NATURAL ENVIRONMENT
LEVEL 1 AND LEVEL 2 TECHNICAL REPORTS
&
ORMCP NATURAL HERITAGE EVALUATION
FOR PROPOSED
VICDOM BROCK ROAD PIT EXPANSION
MIDDLETON AND FEASBY PROPERTIES

UXBRIDGE, REGIONAL MUNICIPALITY OF DURHAM, ONTARIO

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Branchton, Ontario
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C03004
June 2011

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Prepared for:
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Box 1359
Uxbridge, Ontario
L9P 1N6

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COLVILLE CONSULTING INC.

June 13, 2011

Mr. Bruno Giordano
Vicdom Sand and Gravel (Ontario) Limited
Box 1359
Uxbridge, Ontario
L9P 1N6

Dear Bruno,

RE: **NATURAL ENVIRONMENT LEVEL 1 AND LEVEL 2 TECHNICAL REPORTS & ORMCP NATURAL HERITAGE EVALUATION FOR PROPOSED VICDOM BROCK ROAD PIT EXPANSION MIDDLETON AND FEASBY PROPERTIES - UXBRIDGE, REGIONAL MUNICIPALITY OF DURHAM**

I am pleased to provide you with the following report in support of your application to expand the Brock Road Pit. The report concludes a study that began over ten years ago and assesses the potential impacts on the natural heritage features and functions observed on and adjacent to the proposed pit expansion. The report meets the requirements of the Aggregate Resources Act by including both Natural Environment Level 1 and Level 2 Technical studies and the Natural Heritage Evaluation fulfills the requirements of the Oak Ridges Moraine Conservation Act.

Thank you for retaining Colville Consulting Inc. to complete these studies. Do not hesitate to contact me if you have any questions.

Sincerely yours,

Sean Colville, B.Sc., P.Ag.,
Colville Consulting Inc.

Colville Consulting Inc. 404 Queenston Street, St. Catharines, Ontario L2P 2Y2
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EXECUTIVE SUMMARY

VicDom Sand and Gravel Limited (VicDom) is applying for a Category 1, Class A License under the Aggregate Resources Act to expand its Brock Road Pit operation in the Township of Uxbridge onto adjacent lands known as the Middleton and Feasby properties. The lands to be licensed within the Middleton and Feasby properties will be referred to as "the Site". The Site is considered to be an expansion of VicDom's existing Brock Road Pit and includes both above and below water table extraction. Lands within the Middleton and Feasby properties that include the Site and lands outside of the Site but within the property boundaries will be referred to throughout this document as the "Subject Lands". The Proposed Vicdom Brock Road Pit Expansion is predominantly located in the Countryside Area of the Oak Ridges Moraine Conservation Plan (O. Reg. 140/02). A small portion of the Middleton property outside of the Site is mapped as Natural Core Area. These lands were excluded from the Site at the request of the Ontario Ministry of Natural Resources (OMNR). The Natural Core Area is also mapped immediately to the west and south of the Site. This report combines the results of the Level 1 and Level 2 Natural Environment Technical Reports, as required by the Aggregate Resources Act (ARA, 1990), the Natural Heritage Evaluation study required by the Oak Ridges Moraine Conservation Act (ORMCA, 2001), and the Region of Durham Official Plan (2008).

The collection and analysis of natural heritage information began in 2000 and continued in subsequent years culminating in the spring of 2011. The initial background information and early site visits identified a provincially significant wetland complex and potentially significant woodlands and significant wildlife habitat. More detailed analysis of these and other natural heritage features, as defined in the Provincial Policy Statement (2005) and the Oak Ridges Moraine Conservation Plan (ORMCP) (i.e., Key Natural Heritage Features & Key Hydrologically Sensitive Features), confirmed that significant wetlands are located on and adjacent to the Site. The study also determined that a small part of a significant woodland is located on the Site. The majority of the significant woodlands are identified on adjacent lands immediately abutting the Site. Two locally significant species were identified on the Site and their habitat may be considered significant wildlife habitat.

The proposed extraction limits are defined and will not encroach within the 30 m vegetation protection zones identified for each of the Key Natural Heritage Features (KNHF). For the most part, extraction limits will not encroach within the separation areas identified between KNHFs and Core Natural Areas. Where the extraction limits do encroach within the identified separation areas, the impact will be minor and rehabilitation within the separation area following extraction will establish a naturalized corridor to improve the connectivity between the KNHFs and Core Natural Areas.

No habitat of endangered, rare and threatened species, fish habitat, Areas of Natural and Scientific Interest (ANSI), significant valleylands, sand barrens, savannahs and tall grass prairies were identified on the Site. One area was identified as provincially vulnerable species habitat. This area may be considered significant wildlife habitat, however, the area is not within the proposed extraction limits although it is on the Site. More recent analyses identified the potential for endangered or threatened species to occur on or adjacent to the Site. Presence of the Bobolink, which has been identified as a threatened species nationally and provincially, has been confirmed on the Site. After analysis of the habitat requirements of this species and a comparison with the existing habitat and projected natural succession, it was concluded that the Site does not provide significant habitat for this species.

The threatened western chorus frog was found in two ponds on the Site. These ponds are considered significant habitat for this species. Presence of resident and nesting snapping turtles was confirmed in the ORM right-of-way south of the Site and within the Site. Habitat for this species is considered significant

habitat of a rare species. The habitats for these species will be protected and maintained. The extraction limits will not encroach within at least 30 m of significant wildlife habitat.

Extraction is not expected to have an impact on the regional groundwater table system as determined by Genivar Consultants (formerly Jagger Hims Limited) in their Proposed Vicdom Brock Road Pit Expansion Middleton and Feasby Properties Hydrological Assessment (May 2011). In some cases, sand and gravel extraction will reduce the size of subcatchment areas contributing to the wetland features, ponds and both the perched groundwater table. This will result in a reduction of the volume of water reaching the ponds and wetland features through surface flow and infiltration. However, it is expected that these features will still receive annual surpluses and Genivar has determined that the reduction of the subcatchment areas will have a negligible effect on the water levels in the ponds and wetland areas. The Performance Monitoring Program proposed by Genivar has identified mitigation measures that will address any unexpected impacts in water levels.

The proposed rehabilitation plan includes the creation of both deep water and shallow water aquatic habitat, marsh and shallow open water (sloughs) wetland habitats and open grassland terrestrial habitat. Habitat for one provincially significant species, the snapping turtle, and eight locally significant species, the Clay-colored Sparrow (*Spizella pallida*), Sprengel's sedge (*Carex sprengelii*), Common coontail (*Ceratophyllum demersum*), Silky dogwood (*Cornus amomum* ssp. *obliqua*), Variegated horsetail (*Equisetum variegatum*), Spotted Cranesbill (*Geranium maculatum*), Black Walnut (*Juglans nigra*) and Bristly Crowfoot (*Ranunculus pensylvanicus*) will be maintained on the Site and potentially increased following rehabilitation efforts. The Bobolink, which is listed as Threatened by COSSARO, was observed on the Site, however, the habitat is marginal (active hay field). The rehabilitation plans will include an open grassland component which may provide better habitat for this species.

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1. INTRODUCTION

1.1 Purpose of Report

Colville Consulting Inc. was retained by Genivar on behalf of VicDom Investments Limited (VicDom) to complete a Natural Environment Level 1 and Level 2 Technical Report as required under the Aggregate Resources of Ontario Provincial Standards for Category 1 Applications, and to complete a Natural Heritage Evaluation as required under the Oak Ridges Moraine Conservation Plan (ORMCP) for the proposed expansion of VicDom's Brock Road Pit.

VicDom is applying for a Category 1, Class 'A' licence for the expansion as required under the Aggregate Resources of Ontario Provincial Standards. A Category 1, Class 'A' licence is required for a pit operation intending to extract more than 20,000 tonnes of aggregate material annually from below the water table. This study was prepared to meet the requirements of the Aggregate Resources Act (1990) and the Oak Ridges Moraine Conservation Act (2001), and the policies of the Region of Durham's Official Plan (2008).

The Subject Lands, shown on Figure 1, is located in the west half of Lots 10 and 11, Concession 4, in the Township of Uxbridge, Regional Municipality of Durham and part of the Road Allowance between Lots 10 and 11, known as the Middleton property; and in the east half Lot 11, Concession 4, in the Township of Uxbridge, Regional Municipality of Durham known as the Feasby property. The area proposed to be licensed includes a 41.8 hectare parcel that is part of the Middleton property and a 7.3 hectare parcel that is part of the Feasby property. These lands are owned by VicDom and its' related companies and the total area is approximately 49.1 hectares. The collective areas that are proposed to be licensed are referred to as the "Site" throughout this document. The Subject Lands when referred to in this document include the Site and lands outside of the Site but within the Middleton and Feasby property boundaries. The majority of detailed field inventories were completed for the entire Subject Lands and in some cases on adjacent properties.

The Subject Lands are located within the Oak Ridges Moraine Conservation Plan (ORMCP) area and the majority of the lands are located in the Countryside Area land use designation. Aggregate extraction is a permitted use in the Countryside Area under the ORMCP. A small area in the western portion of the Subject Lands but outside of the Site is located within the Natural Core Areas. Aggregate extraction is not a permitted use in this land use designation and no aggregate extraction is proposed for this area. As a result of a specific request from the Ontario Ministry of Natural Resources (OMNR), the Cores Areas have been excluded from the proposed licensed area under application.

The proposed aggregate extraction expansion includes both above and below water table extraction. Where extraction occurs below the water table, a large pond several metres deep will be created which will be an extension of the existing pond created by extraction activities on the lands immediately to the north (i.e., VicDom's existing Brock Road pit). In those areas where extraction activities are proposed above the water table the rehabilitation plan proposes a combination of new shoreline and wetland habitats, upland habitats and naturalized areas established between existing natural features that will function as wildlife corridors.

