FY**	**T**		**H**		
	GREBES												
Podilymbus podiceps	Pied-billed Grebe	PBGR	G5	S4B, S4N					**P**		**S**		
	HERONS & BITTERNS												
Ardea herodias	Great Blue Heron	GBHE	G5	S4B				**H**	**H**	**H**	**H**		T
Butorides virescens	Green Heron	GRHE	G5	S4B				**D**	**P**	**H**	**FY**		
	VULTURES												
Cathartes aura	Turkey Vulture	TUVU	G5	S5B				**P**	**T**	**P**	**P**		X
	HAWKS, KITES & EAGLES												
Pandion haliaetus	Osprey	OSPR	G5	S5B					**H**				
Circus cyaneus	Northern Harrier	NOHA	G5	S4B	NAR	NAR		**T**	**P**	**H**			
Accipiter striatus	Sharp-shinned Hawk	SSHA	G5	S5		NAR		**H**	**CF**	**H**	**CF**		
Accipiter cooperii	Cooper's Hawk	COHA	G5	S4	NAR	NAR		**A**	**A**		**FY**		
Accipiter gentilis	Northern Goshawk	NOGO	G5	S4	NAR	NAR		**A**	**A**				
Buteo lineatus	Red-shouldered Hawk	RSHA	G5	S4B	NAR	NAR	Schedule 3					X	
Buteo platypterus	Broad-winged Hawk	BWHA	G5	S5B				**FY**	**NU**	**A**	**P**		
Buteo jamaicensis	Red-tailed Hawk	RTHA	G5	S5	NAR	NAR		**FY**	**NY**	**H**	**CF**		T
	CARACARAS & FALCONS												
Falco sparverius	American Kestrel	AMKE	G5	S4				**NY**	**P**		**H**		
Falco columbarius	Merlin	MERL	G5	S5B	NAR	NAR					**H**		
	RAILS, GALLINULES & COOTS												
Rallus limicola	Virginia Rail	VIRA	G5	S5B				**T**	**A**	**P**	**S**		
Porzana carolina	Sora	SORA	G5	S4B				**S**	**S**	**T**	**T**		
	CRANES												
Grus canadensis	Sandhill Crane	SACR	G5	S5B								X	
	PLOVERS												
Charadrius vociferus	Killdeer	KILL	G5	S5B, S5N				**FY**	**FY**	**P**	**NE**		T
	SANDPIPERS & PHALAROPES												
Actitis macularia	Spotted Sandpiper	SPSA	G5	S5				**P**	**FY**		**H**		
Bartramia longicauda	Upland Sandpiper	UPSA	G5	S4B				**S**	**FY**				

Scientific Name	Common Name	CODE	GRANK	SRANK	COSEWIC	SARO	Schedule	17NJ74	17NJ75	17NJ84	17NJ85	CV	NR
Gallingo delicata	Wilson's Snipe	WISN	G5	S5B						S			
Scolopax minor	American Woodcock	AMWO	G5	S4B				NE	D	FY	D		
	GULLS, TERNS & SKIMMERS												
Larus delawarensis	Ring-billed Gull	RBGU	G5	S5B, S4N									X
	PIGEONS & DOVES												
Columba livia	Rock Pigeon	ROPI	G5	SNA				P	NY	AE	NY		T
Zenaida macroura	Mourning Dove	MODO	G5	S5				P	P	P	NE		T
	CUCKOOS & ANIS												
Coccyzus americanus	Yellow-billed Cuckoo	YBCU	G5	S4B					S	S			
Coccyzus erythropthalmus	Black-billed Cuckoo	BBCU	G5	S5B				H	CF	S	S		
	TYPICAL OWLS												
Otus asio	Eastern Screech-Owl	EASO	G5	S4	NAR	NAR		T	A	S	T		
Bubo virgianus	Great Horned Owl	GHOW	G5	S4				H	T	S	H		
Asio flammeus	Short-eared Owl	SEOW	G5	S2N, S4B	SC	SC	Schedule 3	S					
Aegolius acadicus	Northern Saw-whet Owl	NSWO	G5	S4					S				
	SWIFTS												
Chaetura pelagica	Chimney Swift	CHSW	G5	S4B, S4N	T	THR	Schedule 1	T	T	P			T
	HUMMINGBIRDS												
Archilochus colubris	Ruby-throated Hummingbird	RTHU	G5	S5B				FY	FY	H	P		A
	KINGFISHERS												
Ceryle alcyon	Belted Kingfisher	BEKI	G5	S4B				H	NY	P	T		T
	WOODPECKERS												
Melanerpes carolinus	Red-bellied Woodpecker	RBWO	G5	S4				FY					
Sphyrapicus varius	Yellow-bellied Sapsucker	YBSA	G5	S5B				H	NY				
Picoides pubescens	Downy Woodpecker	DOWO	G5	S5				NY	T	S	CF		T
Picoides villosus	Hairy Woodpecker	HAWO	G5	S5				NY	NY	H	FY		T
Colaptes auratus	Northern Flicker	NOFL	G5	S4B				NY	FY	T	P		T
Dryocopus pileatus	Pileated Woodpecker	PIWO	G5	S5				FY	NY	P	P		
	TYRANT FLYCATCHERS												
Contopus virens	Eastern Wood-Pewee	EAWP	G5	S4B	SC			NY	NY	T	T		T
Empidonax alnorum	Alder Flycatcher	ALFL	G5	S5B				T	T	S	T		
Empidonax traillii	Willow Flycatcher	WIFL	G5	S5B				A		S	S		T
Empidonax minimus	Least Flycatcher	LEFL	G5	S4B				H	CF	P	T		
Empidonax flaviventris	Yellow-bellied Flycatcher	YBFL	G5	S5B								X	
Sayornis phoebe	Eastern Phoebe	EAPH	G5	S5B				NY	NY	CF	CF		
Myiarchus crinitus	Great Crested Flycatcher	GCFL	G5	S4B				NY	AE	P	CF		T
Tyrannus tyrannus	Eastern Kingbird	EAKI	G5	S4B				NY	NE	T	CF		P
	Shrikes												
Lanius excubitor	Northern Shrike	NSHR	G5	SNA								X	
	VIREOS												
Vireo flavifrons	Yellow-throated Vireo	YTVI	G5	S4B				S					
Vireo solitarius	Blue-headed Vireo	BHVI	G5	S5B				T		S			
Vireo gilvis	Warbling Vireo	WAVI	G5	S5B				T	FY	S	CF		T
Vireo olivaceus	Red-eyed Vireo	REVI	G5	S5B				FY	A	A	T		T
	CROWS & JAYS												
Cyanocitta cristata	Blue Jay	BLJA	G5	S5				FY	FY	FY	FY		P
Corvus brachyrhynchos	American Crow	AMCR	G5	S5B				FY	CF	FY	CF		T
Corvus corax	Common Raven	CORA	G5	S5					S				

Scientific Name	Common Name	CODE	GRANK	SRANK	COSEWIC	SARO	Schedule	17NJ74	17NJ75	17NJ84	17NJ85	CV	NR
	LARKS												
Eremophila alpestris	Horned Lark	HOLA	G5	S5B				**T**	**D**	**S**	**S**		
	SWALLOWS												
Progne subis	Purple Martin	PUMA	G5	S4B							**H**		
Tachycineta bicolor	Tree Swallow	TRES	G5	S4B				**NY**	**AE**	**H**	**NY**		P
Stelgidopteryx serripennis	Northern Rough-winged Swall	NRWS	G5	S4B				**T**	**AE**		**D**		
Riparia riparia	Bank Swallow	BANS	G5	S4B				**AE**	**NY**	**H**	**H**		
Petrochelidon pyrrhonota	Cliff Swallow	CLSW	G5	S4B				**NY**	**NY**	**V**	**NE**		
Hirundo rustica	Barn Swallow	BARS	G5	S4B	T	THR		**NY**	**AE**	**NY**	**CF**		T
	CHICKADEES & TITMICE												
Poecile atricapillus	Black-capped Chickadee	BCCH	G5	S5				**CF**	**NY**	**FY**	**CF**		T
Baeolophus bicolor	Tufted Titmouse	TUTI	G5	S4				**S**					
	NUTHATCHES												
Sitta canadensis	Red-breasted Nuthatch	RBNU	G5	S5				**CF**	**CF**	**H**	**S**		T
Sitta carolinensis	White-breasted Nuthatch	WBNU	G5	S5				**H**	**CF**	**D**	**T**		
	CREEPERS												
Certhia americana	Brown Creeper	BRCR	G5	S5B				**P**	**CF**	**S**	**S**		
	WRENS												
Thryothorus ludovicianus	Carolina Wren	CARW	G5	S4				**S**		**P**			
Troglodytes aedon	House Wren	HOWR	G5	S5B				**AE**	**AE**	**T**	**AE**		T
Troglodytes troglodytes	Winter Wren	WIWR	G5	S5B				**T**	**FY**		**T**		
Cistothorus platensis	Sedge Wren	SEWR	G5	S4B	NAR	NAR			**T**				
	KINGLETS												
Regulus satrapa	Golden-crowned Kinglet	GCKI	G5	S5B				**S**	**A**		**FY**		
	GNATCATCHERS												
Polioptila caerulea	Blue-gray Gnatcatcher	BGGN	G5	S4B				**H**					
	THRUSHES												
Sialia sialis	Eastern Bluebird	EABL	G5	S5B	NAR	NAR		**CF**	**AE**	**FY**	**AE**		P
Catharus fuscescens	Veery	VEER	G5	S4B				**A**	**CF**	**S**	**A**		
Hylocichla mustelina	Wood Thrush	WOTH	G5	S4B				**T**	**A**	**T**	**T**		T
Turdus migratorius	American Robin	AMRO	G5	S5B				**NY**	**CF**	**NE**	**NY**		FY
	MOCKINGBIRDS & THRASHERS												
Dumetella carolinensis	Gray Catbird	GRCA	G5	S4B				**T**	**CF**	**A**	**T**		P
Mimus polyglottos	Northern Mockingbird	NOMO	G5	S4				**S**		**T**			
Toxostoma rufum	Brown Thrasher	BRTH	G5	S4B				**NE**	**CF**	**A**	**T**		T
	STARLINGS												
Sturnus vulgaris	European Starling	EUST	G5	SNA				**FY**	**NY**	**CF**	**AE**		FY
	WAXWINGS												
Bombycilla cedrorum	Cedar Waxwing	CEDW	G5	S5B				**NY**	**NE**	**P**	**FY**		P
Bombycilla garrulus	Bohemian Waxwing	BOWA	G5	SNA								X	
	Longspurs and Snow Buntings												
Plectrophenax nivalis	Snow Bunting	SNBU	G5	SNA								X	
	WOOD-WARBLERS												
Seiurus aurocapillus	Ovenbird	OVEN	G5	S4B				**T**	**FY**	**A**	**NE**		T
Seiurus motacilla	Louisiana Waterthrush	LOWA	G5	S3B	SC	SC	Schedule 1				**D**		
Seiurus noveboracensis	Northern Waterthrush	NOWA	G5	S5B				**T**	**CF**	**A**	**CF**		T
Vermivora chrysoptera	Golden-winged Warbler	GWWA	G4	S4B	T	SC	Schedule 1				**CF**		

Scientific Name	Common Name	CODE	GRANK	SRANK	COSEWIC	SARO	Schedule	17NJ74	17NJ75	17NJ84	17NJ85	CV	NR
Vermivora chrysoptera x pinus	Brewster's Warbler									S			
Vermivora pinus	Blue-winged Warbler	BWWA	G5	S4B					A		T		
Mniotilta varia	Black-and-white Warbler	BAWW	G5	S5B				CF	A	S	T		
Oreothlypis ruficapilla	Nashville Warbler	NAWA	G5	S5B				T	CF	CF	S		
Geothylpis philadelphia	Mourning Warbler	MOWA	G5	S4B				S	A	S	CF		
Geothylpis trichas	Common Yellowthroat	COYE	G5	S5B				T	CF	T	CF		T
Setophaga citrina	Hooded Warbler	HOWA	G5	S3B	T	SC	Schedule 1		S				
Setophaga ruticilla	American Redstart	AMRE	G5	S5B				T	CF	S	CF		
Setophaga magnolia	Magnolia Warbler	MAWA	G5	S5B				T	T				
Setophaga fusca	Blackburnian Warbler	BLBW	G5	S5B				T	S		P		
Setophaga petechia	Yellow Warbler	YWAR	G5	S5B				T	CF	CF	CF		T
Setophaga pensylvanica	Chestnut-sided Warbler	CSWA	G5	S5B				T	CF	S	FS		T
Setophaga tigrina	Cape May Warbler	CMWA	G5	S5B								X	
Setophaga caerulescens	Black-throated Blue Warbler	BTBW	G5	S5B					CF		T		
Setophaga pinus	Pine Warbler	PIWA	G5	S5B				CF	CF	T	T		T
Setophaga coronata	Yellow-rumped Warbler	YRWA	G5	S5B				D	A		S		
Setophaga virens	Black-throated Green Warbler	BTNW	G5	S5B				T	A	P	T		T
Cardellina canadensis	Canada Warbler	CAWA	G5	S4B	T	SC	Schedule 1	T	CF	S	H		
	SPARROWS												
Pipilo erythrophthalmus	Eastern Towhee	EATO	G5	S4B				T	T	A	T		CF
Spizella passerina	Chipping Sparrow	CHSP	G5	S5B				T	CF	CF	CF		T
Spizella pallida	Clay-colored Sparrow	CCSP	G5	S4B				T	FY		NB		
Spizella pusilla	Field Sparrow	FISP	G5	S4B				T	NY	FY	FY		T
Pooecetes gramineus	Vesper Sparrow	VESP	G5	S4B				T	T	S	H		
Passerella iliaca	Fox Sparrow	FOXP	G5	S4B								X	
Passerculus sandwichensis	Savannah Sparrow	SAVS	G5	S4B				CF	CF	S	CF		T
Ammodramus savannarum	Grasshopper Sparrow	GRSP	G5	S4B				T	CF		CF		
Melospiza melodia	Song Sparrow	SOSP	G5	S5B				CF	CF	CF	CF		T
Melospiza georgiana	Swamp Sparrow	SWSP	G5	S5B				A	CF	S	T		
Zonotrichia albicollis	White-throated Sparrow	WTSP	G5	S5B				T	A	S	A		
Junco hyemalis	Dark-eyed Junco	DEJU	G5	S5B								X	
	CARDINALS & ALLIES												
Piranga olivacea	Scarlet Tanager	SCTA	G5	S4B				S	CF	A	T		T
Cardinalis cardinalis	Northern Cardinal	NOCA	G5	S5				NY	CF	FY	T		T
Pheucticus ludovicianus	Rose-breasted Grosbeak	RBGR	G5	S4B				CF	FY	S	CF		T
Passerina cyanea	Indigo Bunting	INBU	G5	S4B				CF	CF	A	A		T
	BLACKBIRDS												
Dolichonyx oryzivorus	Bobolink	BOBO	G5	S4B	T	THR	No Schedule	FY	CF	CF	FY		T
Agelaius phoeniceus	Red-winged Blackbird	RWBL	G5	S4				FY	NE	NY	CF		T
Sturnella magna	Eastern Meadowlark	EAME	G5	S4B	T	THR		A	FY	P	CF		T
Quiscalus quiscula	Common Grackle	COGR	G5	S5B				CF	CF	CF	CF		T
Molothrus ater	Brown-headed Cowbird	BHCO	G5	S4B				T	P	S	FY		T
Icterus spurius	Orchard Oriole	OROR	G5	S4B						S			
Icterus galbula	Baltimore Oriole	BAOR	G5	S4B				FY	NY	FY	CF		T
	FINCHES												
Carpodacus purpureus	Purple Finch	PUFI	G5	S4B				D	T	S	S		T
Carpodacus mexicanus	House Finch	HOFI	G5	SNA				FY	FY	D	FY		
Loxia curvirostra	Red Crossbill	RECR	G5	S4B								X	
Carduelis tristis	American Goldfinch	AMGO	G5	S5B				FY	NB	FY	T		T
Coccothraustes vespertinus	Evening Grosbeak	EVGR	G5	S4B							P		
	OLD WORLD SPARROWS												
Passer domesticus	House Sparrow	HOSP	G5	SNA				A	AE	S	CF		P

APPENDIX V
Herpetofauna Species List

Appendix 5. Reptiles and Amphibians Recorded From the Study Area

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	SARO	Ontario Herp Atlas	CVC Observations	NRSI Observed
Turtles								
Chelydra serpentina serpentina	Common Snapping Turtle	G5	S3	SC	SC	X		
Chrysemys picta marginata	Midland Painted Turtle	G5T5	S5			X		
Trachemys scripta elegans	Red-eared Slider	G5	SNA			X		
Snakes								
Diadophis punctatus edwardsi	Northern Ringneck Snake	G5	S4			X		
Lampropeltis t. triangulum	Eastern Milksnake	G5	S3	SC	SC	X		
Nerodia sipedon sipedon	Northern Watersnake	G5T5	S5	NAR	NAR	X		
Storeria dekayi dekayi	Northern (DeKay's) Brownsnake	G5	S5	NAR	NAR	X		
Storeria occipitomaculata occipitomaculata	Northern Red-bellied Snake	G5T5	S5			X		
Thamnophis sirtalis sirtalis	Eastern Gartersnake	G5T5	S5			X		
Salamanders								
Ambystoma jeffersonianum	Jefferson Salamander	G4	S2	E	THR	X		
Ambystoma jeffersonianum-laterale "complex"	Jefferson/Blue Spotted Salamander Complex	GNA	S2			X		
Ambystoma jeffersonianum-laterale polyploids	Jefferson/Blue-spotted Salamander Polyploids	GNA	S2			X		
Ambystoma laterale	Blue-spotted Salamander	G5	S4			X		
Ambystoma maculatum	Spotted Salamander	G5	S4			X		
Hemidactylium scutatum	Four-toed Salamander	G5	S4	NAR	NAR	X		
Necturus maculosus	Mudpuppy	G5	S4	NAR	NAR	X		
Notophthalmus viridescens viridescens	Red-spotted Newt	G5T5	S5			X		
Plethodon cinereus	Eastern (Northern) Redback Salamander	G5	S5			X		
Toads and Frogs								
Bufo americanus	American Toad	G5	S5			X		
Hyla versicolor	Tetraploid Gray Treefrog	G5	S5			X		
Pseudacris triseriata pop. 2 (Gr. Lakes/St. Lawrence -	Western Chorus Frog	G5TNR	S3	T	NAR	X		
Pseudacris crucifer crucifer	Northern Spring Peeper	G5	S5			X		
Rana catesbeiana	Bullfrog	G5	S4			X		
Rana clamitans melanota	Green Frog	G5	S5			X	X	X
Rana palustris	Pickerel Frog	G5	S4	NAR	NAR	X	X	
Rana pipiens	Northern Leopard Frog	G5	S5	NAR	NAR	X	X	
Rana septentrionalis	Mink Frog	G5	S5			X		
Rana sylvatica	Wood Frog	G5	S5			X	X	

APPENDIX VI
Mammal Species List

Appendix 6. Mammals Recorded From the Study Area

Scientific Name	Common Name	GRANK	SRANK	COSEWIC	SARO	SAR Schedule	Ontario Mammal Atlas	CVC Data Additions	NRSI Observed
Blarina brevicauda	Northern Short-tailed Shrew	G5	S5				X		
Canis latrans	Coyote	G5	S5				X		
Castor canadensis	Beaver	G5	S5				X		
Condylura cristata	Star-nosed Mole	G5	S5				X		
Didelphis virginiana	Virginia Opossum	G5	S4				X		
Eptesicus fuscus	Big Brown Bat	G5	S5				X		
Erethizon dorsatum	Porcupine	G5	S5				X		
Lasionycteris noctivagans	Silver-haired Bat	G5	S4					X	
Lasiurus borealis	Red Bat	G5	S4					X	
Lasiurus cinereus	Hoary Bat	G5	S4					X	
Lepus americanus	Snowshoe Hare	G5	S5				X		
Lepus europaeus	European Hare	G5	SE				X		
Marmota monax	Woodchuck	G5	S5				X		
Mephitis mephitis	Striped Skunk	G5	S5				X		
Microtus pennsylvanicus	Meadow Vole	G5	S5				X		
Mus musculus	House Mouse	G5	SE				X		
Mustela erminea	Ermine	G5	S5				X		
Mustela frenata	Long-tailed Weasel	G5	S4				X		
Mustela vison	Mink	G5	S5				X		
Myotis lucifuga	Little Brown Bat	G5	S5	E			X		
Napeozapus insignis	Woodland Jumping Mouse	G5	S5				X		
Odocoileus virginianus	White-tailed Deer	G5	S5				X		
Ondatra zibethicus	Muskrat	G5	S5				X		
Perimyotis subflavus	Tricoloured Bat	G5	S3?	E			X		
Peromyscus leucopus	White-footed Mouse	G5	S5				X		
Peromyscus maniculatus	Deer Mouse	G5	S5				X		
Procyon lotor	Raccoon	G5	S5				X		
Rattus norvegicus	Norway Rat	G5	SE				X		
Sciurus carolinensis	Gray Squirrel Black Morph	G5	S5				X		
Sciurus carolinensis	Gray Squirrel Gray Morph	G5	S5				X		
Sylvilagus floridanus	Eastern Cottontail	G5	S5				X		
Tamias striatus	Eastern Chipmunk	G5	S5				X		X
Tamiasciurus hudsonicus	Red Squirrel	G5	S5				X		
Vulpes vulpes	Red Fox	G5	S5				X		
Zapus hudsonius	Meadow Jumping Mouse	G5	S5				X		

APPENDIX VII

Odonata and Butterfly Species List

Appendix VII. Butterflies Recorded From the Study Area

Scientific Name	Common Name	GRANK	SRANK	COSEWIC	OMNR	Butterflies of Canada	CVC Observations
Satyrium acadicum	Acadian Hairstreak	G5	S4			X	
Lycaeana phlaeas	American Copper	G5	S4			X	
Vanessa virginiensis	American Lady	G5	S5			X	
Speyeria aphrodite	Aphrodite Fritillary	G5	S5			X	
Satyrodes appalachia	Appalachian Brown	G4	S4			X	
Cartercephalus palaemon	Arctic Skipper	G5	S5			X	
Speyeria atlantis	Atlantis Fritillary	G5	S5			X	
Euphydryas phaeton	Baltimore Checkerspot	G4	S4			X	
Satyrium calanus	Banded Hairstreak	G5	S4			X	
Papilio polyxenes	Black Swallowtail	G5	S5			X	
Lycaena hyllus	Bronze Copper	G5	S5			X	
Callophrys augustinus	Brown Elfin	G5	S5			X	
Pieris rapae	Cabbage White	G5	SE			X	
Colias philodice	Clouded Sulphur	G5	S5			X	
Coenonympha tullia	Common Ringlet	G5	S5			X	
Cercyonis pegala	Common Wood-Nymph	G5	S5			X	
Nymphalis vaualbum	Compton Tortoiseshell	G5	S5			X	
Harkenclenus titus	Coral Hairstreak	G5	S4			X	
Anatrytone logan	Delaware Skipper	G5	S3S4			X	
Erynnis icelus	Dreamy Duskywing	G5	S5			X	
Euphyes vestris	Dun Skipper	G5	S5			X	
Polygonia comma	Eastern Comma	G5	S5			X	
Callophrys niphon	Eastern Pine Elfin	G5	S5			X	
Cupido comyntas	Eastern Tailed Blue	G5	S5			X	
Papilio glaucus	Eastern Tiger Swallowtail	G5	S4S5			X	
Thymelicus lineola	European Skipper	G5	SE			X	
Satyrodes eurydice	Eyed Brown / Northern Eyed Brown	G4	S5			X	
Speyeria cybele	Great Spangled Fritillary	G5	S5			X	
Polygonia faunus	Green Comma	G5	S4			X	
Polygonia progne	Gray Comma	G5	S5			X	
Feniseca tarquinius	Harvester	G4	S4			X	
Poanes hobomok	Hobomok Skipper	G5	S5			X	
Erynnis juvenalis	Juvenal's Duskywing	G5	S5			X	
Ancyloxpha numitor	Least Skipper	G5	S5			X	
Megisto cymela	Little Wood-Satyr	G5	S5			X	
Polites mystic	Long Dash Skipper	G5	S5			X	
Boloria bellona	Meadow Fritillary	G5	S5			X	
Nymphalis milberti	Milbert's Tortoiseshell	G5	S5			X	
Danaus plexippus	Monarch	G4	S4	SC	SC	X	
Nymphalis antiopa	Mourning Cloak	G5	S5			X	
Pieris oleracea	Mustard White	G4G5	S4			X	
Wallengrenia egeremet	Northern Broken Dash	G5	S5			X	
Thorybes pylades	Northern Cloudywing	G5	S5			X	
Phyciodes pascoensis	Northern Crescent	G5	S5			X	
Enodia anthedon	Northern Pearly-Eye	G5	S4			X	
Colias eurytheme	Orange Sulphur	G5	S5			X	
Vanessa cardui	(Common) Painted Lady	G5	SZB			X	
Phyciodes tharos	Pearl Crescent	G5	S4			X	
Polites peckius	Peck's Skipper	G5	S5			X	
Colias interior	Pink-edged Sulphur	G5	S5			X	
Polygonia interrogationis	Question Mark	G5	S5			X	
Vanessa atalanta	Red Admiral	G5	S5			X	
Amblyscirtes vialis	Common Roadside Skipper	G5	S4			X	
Boloria selene	Silver-bordered Fritillary	G5	S5			X	
Epargyreus clarus	Silver-spotted Skipper	G5	S4			X	
Glaucopsyche lygdamus	Silvery Blue	G5	S5			X	
Chlosyne nycteis	Silvery Checkerspot	G5	S4S5			X	
Celastrina ladon	Spring Azure	G5	S5			X	
Satyrium liparops	Striped Hairstreak	G5	S5			X	
Celastrina neglecta	Summer Azure	G5	S5			X	
Phyciodes batesii	Tawny Crescent	G4	S4			X	
Polites themistocles	Tawny-edged Skipper	G5	S5			X	
Euphyes bimacula	Two-spotted Skipper	G4	S4				X
Limenitis archippus	Viceroy	G5	S5			X	
Pontia protodice	Western Checkered White	G4	SZB			X	
Limenitis arthemis arthemis	White Admiral/Banded Purple	G5	S5			X	

Appendix 7. Odonata Recorded From the Study Area

COMMON NAME	*SCIENTIFIC NAME*	Srank	COSSARO	COSEWIC	Odonata Atlas	CVC Observations
Canada Darner	*Aeshna canadensis*	S5			X	
Lance-tipped Darner	*Aeshna constricta*	S5			X	
Lake Darner	*Aeshna eremita*	S5			X	
Variable Darner	*Aeshna interrupta*	S5			X	
Black-tipped Darner	*Aeshna tuberculifera*	S4			X	
Common Green Darner	*Anax junius*	S5			X	
Lilypad Clubtail	*Arigomphus furcifer*	S3				X
Violet Dancer	*Argia fumipennis violacea*	S5				X
Powdered Dancer	*Argia moesta*	S5			X	
Fawn Darner	*Boyeria vinosa*	S5			X	
River Jewelwing	*Calopteryx aequabilis*	S5			X	
Ebony Jewelwing	*Calopteryx maculata*	S5			X	
Calico Pennant	*Celithemis elisa*	S5			X	
Delta-spotted Spiketail	*Cordulegaster diastatops*	S3				X
Twin-spotted Spiketail	*Cordulegaster maculata*	S4				X
Arrowhead Spiketail	*Cordulegaster obliqua*	S1				X
American Emerald	*Cordulia shurtleffi*	S5				X
Aurora Damsel	*Chromagrion conditum*	S5			X	
Racket-tailed Emerald	*Dorocorulia libera*	S5				X
Common Baskettail	*Epitheca cynosura*	S5				X
Spiny Baskettail	*Epitheca spinigera*	S5				X
Rainbow Bluet	*Enallagma antennatum*	S4			X	
Boreal Bluet	*Enallagma boreale*	S5			X	
Tule Bluet	*Enallagma carunculatum*	S5			X	
Familiar Bluet	*Enallagma civile*	S5				X
Marsh Bluet	*Enallagma ebrium*	S5			X	
Stream Bluet	*Enallagma exsulans*	S5			X	
Hagen's Bluet	*Enallagma hageni*	S5			X	
Lancet Clubtail	*Gomphus exilis*	S5			X	
Harpoon Clubtail	*Gomphus descriptus*	S3				X
Ashy Clubtail	*Gomphus lividus*	S4				X
Dusky Clubtail	*Gomphus spicatus*	S5			X	
Fragile Forktail	*Ischnura posita*	S4			X	
Eastern Forktail	*Ischnura verticalis*	S5			X	
Spotted Spreadwing	*Lestes congener*	S5			X	
Common Spreadwing	*Lestes disjunctus*	S5			X	
Emerald Spreadwing	*Lestes dryas*	S5			X	
Amber-winged Spreadwing	*Lestes eurinus*	S3				X
Elegant Spreadwing	*Lestes inaequalis*	S4			X	
Slender Spreadwing	*Lestes rectangularis*	S5			X	
Lyre-tipped Spreadwing	*Lestes unguiculatus*	S5			X	
Dot-tailed Whiteface	*Leucorrhinia intacta*	S5				X
Red-waisted (Belted) Whiteface	*Leucorrhinia proxima*	S5				X
Widow Skimmer	*Libellula luctuosa*	S5			X	
Twelve-spotted Skimmer	*Libellula pulchella*	S5			X	
Four-spotted Skimmer	*Libellula quadrimaculata*	S5			X	
Sedge Sprite	*Nehalennia irene*	S5			X	
Rusty Snaketail	*Ophiogomphus rupinsulensis*	S3			X	
Common Whitetail	*Plathemis lydia*	S5			X	
Saffron-bordered Meadowhawk	*Sympetrum costiferm*	S4			X	
White-faced Meadowhawk	*Sympetrum obtrusum*	S5			X	
Yellow-legged (Banded) Meadowhawk	*Sympetrum vicinum*	S5				X
Black Saddlebags	*Tramea lacerata*	S4				X

APPENDIX VIII

Existing Study Area Fisheries Data

LGL LIMITED
environmental research associates
3365 Harvester Road, Ground Level
Burlington, Ontario L7N 3N2
Tel: 905-333-1667 Fax: 905-333-2660
e-mail: burlington@lgl.com

Head Office: 22 Fisher St., P.O. Box 280, King City, Ontario CANADA L7B 1A6 Tel: 905-833-1244 Fax: 905-833-1255 e-mail: kingcity@lgl.com web: www.lgl.com

December 5, 2006

Ministry of Natural Resources – Aurora (GTA) District Office
Attention: Ms. Karen Golby/Mark Heaton → WARREN
50 Bloomington Road W.
Aurora, ON L4G 3G8
Fax Number: (905) 713-7361

FYI, – RETURN TO KAREN FOR FILING. THANKS MARK

Dear Ms. Golby/Mr. Heaton:

Re: Fish Community Monitoring within Credit River Watershed in Streams that are Expected to be Impacted by the Quarry Application made by James Dick Aggregates
Olde Baseline Road and Winston Churchill Boulevard
Town of Caledon, Regional Municipality of Peel

This letter is intended to satisfy the condition of permit #1031669. LGL Limited conducted fish surveys to monitor the fish community within the Credit River watershed in streams that are expected to be impacted by the quarry application being made by James Dick Aggregates at the corner of Olde Baseline Road and Winston Churchill Boulevard, located in the Town of Caledon, Regional Municipality of Peel. Please see attached map of the sites surveyed for your reference.

A total of 2 biomass stations were examined by using a Smith-Root LR24 backpack electrofishing unit during August 17, 2006. At these predetermined stations, lengths and weights of fish were recorded. LGL Limited staff members involved in this task were Ken Glasbergen, and Melissa Kiddie and were assisted by Brian Morrison and Sarah Quesniele from the Credit Valley Conservation electrofishing crew. Additional exploratory electrofishing stations at as roadside sampling stations at Mississauga Road south of The Grange Sideroad and 5th Sideroad at 10th Line (completed June 28, 2006 by Andrew Bruce and Martin O'Halloran of LGL Limited),
Second Creek upstream and downstream of the Caledon Rail Trail (completed Sept. 21, 2006 by Melissa Kiddie and Ken Glasbergen) as well as Second Creek in the upper region and Fourth Creek-South Branch (completed Nov.1, 2006 by Ken Glasbergen and Ecoplans Limited).

The Field Collection Records (FCR's), as well as specific station maps have been attached for your records.

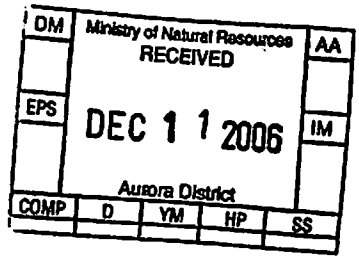
If you have any questions or requests feel free to contact me at our Burlington Office.

Yours truly,

LGL Limited environmental research associates

Melissa Kiddie

Melissa Kiddie B.Sc., ERPG
Field Biologist



Licence to Collect Fish for Scientific Purposes #1031669 (Credit River Watershed expected to be impacted from the quarry application being made by James Dick Aggregates), 2006

Objectives

To monitor the fish community within the Credit River watershed including permanent, semi-permanent, and intermittent streams, that are expected to be impacted by the quarry application being made by James Dick Aggregates at the corner of Olde Baseline Road and Winston Churchill Boulevard, located in the Town of Caledon, Regional Municipality of Peel.

Methods

Exploratory roadside electrofishing stations were completed on June 28, 2006 using a Smith-root LR24 backpack electrofisher. This task was completed by LGL Limited staff Martin O'Halloran and Andrew Bruce. The fish community in Rogers Creek and Second Creek was sampled on August 17, 2006 using a Smith-Root LR24 backpack electrofisher. Lengths and weights of the fish were recorded at two (2) predetermined sites and all fish caught were returned to where they were found. LGL Limited staff members involved in this task were Ken Glasbergen and Melissa Kiddie and were assisted by the Credit Valley Conservation electrofishing crew. Exploratory electrofishing was completed on Second Creek upstream and downstream of the Caledon Rail Trail with a Smith-Root LR24 electrofisher on Sept. 22, 2006 by LGL staff Ken Glasbergen and Melissa Kiddie. Exploratory electrofishing was also completed on Second Creek in the upper region and Fourth Creek-South Branch with a Smith-Root LR24 electrofisher on Nov.1, 2006.

Number and Species Caught

Rogers Creek

West Branch

Field Collection Record for 5th Sideroad and 10th Line (Exploratory; Roadside) (June 28, 2006)

- Fathead minnow (*Pimephales promelas*)
- Blacknose dace (*Rhinichthys atratulus*)

Main Branch

Field Collection Record for Mackenzie property (Property 15) (4948 Winston Churchill Boulevard) (biomass station) (weight is in g and length is in mm) (Aug.17, 2006)

- 1 Largemouth bass (*Micropterus salmoides*); weight= 479; length= 315
- 11 Largemouth bass (*Micropterus salmoides*); weight=50; Max=96, Avg.=77; Min=45
- 184 Creek chub (*Semotilus atromaculatus)*; weight=820; Max=176, Avg.=101; Min=58
- 3 Brook trout (*Salvelinus fontinalis*); weight= 243; Max=205, Avg.=198, Min=190
- 35 White sucker (*Catostomus commersoni*); weight=374; Max=181, Avg.=135, Min=50
- 222 Blacknose dace (*Rhinichthys atratulus*); weight=750; Max= 95, Avg.=70, Min= 45
- 39 Fathead minnow (*Pimephales promelas)*; weight= 111; Max= 68, Avg.=55, Min=44
- 12 Brook stickleback (*Culaea inconstans*); weight= 15; Max=51, Avg.=40, Min= 38
- 1 Northern redbelly dace (*Phoxinus eos*); weight= 1; length= 55

Second Creek

Main Branch

Field Collection Record for Mississauga Road south of The Grange Sideroad (Exploratory; Roadside) (June 28, 2006)

- Blacknose dace (*Rhinichthys atratulus*)
- Creek chub (*Semotilus atromaculatus*)
- Northern redbelly dace (*Phoxinus eos*)

Field Collection Record for Dimpflmeier property (Property 39) (77 Ballinafad Road) (biomass station) (weight is in g and length is in mm) (Aug. 17, 2006)

- 38 Creek chub (*Semotilus atromaculatus)*; weight= 384; Max=185, Avg. 70, Min=30
- 20 Brook trout (*Salvelinus fontinalis*); weight= 174; Max=250, Avg. 176, Min=115
- 133 Blacknose dace (*Rhinichthys atratulus)*; weight= 254; Max= 76, Avg.=53, Min= 30
- 99 Northern redbelly dace (*Phoxinus eos*); weight= 192; Max= 55, Avg. 50, Min= 48
- 14 Pumpkinseed (*Lepomis gibbossus*); weight= 134; Max= 107, Avg.= 72, Min= 54
- 77 Brook stickleback (*Culaea inconstans)*; weight= 65; Max= 47, Avg.=45, Min=27
- 93 Fathead minnow (*Pimephales promelas)*; weight= 132; Max= 62, Avg.=46, Min= 30

Field Collection Record for Second Creek- Caledon Rail Trail (Exploratory; downstream) (Sept. 21, 2006)

- 6 Fathead minnow (*Pimephales promelas*)
- 3 Common shiner (*Luxilus cornutus*)
- 1 Brown trout (10 inch) (*Salmo trutta*)
- 2 Brown trout (*Salmo trutta*)
- 13 Creek chub (*Semotilus atromaculatus*)
- 6 White sucker (*Catostomus commersoni*)
- 2 Rainbow trout (*Oncorhynchus mykiss*)
- 3 Blacknose dace (*Rhinichthys atratulus*)
- 2 Northern hog sucker (*Hypentelium nigricans*)
- 3 Bluntnose minnow (*Pimephales notatus*)
- 1 Fantail darter (*Etheostoma flabellare*)
- 1 Unknown darter

Field Collection Record for Second Creek- Caledon Rail Trail (Exploratory; upstream) (Sept. 21, 2006)

- 25 Creek chub (*Semotilus atromaculatus*)
- 13 Blacknose dace (*Rhinichthys atratulus*)

Field Collection Record for Second Creek- upper region (Exploratory) (Nov.1, 2006)

- Creek chub (*Semotilus atromaculatus*)

Fourth Creek-South Branch

Field Collection Record for Fourth Creek-South Branch (Exploratory) (Nov.1, 2006)

- Creek chub

Ontario

[redacted]

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1031669	Licencee Name: Melissa Kiddie		
Business Name: LGL Limited		Telephone: (905)333-1667	Fax: (905)333-2660
Mailing Address: 3365 Harvester Rd Ground Level		Town/City Burlington	Postal Code: L7N 3N2
Waterbody Name: Rogers Creek - West Branch		Township/Municipality: Peel	
General Description of Sampling Site Location/Access: Corner of 5th Sideroad and 10th Line (Exploratory – roadside sampling)			
Collection Site No. 1 of 1	Site UTM Coordinates: ☐☐☐☐☐☐ E ☐☐☐☐☐☐☐ N		
Collection Date: June 28/06	Start Time:	End Time:	Duration (hrs)
Electrofisher Seconds:	Length of Station (m)	Water Temp. (C)	Air Temp. (C)
Stream Type: ☐ Intermittent	☑ Permanent	Watercress Present: ☐ Yes	☐ No

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)*

Bottom Type by Percent: *(Total = 100%)*					
	Rock	Boulder	Rubble	Gravel	Sand
	Silt	Clay	Muck	Marl	Detritus
	Other *(Description)*				

Current: ☐ Still ☐ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☐ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☐ None

Cover (Shore): ☐ None ☐ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☐ None ☐ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☑ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 28 Month 06 Year 2006

Collectors:
H. O'HALLORAN, A BRUCE

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*
Exploratory roadside sampling

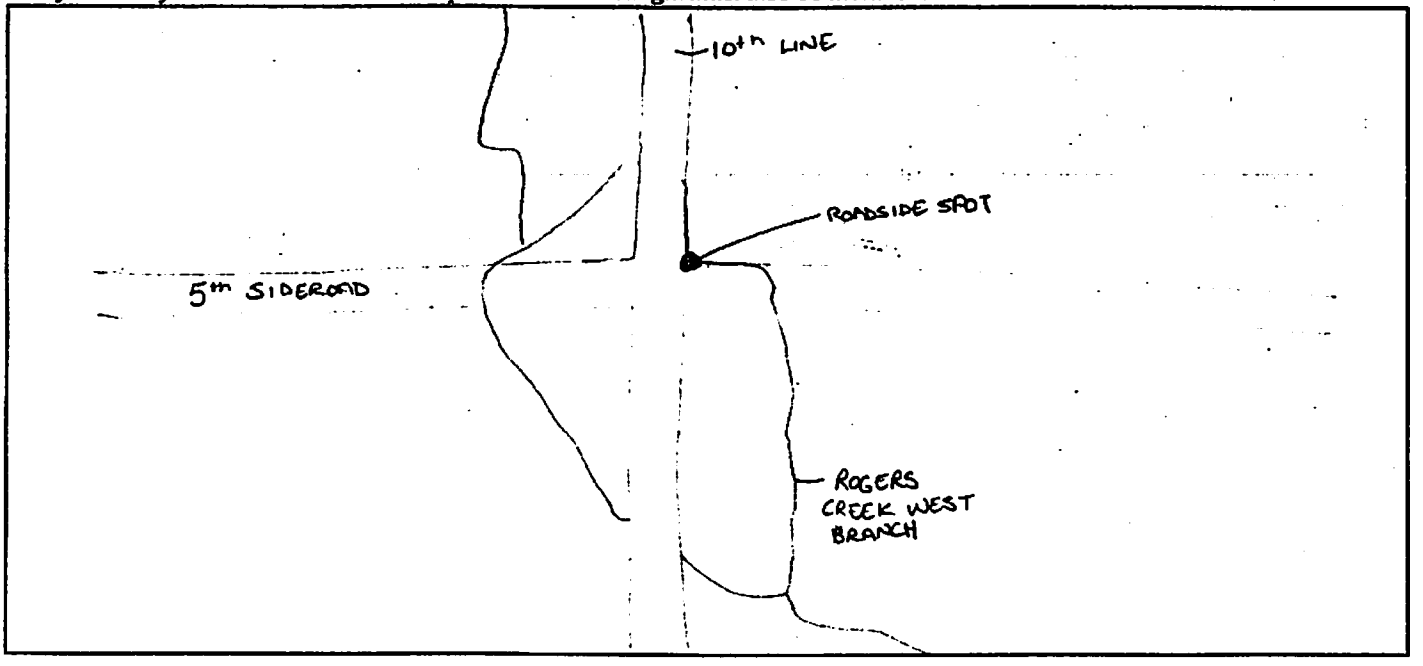
Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept	Size Range (T.L. in mm)
Fathead Minnow				
Blacknose dace				
Identified By:				Date:

Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



Ontario

[redacted]

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1031669	Licencee Name: Melissa Kiddie		
Business Name: LGL Limited	Telephone: (905)333-1667	Fax: (905)333-2660	
Mailing Address: 3365 Harvester Rd Ground Floor	Town/City Burlington	Postal Code: L7N 3N2	
Waterbody Name: Second Creek	Township/Municipality: Peel		
General Description of Sampling Site Location/Access: Mississauga Road South of The Grange Sideroad (Exploratory - roadside)			
Collection Site No. 1 of 1	Site UTM Coordinates: E N		
Collection Date: June 28/06	Start Time:	End Time:	Duration (hrs)
Electrofisher Seconds:	Length of Station (m)	Water Temp. (C)	Air Temp. (C)
Stream Type: ☐ Intermittent	☑ Permanent	Watercress Present: ☐ Yes ☐ No	

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)*

Bottom Type by Percent: *(Total = 100%)*						
	Rock		Boulder	Rubble	Gravel	Sand
	Silt		Clay	Muck	Marl	Detritus
	Other *(Description)*					

Current: ☐ Still ☐ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☐ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☐ None

Cover (Shore): ☐ None ☐ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☐ None ☐ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☑ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 28 Month 06 Year 2006

Collectors:
M O'HALLORAN, A. BRUCE

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*

EXPLORATORY ROADSIDE STATION

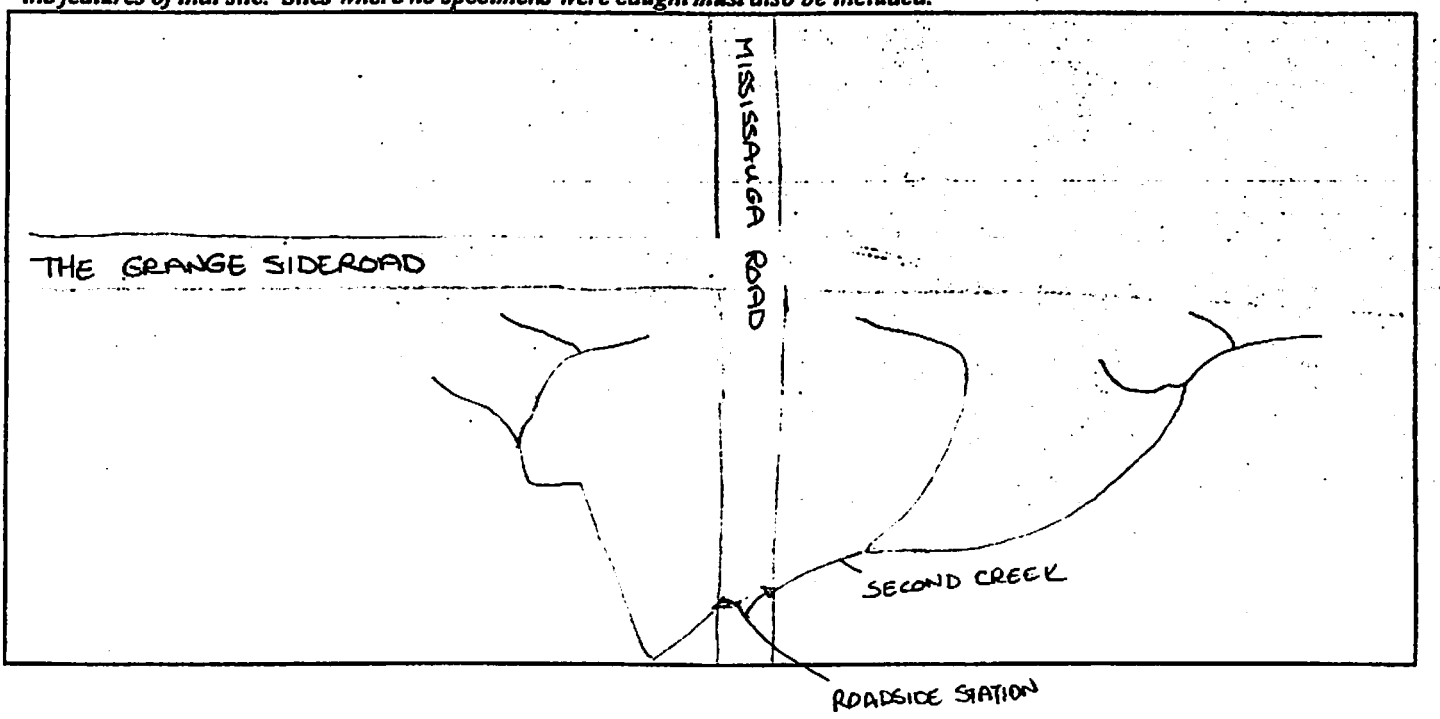
Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept	Size Range (T.L. in mm)
Blacknose dace				
Creek chub				
Northern redbelly dace				
Identified By:				Date:

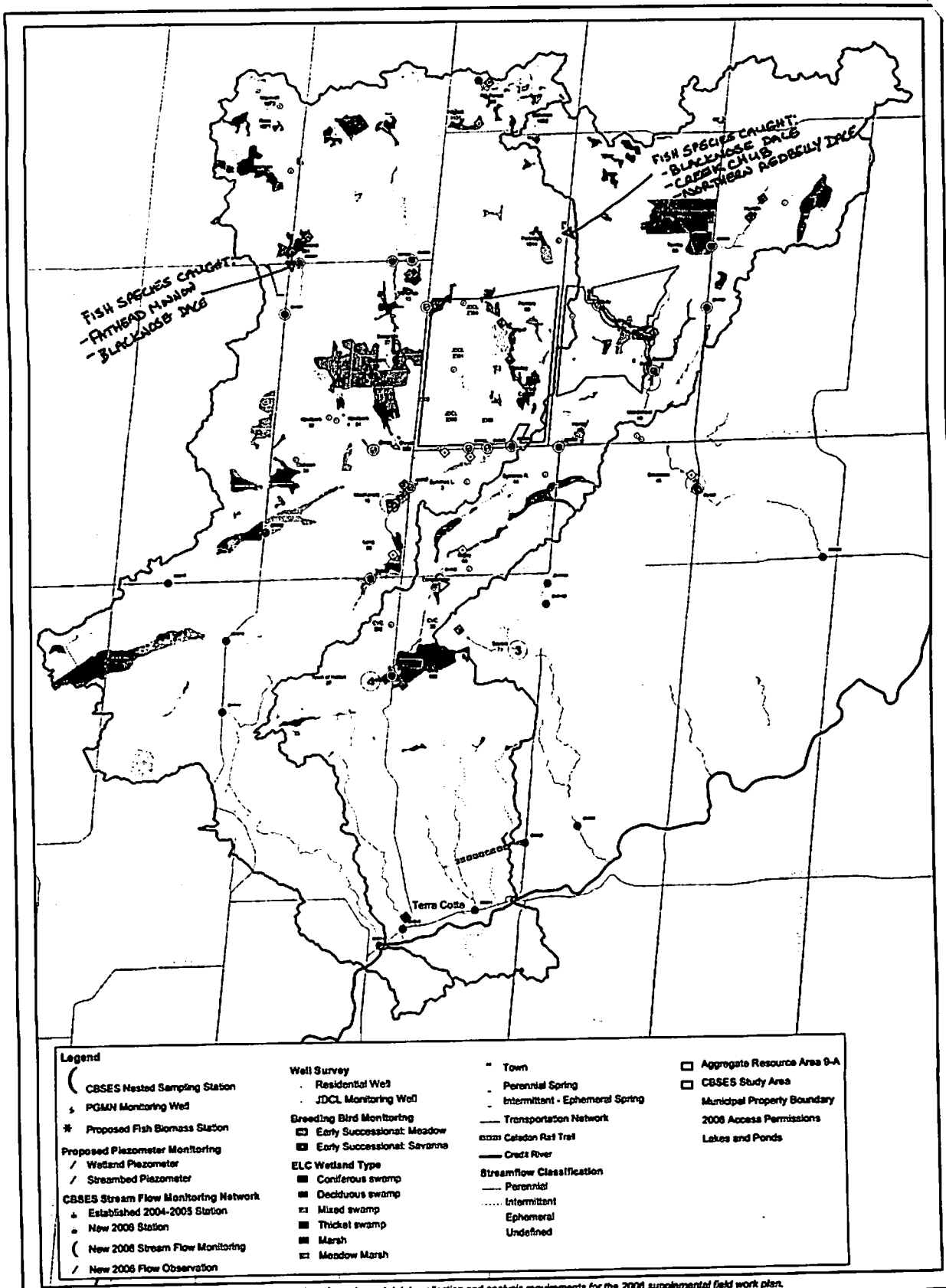
Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



, ROADSIDE ELECTROFISHING STATIONS
June 28/06

DRAFT



Refer to Schedules 1, 2, and 3 for complete description of supplemental data collection and analysis requirements for the 2006 supplemental field work plan.