1.2 Existing Conditions

The majority of the Subject Lands include both active agricultural uses and abandoned agricultural areas. The agricultural portion is actively cultivated by a local farmer. Annual crops such as corn, soybean and cereal grains are grown in rotation while forage crops (alfalfa) are also grown on portions of the Middleton property. The abandoned agricultural areas consist predominantly of old field vegetation

species. In addition, there are small areas of wetland communities and open ponds. The lands include both undulating and hummocky topography consisting of morainal and glaciofluvial deposits.

The ownership of the unopened road allowance between lots 10 and 11 in the west half of Concession 4 was transferred from the Township of Uxbridge to VicDom Sand & Gravel Ltd. and a 13.5 metre wide corridor along the south and east boundaries of the Middleton property was transferred by VicDom to the Township for the Oak Ridges Moraine Trail System.

1.3 Environmental Policy Context

1.3.1 Provincial Policy Statement

The Provincial Policy Statement (PPS) was issued under Section 3 of the Planning Act, and came into effect on May 22, 1996. The PPS was updated in 1997 and more recently in 2005. It applies to all applications submitted after March 1, 2005 and states that decisions affecting planning matters "shall be consistent with" policy statements issued under the Act. This report deals specifically with the Policies contained in Part V, Section 2 of the PPS which is directed at protection and management of natural heritage resources.

The PPS states that natural features and areas shall be protected for the long term. Natural heritage features include:

- significant habitat of endangered species and threatened species;
- significant wetlands;
- significant coastal wetlands;
- significant woodlands south and east of the Canadian Shield;
- significant valleylands south and east of the Canadian Shield;
- significant wildlife habitat;
- significant areas of natural and scientific interest; and
- fish habitat.

Development and site alteration is not permitted in:

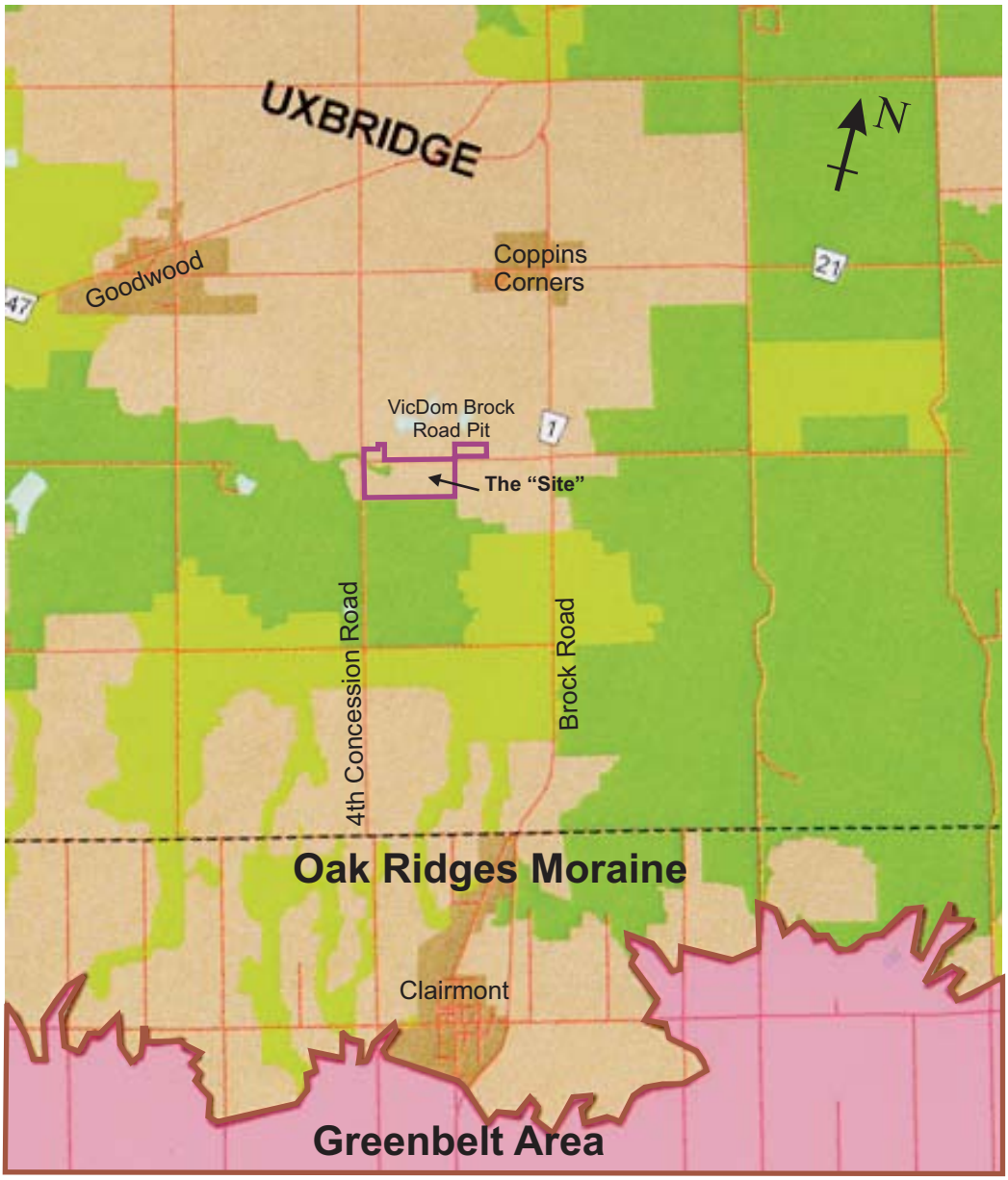
- significant habitat of endangered species and threatened species;
- significant wetlands in Ecoregions 5E, 6E and 7E; and
- significant coastal wetlands.

Development and site alteration is permitted in:

- significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E and 7E;
- significant woodlands south and east of the Canadian Shield;
- significant valleylands south and east of the Canadian Shield;
- significant wildlife habitat; and
- significant areas of natural and scientific interest.

Where it can be demonstrated that there will be no negative impacts on the natural features or their ecological functions, development and site alteration is also permitted in fish habitat but only in accordance with provincial and federal requirements.

Development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified above unless the ecological function of the adjacent lands has been evaluated and it



Oak Ridges Moraine Conservation Plan

Land Use Designations

- Natural Core Areas
- Natural Linkage Areas
- Countryside Areas
- Rural Settlement
- Greenbelt Areas
- Subject Lands

0 1 2 Kilometers

Approximate Scale 1:80,000

FIGURE 1
Location Map

Proposed Brock Road Pit Expansion

Prepared for:

VicDom Sand & Gravel Ltd.

Prepared by: COLVILLE CONSULTING INC.

DATE: June 2011

FILE: C03004_01

Source: Oak Ridges Moraine Conservation Plan Land Use Designation Map - Map 5. Ministry of Natural Resources & Ministry of Municipal Affairs and Housing

has been demonstrated that there will be no negative impacts on the natural heritage features or on their ecological functions.

Development must ensure that "the diversity and connectivity of natural features in an area, and the long term ecological function and biodiversity of natural heritage systems", are maintained, restored or where possible, improved, recognizing that "there is a linkage between and among natural heritage features and areas, surface water features, and ground water features".

1.3.2 Aggregate Resources Act

The *Aggregate Resources Act* (ARA) was proclaimed law on January 1, 1990 and regulates the extraction of mineral aggregates. The purposes of the ARA are:

(a) to provide for the management of the aggregate resources of Ontario;

(b) to control and regulate aggregate operations on Crown and private lands;

(c) to require the rehabilitation of land from which aggregate has been excavated; and

(d) to minimize adverse impact on the environment in respect of aggregate operations (R.S.O. 1990, c. A.8, s. 2).

The *Aggregate Resources of Ontario - Provincial Standards* were developed to support the ARA as amended by *Bill 52*, the *Aggregate and Petroleum Resources Statute Law Amendment, 1996*. The Standards apply to aggregate operations that are going through the licensing or permitting process and provide the minimum requirements for a licence application, including the report standards such as the Natural Environment Level 1 and Level 2 Technical Reports.

Level 1 Natural Environment Technical Reports

A Natural Environment Level 1 study determines whether any of the natural heritage features as defined by the PPS are located on and/or within 120 metres of the Site. The Level 1 analysis is based primarily on a review of background information and may be supplemented by site inventories.

Level 2 Natural Environment Technical Reports

A Natural Environment Level 2 study consists of an impact assessment for those natural heritage features located on and/or within 120 metres of the Site as identified in the Natural Environment Level 1 study. This study determines the impact of the proposed aggregate extraction on the natural features or ecological functions for which the area is identified, and includes any proposed preventative, mitigative, or remedial measures recommended that would avoid or limit impacts.

1.3.3 Greenbelt Plan

The Subject Lands are located within the Greenbelt Plan area. The Greenbelt Act, 2005, designates an area of land as Greenbelt Area and establishes the Greenbelt Plan (February 28, 2005) which identifies a broad band of permanently protected lands. The Greenbelt Plan:

"protects against the loss and fragmentation of the agricultural land base and supports agriculture as the predominant use;

gives permanent protection to the natural heritage and water resource systems that sustain ecological and human health and that form the environmental framework around which major urbanization in southern Ontario will be organized; and

provides for a diverse range of economic and social activities associated with rural communities, agriculture, tourism, recreation and resource use."

The Greenbelt Plan "includes lands within, and builds upon the ecological protections provided by, the Niagara Escarpment Plan and the Oak Ridges Moraine Conservation Plan". The policies of the Oak Ridges Moraine Conservation Plan apply to those Greenbelt lands located within the Oak Ridges Moraine Conservation Plan area.

1.3.4 Oak Ridges Moraine Conservation Act

The *Oak Ridges Moraine Conservation Act, 2001* was enacted to establish a land use plan to guide development on the Oak Ridges Moraine, manage its natural resources, and protect its diverse significant natural heritage and water resource features. Decisions on planning and development applications that commenced on or after November 17, 2001 are required to conform to the *Oak Ridges Moraine Conservation Plan* (ORMCP).