350 0 350 700 1,050 1,400 1,750
Metres

CBSES Resource Area 9-A

Base mapping: Revised from Credit Valley Conservation, 2004
Municipal Property Boundaries, MHBC 2005
Projection: UTM (Zone 17N) NAD 83

Proposed Monitoring Locations
2006 Supplemental Field Work Plan

Aggregate Resource Area 9-A CBSES
Town of Caledon, Ontario

Ontario

[redacted]

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1031669	Licencee Name: Melissa Kiddie		
Business Name: LGL Limited	Telephone: (905) 333-1667	Fax: (905) 333-2660	
Mailing Address: 3365 Harvester Rd Ground Level	Town/City Burlington	Postal Code: L7N 3W	
Waterbody Name: Rogers Creek	Township/Municipality: Peel		
General Description of Sampling Site Location/Access: 4948 Winston Churchill Boulevard			
Collection Site No. 1 of 1	Site UTM Coordinates: 5 8 2 4 0 2 E 4 8 4 3 2 9 0 N		
Collection Date: Aug. 17/06	Start Time: 11:05 AM	End Time: 12:04 PM	Duration (hrs) 59 min
Electrofisher Seconds: 638	Length of Station (m) 40	Water Temp. (C) 15.8	Air Temp. (C) 20.4
Stream Type: ☐ Intermittent ☑ Permanent		Watercress Present: ☐ Yes ☑ No	

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)*

Bottom Type by Percent: *(Total = 100%)*					
	Rock	Boulder	Rubble 60%	Gravel 20%	Sand 15%
	Silt	Clay	Muck	Marl	Detritus 5%
	Other *(Description)*				

Current: ☐ Still ☑ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☑ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☑ None

Cover (Shore): ☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☑ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 1 7 Month 0 8 Year 2 0 0 6

Collectors: Melissa Kiddie, Ken Glasbergen, Brian Harrison, Sarah Quesniele

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*

Width

1	2.94	5	2.20	9	2.10
2	2.70	6	2.47	10	0.95
3	2.15	7	2.20		
4	1.90	8	3.10		

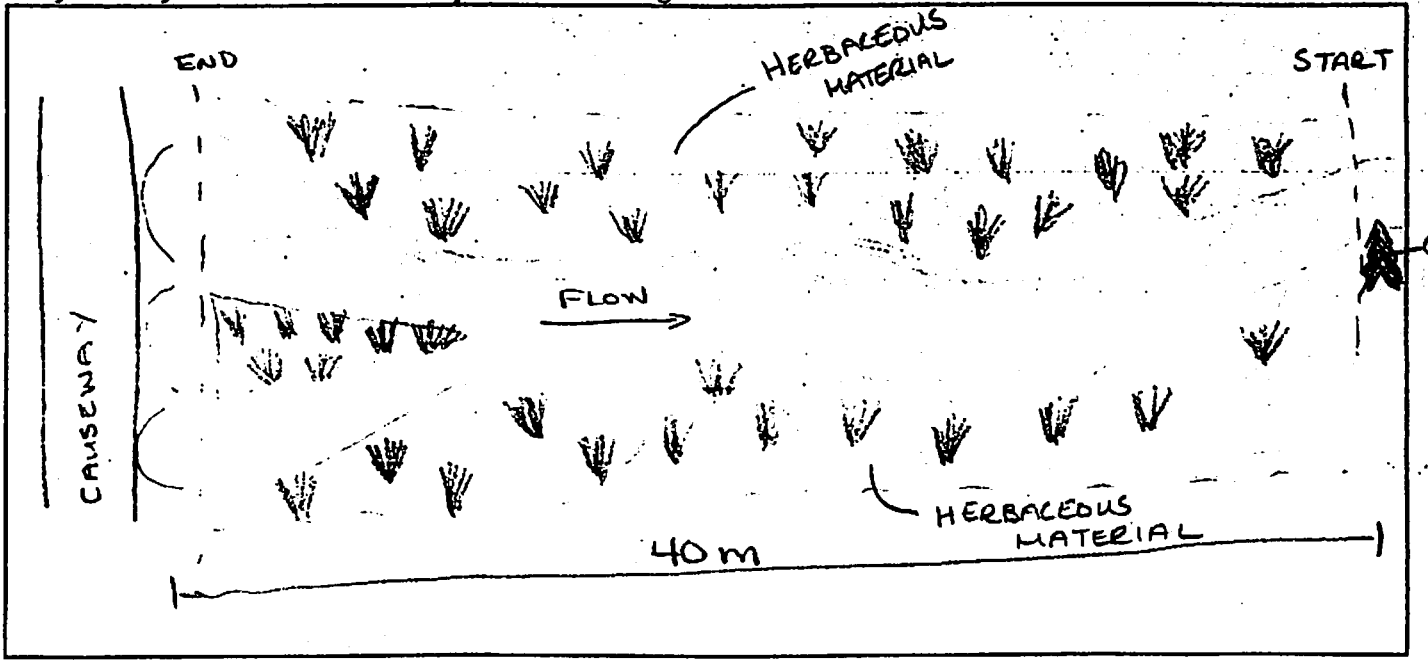
Continued on Reverse

Species Captured

Species	Code	No. Caught	~~No. Kept~~ weight (g)	Size Range (T.L. in mm)
Largemouth bass		1	479	315
Largemouth bass		11	50	Max=96 Avg=77 Min=45
Creek Chub		126	159	Max=176 Avg=101 Min=58
		58	661	
Brook trout		3	243	Max=205 Avg=198 Min=190
White sucker		35	374	Max=181 Avg=135 Min=50
Blacknose dace		222	750	Max=95 Avg=70 Min=45
Fathead minnow		39	111	Max=68 Avg=55 Min=44
Brook stickleback		12	15	Max=51 Avg=46 Min=38
Northern redbelly dace		1	1	Max=55
Identified By:				Date: Aug 17/06

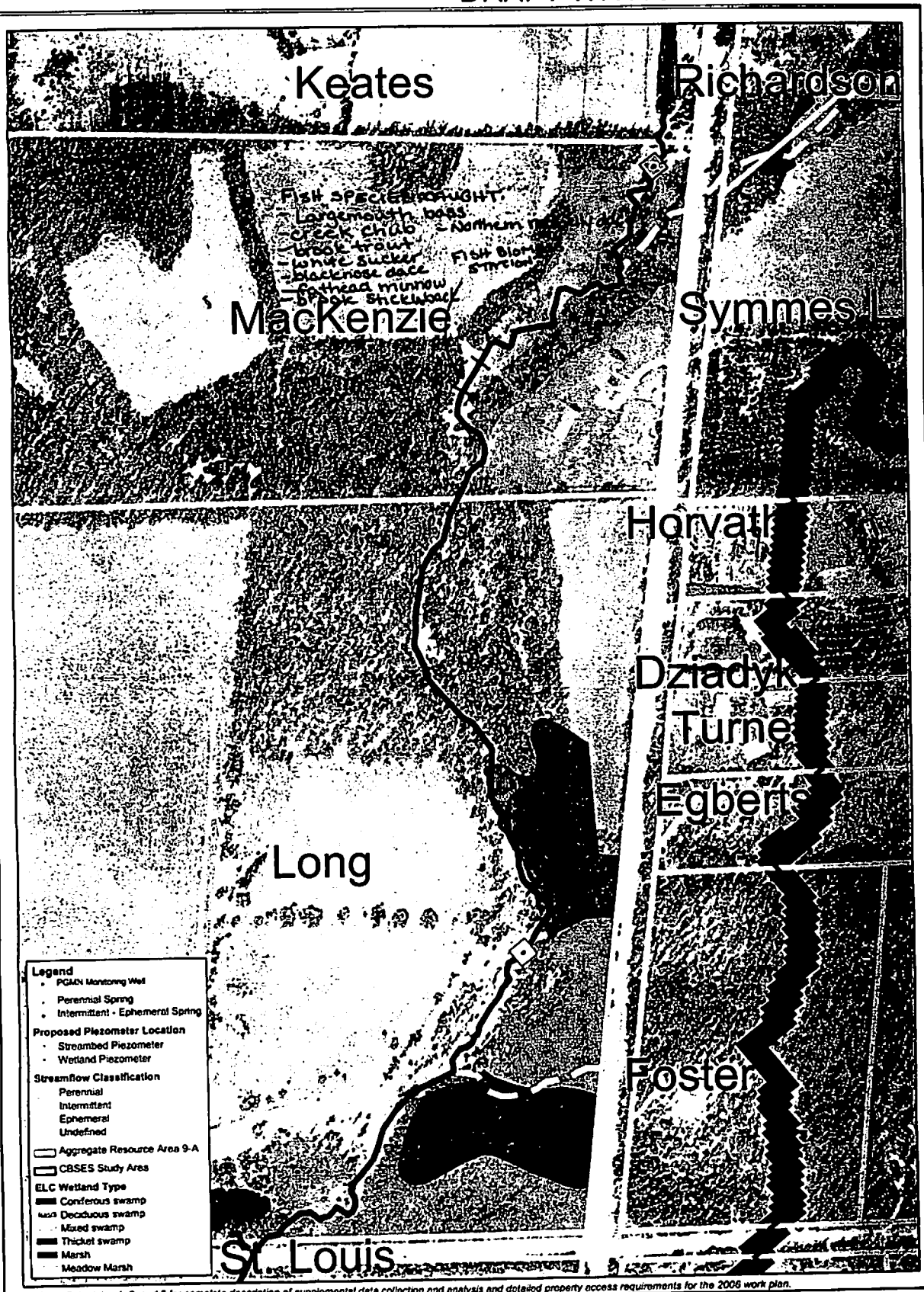
Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



FISH BIOMASS STATION - August 17/2006
Mackenzie Property 4948 Winston Churchill Boulevard

DRAFT WITHOUT PREJUDICE



Refer to Schedules 1, 2, and 3 for complete description of supplemental data collection and analysis and detailed property access requirements for the 2006 work plan.

30 0 30 60 90 120 150
Metres

2006 PROPOSED PIEZOMETER LOCATIONS

CBSES Resource Area 9-A

Base mapping: Revised from Credit Valley Conservation, 2004
Municipal Property Boundaries, MHBC 2005
Projection: UTM (Zone 17N) NAD 83

Aggregate Resource Area 9-A CBSES
Town of Caledon, Ontario

036172(INT500)GIS-WA000 CBSES Property Access & Work Plan 2006 - REVISED April 13, 2006 Prezometers

Ontario

[redacted]

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1031669	Licencee Name: Melissa Kiddle		
Business Name: LGL limited		Telephone: (905)333-1667	Fax (905)333-2660
Mailing Address: 3365 Harvester Rd Ground Level		Town/City Burlington	Postal Code: L7N 3N2
Waterbody Name: Second Creek		Township/Municipality: Peel	

General Description of Sampling Site Location/Access:
77 Ballinafad Road

Collection Site No. 1 of 1	Site UTM Coordinates: 5 8 2 7 8 6 E 4 8 4 3 0 2 4 N		
Collection Date: Aug. 17/06	Start Time: 9:10 AM	End Time: 10:10 AM	Duration (hrs) 1
Electrofisher Seconds: 1273	Length of Station (m) 40	Water Temp. (C) 15.8	Air Temp. (C) 20.2
Stream Type: ☐ Intermittent ☑ Permanent		Watercress Present: ☐ Yes ☑ No	

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)*

Bottom Type by Percent: *(Total = 100%)*	Rock 5%	Boulder	Rubble	Gravel 60%	Sand
	Silt 20%	Clay	Muck 15%	Marl	Detritus
	Other *(Description)*				

Current: ☑ Still ☐ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☑ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☑ Emergent ☐ None

Cover (Shore): ☐ None ☑ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☐ None ☐ Sparse ☐ Moderate ☑ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☑ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 1 7 Month 0 8 Year 2 0 0 6

Collectors:
Melissa Kiddle, Ken Glasbergen, Brian Harrison, Sarah Quesnele

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*
Appears gravel has been added to bottom of channel; blackspot on blacknose dace (10%)

Width	1 3.40	4 3.05	7 3.42	10 4.65	
	2 3.03	5 3.43	8 4.12		
	3 2.90	6 3.62	9 4.18		

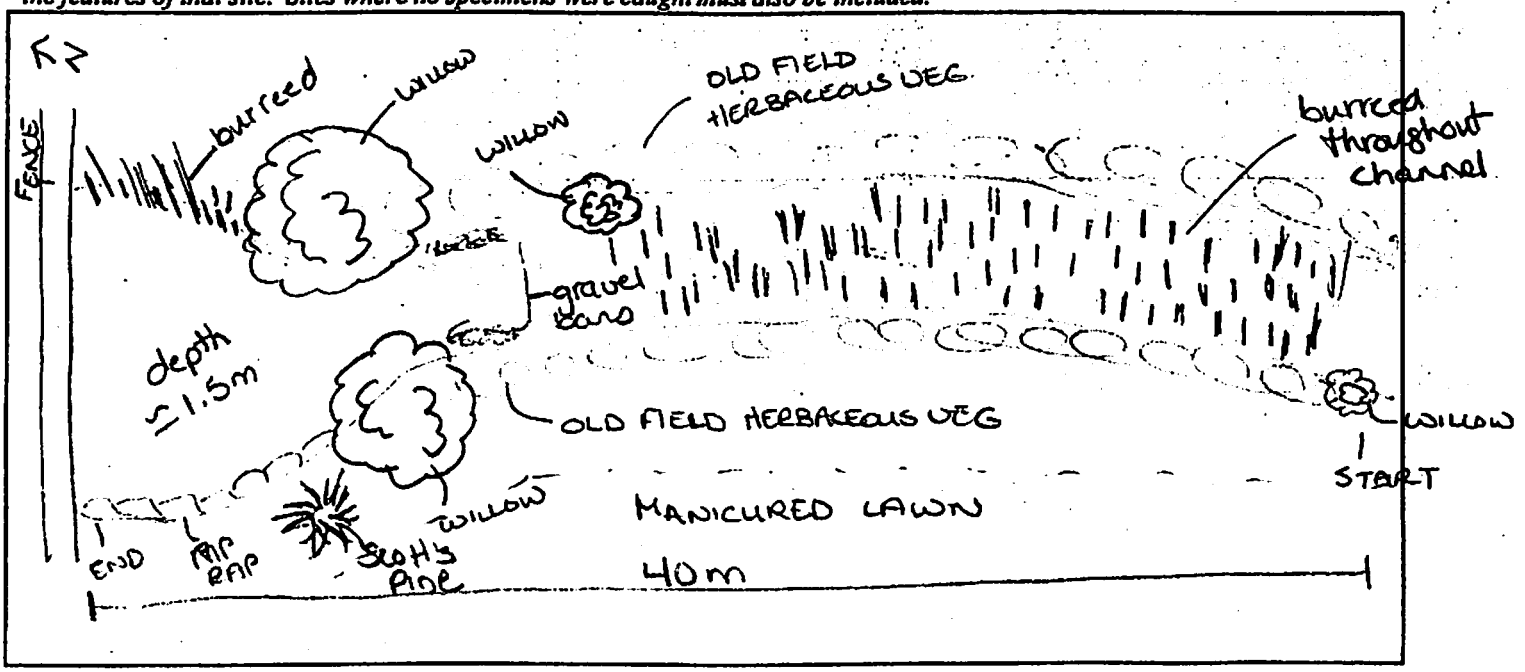
Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept (weight (g))	Size Range (T.L. in mm)
Creek chub		38	384	Max=185 Avg=70 Min=30
Brook trout		20	174	Max=250 Avg=176 Min=115
Blacknose dace		133	254	Max=76 Avg=53 Min=30
Northern redbelly dace		99	192	Max=55 Avg=50 Min=48
Pumpkinseed		14	134	Max=107 Avg=72 Min=64
Brook stickleback		77	65	Max=47 Avg=45 Min=27
Fathead minnow		93	132	Max=62 Avg=46 Min=30
Identified By:				Date: Aug. 17/06

Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



FISH RICHASS STATION - AUGUST 17/2006
DIMPFLMEIER PROPERTY 77 BALLINAFAD RD

CBSES

LGL

Data projected to UTM (Zone 17N) NAD 83
Produced by LGL environmental research associates Ltd., 2005

Field Data Collection
A. Dimplfmeier
Aggregate Resource Area 9-A CBSES
Town of Caledon, Ontario

FDC_39_221 Aug31, 2005

Ontario

[redacted]

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1031669	Licencee Name: Melissa Kiddie		
Business Name: L&L Limited	Telephone (905) 333-1667	Fax: (905) 333-2660	
Mailing Address: 3365 Harvester Rd Ground Level	Town/City Burlington	Postal Code: L7N 3N2	
Waterbody Name: Second Creek	Township/Municipality: Peel		
General Description of Sampling Site Location/Access: Caledon Rail Trail West of Winston Churchill Blvd; upstream			
Collection Site No. 1 of 1	Site UTM Coordinates: ☐☐☐☐☐☐ E ☐☐☐☐☐☐☐ N		
Collection Date: Sept. 22/06	Start Time:	End Time:	Duration (hrs)
Electrofisher Seconds:	Length of Station (m)	Water Temp. (C) 11.5	Air Temp. (C) 14.7
Stream Type: ☐ Intermittent ☑ Permanent	Watercress Present: ☐ Yes ☐ No		

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)*

Bottom Type by Percent: *(Total = 100%)*					
	Rock	Boulder 25%	Rubble 35%	Gravel	Sand
	Silt	Clay 40%	Muck	Marl	Detritus
	Other *(Description)*				

Current: ☐ Still ☑ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☑ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☑ None

Cover (Shore): ☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☐ None ☑ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☑ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 22 Month 09 Year 2006

Collectors:
Melissa Kiddie, Ken Glasbergen

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*
Exploratory electrofishing

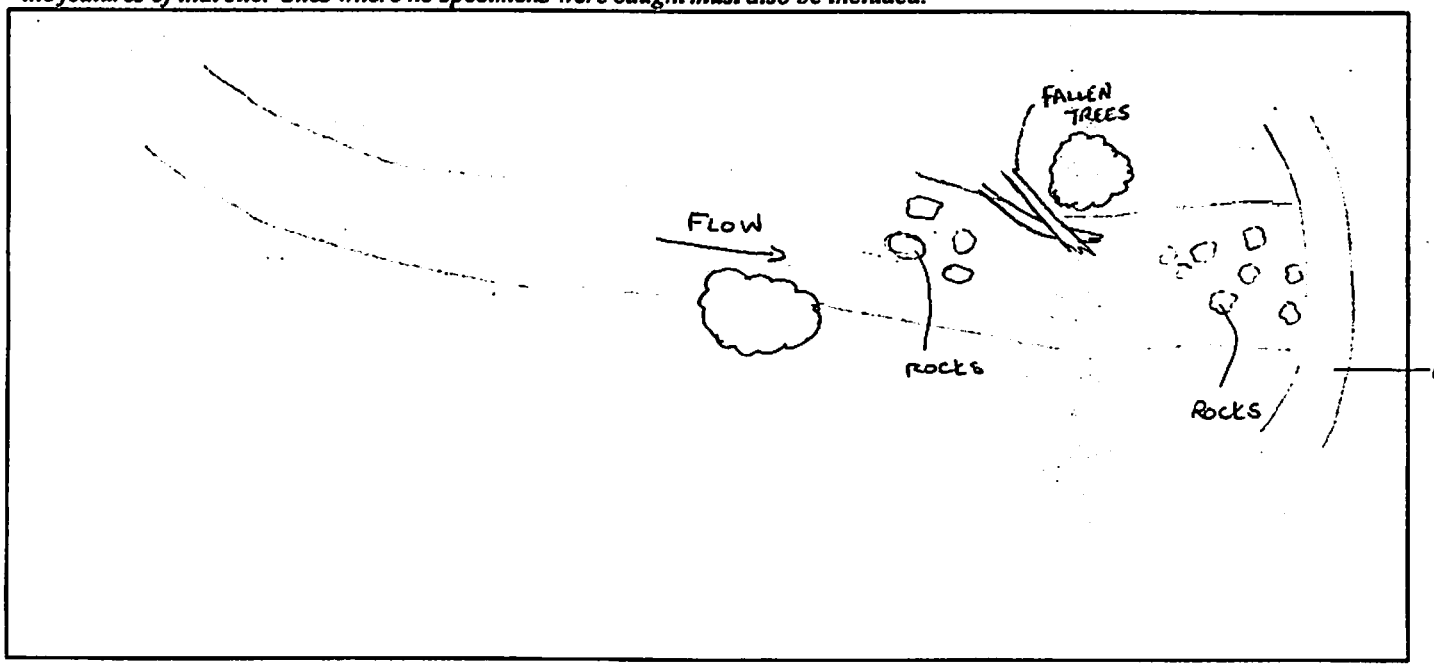
Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept	Size Range (T.L. in mm)
Creek chub		25		
Blacknose dace		13		
Identified By:				Date:

Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



Ontario

[redacted]

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1031669	Licencee Name: Melissa Kiddie		
Business Name: LGL Limited	Telephone: (905) 333-1664	Fax: (905) 333-2660	
Mailing Address: 3365 Harvester Rd Ground Floor	Town/City: Burlington	Postal Code: L7N 3N2	
Waterbody Name: Second Creek	Township/Municipality: Peel		
General Description of Sampling Site Location/Access: Caledon Rail Trail West of Winston Churchill Blvd, Downstream			
Collection Site No. 1 of 1	Site UTM Coordinates: 3 0 9 1 3 4 E 5 1 0 1 0 6 1 N		
Collection Date: Sept. 21/06	Start Time:	End Time:	Duration (hrs)
Electrofisher Seconds:	Length of Station (m)	Water Temp. (C) 11.6	Air Temp. (C) 14.7
Stream Type: ☐ Intermittent ☑ Permanent		Watercress Present: ☐ Yes ☑ No	

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)*

Bottom Type by Percent: *(Total = 100%)*					
	Rock	Boulder 20%	Rubble 20%	Gravel	Sand
	Silt	Clay 60%	Muck	Marl	Detritus
	Other *(Description)*				

Current: ☐ Still ☑ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☑ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☑ None

Cover (Shore): ☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☐ None ☑ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☑ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 2 1 Month 0 9 Year 2 0 0 6

Collectors:
Melissa Kiddie, Ken Glasbergen

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*
- exploratory electrofishing

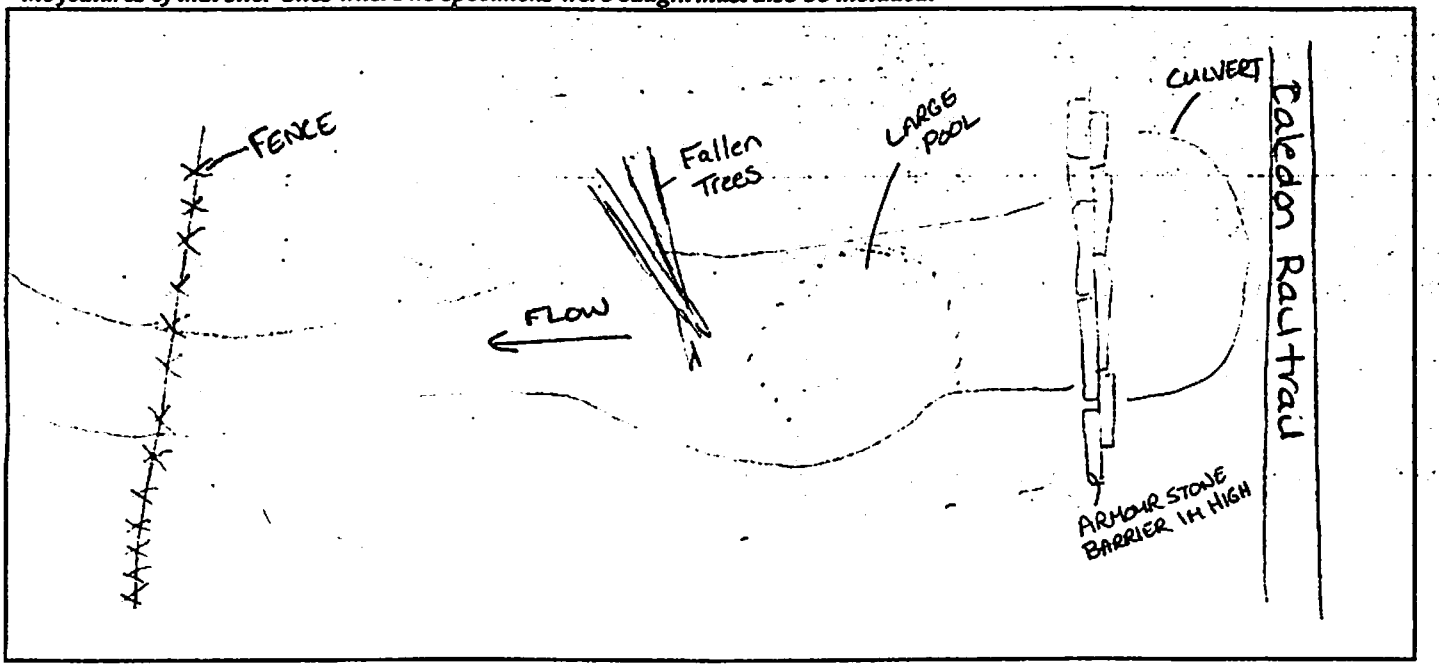
Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept	Size Range (T.L. in mm)
Fathead minnow		6		
Common shiner		3		
Brown trout (10 inch)		1		
Brown trout		2		
Creek chub		13		
White sucker		6		
Rainbow trout		2		
Blacknose dace		3		
Hogsucker		2		
Bluntnose minnow		3		
Fantail darter		1		
Unknown darter		1		
Identified By:				Date:

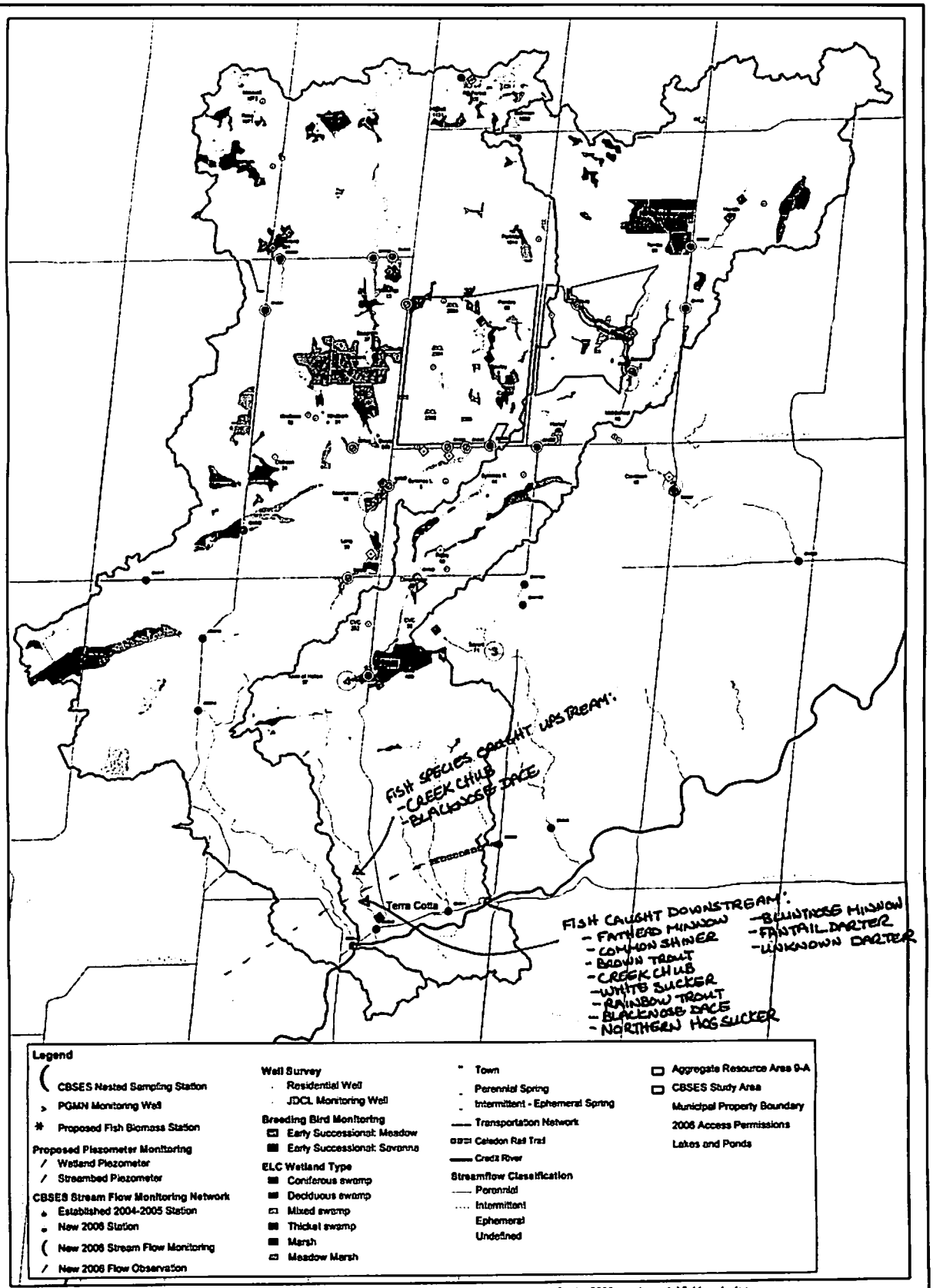
Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



CALEDON RAIL TRAIL
EXPLORATORY ELECTROFISHING - SEPT. 22/06

DRAFT



Refer to Schedules 1, 2, and 3 for complete description of supplemental data collection and analysis requirements for the 2006 supplemental field work plan.

350 0 350 700 1,050 1,400 1,750
Metres

CBSES Resource Area 9-A

Base mapping: Revised from Credit Valley Conservation, 2004
Municipal Property Boundaries, MHBC 2005
Projection: UTM (Zone 17N) NAD 83

Proposed Monitoring Locations
2006 Supplemental Field Work Plan

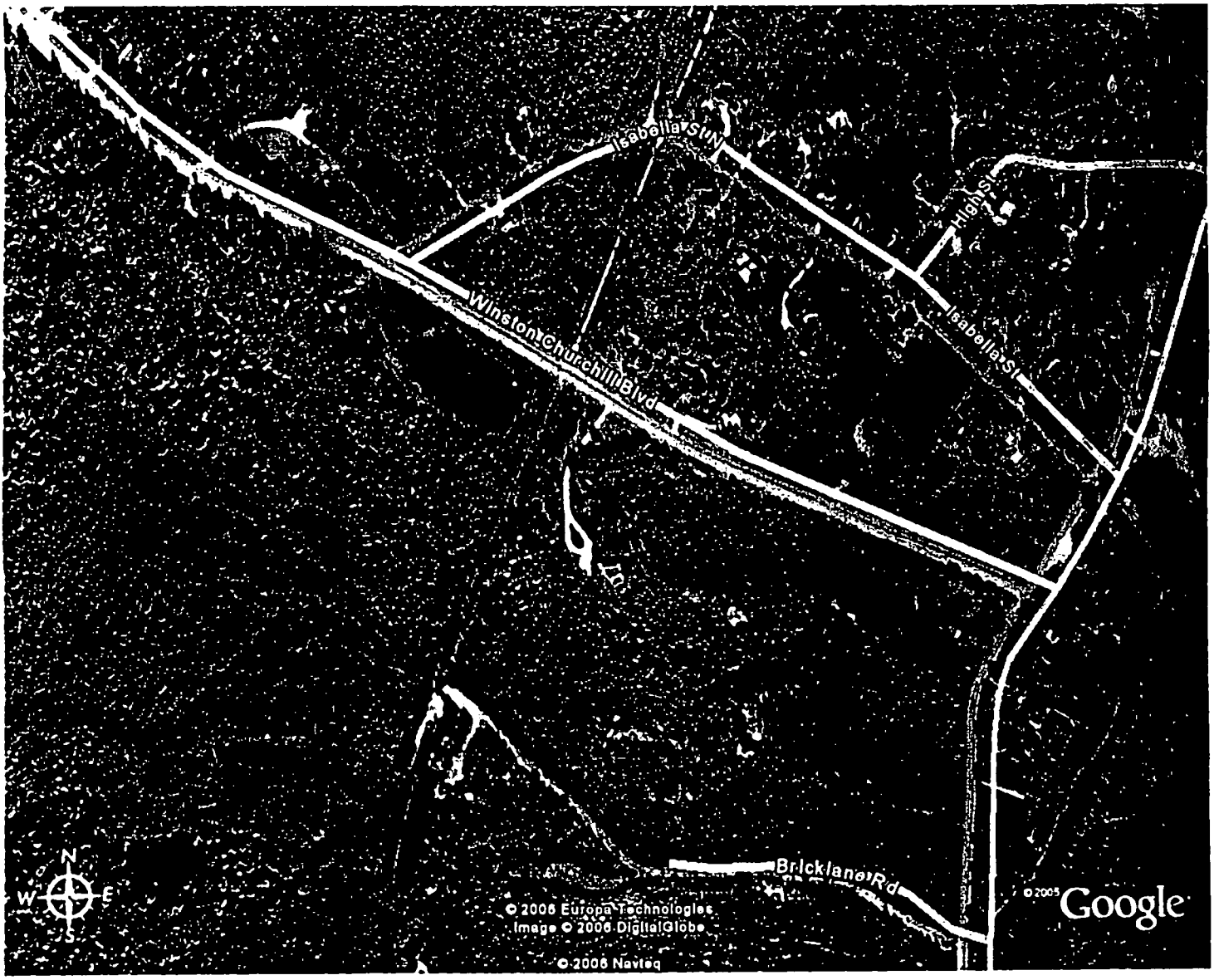
Aggregate Resource Area 9-A CBSES
Town of Caledon, Ontario

CALEDON RAIL TRAIL

EXPLORATORY ELECTROFISHING - SEPT. 22/06

SECOND CREEK

- -UPSTREAM
- -DOWNSTREAM



Ontario

[redacted]

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1031669	Licencee Name: Melissa Kiddie		
Business Name: LGL Limited	Telephone: (905) 333-1667	Fax: (905) 333-2660	
Mailing Address: 3365 Harvester Rd Suite 4	Town/City Burlington	Postal Code: L7N 3N2	
Waterbody Name: Fourth Creek - South Branch	Township/Municipality: Peel		
General Description of Sampling Site Location/Access: 15236 Mississauga Road			
Collection Site No. 1 of 1	Site UTM Coordinates: ☐☐☐☐☐☐ E ☐☐☐☐☐☐☐ N		
Collection Date: Nov. 1/06	Start Time:	End Time:	Duration (hrs)
Electrofisher Seconds:	Length of Station (m)	Water Temp. (C)	Air Temp. (C)
Stream Type: ☐ Intermittent ☐ Permanent	Watercress Present: ☐ Yes ☐ No		

Waterbody Type: ☐ Spring ☐ Canal ☐ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)*

Bottom Type by Percent: *(Total = 100%)*					
	Rock	Boulder	Rubble	Gravel	Sand
	Silt	Clay	Muck	Marl	Detritus
	Other *(Description)*				

Current: ☐ Still ☐ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☐ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☐ None

Cover (Shore): ☐ None ☐ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☐ None ☐ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☐ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch

** Record released fish on back.*

Date: Day 0 1 Month 1 1 Year 2 0 0 6

Collectors:
K. Glasberger, A. Macmillan, J. Beebe

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*
Exploratory electrofishing

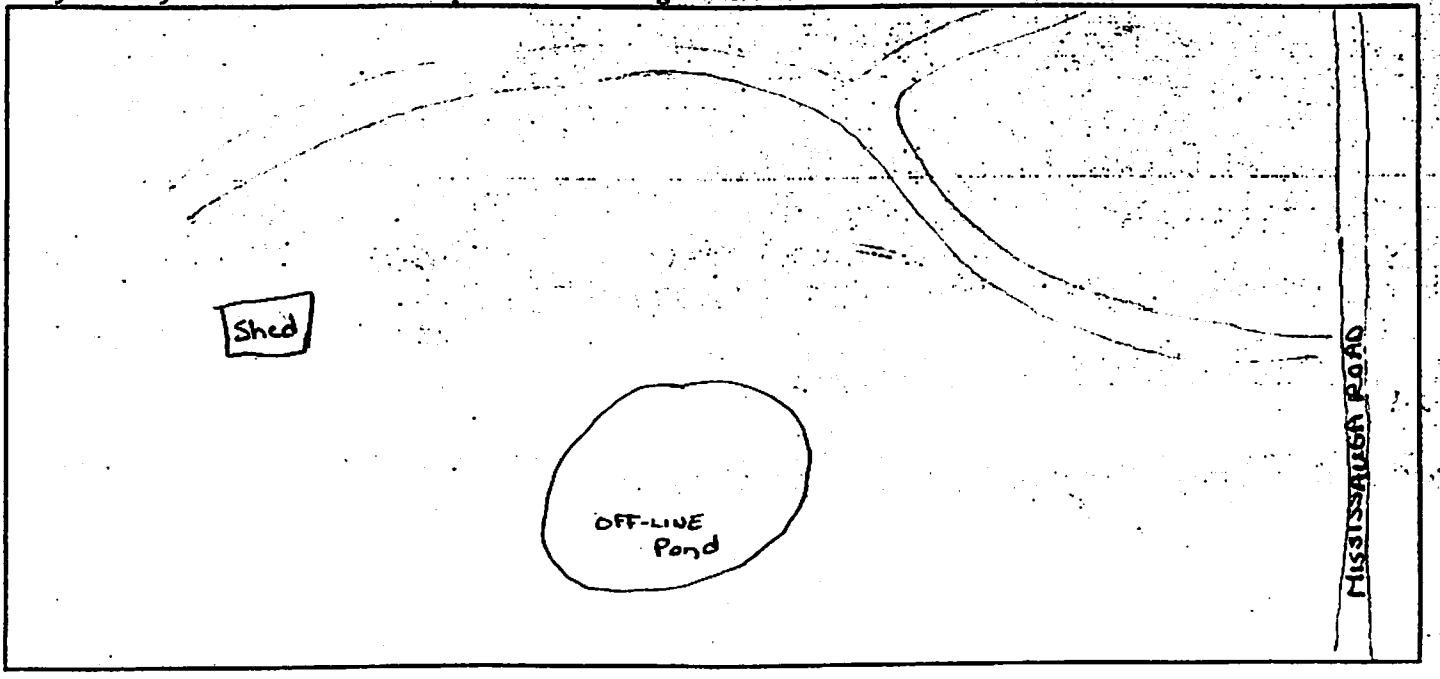
Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept	Size Range (T.L. in mm)
Creek Chub				
Identified By:				Date:

Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



Ontario

[redacted]

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1031669	Licencee Name: Melissa Kuddie		
Business Name: LGL Limited	Telephone: (905) 333-1667	Fax: (905) 333-2660	
Mailing Address: 3365 Harvester Rd Ground Level	Town/City Burlington	Postal Code: L7N 3N2	
Waterbody Name: Second Creek	Township/Municipality: Peel		
General Description of Sampling Site Location/Access: 16117 Mississauga Road			
Collection Site No. 1 of 1	Site UTM Coordinates: ☐☐☐☐☐☐ E ☐☐☐☐☐☐☐ N		
Collection Date: Nov. 1/06	Start Time:	End Time:	Duration (hrs)
Electrofisher Seconds:	Length of Station (m)	Water Temp. (C)	Air Temp. (C)
Stream Type: ☐ Intermittent ☑ Permanent	Watercress Present: ☐ Yes ☐ No		

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)*

Bottom Type by Percent: *(Total = 100%)*					
	Rock	Boulder	Rubble	Gravel	Sand 50%
	Silt 50%	Clay	Muck	Marl	Detritus
	Other *(Description)*				

Current: ☐ Still ☑ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☐ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☐ None

Cover (Shore): ☐ None ☐ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☐ None ☐ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☐ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 0 1 Month 1 1 Year 2 0 0 6

Collectors:
K. Glasbergen, A. Macmillan, J. Beebe

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*
Exploratory fish station flow 5 sec/1m
wetted width = 1.5 to 2.0m
wetted depth = 0.1 to 0.2m

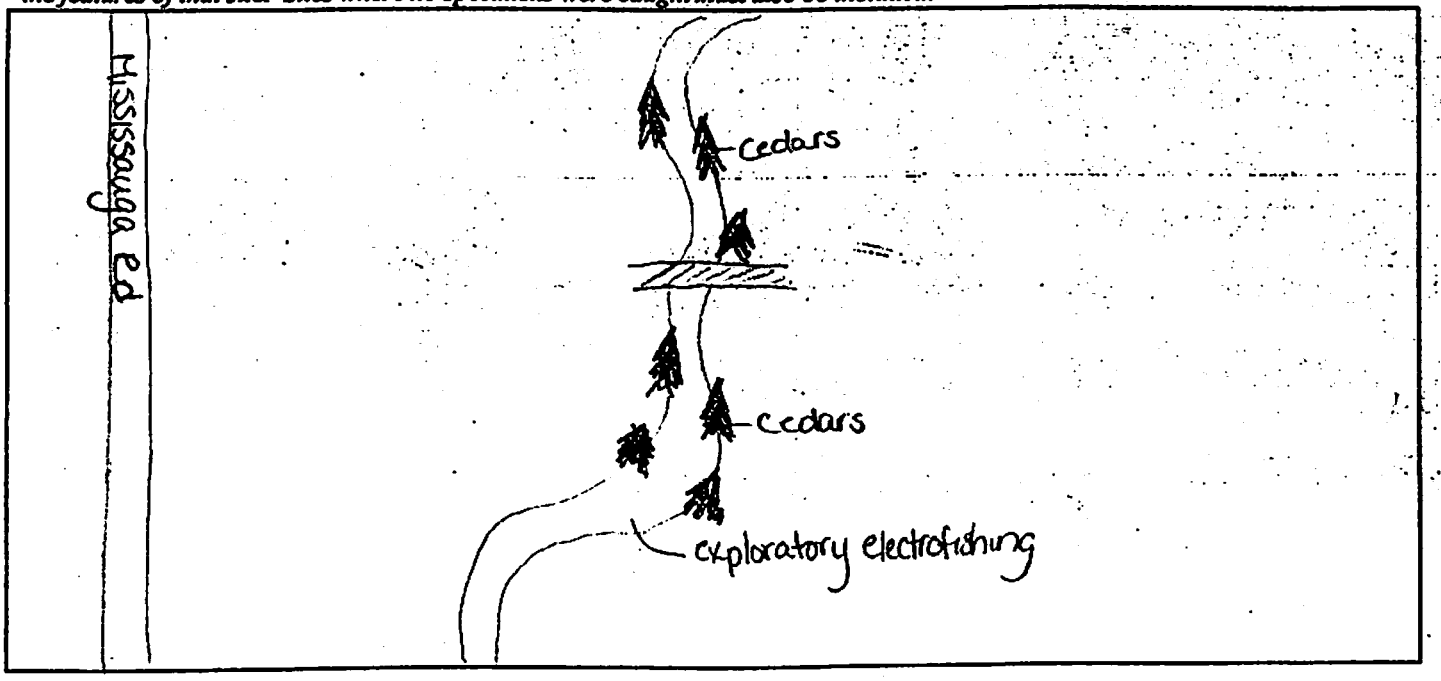
Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept	Size Range (T.L. in mm)
Blacknose dace		2		
Identified By:				Date:

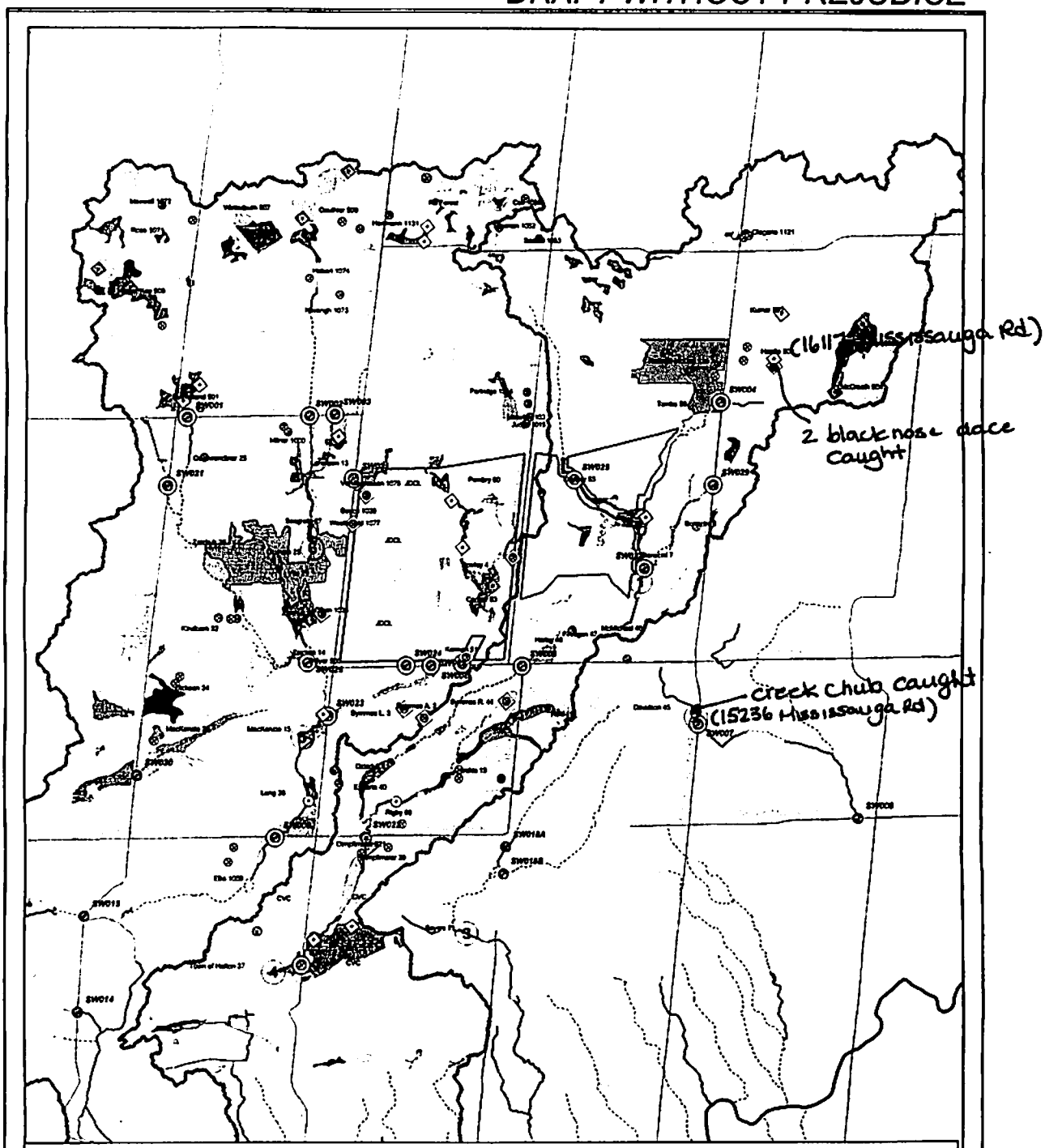
Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



. Exploratory Electrofishing Stations - LGL Nov. 2006

DRAFT WITHOUT PREJUDICE



Legend

- CBSES Nested Sampling Station
- PGMN Monitoring Well
- **Residential Well**
  - Bedrock Well
  - Overburden Well
  - NA
- 1997 Residential Well Survey
- Proposed Fish Biomass Station
- Proposed 2006 Flow Observation
- **Proposed Peizometer Monitoring**
  - Wetland Piezometer
  - Alternative Wetland Piezometer
  - Streambed Piezometer
  - Alternative Streambed Piezometer
- **CBSES Stream Flow Monitoring Network**
  - Established 2004-2005 Station
  - Proposed 2006 New Station
  - Proposed 2006 Stream Flow Monitoring
- Town
- Transportation Network
- Credit River
- **Streamflow Classification**
  - Perennial
  - Intermittent
  - Ephemeral
  - Undefined
- Aggregate Resource Area 9-A
- CBSES Study Area
- Municipal Property Boundary
- **2006 Property Access Requirements**
  - New Access Permission
  - Existing Access Permission
  - Well Survey - New Access
  - Well Survey - Existing Access
  - JDCL Monitoring
  - CVC-Owned Lands
- **Proposed Breeding Bird Monitoring**
  - Early Successional: Meadow
  - Early Successional: Savanna
- **ELC Wetland Type**
  - Coniferous swamp
  - Deciduous swamp
  - Mixed swamp
  - Thicket swamp
  - Marsh
  - Meadow Marsh

Refer to Schedule 1 for complete description of supplemental data collection and analysis and Schedule 3 for detailed property access requirements.

280 0 280 560 840 1,120 1,400
Metres

Base mapping: Revised from Credit Valley Conservation, 2004
Municipal Property Boundaries, MHBC 2005
Projection: UTM (Zone 17N) NAD 83

2006 PROPERTY ACCESS REQUIREMENTS & PROPOSED SUPPLEMENTAL DATA COLLECTION

Aggregate Resource Area 9-A CBSES
Town of Caledon, Ontario

Ministry of Natural Resources
Ontario

Field Sample ID 98

Field Collection Record

Use Pencil Only

0769

stn: 50112 0002

MNR LICENCE NO. TO COLLECT FISH FOR SCIENTIFIC PURPOSES: AU 001-02

No. of Bags

MNR District No. | Name of Waterbody: ROGER CREEK d/s Winston Churchill | Collection No. | Station No.

County or Judicial District: Wellington | Township: Erin | Watershed Code: H

Locality of Waterbody (if other than stream or river): U/S BALLINFAD RD. - WEST OF WINSTON CHURCHILL

Locality of station: On the Long's Property

Latitude ° ′ | Longitude ° ′ | Date Day 25 Month 07 Year 02 | Time Started 10317 Hrs. 11:37

Duration 610 Hrs min | Drainage System: Credit River

Water Type
☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool
☐ Pond ☐ Lake ☐ Muskeg/Bog ☐ Reservoir ☐ Other

Water Temperature	Air Temperature	Distance Offshore Min.	Distance Offshore Max.	Depth of Capture Min.	Depth of Capture Max.
16.5 °C	22.0 °C	m	m	m	m

Plant Type
☐ Submergent ☐ Floating ☒ Emergent ☐ None — Water Cress abundant, Valerie abundant

Bottom Type
☑ Rock ☐ Boulder ☐ Rubble ☐ Gravel ☐ Sand ☒ Silt
☐ Clay ☑ Muck ☐ Marl ☐ Detritus ☐ Other mainly silt

Current
☐ Still ☒ Slow ☐ Medium ☐ Fast ☐ Quantitative ____ m/s

Water Colour
☒ Colorless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other

Cover (Shore)
☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other

Cover (In water)
☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other

Gear
☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap
☐ Piscicide ☐ Trap Net ☐ Hoop Net ☒ Electrofish ☐ Surber ☐ Other

Size of Net (Gill or Seine Net) Length	Size of Net or Mouth (Trap, Hoop or Trawl)	Mesh Size Smallest	Mesh Size Largest
m	m	cm	cm

Selectivity of Sample
☐ All Kept ☐ None Kept* ☐ Some Kept* ☐ No Catch
*List Released Fish on Back

Preservative
☐ Formalin ☐ Kahle's Solution ☐ Alcohol ☐ Frozen ☐ Other

Date Day 25 Month 07 Year 02 | Collectors: B. Mains, J. Davis, B. Morrison, A. Kennedy

Additional Data: Pollution, Colour and Condition of Fish, Parasites, etc.

Widths
1.6 m. 3.35
3.7 3.75
1.93 3.1
1.17 1.8
1.45 2.3

Length
149.6 m

Shock Seconds & Grant
Start = 298857
end = 312235
A = 13378

Lenard

UTM NAD 83
E 582,406
N 4,843,274

Shaded Areas For Main Office Use Only

MNR District No.	Name of Waterbody	Collection No.	Station No.