The ORMCP is an ecologically based plan developed for the 190,000 ha of land and water within the Moraine. The Plan divides the Moraine into four land use designations which include:

Natural Core Areas: Lands with the greatest concentrations of key natural heritage features which are critical to maintaining the integrity of the Moraine as a whole. Only existing uses and very restricted new resource management, agricultural, low intensity recreational, home businesses, transportation and utility uses are allowed in areas designated as Natural Core.

Natural Linkage Areas: Lands that protect critical natural and open space linkages between the Natural Core Areas and along rivers and streams. The only uses that are allowed on lands designated as linkage areas are those allowed in Natural Core Areas, plus some aggregate resource operations.

Countryside Areas: Lands that provide an agricultural and rural transition and buffer between the Natural Core and Natural Linkage Areas and the urbanized Settlement Areas. Prime agricultural areas as well as natural features are protected. Most of the uses typically allowed in agricultural and other rural areas are allowed here including most aggregate extraction operations. Rural Settlements are also delineated within Countryside Areas which are existing hamlets or similar small, generally long-established communities that are identified in official plans.

Settlement Areas: Lands that include a range of existing communities planned by municipalities to reflect community needs and values. Urban uses and development as set out in municipal official plans are allowed.

Key Natural Heritage Features and Sensitive Hydrological Features

The ORMCP identifies eight Key Natural Heritage Features (KNHF) and four Hydrologically Sensitive Features (HSF). Earth science Areas of Natural and Scientific Interest (ANSI) are not identified as a KNHF or HSF.

Key Natural Heritage Features (KNHF)

1. Wetlands
2. Significant portions of the habitat of endangered, rare, and threatened species;
3. Fish habitat;
4. Areas of Natural and Scientific Interest (life science);
5. Significant valleylands;
6. Significant woodlands;

7. Significant wildlife habitat;
8. Sand barrens, savannahs, and tallgrass prairies

Hydrologically Sensitive Features (HSF)

1. Wetlands;
2. Kettle Lakes;
3. Permanent and intermittent streams; and
4. Seepage areas and springs.

Each of the KNHFs and HSFs has a minimum vegetation protection zone that generally extends a minimum of 30 metres from the KNHF/HSF or as determined by a natural heritage evaluation (Table 1, Appendix A). "Development and site alteration within a key natural heritage feature [Section 22 (2)] or HSF [Section 26 (2)] within the related minimum vegetation protection zone is generally prohibited, except the following:

1. Forest, fish, and wildlife management;
2. Conservation and flood or erosion control projects, but only if they have been demonstrated to be necessary in the public interest after all alternatives have been considered;
3. Transportation, infrastructure, and utilities as described in Section 41 of the ORMCP, but only if the need for the project has been demonstrated and there is no reasonable alternative; or
4. Low-intensity recreational uses as described in Section 37 of the ORMCP."

The minimum area of influence and minimum vegetation protection zone for a particular KNFH or HSF is discussed under Section 21 of the ORMCP and described in Table 1 of Appendix A. There is a 120 metre minimum area of influence associated with each of the KNHFs and HSFs and 50 metres for an earth science ANSI. A natural heritage evaluation and hydrological evaluation is required for development proposals or site alterations within the minimum area of influence of a KNHF (i.e. 120 m) or HSF but that are outside of the KNHF or HSF itself and related minimum vegetation protection zone. The natural heritage evaluation for a KNHF is described in Section 23 (Appendix A) and hydrological evaluation in Section 26 of the ORMCP. A hydrological evaluation was completed by Genivar and therefore not discussed in detail in this report.

Natural Heritage Evaluation

Section 23 of the ORMCP states that "a natural heritage evaluation shall,

(a) demonstrate that the development or site alteration applied for will have no adverse effects on the key natural heritage feature or on the related ecological functions;

(b) identify planning, design and construction practices that will maintain and, where possible, improve or restore the health, diversity and size of the key natural heritage feature and its connectivity with other key natural heritage features;

(c) in the case of an application relating to land in a Natural Core Area, Natural Linkage Area or Countryside Area, demonstrate how connectivity within and between key natural heritage features will be maintained and, where possible, improved or restored before, during and after construction;

(d) if the Table to this Part specifies the dimensions of a minimum vegetation protection zone, determine whether it is sufficient, and if it is not sufficient, specify the dimensions of the required minimum vegetation protection zone and provide for the maintenance and, where possible, improvement or restoration of natural self-sustaining vegetation within it;

(e) if the Table to this Part does not specify the dimensions of a minimum vegetation protection zone, determine whether one is required, and if one is required, specify the dimensions of the required minimum vegetation protection zone and provide for the maintenance and, where possible, improvement or restoration of natural self-sustaining vegetation within it; and

(f) in the case of a key natural heritage feature that is fish habitat, ensure compliance with the requirements of the Department of Fisheries and Oceans (Canada)."

The "ORMCP Technical Paper 8 - Preparation of Natural Heritage Evaluations for All Key Natural Heritage Features" (Final Draft, February, 2004) provides guidelines for assessing the impact of development and site alteration on KNHFs and demonstrates how the requirements of Section 23 of the ORMCP can be met.

Mineral Aggregate Policies

Specific land use policies have been developed for the mineral aggregate industry and are contained in Section 35 of the ORMCP. These policies are provided in Appendix A.

1.3.5 Durham Regional Official Plan

The existing VicDom Brock Road Pit and the proposed expansion are identified as an area of high potential aggregate resources within the Oak Ridges Moraine Conservation Plan Area in Schedule D – High Potential Aggregate Resource Areas of the Durham Regional OP (2008).

Section 2.3.42 states, "Any proposal for development or site alteration in proximity to key natural heritage or hydrological features, or which may have major environmental impacts, the Region, in consultation with the respective area municipality, shall select and retain a qualified environmental consultant to prepare an EIS at the expense of the proponents."

Section 2.3.42 also states, "For aggregate resource extraction proposals, and EIS as required by the Aggregate Resources Act may be prepared by the proponent."

Section 10, subsection 10B deals specifically with the Greenlands System within the Oak Ridges Moraine Areas. Section 10B.2.6 states, "development and site alteration shall be prohibited within key natural heritage features and hydrologically sensitive features and their related minimum vegetation protection zone."

Section 10B.2.10 states, "Notwithstanding Policy 10B.2.6, an application for a mineral aggregate operation or wayside pit with a key natural heritage feature may be approved if the key natural heritage feature is occupied by young plantations or early successional habitat, and the specific requirements of the Oak Ridges Moraine Conservation Plan are fulfilled."

1.4 Report Outline

This report combines three separate studies into one. It addresses the ARA by including the Natural Environment Level I and II Technical Reports, and it addresses the ORMCP by completing a Natural Heritage Evaluation.

The report is provided in two parts. Part I of this study presents the Natural Environment Level 1 Technical Report as per the requirements of the ARA. This study was initiated in 2000 prior to the enactment of the *Oak Ridges Moraine Conservation Act (2001)*. However, in addition to fulfilling the requirements of the ARA it also incorporates the first four steps of a natural heritage evaluation as required under the ORMCP. The Level 1 Technical Report evaluation concluded that a Level II Technical Report was required. The results also demonstrated that a Natural Heritage Evaluation was required as per the ORMCP.

Part II of the report combines the Natural Environment Level 2 Technical Report and the Natural Heritage Evaluation which is required for all aggregate applications within the ORMCP area.

PART I:

NATURAL ENVIRONMENT LEVEL 1 TECHNICAL REPORT

1. NATURAL ENVIRONMENT LEVEL 1 TECHNICAL REPORT

The Natural Environment Level 1 Technical Report identifies the key natural heritage features on and adjacent to the Subject Lands as documented in the background material listed below and following two site visits.

1.1 Background Review

The initial background review for the Natural Environment Level 1 Technical Report was completed nearly a decade ago and included:

- Oak Ridges Moraine Aggregate Resource Study, Oak Ridges Moraine Planning Background Study 10 (ORMAC, 1994);
- Environmentally Significant Areas Study (TRCA, 1982);
- Map 1 Natural Heritage Features Oak Ridges Moraine Greater Toronto Area Portion (OMNR, 2000);
- The Regional Municipality of Durham Official Plan (Durham Region, 1999);
- Goodwood – Glasgow Wetland Complex Evaluation (OMNR, 1993); and
- Implementation Guidelines: Provincial Interest on the Oak Ridges Moraine Area of the Greater Toronto Area (OMNR, 1991).

Subsequent to our initial work, the Natural Environment Level 1 Technical Report was updated and other information sources were accessed and reviewed. For example, the Natural Heritage Information Centre (NHIC) database was accessed on several occasions and most recently in October 2009 to search for records of provincially significant elements in the vicinity of the study area. In addition, the second Ontario Breeding Bird Atlas (Cadman et al., 2007) was reviewed to determine if any significant bird species had been documented breeding in the general vicinity of the Subject Lands. Fisheries habitat information for West Duffin's Creek was obtained from local Ontario Ministry of Natural Resources (OMNR) files and from the Toronto Region Conservation Authority (TRCA).

1.2 Field Studies

The field data gathered for the initial Natural Heritage Level 1 Technical Report was obtained during two separate field visits to survey the natural heritage features on and adjacent to the proposed Middleton Pit. These surveys were conducted on the following dates.

- July 19, 2000 - breeding bird survey
- August 3, 2000 - late summer botanical inventory and vegetation mapping
- May 17, 2001 – breeding bird and botanical inventory

The biological inventories conducted as part of the Level 1 Technical Report included a breeding bird inventory (July 19, 2000) and a botanical inventory (August 3, 2000). Additional inventories were completed (botanical and breeding bird) on May 17, 2001 to supplement the earlier data and to further investigate the potential for provincial significance for the woodlot and wildlife habitat.

Inventories of wildlife were compiled from distinctive sounds and signs during field visits. The inventories were carried out by systematically covering the area on foot to ensure a thorough survey of species and communities. A conservative approach to estimating breeding status was taken; all bird species seen or heard singing in suitable habitat were assumed to be breeding.