Date Received Day	Month	Year	Township	Latitude ° '	Longitude ° '	Acc.	Page	Of

No.	Scientific Name	Code	Size Range (T.L. in mm)	OMNR Cat No.	ROM Cat.
160	Blacknose dace Tw = 557.5g		Max = 9.7cm Min = 2.4cm Avg = 7.4cm		
15	White Sucker Tw = 141.0g		Max 10.2cm Min 8.4 cm Avg 9.3cm		
93	Creek Chub Tw = 164.0g		Max 11.9cm Min = 6cm Avg = 6.5cm		
13	Pumpkin seed Tw = 204.5		Max 10 cm Min 8.5 cm Avg = 9 cm		
3	Central Mudminnow Tw = 7.0g		Max = 4cm Min = 4cm		
2	Fathead Minnow Tw = entered as 8g in db for summary		Max = 6.9cm Min = 5.7 cm		
2	Largemouth bass (Adult) Tw = 68.5g		Max = 14.9cm Min = 10.6cm		
13	Largemouth bass (YOY) Tw = 25.0g		Max = 5.2cm Min = 4.3cm Avg = 4.8cm		
131	brook stickleback Tw = 58.0g		Max = 3.3cm Min = 1.8cm Avg = 2.5cm		
159	White Sucker (YOY) Tw = 148.5g		Max = 4.6cm Min = 3.5cm Avg = 3.9cm		
18	Creek Chub (YOY) Tw = 7g		Max = 3.8cm Min = 2.8cm Avg = 3.3cm		

Identified by	Date

Station Diagram

ROGERS CREEK U/S BALLINA FARQ. 2002

(Long property)

Length = 149.6m flagged dead tree

END (tag on dead tree)

root wad

dense grass + joe pie weed

riffle area

large pool

dead tree

dead tree

down tree across stream

large fallen tree

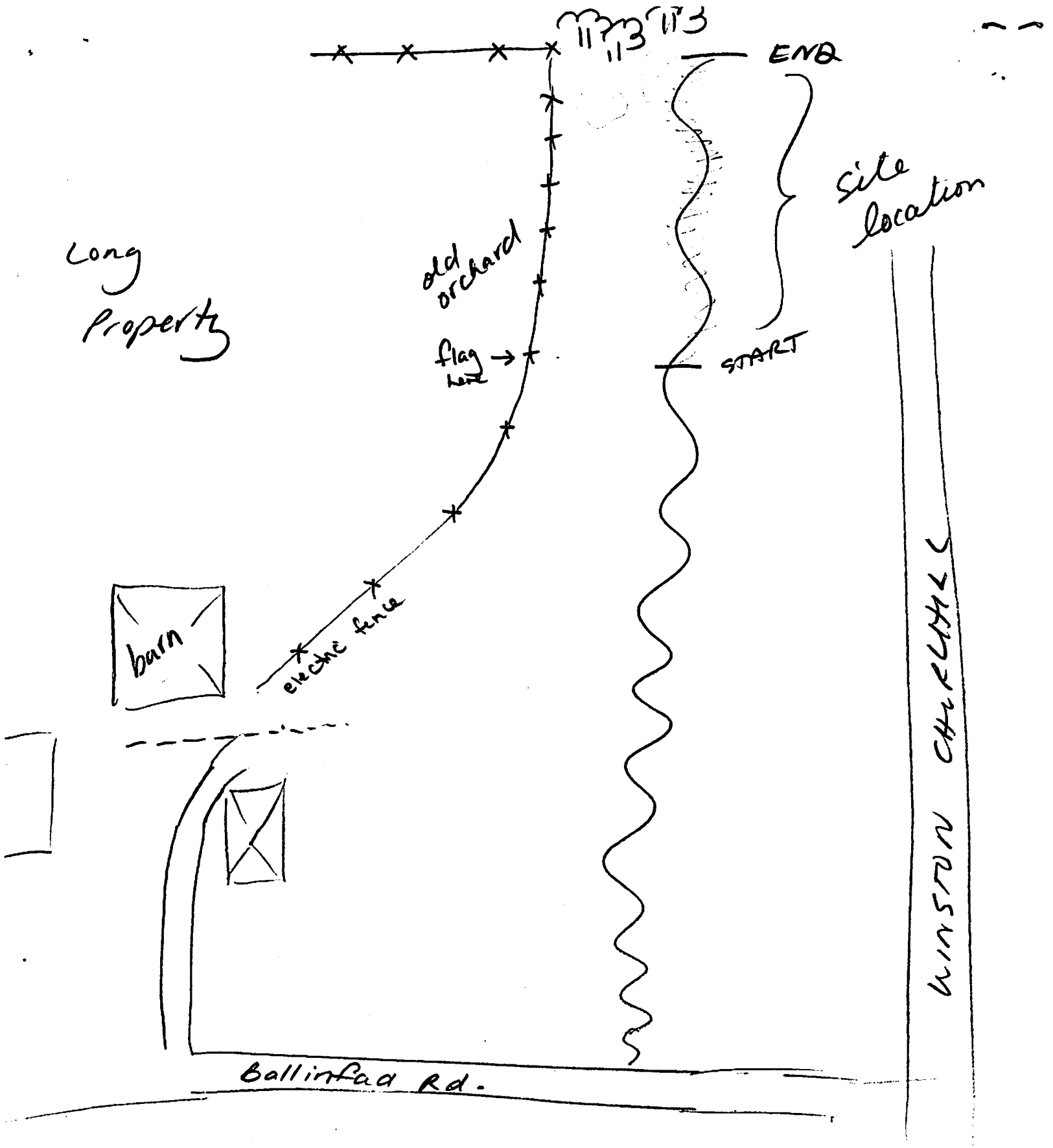
to find sik see picture

pool area

downed cedars

five clustered poplars

tag on cedar branch


113
113
113
END
site location
Long Property
old orchard
flag here
START
barn
electric fence
Ballinfad Rd.

Credit 339

Ontario

MNR Office Use:	
Watershed:	
Waterbody Name:	
Fish Dot No.:	

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1016985	Licencee Name: Martin O'Halloran		
Business Name: LGL Limited	Telephone: 905-333-1667	Fax: 905-333-2660	
Mailing Address: 3365 Harvester Rd, Ground Level	Town/City Burlington	Postal Code: L7N 3N2	
Waterbody Name: Roger's Creek - west branch	Township/Municipality: Peel		
General Description of Sampling Site Location/Access: Rolf Kindbom Property (5013 10th Line) (Property: 32/31) (10th Line south of 5th sideroad and north of Erin-Halton Hills Townline)			
Collection Site No. 1 of 1	Site UTM Coordinates: 5 8 1 4 5 1 E 4 8 4 3 4 7 3 N		
Collection Date: Sept. 8, 2004	Start Time:	End Time:	Duration (hrs)
Electrofisher Seconds:	Length of Station (m) 40	Water Temp. (C)	Air Temp. (C)
Stream Type: ☑ Intermittent ☐ Permanent	Watercress Present: ☑ Yes ☐ No		

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)* _____

Bottom Type by Percent: *(Total = 100%)*					
	Rock	Boulder 50%	Rubble	Gravel	Sand
	Silt	Clay	Muck	Marl	Detritus
	Other *(Description)*				

Current: ☐ Still ☑ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☐ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☐ None

Cover (Shore): ☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☑ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☐ None Kept* ☐ Some Kept* ☑ No Catch

* *Record released fish on back.*

Date: Day 0 8 Month 0 9 Year 2 0 0 4

Collectors:
A. BRUCE, M. KIDDIE

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*

NOTE: The downstream section of this reach was dry, while the upstream section had a small amount of water in it

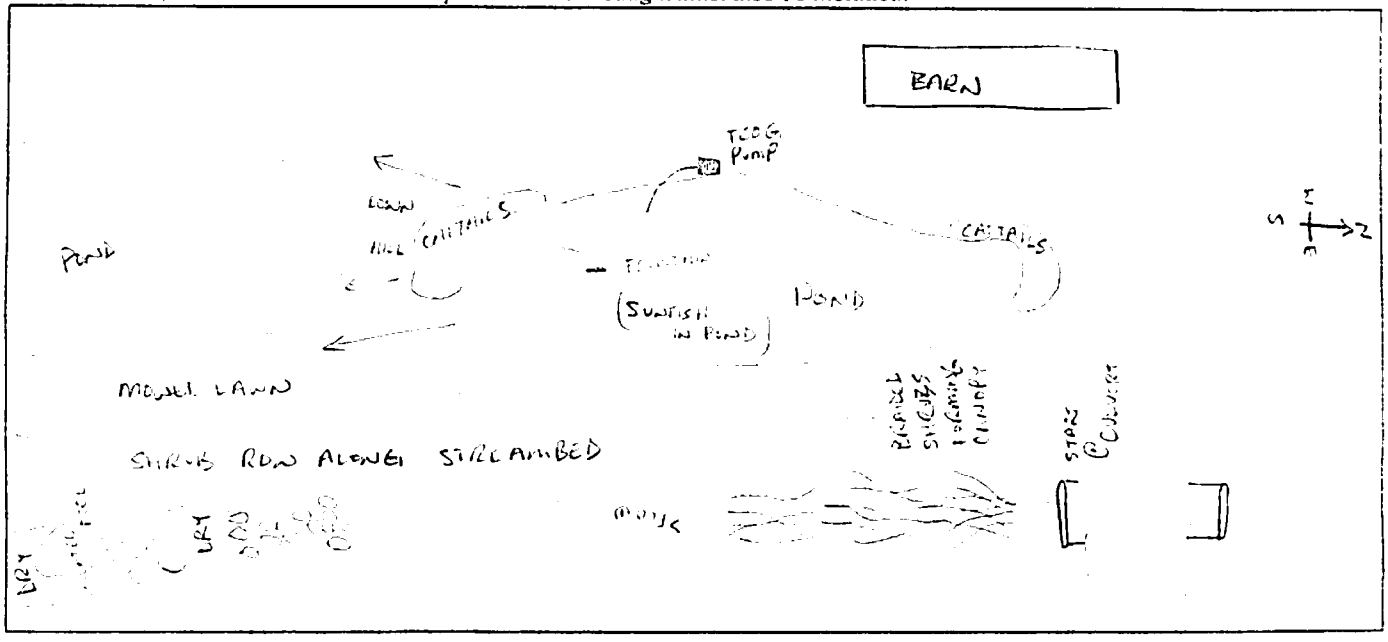
Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept	Size Range (T.L. in mm)
NO CATCH				
Identified By:				Date: Sept 8/04

Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



FS#14 Credit .769

Ontario

MNR Office Use:
Watershed:
Waterbody Name:
Fish Dot No.:

CUC SYN # 501120002

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1008080	Licencee Name: LOVELEEN CLAYTON		
Business Name: CREDIT VALLEY CONSERVATION	Telephone: 905 670 1615	Fax: (905) 670-2210	
Mailing Address: 1255 OLD DERRY ROAD WEST	Town/City MISSISSAUGA	Postal Code: L5N 6R4	
Waterbody Name: ROGERS CREEK	Township/Municipality: Caledon / Peel		
General Description of Sampling Site Location/Access: ROGERS CREEK @ WINSTON CHURCHILL BLVD N of TERRA COTTA C.A			
Collection Site No. ☐ of ☐	Site UTM Coordinates: 5 8 2 4 0 6 E 4 8 4 3 2 7 4 N		
Collection Date: Aug 12/03	Start Time: 1:40	End Time: 2:10	Duration (hrs) .5 hr
Electrofisher Seconds:	Length of Station (m) 149.6	Water Temp. (C)	Air Temp. (C) 31°C
Stream Type: ☐ Intermittent ☑ Permanent	Watercress Present: ☐ Yes ☐ No		

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)*

Bottom Type by Percent: *(Total = 100%)*					
	Rock 20	Boulder	Rubble	Gravel 10	Sand 10
	Silt 15	Clay	Muck 15	Marl	Detritus 30
	Other *(Description)*				

Current: ☐ Still ☑ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☑ Colourless ☑ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☑ Submergent ☑ Floating ☑ Emergent ☐ None

Cover (Shore): ☐ None ☐ Sparse ☐ Moderate ☑ Dense ☐ Other _____

Cover (In Water): ☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☑ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 1 2 Month 0 8 Year 2 0 0 3

Collectors: A. Dance, M. Pine, R. Acleson

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*

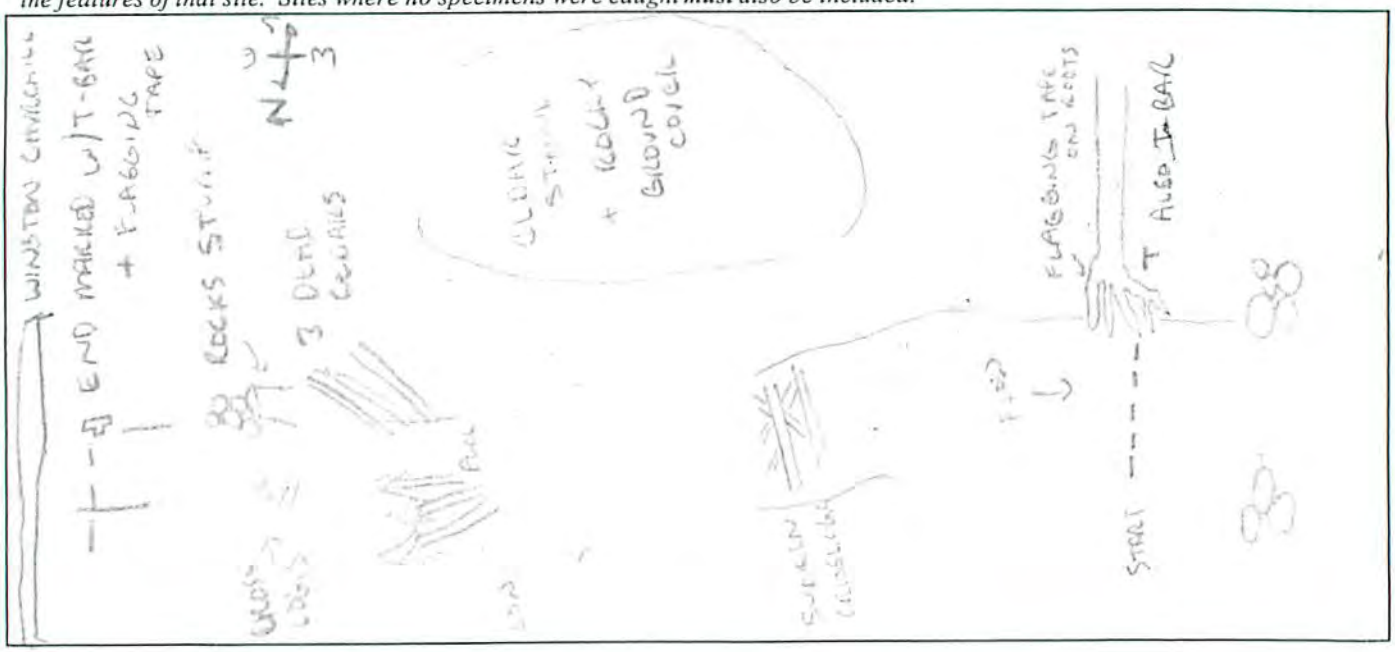
Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept WEIGHT (G)	Size Range (T.L. in mm)		
BROOK STICKLEBACK		14	5.5	42	35	19
NORTHERN REDBELLY DACE		103	125.5	68	50	35
PUMPKINSEED SUNFISH		2	9.5	61	60	
BLACKNOSE DACE		97	262.5	85	65	28
FATHEAD MINNOW		3	5.5	58		47
CREEK CHUB		111	668.5	154	95	44
1 2.99 6 2.91						
2 2.35 7 2.04						
3 2.48 8 2.53						
4 2.89 9 3.08						
5 3.04 10 3.84						
Identified By: A. Bruce, M. Pine, R. Acheson				Date: Aug 12/03		

Station Diagram

*(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught **must** also be included.*



Credit 334

Ontario

MNR Office Use
Watershed:
Waterbody Name:
Field Doc No:

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1016985 | Licencee Name: Martin O'Halloran

Business Name: LGL Limited | Telephone: 905-333-1667 | Fax: 905-333-2660

Mailing Address: 3365 Harvester Rd, Ground Level | Town/City: Burlington | Postal Code: L7N 3N2

Waterbody Name: Roger's Creek - west branch | Township/Municipality: Peel

General Description of Sampling Site Location/Access: Gschwendtner Property (5081 10th Line) (Property 25) (10th Line South of 5th Sideroad)

Collection Site No. 1 of 1 | Site UTM Coordinates: 580321 E 4843888 N

Collection Date: Sept. 15, 2004 | Start Time: | End Time: 12:41 | Duration (hrs)

Electrofisher Seconds: | Length of Station (m) | Water Temp. (C) | Air Temp. (C)

Stream Type: ☐ Intermittent ☑ Permanent | Watercress Present: ☐ Yes ☑ No

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other (Describe)

Bottom Type by Percent: (Total = 100%)					
	Rock	Boulder	Rubble 70%	Gravel 30%	Sand
	Silt	Clay	Muck	Marl	Detritus
	Other (Description)				

Current: ☐ Still ☑ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) ______

Water Colour/Clarity: ☑ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other ______ Secchi Depth: (m) ______

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☑ None

Cover (Shore): ☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other ______

Cover (In Water): ☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other ______

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☑ Electrofisher ☐ Surber ☐ Other ______

Size of Net (Gill or Seine Net) Length (m): | Size of Net or Mouth (Trap, Hoop or Trawl) (m): | Mesh Size (cm) Smallest: Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 15 Month 09 Year 2004

Collectors:
A. BRUCE M. ADDIE

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*
- area was forested by cedars then went into old field area (i.e. spotted Joe Pye weed, goldenrod sp. and [illegible] sp.)

Continued on Reverse

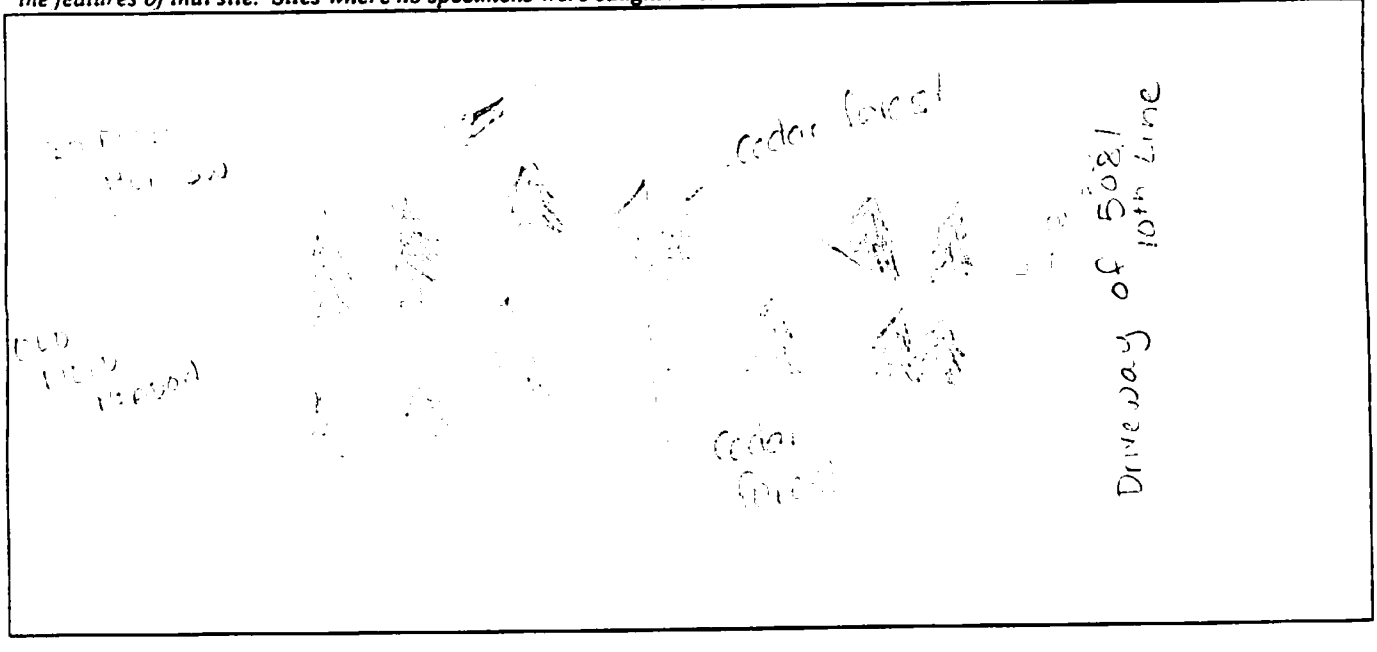
- avg channel width was 0.75 m

Species Captured

Species	Code	No. Caught	No. Kept	Size Range (T.L. in mm)
Blacknose dace (Rhinichthys atratulus)	210	5	0	
Identified By: A BRULE				Date: Sept. 15 2004

Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



Credit 482

Ontario

MNR Office Use:
Watershed:
Waterbody Name:
Fish Dot No.:

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 101695	Licencee Name: Martin O'Halloran		
Business Name: LGL Limited	Telephone: (905) 333-166	Fax: (905) 333-2660	
Mailing Address: 3365 Harvester Rd Unit 2	Town/City Burlington	Postal Code: L7N 3N2	
Waterbody Name: Roger's Creek-Main Branch	Township/Municipality: Peel		
General Description of Sampling Site Location/Access: Lorenzen Property (50 Winston Churchill Boulevard) (Property 13) (Winston Churchill Blvd south of 5th sideroad)			
Collection Site No. 1 of 1	Site UTM Coordinates: 5 8 0 9 6 9 E 4 8 4 4 4 9 2 N		
Collection Date: Oct. 1, 2004	Start Time:	End Time:	Duration (hrs)
Electrofisher Seconds:	Length of Station (m) 40	Water Temp. (C)	Air Temp. (C)
Stream Type: ☐ Intermittent ☑ Permanent	Watercress Present: ☐ Yes ☑ No		

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)*

Bottom Type by Percent: *(Total = 100%)*					
	Rock	Boulder	Rubble 52	Gravel 90%	Sand 5%
	Silt	Clay	Muck	Marl	Detritus
	Other *(Description)*				

Current: ☐ Still ☑ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☑ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☑ None

Cover (Shore): ☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☑ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 0 1 Month 1 0 Year 2 0 0 4

Collectors:
H. O'Halloran, H. Kiddie

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*
- this site was downstream of the pond

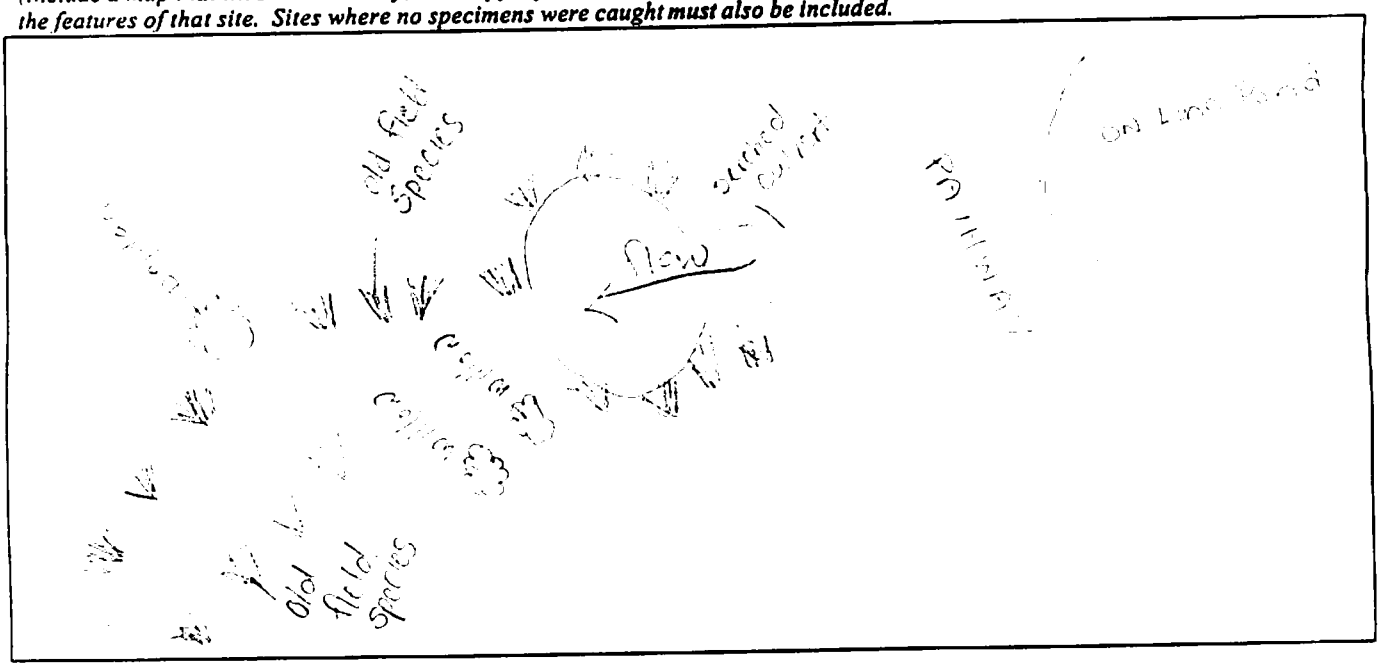
Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept	Size Range (T.L. in mm)
Creek Chub (Semotilus atromaculatus)	212	1111 1 (6)	0	
Largemouth bass (Micropterus salmoides)	317	1 (1)	0	
Pumpkinseed (Lepomis gibbosus)	313	1 (1)	0	
White Sucker (Catostomus commersoni)	163	1111 1111 (10)	0	
brook Stickleback (Culaea inconstans)	081	11 (2)	0	
Fathead minnow (Pimephales promelas)	209	11 (2)	0	
Bluntnose minnow (Pimephales notatus)	208	11 (2)	0	
Identified By: Martin O'Halloran				Date: Oct. 1 2004

Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



- good riparian area
- vegetation includes
  - Joe-pye weed
  - red osier dogwood
  - goldenrod species
- jewelweed
- grasses

Licence to Collect Fish for Scientific Purposes #1016985 (Credit River Watershed expected to be impacted from the quarry application being made by James Dick Aggregates), January 2005

Objectives
To monitor the fish community within the Credit River watershed including permanent, semi-permanent, and intermittent streams, that are expected to be impacted by the quarry application being made by James Dick Aggregates at the corner of Olde Baseline Road and Winston Churchill Boulevard, located in the Town of Caledon, Regional Municipality of Peel.

Methods
The fish community in this area was sampled using a Smith-Root backpack electrofisher. Lengths and weights of the fish were recorded at predetermined sites while other sites were exploratory and all fish were returned to where they were found. There were a total of 20 stations examined within this area. At 9 stations, no fish were caught due mainly to the fact that the streams were ephemeral or intermittent and did not have any water in them at the time of sampling. LGL Ltd. staff members involved in this task were Andrew Bruce, Melissa Kiddie, and Martin O'Halloran.

Number and Species Caught
Roger' Creek

West Branch

Field Collection Record for Gschwendtner property (Property 25) (5081 10th Line) (exploratory)
- 5 blacknose dace (*Rhinichthys atratulus*)

Field Collection Record for Kindbom property (Property 31/32) (5013 10th Line) (exploratory)
- No catch; half of stream reach was dry

Main Branch

Field Collection Record for Lorenzen property (Property 13) (5072 Winston Churchill Boulevard) (exploratory)
- 6 creek chub (*Semotilus atromaculatus*)
- 1 largemouth bass (*Micropterus salmoides*)
- 1 pumpkinseed (*Lepomis gibbosus)*
- 10 white sucker (*Catostomus commersoni*)
- 2 brook stickleback (*Culaea inconstans)*
- 2 fathead minnow (*Pimephales promelas*)
- 2 bluntnose minnow (*Pimephales notatus*)

Field Collection Record for Harold Graham property (Property 28) (5032 Winston Churchill Boulevard) (biomass)
- 2 white sucker (YOY) (*Catostomus commersoni*), Avg.=46mm, Weight=3g
- 2 creek chub (YOY) (*Semotilus atromaculatus*), Max=54mm, Min=40mm, Weight=4g

Field Collection Record for Mackenzie property (Property 15/16) (4948 Winston Churchill Boulevard) (exploratory)
- 17 blacknose dace (*Rhinichthys atratulus*)
- 5 creek chub (*Semotilus atromaculatus*)
- 5 fathead minnow (*Pimephales promelas*)
- 4 brook stickleback (*Culaea inconstans*)
- 3 brook trout (*Salvelinus fontinalis*)
- 2 largemouth bass (*Micropterus salmoides*)
- 2 central mudminnow (*Umbra limi*)
- 2 white sucker (*Catostomus commersoni*)

Field Collection Record for Roger's Creek at Winston Churchill Boulevard north of Terra Cotta Conservation Area (CVC ID# 501120002) (biomass)

- 103 brook stickleback (*Culaea inconstans*), Max=60mm, Min=34 mm, Avg.=23mm, Weight=45g
- 71 blacknose dace (*Rhinichthys atratulus),* Max=92mm, Min=37mm, Avg.= 62mm, Weight=341.5g
- 51 creek chub (*Semotilus atromaculatus*), Max=155mm, Min=35mm, Avg.=77mm, Weight=500g
- 35 white sucker (*Catostomus commersoni*), Max=93mm, Min=32mm, Avg.=71mm, Weight=80g
- 21 fathead minnow (*Pimephales promelas*), Max=68mm, Min=46mm, Avg. 54mm, Weight=40g
- 8 central mudminnow (*Umbra limi*), Max=90mm, Min=77mm, Avg.=81mm, Weight=55g

East Branch

Field Collection Record for Matzdorff property (Property 52) (15516 Shaw's Creek Road) (biomass)

- No catch

Field Collection Record for L. Symmes property (Property 3) (239 Olde Baseline Road) (exploratory)

- No catch; this reach was dry

Second Creek

Field Collection Record for Escarpment Tributary (CVC ID# 501120001) (biomass)

- 93 blacknose dace (*Rhinichthys atratulus*), Max=75mm, Min=37.3mm, Avg.=56mm, Weight=87g
- 54 creek chub (*Semotilus atromaculatus*), Max=122.3mm, Min=60.3mm, Avg.=86.5mm, Weight=126.3g
- 54 northern redbelly dace (*Phoxinus eos*), Max=59.6mm, Min=33.6mm, Avg.=46.6mm, Weight=21.3g
- 8 brook stickleback (*Culaea inconstans*), Max=29.6mm, Min=31.5mm, Weight=1.5g
- 1 brassy minnow (*Hybognathus hankinsoni*), Max=56mm, Min=32mm, Avg.=42mm, Weight=2.5g

Field Collection Record for McLeish property (Property 17) (76 Ballinafad Road) (exploratory)

- No catch; reach was dry

Field Collection Record for A. Symmes property (Property 2) (249 Olde Baseline Road) (exploratory)

- Creek chub (YOY) (*Semotilus atromaculatus*)
- Pumpkinseed (*Lepomis gibbosus*)
- Fathead minnow (*Pimephales promelas*)
- Brook stickleback (*Culaea inconstans*)

Field Collection Record for Finnigan property (Property 47) (690 Olde Baseline Road) (exploratory)

- No catch; reach was dry

Field Collection Record for McMichael (Property 46) (800 Olde Baseline Road)

- No catch; reach was dry

Field Collection Record for Michael Bonacini property (Property 5, 6, 7, 8,9) (North of Olde Baseline Road on Mississauga Road) (exploratory)

- No catch; branch explored was dry

Field Collection Record for Lindsay property (Property 55) (15801 Shaw's Creek Road) (exploratory)

- 16 brook stickleback (*Culaea inconstans*)
- 9 northern redbelly dace (*Phoxinus eos*)

Field Collection Record for Reid property (Property 19) (15323 Rockside Road) (exploratory)

- No catch; ephemeral stream and wetland area

Field Collection Record for Reid property (Property 64) (15095 Rockside Road) (exploratory)

- No catch; only a wetland feature observed

Tributary to Credit River

Field Collection Record for Davidson property (Property 45) (15236 Mississauga Road) (exploratory)

- 1 Brook stickleback (*Culaea inconstans*)

Credit River

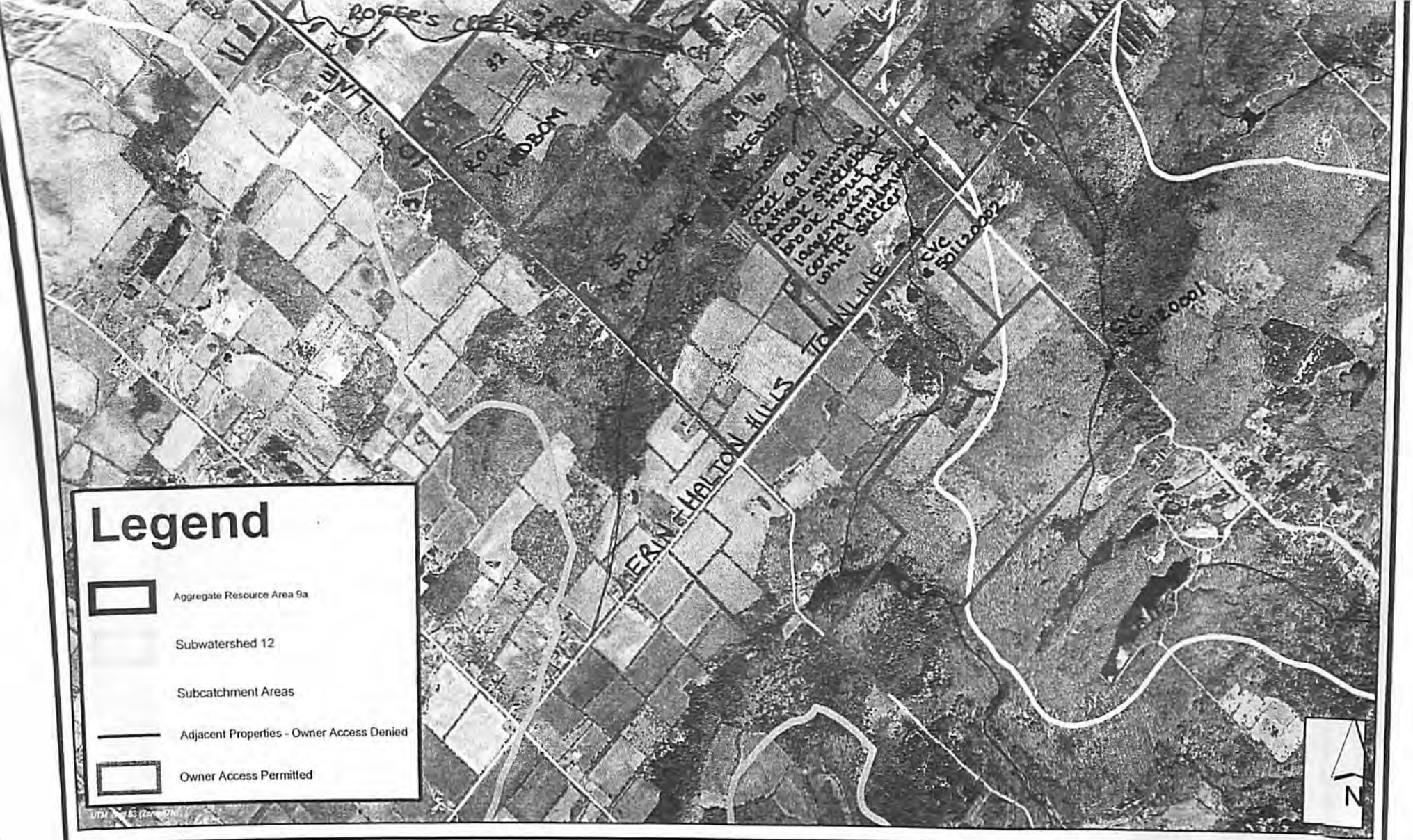
Field Collection Record for Credit River at Glen Williams (CVC ID #501120004) (biomass)

- 127 fantail darter (*Etheostoma flabellare*), Max=68mm, Min=32.5mm, Avg.=48mm, Weight=133g
- 113 longnose dace (*Rhinichthys cataractae*), Max=120.5 mm, Min=54 mm, Avg.=82mm, Weight=159.4g
- 56 rainbow darter (*Etheostoma caeruleum*), Max=62mm, Min=50mm, Avg.=55mm, Weight=52.5g
- 48 blacknose dace (*Rhinichthys atratulus*), Max=85mm, Min=38mm, Avg.=68mm, Weight=124.5g
- 21 northern hog sucker (*Phoxinus eos*), Max=234.2mm, Min=64mm, Avg.= 80.3mm, Weight=330g
- 18 creek chub (*Semotilus atromaculatus*), Max=155mm, Min=58mm, Avg.=98mm, Weight=177g
- 16 stonecat (*Noturus flavus*), Max=157.3mm, Min=110.3mm, Avg.=127mm, Weight=332g
- 16 common shiner (*Luxilus cornutus*), Max=114mm, Min=55mm, Avg.=65.7mm, Weight=32.5g
- 14 longnose dace (YOY) (*Rhinichthys cataractae*), Max=41mm, Min=25mm, Avg.=34mm, Weight=6.5g
- 13 river chub (*Nocomis micropogon*), Max=132mm, Min=62mm, Avg.=98mm, Weight=154.5g
- 9 creek chub (YOY) (*Semotilus atromaculatus*), Avg.=22mm, Weight=1.5g
- 9 white sucker (*Catostomus commersoni*), Max=258.5mm, Min=129mm, Avg.=111mm, Weight=332g
- 8 common shiner (YOY) (*Luxilus cornutus*), Avg.=24mm, Weight=1g
- 3 northern hog sucker (YOY) (*Hypentelium nigricans*), Max=32mm, Min=26mm, Avg.=30mm, Weight=4g
- 3 white sucker (YOY) (*Catostomus commersoni*), Max=41mm, Min=32mm, Avg.=39mm, Weight=2g
- 2 brown trout (*Salmo trutta*), Max=285mm, Avg.=204mm, Weight=160.5g
- 1 stonecat (YOY) (*Noturus flavus*), Min=14mm, Weight=0.5g
- 1 pumpkinseed (*Lepomis gibbosus*), Max=66mm, Weight=7g

Field Collection Record for Credit River at Terra Cotta (CVC ID #501120003) (biomass)

- 183 fantail darter (*Etheostoma flabellare*), Max=71mm, Min=40.3mm, Avg.=55.3mm, Wight=129.5g
- 178 longnose dace (*Rhinichthys cataractae*), Max=114.3mm, Min=50.7mm, Avg.=86.7mm, Wight=451.2mm
- 121 blacknose dace (*Rhinichthys atratulus*), Max=93.5mm, Min=32mm, Avg.=70.5mm, Wight=235.5g
- 46 creek chub (*Semotilus atromaculatus*), Max=116mm, Min=31.5mm, Avg.= 71.5mm, Wight=185.5g
- 44 rainbow darter (*Etheostoma caeruleum*), Max=57.5mm, Min=41mm, Avg.= 49mm, Weight=54g
- 35 river chub (*Nocomis micropogon*),

- 21 northern hog sucker (*Hypentelium nigricans*), Max=246mm, Min=95mm, Avg.=133mm, Weight=521.7g
- 21 common shiner (*Luxilus cornutus*), Max=114mm, Min=18mm, Avg.=68mm, Weight=150g
- 15 stonecat (*Noturus flavus*), Max=190mm, Min=75mm, Avg.=170mm, Weight= 454g
- 7 johnny darter (*Etheostoma nigrum*), Max=52mm, Min=32mm, Avg.= 47mm, Weight=12g
- 6 Mottled sculpin (*Cottus bairdii*), Max=114mm, Min=38mm, Avg.=77mm, Weight=52.5g
- 2 brown trout (*Salmo trutta*), Max=243mm, Weight=184g



Legend

- Aggregate Resource Area 9a
- Subwatershed 12
- Subcatchment Areas
- Adjacent Properties - Owner Access Denied
- Owner Access Permitted

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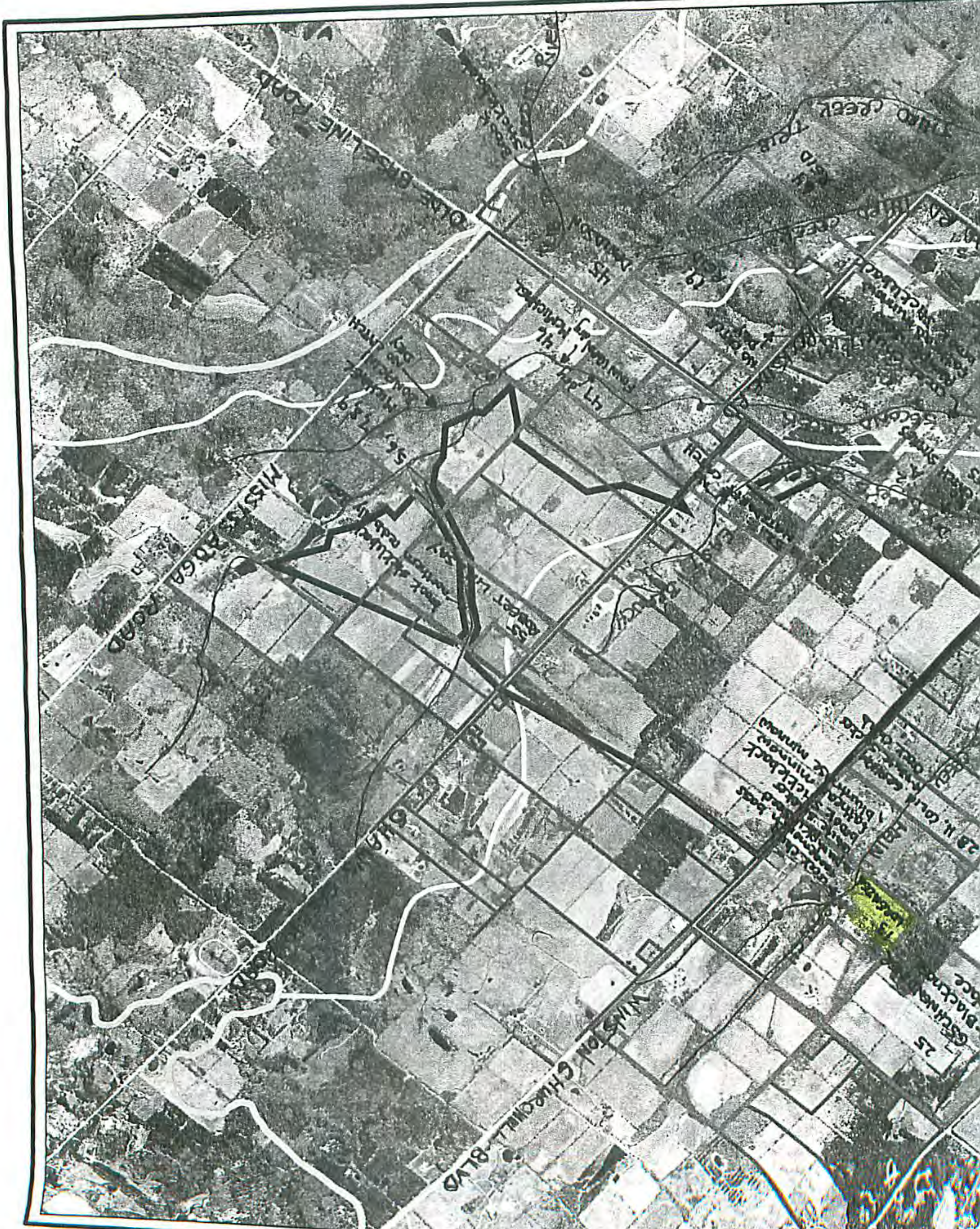
environmental research associates

Source : Credit Valley Conservation, 2004

Property Numbering
CBSES STUDY AREA
Aggregate Resource Area 9A CBSES
Town of Caledon, Ontario


Olde Base Line Road
Mississauga Road
Winston Churchill Blvd

Credit 487

Ontario

MNR Office Use:
Watershed: _____
Waterbody Name: _____
Fish Dot No.: _____

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1016985	Licencee Name: Martin O'Halloran		
Business Name: L&L Limited	Telephone: 905-333-1667	Fax: 905-333-2660	
Mailing Address: 9365 Harrister Rd Grand Level	Town/City Burlington	Postal Code: L7N 3N3	
Waterbody Name: Roger's Creek - Main branch	Township/Municipality: Reel		
General Description of Sampling Site Location/Access: Harold Graham property (Property 38) 6032 Winston Churchill Blvd) (Winston Churchill Boulevard South of 5th sideroad, North of Olde Baseline Rd)			
Collection Site No. 1 of 1	Site UTM Coordinates: 5 8 1 3 9 9 E 4 8 4 4 1 3 6 N		
Collection Date: Sept. 8, 2004	Start Time: 10:45	End Time: 11:10	Duration (hrs)
Electrofisher Seconds:	Length of Station (m) 40	Water Temp. (C)	Air Temp. (C)
Stream Type: ☐ Intermittent ☑ Permanent		Watercress Present: ☑ Yes ☐ No	

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)* _____

Bottom Type by Percent: *(Total = 100%)*					
	Rock	Boulder	Rubble 95%	Gravel	Sand
	Silt 5%	Clay	Muck	Marl	Detritus
	Other *(Description)*				

Current: ☐ Still ☑ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☑ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☑ None

Cover (Shore): ☐ None ☑ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☐ None ☑ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☑ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 0 8 Month 0 9 Year 2 0 0 4

Collectors:
A. BRUCE, H. KIDDIE

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*
Temp logger Rock #2 deployed
Biomass station

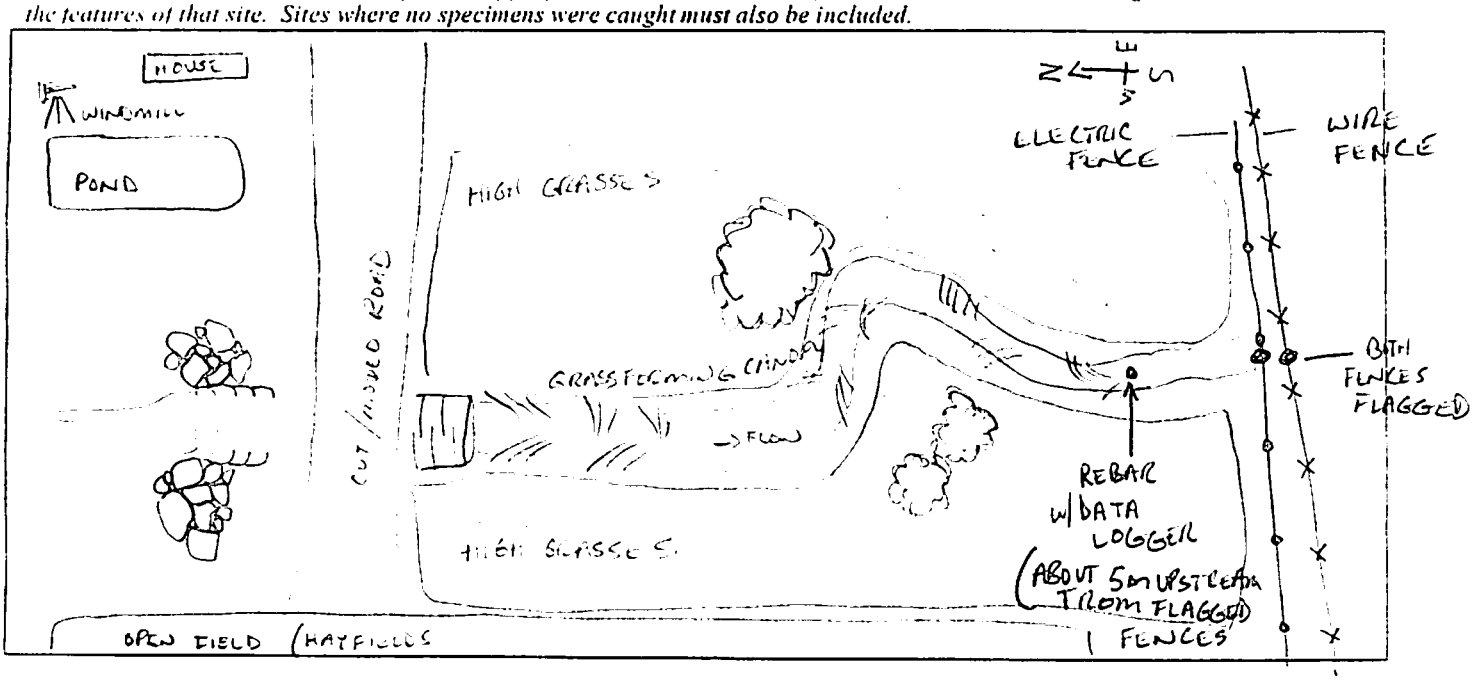
Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept (weight g)	Size Range (T.L. in mm)
White Sucker (YOY) (Catostomus commersoni)	163	2	3	Avg = 46
Creek Chub (YOY) (Semotilus atromaculatus)	212	2	4	Max: 44 Min: 43
Identified By: A. BRUCE				Date: Sept. 8, 2004

Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



Licence to Collect Fish for Scientific Purposes #1016985 (Credit River Watershed expected to be impacted from the quarry application being made by James Dick Aggregates), January 2005

Objectives

To monitor the fish community within the Credit River watershed including permanent, semi-permanent, and intermittent streams, that are expected to be impacted by the quarry application being made by James Dick Aggregates at the corner of Olde Baseline Road and Winston Churchill Boulevard, located in the Town of Caledon, Regional Municipality of Peel.

Methods

The fish community in this area was sampled using a Smith-Root backpack electrofisher. Lengths and weights of the fish were recorded at predetermined sites while other sites were exploratory and all fish were returned to where they were found. There were a total of 20 stations examined within this area. At 9 stations, no fish were caught due mainly to the fact that the streams were ephemeral or intermittent and did not have any water in them at the time of sampling. LGL Ltd. staff members involved in this task were Andrew Bruce, Melissa Kiddie, and Martin O'Halloran.

Number and Species Caught

Roger' Creek

West Branch

Field Collection Record for Gschwendtner property (Property 25) (5081 10th Line) (exploratory)

- 5 blacknose dace (*Rhinichthys atratulus*)

Field Collection Record for Kindbom property (Property 31/32) (5013 10th Line) (exploratory)

- No catch; half of stream reach was dry

Main Branch

Field Collection Record for Lorenzen property (Property 13) (5072 Winston Churchill Boulevard) (exploratory)

- 6 creek chub (*Semotilus atromaculatus*)
- 1 largemouth bass (*Micropterus salmoides*)
- 1 pumpkinseed (*Lepomis gibbosus)*
- 10 white sucker (*Catostomus commersoni*)
- 2 brook stickleback (*Culaea inconstans)*
- 2 fathead minnow (*Pimephales promelas*)
- 2 bluntnose minnow (*Pimephales notatus*)

Field Collection Record for Harold Graham property (Property 28) (5032 Winston Churchill Boulevard) (biomass)

- 2 white sucker (YOY) (*Catostomus commersoni*), Avg.=46mm, Weight=3g
- 2 creek chub (YOY) (*Semotilus atromaculatus*), Max=54mm, Min=40mm, Weight=4g

Field Collection Record for Mackenzie property (Property 15/16) (4948 Winston Churchill Boulevard) (exploratory)

- 17 blacknose dace (*Rhinichthys atratulus*)
- 5 creek chub (*Semotilus atromaculatus*)
- 5 fathead minnow (*Pimephales promelas*)
- 4 brook stickleback (*Culaea inconstans*)
- 3 brook trout (*Salvelinus fontinalis*)
- 2 largemouth bass (*Micropterus salmoides*)
- 2 central mudminnow (*Umbra limi*)
- 2 white sucker (*Catostomus commersoni*)

Field Collection Record for Roger's Creek at Winston Churchill Boulevard north of Terra Cotta Conservation Area (CVC ID# 501120002) (biomass)

- 103 brook stickleback (*Culaea inconstans*), Max=60mm, Min=34 mm, Avg.=23mm, Weight=45g
- 71 blacknose dace (*Rhinichthys atratulus),* Max=92mm, Min=37mm, Avg.= 62mm, Weight=341.5g
- 51 creek chub (*Semotilus atromaculatus*), Max=155mm, Min=35mm, Avg.=77mm, Weight=500g
- 35 white sucker (*Catostomus commersoni*), Max=93mm, Min=32mm, Avg.=71mm, Weight=80g
- 21 fathead minnow (*Pimephales promelas*), Max=68mm, Min=46mm, Avg. 54mm, Weight=40g
- 8 central mudminnow (*Umbra limi*), Max=90mm, Min=77mm, Avg.=81mm, Weight=55g

East Branch

Field Collection Record for Matzdorff property (Property 52) (15516 Shaw's Creek Road) (biomass)

- No catch

Field Collection Record for L. Symmes property (Property 3) (239 Olde Baseline Road) (exploratory)

- No catch; this reach was dry

Second Creek

Field Collection Record for Escarpment Tributary (CVC ID# 501120001) (biomass)

- 93 blacknose dace (*Rhinichthys atratulus*), Max=75mm, Min=37.3mm, Avg.=56mm, Weight=87g
- 54 creek chub (*Semotilus atromaculatus*), Max=122.3mm, Min=60.3mm, Avg.=86.5mm, Weight=126.3g
- 54 northern redbelly dace (*Phoxinus eos*), Max=59.6mm, Min=33.6mm, Avg.=46.6mm, Weight=21.3g
- 8 brook stickleback (*Culaea inconstans*), Max=29.6mm, Min=31.5mm, Weight=1.5g
- 1 brassy minnow (*Hybognathus hankinsoni*), Max=56mm, Min=32mm, Avg.=42mm, Weight=2.5g

Field Collection Record for McLeish property (Property 17) (76 Ballinafad Road) (exploratory)

- No catch; reach was dry

Field Collection Record for A. Symmes property (Property 2) (249 Olde Baseline Road) (exploratory)

- Creek chub (YOY) (*Semotilus atromaculatus*)
- Pumpkinseed (*Lepomis gibbosus*)
- Fathead minnow (*Pimephales promelas*)
- Brook stickleback (*Culaea inconstans*)

Field Collection Record for Finnigan property (Property 47) (690 Olde Baseline Road) (exploratory)

- No catch; reach was dry

Field Collection Record for McMichael (Property 46) (800 Olde Baseline Road)

- No catch; reach was dry

Field Collection Record for Michael Bonacini property (Property 5, 6, 7, 8,9) (North of Olde Baseline Road on Mississauga Road) (exploratory)

- No catch; branch explored was dry

Field Collection Record for Lindsay property (Property 55) (15801 Shaw's Creek Road) (exploratory)

- 16 brook stickleback (*Culaea inconstans*)
- 9 northern redbelly dace (*Phoxinus eos*)

Field Collection Record for Reid property (Property 19) (15323 Rockside Road) (exploratory)

- No catch; ephemeral stream and wetland area

Field Collection Record for Reid property (Property 64) (15095 Rockside Road) (exploratory)

- No catch; only a wetland feature observed

Tributary to Credit River

Field Collection Record for Davidson property (Property 45) (15236 Mississauga Road) (exploratory)

- 1 Brook stickleback (*Culaea inconstans*)

Credit River

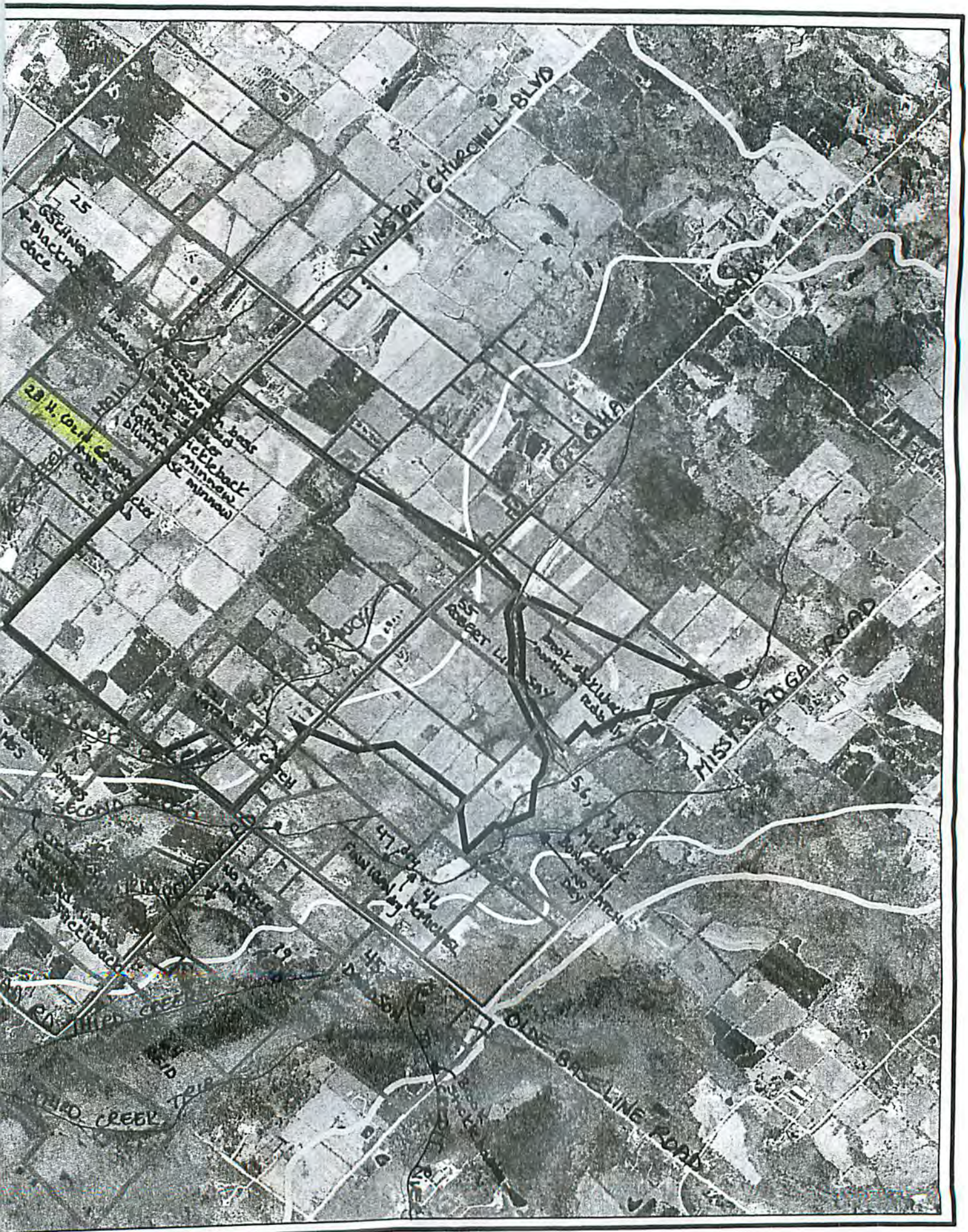
Field Collection Record for Credit River at Glen Williams (CVC ID #501120004) (biomass)

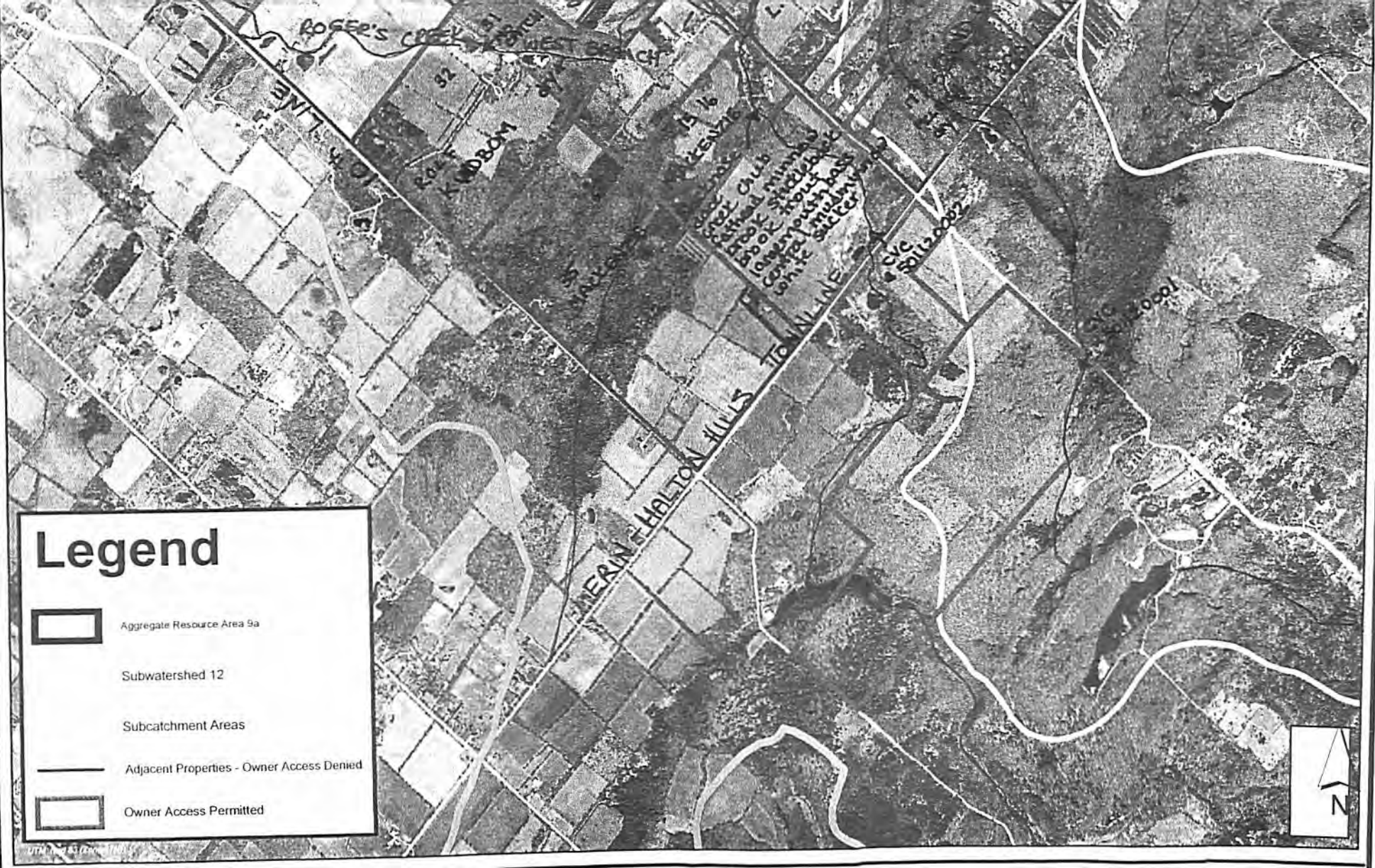
- 127 fantail darter (*Etheostoma flabellare*), Max=68mm, Min=32.5mm, Avg.=48mm, Weight=133g
- 113 longnose dace (*Rhinichthys cataractae*), Max=120.5 mm, Min=54 mm, Avg.=82mm, Weight=159.4g
- 56 rainbow darter (*Etheostoma caeruleum*), Max=62mm, Min=50mm, Avg.=55mm, Weight=52.5g
- 48 blacknose dace (*Rhinichthys atratulus*), Max=85mm, Min=38mm, Avg.=68mm, Weight=124.5g
- 21 northern hog sucker (*Phoxinus eos*), Max=234.2mm, Min=64mm, Avg.= 80.3mm, Weight=330g
- 18 creek chub (*Semotilus atromaculatus*), Max=155mm, Min=58mm, Avg.=98mm, Weight=177g
- 16 stonecat (*Noturus flavus*), Max=157.3mm, Min=110.3mm, Avg.=127mm, Weight=332g
- 16 common shiner (*Luxilus cornutus*), Max=114mm, Min=55mm, Avg.=65.7mm, Weight=32.5g
- 14 longnose dace (YOY) (*Rhinichthys cataractae*), Max=41mm, Min=25mm, Avg.=34mm, Weight=6.5g
- 13 river chub (*Nocomis micropogon*), Max=132mm, Min=62mm, Avg.=98mm, Weight=154.5g
- 9 creek chub (YOY) (*Semotilus atromaculatus*), Avg.=22mm, Weight=1.5g
- 9 white sucker (*Catostomus commersoni*), Max=258.5mm, Min=129mm, Avg.=111mm, Weight=332g
- 8 common shiner (YOY) (*Luxilus cornutus*), Avg.=24mm, Weight=1g
- 3 northern hog sucker (YOY) (*Hypentelium nigricans*), Max=32mm, Min=26mm, Avg.=30mm, Weight=4g
- 3 white sucker (YOY) (*Catostomus commersoni*), Max=41mm, Min=32mm, Avg.=39mm, Weight=2g
- 2 brown trout (*Salmo trutta*), Max=285mm, Avg.=204mm, Weight=160.5g
- 1 stonecat (YOY) (*Noturus flavus*), Min=14mm, Weight=0.5g
- 1 pumpkinseed (*Lepomis gibbosus*), Max=66mm, Weight=7g

Field Collection Record for Credit River at Terra Cotta (CVC ID #501120003) (biomass)

- 183 fantail darter (*Etheostoma flabellare*), Max=71mm, Min=40.3mm, Avg.=55.3mm, Wight=129.5g
- 178 longnose dace (*Rhinichthys cataractae*), Max=114.3mm, Min=50.7mm, Avg.=86.7mm, Wight=451.2mm
- 121 blacknose dace (*Rhinichthys atratulus*), Max=93.5mm, Min=32mm, Avg.=70.5mm, Wight=235.5g
- 46 creek chub (*Semotilus atromaculatus*), Max=116mm, Min=31.5mm, Avg.= 71.5mm, Wight=185.5g
- 44 rainbow darter (*Etheostoma caeruleum*), Max=57.5mm, Min=41mm, Avg.= 49mm, Weight=54g
- 35 river chub (*Nocomis micropogon*),

- 21 northern hog sucker (*Hypentelium nigricans*), Max=246mm, Min=95mm, Avg.=133mm, Weight=521.7g
- 21 common shiner (*Luxilus cornutus*), Max=114mm, Min=18mm, Avg.=68mm, Weight=150g
- 15 stonecat (*Noturus flavus*), Max=190mm, Min=75mm, Avg.=170mm, Weight= 454g
- 7 johnny darter (*Etheostoma nigrum*), Max=52mm, Min=32mm, Avg.= 47mm, Weight=12g
- 6 Mottled sculpin (*Cottus bairdii*), Max=114mm, Min=38mm, Avg.=77mm, Weight=52.5g
- 2 brown trout (*Salmo trutta*), Max=243mm, Weight=184g


WINSTON CHURCHILL BLVD
MISSISSAUGA ROAD
OLD BASELINE ROAD
CREEK



Legend

- Aggregate Resource Area 9a
- Subwatershed 12
- Subcatchment Areas
- Adjacent Properties - Owner Access Denied
- Owner Access Permitted

N

LGL
environmental research associates

Source: Credit Valley Conservation, 2004

Property Numbering
CBSES STUDY AREA
Aggregate Resource Area 9A CBSES
Town of Caledon, Ontario

Credit 659

Ontario

MNR Office Use:	
Watershed:	
Waterbody Name:	
Fish Dot No:	

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1016985	Licencee Name: Martin O'Halloran		
Business Name: LGL Limited	Telephone: 905-333-1667	Fax: 905-333-2660	
Mailing Address: 3365 Harvester Rd, Ground level	Town/City Burlington	Postal Code: L7N 3N2	
Waterbody Name: Second Creek	Township/Municipality: Peel		
General Description of Sampling Site Location/Access: Robert Lindsay Property (1580 Shaw's Creek Rd & Property 55) (Shaw's Creek Rd north of olde Baseline Rd)			
Collection Site No. 1 of 1	Site UTM Coordinates: 5 8 2 0 6 5 E 4 8 4 6 0 2 0 N		
Collection Date: Sept 7 2004	Start Time:	End Time:	Duration (hrs)
Electrofisher Seconds:	Length of Station (m)	Water Temp. (C) 18	Air Temp. (C) 23
Stream Type: ☐ Intermittent ☑ Permanent		Watercress Present: ☐ Yes ☑ No	

Waterbody Type: ☐ Spring ☐ Canal ☐ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)* _____

Bottom Type by Percent: *(Total = 100%)*					
	Rock	Boulder	Rubble 70%	Gravel	Sand
	Silt	Clay	Muck	Marl	Detritus 30%
	Other *(Description)*				

Current: ☑ Still ☐ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☑ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☐ None cattails, watercress

Cover (Shore): ☐ None ☐ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☑ None ☐ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☑ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☐ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 0 7 Month 0 9 Year 2 0 0 4

Collectors:
A. BRULE, H. KIDDLE

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*
- dip netted fish, electroshocker malfunction (see back)
- Predacious diving beetle, giant water bug, backswimmers, dragonfly larvae, water boatmen, water skimmers,
- Temp logger Rock #1 deployed

Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept	Size Range (T.L. in mm)
Brook Stickleback (Culaea inconstans)	281	卌 卌 卌 I (16)	0	
Northern Redbelly dace (Phoxinus eos)	182	卌 IIII (9)	0	

Identified By: A. BRUCE + M. KIDDIE

Date: Sept 7, 2007

Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.

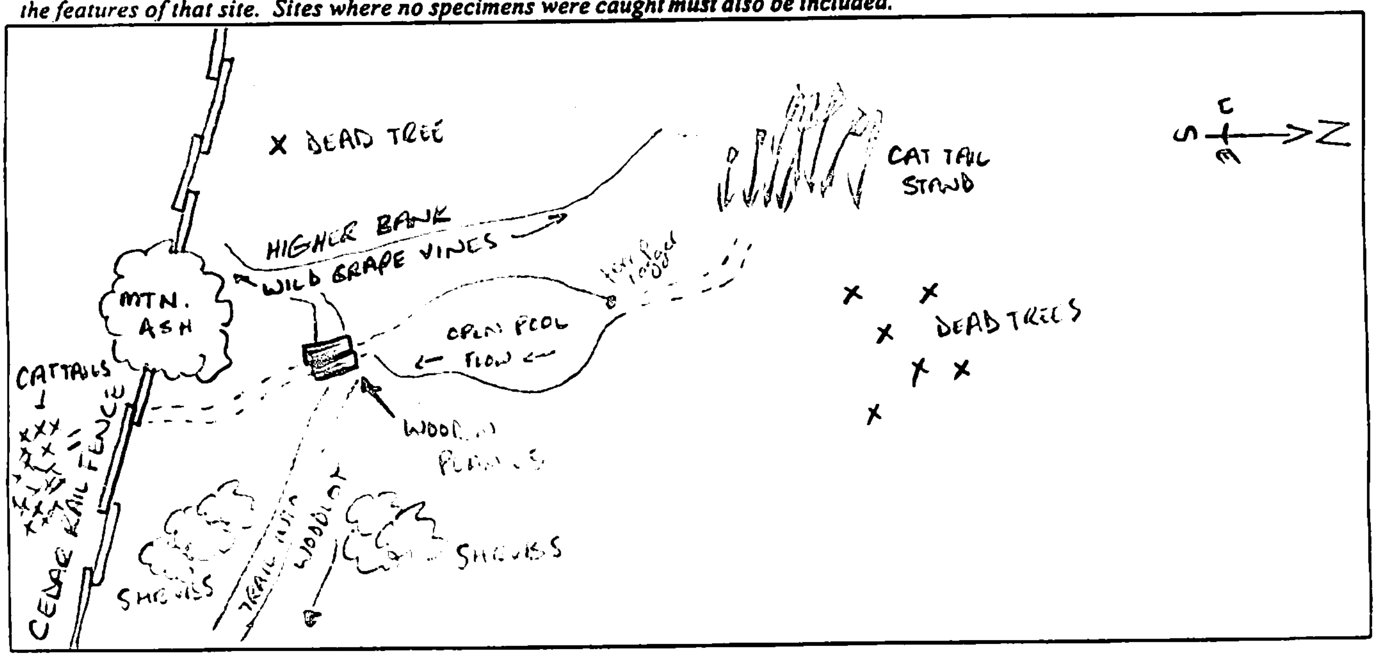


photo: ...-681

d... Rock...

Licence to Collect Fish for Scientific Purposes #1016985 (Credit River Watershed expected to be impacted from the quarry application being made by James Dick Aggregates), January 2005

Objectives
To monitor the fish community within the Credit River watershed including permanent, semi-permanent, and intermittent streams, that are expected to be impacted by the quarry application being made by James Dick Aggregates at the corner of Olde Baseline Road and Winston Churchill Boulevard, located in the Town of Caledon, Regional Municipality of Peel.

Methods
The fish community in this area was sampled using a Smith-Root backpack electrofisher. Lengths and weights of the fish were recorded at predetermined sites while other sites were exploratory and all fish were returned to where they were found. There were a total of 20 stations examined within this area. At 9 stations, no fish were caught due mainly to the fact that the streams were ephemeral or intermittent and did not have any water in them at the time of sampling. LGL Ltd. staff members involved in this task were Andrew Bruce, Melissa Kiddie, and Martin O'Halloran.

Number and Species Caught
Roger' Creek

West Branch

Field Collection Record for Gschwendtner property (Property 25) (5081 10th Line) (exploratory)
- 5 blacknose dace (*Rhinichthys atratulus*)

Field Collection Record for Kindbom property (Property 31/32) (5013 10th Line) (exploratory)
- No catch; half of stream reach was dry

Main Branch

Field Collection Record for Lorenzen property (Property 13) (5072 Winston Churchill Boulevard) (exploratory)
- 6 creek chub (*Semotilus atromaculatus*)
- 1 largemouth bass (*Micropterus salmoides*)
- 1 pumpkinseed (*Lepomis gibbosus)*
- 10 white sucker (*Catostomus commersoni*)
- 2 brook stickleback (*Culaea inconstans)*
- 2 fathead minnow (*Pimephales promelas*)
- 2 bluntnose minnow (*Pimephales notatus*)

Field Collection Record for Harold Graham property (Property 28) (5032 Winston Churchill Boulevard) (biomass)
- 2 white sucker (YOY) (*Catostomus commersoni*), Avg.=46mm, Weight=3g
- 2 creek chub (YOY) (*Semotilus atromaculatus*), Max=54mm, Min=40mm, Weight=4g

Field Collection Record for Mackenzie property (Property 15/16) (4948 Winston Churchill Boulevard) (exploratory)
- 17 blacknose dace (*Rhinichthys atratulus*)
- 5 creek chub (*Semotilus atromaculatus*)
- 5 fathead minnow (*Pimephales promelas*)
- 4 brook stickleback (*Culaea inconstans*)
- 3 brook trout (*Salvelinus fontinalis*)
- 2 largemouth bass (*Micropterus salmoides*)
- 2 central mudminnow (*Umbra limi*)
- 2 white sucker (*Catostomus commersoni*)

Field Collection Record for Roger's Creek at Winston Churchill Boulevard north of Terra Cotta Conservation Area (CVC ID# 501120002) (biomass)

- 103 brook stickleback (*Culaea inconstans*), Max=60mm, Min=34 mm, Avg.=23mm, Weight=45g
- 71 blacknose dace (*Rhinichthys atratulus),* Max=92mm, Min=37mm, Avg.= 62mm, Weight=341.5g
- 51 creek chub (*Semotilus atromaculatus*), Max=155mm, Min=35mm, Avg.=77mm, Weight=500g
- 35 white sucker (*Catostomus commersoni*), Max=93mm, Min=32mm, Avg.=71mm, Weight=80g
- 21 fathead minnow (*Pimephales promelas*), Max=68mm, Min=46mm, Avg. 54mm, Weight=40g
- 8 central mudminnow (*Umbra limi*), Max=90mm, Min=77mm, Avg.=81mm, Weight=55g

East Branch

Field Collection Record for Matzdorff property (Property 52) (15516 Shaw's Creek Road) (biomass)

- No catch

Field Collection Record for L. Symmes property (Property 3) (239 Olde Baseline Road) (exploratory)

- No catch; this reach was dry

Second Creek

Field Collection Record for Escarpment Tributary (CVC ID# 501120001) (biomass)

- 93 blacknose dace (*Rhinichthys atratulus*), Max=75mm, Min=37.3mm, Avg.=56mm, Weight=87g
- 54 creek chub (*Semotilus atromaculatus*), Max=122.3mm, Min=60.3mm, Avg.=86.5mm, Weight=126.3g
- 54 northern redbelly dace (*Phoxinus eos*), Max=59.6mm, Min=33.6mm, Avg.=46.6mm, Weight=21.3g
- 8 brook stickleback (*Culaea inconstans*), Max=29.6mm, Min=31.5mm, Weight=1.5g
- 1 brassy minnow (*Hybognathus hankinsoni*), Max=56mm, Min=32mm, Avg.=42mm, Weight=2.5g

Field Collection Record for McLeish property (Property 17) (76 Ballinafad Road) (exploratory)

- No catch; reach was dry

Field Collection Record for A. Symmes property (Property 2) (249 Olde Baseline Road) (exploratory)

- Creek chub (YOY) (*Semotilus atromaculatus*)
- Pumpkinseed (*Lepomis gibbosus*)
- Fathead minnow (*Pimephales promelas*)
- Brook stickleback (*Culaea inconstans*)

Field Collection Record for Finnigan property (Property 47) (690 Olde Baseline Road) (exploratory)

- No catch; reach was dry

Field Collection Record for McMichael (Property 46) (800 Olde Baseline Road)

- No catch; reach was dry

Field Collection Record for Michael Bonacini property (Property 5, 6, 7, 8,9) (North of Olde Baseline Road on Mississauga Road) (exploratory)

- No catch; branch explored was dry

Field Collection Record for Lindsay property (Property 55) (15801 Shaw's Creek Road) (exploratory)

- 16 brook stickleback (*Culaea inconstans*)
- 9 northern redbelly dace (*Phoxinus eos*)

Field Collection Record for Reid property (Property 19) (15323 Rockside Road) (exploratory)

- No catch; ephemeral stream and wetland area

Field Collection Record for Reid property (Property 64) (15095 Rockside Road) (exploratory)

- No catch; only a wetland feature observed

Tributary to Credit River

Field Collection Record for Davidson property (Property 45) (15236 Mississauga Road) (exploratory)

- 1 Brook stickleback (*Culaea inconstans*)

Credit River

Field Collection Record for Credit River at Glen Williams (CVC ID #501120004) (biomass)

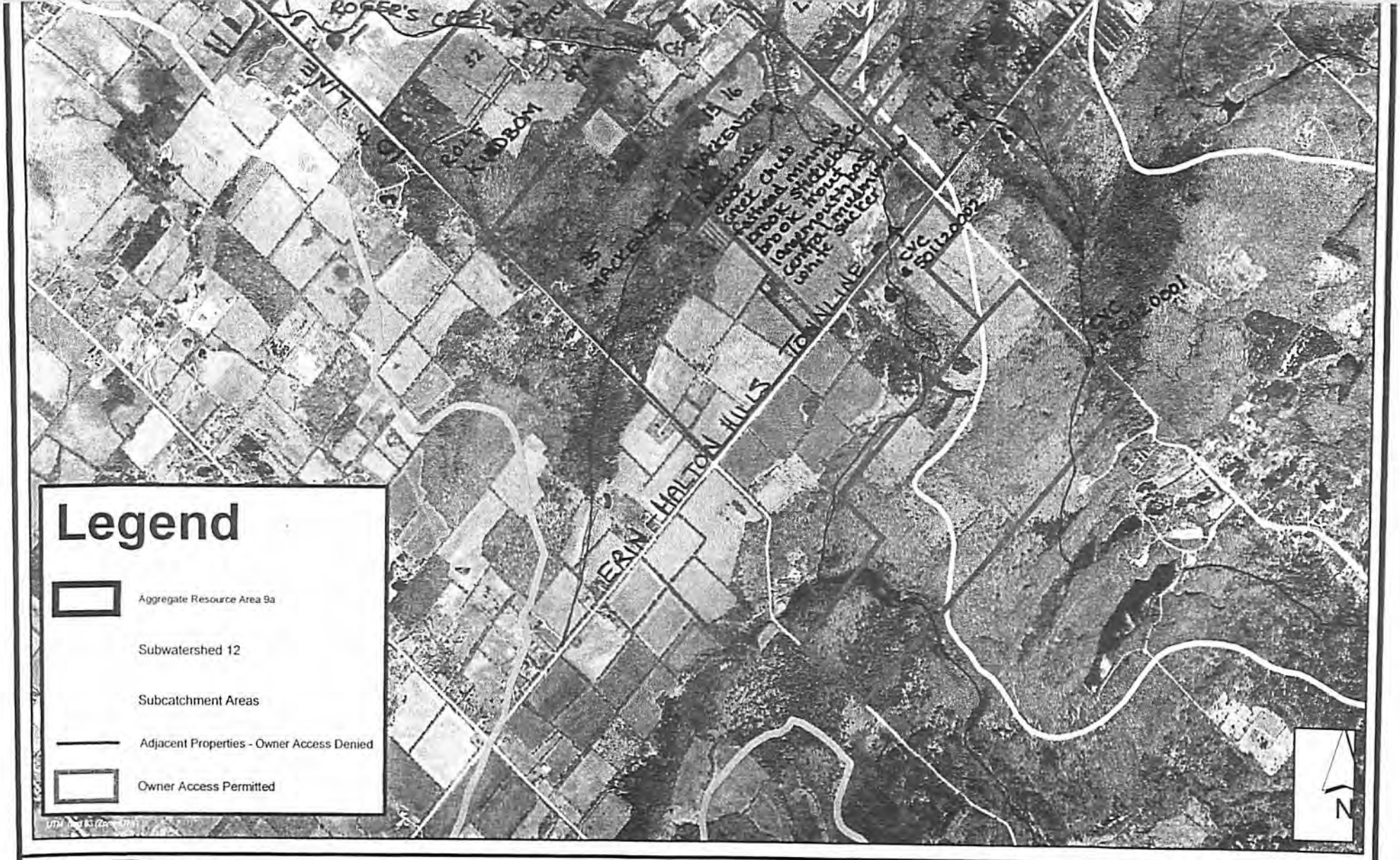
- 127 fantail darter (*Etheostoma flabellare*), Max=68mm, Min=32.5mm, Avg.=48mm, Weight=133g
- 113 longnose dace (*Rhinichthys cataractae*), Max=120.5 mm, Min=54 mm, Avg.=82mm, Weight=159.4g
- 56 rainbow darter (*Etheostoma caeruleum*), Max=62mm, Min=50mm, Avg.=55mm, Weight=52.5g
- 48 blacknose dace (*Rhinichthys atratulus*), Max=85mm, Min=38mm, Avg.=68mm, Weight=124.5g
- 21 northern hog sucker (*Phoxinus eos*), Max=234.2mm, Min=64mm, Avg.= 80.3mm, Weight=330g
- 18 creek chub (*Semotilus atromaculatus*), Max=155mm, Min=58mm, Avg.=98mm, Weight=177g
- 16 stonecat (*Noturus flavus*), Max=157.3mm, Min=110.3mm, Avg.=127mm, Weight=332g
- 16 common shiner (*Luxilus cornutus*), Max=114mm, Min=55mm, Avg.=65.7mm, Weight=32.5g
- 14 longnose dace (YOY) (*Rhinichthys cataractae*), Max=41mm, Min=25mm, Avg.=34mm, Weight=6.5g
- 13 river chub (*Nocomis micropogon*), Max=132mm, Min=62mm, Avg.=98mm, Weight=154.5g
- 9 creek chub (YOY) (*Semotilus atromaculatus*), Avg.=22mm, Weight=1.5g
- 9 white sucker (*Catostomus commersoni*), Max=258.5mm, Min=129mm, Avg.=111mm, Weight=332g
- 8 common shiner (YOY) (*Luxilus cornutus*), Avg.=24mm, Weight=1g
- 3 northern hog sucker (YOY) (*Hypentelium nigricans*), Max=32mm, Min=26mm, Avg.=30mm, Weight=4g
- 3 white sucker (YOY) (*Catostomus commersoni*), Max=41mm, Min=32mm, Avg.=39mm, Weight=2g
- 2 brown trout (*Salmo trutta*), Max=285mm, Avg.=204mm, Weight=160.5g
- 1 stonecat (YOY) (*Noturus flavus*), Min=14mm, Weight=0.5g
- 1 pumpkinseed (*Lepomis gibbosus*), Max=66mm, Weight=7g

Field Collection Record for Credit River at Terra Cotta (CVC ID #501120003) (biomass)

- 183 fantail darter (*Etheostoma flabellare*), Max=71mm, Min=40.3mm, Avg.=55.3mm, Wight=129.5g
- 178 longnose dace (*Rhinichthys cataractae*), Max=114.3mm, Min=50.7mm, Avg.=86.7mm, Wight=451.2mm
- 121 blacknose dace (*Rhinichthys atratulus*), Max=93.5mm, Min=32mm, Avg.=70.5mm, Wight=235.5g
- 46 creek chub (*Semotilus atromaculatus*), Max=116mm, Min=31.5mm, Avg.= 71.5mm, Wight=185.5g
- 44 rainbow darter (*Etheostoma caeruleum*), Max=57.5mm, Min=41mm, Avg.= 49mm, Weight=54g
- 35 river chub (*Nocomis micropogon*),

- 21 northern hog sucker (*Hypentelium nigricans*), Max=246mm, Min=95mm, Avg.=133mm, Weight=521.7g
- 21 common shiner (*Luxilus cornutus*), Max=114mm, Min=18mm, Avg.=68mm, Weight=150g
- 15 stonecat (*Noturus flavus*), Max=190mm, Min=75mm, Avg.=170mm, Weight= 454g
- 7 johnny darter (*Etheostoma nigrum*), Max=52mm, Min=32mm, Avg.= 47mm, Weight=12g
- 6 Mottled sculpin (*Cottus bairdii*), Max=114mm, Min=38mm, Avg.=77mm, Weight=52.5g
- 2 brown trout (*Salmo trutta*), Max=243mm, Weight=184g

Project Location
Mississauga Road
Winston Churchill Blvd



LGL
environmental research associates

Source: Credit Valley Conservation 2004

Property Numbering
CBSES STUDY AREA
Aggregate Resource Area 9A CBSES
Town of Caledon, Ontario

LGL LIMITED
environmental research associates
3365 Harvester Road, Ground Level
Burlington, Ontario L7N 3N2
Tel: 905-333-1667 Fax: 905-333-2660
e-mail: burlington@lgl.com

Head Office: 22 Fisher St., P.O. Box 280, King City, Ontario CANADA L7B 1A6 Tel: 905-833-1244 Fax: 905-833-1255 e-mail: kingcity@lgl.com web: www.lgl.com

December 5, 2006

Ministry of Natural Resources – Aurora (GTA) District Office
Attention: Ms. Karen Golby/Mark Heaton → WARREN
50 Bloomington Road W.
Aurora, ON L4G 3G8
Fax Number: (905) 713-7361

FYI, – RETURN TO KAREN FOR FILING. THANKS MARK

Dear Ms. Golby/Mr. Heaton:

Re: Fish Community Monitoring within Credit River Watershed in Streams that are Expected to be Impacted by the Quarry Application made by James Dick Aggregates
Olde Baseline Road and Winston Churchill Boulevard
Town of Caledon, Regional Municipality of Peel

This letter is intended to satisfy the condition of permit #1031669. LGL Limited conducted fish surveys to monitor the fish community within the Credit River watershed in streams that are expected to be impacted by the quarry application being made by James Dick Aggregates at the corner of Olde Baseline Road and Winston Churchill Boulevard, located in the Town of Caledon, Regional Municipality of Peel. Please see attached map of the sites surveyed for your reference.

A total of 2 biomass stations were examined by using a Smith-Root LR24 backpack electrofishing unit during August 17, 2006. At these predetermined stations, lengths and weights of fish were recorded. LGL Limited staff members involved in this task were Ken Glasbergen, and Melissa Kiddie and were assisted by Brian Morrison and Sarah Quesniele from the Credit Valley Conservation electrofishing crew. Additional exploratory electrofishing stations at as roadside sampling stations at Mississauga Road south of The Grange Sideroad and 5th Sideroad at 10th Line (completed June 28, 2006 by Andrew Bruce and Martin O'Halloran of LGL Limited),
Second Creek upstream and downstream of the Caledon Rail Trail (completed Sept. 21, 2006 by Melissa Kiddie and Ken Glasbergen) as well as Second Creek in the upper region and Fourth Creek-South Branch (completed Nov.1, 2006 by Ken Glasbergen and Ecoplans Limited).

The Field Collection Records (FCR's), as well as specific station maps have been attached for your records.

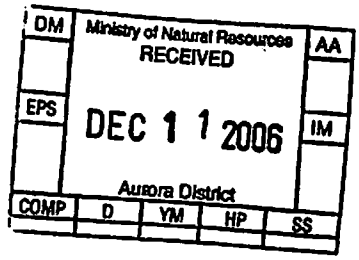
If you have any questions or requests feel free to contact me at our Burlington Office.

Yours truly,

LGL Limited environmental research associates

Melissa Kiddie

Melissa Kiddie B.Sc., ERPG
Field Biologist



Licence to Collect Fish for Scientific Purposes #1031669 (Credit River Watershed expected to be impacted from the quarry application being made by James Dick Aggregates), 2006

Objectives

To monitor the fish community within the Credit River watershed including permanent, semi-permanent, and intermittent streams, that are expected to be impacted by the quarry application being made by James Dick Aggregates at the corner of Olde Baseline Road and Winston Churchill Boulevard, located in the Town of Caledon, Regional Municipality of Peel.

Methods

Exploratory roadside electrofishing stations were completed on June 28, 2006 using a Smith-root LR24 backpack electrofisher. This task was completed by LGL Limited staff Martin O'Halloran and Andrew Bruce. The fish community in Rogers Creek and Second Creek was sampled on August 17, 2006 using a Smith-Root LR24 backpack electrofisher. Lengths and weights of the fish were recorded at two (2) predetermined sites and all fish caught were returned to where they were found. LGL Limited staff members involved in this task were Ken Glasbergen and Melissa Kiddie and were assisted by the Credit Valley Conservation electrofishing crew. Exploratory electrofishing was completed on Second Creek upstream and downstream of the Caledon Rail Trail with a Smith-Root LR24 electrofisher on Sept. 22, 2006 by LGL staff Ken Glasbergen and Melissa Kiddie. Exploratory electrofishing was also completed on Second Creek in the upper region and Fourth Creek-South Branch with a Smith-Root LR24 electrofisher on Nov.1, 2006.

Number and Species Caught

Rogers Creek

West Branch

Field Collection Record for 5th Sideroad and 10th Line (Exploratory; Roadside) (June 28, 2006)

- Fathead minnow (*Pimephales promelas*)
- Blacknose dace (*Rhinichthys atratulus*)

Main Branch

Field Collection Record for Mackenzie property (Property 15) (4948 Winston Churchill Boulevard) (biomass station) (weight is in g and length is in mm) (Aug.17, 2006)

- 1 Largemouth bass (*Micropterus salmoides*); weight= 479; length= 315
- 11 Largemouth bass (*Micropterus salmoides*); weight=50; Max=96, Avg.=77; Min=45
- 184 Creek chub (*Semotilus atromaculatus)*; weight=820; Max=176, Avg.=101; Min=58
- 3 Brook trout (*Salvelinus fontinalis*); weight= 243; Max=205, Avg.=198, Min=190
- 35 White sucker (*Catostomus commersoni*); weight=374; Max=181, Avg.=135, Min=50
- 222 Blacknose dace (*Rhinichthys atratulus*); weight=750; Max= 95, Avg.=70, Min= 45
- 39 Fathead minnow (*Pimephales promelas)*; weight= 111; Max= 68, Avg.=55, Min=44
- 12 Brook stickleback (*Culaea inconstans*); weight= 15; Max=51, Avg.=40, Min= 38
- 1 Northern redbelly dace (*Phoxinus eos*); weight= 1; length= 55

Second Creek

Main Branch

Field Collection Record for Mississauga Road south of The Grange Sideroad (Exploratory; Roadside) (June 28, 2006)

- Blacknose dace (*Rhinichthys atratulus*)
- Creek chub (*Semotilus atromaculatus*)
- Northern redbelly dace (*Phoxinus eos*)

Field Collection Record for Dimpflmeier property (Property 39) (77 Ballinafad Road) (biomass station) (weight is in g and length is in mm) (Aug. 17, 2006)

- 38 Creek chub (*Semotilus atromaculatus)*; weight= 384; Max=185, Avg. 70, Min=30
- 20 Brook trout (*Salvelinus fontinalis*); weight= 174; Max=250, Avg. 176, Min=115
- 133 Blacknose dace (*Rhinichthys atratulus)*; weight= 254; Max= 76, Avg.=53, Min= 30
- 99 Northern redbelly dace (*Phoxinus eos*); weight= 192; Max= 55, Avg. 50, Min= 48
- 14 Pumpkinseed (*Lepomis gibbossus*); weight= 134; Max= 107, Avg.= 72, Min= 54
- 77 Brook stickleback (*Culaea inconstans)*; weight= 65; Max= 47, Avg.=45, Min=27
- 93 Fathead minnow (*Pimephales promelas)*; weight= 132; Max= 62, Avg.=46, Min= 30

Field Collection Record for Second Creek- Caledon Rail Trail (Exploratory; downstream) (Sept. 21, 2006)

- 6 Fathead minnow (*Pimephales promelas*)
- 3 Common shiner (*Luxilus cornutus*)
- 1 Brown trout (10 inch) (*Salmo trutta*)
- 2 Brown trout (*Salmo trutta*)
- 13 Creek chub (*Semotilus atromaculatus*)
- 6 White sucker (*Catostomus commersoni*)
- 2 Rainbow trout (*Oncorhynchus mykiss*)
- 3 Blacknose dace (*Rhinichthys atratulus*)
- 2 Northern hog sucker (*Hypentelium nigricans*)
- 3 Bluntnose minnow (*Pimephales notatus*)
- 1 Fantail darter (*Etheostoma flabellare*)
- 1 Unknown darter

Field Collection Record for Second Creek- Caledon Rail Trail (Exploratory; upstream) (Sept. 21, 2006)

- 25 Creek chub (*Semotilus atromaculatus*)
- 13 Blacknose dace (*Rhinichthys atratulus*)

Field Collection Record for Second Creek- upper region (Exploratory) (Nov.1, 2006)

- Creek chub (*Semotilus atromaculatus*)

Fourth Creek-South Branch

Field Collection Record for Fourth Creek-South Branch (Exploratory) (Nov.1, 2006)

- Creek chub

Ontario

[redacted]

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1031669	Licencee Name: Melissa Kiddie		
Business Name: LGL Limited		Telephone: (905)333-1667	Fax: (905)333-2660
Mailing Address: 3365 Harvester Rd Ground Level		Town/City Burlington	Postal Code: L7N 3N2
Waterbody Name: Rogers Creek - West Branch		Township/Municipality: Peel	
General Description of Sampling Site Location/Access: Corner of 5th Sideroad and 10th Line (Exploratory – roadside sampling)			
Collection Site No. 1 of 1	Site UTM Coordinates: ☐☐☐☐☐☐ E ☐☐☐☐☐☐☐ N		
Collection Date: June 28/06	Start Time:	End Time:	Duration (hrs)
Electrofisher Seconds:	Length of Station (m)	Water Temp. (C)	Air Temp. (C)
Stream Type: ☐ Intermittent	☑ Permanent	Watercress Present: ☐ Yes	☐ No

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)*

Bottom Type by Percent: *(Total = 100%)*					
	Rock	Boulder	Rubble	Gravel	Sand
	Silt	Clay	Muck	Marl	Detritus
	Other *(Description)*				

Current: ☐ Still ☐ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☐ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☐ None

Cover (Shore): ☐ None ☐ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☐ None ☐ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☑ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 28 Month 06 Year 2006

Collectors:
H. O'HALLORAN, A BRUCE

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*
Exploratory roadside sampling

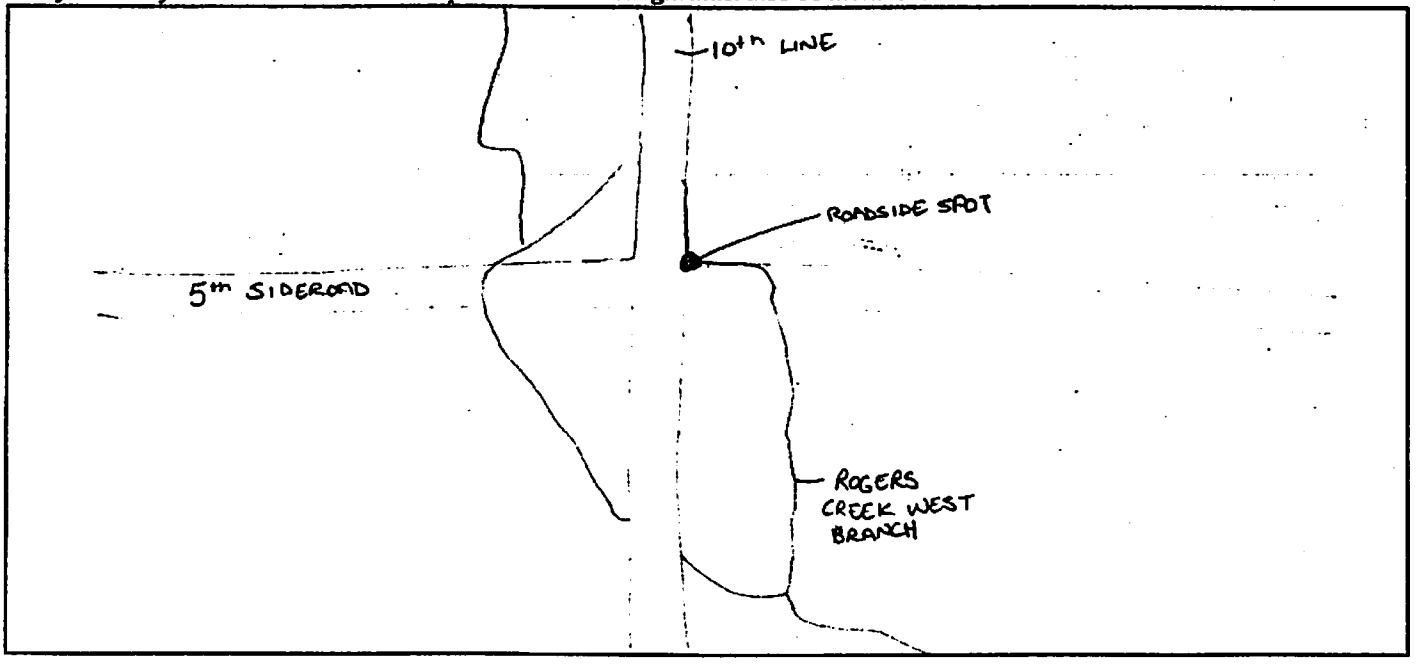
Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept	Size Range (T.L. in mm)
Fathead Minnow				
Blacknose dace				
Identified By:				Date:

Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



Ontario

[redacted]

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1031669	Licencee Name: Melissa Kiddie		
Business Name: LGL Limited	Telephone: (905)333-1667	Fax: (905)333-2660	
Mailing Address: 3365 Harvester Rd Ground Floor	Town/City Burlington	Postal Code: L7N 3N2	
Waterbody Name: Second Creek	Township/Municipality: Peel		
General Description of Sampling Site Location/Access: Mississauga Road South of The Grange Sideroad (Exploratory - roadside)			
Collection Site No. 1 of 1	Site UTM Coordinates: E N		
Collection Date: June 28/06	Start Time:	End Time:	Duration (hrs)
Electrofisher Seconds:	Length of Station (m)	Water Temp. (C)	Air Temp. (C)
Stream Type: ☐ Intermittent	☑ Permanent	Watercress Present: ☐ Yes ☐ No	

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)*

Bottom Type by Percent: *(Total = 100%)*						
	Rock		Boulder	Rubble	Gravel	Sand
	Silt		Clay	Muck	Marl	Detritus
	Other *(Description)*					

Current: ☐ Still ☐ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☐ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☐ None

Cover (Shore): ☐ None ☐ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☐ None ☐ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☑ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 28 Month 06 Year 2006

Collectors:
M O'HALLORAN, A. BRUCE

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*

EXPLORATORY ROADSIDE STATION

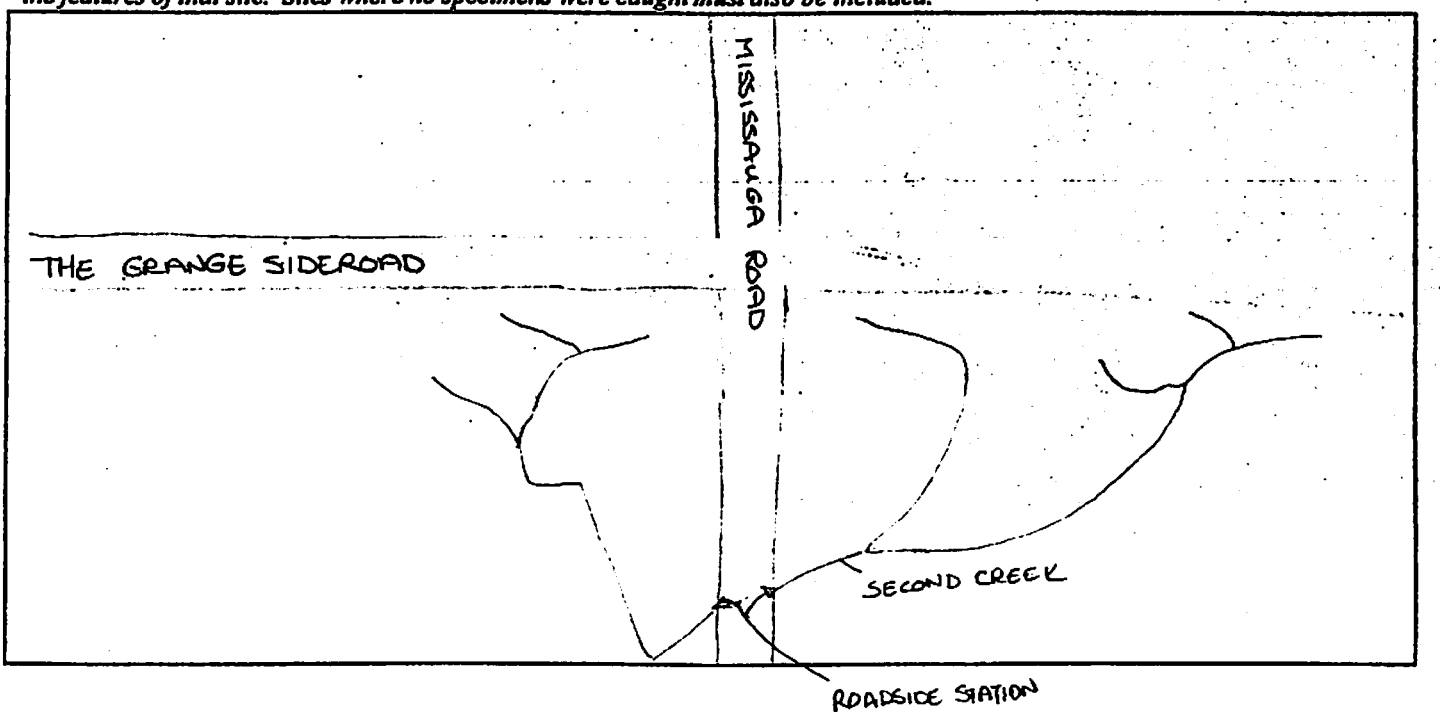
Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept	Size Range (T.L. in mm)
Blacknose dace				
Creek chub				
Northern redbelly dace				
Identified By:				Date:

Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



, ROADSIDE ELECTROFISHING STATIONS
June 28/06

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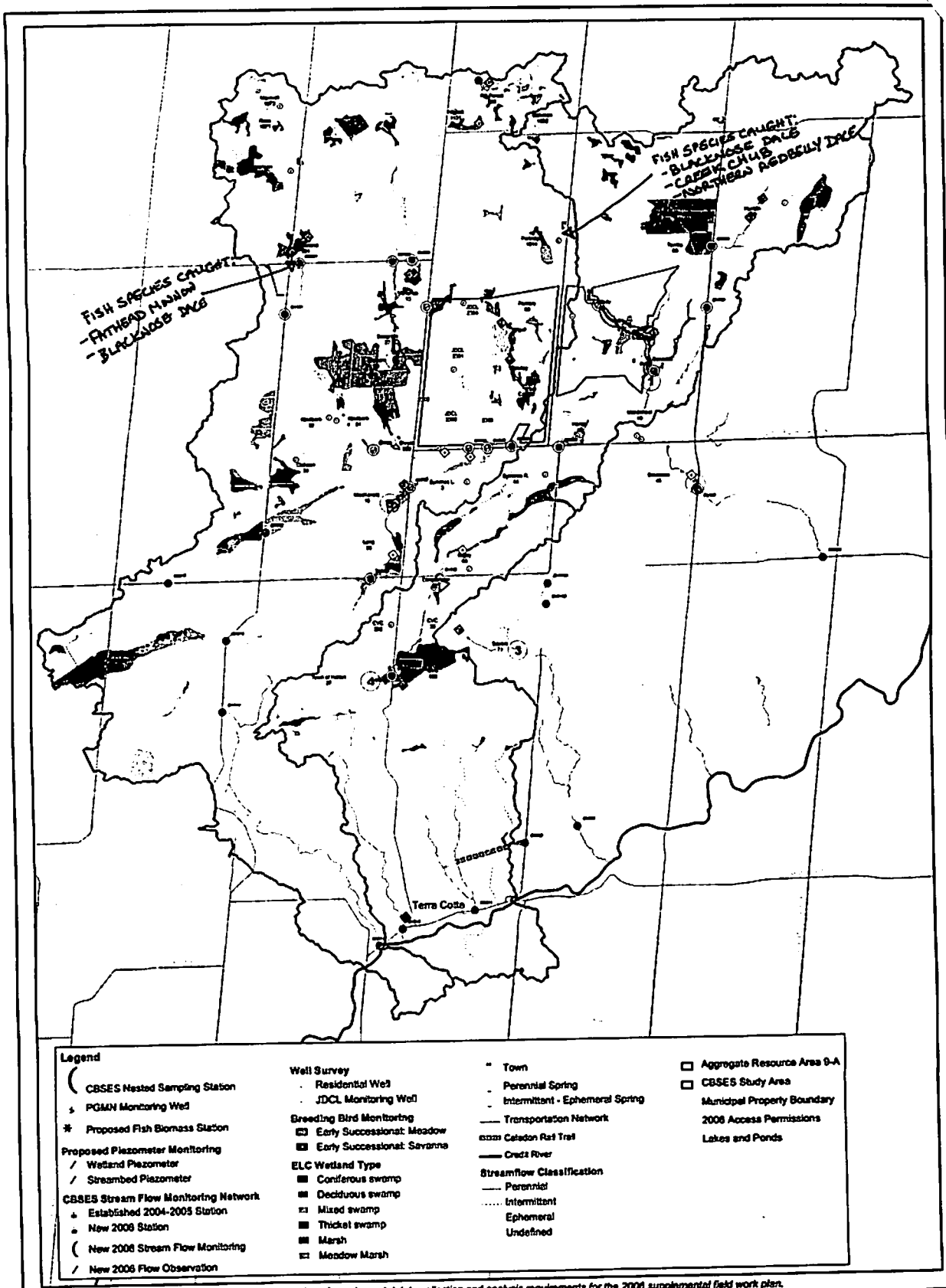


Refer to Schedules 1, 2, and 3 for complete description of supplemental data collection and analysis requirements for the 2006 supplemental field work plan.