Prior to visiting the site, vegetation communities were identified on and adjacent to the Subject Lands through interpretation of digital ortho-imagery (1990) at a scale of 1:10,000. This interpretation was used to generate preliminary maps of vegetation polygons that could be ground-truthed during the field investigations. Each vegetation unit was characterized using the standardized Ecological Land Classification (ELC) System (Lee et al., 1998). For the purpose of this study, each unit was assessed as a separate vegetation unit. Wetland indicator plants listed in the Ontario Wetland Evaluation System - Southern Manual (OMNR, 1993) were used in the demarcation of wetland community boundaries. Wetness Index values (Oldham et al., 1995) were also applied to all species recorded on the property to assist in the identification and delineation of potential wetland habitats.

The botanical fieldwork consisted of systematically cruising the Subject Lands and adjacent lands to ensure a thorough survey of plant species and vegetation communities. Plants that could not be identified in the field were collected for more detailed examination in the laboratory. Nomenclature used in this report follows the Ontario Plant List (Newmaster et al., 1998) for both common and scientific names. Authorities for scientific names are given in Newmaster et al. (1998).

2. ANALYSIS

The Level 1 evaluation of the Subject Lands was initiated in 2000, prior to the enactment of the *Oak Ridges Moraine Conservation Act, 2001.* Therefore the analysis of this report is based on the requirements of the Provincial Standards of the ARA and the definitions of natural heritage features as described in the *Provincial Policy Statement* (PPS, 1997) and the Natural Heritage Reference Manual (OMNR, 1999). The requirements of the *Oak Ridges Moraine Conservation Act* and the 2005 PPS are addressed in Part II of this report. The following summarizes the Key Natural Heritage Features identified on the Subject Lands in the Level 1 analysis.

2.1 Significant Wetlands

Development is not permitted within significant wetlands south and east of the Canadian Shield according to Section 2.1.3 of the PPS (2005). Development may occur on adjacent lands (e.g. lands within 120 metres) of a significant wetland provided that it can be demonstrated that there will be no negative impacts on the features or ecological functions for which the area is designated (PPS, 2005).

The preliminary evaluation based on large scale OMNR wetland mapping determined that the Subject Lands are potentially within and adjacent to a provincially significant wetland (PSW). The NHIC search identified that a portion of the Subject Lands including the Site is included within part of the Goodwood Glasgow Provincially Significant Wetland Complex. The North Glasgow Area Wetland ESA, which is part of the Goodwood Glasgow PSW Complex, is within 120 metres of the north western boundary of the Site. There are also several small areas on and adjacent to the Site (Figure 2) that have been included as part of the wetland and designated as PSW.

Field observations confirm that wetlands features are located on and adjacent to the Subject Lands and the Site, however, their extent is much less than shown on the large scale OMNR wetland mapping.

Wetlands are identified as KNHFs in the ORMCP (O. Reg. 140/02). This will be discussed further in Part 2 of this report.

2.2 Significant Portions of the Habitat of Endangered and Threatened Species

Development is not permitted within the significant portions of the habitat of endangered or threatened species, but may occur on adjacent lands if it can be demonstrated that there will be no negative impacts. Adjacent lands are defined as 50 metres from the significant portions of the habitat, or more species-specific adjacent lands defined by the OMNR.

The initial Level 1 analysis did not identify any endangered or threatened species on, or adjacent to the Subject Lands. More recent background information and field analyses, however, have confirmed the presence of endangered, rare, and threatened species on and adjacent to the Site. RiverStone Environmental Solutions Inc. (2010) prepared a screening of the Subject Lands and surrounding area for the potential for endangered and threatened species and determined that there was the potential for five endangered and threatened species to occur in the general vicinity of the Site (Butternut, Acadian Flycatcher, Henslow's Sparrow, Whip-poor-will, and Chimney Swift). In addition, two other threatened species (Bobolink and western chorus frog) have been confirmed as being present on the Site. Following the completion of the initial Level I report, the status of the snapping turtle, which occurs on the Site, was upgraded to special concern; so its habitat has the potential to qualify as the significant portion of a rare species.

2.3 Fish Habitat

No fish habitat was identified on or immediately adjacent to the Subject Lands (i.e., within 120 m). The man-made ponds identified on site do not appear to contribute to the headwaters of any nearby watercourses. No surficial drainage features (creeks, seepage areas, etc.) were observed on the Subject Lands.

2.4 Significant Woodlands

The PPS states that development may occur in and adjacent to significant woodlands if it can be demonstrated that there will be no negative impacts to the woodlands or its functions.

Designation of significant woodlands is the responsibility of municipal planning authorities. If municipal Official Plans were last approved before the PPS came into effect, woodlands should be examined in light of the criteria in the Natural Heritage Reference Manual to determine if they qualify as significant woodlands. However, if the Official Plans were last approved after implementation of the PPS, designations in the Official Plan take precedence over the recommendations in the Natural Heritage Reference Manual. The municipality has decided not to consider individual woodlands, or any woodlands, as significant; a decision that has been approved under the PPS.

At the time this Level 1 Natural Environment Technical Report was prepared, the Toronto and Region Conservation Authority (TRCA) and Regional Municipality of Durham had not officially designated any Significant Woodlands on or adjacent to the Subject Lands. The 1982 ESA study completed by the Metropolitan Toronto and Region Conservation Authority did not identify any woodlands on or adjacent to the study area as significant. The recommended approach for the Evaluation of Significant Woodlands in the Natural Heritage Resource Manual suggests that where woodland cover is between 15-30% of the land cover, woodlands 40 ha in size or larger, and preferably 300 metres in minimum width, should be considered for significance. The Regional Municipality of Durham has approximately 22% forest cover (Riley and Mohr, 1994). There are woodlands located adjacent to the Site (east half of Lot 10) which are approximately 6.0 ha in size. Therefore, based on the identification and evaluation criteria in the Natural Heritage Reference Manual (1999), the site would not qualify as significant woodland using the “size” criteria. This woodlot is shown in Figure 2.

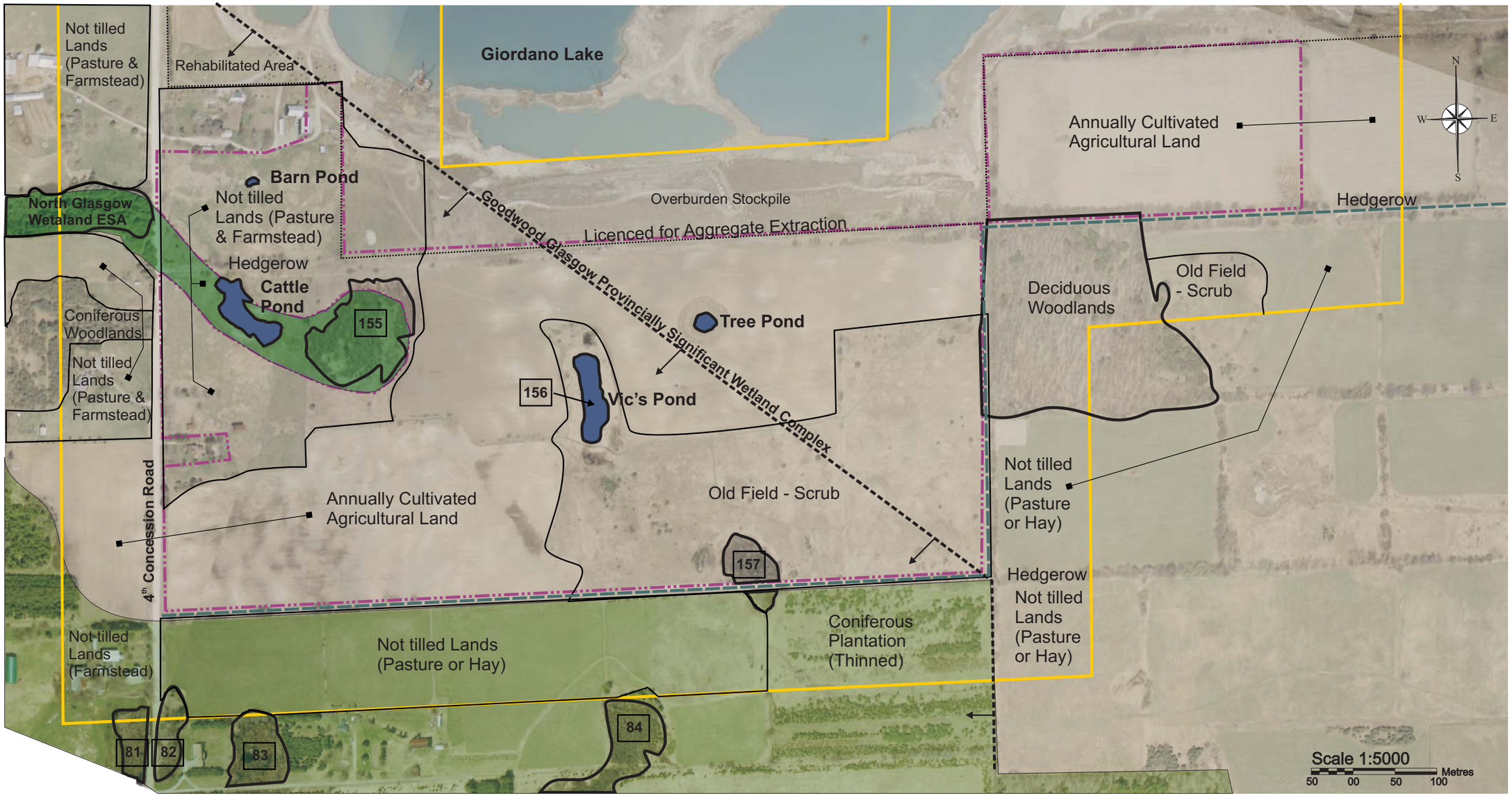
Field investigations were not conducted throughout the entire woodlot east of the Site and as such the status of the remaining significant woodlands evaluation criteria, namely ecological function, uncommon characteristics and economic and social values, was not considered as part of the Level 1 analysis.

A more detailed analysis of the woodland east of the Site is provided in Part II of this report, including the criteria used to designate significant woodlands on lands in the ORMCP area.