350 0 350 700 1,050 1,400 1,750
Metres

CBSES Resource Area 9-A

Base mapping: Revised from Credit Valley Conservation, 2004
Municipal Property Boundaries, MHBC 2005
Projection: UTM (Zone 17N) NAD 83

Proposed Monitoring Locations
2006 Supplemental Field Work Plan

Aggregate Resource Area 9-A CBSES
Town of Caledon, Ontario

Ontario

[redacted]

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1031669	Licencee Name: Melissa Kiddie		
Business Name: LGL Limited	Telephone: (905) 333-1667	Fax: (905) 333-2660	
Mailing Address: 3365 Harvester Rd Ground Level	Town/City Burlington	Postal Code: L7N 3W	
Waterbody Name: Rogers Creek	Township/Municipality: Peel		
General Description of Sampling Site Location/Access: 4948 Winston Churchill Boulevard			
Collection Site No. 1 of 1	Site UTM Coordinates: 5 8 2 4 0 2 E 4 8 4 3 2 9 0 N		
Collection Date: Aug. 17/06	Start Time: 11:05 AM	End Time: 12:04 PM	Duration (hrs) 59 min
Electrofisher Seconds: 638	Length of Station (m) 40	Water Temp. (C) 15.8	Air Temp. (C) 20.4
Stream Type: ☐ Intermittent ☑ Permanent		Watercress Present: ☐ Yes ☑ No	

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)*

Bottom Type by Percent: *(Total = 100%)*					
	Rock	Boulder	Rubble 60%	Gravel 20%	Sand 15%
	Silt	Clay	Muck	Marl	Detritus 5%
	Other *(Description)*				

Current: ☐ Still ☑ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☑ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☑ None

Cover (Shore): ☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☑ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 1 7 Month 0 8 Year 2 0 0 6

Collectors: Melissa Kiddie, Ken Glasbergen, Brian Harrison, Sarah Quesniele

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*

Width

1	2.94	5	2.20	9	2.10
2	2.70	6	2.47	10	0.95
3	2.15	7	2.20		
4	1.90	8	3.10		

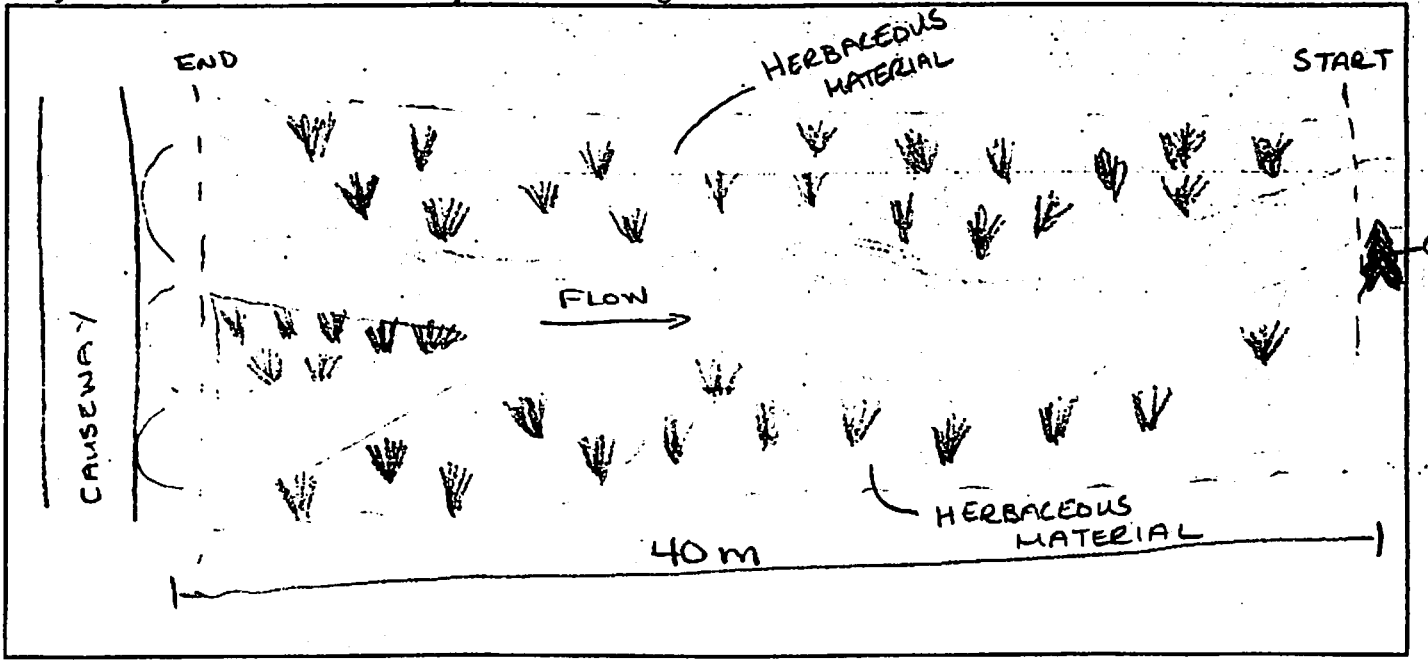
Continued on Reverse

Species Captured

Species	Code	No. Caught	~~No. Kept~~ weight (g)	Size Range (T.L. in mm)
Largemouth bass		1	479	315
Largemouth bass		11	50	Max=96 Avg=77 Min=45
Creek Chub		126	159	Max=176 Avg=101 Min=58
		58	661	
Brook trout		3	243	Max=205 Avg=198 Min=190
White sucker		35	374	Max=181 Avg=135 Min=50
Blacknose dace		222	750	Max=95 Avg=70 Min=45
Fathead minnow		39	111	Max=68 Avg=55 Min=44
Brook stickleback		12	15	Max=51 Avg=46 Min=38
Northern redbelly dace		1	1	Max=55
Identified By:				Date: Aug 17/06

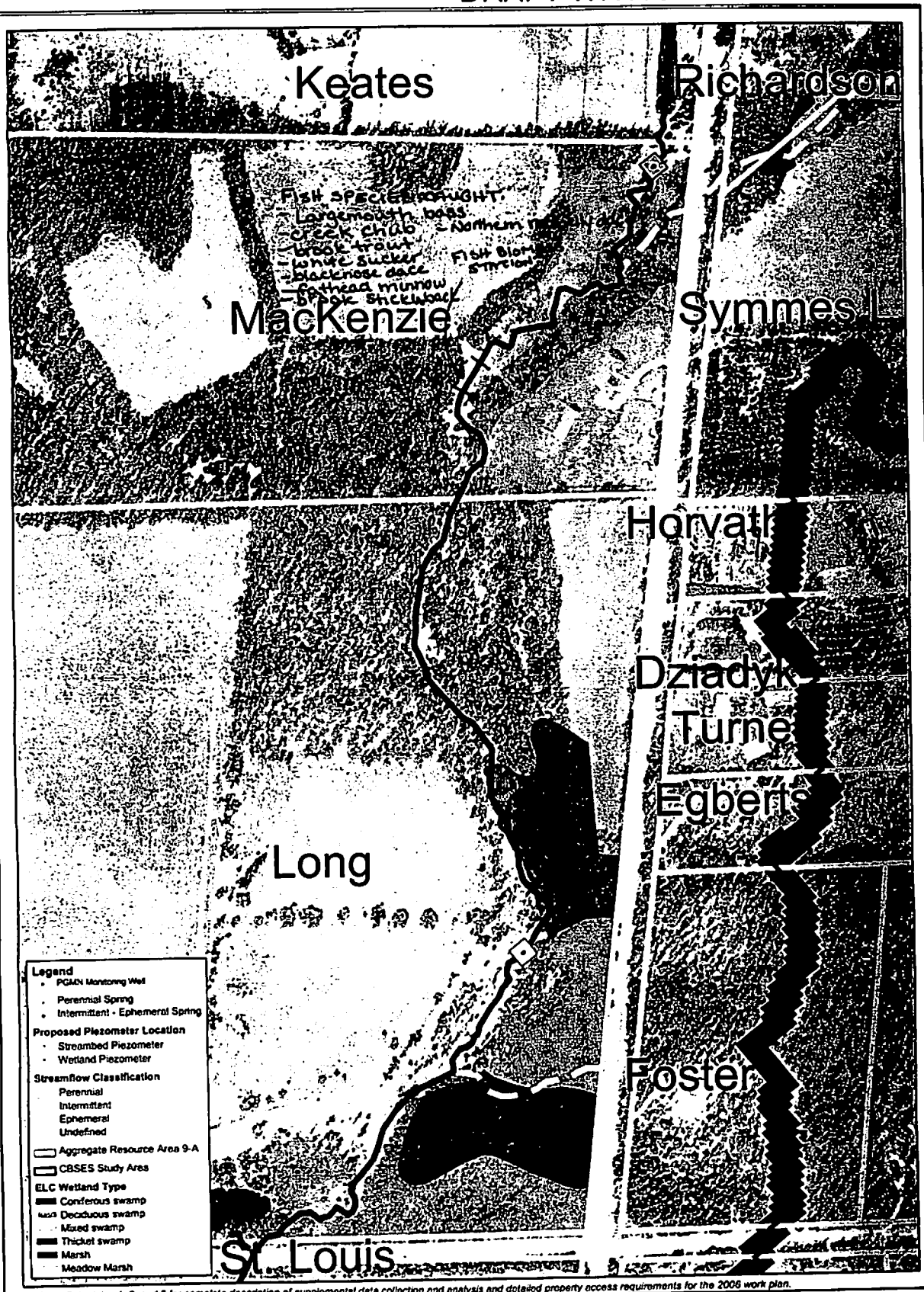
Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



FISH BIOMASS STATION - August 17/2006
Mackenzie Property 4948 Winston Churchill Boulevard

DRAFT WITHOUT PREJUDICE



Refer to Schedules 1, 2, and 3 for complete description of supplemental data collection and analysis and detailed property access requirements for the 2006 work plan.

30 0 30 60 90 120 150
Metres

2006 PROPOSED PIEZOMETER LOCATIONS

CBSES Resource Area 9-A

Base mapping: Revised from Credit Valley Conservation, 2004
Municipal Property Boundaries, MHBC 2005
Projection: UTM (Zone 17N) NAD 83

Aggregate Resource Area 9-A CBSES
Town of Caledon, Ontario

036172(INT500)GIS-WA000 CBSES Property Access & Work Plan 2006 - REVISED April 13, 2006 Prezometers

Ontario

[redacted]

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1031669	Licencee Name: Melissa Kiddle		
Business Name: LGL limited		Telephone: (905)333-1667	Fax (905)333-2660
Mailing Address: 3365 Harvester Rd Ground Level		Town/City Burlington	Postal Code: L7N 3N2
Waterbody Name: Second Creek		Township/Municipality: Peel	

General Description of Sampling Site Location/Access:
77 Ballinafad Road

Collection Site No. 1 of 1	Site UTM Coordinates: 5 8 2 7 8 6 E 4 8 4 3 0 2 4 N		
Collection Date: Aug. 17/06	Start Time: 9:10 AM	End Time: 10:10 AM	Duration (hrs) 1
Electrofisher Seconds: 1273	Length of Station (m) 40	Water Temp. (C) 15.8	Air Temp. (C) 20.2
Stream Type: ☐ Intermittent ☑ Permanent		Watercress Present: ☐ Yes ☑ No	

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)*

Bottom Type by Percent: *(Total = 100%)*	Rock 5%	Boulder	Rubble	Gravel 60%	Sand
	Silt 20%	Clay	Muck 15%	Marl	Detritus
	Other *(Description)*				

Current: ☑ Still ☐ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☑ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☑ Emergent ☐ None

Cover (Shore): ☐ None ☑ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☐ None ☐ Sparse ☐ Moderate ☑ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☑ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 1 7 Month 0 8 Year 2 0 0 6

Collectors:
Melissa Kiddle, Ken Glasbergen, Brian Harrison, Sarah Quesnele

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*
Appears gravel has been added to bottom of channel; blackspot on blacknose dace (10%)

Width	1 3.40	4 3.05	7 3.42	10 4.65	
	2 3.03	5 3.43	8 4.12		
	3 2.90	6 3.62	9 4.18		

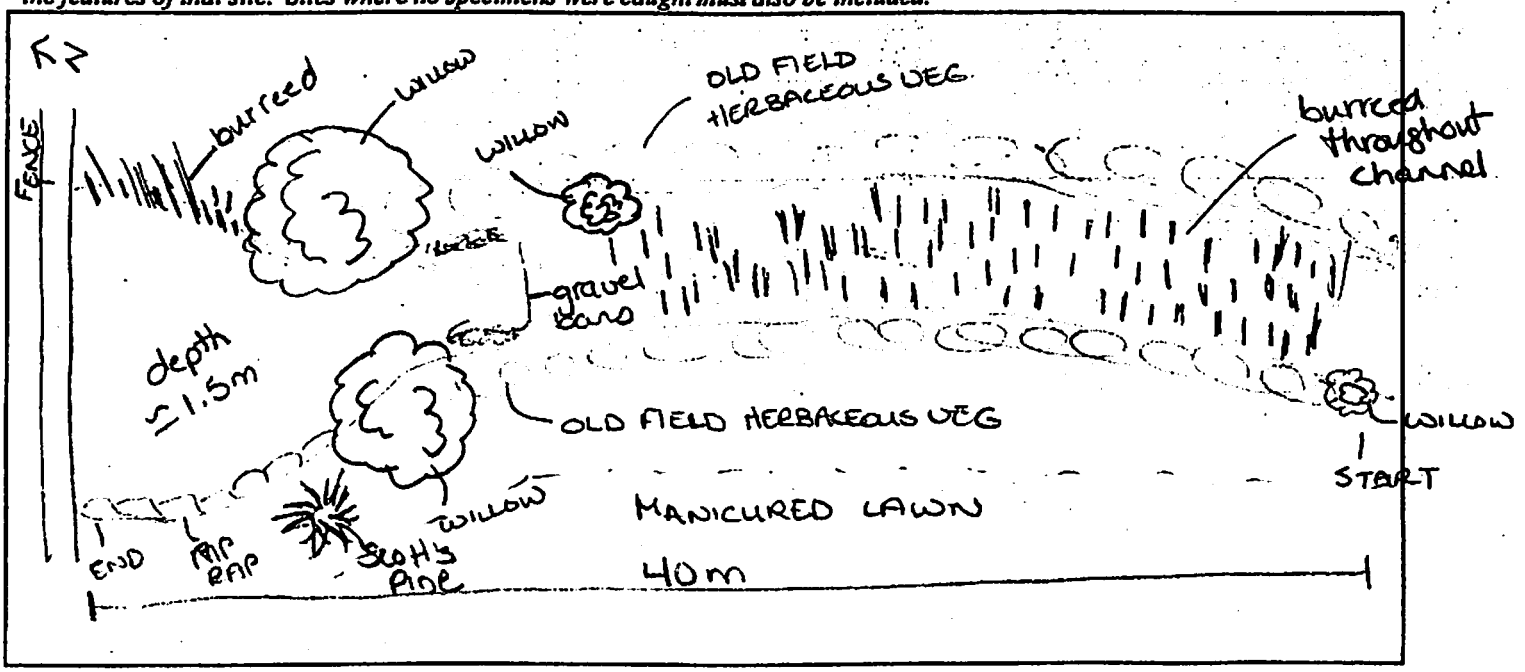
Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept (weight (g))	Size Range (T.L. in mm)
Creek chub		38	384	Max=185 Avg=70 Min=30
Brook trout		20	174	Max=250 Avg=176 Min=115
Blacknose dace		133	254	Max=76 Avg=53 Min=30
Northern redbelly dace		99	192	Max=55 Avg=50 Min=48
Pumpkinseed		14	134	Max=107 Avg=72 Min=64
Brook stickleback		77	65	Max=47 Avg=45 Min=27
Fathead minnow		93	132	Max=62 Avg=46 Min=30
Identified By:				Date: Aug. 17/06

Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



FISH RICHASS STATION - AUGUST 17/2006
DIMPFLMEIER PROPERTY 77 BALLINAFAD RD

CBSES

LGL

Data projected to UTM (Zone 17N) NAD 83
Produced by LGL environmental research associates Ltd., 2005

Field Data Collection
A. Dimplfmeier
Aggregate Resource Area 9-A CBSES
Town of Caledon, Ontario

FDC_39_221 Aug31, 2005

Ontario

[redacted]

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1031669	Licencee Name: Melissa Kiddie		
Business Name: L&L Limited	Telephone (905) 333-1667	Fax: (905) 333-2660	
Mailing Address: 3365 Harvester Rd Ground Level	Town/City Burlington	Postal Code: L7N 3N2	
Waterbody Name: Second Creek	Township/Municipality: Peel		
General Description of Sampling Site Location/Access: Caledon Rail Trail West of Winston Churchill Blvd; upstream			
Collection Site No. 1 of 1	Site UTM Coordinates: ☐☐☐☐☐☐ E ☐☐☐☐☐☐☐ N		
Collection Date: Sept. 22/06	Start Time:	End Time:	Duration (hrs)
Electrofisher Seconds:	Length of Station (m)	Water Temp. (C) 11.5	Air Temp. (C) 14.7
Stream Type: ☐ Intermittent ☑ Permanent	Watercress Present: ☐ Yes ☐ No		

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)*

Bottom Type by Percent: *(Total = 100%)*					
	Rock	Boulder 25%	Rubble 35%	Gravel	Sand
	Silt	Clay 40%	Muck	Marl	Detritus
	Other *(Description)*				

Current: ☐ Still ☑ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☑ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☑ None

Cover (Shore): ☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☐ None ☑ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☑ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 22 Month 09 Year 2006

Collectors:
Melissa Kiddie, Ken Glasbergen

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*
Exploratory electrofishing

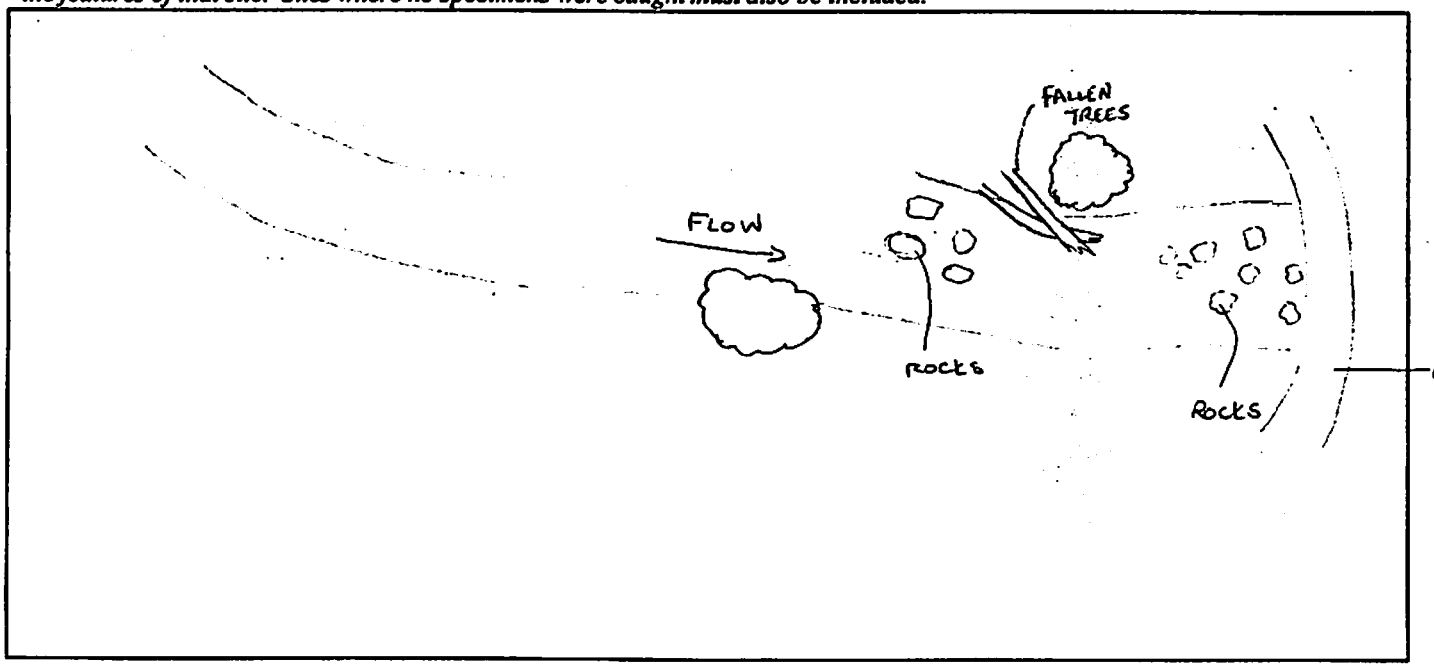
Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept	Size Range (T.L. in mm)
Creek chub		25		
Blacknose dace		13		
Identified By:				Date:

Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



Ontario

[redacted]

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1031669	Licencee Name: Melissa Kiddie		
Business Name: LGL Limited	Telephone: (905) 333-1664	Fax: (905) 333-2660	
Mailing Address: 3365 Harvester Rd Ground Floor	Town/City: Burlington	Postal Code: L7N 3N2	
Waterbody Name: Second Creek	Township/Municipality: Peel		
General Description of Sampling Site Location/Access: Caledon Rail Trail West of Winston Churchill Blvd, Downstream			
Collection Site No. 1 of 1	Site UTM Coordinates: 3 0 9 1 3 4 E 5 1 0 1 0 6 1 N		
Collection Date: Sept. 21/06	Start Time:	End Time:	Duration (hrs)
Electrofisher Seconds:	Length of Station (m)	Water Temp. (C) 11.6	Air Temp. (C) 14.7
Stream Type: ☐ Intermittent ☑ Permanent		Watercress Present: ☐ Yes ☑ No	

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)*

Bottom Type by Percent: *(Total = 100%)*					
	Rock	Boulder 20%	Rubble 20%	Gravel	Sand
	Silt	Clay 60%	Muck	Marl	Detritus
	Other *(Description)*				

Current: ☐ Still ☑ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☑ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☑ None

Cover (Shore): ☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☐ None ☑ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☑ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 2 1 Month 0 9 Year 2 0 0 6

Collectors:
Melissa Kiddie, Ken Glasbergen

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*
- exploratory electrofishing

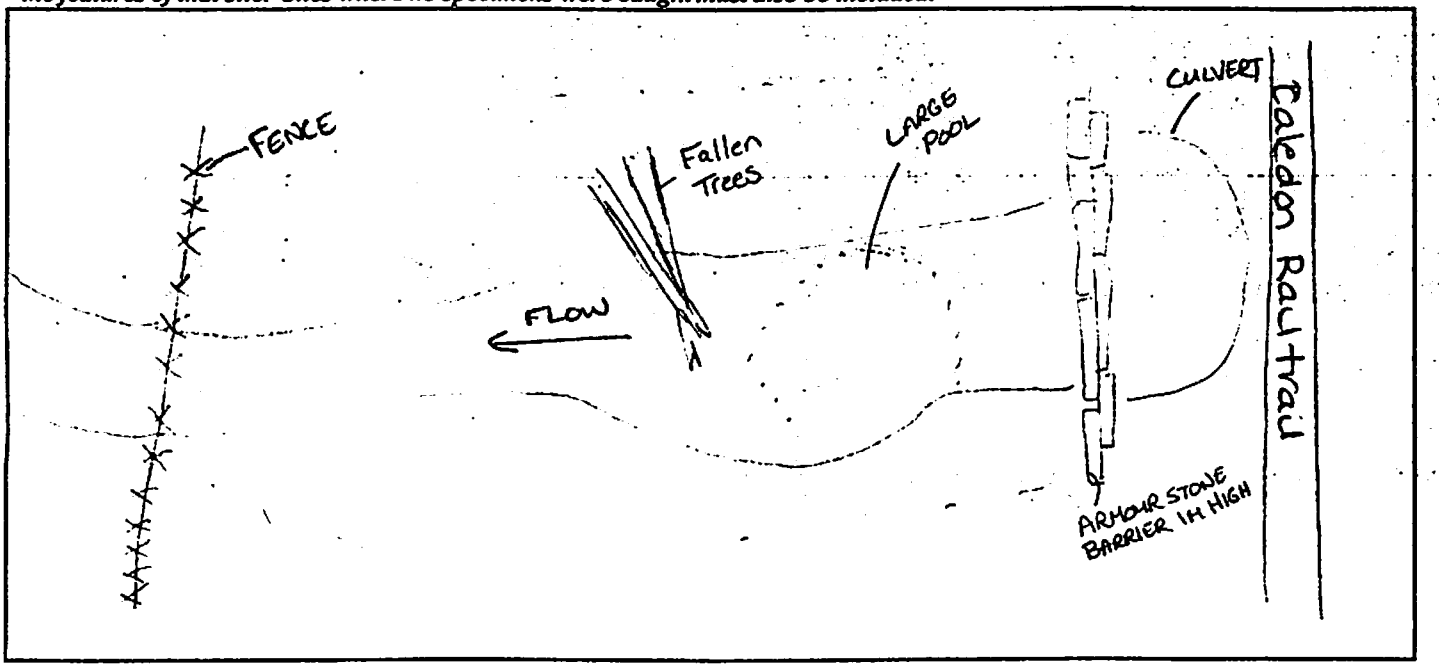
Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept	Size Range (T.L. in mm)
Fathead minnow		6		
Common shiner		3		
Brown trout (10 inch)		1		
Brown trout		2		
Creek chub		13		
White sucker		6		
Rainbow trout		2		
Blacknose dace		3		
Hogsucker		2		
Bluntnose minnow		3		
Fantail darter		1		
Unknown darter		1		
Identified By:				Date:

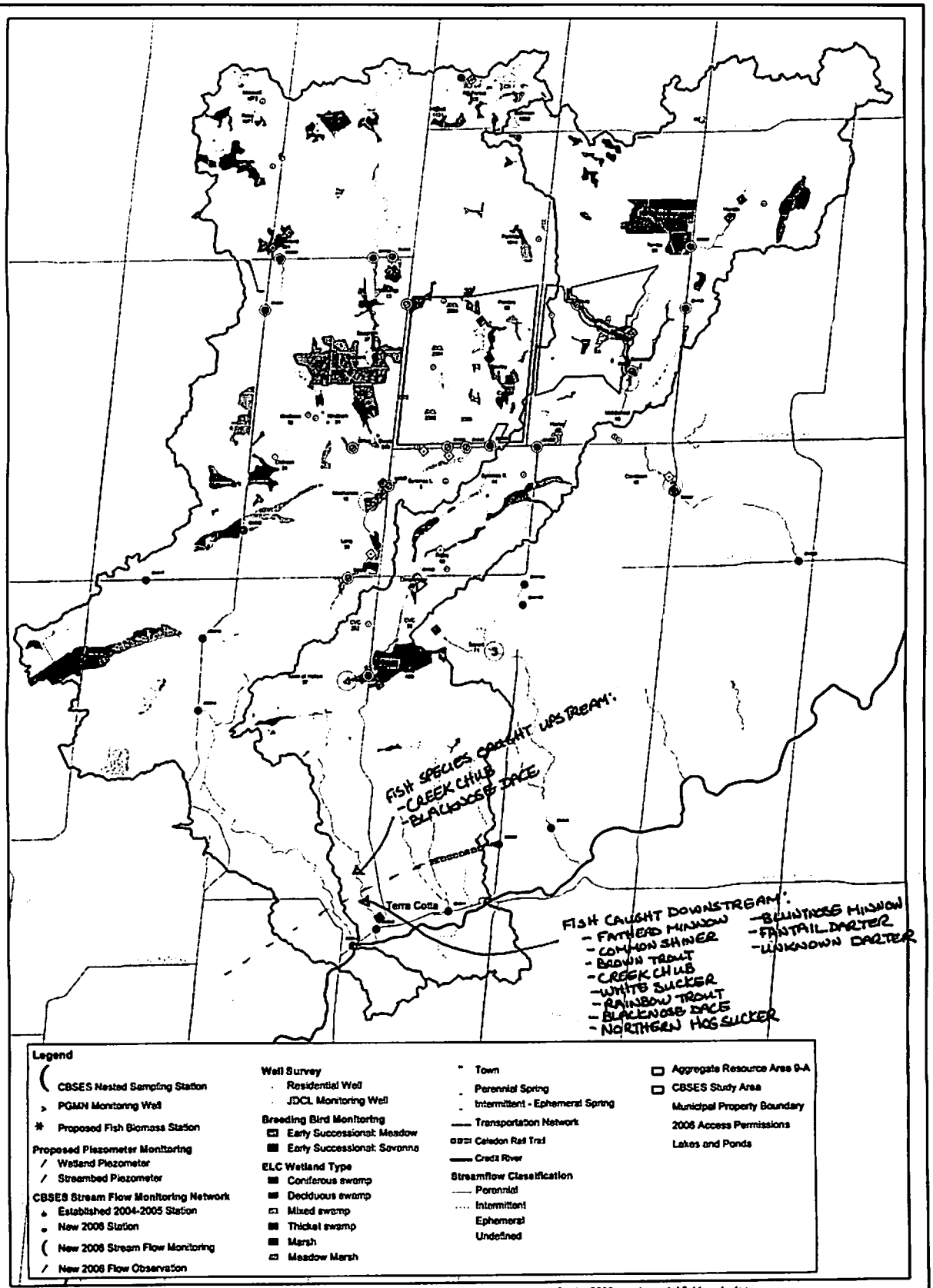
Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



CALEDON RAIL TRAIL
EXPLORATORY ELECTROFISHING - SEPT. 22/06

DRAFT



Refer to Schedules 1, 2, and 3 for complete description of supplemental data collection and analysis requirements for the 2006 supplemental field work plan.

350 0 350 700 1,050 1,400 1,750
Metres

CBSES Resource Area 9-A

Base mapping: Revised from Credit Valley Conservation, 2004
Municipal Property Boundaries, MHBC 2005
Projection: UTM (Zone 17N) NAD 83

Proposed Monitoring Locations
2006 Supplemental Field Work Plan

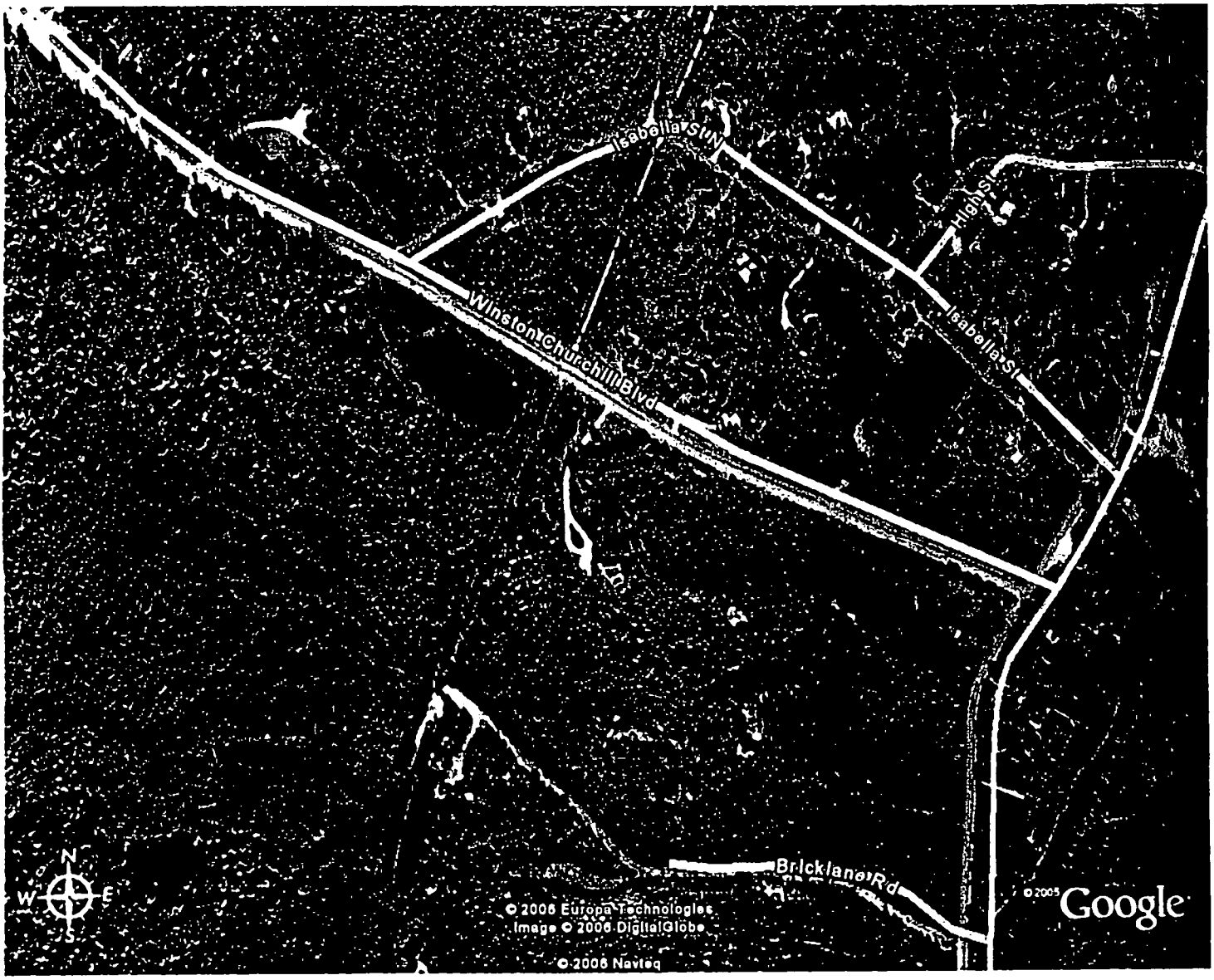
Aggregate Resource Area 9-A CBSES
Town of Caledon, Ontario

CALEDON RAIL TRAIL

EXPLORATORY ELECTROFISHING - SEPT. 22/06

SECOND CREEK

- -UPSTREAM
- -DOWNSTREAM



Ontario

[redacted]

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1031669	Licencee Name: Melissa Kiddie		
Business Name: LGL Limited	Telephone: (905) 333-1667	Fax: (905) 333-2660	
Mailing Address: 3365 Harvester Rd Suite 4	Town/City Burlington	Postal Code: L7N 3N2	
Waterbody Name: Fourth Creek - South Branch	Township/Municipality: Peel		
General Description of Sampling Site Location/Access: 15236 Mississauga Road			
Collection Site No. 1 of 1	Site UTM Coordinates: ☐☐☐☐☐☐ E ☐☐☐☐☐☐☐ N		
Collection Date: Nov. 1/06	Start Time:	End Time:	Duration (hrs)
Electrofisher Seconds:	Length of Station (m)	Water Temp. (C)	Air Temp. (C)
Stream Type: ☐ Intermittent ☐ Permanent	Watercress Present: ☐ Yes ☐ No		

Waterbody Type: ☐ Spring ☐ Canal ☐ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)*

Bottom Type by Percent: *(Total = 100%)*					
	Rock	Boulder	Rubble	Gravel	Sand
	Silt	Clay	Muck	Marl	Detritus
	Other *(Description)*				

Current: ☐ Still ☐ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☐ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☐ None

Cover (Shore): ☐ None ☐ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☐ None ☐ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☐ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch

** Record released fish on back.*

Date: Day 0 1 Month 1 1 Year 2 0 0 6

Collectors:
K. Glasberger, A. Macmillan, J. Beebe

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*
Exploratory electrofishing

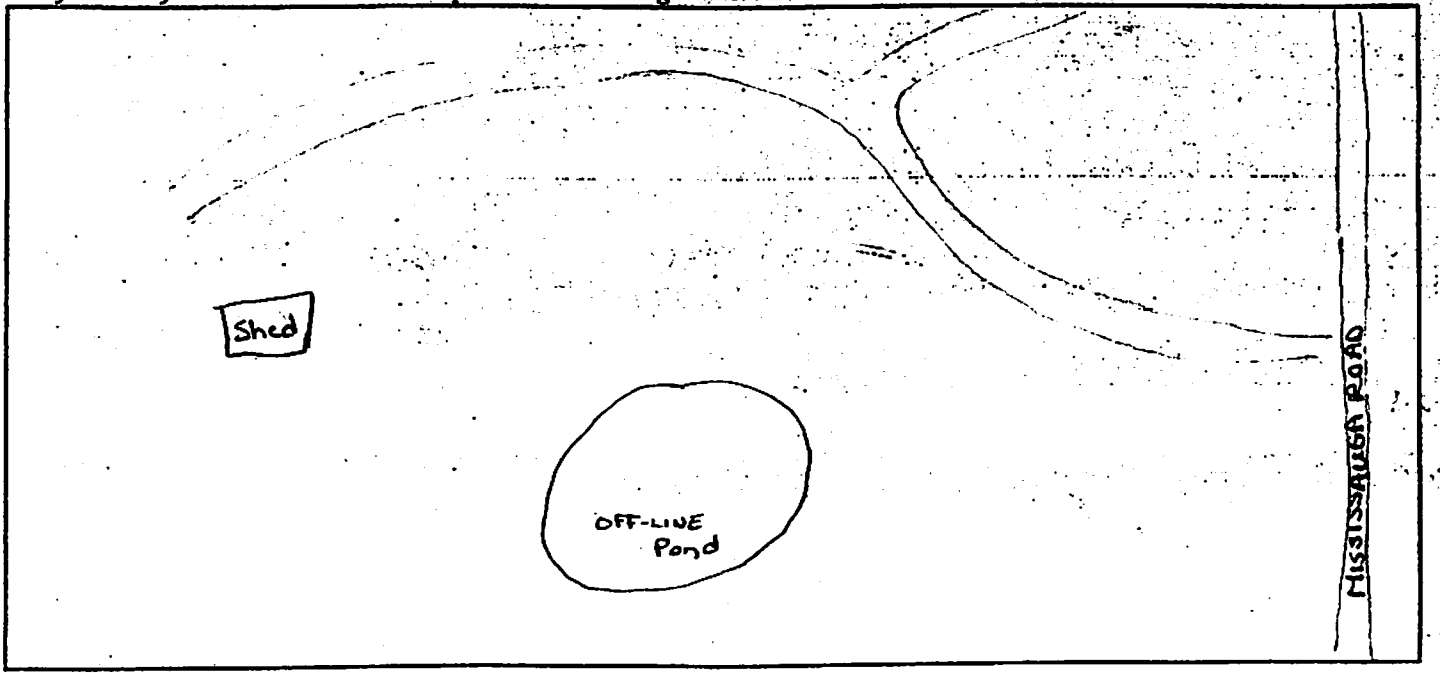
Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept	Size Range (T.L. in mm)
Creek Chub				
Identified By:				Date:

Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



Ontario

[redacted]

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1031669	Licencee Name: Melissa Kuddie		
Business Name: LGL Limited	Telephone: (905) 333-1667	Fax: (905) 333-2660	
Mailing Address: 3365 Harvester Rd Ground Level	Town/City Burlington	Postal Code: L7N 3N2	
Waterbody Name: Second Creek	Township/Municipality: Peel		
General Description of Sampling Site Location/Access: 16117 Mississauga Road			
Collection Site No. 1 of 1	Site UTM Coordinates: ☐☐☐☐☐☐ E ☐☐☐☐☐☐☐ N		
Collection Date: Nov. 1/06	Start Time:	End Time:	Duration (hrs)
Electrofisher Seconds:	Length of Station (m)	Water Temp. (C)	Air Temp. (C)
Stream Type: ☐ Intermittent ☑ Permanent	Watercress Present: ☐ Yes ☐ No		

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)*

Bottom Type by Percent: *(Total = 100%)*					
	Rock	Boulder	Rubble	Gravel	Sand 50%
	Silt 50%	Clay	Muck	Marl	Detritus
	Other *(Description)*				

Current: ☐ Still ☑ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☐ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☐ None

Cover (Shore): ☐ None ☐ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☐ None ☐ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☐ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 0 1 Month 1 1 Year 2 0 0 6

Collectors:
K. Glasbergen, A. Macmillan, J. Beebe

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*
Exploratory fish station flow 5 sec/1m
wetted width = 1.5 to 2.0m
wetted depth = 0.1 to 0.2m

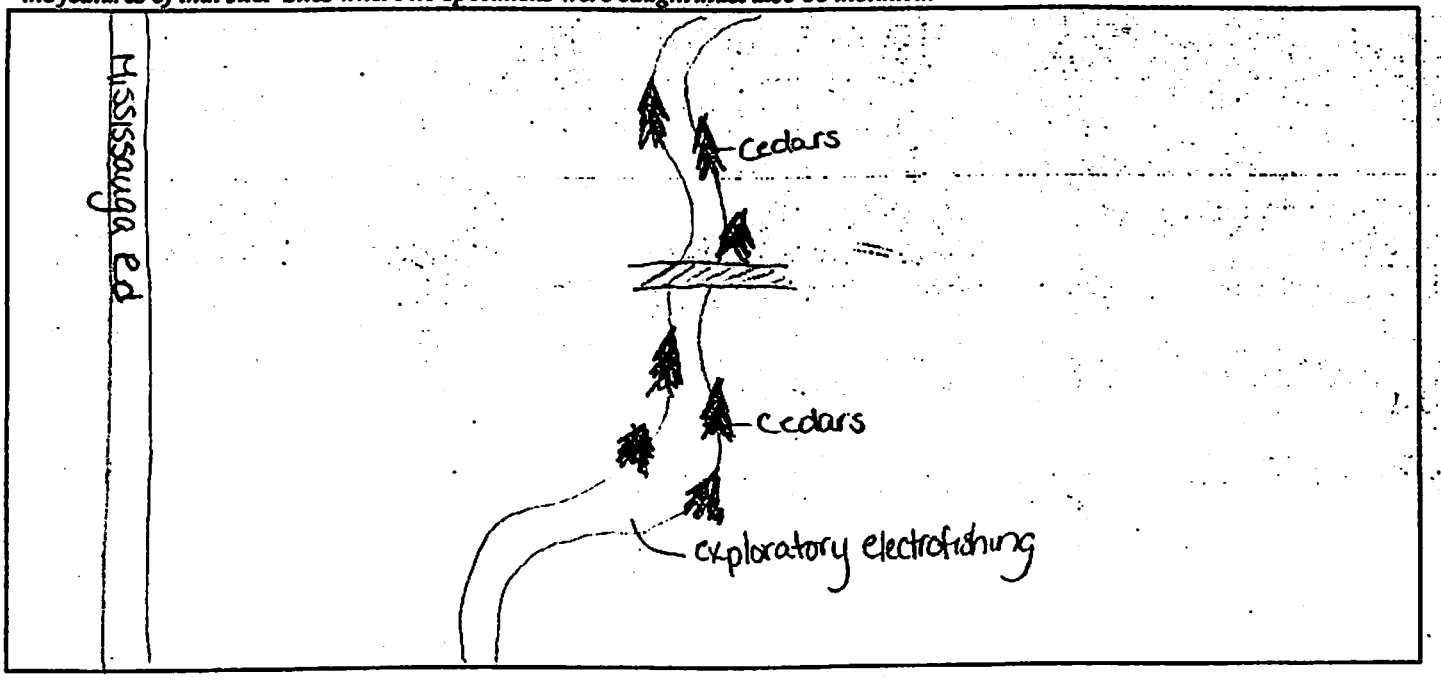
Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept	Size Range (T.L. in mm)
Blacknose dace		2		
Identified By:				Date:

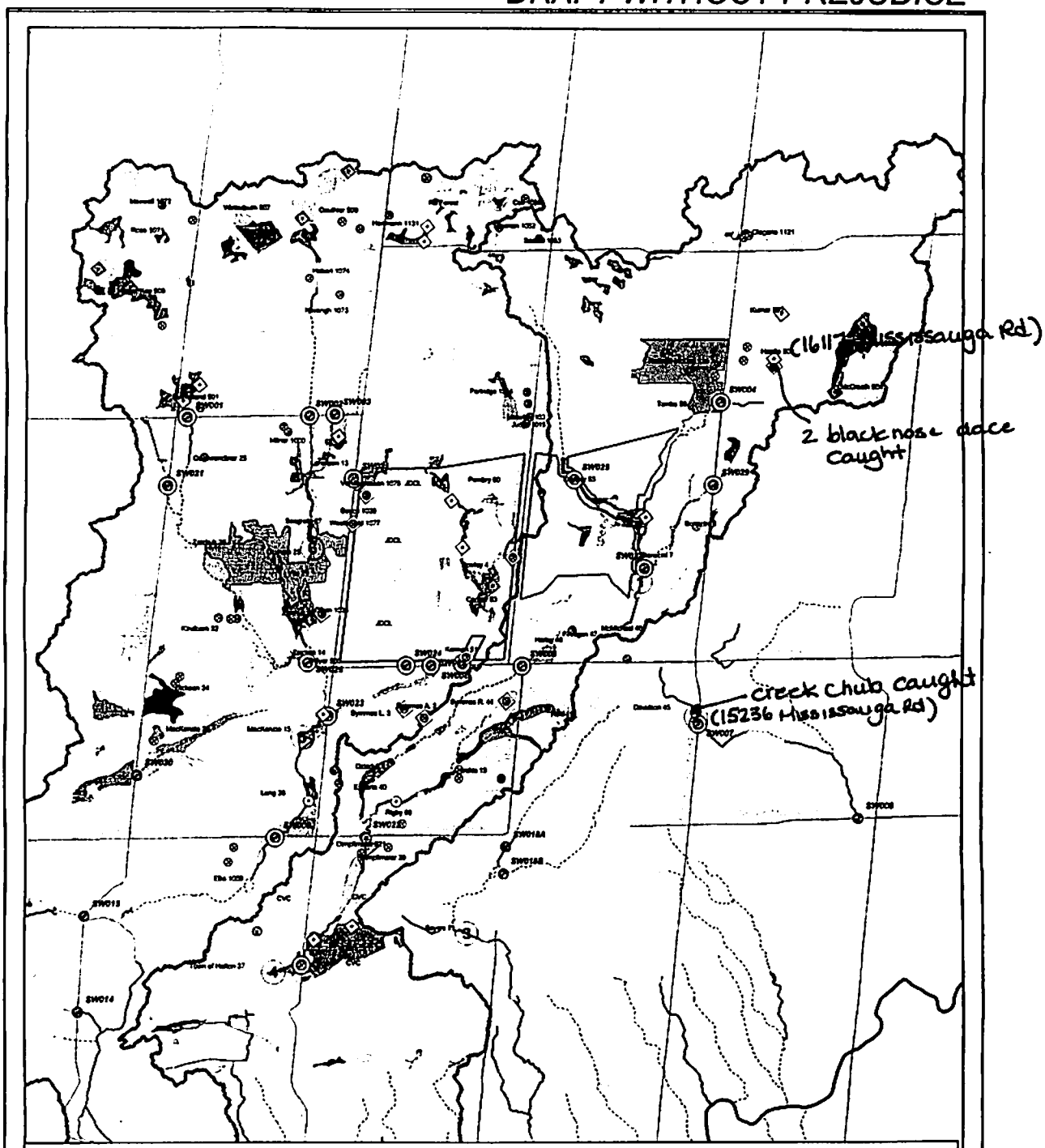
Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



. Exploratory Electrofishing Stations - LGL Nov. 2006

DRAFT WITHOUT PREJUDICE



Legend

- CBSES Nested Sampling Station
- PGMN Monitoring Well
- **Residential Well**
  - Bedrock Well
  - Overburden Well
  - NA
- 1997 Residential Well Survey
- Proposed Fish Biomass Station
- Proposed 2006 Flow Observation
- **Proposed Peizometer Monitoring**
  - Wetland Piezometer
  - Alternative Wetland Piezometer
  - Streambed Piezometer
  - Alternative Streambed Piezometer
- **CBSES Stream Flow Monitoring Network**
  - Established 2004-2005 Station
  - Proposed 2006 New Station
  - Proposed 2006 Stream Flow Monitoring
- Town
- Transportation Network
- Credit River
- **Streamflow Classification**
  - Perennial
  - Intermittent
  - Ephemeral
  - Undefined
- Aggregate Resource Area 9-A
- CBSES Study Area
- Municipal Property Boundary
- **2006 Property Access Requirements**
  - New Access Permission
  - Existing Access Permission
  - Well Survey - New Access
  - Well Survey - Existing Access
  - JDCL Monitoring
  - CVC-Owned Lands
- **Proposed Breeding Bird Monitoring**
  - Early Successional: Meadow
  - Early Successional: Savanna
- **ELC Wetland Type**
  - Coniferous swamp
  - Deciduous swamp
  - Mixed swamp
  - Thicket swamp
  - Marsh
  - Meadow Marsh

Refer to Schedule 1 for complete description of supplemental data collection and analysis and Schedule 3 for detailed property access requirements.

280 0 280 560 840 1,120 1,400
Metres

Base mapping: Revised from Credit Valley Conservation, 2004
Municipal Property Boundaries, MHBC 2005
Projection: UTM (Zone 17N) NAD 83

2006 PROPERTY ACCESS REQUIREMENTS & PROPOSED SUPPLEMENTAL DATA COLLECTION

Aggregate Resource Area 9-A CBSES
Town of Caledon, Ontario

Ministry of Natural Resources
Ontario

Field Sample ID 98

Field Collection Record

Use Pencil Only

0769

stn: 50112 0002

MNR LICENCE NO. TO COLLECT FISH FOR SCIENTIFIC PURPOSES: AU 001-02

No. of Bags

MNR District No. | Name of Waterbody: ROGER CREEK d/s Winston Churchill | Collection No. | Station No.

County or Judicial District: Wellington | Township: Erin | Watershed Code: H

Locality of Waterbody (if other than stream or river): U/S BALLINFAD RD. - WEST OF WINSTON CHURCHILL

Locality of station: On the Long's Property

Latitude ° ′ | Longitude ° ′ | Date Day 25 Month 07 Year 02 | Time Started 10317 Hrs. 11:37

Duration 610 Hrs min | Drainage System: Credit River

Water Type
☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool
☐ Pond ☐ Lake ☐ Muskeg/Bog ☐ Reservoir ☐ Other

Water Temperature	Air Temperature	Distance Offshore Min.	Distance Offshore Max.	Depth of Capture Min.	Depth of Capture Max.
16.5 °C	22.0 °C	m	m	m	m

Plant Type
☐ Submergent ☐ Floating ☒ Emergent ☐ None — Water Cress abundant, Valerie abundant

Bottom Type
☑ Rock ☐ Boulder ☐ Rubble ☐ Gravel ☐ Sand ☒ Silt
☐ Clay ☑ Muck ☐ Marl ☐ Detritus ☐ Other mainly silt

Current
☐ Still ☒ Slow ☐ Medium ☐ Fast ☐ Quantitative ____ m/s

Water Colour
☒ Colorless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other

Cover (Shore)
☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other

Cover (In water)
☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other

Gear
☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap
☐ Piscicide ☐ Trap Net ☐ Hoop Net ☒ Electrofish ☐ Surber ☐ Other

Size of Net (Gill or Seine Net) Length	Size of Net or Mouth (Trap, Hoop or Trawl)	Mesh Size Smallest	Mesh Size Largest
m	m	cm	cm

Selectivity of Sample
☐ All Kept ☐ None Kept* ☐ Some Kept* ☐ No Catch
*List Released Fish on Back

Preservative
☐ Formalin ☐ Kahle's Solution ☐ Alcohol ☐ Frozen ☐ Other

Date Day 25 Month 07 Year 02 | Collectors: B. Mains, J. Davis, B. Morrison, A. Kennedy

Additional Data: Pollution, Colour and Condition of Fish, Parasites, etc.

Widths
1.6 m. 3.35
3.7 3.75
1.93 3.1
1.17 1.8
1.45 2.3

Length
149.6 m

Shock Seconds & Grant
Start = 298857
end = 312235
A = 13378

Lenard

UTM NAD 83
E 582,406
N 4,843,274

Shaded Areas For Main Office Use Only

MNR District No.	Name of Waterbody	Collection No.	Station No.