2.5 Significant Valleylands

The PPS states that development may occur in and adjacent to significant valleylands if it can be demonstrated that there will be no negative impacts to the valleylands or its functions. Significant valleylands can be generally described as natural areas in a valley landform that has water flowing through or standing for some period of the year and which is ecologically important in terms of its features, functions and representation or amount. Significant valleylands contribute to the quality and diversity of an identifiable geographic area or natural heritage system.

The identification and evaluation of significant valleylands is the responsibility of OMNR. The background information provided by the OMNR did not identify any portion of the Subject Lands or the adjacent lands as significant valleylands. The TRCA and Regional Municipality of Durham have not



LEGEND

- # — Ministry of Natural Resources - Wetland Identification Number
- Licenced Limits
- 120 m limits surrounding Proposed Middleton Pit
- Oak Ridges Trail
- Open Water (Pond)
- Core Natural Areas
- Subject Lands - Proposed Licenced Boundary

FIGURE 2
Natural Heritage Features & Existing Conditions

Proposed Brock Road Pit Expansion

Prepared for:
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Prepared by: COLVILLE CONSULTING INC.

DATE: June 2011

FILE: C03004_02

officially designated any significant valleylands on or adjacent to the site. There are no features on site that are likely to meet the definition of significant valleylands, therefore it is not an issue for concern.

2.6 Significant Wildlife Habitat

The PPS states that development may occur in and adjacent to significant wildlife habitat if it can be demonstrated that there will be no negative impacts to the habitat or its functions.

Significant wildlife habitat is one of the more complicated natural heritage features to identify and evaluate. The Natural Heritage Reference Manual (OMNR, 1999; 2010) is a general reference tool that includes criteria and guidelines for designating significant. The Significant Wildlife Habitat Technical Guide (SWHTG) (OMNR, 2000) is a detailed technical manual that provides recommended approaches for identifying, describing and prioritizing significant wildlife habitat.

There are four general types of significant wildlife: migration corridors, seasonal concentration areas, rare or specialized habitat, and species of conservation concern. These are discussed in more detail below.

Migration corridors are linear habitats that are traditionally used by wildlife to move to one habitat from another. This is usually in response to different seasonal habitat requirements. Some examples are trails used by deer to move to wintering areas, and areas used by amphibians between breeding and summering habitat.

Seasonal concentration areas are those sites where large numbers of a species gather together at one time of the year, or where several species congregate. The following is a partial list of numerous potential examples: deer yards, amphibian breeding ponds, snake and bat hibernacula, waterfowl staging and moulting areas, raptor roosts, bird nesting colonies, shorebird staging areas, and passerine migration concentrations. Only the best examples of these concentration areas are usually designated as significant wildlife habitat. Areas that support a species at risk, or if a large proportion of the population may be lost if the habitat is destroyed, are examples of seasonal concentration areas which should be designated as significant.

Rare or specialized habitats are two separate components. Rare habitats are those with vegetation communities that are considered rare in the province. In Ontario, sub-national ranks (S-ranks) for species and vegetation communities are assigned by the Natural Heritage Information Centre (NHIC), and are part of a system developed under the auspices of the Nature Conservancy (Arlington, VA). NHIC definitions of the most common S-ranks are provided below.

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

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

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

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

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

Generally, community types with S-ranks of S1 to S3 (critically imperiled to vulnerable in Ontario), as defined by the NHIC, could qualify as significant wildlife habitat. It is assumed that these habitats are at risk and that they are also likely to support additional wildlife species that are considered significant.

Specialized habitats are microhabitats that are critical to some wildlife species. Potential examples include moose aquatic feeding areas, salt licks for ungulates, and groundwater seeps for wild turkeys. In total, the SWHTG identifies 14 different specialized habitats for wildlife.

Species of conservation concern includes three types of species: those that are rare, those whose populations are significantly declining, and those with a large proportion of their global population in Ontario. Rare species are considered at five levels: globally rare, nationally rare (with designations by the Committee on the Status of Endangered Wildlife in Canada [COSEWIC]), provincially rare, regionally rare (at the Site Region level); and locally rare (in the municipality or Site District). The priority for protection is highest for globally rare species and lowest for locally rare species.

No globally or regionally rare species were identified on the Subject Lands. One locally rare species was observed on site (Ditch stonecrop), therefore it was determined that there is some potential for portions of the Site to be considered significant wildlife habitat. Subsequent to our initial findings, we have determined that there is limited or marginal habitat for provincially vulnerable and threatened species on and adjacent to the Subject Lands. At this time, there are also eight locally rare species that have been observed on and adjacent to the Subject Lands. Part II of the study will address the potential for the presence of significant wildlife habitat on and adjacent to the Subject Lands in more detail.

2.7 Significant Areas of Natural and Scientific Interest

The PPS states that development may occur in and adjacent to an ANSI if it can be demonstrated that there will be no negative impacts to the natural features or the ecological functions for which the area is defined.

No significant areas of natural and scientific interest (ANSI) have been designated by the OMNR on or adjacent to the Subject Lands. This was confirmed through a review of the NHIC database.

3.0 SUMMARY AND CONCLUSIONS

3.1 Initial Level 1 Technical Report

Table 1 summarizes the natural heritage features that were identified on and adjacent to the Subject Lands. The summary is based on the information gathered during our initial background review and site visits. More detailed evaluation and additional information regarding these features is provided in Part II of the report.

Table 1: Summary of Natural Heritage Features

Natural Heritage Feature	On or Adjacent to the Subject Lands?	Discussion
Significant Wetlands	**Yes**	portions of the Subject Lands, including the Site, are within the Goodwood-Glasgow PSW Complex the North Glasgow Area Wetland ESA is within 120 metres of the Site
Significant portions of the habitat of endangered and threatened species	No	no records from the Natural Heritage Information Centre or from fieldwork
Fish Habitat	No	no fish habitat on or adjacent to the Site
Significant Woodlands	**Potentially**	the forested area to the east of the Site is smaller than the minimum recommended size for significance woodlot provides some ecological functions woodland characteristics (common or uncommon) are not known economic and social values of woodlot are not known
Significant Valleylands	**No**	no valleylands on or adjacent to site
Significant ANSI's	**No**	no ANSI's on or adjacent to site
Significant Wildlife Habitat	**Potentially**	presence of significant migration corridors, seasonal concentration areas, rare or specialized habitats is not known locally rare species of conservation concern is present provincially vulnerable species of conservation concern habitat present Level 2 Technical Report provides species lists

Aggregate extraction can result in changes to groundwater regimes and may have a negative impact on the wetland features identified on site and in the surrounding area. Potential change to the groundwater regimes as a result of aggregate extraction is addressed in Part II of the report and is based on the hydrogeological investigations completed by Genivar (Middleton Pit Hydrological Application Assessment, Uxbridge, Regional Municipality of Durham, January 2010).

The Natural Environment Level 1 technical report determined that there are Provincially Significant Wetlands on and adjacent to the Subject Lands including the Site, and there are potentially Significant Woodlands and Significant Wildlife Habitat on and adjacent to the Subject Lands and Siteite. There are no significant portions of the habitat of endangered and threatened species, significant valleylands, or ANSI's located on or adjacent to the Subject Lands. Fish habitat is also absent from the Subject Lands. Based on these findings, the ARA requires the completion of a Natural Environment Level 2 technical report to address the potential impacts of extraction on the natural heritage features identified above. The Natural Environment Level 2 Technical Report is provided in Part II of this report. Part 1 of this study also determined that because of the presence of these KNHFs, a natural heritage evaluation is required as per the requirements of the ORMCP. Part II of this report fulfils this requirement.

3.2 Update to the Level 1 Report

The initial Level 1 Technical Report was completed almost a decade ago. Since then, several new species have been designated endangered or threatened. As a result of these new designations, more recent background searches of databases, and current fieldwork, it has been concluded that there is potential for the Site or adjacent lands to support significant habitat for endangered or threatened species. Consequently, Table 1 above should also include "**potentially**" in the column headed "**On or Adjacent to Site**?' for the row on "**Significant Portions of the Habitat of Endangered, Rare, and Threatened Species**".

The following natural heritage features will be discussed in the Natural Environment Level 2 Technical Report and ORMCP Natural Heritage Evaluation: Provincially Significant Wetlands, Significant Habitat of Endangered and Threatened Species, Significant Woodlands, and Significant Wildlife Habitat.

PART II:

NATURAL ENVIRONMENT LEVEL 2 TECHNICAL REPORT

&

ORMCP NATURAL HERITAGE EVALUATION

1. NATURAL ENVIRONMENT LEVEL 2 TECHNICAL REPORT

The Level 2 report builds on the findings of the Level 1 report and fulfills the requirements of the ARA and ORMCP for a natural heritage evaluation. It describes the natural features on and adjacent to the Proposed Brock Road Pit Expansion in more detail. Those natural heritage features identified in the Level 1 report are further investigated to determine their potential to occur on or adjacent to the Subject Lands and Site. The natural heritage features identified from the Level 1 study include significant wetlands, significant wildlife habitat, and significant woodlands as defined in the PPS (2005). This report will address the potential impacts of the proposed aggregate extraction and develop mitigation measures designed to limit the potential impact.

1.1 Biological Inventories

1.1.1 Inventories for Level I Technical Report

The biological inventories conducted as part of the Level 1 Technical Report included a breeding bird inventory (July 19, 2000) and a botanical inventory (August 3, 2000). Additional inventories were completed (botanical and breeding bird) on May 17, 2001 to supplement the earlier data and to further investigate the potential for provincial significance for the woodlot and wildlife habitat.

1.1.2 Inventories for Level II Technical Report

Amphibian Inventory
Frog call surveys were completed on April 22, May 14 and June 6, 2005; May 3, 2006; and May 25, 2010.

Wildlife Inventory
The Subject Lands were visited on June 12, 2006 from 5:55 am to 9:03 am. During this period, a breeding bird and general wildlife survey was completed. Additional breeding bird and wildlife inventories were undertaken on June 8 and 18, 2010.

Vegetation Inventory
Surveys of vegetation and flora on the Subject Lands were undertaken on April 22 and 29, June 6 and August 20, 2005, August 20, 2008 (OMNR site walk to review wetlands and wetland boundaries), August 28 and September 18, 2010. The vegetation communities were mapped following the Ecological Land Classification (ELC) for Southern Ontario (Lee et al. 1998). An inventory of the vegetation community west of the Subject Lands within the Core Natural Area was completed in April 2011.

1.2 The Proposed Extraction

Aggregate extraction is proposed below the water table to a depth of approximately 20 m. Figure 3 shows the proposed licence and extraction limits for the Site. Rehabilitation of the Site will be coordinated with the existing rehabilitation requirements of the licensed area to the north. The rehabilitation efforts will result in the enlargement of the lake to the north and the creation of shallow wetland features along its shores. Those areas where aggregate extraction does not occur below the water table will be rehabilitated to upland conditions common to the Oak Ridges Moraine.

The lands immediately adjacent to the new shoreline will be rehabilitated progressively immediately following extraction. All exposed areas above the final water level will be covered with topsoil and seeded with a grass-legume mixture to reduce the potential for erosion and improve the soil conditions.

In areas adjacent to the shallow created wetlands, appropriate aquatic vegetation will be planted along the shoreline and native shrubs such as Red-osier dogwoods and shrub willows (*Salix bebbiana, S. discolour, S. exigua, S. petiolaris*) will be planted.

There will be no drainage courses on the Site, and surface waters will flow overland to the rehabilitated Giordano Lake, the other retained ponds (Vic's Pond & Cattle Pond) or will infiltrate into the porous soils following rehabilitation. No water will be discharged from the Site. The rehabilitated lands will be suitable for a wide range of flora and fauna found on the Oak Ridges Moraine.

2. SITE DESCRIPTION

2.1 Regional Setting

The Subject Lands are located on the Oak Ridges Moraine physiographic region and within the Duffin's Creek subwatershed. The topography of the Subject Lands is hummocky with slopes ranging from very gentle (2% - 5%) to steep (>15%). The topographic of the Subject Lands is provided in Figure 3. The soils consist primarily of the Pontypool sandy loam soil series which is derived from glacial outwash deposits. These soils are comprised of irregularly stratified, calcareous sand and gravel and except where the groundwater table occurs within a metre of the surface, these soils are well to rapidly drained.

2.2 Hydrogeology

Genivar prepared a hydrogeologic study for the property entitled Proposed Vicdom Brock Road Pit Expansion and Middleton and Feasby Properties Hydrogeologic Assessment (May 2011) for VicDom and & Gravel (Ontario) Limited. The study provided a description of the regional geology, an assessment of the aggregate resources on the Site as well as the groundwater and surface water conditions. The study identified a localized perched water table primarily located in the eastern portion of the Subject Lands and a deeper regional groundwater system known as the Oak Ridges Aquifer. The work completed by Genivar determined that the elevation of the perched water table varies seasonably from a high of 326.0 m asl in the spring to approximately 319.3 m asl during the drier summer, fall and winter months. The perched system ranges from 3.9 to 10.6 m above the regional water table and generally flows in a south easterly direction.

Groundwater monitoring completed by Genivar determined that the groundwater levels in this area are generally stable, ranging from 313.0 to 315.4 m asl. Therefore, it has been assumed that the maximum groundwater elevation is 315.4 m asl. The direction of flow was determined to be from north to south.

Three kettle depressions are located in the eastern/central portion of the Subject Lands. Ponds have been excavated in two of these depressions for agricultural purposes. A third depression is located along the southern boundary and contains a small wetland feature. Steep slopes surround three sides of the wetland however it is open to the south. These three depressions do not intersect the regional groundwater table however they do, at least seasonally, receive discharge from the perched groundwater system.

The Genivar study concluded that extraction below the water table is predicted to have no negative impact to the regional water table. Below water extraction has occurred on the adjacent lands north of the Site for several years and monitoring of this site has not documented any problems regarding groundwater interference. For more information on the hydrogeology of the Subject Lands please refer to Genivar Limited's Proposed Vicdom Brock Road Pit Expansion and Middleton and Feasby Properties Hydrogeologic Assessment (May 2011).

2.3 Surface Waters

Four ponds are located on the Subject Land; three of which are located on the Site and one of which is located on the Subject Lands' Middleton property outside of the Site but within the Natural Core Area. As discussed above, all four ponds are man-made features that were created by excavating within depressional areas. The three ponds located on the Site are identified as Vic's Pond, Tree Pond, and Barn Pond. The fourth pond, Cattle Pond, is located outside the proposed licensed limit and is therefore not on the Site. Three of these ponds were created for agricultural purposes, that is, to provide a source of drinking water for livestock. Although the majority of the lands are now in cash crop production, one of

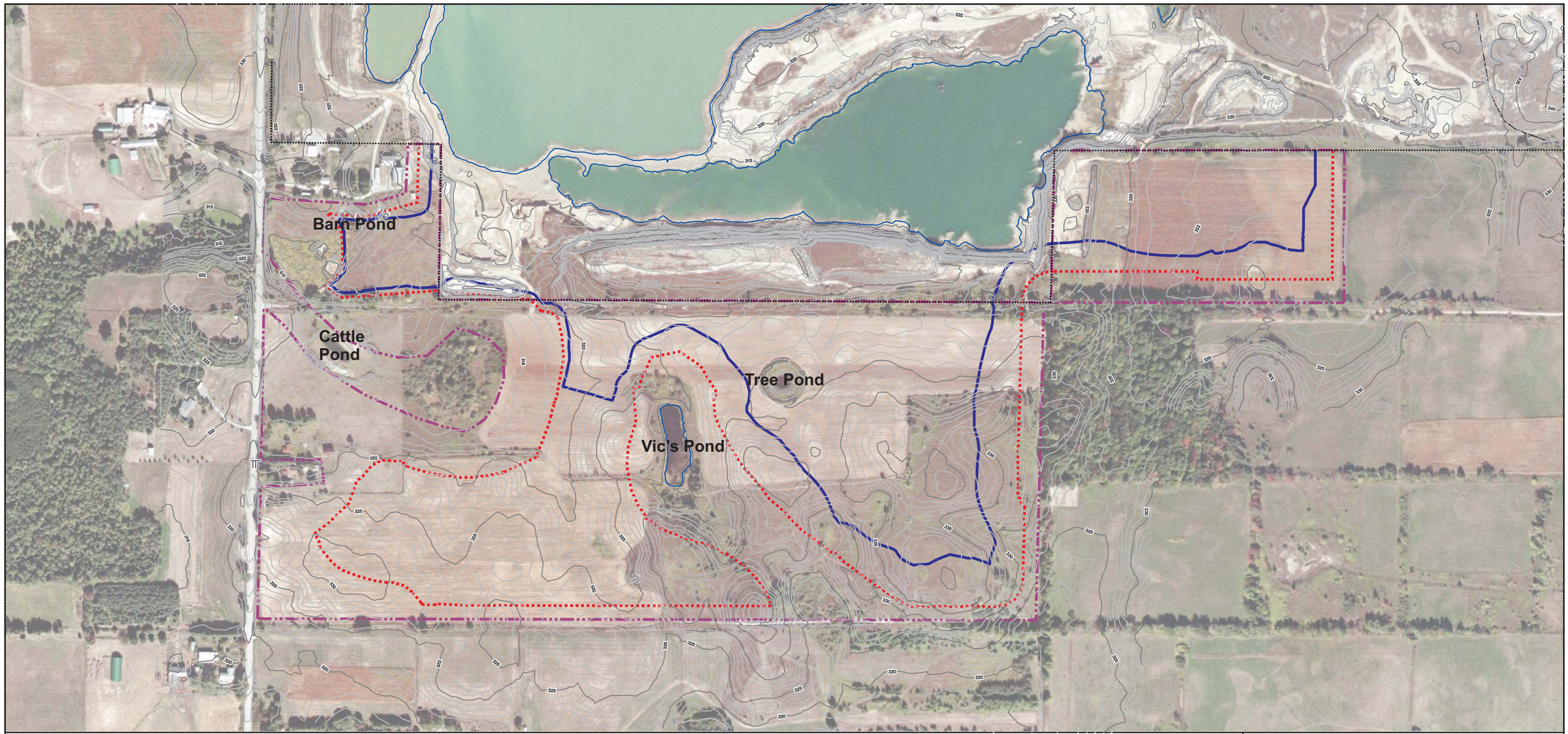
the ponds still provides the main source of drinking water for cattle pastured on the Subject Lands but not on the Site (i.e., Cattle Pond).

Vic's Pond is the largest pond on the Site and was excavated on at least one occasion in the early 1990's. It is centrally located and approximately 0.46 ha in size. It was excavated in the lowest portion of a bowl shaped depression to a depth of 2.5 to 3.5 metres (8-12 feet). As can be seen in the following photos (Photos #1 & 2), the sides of the pond are steep and in some places they are nearly vertical.

Photo 1. Vic's Pond - View looking south from southern boundary of existing licenced area. Note steep, linear pond edges.

Photo 2. Vic's Pond - View from north edge of pond looking south.

Vegetation surrounding the pond is dominated by Reed Canary Grass (*Phalaris arundinacea*) although other species such as Tall Goldenrod (*Solidago altissima*), Common Milkweed (*Asclepias syriaca*), Cow Vetch (*Vicia cracca*), shrub willows (*Salix* spp.), Red-osier Dogwood (*Cornus stolonifera*), and young Trembling Aspen (*Populus tremuloides*) were noted. Few Common Cattails (*Typha latifolia*) are present and only occur immediately adjacent (i.e., within one metre) of the sides of the pond. The spoil pile adjacent



Legend

- Licenced Limits
- Proposed Extraction Limits Middleton Pit
- Below Water Extraction
- Proposed Licenced Boundary

0 50 100 150 Metres

Scale 1:5000

N W E S

FIGURE 3
Topography

Proposed Brock Road Pit Expansion

Prepared for:

VicDom Sand & Gravel Ltd.