Date Received Day	Month	Year	Township	Latitude ° '	Longitude ° '	Acc.	Page	Of

No.	Scientific Name	Code	Size Range (T.L. in mm)	OMNR Cat No.	ROM Cat.
160	Blacknose dace Tw = 557.5g		Max = 9.7cm Min = 2.4cm Avg = 7.4cm		
15	White Sucker Tw = 141.0g		Max 10.2cm Min 8.4 cm Avg 9.3cm		
93	Creek Chub Tw = 164.0g		Max 11.9cm Min = 6cm Avg = 6.5cm		
13	Pumpkin seed Tw = 204.5		Max 10 cm Min 8.5 cm Avg = 9 cm		
3	Central Mudminnow Tw = 7.0g		Max = 4cm Min = 4cm		
2	Fathead Minnow Tw = entered as 8g in db for summary		Max = 6.9cm Min = 5.7 cm		
2	Largemouth bass (Adult) Tw = 68.5g		Max = 14.9cm Min = 10.6cm		
13	Largemouth bass (YOY) Tw = 25.0g		Max = 5.2cm Min = 4.3cm Avg = 4.8cm		
131	brook stickleback Tw = 58.0g		Max = 3.3cm Min = 1.8cm Avg = 2.5cm		
159	White Sucker (YOY) Tw = 148.5g		Max = 4.6cm Min = 3.5cm Avg = 3.9cm		
18	Creek Chub (YOY) Tw = 7g		Max = 3.8cm Min = 2.8cm Avg = 3.3cm		

Identified by	Date

Station Diagram

ROGERS CREEK U/S BALLINA FARQ. 2002

(Long property)

Length = 149.6m flagged dead tree

END (tag on dead tree)

root wad

dense grass + joe pie weed

riffle area

large pool

dead tree

dead tree

down tree across stream

large fallen tree

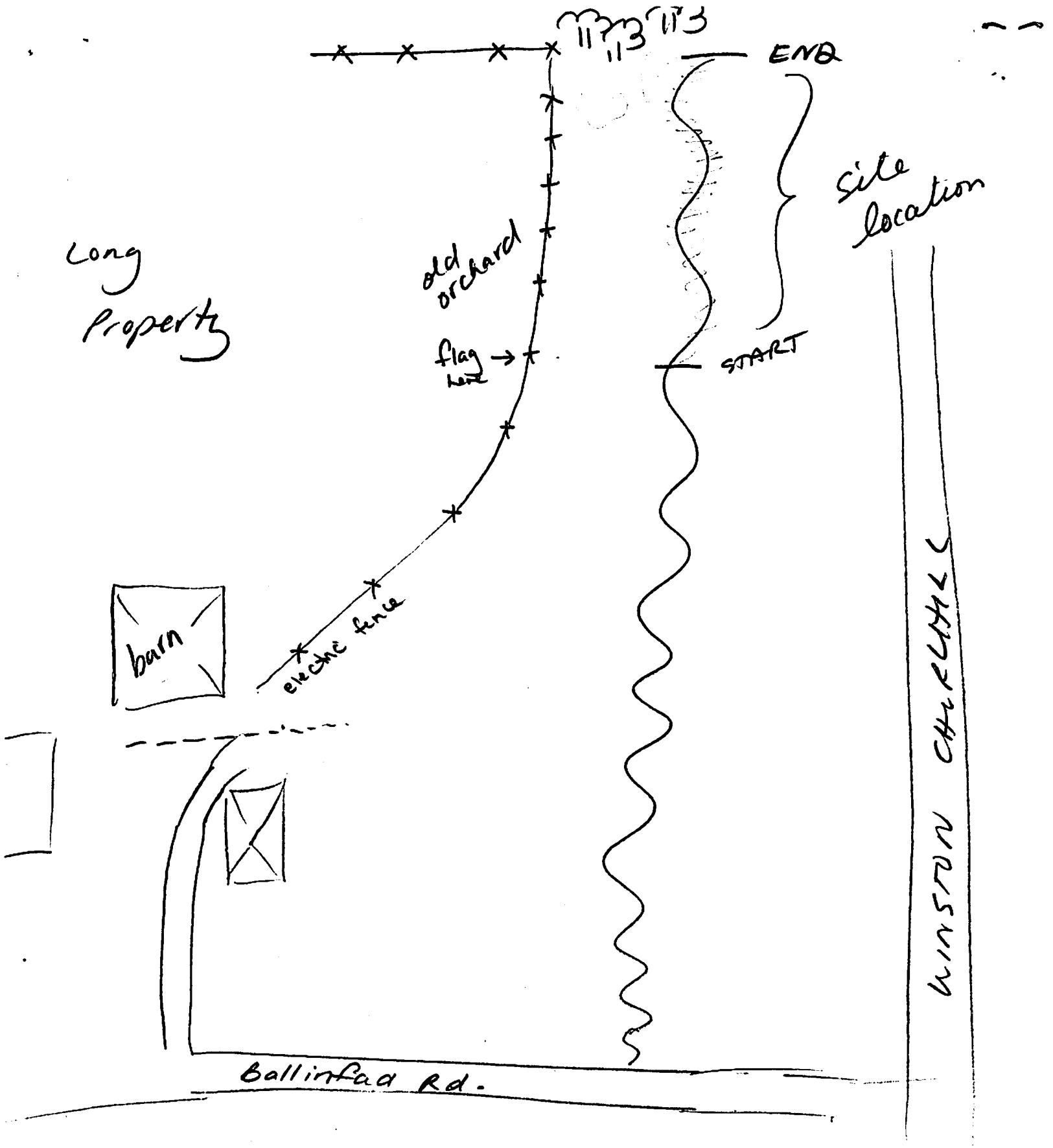
to find sik see picture

pool area

downed cedars

five clustered poplars

tag on cedar branch


113
113
113
END
site location
Long Property
old orchard
flag here
START
barn
electric fence
Ballinfad Rd.

Credit 339

Ontario

MNR Office Use:	
Watershed:	
Waterbody Name:	
Fish Dot No.:	

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1016985	Licencee Name: Martin O'Halloran		
Business Name: LGL Limited	Telephone: 905-333-1667	Fax: 905-333-2660	
Mailing Address: 3365 Harvester Rd, Ground Level	Town/City Burlington	Postal Code: L7N 3N2	
Waterbody Name: Roger's Creek - west branch	Township/Municipality: Peel		
General Description of Sampling Site Location/Access: Rolf Kindbom Property (5013 10th Line) (Property: 32/31) (10th Line south of 5th sideroad and north of Erin-Halton Hills Townline)			
Collection Site No. 1 of 1	Site UTM Coordinates: 5 8 1 4 5 1 E 4 8 4 3 4 7 3 N		
Collection Date: Sept. 8, 2004	Start Time:	End Time:	Duration (hrs)
Electrofisher Seconds:	Length of Station (m) 40	Water Temp. (C)	Air Temp. (C)
Stream Type: ☑ Intermittent ☐ Permanent	Watercress Present: ☑ Yes ☐ No		

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)* _____

Bottom Type by Percent: *(Total = 100%)*					
	Rock	Boulder 50%	Rubble	Gravel	Sand
	Silt	Clay	Muck	Marl	Detritus
	Other *(Description)*				

Current: ☐ Still ☑ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☐ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☐ None

Cover (Shore): ☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☑ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☐ None Kept* ☐ Some Kept* ☑ No Catch

* *Record released fish on back.*

Date: Day 0 8 Month 0 9 Year 2 0 0 4

Collectors:
A. BRUCE, M. KIDDIE

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*

NOTE: The downstream section of this reach was dry, while the upstream section had a small amount of water in it

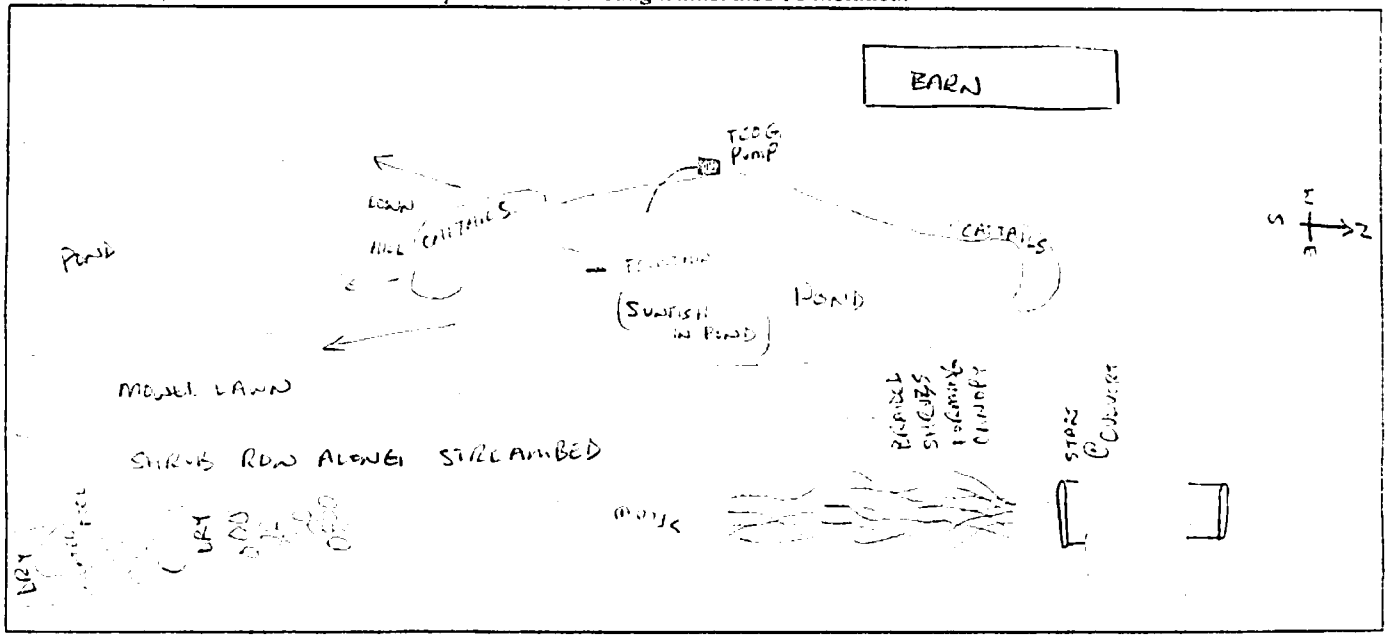
Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept	Size Range (T.L. in mm)
NO CATCH				
Identified By:				Date: Sept 8/04

Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



FS#14 Credit .769

Ontario

MNR Office Use:
Watershed:
Waterbody Name:
Fish Dot No.:

CUC SYN # 501120002

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1008080	Licencee Name: LOVELEEN CLAYTON		
Business Name: CREDIT VALLEY CONSERVATION	Telephone: 905 670 1615	Fax: (905) 670-2210	
Mailing Address: 1255 OLD DERRY ROAD WEST	Town/City MISSISSAUGA	Postal Code: L5N 6R4	
Waterbody Name: ROGERS CREEK	Township/Municipality: Caledon / Peel		
General Description of Sampling Site Location/Access: ROGERS CREEK @ WINSTON CHURCHILL BLVD N of TERRA COTTA C.A			
Collection Site No. ☐ of ☐	Site UTM Coordinates: 5 8 2 4 0 6 E 4 8 4 3 2 7 4 N		
Collection Date: Aug 12/03	Start Time: 1:40	End Time: 2:10	Duration (hrs) .5 hr
Electrofisher Seconds:	Length of Station (m) 149.6	Water Temp. (C)	Air Temp. (C) 31°C
Stream Type: ☐ Intermittent ☑ Permanent	Watercress Present: ☐ Yes ☐ No		

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)*

Bottom Type by Percent: *(Total = 100%)*					
	Rock 20	Boulder	Rubble	Gravel 10	Sand 10
	Silt 15	Clay	Muck 15	Marl	Detritus 30
	Other *(Description)*				

Current: ☐ Still ☑ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☑ Colourless ☑ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☑ Submergent ☑ Floating ☑ Emergent ☐ None

Cover (Shore): ☐ None ☐ Sparse ☐ Moderate ☑ Dense ☐ Other _____

Cover (In Water): ☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☑ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 1 2 Month 0 8 Year 2 0 0 3

Collectors: A. Dance, M. Pine, R. Acleson

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*

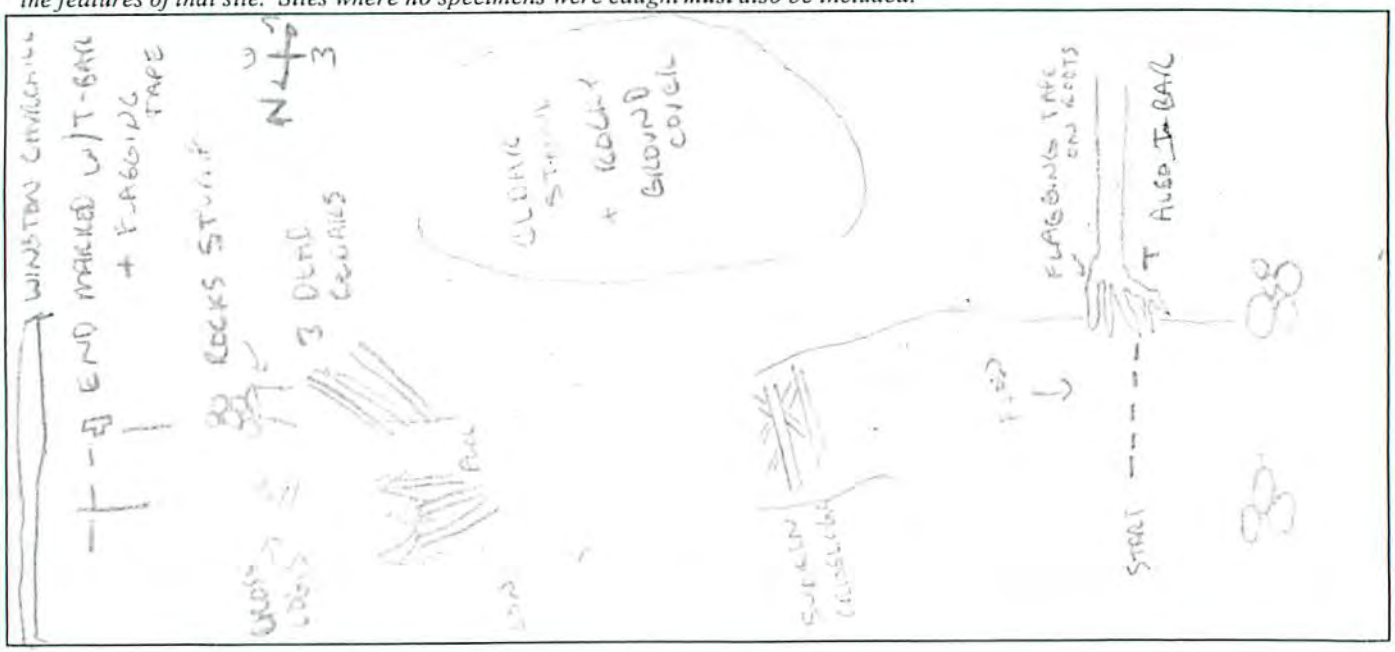
Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept WEIGHT (G)	Size Range (T.L. in mm)		
BROOK STICKLEBACK		14	5.5	42	35	19
NORTHERN REDBELLY DACE		103	125.5	68	50	35
PUMPKINSEED SUNFISH		2	9.5	61	60	
BLACKNOSE DACE		97	262.5	85	65	28
FATHEAD MINNOW		3	5.5	58		47
CREEK CHUB		111	668.5	154	95	44
1 2.99 6 2.91						
2 2.35 7 2.04						
3 2.48 8 2.53						
4 2.89 9 3.08						
5 3.04 10 3.84						
Identified By: A. Bruce, M. Pine, R. Acheson				Date: Aug 12/03		

Station Diagram

*(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught **must** also be included.*



Credit 334

Ontario

MNR Office Use
Watershed:
Waterbody Name:
Field Doc No.:

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1016985	Licencee Name: Martin O'Halloran

Business Name: LGL Limited	Telephone: 905-333-1667	Fax: 905-333-2660
Mailing Address: 3365 Harvester Rd, Ground Level	Town/City: Burlington	Postal Code: L7N 3N2

Waterbody Name: Roger's Creek - west branch | Township/Municipality: Peel

General Description of Sampling Site Location/Access: (10th Line South of 5th Sideroad) Gschwendtner Property (5081 10th Line) (Property 25)

Collection Site No. 1 of 1 | Site UTM Coordinates: 580321 E 4843888 N

Collection Date: Sept. 15, 2004	Start Time:	End Time: 12:41
Duration (hrs):	Electrofisher Seconds:	Length of Station (m):
Water Temp. (C):	Air Temp. (C):	

Stream Type: [ ] Intermittent [x] Permanent | Watercress Present: [ ] Yes [x] No

Waterbody Type: [ ] Spring [ ] Canal [x] Stream/River [ ] River/Lake Junction [ ] Flooded Area [ ] Pool [ ] Pond [ ] Lake [ ] Reservoir [ ] Muskeg/Bog [ ] Other *(Describe)*

Bottom Type by Percent: *(Total = 100%)*					
	Rock	Boulder	Rubble 70%	Gravel 30%	Sand
	Silt	Clay	Muck	Marl	Detritus
	Other *(Description)*				

Current: [ ] Still [x] Slow [ ] Medium [ ] Fast [ ] Quantitative (m/s) ______

Water Colour/Clarity: [x] Colourless [ ] Yellow/Brown [ ] Blue/Green [ ] Turbid [ ] Other ______ Secchi Depth: (m) ______

Aquatic Vegetation: [ ] Submergent [ ] Floating [ ] Emergent [x] None

Cover (Shore): [ ] None [ ] Sparse [x] Moderate [ ] Dense [ ] Other ______

Cover (In Water): [ ] None [ ] Sparse [x] Moderate [ ] Dense [ ] Other ______

Gear: [ ] Seine [ ] Gill Net [ ] Dip Net [ ] Angled [ ] Trawl [ ] Minnow Trap [ ] Piscicide [ ] Trap Net [x] Electrofisher [ ] Surber [ ] Other ______

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: [ ] All Kept [x] None Kept* [ ] Some Kept* [ ] No Catch

** Record released fish on back.*

Date: Day 15 Month 09 Year 2004

Collectors:
A. BRUCE M. IDDIE

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*
- area was forested by cedars, then went into old field area (i.e. spotted Joe Pye weed, goldenrod sp., aster sp.)

Continued on Reverse

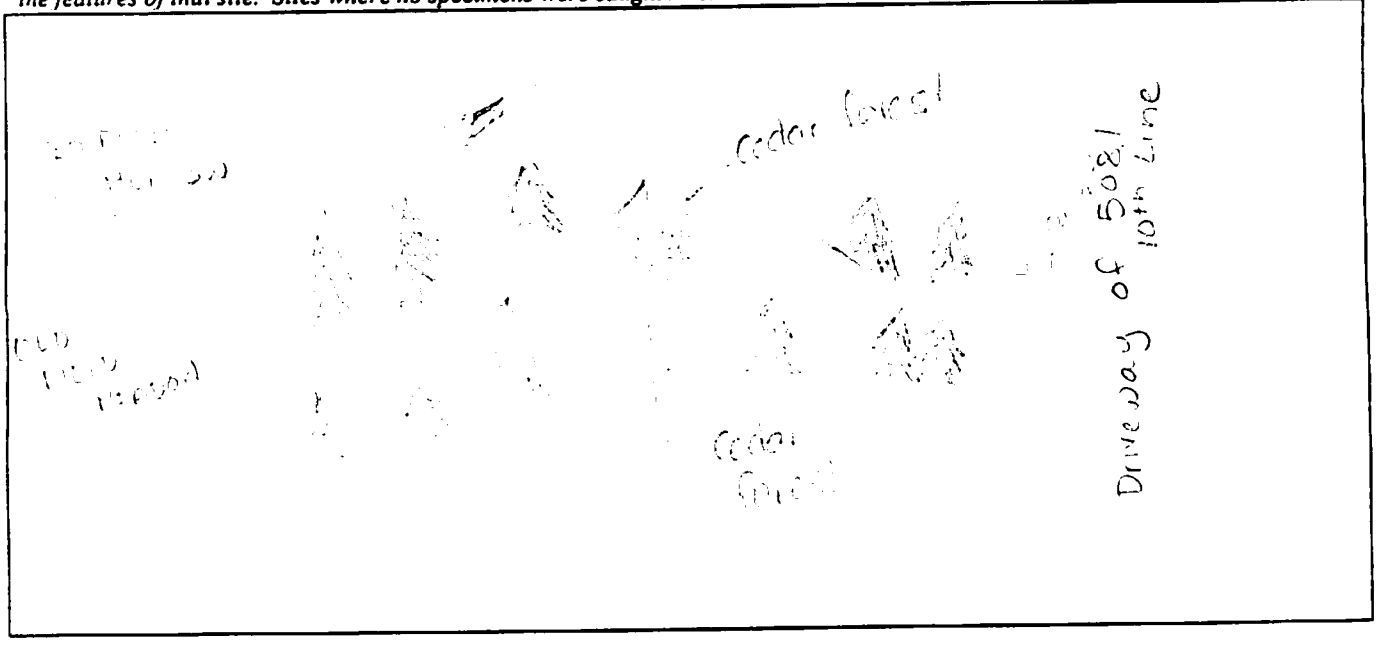
- avg channel width was 0.75 m

Species Captured

Species	Code	No. Caught	No. Kept	Size Range (T.L. in mm)
Blacknose dace (Rhinichthys atratulus)	210	5	0	
Identified By: A BRULE				Date: Sept. 15 2004

Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



Credit 482

Ontario

MNR Office Use:
Watershed:
Waterbody Name:
Fish Dot No.:

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 101695	Licencee Name: Martin O'Halloran		
Business Name: LGL Limited	Telephone: (905) 333-166	Fax: (905) 333-2660	
Mailing Address: 3365 Harvester Rd Unit 2	Town/City Burlington	Postal Code: L7N 3N2	
Waterbody Name: Roger's Creek-Main Branch	Township/Municipality: Peel		
General Description of Sampling Site Location/Access: Lorenzen Property (50 Winston Churchill Boulevard) (Property 13) (Winston Churchill Blvd south of 5th sideroad)			
Collection Site No. 1 of 1	Site UTM Coordinates: 5 8 0 9 6 9 E 4 8 4 4 4 9 2 N		
Collection Date: Oct. 1, 2004	Start Time:	End Time:	Duration (hrs)
Electrofisher Seconds:	Length of Station (m) 40	Water Temp. (C)	Air Temp. (C)
Stream Type: ☐ Intermittent ☑ Permanent	Watercress Present: ☐ Yes ☑ No		

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)*

Bottom Type by Percent: *(Total = 100%)*					
	Rock	Boulder	Rubble 52	Gravel 90%	Sand 5%
	Silt	Clay	Muck	Marl	Detritus
	Other *(Description)*				

Current: ☐ Still ☑ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☑ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☑ None

Cover (Shore): ☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☐ None ☐ Sparse ☑ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☑ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 0 1 Month 1 0 Year 2 0 0 4

Collectors:
H. O'Halloran, H. Kiddie

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*
- this site was downstream of the pond

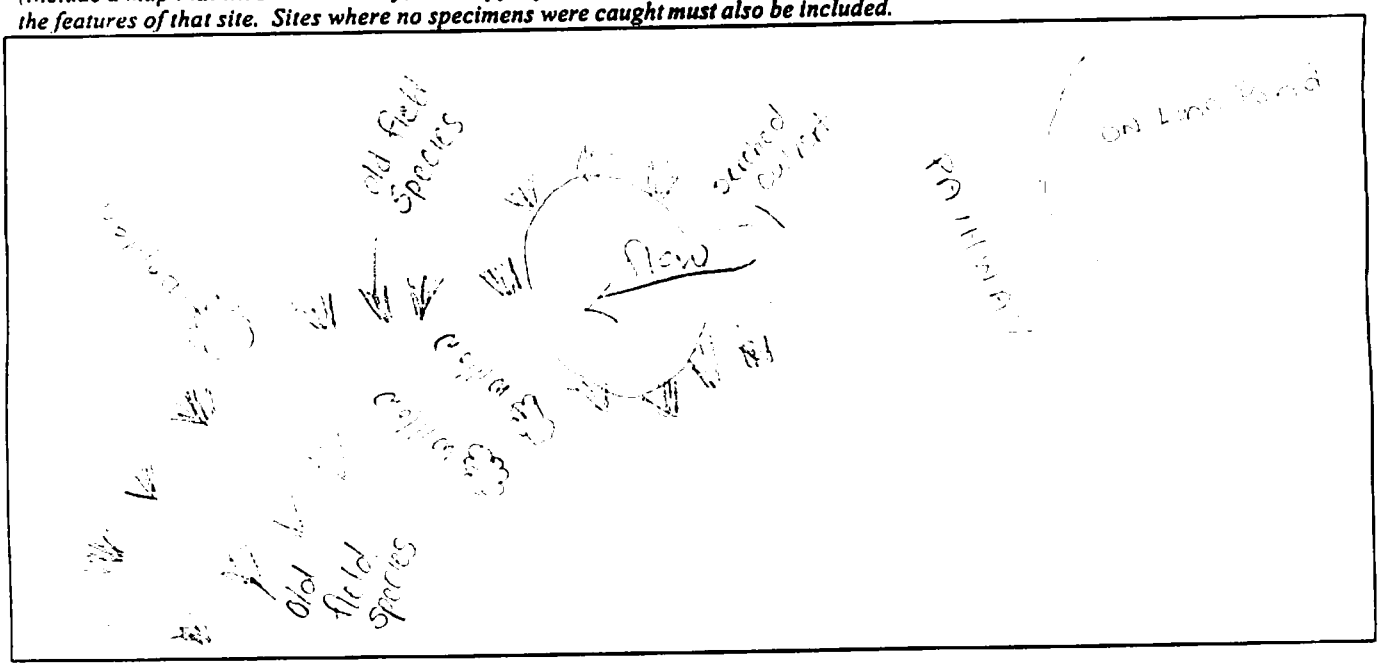
Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept	Size Range (T.L. in mm)
Creek Chub (Semotilus atromaculatus)	212	1111 1 (6)	0	
Largemouth bass (Micropterus salmoides)	317	1 (1)	0	
Pumpkinseed (Lepomis gibbosus)	313	1 (1)	0	
White Sucker (Catostomus commersoni)	163	1111 1111 (10)	0	
brook Stickleback (Culaea inconstans)	081	11 (2)	0	
Fathead minnow (Pimephales promelas)	209	11 (2)	0	
Bluntnose minnow (Pimephales notatus)	208	11 (2)	0	
Identified By: Martin O'Halloran				Date: Oct. 1 2004

Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



- good riparian area
- vegetation includes
  - Joe-pye weed
  - red osier dogwood
  - goldenrod species
- jewelweed
- grasses

Licence to Collect Fish for Scientific Purposes #1016985 (Credit River Watershed expected to be impacted from the quarry application being made by James Dick Aggregates), January 2005

Objectives
To monitor the fish community within the Credit River watershed including permanent, semi-permanent, and intermittent streams, that are expected to be impacted by the quarry application being made by James Dick Aggregates at the corner of Olde Baseline Road and Winston Churchill Boulevard, located in the Town of Caledon, Regional Municipality of Peel.

Methods
The fish community in this area was sampled using a Smith-Root backpack electrofisher. Lengths and weights of the fish were recorded at predetermined sites while other sites were exploratory and all fish were returned to where they were found. There were a total of 20 stations examined within this area. At 9 stations, no fish were caught due mainly to the fact that the streams were ephemeral or intermittent and did not have any water in them at the time of sampling. LGL Ltd. staff members involved in this task were Andrew Bruce, Melissa Kiddie, and Martin O'Halloran.

Number and Species Caught
Roger' Creek

West Branch

Field Collection Record for Gschwendtner property (Property 25) (5081 10th Line) (exploratory)
- 5 blacknose dace (*Rhinichthys atratulus*)

Field Collection Record for Kindbom property (Property 31/32) (5013 10th Line) (exploratory)
- No catch; half of stream reach was dry

Main Branch

Field Collection Record for Lorenzen property (Property 13) (5072 Winston Churchill Boulevard) (exploratory)
- 6 creek chub (*Semotilus atromaculatus*)
- 1 largemouth bass (*Micropterus salmoides*)
- 1 pumpkinseed (*Lepomis gibbosus)*
- 10 white sucker (*Catostomus commersoni*)
- 2 brook stickleback (*Culaea inconstans)*
- 2 fathead minnow (*Pimephales promelas*)
- 2 bluntnose minnow (*Pimephales notatus*)

Field Collection Record for Harold Graham property (Property 28) (5032 Winston Churchill Boulevard) (biomass)
- 2 white sucker (YOY) (*Catostomus commersoni*), Avg.=46mm, Weight=3g
- 2 creek chub (YOY) (*Semotilus atromaculatus*), Max=54mm, Min=40mm, Weight=4g

Field Collection Record for Mackenzie property (Property 15/16) (4948 Winston Churchill Boulevard) (exploratory)
- 17 blacknose dace (*Rhinichthys atratulus*)
- 5 creek chub (*Semotilus atromaculatus*)
- 5 fathead minnow (*Pimephales promelas*)
- 4 brook stickleback (*Culaea inconstans*)
- 3 brook trout (*Salvelinus fontinalis*)
- 2 largemouth bass (*Micropterus salmoides*)
- 2 central mudminnow (*Umbra limi*)
- 2 white sucker (*Catostomus commersoni*)

Field Collection Record for Roger's Creek at Winston Churchill Boulevard north of Terra Cotta Conservation Area (CVC ID# 501120002) (biomass)

- 103 brook stickleback (*Culaea inconstans*), Max=60mm, Min=34 mm, Avg.=23mm, Weight=45g
- 71 blacknose dace (*Rhinichthys atratulus),* Max=92mm, Min=37mm, Avg.= 62mm, Weight=341.5g
- 51 creek chub (*Semotilus atromaculatus*), Max=155mm, Min=35mm, Avg.=77mm, Weight=500g
- 35 white sucker (*Catostomus commersoni*), Max=93mm, Min=32mm, Avg.=71mm, Weight=80g
- 21 fathead minnow (*Pimephales promelas*), Max=68mm, Min=46mm, Avg. 54mm, Weight=40g
- 8 central mudminnow (*Umbra limi*), Max=90mm, Min=77mm, Avg.=81mm, Weight=55g

East Branch

Field Collection Record for Matzdorff property (Property 52) (15516 Shaw's Creek Road) (biomass)

- No catch

Field Collection Record for L. Symmes property (Property 3) (239 Olde Baseline Road) (exploratory)

- No catch; this reach was dry

Second Creek

Field Collection Record for Escarpment Tributary (CVC ID# 501120001) (biomass)

- 93 blacknose dace (*Rhinichthys atratulus*), Max=75mm, Min=37.3mm, Avg.=56mm, Weight=87g
- 54 creek chub (*Semotilus atromaculatus*), Max=122.3mm, Min=60.3mm, Avg.=86.5mm, Weight=126.3g
- 54 northern redbelly dace (*Phoxinus eos*), Max=59.6mm, Min=33.6mm, Avg.=46.6mm, Weight=21.3g
- 8 brook stickleback (*Culaea inconstans*), Max=29.6mm, Min=31.5mm, Weight=1.5g
- 1 brassy minnow (*Hybognathus hankinsoni*), Max=56mm, Min=32mm, Avg.=42mm, Weight=2.5g

Field Collection Record for McLeish property (Property 17) (76 Ballinafad Road) (exploratory)

- No catch; reach was dry

Field Collection Record for A. Symmes property (Property 2) (249 Olde Baseline Road) (exploratory)

- Creek chub (YOY) (*Semotilus atromaculatus*)
- Pumpkinseed (*Lepomis gibbosus*)
- Fathead minnow (*Pimephales promelas*)
- Brook stickleback (*Culaea inconstans*)

Field Collection Record for Finnigan property (Property 47) (690 Olde Baseline Road) (exploratory)

- No catch; reach was dry

Field Collection Record for McMichael (Property 46) (800 Olde Baseline Road)

- No catch; reach was dry

Field Collection Record for Michael Bonacini property (Property 5, 6, 7, 8,9) (North of Olde Baseline Road on Mississauga Road) (exploratory)

- No catch; branch explored was dry

Field Collection Record for Lindsay property (Property 55) (15801 Shaw's Creek Road) (exploratory)

- 16 brook stickleback (*Culaea inconstans*)
- 9 northern redbelly dace (*Phoxinus eos*)

Field Collection Record for Reid property (Property 19) (15323 Rockside Road) (exploratory)

- No catch; ephemeral stream and wetland area

Field Collection Record for Reid property (Property 64) (15095 Rockside Road) (exploratory)

- No catch; only a wetland feature observed

Tributary to Credit River

Field Collection Record for Davidson property (Property 45) (15236 Mississauga Road) (exploratory)

- 1 Brook stickleback (*Culaea inconstans*)

Credit River

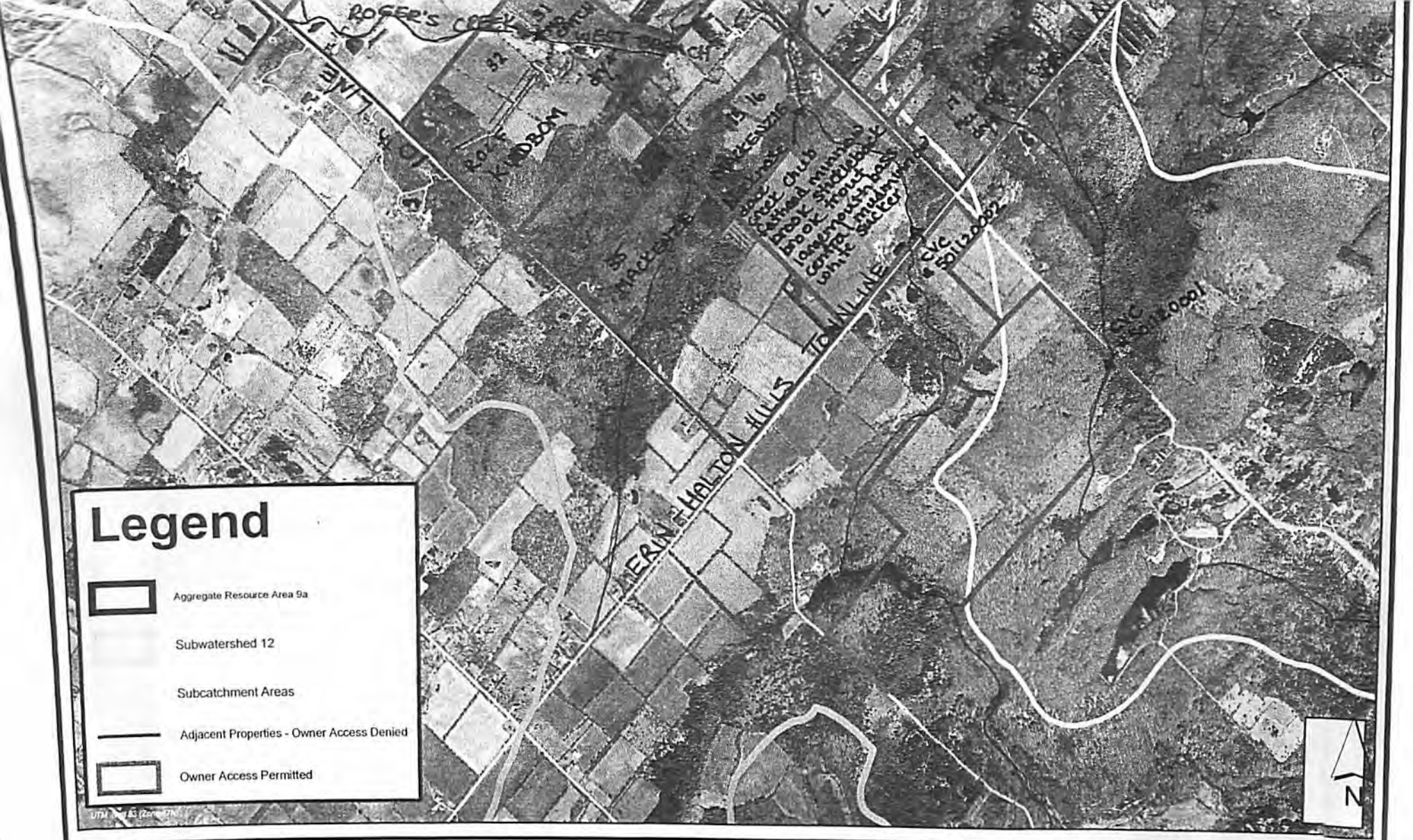
Field Collection Record for Credit River at Glen Williams (CVC ID #501120004) (biomass)

- 127 fantail darter (*Etheostoma flabellare*), Max=68mm, Min=32.5mm, Avg.=48mm, Weight=133g
- 113 longnose dace (*Rhinichthys cataractae*), Max=120.5 mm, Min=54 mm, Avg.=82mm, Weight=159.4g
- 56 rainbow darter (*Etheostoma caeruleum*), Max=62mm, Min=50mm, Avg.=55mm, Weight=52.5g
- 48 blacknose dace (*Rhinichthys atratulus*), Max=85mm, Min=38mm, Avg.=68mm, Weight=124.5g
- 21 northern hog sucker (*Phoxinus eos*), Max=234.2mm, Min=64mm, Avg.= 80.3mm, Weight=330g
- 18 creek chub (*Semotilus atromaculatus*), Max=155mm, Min=58mm, Avg.=98mm, Weight=177g
- 16 stonecat (*Noturus flavus*), Max=157.3mm, Min=110.3mm, Avg.=127mm, Weight=332g
- 16 common shiner (*Luxilus cornutus*), Max=114mm, Min=55mm, Avg.=65.7mm, Weight=32.5g
- 14 longnose dace (YOY) (*Rhinichthys cataractae*), Max=41mm, Min=25mm, Avg.=34mm, Weight=6.5g
- 13 river chub (*Nocomis micropogon*), Max=132mm, Min=62mm, Avg.=98mm, Weight=154.5g
- 9 creek chub (YOY) (*Semotilus atromaculatus*), Avg.=22mm, Weight=1.5g
- 9 white sucker (*Catostomus commersoni*), Max=258.5mm, Min=129mm, Avg.=111mm, Weight=332g
- 8 common shiner (YOY) (*Luxilus cornutus*), Avg.=24mm, Weight=1g
- 3 northern hog sucker (YOY) (*Hypentelium nigricans*), Max=32mm, Min=26mm, Avg.=30mm, Weight=4g
- 3 white sucker (YOY) (*Catostomus commersoni*), Max=41mm, Min=32mm, Avg.=39mm, Weight=2g
- 2 brown trout (*Salmo trutta*), Max=285mm, Avg.=204mm, Weight=160.5g
- 1 stonecat (YOY) (*Noturus flavus*), Min=14mm, Weight=0.5g
- 1 pumpkinseed (*Lepomis gibbosus*), Max=66mm, Weight=7g

Field Collection Record for Credit River at Terra Cotta (CVC ID #501120003) (biomass)

- 183 fantail darter (*Etheostoma flabellare*), Max=71mm, Min=40.3mm, Avg.=55.3mm, Wight=129.5g
- 178 longnose dace (*Rhinichthys cataractae*), Max=114.3mm, Min=50.7mm, Avg.=86.7mm, Wight=451.2mm
- 121 blacknose dace (*Rhinichthys atratulus*), Max=93.5mm, Min=32mm, Avg.=70.5mm, Wight=235.5g
- 46 creek chub (*Semotilus atromaculatus*), Max=116mm, Min=31.5mm, Avg.= 71.5mm, Wight=185.5g
- 44 rainbow darter (*Etheostoma caeruleum*), Max=57.5mm, Min=41mm, Avg.= 49mm, Weight=54g
- 35 river chub (*Nocomis micropogon*),

- 21 northern hog sucker (*Hypentelium nigricans*), Max=246mm, Min=95mm, Avg.=133mm, Weight=521.7g
- 21 common shiner (*Luxilus cornutus*), Max=114mm, Min=18mm, Avg.=68mm, Weight=150g
- 15 stonecat (*Noturus flavus*), Max=190mm, Min=75mm, Avg.=170mm, Weight= 454g
- 7 johnny darter (*Etheostoma nigrum*), Max=52mm, Min=32mm, Avg.= 47mm, Weight=12g
- 6 Mottled sculpin (*Cottus bairdii*), Max=114mm, Min=38mm, Avg.=77mm, Weight=52.5g
- 2 brown trout (*Salmo trutta*), Max=243mm, Weight=184g



Legend

- Aggregate Resource Area 9a
- Subwatershed 12
- Subcatchment Areas
- Adjacent Properties - Owner Access Denied
- Owner Access Permitted

LGL
environmental research associates

Source : Credit Valley Conservation, 2004

Property Numbering
CBSES STUDY AREA
Aggregate Resource Area 9A CBSES
Town of Caledon, Ontario


WINSTON CHURCHILL BLVD
MISSISSAUGA ROAD
OLDE BASE LINE ROAD
THIRD CREEK TRIB
THIRD CREEK
SECOND CREEK
EAST BRANCH
45 DAVIDSON
19 REID
25

Credit 487

Ontario

MNR Office Use:
Watershed: _____
Waterbody Name: _____
Fish Dot No.: _____

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1016985	Licencee Name: Martin O'Halloran		
Business Name: L&L Limited	Telephone: 905-333-1667	Fax: 905-333-2660	
Mailing Address: 9365 Harrister Rd Grand Level	Town/City Burlington	Postal Code: L7N 3N3	
Waterbody Name: Roger's Creek - Main branch	Township/Municipality: Reel		
General Description of Sampling Site Location/Access: Harold Graham property (Property 38) 6032 Winston Churchill Blvd) (Winston Churchill Boulevard South of 5th sideroad, North of Olde Baseline Rd)			
Collection Site No. 1 of 1	Site UTM Coordinates: 5 8 1 3 9 9 E 4 8 4 4 1 3 6 N		
Collection Date: Sept. 8, 2004	Start Time: 10:45	End Time: 11:10	Duration (hrs)
Electrofisher Seconds:	Length of Station (m) 40	Water Temp. (C)	Air Temp. (C)
Stream Type: ☐ Intermittent ☑ Permanent		Watercress Present: ☑ Yes ☐ No	

Waterbody Type: ☐ Spring ☐ Canal ☑ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)* _____

Bottom Type by Percent: *(Total = 100%)*					
	Rock	Boulder	Rubble 95%	Gravel	Sand
	Silt 5%	Clay	Muck	Marl	Detritus
	Other *(Description)*				

Current: ☐ Still ☑ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☑ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☑ None

Cover (Shore): ☐ None ☑ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☐ None ☑ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☐ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☑ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 0 8 Month 0 9 Year 2 0 0 4

Collectors:
A. BRUCE, H. KIDDIE

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*
Temp logger Rock #2 deployed
Biomass station

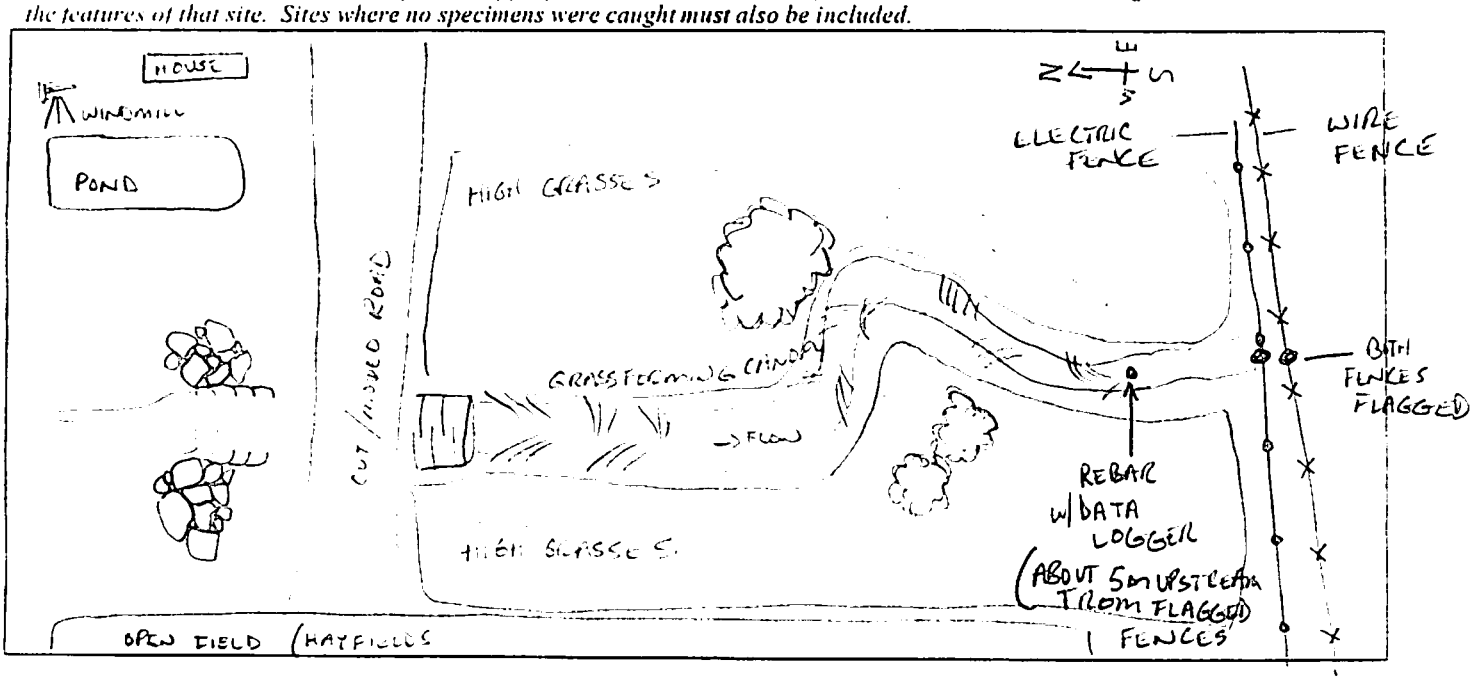
Continued on Reverse

Species Captured

Species	Code	No. Caught	No. Kept (weight g)	Size Range (T.L. in mm)
White Sucker (YOY) (Catostomus commersoni)	163	2	3	Avg = 46
Creek Chub (YOY) (Semotilus atromaculatus)	212	2	4	Max: 44 Min: 43
Identified By: A. BRUCE				Date: Sept. 8, 2004

Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



Licence to Collect Fish for Scientific Purposes #1016985 (Credit River Watershed expected to be impacted from the quarry application being made by James Dick Aggregates), January 2005

Objectives

To monitor the fish community within the Credit River watershed including permanent, semi-permanent, and intermittent streams, that are expected to be impacted by the quarry application being made by James Dick Aggregates at the corner of Olde Baseline Road and Winston Churchill Boulevard, located in the Town of Caledon, Regional Municipality of Peel.

Methods

The fish community in this area was sampled using a Smith-Root backpack electrofisher. Lengths and weights of the fish were recorded at predetermined sites while other sites were exploratory and all fish were returned to where they were found. There were a total of 20 stations examined within this area. At 9 stations, no fish were caught due mainly to the fact that the streams were ephemeral or intermittent and did not have any water in them at the time of sampling. LGL Ltd. staff members involved in this task were Andrew Bruce, Melissa Kiddie, and Martin O'Halloran.