Prepared by: COLVILLE CONSULTING INC.

DATE: June 2011

File: C03004_03

to the pond is still evident and in some locations early successional species tolerant of poor soil conditions such as Coltsfoot (*Tussilago farfara*) still persist.

Vic's pond is part of the perched groundwater system and receives water mainly from precipitation and runoff although it also periodically receives discharge from the perched groundwater table when it is at its highest levels (i.e., 326.0 m asl). For the majority of the year it contributes to the perched water system. The pond water also moves downwards through the underlying fine grain soil to recharge the regional water table. Vic's Pond and some of the adjoining lands are considered by the OMNR to be part of the Goodwood Glasgow wetland complex. It has three components; the central portion is comprised of a shallow open water marsh, a small marsh is located at the southern tip, and a small swamp thicket is located at the northern end of the pond. The latter two wetland areas receive water primarily from overflow of Vic's Pond during the spring months.

Photos #3 & 4 shows the Tree Pond which is located in the north-central portion of the Site, within the area to be extracted. It is approximately 0.02 ha in size, 20 m wide and the water level appears to be approximately 30 cm in depth. This pond was created by excavating approximately 1.5 – 2.0 metres below the original surface to an elevation that intersects the perched water table. It is not connected to the regional water table.

A small island which supports an ash tree represents the original surface elevation of the depression. The high water mark evident along the edges of the pond lies below the elevation of the island surface (Photo #4) and therefore it is unlikely that a pond had previously existed prior to excavation in this depression. As the water levels in the pond fall during the summer months bare soil is exposed on the steep banks of the pond.

Photo 3. Tree Pond - View from northern boundary of Subject Lands looking south. This pond is surrounded by a corn crop.

The surrounding vegetation is comprised predominantly of upland species such as Goldenrod. Aquatic vegetation is confined to the pond edges or is submerged. The water levels fluctuate throughout the year as evidenced by the non-vegetated area along the rim of the pond shown in Photo # 4. There are no wetland areas associated with this pond.

Photo 4. Tree Pond– Note ash tree on a small island which represents original depth of kettle depression.

The Cattle Pond is located on the Subject Lands but not on the Site. It is located within an area (approximately 2.6 ha) that is seasonally inundated. Aerial photography taken in the spring of 1990, 1994 and 1997 shows that the area is sometimes periodically inundated by surface runoff (spring snow melt). However, the duration of the ponding is relatively short and in the spring of 2005 and 2006 this larger area remained relatively dry. A pond was excavated in this area to ensure that the cattle being pastured in this area received an adequate supply during the summer months. The pond is approximately 0.09 ha in size and, as can be seen in the photo below, the area immediately surrounding the pond is closely grazed. The spoil pile adjacent to the pond is still evident and only partially vegetated.

Photo 5. Cattle Pond – Located in northwest corner of Subject Lands. Note cattle grazing in photo centre. View from 4th Concession Road looking east.

The area that is not in pasture has developed into a swamp thicket approximately 0.7 ha in size. It has been labelled as Wetland C and is the largest wetland area identified on the Subject Lands. Wetland C occurs across the boundary of the Site. Wetland C and the Cattle pond are directly connected to the regional groundwater system.

A small pond was identified to the north of the Cattle Pond in the northwest corner of the Site. It has been labelled Barn Pond and was formed as a result of the resource evaluations conducted for this application. Water temporarily collects in a test pit dug for the resource evaluation. It appears to be dry for the majority of the year. No wetland areas are associated with this pond. This pond is located within the area to be extracted.

None of these ponds form the headwaters for any creeks in the area. There are no surficial drainage features associated with these ponds and no stream channels or other surface drainage features were observed elsewhere on the Subject Lands. The closest fish habitat to the Subject Lands, as identified by the OMNR, is a small, un-named creek located 300 m or more south of the Subject Lands.

2.2 Wildlife

2.2.1 Approach

Inventories of wildlife were compiled from distinctive sounds and signs during field visits. The original breeding bird survey was carried out on July 19, 2000 as part of the Level 1 Technical Report. This is somewhat late in the breeding bird season therefore another inventory was completed on May 17, 2001. The inventories were carried out by systematically covering the unit on foot to ensure a thorough survey of species and communities. A conservative approach to estimating breeding status was taken. All species seen or heard singing, in suitable habitat, were assumed to be breeding. Opportunistic sightings of other animal species were also recorded during these site visits. A third wildlife inventory was completed on June 12, 2006 from 0555 to 0903 hours. This included a breeding bird survey as well as opportunistic observations of other groups of wildlife species. Weather during the survey was a mix of sun and cloud, temperature ranging from 6 to 12° C, and wind 3 to 4 on the Beaufort wind scale.

The wildlife inventory was updated in 2010. An evening survey was completed on May 25, 2010. The purpose of this visit was two-fold: to complete an amphibian survey and to determine if any Whip-poor-wills were nesting on or adjacent to the Subject Lands. The visit was designed to coincide with the full moon as this is the period when the Whip-poor-will sings most vigorously (Mills, 1986; 1998). This survey was conducted from 2030 to 2140 hours. There was no wind or clouds, with sunny conditions changing to full moon.

Two breeding bird surveys were completed on June 8 and 18, 2010. All birds seen and heard were recorded and it was noted whether they occurred on or adjacent to the Subject Lands. The number of pairs of grassland/shrubland birds was documented to determine if the site could qualify as significant wildlife habitat for this guild of birds according to the ORM Technical Guidelines. Surveys started in early morning and continued into mid-morning to allow time for emergence of flying odonates and butterflies. The June 8th survey was undertaken from 0601 to 1012 hours while the June 18th survey was from 0557 to 1041 hours. The weather on June 8th was sunny with temperatures ranging from 7 to 15°C and with wind 3-4 on the Beaufort scale. June 18th was sunny with temperatures of 16-25°C. Early in the morning it was calm with wind 0-1 on the Beaufort scale, but the wind increased to 3-4 beginning around 0930.

2.2.2 Species Observed

Wildlife work had previously been completed in 2000 and 2001. A composite wildlife list was compiled that included observations from the previous surveys as well as those from 2006 and 2010. This list is presented in Appendix B.

A total of 96 wildlife species were documented from the ten years of investigation. These included 4 odonate, 16 butterfly, 6 amphibian, 2 reptile, 54 bird, and 10 mammal species. All species observed are ranked either S5 - secure (common, widespread, and abundant in Ontario), S4 - apparently secure (uncommon but not rare in Ontario) or S3 – Vulnerable (vulnerable in Ontario). Four non-native species were documented: European skipper, Rock Pigeon, European Starling, and European hare.

A higher diversity of species was observed on the Subject Lands in comparison to species observed on adjacent lands. This was primarily because the majority of the field work was confined to the Subject Lands. Most of the species found on adjacent lands were detected while the surveyor was on the Subject Lands. The Subject Lands supported a total of 88 species (4 odonates, 16 butterflies, 6 amphibians, 2 reptiles, 51 birds, 9 mammals) while the adjacent lands supported a minimum of 43 species (1 butterfly, 40 birds, 2 mammals). Because the birds are vocal, a good inventory of birds within 120 m of the Subject Lands was obtained.

The diversity of odonates present was surprisingly low, with only 4 species documented. All of these are common to abundant in Ontario.

The 16 butterfly species observed are also all common to abundant in Ontario, with all of them having an S-rank of S5, except for the European skipper which is not native to Canada.

Six amphibian species were observed and included spring peeper, western chorus frog, American toad, northern green frog, northern leopard frog, and tetraploid gray treefrog. All species are common and widespread in Ontario except for the western chorus frog which has been designated threatened nationally and not at risk provincially. All were documented during the amphibian call surveys and also during other surveys. Cattle Pond, Vic's Pond, Tree Pond, and the wetland along the southern property boundary all supported breeding amphibian species. The chorus frog is discussed in more detail in Section 3.2 under significant portions of the habitat of endangered, rare, and threatened species.

Two species of reptiles were documented on site: the snapping turtle and the Midland painted turtle. No snapping turtles were actually observed, but broken shells and a nest were found. The snapping turtle has been designated special concern nationally and provincially and its habitat may be considered the significant portion of the habitat of an endangered, rare, or threatened species under the ORM Technical Papers. This species is discussed in more detail in Section 3.2. The other reptile species that was present was the Midland painted turtle which was seen in Cattle Pond. This is the most widespread and abundant turtle in Ontario.

The majority of the Subject Lands do not provide suitable habitat for breeding birds as it is in agricultural production. Breeding bird habitat is limited to the small wetland areas, the treed hedgerow, the cultural meadow, and pond areas. In 2010, some of the land that was previously planted to row crops was in hay that provided breeding habitat for some grassland bird species. The adjacent woodlot to the east and the wetlands areas located on surrounding lands offer additional habitat for breeding birds.

Of the 51 bird species documented on the Subject Lands, 46 were considered breeding species. The six nonbreeders were Wood Duck, Turkey Vulture, Northern Harrier, Rock Pigeon, American Crow, and Bank Swallow. The vulture was seen flying over the Subject Lands only and there is no suitable breeding habitat for this species on the Site. The Wood Duck, pigeon, crow, and Bank Swallow were observed foraging on the Subject Lands, but there is no suitable breeding habitat for them in the area.

The Northern Harrier was seen foraging over the Subject Lands and adjacent areas on both inventories in 2010. The Northern Harrier typically nests in open wetlands or large grassy fields. In Ontario, it has nested in cattail marshes, bogs, open swamps, grassy meadows, pastures, and hay and grain fields. Other nesting sites include abandoned gravel pits, hydro corridors, open deciduous woods, and young coniferous plantations. Open areas with good visibility are preferred (Peck and James, 1983).