Number and Species Caught

Roger' Creek

West Branch

Field Collection Record for Gschwendtner property (Property 25) (5081 10th Line) (exploratory)

- 5 blacknose dace (*Rhinichthys atratulus*)

Field Collection Record for Kindbom property (Property 31/32) (5013 10th Line) (exploratory)

- No catch; half of stream reach was dry

Main Branch

Field Collection Record for Lorenzen property (Property 13) (5072 Winston Churchill Boulevard) (exploratory)

- 6 creek chub (*Semotilus atromaculatus*)
- 1 largemouth bass (*Micropterus salmoides*)
- 1 pumpkinseed (*Lepomis gibbosus)*
- 10 white sucker (*Catostomus commersoni*)
- 2 brook stickleback (*Culaea inconstans)*
- 2 fathead minnow (*Pimephales promelas*)
- 2 bluntnose minnow (*Pimephales notatus*)

Field Collection Record for Harold Graham property (Property 28) (5032 Winston Churchill Boulevard) (biomass)

- 2 white sucker (YOY) (*Catostomus commersoni*), Avg.=46mm, Weight=3g
- 2 creek chub (YOY) (*Semotilus atromaculatus*), Max=54mm, Min=40mm, Weight=4g

Field Collection Record for Mackenzie property (Property 15/16) (4948 Winston Churchill Boulevard) (exploratory)

- 17 blacknose dace (*Rhinichthys atratulus*)
- 5 creek chub (*Semotilus atromaculatus*)
- 5 fathead minnow (*Pimephales promelas*)
- 4 brook stickleback (*Culaea inconstans*)
- 3 brook trout (*Salvelinus fontinalis*)
- 2 largemouth bass (*Micropterus salmoides*)
- 2 central mudminnow (*Umbra limi*)
- 2 white sucker (*Catostomus commersoni*)

Field Collection Record for Roger's Creek at Winston Churchill Boulevard north of Terra Cotta Conservation Area (CVC ID# 501120002) (biomass)

- 103 brook stickleback (*Culaea inconstans*), Max=60mm, Min=34 mm, Avg.=23mm, Weight=45g
- 71 blacknose dace (*Rhinichthys atratulus),* Max=92mm, Min=37mm, Avg.= 62mm, Weight=341.5g
- 51 creek chub (*Semotilus atromaculatus*), Max=155mm, Min=35mm, Avg.=77mm, Weight=500g
- 35 white sucker (*Catostomus commersoni*), Max=93mm, Min=32mm, Avg.=71mm, Weight=80g
- 21 fathead minnow (*Pimephales promelas*), Max=68mm, Min=46mm, Avg. 54mm, Weight=40g
- 8 central mudminnow (*Umbra limi*), Max=90mm, Min=77mm, Avg.=81mm, Weight=55g

East Branch

Field Collection Record for Matzdorff property (Property 52) (15516 Shaw's Creek Road) (biomass)

- No catch

Field Collection Record for L. Symmes property (Property 3) (239 Olde Baseline Road) (exploratory)

- No catch; this reach was dry

Second Creek

Field Collection Record for Escarpment Tributary (CVC ID# 501120001) (biomass)

- 93 blacknose dace (*Rhinichthys atratulus*), Max=75mm, Min=37.3mm, Avg.=56mm, Weight=87g
- 54 creek chub (*Semotilus atromaculatus*), Max=122.3mm, Min=60.3mm, Avg.=86.5mm, Weight=126.3g
- 54 northern redbelly dace (*Phoxinus eos*), Max=59.6mm, Min=33.6mm, Avg.=46.6mm, Weight=21.3g
- 8 brook stickleback (*Culaea inconstans*), Max=29.6mm, Min=31.5mm, Weight=1.5g
- 1 brassy minnow (*Hybognathus hankinsoni*), Max=56mm, Min=32mm, Avg.=42mm, Weight=2.5g

Field Collection Record for McLeish property (Property 17) (76 Ballinafad Road) (exploratory)

- No catch; reach was dry

Field Collection Record for A. Symmes property (Property 2) (249 Olde Baseline Road) (exploratory)

- Creek chub (YOY) (*Semotilus atromaculatus*)
- Pumpkinseed (*Lepomis gibbosus*)
- Fathead minnow (*Pimephales promelas*)
- Brook stickleback (*Culaea inconstans*)

Field Collection Record for Finnigan property (Property 47) (690 Olde Baseline Road) (exploratory)

- No catch; reach was dry

Field Collection Record for McMichael (Property 46) (800 Olde Baseline Road)

- No catch; reach was dry

Field Collection Record for Michael Bonacini property (Property 5, 6, 7, 8,9) (North of Olde Baseline Road on Mississauga Road) (exploratory)

- No catch; branch explored was dry

Field Collection Record for Lindsay property (Property 55) (15801 Shaw's Creek Road) (exploratory)

- 16 brook stickleback (*Culaea inconstans*)
- 9 northern redbelly dace (*Phoxinus eos*)

Field Collection Record for Reid property (Property 19) (15323 Rockside Road) (exploratory)

- No catch; ephemeral stream and wetland area

Field Collection Record for Reid property (Property 64) (15095 Rockside Road) (exploratory)

- No catch; only a wetland feature observed

Tributary to Credit River

Field Collection Record for Davidson property (Property 45) (15236 Mississauga Road) (exploratory)

- 1 Brook stickleback (*Culaea inconstans*)

Credit River

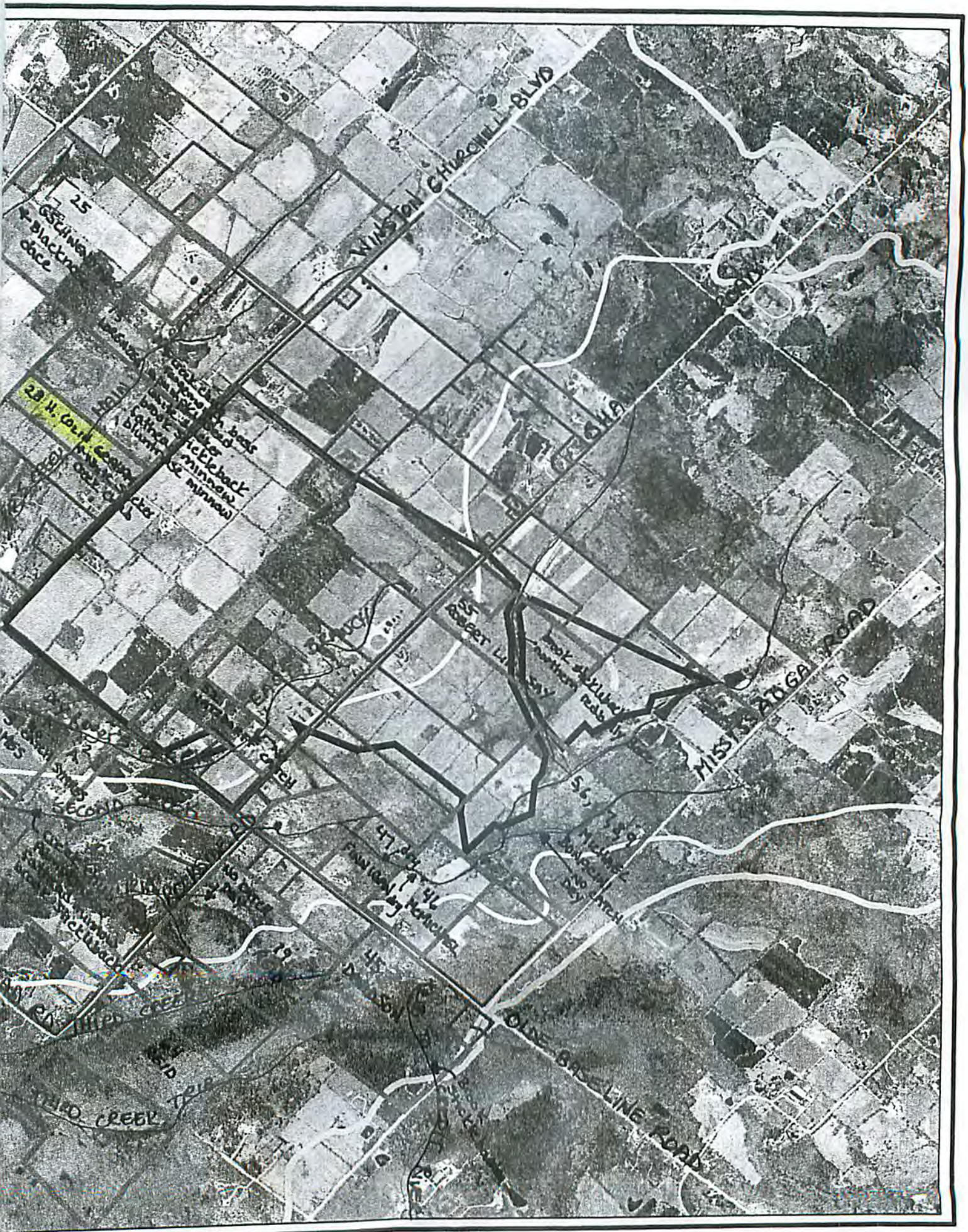
Field Collection Record for Credit River at Glen Williams (CVC ID #501120004) (biomass)

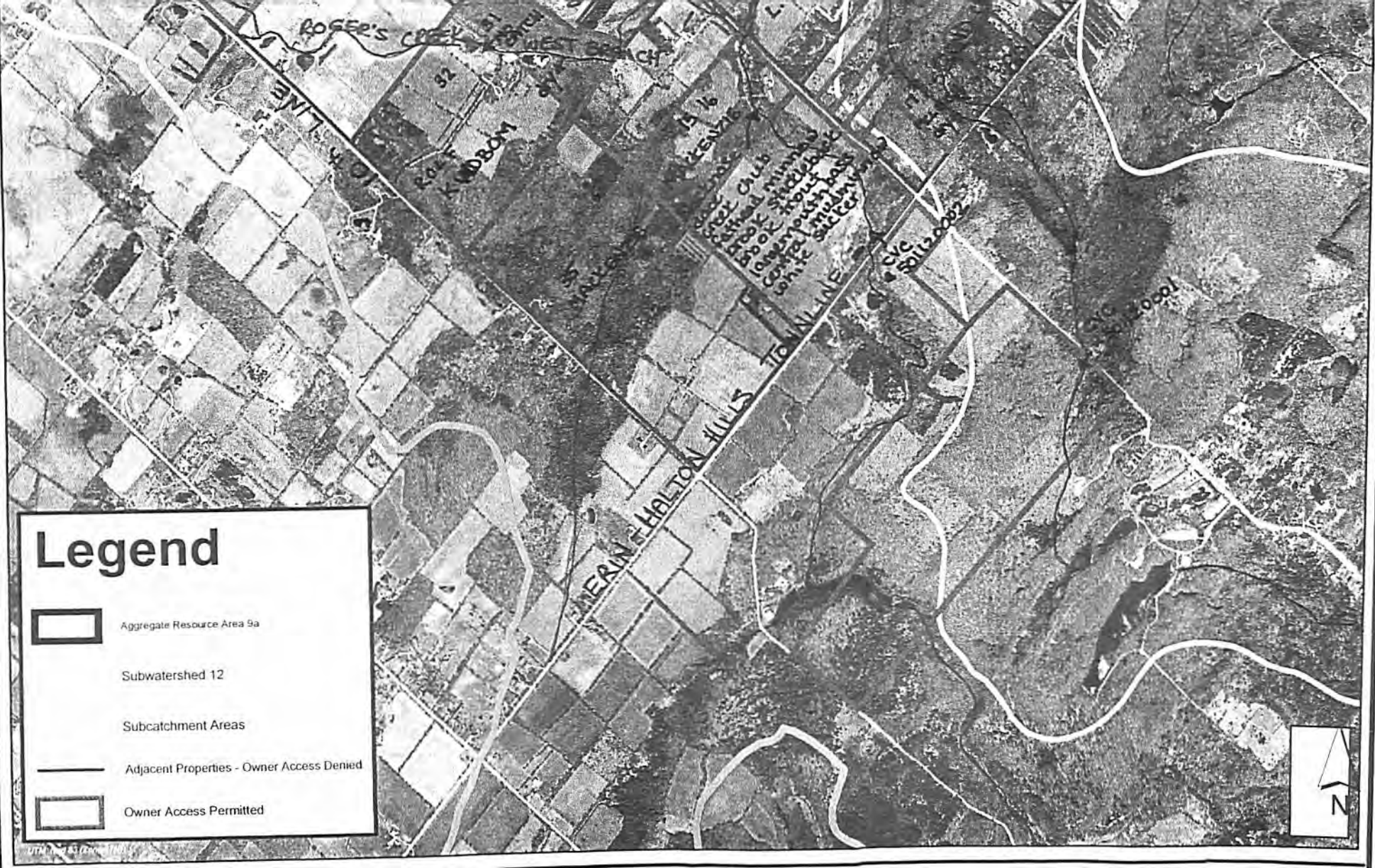
- 127 fantail darter (*Etheostoma flabellare*), Max=68mm, Min=32.5mm, Avg.=48mm, Weight=133g
- 113 longnose dace (*Rhinichthys cataractae*), Max=120.5 mm, Min=54 mm, Avg.=82mm, Weight=159.4g
- 56 rainbow darter (*Etheostoma caeruleum*), Max=62mm, Min=50mm, Avg.=55mm, Weight=52.5g
- 48 blacknose dace (*Rhinichthys atratulus*), Max=85mm, Min=38mm, Avg.=68mm, Weight=124.5g
- 21 northern hog sucker (*Phoxinus eos*), Max=234.2mm, Min=64mm, Avg.= 80.3mm, Weight=330g
- 18 creek chub (*Semotilus atromaculatus*), Max=155mm, Min=58mm, Avg.=98mm, Weight=177g
- 16 stonecat (*Noturus flavus*), Max=157.3mm, Min=110.3mm, Avg.=127mm, Weight=332g
- 16 common shiner (*Luxilus cornutus*), Max=114mm, Min=55mm, Avg.=65.7mm, Weight=32.5g
- 14 longnose dace (YOY) (*Rhinichthys cataractae*), Max=41mm, Min=25mm, Avg.=34mm, Weight=6.5g
- 13 river chub (*Nocomis micropogon*), Max=132mm, Min=62mm, Avg.=98mm, Weight=154.5g
- 9 creek chub (YOY) (*Semotilus atromaculatus*), Avg.=22mm, Weight=1.5g
- 9 white sucker (*Catostomus commersoni*), Max=258.5mm, Min=129mm, Avg.=111mm, Weight=332g
- 8 common shiner (YOY) (*Luxilus cornutus*), Avg.=24mm, Weight=1g
- 3 northern hog sucker (YOY) (*Hypentelium nigricans*), Max=32mm, Min=26mm, Avg.=30mm, Weight=4g
- 3 white sucker (YOY) (*Catostomus commersoni*), Max=41mm, Min=32mm, Avg.=39mm, Weight=2g
- 2 brown trout (*Salmo trutta*), Max=285mm, Avg.=204mm, Weight=160.5g
- 1 stonecat (YOY) (*Noturus flavus*), Min=14mm, Weight=0.5g
- 1 pumpkinseed (*Lepomis gibbosus*), Max=66mm, Weight=7g

Field Collection Record for Credit River at Terra Cotta (CVC ID #501120003) (biomass)

- 183 fantail darter (*Etheostoma flabellare*), Max=71mm, Min=40.3mm, Avg.=55.3mm, Wight=129.5g
- 178 longnose dace (*Rhinichthys cataractae*), Max=114.3mm, Min=50.7mm, Avg.=86.7mm, Wight=451.2mm
- 121 blacknose dace (*Rhinichthys atratulus*), Max=93.5mm, Min=32mm, Avg.=70.5mm, Wight=235.5g
- 46 creek chub (*Semotilus atromaculatus*), Max=116mm, Min=31.5mm, Avg.= 71.5mm, Wight=185.5g
- 44 rainbow darter (*Etheostoma caeruleum*), Max=57.5mm, Min=41mm, Avg.= 49mm, Weight=54g
- 35 river chub (*Nocomis micropogon*),

- 21 northern hog sucker (*Hypentelium nigricans*), Max=246mm, Min=95mm, Avg.=133mm, Weight=521.7g
- 21 common shiner (*Luxilus cornutus*), Max=114mm, Min=18mm, Avg.=68mm, Weight=150g
- 15 stonecat (*Noturus flavus*), Max=190mm, Min=75mm, Avg.=170mm, Weight= 454g
- 7 johnny darter (*Etheostoma nigrum*), Max=52mm, Min=32mm, Avg.= 47mm, Weight=12g
- 6 Mottled sculpin (*Cottus bairdii*), Max=114mm, Min=38mm, Avg.=77mm, Weight=52.5g
- 2 brown trout (*Salmo trutta*), Max=243mm, Weight=184g


WINSTON CHURCHILL BLVD
MISSISSAUGA ROAD
OLD BASELINE ROAD
CREEK



Legend

- Aggregate Resource Area 9a
- Subwatershed 12
- Subcatchment Areas
- Adjacent Properties - Owner Access Denied
- Owner Access Permitted

N

LGL
environmental research associates

Source: Credit Valley Conservation, 2004

Property Numbering
CBSES STUDY AREA
Aggregate Resource Area 9A CBSES
Town of Caledon, Ontario

Credit 659

Ontario

MNR Office Use:	
Watershed:	
Waterbody Name:	
Fish Dot No:	

Licence to Collect Fish for Scientific Purposes
Field Collection Record

Licence No: 1016985	Licencee Name: Martin O'Halloran		
Business Name: LGL Limited	Telephone: 905-333-1667	Fax: 905-333-2660	
Mailing Address: 3365 Harvester Rd, Ground level	Town/City Burlington	Postal Code: L7N 3N2	
Waterbody Name: Second Creek	Township/Municipality: Peel		
General Description of Sampling Site Location/Access: Robert Lindsay Property (1580 Shaw's Creek Rd & Property 55) (Shaw's Creek Rd north of olde Baseline Rd)			
Collection Site No. 1 of 1	Site UTM Coordinates: 5 8 2 0 6 5 E 4 8 4 6 0 2 0 N		
Collection Date: Sept 7 2004	Start Time:	End Time:	Duration (hrs)
Electrofisher Seconds:	Length of Station (m)	Water Temp. (C) 18	Air Temp. (C) 23
Stream Type: ☐ Intermittent ☑ Permanent		Watercress Present: ☐ Yes ☑ No	

Waterbody Type: ☐ Spring ☐ Canal ☐ Stream/River ☐ River/Lake Junction ☐ Flooded Area ☐ Pool ☐ Pond ☐ Lake ☐ Reservoir ☐ Muskeg/Bog ☐ Other *(Describe)* _____

Bottom Type by Percent: *(Total = 100%)*					
	Rock	Boulder	Rubble 70%	Gravel	Sand
	Silt	Clay	Muck	Marl	Detritus 30%
	Other *(Description)*				

Current: ☑ Still ☐ Slow ☐ Medium ☐ Fast ☐ Quantitative (m/s) _____

Water Colour/Clarity: ☑ Colourless ☐ Yellow/Brown ☐ Blue/Green ☐ Turbid ☐ Other _____ Secchi Depth: (m) _____

Aquatic Vegetation: ☐ Submergent ☐ Floating ☐ Emergent ☐ None cattails, watercress

Cover (Shore): ☐ None ☐ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Cover (In Water): ☑ None ☐ Sparse ☐ Moderate ☐ Dense ☐ Other _____

Gear: ☐ Seine ☐ Gill Net ☑ Dip Net ☐ Angled ☐ Trawl ☐ Minnow Trap ☐ Piscicide ☐ Trap Net ☐ Electrofisher ☐ Surber ☐ Other _____

Size of Net (Gill or Seine Net) Length (m):	Size of Net or Mouth (Trap, Hoop or Trawl) (m):	Mesh Size (cm) Smallest:	Largest:

Selectivity of Sample: ☐ All Kept ☑ None Kept* ☐ Some Kept* ☐ No Catch
** Record released fish on back.*

Date: Day 0 7 Month 0 9 Year 2 0 0 4

Collectors:
A. BRULE, H. KIDDLE

Additional Data: *(Pollution, Condition of Fish, Habitat Conditions)*
- dip netted fish, electroshocker malfunction (see back)
- Predacious diving beetle, giant water bug, backswimmers, dragonfly larvae, water boatmen, water skimmers,
- Temp logger Rock #1 deployed

Continued on Reverse

Species Captured

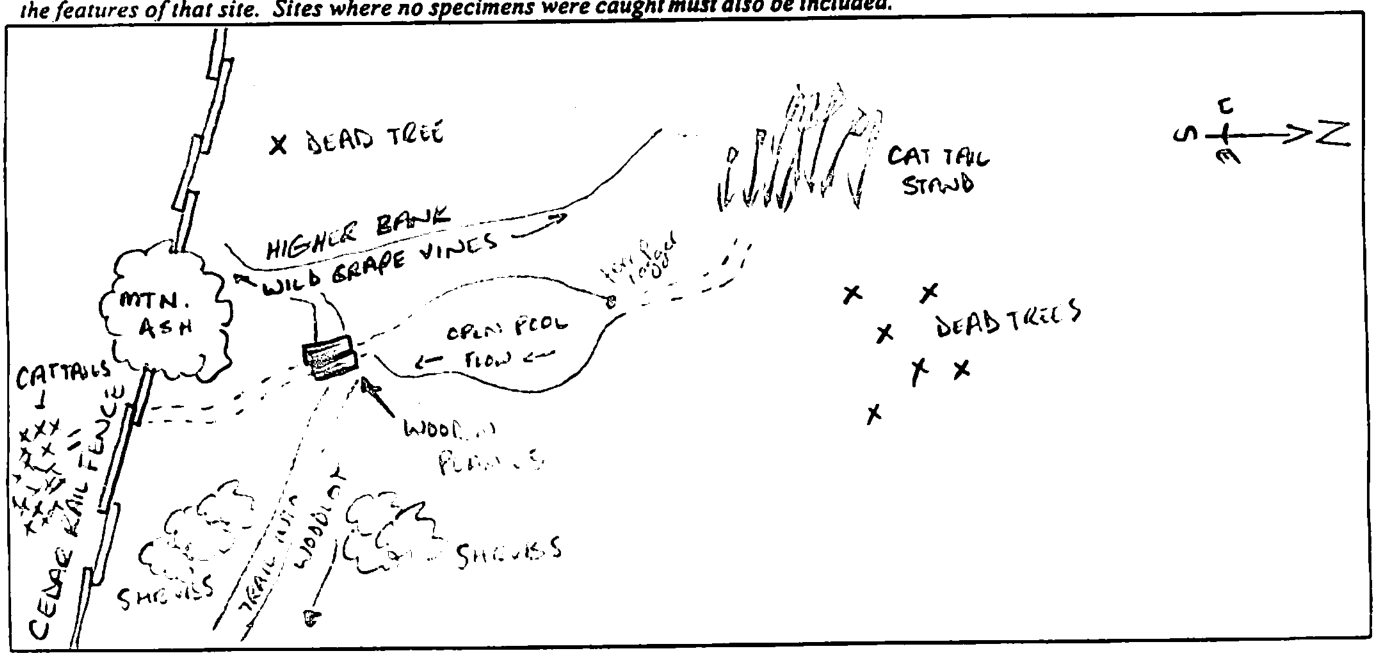
Species	Code	No. Caught	No. Kept	Size Range (T.L. in mm)
Brook Stickleback (Culaea inconstans)	281	~~||||~~ ~~||||~~ ~~||||~~ I (16)	0	
Northern Redbelly dace (Phoxinus eos)	182	~~||||~~ IIII (9)	0	

Identified By: A. BRUCE + M. KIDDIE

Date: Sept 7, 2007

Station Diagram

(Include a map that illustrates clearly, at an appropriate scale, the location of each collection site and a diagram that illustrates the features of that site. Sites where no specimens were caught must also be included.



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Licence to Collect Fish for Scientific Purposes #1016985 (Credit River Watershed expected to be impacted from the quarry application being made by James Dick Aggregates), January 2005

Objectives
To monitor the fish community within the Credit River watershed including permanent, semi-permanent, and intermittent streams, that are expected to be impacted by the quarry application being made by James Dick Aggregates at the corner of Olde Baseline Road and Winston Churchill Boulevard, located in the Town of Caledon, Regional Municipality of Peel.

Methods
The fish community in this area was sampled using a Smith-Root backpack electrofisher. Lengths and weights of the fish were recorded at predetermined sites while other sites were exploratory and all fish were returned to where they were found. There were a total of 20 stations examined within this area. At 9 stations, no fish were caught due mainly to the fact that the streams were ephemeral or intermittent and did not have any water in them at the time of sampling. LGL Ltd. staff members involved in this task were Andrew Bruce, Melissa Kiddie, and Martin O'Halloran.

Number and Species Caught
Roger' Creek

West Branch

Field Collection Record for Gschwendtner property (Property 25) (5081 10th Line) (exploratory)
- 5 blacknose dace (*Rhinichthys atratulus*)

Field Collection Record for Kindbom property (Property 31/32) (5013 10th Line) (exploratory)
- No catch; half of stream reach was dry

Main Branch

Field Collection Record for Lorenzen property (Property 13) (5072 Winston Churchill Boulevard) (exploratory)
- 6 creek chub (*Semotilus atromaculatus*)
- 1 largemouth bass (*Micropterus salmoides*)
- 1 pumpkinseed (*Lepomis gibbosus)*
- 10 white sucker (*Catostomus commersoni*)
- 2 brook stickleback (*Culaea inconstans)*
- 2 fathead minnow (*Pimephales promelas*)
- 2 bluntnose minnow (*Pimephales notatus*)

Field Collection Record for Harold Graham property (Property 28) (5032 Winston Churchill Boulevard) (biomass)
- 2 white sucker (YOY) (*Catostomus commersoni*), Avg.=46mm, Weight=3g
- 2 creek chub (YOY) (*Semotilus atromaculatus*), Max=54mm, Min=40mm, Weight=4g

Field Collection Record for Mackenzie property (Property 15/16) (4948 Winston Churchill Boulevard) (exploratory)
- 17 blacknose dace (*Rhinichthys atratulus*)
- 5 creek chub (*Semotilus atromaculatus*)
- 5 fathead minnow (*Pimephales promelas*)
- 4 brook stickleback (*Culaea inconstans*)
- 3 brook trout (*Salvelinus fontinalis*)
- 2 largemouth bass (*Micropterus salmoides*)
- 2 central mudminnow (*Umbra limi*)
- 2 white sucker (*Catostomus commersoni*)

Field Collection Record for Roger's Creek at Winston Churchill Boulevard north of Terra Cotta Conservation Area (CVC ID# 501120002) (biomass)

- 103 brook stickleback (*Culaea inconstans*), Max=60mm, Min=34 mm, Avg.=23mm, Weight=45g
- 71 blacknose dace (*Rhinichthys atratulus),* Max=92mm, Min=37mm, Avg.= 62mm, Weight=341.5g
- 51 creek chub (*Semotilus atromaculatus*), Max=155mm, Min=35mm, Avg.=77mm, Weight=500g
- 35 white sucker (*Catostomus commersoni*), Max=93mm, Min=32mm, Avg.=71mm, Weight=80g
- 21 fathead minnow (*Pimephales promelas*), Max=68mm, Min=46mm, Avg. 54mm, Weight=40g
- 8 central mudminnow (*Umbra limi*), Max=90mm, Min=77mm, Avg.=81mm, Weight=55g

East Branch

Field Collection Record for Matzdorff property (Property 52) (15516 Shaw's Creek Road) (biomass)

- No catch

Field Collection Record for L. Symmes property (Property 3) (239 Olde Baseline Road) (exploratory)

- No catch; this reach was dry

Second Creek

Field Collection Record for Escarpment Tributary (CVC ID# 501120001) (biomass)

- 93 blacknose dace (*Rhinichthys atratulus*), Max=75mm, Min=37.3mm, Avg.=56mm, Weight=87g
- 54 creek chub (*Semotilus atromaculatus*), Max=122.3mm, Min=60.3mm, Avg.=86.5mm, Weight=126.3g
- 54 northern redbelly dace (*Phoxinus eos*), Max=59.6mm, Min=33.6mm, Avg.=46.6mm, Weight=21.3g
- 8 brook stickleback (*Culaea inconstans*), Max=29.6mm, Min=31.5mm, Weight=1.5g
- 1 brassy minnow (*Hybognathus hankinsoni*), Max=56mm, Min=32mm, Avg.=42mm, Weight=2.5g

Field Collection Record for McLeish property (Property 17) (76 Ballinafad Road) (exploratory)

- No catch; reach was dry

Field Collection Record for A. Symmes property (Property 2) (249 Olde Baseline Road) (exploratory)

- Creek chub (YOY) (*Semotilus atromaculatus*)
- Pumpkinseed (*Lepomis gibbosus*)
- Fathead minnow (*Pimephales promelas*)
- Brook stickleback (*Culaea inconstans*)

Field Collection Record for Finnigan property (Property 47) (690 Olde Baseline Road) (exploratory)

- No catch; reach was dry

Field Collection Record for McMichael (Property 46) (800 Olde Baseline Road)

- No catch; reach was dry

Field Collection Record for Michael Bonacini property (Property 5, 6, 7, 8,9) (North of Olde Baseline Road on Mississauga Road) (exploratory)

- No catch; branch explored was dry

Field Collection Record for Lindsay property (Property 55) (15801 Shaw's Creek Road) (exploratory)

- 16 brook stickleback (*Culaea inconstans*)
- 9 northern redbelly dace (*Phoxinus eos*)

Field Collection Record for Reid property (Property 19) (15323 Rockside Road) (exploratory)

- No catch; ephemeral stream and wetland area

Field Collection Record for Reid property (Property 64) (15095 Rockside Road) (exploratory)

- No catch; only a wetland feature observed

Tributary to Credit River

Field Collection Record for Davidson property (Property 45) (15236 Mississauga Road) (exploratory)

- 1 Brook stickleback (*Culaea inconstans*)

Credit River

Field Collection Record for Credit River at Glen Williams (CVC ID #501120004) (biomass)

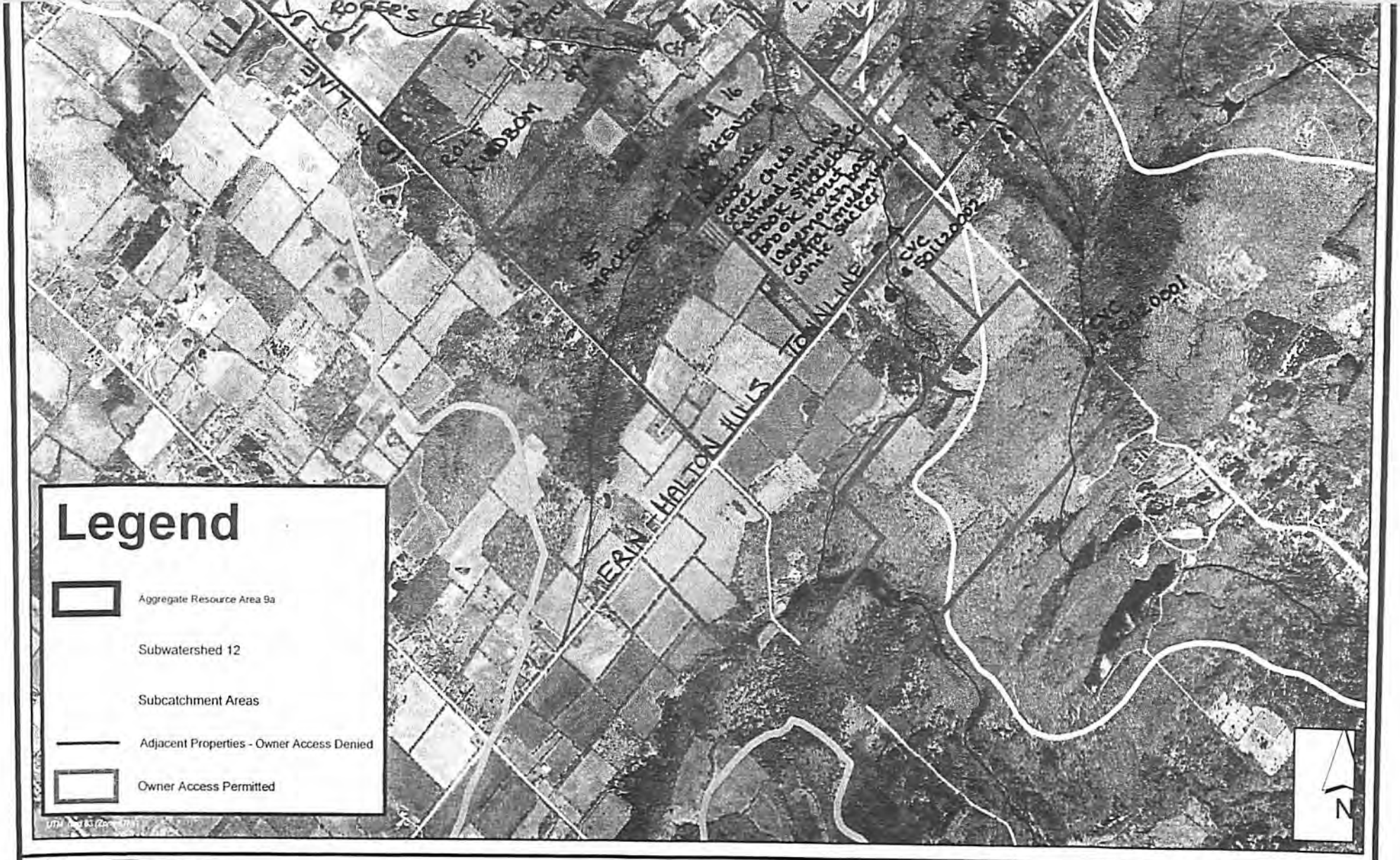
- 127 fantail darter (*Etheostoma flabellare*), Max=68mm, Min=32.5mm, Avg.=48mm, Weight=133g
- 113 longnose dace (*Rhinichthys cataractae*), Max=120.5 mm, Min=54 mm, Avg.=82mm, Weight=159.4g
- 56 rainbow darter (*Etheostoma caeruleum*), Max=62mm, Min=50mm, Avg.=55mm, Weight=52.5g
- 48 blacknose dace (*Rhinichthys atratulus*), Max=85mm, Min=38mm, Avg.=68mm, Weight=124.5g
- 21 northern hog sucker (*Phoxinus eos*), Max=234.2mm, Min=64mm, Avg.= 80.3mm, Weight=330g
- 18 creek chub (*Semotilus atromaculatus*), Max=155mm, Min=58mm, Avg.=98mm, Weight=177g
- 16 stonecat (*Noturus flavus*), Max=157.3mm, Min=110.3mm, Avg.=127mm, Weight=332g
- 16 common shiner (*Luxilus cornutus*), Max=114mm, Min=55mm, Avg.=65.7mm, Weight=32.5g
- 14 longnose dace (YOY) (*Rhinichthys cataractae*), Max=41mm, Min=25mm, Avg.=34mm, Weight=6.5g
- 13 river chub (*Nocomis micropogon*), Max=132mm, Min=62mm, Avg.=98mm, Weight=154.5g
- 9 creek chub (YOY) (*Semotilus atromaculatus*), Avg.=22mm, Weight=1.5g
- 9 white sucker (*Catostomus commersoni*), Max=258.5mm, Min=129mm, Avg.=111mm, Weight=332g
- 8 common shiner (YOY) (*Luxilus cornutus*), Avg.=24mm, Weight=1g
- 3 northern hog sucker (YOY) (*Hypentelium nigricans*), Max=32mm, Min=26mm, Avg.=30mm, Weight=4g
- 3 white sucker (YOY) (*Catostomus commersoni*), Max=41mm, Min=32mm, Avg.=39mm, Weight=2g
- 2 brown trout (*Salmo trutta*), Max=285mm, Avg.=204mm, Weight=160.5g
- 1 stonecat (YOY) (*Noturus flavus*), Min=14mm, Weight=0.5g
- 1 pumpkinseed (*Lepomis gibbosus*), Max=66mm, Weight=7g

Field Collection Record for Credit River at Terra Cotta (CVC ID #501120003) (biomass)

- 183 fantail darter (*Etheostoma flabellare*), Max=71mm, Min=40.3mm, Avg.=55.3mm, Wight=129.5g
- 178 longnose dace (*Rhinichthys cataractae*), Max=114.3mm, Min=50.7mm, Avg.=86.7mm, Wight=451.2mm
- 121 blacknose dace (*Rhinichthys atratulus*), Max=93.5mm, Min=32mm, Avg.=70.5mm, Wight=235.5g
- 46 creek chub (*Semotilus atromaculatus*), Max=116mm, Min=31.5mm, Avg.= 71.5mm, Wight=185.5g
- 44 rainbow darter (*Etheostoma caeruleum*), Max=57.5mm, Min=41mm, Avg.= 49mm, Weight=54g
- 35 river chub (*Nocomis micropogon*),

- 21 northern hog sucker (*Hypentelium nigricans*), Max=246mm, Min=95mm, Avg.=133mm, Weight=521.7g
- 21 common shiner (*Luxilus cornutus*), Max=114mm, Min=18mm, Avg.=68mm, Weight=150g
- 15 stonecat (*Noturus flavus*), Max=190mm, Min=75mm, Avg.=170mm, Weight= 454g
- 7 johnny darter (*Etheostoma nigrum*), Max=52mm, Min=32mm, Avg.= 47mm, Weight=12g
- 6 Mottled sculpin (*Cottus bairdii*), Max=114mm, Min=38mm, Avg.=77mm, Weight=52.5g
- 2 brown trout (*Salmo trutta*), Max=243mm, Weight=184g

Project Location
Mississauga Road
Winston Churchill Blvd



LGL
environmental research associates

Source: Credit Valley Conservation 2004

Property Numbering
CBSES STUDY AREA
Aggregate Resource Area 9A CBSES
Town of Caledon, Ontario

Station: **501150001**

West Credit River @ Belfountain CA u/s of dam

STATION INFORMATION:

Electrofishing Date		August 17, 1999	
UTM Northing	4849647	**UTM Easting**	579415
Start Time:	9:50 AM	**Water Temperature:**	16
End Time:	12:05 PM	**Air Temperature:**	23
Total Electrofishing Time (sec.):	8100		
Weather Conditions:		**Flow Conditions:**	

FISH SPECIES INFORMATION:

Species		Number of Individual	Total Biomass (g)	Biomass Density (g/m^2)	Sensitivity *	Station Health Index
Brook Trout (Salvelinus fontinalis)		70	1653.5	2.004	3	6.012
Creek Chub (Semotilus atromaculatus)		18	21.5	0.026	1	0.026
Eastern Blacknose Dace (Rhinichthys atratulus)		117	325.0	0.394	1	0.394
Longnose Dace (Rhinichthys cataractae)		78	392.5	0.476	3	1.427
Rainbow Trout (Oncorhynchus mykiss)		1	22.0	0.027	3	0.080
White Sucker (Catostomus commersonii)		7	12.0	0.015	1	0.015
Total:	**6 species**	**291**	**2426.5**	**2.941**		**7.953**

**** Credit Valley Conservation. 1999. Natural Heritage Project: Habitat Utilization for Fish***

Sensitivity is rated according to the tolerance listing for fish, as shown in the Natural Heritage Project, where sensitive species (S) are given a score of 3 (most sensitive) and tolerant species (T) are given a score of 1 (least sensitive)

STATION DIMENSIONS:

Station Length:	71	**Average Station Width:**	11.62	**Area of Station:**	825.162

NOTES:

Station: **501150001**

West Credit River @ Belfountain CA u/s of dam

STATION INFORMATION:

Electrofishing Date	August 30, 2000		
UTM Northing	4849647	**UTM Easting**	579415
Start Time:	11:10 AM	**Water Temperature:**	17
End Time:	12:00 PM	**Air Temperature:**	24
Total Electrofishing Time (sec.):	3000		
Weather Conditions:		**Flow Conditions:**	

FISH SPECIES INFORMATION:

Species		Number of Individual	Total Biomass (g)	Biomass Density (g/m^2)	Sensitivity *	Station Health Index
Brook Trout (Salvelinus fontinalis)		59	1642.5	1.826	3	5.478
Eastern Blacknose Dace (Rhinichthys atratulus)		136	576.0	0.640	1	0.640
Longnose Dace (Rhinichthys cataractae)		62	449.0	0.499	3	1.498
White Sucker (Catostomus commersonii)		1	12.0	0.013	1	0.013
Total:	**4 species**	**258**	**2679.5**	**2.979**		**7.630**

**** Credit Valley Conservation. 1999. Natural Heritage Project: Habitat Utilization for Fish***

Sensitivity is rated according to the tolerance listing for fish, as shown in the Natural Heritage Project, where sensitive species (S) are given a score of 3 (most sensitive) and tolerant species (T) are given a score of 1 (least sensitive)

STATION DIMENSIONS:

Station Length:	70	**Average Station Width:**	12.85	**Area of Station:**	899.430

NOTES:

Station: **501150001**

West Credit River @ Belfountain CA u/s of dam

STATION INFORMATION:

Electrofishing Date	July 24, 2001		
UTM Northing	4849647	**UTM Easting**	579415
Start Time:	10:30 AM	**Water Temperature:**	21
End Time:	12:40 PM	**Air Temperature:**	28
Total Electrofishing Time (sec.):	7800		
Weather Conditions:		**Flow Conditions:**	

FISH SPECIES INFORMATION:

Species		Number of Individual	Total Biomass (g)	Biomass Density (g/m^2)	Sensitivity *	Station Health Index
Atlantic Salmon (Salmo salar)		20	92.0	0.109	3	0.326
Brook Trout (Salvelinus fontinalis)		50	604.0	0.713	3	2.139
Eastern Blacknose Dace (Rhinichthys atratulus)		81	322.0	0.380	1	0.380
Longnose Dace (Rhinichthys cataractae)		25	236.5	0.279	3	0.838
White Sucker (Catostomus commersonii)		7	280.5	0.331	1	0.331
Total:	**5 species**	**183**	**1535.0**	**1.812**		**4.014**

**** Credit Valley Conservation. 1999. Natural Heritage Project: Habitat Utilization for Fish***

Sensitivity is rated according to the tolerance listing for fish, as shown in the Natural Heritage Project, where sensitive species (S) are given a score of 3 (most sensitive) and tolerant species (T) are given a score of 1 (least sensitive)

STATION DIMENSIONS:

Station Length:	70	**Average Station Width:**	12.10	**Area of Station:**	847.000

NOTES:

Station: **501150001**

West Credit River @ Belfountain CA u/s of dam

STATION INFORMATION:

Electrofishing Date		September 4, 2002	
UTM Northing	4849647	**UTM Easting**	579415
Start Time:	11:45 AM	**Water Temperature:**	
End Time:	1:37 PM	**Air Temperature:**	
Total Electrofishing Time (sec.):	3399		
Weather Conditions:		**Flow Conditions:**	

FISH SPECIES INFORMATION:

Species		Number of Individual	Total Biomass (g)	Biomass Density (g/m^2)	Sensitivity *	Station Health Index
Atlantic Salmon (Salmo salar)		33	455.0	0.489	3	1.467
Brook Trout (Salvelinus fontinalis)		110	1654.0	1.778	3	5.335
Creek Chub (Semotilus atromaculatus)		40	2.0	0.002	1	0.002
Eastern Blacknose Dace (Rhinichthys atratulus)		222	296.5	0.319	1	0.319
Longnose Dace (Rhinichthys cataractae)		118	259.0	0.278	3	0.835
White Sucker (Catostomus commersonii)		14	112.0	0.120	1	0.120
Total:	**6 species**	**537**	**2778.5**	**2.987**		**8.079**

**** Credit Valley Conservation. 1999. Natural Heritage Project: Habitat Utilization for Fish***

Sensitivity is rated according to the tolerance listing for fish, as shown in the Natural Heritage Project, where sensitive species (S) are given a score of 3 (most sensitive) and tolerant species (T) are given a score of 1 (least sensitive)

STATION DIMENSIONS:

Station Length:	77	**Average Station Width:**	12.08	**Area of Station:**	930.160

NOTES:

-a few Atlantic salmon were kept by Mark Heaton MNR for demonstration (1 already dead)

Station: **501150001**

West Credit River @ Belfountain CA u/s of dam

STATION INFORMATION:

Electrofishing Date		July 3, 2003	
UTM Northing	4849647	**UTM Easting**	579415
Start Time:	8:40 AM	**Water Temperature:**	
End Time:	11:00 AM	**Air Temperature:**	
Total Electrofishing Time (sec.):	7331		
Weather Conditions:		**Flow Conditions:**	

FISH SPECIES INFORMATION:

Species	Number of Individual	Total Biomass (g)	Biomass Density (g/m^2)	Sensitivity *	Station Health Index
Atlantic Salmon (Salmo salar)	7	172.0	0.177	3	0.530
Brook Trout (Salvelinus fontinalis)	107	1271.5	1.305	3	3.915
Creek Chub (Semotilus atromaculatus)	2	10.0	0.010	1	0.010
Eastern Blacknose Dace (Rhinichthys atratulus)	206	550.0	0.565	1	0.565
Longnose Dace (Rhinichthys cataractae)	155	540.0	0.554	3	1.663
Rainbow Trout (Oncorhynchus mykiss)	1	8.0	0.008	3	0.025
White Sucker (Catostomus commersonii)	9	125.0	0.128	1	0.128
Total: **7 species**	**487**	**2676.5**	**2.747**		**6.835**

**** Credit Valley Conservation. 1999. Natural Heritage Project: Habitat Utilization for Fish***

Sensitivity is rated according to the tolerance listing for fish, as shown in the Natural Heritage Project, where sensitive species (S) are given a score of 3 (most sensitive) and tolerant species (T) are given a score of 1 (least sensitive)

STATION DIMENSIONS:

Station Length:	77	**Average Station Width:**	12.65	**Area of Station:**	974.281

NOTES:

Missed 1 large brook trout (~7inches).

Station: **501150001**

West Credit River @ Belfountain CA u/s of dam

STATION INFORMATION:

Electrofishing Date	July 14, 2006		
UTM Northing	4849647	**UTM Easting**	579415
Start Time:	10:20 AM	**Water Temperature:**	18.5
End Time:	11:35 AM	**Air Temperature:**	24.4
Total Electrofishing Time (sec.):	3484		
Weather Conditions:		**Flow Conditions:**	

FISH SPECIES INFORMATION:

Species		Number of Individual	Total Biomass (g)	Biomass Density (g/m²)	Sensitivity *	Station Health Index
Atlantic Salmon (Salmo salar)		12	227.0	0.198	3	0.593
Brook Trout (Salvelinus fontinalis)		92	1959.0	1.706	3	5.118
Eastern Blacknose Dace (Rhinichthys atratulus)		62	327.0	0.285	1	0.285
Longnose Dace (Rhinichthys cataractae)		97	380.0	0.331	3	0.993
Rainbow Trout (Oncorhynchus mykiss)		2	126.0	0.110	3	0.329
White Sucker (Catostomus commersonii)		1	131.0	0.114	1	0.114
Total:	**6 species**	**266**	**3150.0**	**2.743**		**7.432**

**** Credit Valley Conservation. 1999. Natural Heritage Project: Habitat Utilization for Fish***

Sensitivity is rated according to the tolerance listing for fish, as shown in the Natural Heritage Project, where sensitive species (S) are given a score of 3 (most sensitive) and tolerant species (T) are given a score of 1 (least sensitive)

STATION DIMENSIONS:

Station Length:	77	**Average Station Width:**	14.91	**Area of Station:**	1148.301

NOTES:

Station: **501150001**

West Credit River @ Belfountain CA u/s of dam

STATION INFORMATION:

Electrofishing Date	August 15, 2007		
UTM Northing	4849647	**UTM Easting**	579415
Start Time:	10:22 AM	**Water Temperature:**	17.2
End Time:	11:26 AM	**Air Temperature:**	24.3
Total Electrofishing Time (sec.):	3876		
Weather Conditions:		**Flow Conditions:**	

FISH SPECIES INFORMATION:

Species		Number of Individual	Total Biomass (g)	Biomass Density (g/m²)	Sensitivity *	Station Health Index
Atlantic Salmon (Salmo salar)		26	311.0	0.276	3	0.827
Brook Trout (Salvelinus fontinalis)		124	2549.0	2.259	3	6.776
Creek Chub (Semotilus atromaculatus)		1	5.0	0.004	1	0.004
Eastern Blacknose Dace (Rhinichthys atratulus)		256	715.0	0.634	1	0.634
Longnose Dace (Rhinichthys cataractae)		222	575.0	0.509	3	1.528
Pumpkinseed (Lepomis gibbosus)		1	5.0	0.004	1	0.004
Rainbow Trout (Oncorhynchus mykiss)		6	218.0	0.193	3	0.579
Total:	**7 species**	**636**	**4378.0**	**3.879**		**10.353**

**** Credit Valley Conservation. 1999. Natural Heritage Project: Habitat Utilization for Fish***

Sensitivity is rated according to the tolerance listing for fish, as shown in the Natural Heritage Project, where sensitive species (S) are given a score of 3 (most sensitive) and tolerant species (T) are given a score of 1 (least sensitive)

STATION DIMENSIONS:

Station Length:	77	**Average Station Width:**	14.66	**Area of Station:**	1128.589

NOTES:

Station: **501150001**

West Credit River @ Belfountain CA u/s of dam

STATION INFORMATION:

Electrofishing Date	August 22, 2008		
UTM Northing	4849647	**UTM Easting**	579415
Start Time:	10:04 AM	**Water Temperature:**	15.4
End Time:	11:09 AM	**Air Temperature:**	25.3
Total Electrofishing Time (sec.):	4405		
Weather Conditions:		**Flow Conditions:**	

FISH SPECIES INFORMATION:

Species		Number of Individual	Total Biomass (g)	Biomass Density (g/m²)	Sensitivity *	Station Health Index
Atlantic Salmon (Salmo salar)		63	700.0	0.692	3	2.077
Brook Trout (Salvelinus fontinalis)		52	1299.0	1.285	3	3.855
Common Shiner (Luxilus cornutus)		1	19.0	0.019	1	0.019
Eastern Blacknose Dace (Rhinichthys atratulus)		86	298.0	0.295	1	0.295
Longnose Dace (Rhinichthys cataractae)		267	667.0	0.660	3	1.979
Rainbow Trout (Oncorhynchus mykiss)		1	100.0	0.099	3	0.297
White Sucker (Catostomus commersonii)		4	4.0	0.004	1	0.004
Total:	**7 species**	**474**	**3087.0**	**3.054**		**8.526**

**** Credit Valley Conservation. 1999. Natural Heritage Project: Habitat Utilization for Fish***

Sensitivity is rated according to the tolerance listing for fish, as shown in the Natural Heritage Project, where sensitive species (S) are given a score of 3 (most sensitive) and tolerant species (T) are given a score of 1 (least sensitive)

STATION DIMENSIONS:

Station Length:	69.5	**Average Station Width:**	14.55	**Area of Station:**	1010.878

NOTES:

Backpack used for side channel (739 sec, 200 Volts, I6, 0.8 amps).

Station: **501150001**

West Credit River @ Belfountain CA u/s of dam

STATION INFORMATION:

Electrofishing Date	August 6, 2009		
UTM Northing	4849647	**UTM Easting**	579415
Start Time:	10:30 AM	**Water Temperature:**	16.1
End Time:	11:43 AM	**Air Temperature:**	17.3
Total Electrofishing Time (sec.):	4469		
Weather Conditions:		**Flow Conditions:**	

FISH SPECIES INFORMATION:

Species		Number of Individual	Total Biomass (g)	Biomass Density (g/m²)	Sensitivity *	Station Health Index
Atlantic Salmon (Salmo salar)		72	1282.0	1.281	3	3.842
Brook Trout (Salvelinus fontinalis)		117	1798.0	1.796	3	5.388
Creek Chub (Semotilus atromaculatus)		1	3.0	0.003	1	0.003
Eastern Blacknose Dace (Rhinichthys atratulus)		85	381.5	0.381	1	0.381
Longnose Dace (Rhinichthys cataractae)		141	604.5	0.604	3	1.812
Rainbow Trout (Oncorhynchus mykiss)		5	366.0	0.366	3	1.097
Total:	**6 species**	**421**	**4435.0**	**4.430**		**12.523**

**** Credit Valley Conservation. 1999. Natural Heritage Project: Habitat Utilization for Fish***

Sensitivity is rated according to the tolerance listing for fish, as shown in the Natural Heritage Project, where sensitive species (S) are given a score of 3 (most sensitive) and tolerant species (T) are given a score of 1 (least sensitive)

STATION DIMENSIONS:

Station Length:	69.5	**Average Station Width:**	14.40	**Area of Station:**	1001.078

NOTES:

backpack used for side channel. Backpack settings 752 sec I6 200V 0.7-0.8A. Mortalities 4 brook trout (3 YOY ,1- 1year+) 7 Atlantics (6 YOY) 1 rainbow trout (1 year +).

Station: **501150001**

West Credit River @ Belfountain CA u/s of dam

STATION INFORMATION:

Electrofishing Date	July 22, 2010		
UTM Northing	4849647	**UTM Easting**	579415
Start Time:	10:30 AM	**Water Temperature:**	19.1
End Time:	12:10 PM	**Air Temperature:**	25.8
Total Electrofishing Time (sec.):	6013		
Weather Conditions:		**Flow Conditions:**	

FISH SPECIES INFORMATION:

Species		Number of Individual	Total Biomass (g)	Biomass Density (g/m²)	Sensitivity *	Station Health Index
Atlantic Salmon (Salmo salar)		104	833.0	0.889	3	2.666
Brook Trout (Salvelinus fontinalis)		83	999.0	1.066	3	3.197
Creek Chub (Semotilus atromaculatus)		1	0.5	0.001	1	0.001
Eastern Blacknose Dace (Rhinichthys atratulus)		41	201.0	0.214	1	0.214
Longnose Dace (Rhinichthys cataractae)		220	683.0	0.729	3	2.186
Rainbow Trout (Oncorhynchus mykiss)		1	236.0	0.252	3	0.755
White Sucker (Catostomus commersonii)		2	35.0	0.037	1	0.037
Total:	**7 species**	**452**	**2987.5**	**3.187**		**9.055**

**** Credit Valley Conservation. 1999. Natural Heritage Project: Habitat Utilization for Fish***

Sensitivity is rated according to the tolerance listing for fish, as shown in the Natural Heritage Project, where sensitive species (S) are given a score of 3 (most sensitive) and tolerant species (T) are given a score of 1 (least sensitive)

STATION DIMENSIONS:

Station Length:	72.94	**Average Station Width:**	12.85	**Area of Station:**	937.498

NOTES:

8 atlantics dead. 2 brook trout dead. 1 Atlantic with caudal fin clip. 1 rainbow trout caught. 1056 efish seconds with backpack. 4957 efish seconds with punt. 1 belted kingfisher observed.

Station: **501150001**

West Credit River @ Belfountain CA u/s of dam

STATION INFORMATION:

Electrofishing Date	July 22, 2011		
UTM Northing	4849647	**UTM Easting**	579415
Start Time:	10:28 AM	**Water Temperature:**	19.2
End Time:	11:22 AM	**Air Temperature:**	26.6
Total Electrofishing Time (sec.):	3271		
Weather Conditions:		**Flow Conditions:**	

FISH SPECIES INFORMATION:

Species		Number of Individual	Total Biomass (g)	Biomass Density (g/m^2)	Sensitivity *	Station Health Index
Atlantic Salmon (Salmo salar)		26	377.0	0.408	3	1.225
Brook Trout (Salvelinus fontinalis)		69	799.0	0.866	3	2.597
Eastern Blacknose Dace (Rhinichthys atratulus)		81	237.0	0.257	1	0.257
Longnose Dace (Rhinichthys cataractae)		129	650.0	0.704	3	2.113
White Sucker (Catostomus commersonii)		2	237.0	0.257	1	0.257
Total:	**5 species**	**307**	**2300.0**	**2.492**		**6.449**

**** Credit Valley Conservation. 1999. Natural Heritage Project: Habitat Utilization for Fish***
Sensitivity is rated according to the tolerance listing for fish, as shown in the Natural Heritage Project, where sensitive species (S) are given a score of 3 (most sensitive) and tolerant species (T) are given a score of 1 (least sensitive)

STATION DIMENSIONS:

Station Length:	70.39	**Average Station Width:**	13.11	**Area of Station:**	922.954

NOTES:

Belted kingfisher observed. Less water. Electrofishing seconds is for both backpack and punt. Settings: Low range, 10%, backpack I6, 200V, 0.4-0.6A, 635 seconds

Station: **501150007**

West Credit River @ Belfountain CA d/s of dam

STATION INFORMATION:

Electrofishing Date	July 29, 2002		
UTM Northing	4849565	**UTM Easting**	579601
Start Time:	9:30 AM	**Water Temperature:**	18.5
End Time:	10:52 AM	**Air Temperature:**	24
Total Electrofishing Time (sec.):	4920		
Weather Conditions:		**Flow Conditions:**	

FISH SPECIES INFORMATION:

Species		Number of Individual	Total Biomass (g)	Biomass Density (g/m^2)	Sensitivity *	Station Health Index
Atlantic Salmon (Salmo salar)		25	1142.0	3.080	3	9.239
Brook Trout (Salvelinus fontinalis)		27	561.5	1.514	3	4.543
Brown Trout (Salmo trutta)		4	455.0	1.227	3	3.681
Creek Chub (Semotilus atromaculatus)		3	10.5	0.028	1	0.028
Eastern Blacknose Dace (Rhinichthys atratulus)		195	662.5	1.787	1	1.787
Longnose Dace (Rhinichthys cataractae)		89	390.0	1.052	3	3.155
Rainbow Trout (Oncorhynchus mykiss)		1	3.0	0.008	3	0.024
White Sucker (Catostomus commersonii)		6	35.5	0.096	1	0.096
Total:	**8 species**	**350**	**3260.0**	**8.792**		**22.554**

**** Credit Valley Conservation. 1999. Natural Heritage Project: Habitat Utilization for Fish***

Sensitivity is rated according to the tolerance listing for fish, as shown in the Natural Heritage Project, where sensitive species (S) are given a score of 3 (most sensitive) and tolerant species (T) are given a score of 1 (least sensitive)

STATION DIMENSIONS:

Station Length:	40	**Average Station Width:**	9.27	**Area of Station:**	370.800

NOTES:

Station: **501150007**

West Credit River @ Belfountain CA d/s of dam

STATION INFORMATION:

Electrofishing Date		July 10, 2003	
UTM Northing	4849565	**UTM Easting**	579601
Start Time:	10:25 AM	**Water Temperature:**	
End Time:	11:30 AM	**Air Temperature:**	
Total Electrofishing Time (sec.):	2666		
Weather Conditions:		**Flow Conditions:**	

FISH SPECIES INFORMATION:

Species		Number of Individual	Total Biomass (g)	Biomass Density (g/m^2)	Sensitivity *	Station Health Index
Atlantic Salmon (Salmo salar)		4	274.0	0.735	3	2.206
Brook Trout (Salvelinus fontinalis)		19	842.5	2.261	3	6.783
Brown Trout (Salmo trutta)		6	365.0	0.980	3	2.939
Creek Chub (Semotilus atromaculatus)		2	15.0	0.040	1	0.040
Eastern Blacknose Dace (Rhinichthys atratulus)		24	70.0	0.188	1	0.188
Longnose Dace (Rhinichthys cataractae)		77	387.0	1.039	3	3.116
White Sucker (Catostomus commersonii)		2	26.0	0.070	1	0.070
Total:	**7 species**	**134**	**1979.5**	**5.313**		**15.342**

**** Credit Valley Conservation. 1999. Natural Heritage Project: Habitat Utilization for Fish***
Sensitivity is rated according to the tolerance listing for fish, as shown in the Natural Heritage Project, where sensitive species (S) are given a score of 3 (most sensitive) and tolerant species (T) are given a score of 1 (least sensitive)

STATION DIMENSIONS:

Station Length:	40	**Average Station Width:**	9.32	**Area of Station:**	372.600

NOTES:

Missed 2 brown trout (approx. 21cm, 16.5cm).

Station: **501150007**

West Credit River @ Belfountain CA d/s of dam

STATION INFORMATION:

Electrofishing Date	July 7, 2004		
UTM Northing	4849565	**UTM Easting**	579601
Start Time:	10:05 AM	**Water Temperature:**	15.4
End Time:	11:20 AM	**Air Temperature:**	18.4
Total Electrofishing Time (sec.):	3603		
Weather Conditions:		**Flow Conditions:**	

FISH SPECIES INFORMATION:

Species		Number of Individual	Total Biomass (g)	Biomass Density (g/m^2)	Sensitivity *	Station Health Index
Atlantic Salmon (Salmo salar)		149	2530.0	5.946	3	17.839
Brook Trout (Salvelinus fontinalis)		12	595.0	1.398	3	4.195
Brown Trout (Salmo trutta)		6	441.5	1.038	3	3.113
Eastern Blacknose Dace (Rhinichthys atratulus)		126	445.0	1.046	1	1.046
Longnose Dace (Rhinichthys cataractae)		54	250.0	0.588	3	1.763
Rainbow Trout (Oncorhynchus mykiss)		1	58.5	0.137	3	0.412
White Sucker (Catostomus commersonii)		1	4.5	0.011	1	0.011
Total:	**7 species**	**349**	**4324.5**	**10.164**		**28.379**

**** Credit Valley Conservation. 1999. Natural Heritage Project: Habitat Utilization for Fish***
Sensitivity is rated according to the tolerance listing for fish, as shown in the Natural Heritage Project, where sensitive species (S) are given a score of 3 (most sensitive) and tolerant species (T) are given a score of 1 (least sensitive)

STATION DIMENSIONS:

Station Length:	40	**Average Station Width:**	10.64	**Area of Station:**	425.480

NOTES:

Station: **501150007**

West Credit River @ Belfountain CA d/s of dam

STATION INFORMATION:

Electrofishing Date	June 7, 2005		
UTM Northing	4849565	**UTM Easting**	579601
Start Time:	10:30 AM	**Water Temperature:**	16.4
End Time:	11:40 AM	**Air Temperature:**	
Total Electrofishing Time (sec.):	3879		
Weather Conditions:		**Flow Conditions:**	

FISH SPECIES INFORMATION:

Species	Number of Individual	Total Biomass (g)	Biomass Density (g/m²)	Sensitivity *	Station Health Index
Atlantic Salmon (Salmo salar)	16	530.0	1.339	3	4.017
Bluntnose Minnow (Pimephales notatus)	1	3.0	0.008	1	0.008
Brook Trout (Salvelinus fontinalis)	7	184.0	0.465	3	1.395
Brown Trout (Salmo trutta)	5	672.0	1.698	3	5.093
Common Shiner (Luxilus cornutus)	3	11.0	0.028	1	0.028
Eastern Blacknose Dace (Rhinichthys atratulus)	16	52.0	0.131	1	0.131
Longnose Dace (Rhinichthys cataractae)	29	171.0	0.432	3	1.296
Rainbow Trout (Oncorhynchus mykiss)	4	444.0	1.122	3	3.365
Total: **8 species**	**81**	**2067.0**	**5.222**		**15.332**

**** Credit Valley Conservation. 1999. Natural Heritage Project: Habitat Utilization for Fish***

Sensitivity is rated according to the tolerance listing for fish, as shown in the Natural Heritage Project, where sensitive species (S) are given a score of 3 (most sensitive) and tolerant species (T) are given a score of 1 (least sensitive)

STATION DIMENSIONS:

Station Length:	40	**Average Station Width:**	9.90	**Area of Station:**	395.840

NOTES:

Station: **501150007**

West Credit River @ Belfountain CA d/s of dam

STATION INFORMATION:

Electrofishing Date	August 26, 2006		
UTM Northing	4849565	**UTM Easting**	579601
Start Time:	10:25 AM	**Water Temperature:**	13.9
End Time:	11:30 AM	**Air Temperature:**	14.7
Total Electrofishing Time (sec.):	3599		
Weather Conditions:		**Flow Conditions:**	

FISH SPECIES INFORMATION:

Species	Number of Individual	Total Biomass (g)	Biomass Density (g/m^2)	Sensitivity *	Station Health Index
Atlantic Salmon (Salmo salar)	135	1710.0	3.138	3	9.413
Brook Trout (Salvelinus fontinalis)	8	196.0	0.360	3	1.079
Brown Trout (Salmo trutta)	7	1189.0	2.182	3	6.545
Common Shiner (Luxilus cornutus)	1	2.0	0.004	1	0.004
Creek Chub (Semotilus atromaculatus)	4	12.0	0.022	1	0.022
Eastern Blacknose Dace (Rhinichthys atratulus)	67	144.0	0.264	1	0.264
Longnose Dace (Rhinichthys cataractae)	23	87.0	0.160	3	0.479
Rainbow Trout (Oncorhynchus mykiss)	3	208.0	0.382	3	1.145
White Sucker (Catostomus commersonii)	2	11.0	0.020	1	0.020
Total: **9 species**	**250**	**3559.0**	**6.530**		**18.971**

**** Credit Valley Conservation. 1999. Natural Heritage Project: Habitat Utilization for Fish***

Sensitivity is rated according to the tolerance listing for fish, as shown in the Natural Heritage Project, where sensitive species (S) are given a score of 3 (most sensitive) and tolerant species (T) are given a score of 1 (least sensitive)

STATION DIMENSIONS:

Station Length:	52.6	**Average Station Width:**	10.36	**Area of Station:**	544.989

NOTES:

Station: **501150007**

West Credit River @ Belfountain CA d/s of dam

STATION INFORMATION:

Electrofishing Date	August 24, 2007		
UTM Northing	4849565	**UTM Easting**	579601
Start Time:	10:20 AM	**Water Temperature:**	18.8
End Time:	11:00 AM	**Air Temperature:**	20.4
Total Electrofishing Time (sec.):	4110		
Weather Conditions:		**Flow Conditions:**	

FISH SPECIES INFORMATION:

Species		Number of Individual	Total Biomass (g)	Biomass Density (g/m²)	Sensitivity *	Station Health Index
Atlantic Salmon (Salmo salar)		107	1836.0	3.625	3	10.875
Bluntnose Minnow (Pimephales notatus)		1	4.0	0.008	1	0.008
Brook Trout (Salvelinus fontinalis)		8	274.2	0.541	3	1.624
Brown Trout (Salmo trutta)		8	596.3	1.177	3	3.532
Eastern Blacknose Dace (Rhinichthys atratulus)		49	167.0	0.330	1	0.330
Longnose Dace (Rhinichthys cataractae)		34	125.0	0.247	3	0.740
Rainbow Trout (Oncorhynchus mykiss)		1	82.7	0.163	3	0.490
White Sucker (Catostomus commersonii)		2	10.0	0.020	1	0.020
Total:	**8 species**	**210**	**3095.2**	**6.111**		**17.619**

**** Credit Valley Conservation. 1999. Natural Heritage Project: Habitat Utilization for Fish***

Sensitivity is rated according to the tolerance listing for fish, as shown in the Natural Heritage Project, where sensitive species (S) are given a score of 3 (most sensitive) and tolerant species (T) are given a score of 1 (least sensitive)

STATION DIMENSIONS:

Station Length:	52.6	**Average Station Width:**	9.63	**Area of Station:**	506.485

NOTES:

Station: **501150007**

West Credit River @ Belfountain CA d/s of dam

STATION INFORMATION:

Electrofishing Date	August 16, 2008		
UTM Northing	4849565	**UTM Easting**	579601
Start Time:	10:47 AM	**Water Temperature:**	14.8
End Time:	11:50 AM	**Air Temperature:**	17.7
Total Electrofishing Time (sec.):	3791		
Weather Conditions:		**Flow Conditions:**	

FISH SPECIES INFORMATION:

Species		Number of Individual	Total Biomass (g)	Biomass Density (g/m²)	Sensitivity *	Station Health Index
Atlantic Salmon (Salmo salar)		60	702.0	1.227	3	3.680
Brook Trout (Salvelinus fontinalis)		1	7.0	0.012	3	0.037
Brown Trout (Salmo trutta)		3	1089.0	1.903	3	5.709
Creek Chub (Semotilus atromaculatus)		1	3.0	0.005	1	0.005
Eastern Blacknose Dace (Rhinichthys atratulus)		13	68.0	0.119	1	0.119
Longnose Dace (Rhinichthys cataractae)		16	67.0	0.117	3	0.351
White Sucker (Catostomus commersonii)		1	5.0	0.009	1	0.009
Total:	**7 species**	**95**	**1941.0**	**3.392**		**9.911**

**** Credit Valley Conservation. 1999. Natural Heritage Project: Habitat Utilization for Fish***

Sensitivity is rated according to the tolerance listing for fish, as shown in the Natural Heritage Project, where sensitive species (S) are given a score of 3 (most sensitive) and tolerant species (T) are given a score of 1 (least sensitive)

STATION DIMENSIONS:

Station Length:	56	**Average Station Width:**	10.22	**Area of Station:**	572.208

NOTES:

Old backpack: 3313 seconds, 60 frequency,300 volts, 0.5 amps. New backpack: 478 seconds, 200 volts, F5, 0.7 amps. New pack dead 1/4 through site. 3 large, approximately 200mm missed (Atlantic salmon)

Station: **501150007**

West Credit River @ Belfountain CA d/s of dam

STATION INFORMATION:

Electrofishing Date		August 17, 2009	
UTM Northing	4849565	**UTM Easting**	579601
Start Time:	11:00 AM	**Water Temperature:**	
End Time:	12:00 PM	**Air Temperature:**	
Total Electrofishing Time (sec.):	5242		
Weather Conditions:		**Flow Conditions:**	

FISH SPECIES INFORMATION:

Species	Number of Individual	Total Biomass (g)	Biomass Density (g/m²)	Sensitivity *	Station Health Index
Atlantic Salmon (Salmo salar)	313	2278.0	3.958	3	11.873
Brook Trout (Salvelinus fontinalis)	2	141.0	0.245	3	0.735
Brown Trout (Salmo trutta)	4	2759.0	4.794	3	14.381
Creek Chub (Semotilus atromaculatus)	1	9.0	0.016	1	0.016
Eastern Blacknose Dace (Rhinichthys atratulus)	5	13.0	0.023	1	0.023
Longnose Dace (Rhinichthys cataractae)	30	131.0	0.228	3	0.683
Rainbow Trout (Oncorhynchus mykiss)	1	109.0	0.189	3	0.568
Total: **7 species**	**356**	**5440.0**	**9.452**		**28.278**

**** Credit Valley Conservation. 1999. Natural Heritage Project: Habitat Utilization for Fish***

Sensitivity is rated according to the tolerance listing for fish, as shown in the Natural Heritage Project, where sensitive species (S) are given a score of 3 (most sensitive) and tolerant species (T) are given a score of 1 (least sensitive)

STATION DIMENSIONS:

Station Length:	56	**Average Station Width:**	10.28	**Area of Station:**	575.568

NOTES:

Old backpack (setttings: 60H, 300V,0.5amps) zeroed after testing, & showed 14108 seconds at end (which is incorrect). New backpack (settings: I5, 200V,0.8-1amps, & I4, 200V, 0.7amps). 46 Atl morts. Thermometer broken. Rbt taken by M.Heaton.

Station: **501150007**

West Credit River @ Belfountain CA d/s of dam

STATION INFORMATION:

Electrofishing Date		August 27, 2010	
UTM Northing	4849565	**UTM Easting**	579601
Start Time:	9:58 AM	**Water Temperature:**	12.9
End Time:	10:40 AM	**Air Temperature:**	16.6
Total Electrofishing Time (sec.):	2398		
Weather Conditions:		**Flow Conditions:**	

FISH SPECIES INFORMATION:

Species		Number of Individual	Total Biomass (g)	Biomass Density (g/m²)	Sensitivity *	Station Health Index
Atlantic Salmon (Salmo salar)		55	873.0	1.607	3	4.821
Brook Trout (Salvelinus fontinalis)		16	139.0	0.256	3	0.768
Brown Trout (Salmo trutta)		15	120.0	0.221	3	0.663
Creek Chub (Semotilus atromaculatus)		1	1.0	0.002	1	0.002
Eastern Blacknose Dace (Rhinichthys atratulus)		45	131.0	0.241	1	0.241
Longnose Dace (Rhinichthys cataractae)		60	199.0	0.366	3	1.099
Northern Hog Sucker (Hypentelium nigricans)		1	36.0	0.066	3	0.199
Rainbow Trout (Oncorhynchus mykiss)		5	646.0	1.189	3	3.567
Total:	**8 species**	**198**	**2145.0**	**3.948**		**11.359**

**** Credit Valley Conservation. 1999. Natural Heritage Project: Habitat Utilization for Fish***

Sensitivity is rated according to the tolerance listing for fish, as shown in the Natural Heritage Project, where sensitive species (S) are given a score of 3 (most sensitive) and tolerant species (T) are given a score of 1 (least sensitive)

STATION DIMENSIONS:

Station Length:	50.2	**Average Station Width:**	10.82	**Area of Station:**	543.264

NOTES:

1 Atlantic salmon dead. Belted kingfishers observed. Shocking seconds only recorded from 1 backpack.

Station: **501150007**

West Credit River @ Belfountain CA d/s of dam

STATION INFORMATION:

Electrofishing Date	August 19, 2011		
UTM Northing	4849565	**UTM Easting**	579601
Start Time:	10:30 AM	**Water Temperature:**	15.8
End Time:	11:14 AM	**Air Temperature:**	19.8
Total Electrofishing Time (sec.):	3626		
Weather Conditions:		**Flow Conditions:**	

FISH SPECIES INFORMATION:

Species		Number of Individual	Total Biomass (g)	Biomass Density (g/m^2)	Sensitivity *	Station Health Index
Atlantic Salmon (Salmo salar)		109	1481.0	2.446	3	7.337
Brook Trout (Salvelinus fontinalis)		14	275.0	0.454	3	1.362
Eastern Blacknose Dace (Rhinichthys atratulus)		26	75.0	0.124	1	0.124
Longnose Dace (Rhinichthys cataractae)		57	210.0	0.347	3	1.040
Rainbow Trout (Oncorhynchus mykiss)		2	173.0	0.286	3	0.857
Total:	**5 species**	**208**	**2214.0**	**3.656**		**10.720**

**** Credit Valley Conservation. 1999. Natural Heritage Project: Habitat Utilization for Fish***
Sensitivity is rated according to the tolerance listing for fish, as shown in the Natural Heritage Project, where sensitive species (S) are given a score of 3 (most sensitive) and tolerant species (T) are given a score of 1 (least sensitive)

STATION DIMENSIONS:

Station Length:	56	**Average Station Width:**	10.81	**Area of Station:**	605.584

NOTES:

G5, 200V 0.5-0.6A. 250V 0.3-0.5A

APPENDIX IX
Aquatic Habitat Photos


Culvert 1a


Culvert 1b


Culvert 1c


Culvert 2a


Culvert 2b


Culvert 2c


Culvert 2d


Culvert 2e


Culvert 3a


Culvert 3b


Culvert 3c


culvert 3d


culvert 3e


Culvert 3f


Culvert 4a


Culvert 4b


Culvert 4c


Culvert 4d


Culvert 5a


Culvert 5b


Culvert 5c


Culvert 5d


Culvert 6a


Culvert 6b


Culvert 6c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Culvert 7d


Culvert 8a


Culvert 8b


Culvert 8c


Culvert 8d


Culvert 8e


Culvert 8f


Culvert 9a


Culvert 9b


Culvert 9c


Culvert 9d


Culvert 10a


Culvert 10b


Culvert 10c


Culvert 10d


Culvert 10e


Culvert 10f


Culvert 10g


Culvert 10h


Culvert 11a


Culvert 11b


Culvert 11c


Culvert 11d


Culvert 12a


Culvert 12b


Culvert 12c


Culvert 12d


Culvert 12e


Culvert 12f


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Culvert 19e


Culvert 19f


Culvert 19g


Culvert 19h


Culvert 19i


Culvert 19j


Culvert 19k


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Culvert 20b


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Culvert 40d


Culvert 41a


Culvert 41b


Culvert 41c


Culvert 41d

Culvert 41e

Culvert 42a

Culvert 42b

Culvert 42c

Culvert 42d

Culvert 43a

Culvert 43b

Culvert 43c

APPENDIX X

Significant Wildlife Habitat Screening

SWH Category	ELC Ecosites (From OMNR Criteria)	Peel Region Threshold Criteria	Study Area Assessment
Seasonal Concentration Areas			
Deer Wintering Area	All Forested Ecosites with these ELC Community Series; FOC FOM FOD SWC SWM SWD Conifer plantations much smaller than 50 ha may also be used.	Deer wintering areas will be assessed and mapped by the OMNR. Mapping will not be based on the traditional assessment methodology. Rather, it will be based on a detailed assessment of historic and recent motor vehicle accident data for Caledon in association with local expert knowledge.	OMNR has confirmed the presence of deer wintering habitat within and adjacent to the west and northeast ends of the study area. **Confirmed SWH**
Colonial Bird Nesting Sites (e.g., heronry, gull colony)	N/A	Any nesting colonies of the following species should be considered SWH: Great Blue Heron, Great Egret, Black-crowned Night Heron, and Black Tern. Habitats that support the following number of nests/pairs be considered SWH: Green Heron 2, Common Tern 5, Northern Rough-winged Swallow 5, Bank Swallow 30, Cliff Swallow 8, Barn Swallow 3, Sedge Wren 3, Marsh Wren 3.	Deciduous swamp occurs in the study area. No nests/colonies were observed within the study area. **Not SWH**
Waterfowl Nesting Habitat	All upland habitats located adjacent to these wetland ELC Ecosites are Candidate SWH: MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 MAM1 MAM2 MAM3 MAM4 MAM5 MAM6	The recommended thresholds for Region of Peel and Town of Caledon are based on ORMCP TP2 (Queen's Printer for Ontario 2007a) but incorporate additions to the species No list. Therefore, it is recommended that SWH be defined as waterfowl nesting areas that support: a) Any combination of 3 or more nesting pairs of: Wood Duck, Gadwall, American Wigeon, American Black Duck, Blue-winged Teal, Northern Shoveler, Northern Pintail, Green-winged Teal, Redhead, Hooded Merganser,	A nominal amount of marsh habitat occurs within the study area; greater amounts of swamp and open water although these are not abundant either. Upland areas around these features may provide suitable conditions for waterfowl nesting. **Candidate SWH**

	SWT1 SWT2 SWD1 SWD2 SWD3 SWD4	Common Merganser, and Ruddy Duck b) Any combination of 10 or more nesting pairs of listed species above, including Mallard Note: Waterfowl nesting areas generally correspond with upland habitats adjacent to marsh, swamp and shallow water ELC community classes, and generally extend out as far as 120 from the wetland (> 0.5 ha) or a cluster of 3 or more smaller wetlands(< 0.5 ha) within 150 m of each other.	
Migratory Landbird Stop-over Areas	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD	It is recommended that all 'natural areas' be identified as SWH within: a. 2 km of Lake Ontario b. River and creek valleys within 5 km of Lake Ontario, and c. 500 m of a river valley, but within 5 km of Lake Ontario. 'Successional communities' are also to be identified as SWH if they are: • ≥5 ha in size and immediately on the lakeshore, or • ≥10 ha in size and within any of the zones (a, b, c) identified above. 'Natural areas' = all terrestrial and wetland communities as defined under the Ecological Land Classification (ELC) system (Lee et al. 1998), as well as cultural woodlands and plantations. 'Successional areas' = cultural savannahs, cultural thickets and cultural meadows. Excluded areas include (a) actively used portions of recreational areas (e.g., sports fields, golf courses) and parks, and (b) lands permanently transformed for human services or infrastructure (e.g., roads, buildings, piers, active pits and quarries). Note 1: SWH designation is not intended to limit existing agricultural activities from continuing. Note 2: It is suggested that the City of Mississauga consider reviewing their Tree Permit By-law Number 474-05 to regulate the cutting of trees within 2 km of the lakeshore more rigorously.	The study area is not within 5 km of Lake Ontario. **Not SWH**
Migratory Bat Stop-over Areas	N/A	There is insufficient information currently available to suggest a threshold. However, in No the not too distant future the OMNR Wind Resource Atlas (http://www.ontariowindatlas.ca/) will indicate areas considered important to bat migration. These areas should be considered candidate SWH in the Region of Peel and Town of Caledon. Further field studies will	Insufficient information to classify this SWH type.

		be required to confirm their significance. In the meantime, the protection of significant migratory bat stopover areas is probably accomplished by criterion A4i, at least along Lake Ontario	
Migratory Butterfly Stop-over Areas	Combination of ELC Community Series; need to have present one Community Series from each landclass: <u>Field</u>: CUM CUT CUS <u>Forest</u>: FOC FOD FOM CUP Anecdotally, a candidate sight for butterfly stopover will have a history of butterflies being observed.	There is insufficient information currently available to suggest a threshold. It is therefore recommended that the Region of Peel and Town of Caledon defer to the Significant Wildlife Habitat Technical Guide (OMNR 2000) approach, or guidelines for Eco-region 7E (in preparation by OMNR), until more data is gathered/analyzed. These areas are likely covered by criterion A4i along Lake Ontario. Note: According to CVC, migratory butterfly congregations have been observed along the Lake Ontario shoreline (e.g., Lakeside Park and Rattray Marsh) during the fall.	The study area is not located within 10 km of the Lake Ontario shore. **Not SWH**
Migratory Waterfowl Stop-over and Staging Areas (Terrestrial)	CUM1 CUT1 - Plus evidence of annual spring flooding from melt water or run-off within these Ecosites.	ORMCP TP2 (Queen's Printer for Ontario 2007a) thresholds (but incorporating 4 additional species) are recommended for the Region of Peel and Town of Caledon: • annual aggregations (observed on a single day) of 100 individuals or more in any combination of the listed species. Listed species include: Wood Duck, Gadwall, American Wigeon, American Black Duck, Blue-winged Teal, Northern Shoveler, Northern Pintail, Green-winged Teal, or Ring-necked Duck. Note1: Annual habitat use can be based on background information or field studies conducted over at least a two-year period. Note 2: SWH designation is not intended to limit existing agricultural activities from continuing, or preventing built infrastructure (e.g., sewage lagoons) from functioning as	Several Cultural Meadows occur within the study area, including some large meadows. Spring field work was completed by Dillon within the original EA study area and expanded study area. No major congregations noted. **Not SWH**

		required.	
Migratory Waterfowl Stop-over and Staging Areas (Aquatic)	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 MAS1 MAS2 MAS3 SAS1 SAM1 SAF1 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	ORMCP TP2 (Queen's Printer for Ontario 2007a) thresholds are recommended for mainland portions of the Region of Peel and Town of Caledon (i.e., annual aggregations of 100 or more individuals (observed during a single day), in any combination, included on the Mainland species list). Nearshore waters of Lake Ontario within the globally No significant "The West End of Lake Ontario" Important Bird Area (IBA) should automatically be designated as SWH. However, for nearshore waters of Lake Ontario east of the IBA, it is recommended that areas that support annual aggregations of 250 or more individuals (observed during a single day), in any combination, included on the Nearshore species list be considered SWH. Mainland species list: Wood Duck, Gadwall, American Wigeon, American Black Duck, Blue-winged Teal, Northern Pintail, Northern Shoveler, Green-winged Teal, Ring-necked Duck, Lesser Scaup, Bufflehead, Common Goldeneye, Hooded Merganser, Common Merganser. Nearshore species list: Brant, Canvasback, Redhead, Greater Scaup, Lesser Scaup, King Eider, Common Eider, Harlequin Duck, Surf Scoter, White-winged Scoter, Black Scoter, Long-tailed Duck, Bufflehead, Common Goldeneye, Common Merganser, Red-breasted Merganser, Ruddy Duck, Horned Grebe, Red-necked Grebe. Note 1: Annual habitat use can be based on background information or field studies conducted over at least a two-year period. Note 2: SWH designation is not intended to limit existing agricultural activities from continuing or preventing built infrastructure (e.g., sewage lagoons) from functioning as required. Note 3: The nearshore waters of Lake Ontario are part of conservation authority jurisdiction under the Conservation Authorities Act and in an agreement with DFO for development planning review including municipal activities and approvals.	A nominal amount of marsh and open water, and some areas of deciduous swamp, occur within the study area. Spring field work was completed by Dillon within the original EA study area and expanded study area. No major congregations noted. **Not SWH**
Migratory Shorebird Stop-over Areas	BBO1 BBO2 BBS1 BBS2 BBT1	It is recommended that sites that support annual aggregations of ≥ 75 individuals (observed on a single day during migration), of any combination of species, be considered SWH: Note 1: A site is defined as (a) a 100 m reach of shoreline	Small areas of suitable habitat may occur within the study area. Large congregations of shorebirds were not noted during Dillon field work.

	BBT2 SDO1 SDS2 SDT1 MAM1 MAM2 MAM3 MAM4 MAM5	(centered at any location), or (b) a habitat patch 0.2 ha in size (centered at any location). This is roughly equivalent to a circle with a 25 m radius or square with 45 m sides. Note 2: The determination of annual habitat use can be based on background information or field studies conducted over at least a two-year period. Note 3: These thresholds should be examined in the future and revised if necessary by consulting with local naturalist clubs and/or the Ontario Field Ornithologists. Note 4: The designation of SWH is not intended to limit the ability of existing, normal agricultural uses from continuing, or preventing existing municipal infrastructure (e.g., sewage lagoons, piers etc.) from functioning as required.	**Not SWH**
Raptor Wintering Areas	Combination of ELC Community Series; need to have present one Community Series from each land class; Forest: FOD, FOM, FOC. Upland: CUM; CUT; CUS; CUW.	Until information specific to the Region of Peel and Town of Caledon becomes available, it is recommended that the provincial guidelines presented in the Significant Wildlife Habitat Technical Guide (OMNR 2000) be used in both jurisdictions. Accordingly, it is recommended that open fields >20 ha in size adjacent to woodlands be considered candidate SWH. Open fields generally correspond with cultural meadows or abandoned agricultural lands. Smaller sites should also be considered if there is any evidence or reasonable possibility of regular winter raptor activity. Confirmed sites should be occupied at least 60% of winters (almost 2 out of every 3 years), and based on 2 or more species and at least 10 individuals of the following species: Northern Harrier, Red-tailed Hawk, Rough-legged Hawk, or American Kestrel. Refer to Section 6.5.10 to see how occurrence data can be collected. Note 1: Any wintering sites used by Short-eared Owl (designated “Special Concern” in Ontario and Canada) should also be designated SWH. Note 2: SWH designation is not intended to limit the ability of existing, normal agricultural uses from continuing.	Field sizes have not been measured; there are a few relatively large fields classified as “non-intensive agriculture” within the study area that occur adjacent to woodland. Field assessment verified some forest/field combination areas that could potentially provide habitat. Winter raptor activity hasn’t been investigated. **Candidate SWH**
Snake Hibernacula	For all snakes, habitat may be found in any ecosite in central Ontario other than very wet ones. Talus, Rock	It is recommended that sites that support the following conditions should be considered SWH in the Region of Peel and Town of Caledon. Thresholds are based on ORMCP TP2 (Queen’s Printer for Ontario 2007a) and supplemented by Ontario Herpetofaunal Atlas data.	Snake surveys have not been completed within the study area. **Candidate SWH**

	Barren, Crevice and Cave, and Alvar sites may be directly related to these habitats. Observations of congregations of snakes on sunny warm days in the spring or fall is a good indicator. The existence of rock piles or slopes, stone fences, and crumbling foundations assist in identifying candidate SWH. For Five-lined Skink, ELC Community Series of FOD and FOM and Ecosites: FOC1 FOC3	• 10 or more Eastern Gartersnakes, or • 5 or more or DeKay's Brownsnakes, or Yes, with • 2 or more of the following species: Ring-necked Snake, Smooth Greensnake, Northern Watersnake, and Red-bellied Snake, or • 2 or more of the above species. Note 1: Foundations of buildings in active use should be exempt. Any significant hibernacula associated with buildings/structures should however be considered for protection through some type of stewardship or mitigation measures. Note 2: Significant snake hibernacula associated with existing municipal infrastructure should be managed in such a way that maintains the function of the facility, but reduces its potential impact.	
Bat Maternal Roosts and Hibernacula	N/A	Until information specific to the Region of Peel and Town of Caledon becomes available, it is recommended that the provincial guidelines presented in the Significant Wildlife Habitat Technical Guide (OMNR 2000) be used in both jurisdictions. Therefore, the following numbers of bats should be considered significant at maternity colonies and winter roosts, respectively: Big Brown Bat, 30, 30; Little Brown Bat, 100, 50; Eastern Pipistrelle, 10, 20; Silver-haired Bat, 10, N/A; Long-eared Bat, 10, 20; Small-footed Bat,10, all sites. However, with the	Bat habitat assessments or surveys have not been completed within the study area. Potential bat maternity colony habitat occurs within the forest communities of the study area. **Candidate SWH**

		discovery of White Nose Syndrome in neighbouring New York State in 2007, OMNR staff must be contacted to see if more restrictive thresholds are Threshold warranted. If so, these should supersede those in the Significant Wildlife Habitat Technical Guide (OMNR 2000). Note: The Natural Heritage Information Centre (OMNR) will be providing hibernacula habitat mapping in the future. However, due to its sensitive nature, specific location information will not be available. It is possible that larger patches will be shown on the MNR Wind Resource Atlas representing candidate SWH. It must also be understood that many hibernacula have not been found, therefore any known cave or crevice ecosites or old mine shafts should be considered candidate SWH and evaluated as such.	
Bullfrog Concentration Areas	N/A	The thresholds recommended for the ORM (OMNR, 2007) will be incorporated in criterion B8ii (Amphibian breeding habitat - non-forested sites). That is, any sites supporting breeding Bullfrogs in the Region of Peel and Town of Caledon should be considered SWH.	Potential habitat exists for Bullfrog within the study area. No Bullfrogs were observed during surveys completed within the original EA study area, or from within the expanded study area. **Not SWH**
Rare Vegetation Communities or Specialized Habitat for Wildlife			
Rare Vegetation Communities	N/A	All communities ranked as S1, S2 or S3 by NHIC (as per Bakowsky 1996) Targeted vegetation communities ranked S3S4, S4 or S5 in Ecodistricts 6E-7 and 7E- 4 in the Great Lakes Conservation Blueprint (Henson and Brodribb 2005), or identified as rare on the ORM in the ORMCP TP2 (Queen's Printer for Ontario 2007a): • Dry - Fresh White Pine - Red Pine Coniferous Forest Type (FOC1-2) • Dry - Fresh White Pine - Sugar Maple Forest Ecosite (FOM 2-2) • Dry - Fresh White Pine - Oak Mixed Forest Type (FOM2-1) • Moist - Fresh Hemlock - Sugar Maple Mixed Forest Type (FOM 6-1) • Dry - Fresh Red Oak Deciduous Forest Type (FOD1-1)	No rare vegetation communities were identified within the original or expanded EA study areas. No rare vegetation communities were classified within the study area. **Not SWH**

		• Dry - Fresh White Oak Deciduous Forest Type (FOD1-2) • Dry-Fresh Mixed Oak Deciduous Forest Type (FOD 1-4) • Dry-Fresh Oak-Hickory Deciduous Forest Type (FOD 2-2) • Dry-Fresh Hickory Deciduous Forest Type (FOD 2-3) • Fresh Sugar Maple-Black Maple Deciduous Forest (FOD 6-2) • Broad-leaved Sedge Organic Meadow Marsh Type (MAM3-6) • White Cedar - Conifer Organic Swamp Type (SWC3-2) • Willow Organic Thicket Swamp Type (SWT3-2) All bog and fen wetland communities (considered rare in the Region of Peel and Town of Caledon) Note 1: The S3S4, S4 and S5 ranked woodland ELC Vegetation communities listed above are also captured by the significant woodlands criteria for significant communities (see Section 5.1.15). Note 2: The minimum size for rare vegetation communities is 0.5 ha.	
Forests Providing a High Diversity of Habitats	N/A	It is assumed that all forests providing a high diversity of habitats (as described in the Significant Wildlife Habitat Technical Guide (OMNR 2000) will be captured by the suite of significant woodlands criteria (e.g., size/interior, proximity to a watercourse, and presence of significant habitats and/or species) even though the diversity criterion itself has not been recommended. Note: See Sections 5.3 and 6.5.17 of this report for more details.	Forests are not anticipated to be impacted; diversity criteria have not been defined. Covered off under Significant Woodlands policy. **Not SWH**
Old Growth or Mature Forest Stands	N/A	Captured under Significant Woodlands policy	**Not SWH**
Foraging Areas with Abundant Mast	N/A	It has been assumed that most forests providing foraging areas with abundant mast (i.e.,nuts like acorns and fruit bearing shrubs) will be captured by the significant woodlands criterion for size/interior, as well as the criterion for old growth (see Section 5.3.1 - 5.3.3). To capture some areas that may not be captured as significant woodlands, we are also Potentially once ELC recommending any ELC community that is: Ecosite mapping is • FOD 1 (Dry-Fresh Oak Deciduous Forest Ecosite), completed for the • FOD 2 (Dry-Fresh Oak-Maple-Hickory Deciduous	Suitable habitat not present within the study area. **Not SWH**

		Forest Ecosite) or Region of Peel • FOD 9 (Fresh-Moist Oak-Maple-Hickory Deciduous Forest Ecosite) also be considered SWH under this criterion. Note: See Sections 5.3 and 6.5.19 of this report for a more comprehensive rationale.	
Highly Diverse Areas	N/A	The top 5% most diverse habitat patches in the Region of Peel (a) in the Rural System (i.e., the Town of Caledon) and (b) in the Urban System (i.e., the Cities of Brampton and Mississauga). Diversity was determined by the number of ELC community types (at the Community Series level) per habitat patch. Habitat patches were defined as continuous natural areas (i.e., all woodland - FOD, FOC, FOM; wetland - MA, SW, FE; and successional community polygon types - CUT, CUS, CUP, CUW) not separated by arterial or collector roads or built-up areas by more than 20 m gaps. Note: Cultural meadows (CUM) were excluded because of the difficulty in distinguishing them from active agricultural areas in air photo interpretation. All agricultural areas (AGR) were excluded as well.	Highly diverse areas may be classified within the study area. **Candidate SWH**
Cliffs and Caves	N/A	Any cliff, talus, crevice or cave community (per ELC, Lee et al. 1998) ranked as S1, S2 or S3 by the NHIC. Note 1: No minimum size threshold is recommended. incomplete) Note 2: Areas where quarry licenses are active are excluded.	Suitable habitat not present within the study area. **Not SWH**
Seeps and Springs	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	Site specific confirmation of presence through any of the following: Visual confirmation of surface discharge or springs Groundwater investigations or detailed vegetation assessments (e.g., confirmed presence of plant species known to be associated with seepage areas in southern Ontario such as Carex scabrata). Areas with red or rust coloured stains on the soil surface (these are usually precipitates of iron hydroxides indicating areas of groundwater discharge). Locating patches of ground that are free of ice and snow in winter and where there is evidence of seepage or springs, or where there are previously confirmed records for seeps or springs.	Seeps and springs may occur within study area habitats. **Candidate SWH**

	seeps/springs.	Presence of marl (i.e., precipitates of carbonates in solution where groundwater pathways go through areas of concentrated dissolved solids and come to the surface) The above site analysis needs to be completed in conjunction with evidence collected through background or current site-specific studies that concludes the seep or spring provides habitat for or otherwise supports other SWH criteria (as identified in this study). e.g., Deer Wintering Areas, Wild Turkey Winter Range, Rare Vegetation Communities (mostly indirectly), Highly Diverse Areas, Amphibian Breeding Habitat (indirectly), and Habitat for Species of Conservation Concern. Note: In addition to protection of the specific seep or spring zone, there needs to be consideration for protection of the hydrologic dynamics within the groundwater catchment area in the Official Plan policies and/or supporting guidelines.	
Amphibian Breeding Habitat (Forested Sites)	N/A	Based mostly on standards developed for the ORM (OMNR, 2007), it is recommended that sites that support the following conditions be considered SWH in the Region of Peel and Town of Caledon. • Breeding populations of 2 or more listed species in Group A with a combined total of at least 40 individuals present. • A combined total of at least 30 individuals from any species listed in Group B (i.e., species that tend to behave more like vernal pool obligates, at least in Peel Region). • All breeding populations of Four-toed Salamander regardless of number of individuals Group A: Red-spotted Newt, Blue-spotted Salamander, Jefferson Salamander complex 'hybrids' (where the Blue-spotted Salamander genome dominates), Spotted Salamander, unidentified members of the Ambystoma salamander genus, Gray Treefrog, Spring Peeper, and Wood Frog. Group B: Blue-spotted Salamander, unidentified members of the Jefferson Salamander	Suitable forested breeding sites (e.g., vernal pools) may occur within the study area. Salamander surveys have not been completed within the study area. Gray Treefrog, Spring Peeper and Wood Frog were all observed within the original and expanded EA study area but abundance information wasn't provided. **Candidate SWH**

		complex or 'hybrids' where the Blue-spotted Salamander genome dominates, and Wood Frog. In addition, management recommendations in "Conserving Pool-breeding Amphibians …" (Calhoun and Klemens 2002) should be followed (e.g., protect and maintain pool hydrology and water quality). Note 1: It is assumed that for every male frog heard calling a female frog is also present. That is, if 5 male frogs are heard calling, it is assumed 10 individuals are present. Note 2: In order to be sure how many individuals are present, field surveys must be conducted in a seasonally appropriate manner. Timing is critical. Refer to Section 6.5.23 for more information. Note 3: Larvae/egg masses numbers cannot reliably reveal how many individuals are present at a site. Documenting adults at the right time of year, under the right weather conditions, and using the right methodology should be the priority. Refer to Section 6.5.23 for more information. Note 4: The Great Lakes-St. Lawrence / Canadian Shield population of the Western Chorus Frog, whose geographic range includes the Region of Peel, was designated "Threatened" by COSEWIC in April 2008. It is addressed under Criterion C1.	
Amphibian Breeding Habitat (Non-forested Sites)	N/A	Based mostly on standards developed for the ORM (OMNR, 2007), it is recommended that sites that support the following conditions be considered SWH in the Region of Peel and Town of Caledon. • Breeding populations of 2 or more listed species in Group A with a combined total Yes, with of at least 40 individuals present. threshold • A combined total of at least 30 individuals from any species listed in Group B (i.e., No species that tends to behave more like vernal pool obligates, at least in Peel Region). • All breeding populations of Bullfrog regardless of number of individuals • All breeding populations of Mudpuppy regardless of number of individuals In addition, wetland hydrology and water quality must be maintained. Protection must also be extended to adjacent	A nominal amount of marsh habitat exists within the study area. Potential breeding habitat is present. Salamander surveys have not been completed within the study area. Sufficient Group A species were observed in the original and expanded EA study area, but without abundance information to assess against these criteria. **Candidate SWH**

		upland habitats to appropriately accommodate the terrestrial portion of their life cycles. The size of the area protected must reflect the habitat requirements of the listed species present. Group A: Red-spotted Newt, Blue-spotted Salamander, Jefferson Salamander complex 'hybrids' (where the Blue-spotted Salamander genome dominates), Spotted Salamander, unidentified members of the Ambystoma salamander genus, American Toad, Gray Treefrog, Spring Peeper, Green Frog, Pickerel Frog, Northern Leopard Frog, Mink Frog, and Wood Frog. Group B: Blue-spotted Salamander, unidentified members of the Jefferson Salamander complex or 'hybrids' where the Blue-spotted Salamander genome dominates, and Wood Frog. Note 1: It is assumed that for every male frog or toad heard calling a female frog is also present. That is, if 5 male frogs or toads are heard calling, it is assumed 10 individuals are present. Note 2: In order to be sure how many individuals are present, field surveys must be conducted in a seasonally appropriate manner. Timing is critical. Refer to Section 6.5.24 for more information. Note 3: Larvae/egg masses numbers cannot reliably reveal how many individuals are present at a site. Documenting adults at the right time of year, under the right weather conditions, and using the right methodology should be the priority. Refer to Section 6.5.24 for more information. Note 4: The Great Lakes-St. Lawrence / Canadian Shield population of the Western Chorus Frog, whose geographic range includes the Region of Peel, was designated "Threatened" by COSEWIC in April 2008. It is addressed under Criterion C1.	
Turtle Nesting Habitat and Turtle Overwintering Areas	N/A	It is recommended that the thresholds developed for the ORM (OMNR, 2007), i.e., breeding or overwintering presence of 5 or more pairs/individuals of Snapping Turtle or Midland Painted Turtle, apply to the Region of Peel and Town of Caledon. It is also recommended that the documentation required be expanded to include turtle nests, not just pairs.	OMNR confirmed the presence of turtle (Snapping Turtle) overwintering at a study area pond (M. Heaton, OMNR, pers. comm., July 2013). **Confirmed SWH**

		Note: Snapping Turtle was designated "Special Concern" nationally in Dec. 2008. It's may receive similar Species at Risk status in Ontario in 2009. Northern Map Turtle was removed from the list since it is designated Special Concern in Ontario and is therefore included under criterion C2.	
Habitat for Area-Sensitive Forest Interior Breeding Bird Species	All Ecosites associated with these ELC Community Series; FOC FOM FOD SWC SWM SWD	The recommended threshold is based on: 1. an analysis of the habitat requirements of area-sensitive forest interior species occurring in Peel, as well as forest interior patch size, and 2. the presence of species listed in the ORMCP TP2 (Queen's Printer for Ontario 2007a). Therefore, it is recommended that mature forests (i.e. greater than 60 years of age) with interior patch size ≥ 4 ha be considered SWH in the Region of Peel and Town of Caledon. In addition, habitats in either jurisdiction (including plantations) that support 3 or more listed species with probable or confirmed breeding evidence should be considered significant. Listed Species include: Hairy Woodpecker, Pileated Woodpecker, Red-breasted Nuthatch, Brown Creeper, Winter Wren, Veery, Northern Parula, Black-throated Blue Warbler, Black-throated Green Warbler, Blackburnian Warbler, Black-and-white Warbler, Ovenbird, and Scarlet Tanager. Note 1: Whip-poor-will, Yellow-bellied Sapsucker, and Blue-headed Vireo were removed from the list since they also occur along forest edges and openings. Hairy Woodpecker, Pileated Woodpecker, Brown Creeper, Winter Wren, and Black-throated Blue Warbler were added to the list. Note 2: Small inclusions of younger forest should not be excluded when analyzing forest interior patch size.	Portions of some forest patches occur within the study area that may be of suitable size to be considered SWH. EA bird observations are for the overall study area and are not associated with any particular habitat patch. Unable to assess against SWH criteria. **Candidate SWH**
Habitat for Open Country and Early Successional Breeding Bird Species	N/A	Open country habitats ≥10 ha, not actively farmed for ≥ 5 years and with confirmed habitat utilization by: • at least 4 area-sensitive species from Group A, or •3 area-sensitive species from Group A and 4 or more species from Group B. Group A: Bobolink, Eastern Meadowlark, Grasshopper Sparrow, Northern Harrier, Savannah Sparrow, Upland Sandpiper, Western Meadowlark, Group B: American Kestrel, Brown Thrasher, Clay-colored Sparrow, Eastern Bluebird,	Some fields considered "low-intensity agriculture" occur within the study area, some of which might be of suitable size. Large field areas were identified during field assessment that could potentially provide open country breeding bird habitat. **Candidate SWH**

Habitat for Wetland Breeding Bird Species	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 For Green Heron: All SW, MA and CUM1 sites.	ORMCP TP2 (Queen's Printer for Ontario 2007a) thresholds are recommended for the Region of Peel and Town of Caledon: 5 nesting pairs of any combination of species from Group A, or 4 nesting pairs of any combination of species from Group B. Group A: Common Loon, Pied-billed Grebe, American Bittern, Virginia Rail, Common No Moorhen, Sora, American Coot, Sandhill Crane, Wilson's Snipe, Wilson's Phalarope, Black Tern, Marsh Wren, & Sedge Wren. Group B: Black Tern, Marsh Wren, and Sedge Wren	A nominal amount of marsh habitat occurs within the study area. Marsh bird surveys haven't been completed within the study area. **Candidate SWH**
Raptor Nesting Habitat (raptors associated with wetlands, ponds and rivers)	N/A	ORMCP TP2 (Queen's Printer for Ontario 2007a) thresholds are recommended for the Region of Peel and Town of Caledon: the presence of one or more active nests of Northern Harrier or Osprey Note: Short-eared Owl was removed from the list of species considered since it is designated Special Concern in Ontario and Canada. It is included under criterion C2 & C3.	Raptor nesting habitat may occur within study area natural features. **Candidate SWH**
Raptor Nesting Habitat (raptors associated with woodland habitats)	N/A	ORMCP TP2 (Queen's Printer for Ontario 2007a) thresholds are recommended for the Region of Peel and Town of Caledon, (i.e., the presence of one or more active nests from listed species). Listed species include: Sharp-shinned Hawk, Cooper's Hawk, Northern Goshawk, Red-shouldered Hawk, Broad-winged Hawk, Northern Saw-whet Owl, Barred Owl, and Long-eared Owl. Note: Eastern Screech-Owl was left off the list because of its common status.	Raptor nesting habitat may occur within study area natural features. **Candidate SWH**
Mink, River Otter, Marten, and Fisher Denning Sites	N/A	Based on available distribution and occurrence data, it is recommended that the following supporting habitats be considered SWH: • All River Otter, Marten and Fisher den sites (i.e., a min.10 x 10 m area around the Threshold den site); • Mink den sites in natural areas with low levels of disturbance (i.e., a min.10 x 10 m area around the den site)	Suitable habitat not present within the study area. **Not SWH**

		With respect to Mink and River Otter, it is also recommended that as much wetland and undeveloped, undisturbed shoreline is protected as possible by establishing a 30 m no-development buffer from the shoreline for a distance of up to 500 m in either direction upstream and downstream for Mink and 2 km in either direction upstream and downstream for River Otter. For Fisher, it is recommended that as many large blocks of contiguous mid-aged to mature forest as possible surrounding the den site is protected. Note: Marten is not found in the planning area.	
Habitat for Species of Conservation Concern			
Species Identified as Nationally Endangered or Threatened by COSEWIC Which Are Not Listed as Endangered or Threatened Under Ontario's *Endangered Species Act*	N/A	Based on the approved SAR/SCC list, species in this category that have records in the vicinity include: Canada Warbler Golden-winged Warbler Hooded Warbler Northern Ribbonsnake Western Chorus Frog	Canada Warbler, Hooded Warbler, Golden-winged Warbler weren't observed in original EA study area. No snake surveys have been completed within the study area to date. Northern Ribbonsnake wasn't seen during original EA. Not seen during surveys in expanded study area. Western Chorus Frog was recorded by CVC within the original EA study area, during April 2010, at the large marsh off of Mississauga Rd. near Belfountain. EA mapping also shows Chorus Frog observations along a tributary crossing Mississauga Rd. near the intersection with Olde Baseline. **Confirmed SWH for Chorus Frog** **Candidate SWH for other species**
Species Identified as Special Concern Based on Species at Risk in Ontario List that is Periodically Updated by the OMNR	N/A	Based on the approved SAR/SCC list, species in this category that have records in the vicinity include: Hart's Tongue Fern Hill's Pondweed Louisiana Waterthrush Short-eared Owl Snapping Turtle Eastern Milksnake Monarch Northern Brook Lamprey	The rare plant species weren't observed in original EA study area. The rare bird species weren't observed in original EA study area. However, additional surveys needed within expanded study area. Snapping Turtle habitat confirmed within the study area, but considered under Turtle Overwintering and Nesting Habitat. Monarchs were observed within the original EA study area in meadows south of Mississauga (see map). But

			not a significant Monarch migratory stop-over area. Northern Brook Lamprey not known from the study area. **Candidate SWH for bird species**
Species That Are Listed As Rare (S1-S3) or Historical in Ontario Based on Records Kept by the NHIC	N/A	Based on the approved SAR/SCC list, species in this category that have records in the vicinity include: Harpoon Clubtail Unicorn Clubtail Amber-winged Spreadwing Arrowhead Spiketail	Insect surveys haven't been completed within the study area to date. **Candidate SWH**
Species That Are Rare Within the Regional Municipality of Peel/Town of Caledon, Even Though They May Not Be Provincially Rare	N/A	Plants: It is recommended that Varga et al., 2005 be used to determine what species are rare in the Region of Peel and Town of Caledon. Wildlife: It is recommended that a composite TRCA/CVC list be prepared. However, CVC only has a list of species of conservation concern for birds, and that list is dated. Note: In addition, the significant species lists in Appendix A of the ORMCP TP6 should apply to areas on the ORM and should be considered during development of a wildlife list.	***Assessment not completed for plants*** Insufficient information for wildlife
Species That Are the Subjects of Recovery Programs	N/A	This criterion applies to species that are designated as Threatened, Endangered or Extirpated by COSEWIC but not Special Concern, Threatened or Endangered in Ontario. In the Region of Peel or Town of Caledon as of April 2009, this applies to: Rapids Clubtail, the Great Lakes/St. Lawrence - Canadian Shield population of Western Chorus Frog, Common Nighthawk, Whip-poor-will, Chimney Swift, Olive-sided Flycatcher, and Canada Warbler. Habitats that support any of these species in the Region or Town should be considered SWH. In addition, if any other species are subject to other recovery programs (such as Black Duck), habitats for these species should also be considered SWH. Note: COSEWIC and OMNR web sites should be checked regularly to ensure that the list of species that qualify for protection under criterion C7 is up-to-date.	These species addressed under other criteria.
Animal Movement			

Corridors			
Includes amphibian and White-tailed Deer movement corridors as well as more general animal and plant movement corridors	N/A	Thresholds for this criterion need to be developed in accordance with the Region's Greenlands System framework for both the Region of Peel and Town of Caledon and should incorporate three scales of corridors, as follows: • Primary (e.g., Niagara Escarpment) • Secondary (e.g., major river valleys) • Tertiary corridors (e.g., hedgerows) Note: While primary and secondary corridors can likely be identified and mapped at the municipal-wide scale, tertiary corridors will likely need to be identified through site-specific studies, although guidelines for their identification could be addressed in policy.	Secondary movement corridors for deer and amphibians are confirmed within the study area. Smaller tertiary movement corridors likely also exist. **Confirmed SWH**