This species typically forages by coursing low over the ground, typically over cultural meadows, hayfields, and lightly grazed pastures. Areas of very short or tall vegetation are unsuitable foraging habitat (MacWhirter and Bildstein, 1996). The dominant food of the Northern Harrier is the meadow vole (*Microtus pennsylvanicus*) and it may comprise 93-98% of the diet (Craighead and Craighead, 1956). The harrier is almost completely dependent upon the meadow vole and the number of nesting harriers in a given area is directly proportional to the abundance of meadow voles (Clark, 1972; Hamerstrom, 1979, 1986). The Northern Harrier is also area sensitive and requires a minimum of approximately 30 ha of grassland for nesting. The home range is much larger, with Ontario pairs appearing to require 250-640 ha of suitable foraging habitat (Cadman,1993).

Although the Northern Harrier was observed flying over the Subject Lands during both of the June 2010 inventories, it was not considered a breeding species. The Subject Lands were apparently within the home range of a pair of Northern Harriers, but all indications were that it was not actually nesting within the study area. The times when it was observed, it simply flew rapidly over site and was present for only 1 or 2 minutes. If a breeding pair was present, birds would spend much more time within the area. The on-site grasslands are considerably smaller than the 30 ha that are typically required for nesting. In addition, the Northern Harrier has a conspicuous courtship flight that is performed at dawn and dusk. The June surveys may have been late in the season for observing this behaviour, but the late May visit would have coincided with the period in which displays would still have been performed. No such displays were observed. For these reasons, it is concluded that the Northern Harrier did not breed on or immediately adjacent to the Subject Lands, although the Subject Lands were clearly within the home range of one pair of harriers.

The Mourning Warbler was listed as possibly breeding on the Subject Lands, but it is more likely that it was not breeding. It was observed only on June 18th and was singing almost continuously in what appeared be considered marginal habitat for this species. It was in a small grove of trees which is part of the hedgerow between the Site and the existing licensed pit. The Mourning Warbler typically nests at the edges of deciduous, mixed, or coniferous forests, but occasionally in shrubby areas as well (Peck and James, 1987). The song of this species is loud and difficult to overlook. Therefore, it is likely that the lack of detection of this species on June 8th was due to the fact that it was not present. The bird singing on June 18th was most likely a late-season nonbreeding male.

The Mourning Warbler has no special status in Ontario, having an S-rank of S4, but it is considered area sensitive by some authors who feel that it requires a minimum of 30 ha of suitable habitat. It is questionable if this species is actually area sensitive. It was not considered area sensitive by James (1984), OMNR (2000), or Pittocchelli (1993); Freemark and Collins (1992) considered it area sensitive, but gave no estimate of its forest size requirements. More recent data from the Ontario Breeding Bird Atlas (Zimmerling, 2007) strongly suggests that this species is not area sensitive. During the second atlas, the Mourning Warbler was found nesting throughout the highly urbanized portions of Metro Toronto where it inhabited small patches of habitat in parks and ravines.

Three of the bird species found are considered area sensitive by some authors: Northern Harrier, Mourning Warbler, and Ovenbird. The former two species have already been discussed, and the Ovenbird nested in the deciduous forest adjacent to the Site.

The ORM Technical Paper for Significant Wildlife Habitat consider assemblages of grassland/shrubland birds to be significant if the habitat supports target number of pairs of different species. The Subject Lands and Site supported several grassland species including Eastern Kingbird, Gray Catbird, Brown Thrasher, Savannah Sparrow, Vesper Sparrow, Grasshopper Sparrow, Field Sparrow, Clay-colored Sparrow, Bobolink, and Eastern Meadowlark. These species are discussed in more detail in Section 3.7 under significant wildlife habitat.

All 10 of the mammal species observed are common to abundant in Ontario with S-ranges of S5, except for the European hare which is a non-native species.

The Natural Heritage Information Centre database contained no records of significant wildlife in the vicinity of the Subject Lands. A broader-based search by RiverStone Environmental Solutions Inc. (2010) which included results from the Ontario Breeding Bird Atlas, found that there was potential for nine endangered or threatened species to occur within the general area of the Subject Lands. They dismissed four of these as being present due to the lack of suitable habitat for them. These were the redside dace (*Clinostomus elongatus*), grey fox (*Urocyon cinereoargenteus*), Least Bittern (*Ixobrychus exilis*), and Hooded Warbler (*Wilsonia citrina*). They considered that there was the potential for five endangered and threatened species to occur on or adjacent to the Subject Lands. These were butternut (*Juglans cinerea*), Acadian Flycatcher (*Empidonax virescens*), Henslow's Sparrow (*Ammodramus henslowii*), Whip-poor-will (*Caprimulgis vociferous*), and Chimney Swift (*Chaetura pelagica*). These five species are discussed in more detail in Section 3.2 under significant habitat for endangered, rare, and threatened species.

In addition, the Bobolink has been documented on and adjacent to the Subject Lands and Site. This species has been identified as being threatened nationally and provincially. Bobolink is also discussed in more detail in Section 3.2.

All of the species observed, other than the snapping turtle, are common globally, nationally, provincially, and regionally. Although the Bobolink is designated threatened, it is still very common south of the Canadian Shield. During the second Ontario Breeding Bird Atlas, it was the 12th most abundant species detected on point counts in Site Region 6 and 24th in Site Region 7 (Gahbauer 2007). One bird species, the Clay-colored Sparrow, is considered rare on the Oak Ridges Moraine although more recent atlas data show that it is actually widespread on the Moraine.

2.2.3 Wildlife Corridors

The majority of the Site consists of agricultural lands in row crop production and some forage (alfalfa). The agricultural land isolates some of the natural features and man-made ponds from other natural features. The only potential wildlife corridor observed is a hedgerow that is located along the road allowance between Lots 10 and 11. The hedgerow consists of medium to mature aged deciduous trees. The total width of the hedgerow (including the road allowance) is approximately 30 m. It extends approximately 120 metres to west from the small woodlot located on the east half of Lot 10 and extends intermittently to the east from the woodlot for another 400 m.

2.3 Vegetation

2.3.1 Approach

Botanical inventories were initially conducted on August 3, 2000 and May 17, 2002. Further field surveys were undertaken on April 22 and 29, June 6 and August 20, 2005, and May 3, 2006, August 20, 2008, August 28 and September 18, 2010. Vegetation community boundaries were delineated from aerial photos and ground-truthed during the field inventories. Community characterizations are based on the *Ecological Land Classification* (ELC) (Lee et al., 1998). Wetland indicator plants listed in the *Ontario Wetland Evaluation Manual: Southern Manual 3rd Edition* (OMNR, 1993) were used in the demarcation of wetland

community boundaries. Coefficient of wetness values (Oldham et al., 1995) were also considered in the identification and delineation of potential wetland habitats. Wetland communities and boundaries were reviewed and staked in the field with OMNR staff on August 20, 2008. The wetland limits were surveyed and are shown on the Site Plans.

2.3.2 Vegetation Communities

Nine separate vegetation communities/features or ELC units were identified. These communities are briefly described in Table 2 and are shown on Figure 4.

Agricultural land predominates on the Subject Lands (60.1 %). The remaining areas consist of cultural meadows (CUM1-1), small marsh and thicket swamp patches, a hedgerow, and a residential/farm lot. The majority of these areas have experienced high levels of disturbance from cattle grazing and agricultural use.

2.3.3 Vascular Plants

A total of 246 vascular plant taxa were identified during the field surveys completed between 2000 and 2010. Approximately 29% of the plants recorded were non-native. A complete list of vascular plants observed is presented in Appendix C. None of the species observed on the Subject Lands are considered Rare, Threatened and Endangered (RTE) species by the ORMCP.

2.3.4 Significant and Sensitive Species

All but 2 species recorded had coefficient of conservatism (CC) values of 6 or less, indicating that the vast majority of species are of low to moderate sensitivity and are found in a wide variety of communities including disturbed sites, or are associated with a specific community but are tolerant of moderate disturbance. Two species, Eastern Hemlock and Two-leaved Toothwort, have CC values of 7, potentially indicating a higher level of sensitivity. Both species were observed in areas where aggregate extraction is not proposed.

A Butternut (*Juglans cinerea*) tree in poor condition was observed in the woodlot east of the Site (unit FOD5-7). Butternut is ranked as "S3?" by the NHIC and listed as endangered under the Ontario Endangered Species Act (2007). This woodlot is not owned by the proponent; it is not part of the licence application and will not be impacted by the extraction operation.

Seven potential species of conservation concern were identified on or adjacent to the Subject Lands.

Sprengel's sedge (*Carex sprengelii*) is listed as rare (R6) in Durham Region, rare (R20) in Site District 6E-7 (Varga et al. 2000) and as a Moraine Rare Species. Sprengel's sedge typically occurs in woodlands; it was found along the edge of the woodlot situated east of the Site. The area where this species was recorded will not be directly impacted by extraction activity (i.e., it is not within the extraction limits).

Common coontail (*Ceratophyllum demersum*) is listed as uncommon (U) in Durham Region, rare (R16) in Site District 6E-7 (Varga et al. 2000) and as a Moraine Rare Species. Common coontail has become established in Vic's Pond (OMNR wetland #156); this feature will not be directly impacted by extraction activity and will be protected.

Silky dogwood (*Cornus amomum* ssp. *obliqua*) is listed as uncommon (U) in Durham Region, rare (R10) in Site District 6E-7 (Varga et al. 2000) and as a Moraine Rare Species. Silky dogwood occurs in unit SWT3-2b (OMNR wetland #157); this feature will not be directly impacted by extraction activity and will be protected.

Variegated horsetail (*Equisetum variegatum*) is listed as common (X) in Durham Region, but rare (R13) in Site District 6E-7 (Varga et al. 2000). This species is listed as a Moraine Rare Species. Variegated horsetail

commonly occurs in wet sands (such as in gravel pits near water's edge), sandy shores, and wetlands. This species was found adjacent to Vic's Pond on the upper banks (i.e., the spoil pile) in 2000, but was not observed during subsequent field surveys. The area where this species was recorded will not be directly impacted by extraction activity (i.e., it is not within the extraction limits). Abundant suitable habitat for Variegated horsetail exists in the adjacent active gravel pit.

Spotted Cranesbill (*Geranium maculatum*), was observed adjacent to the Site in the woodlot located to the east of the Middleton property. It is listed as rare (R7) in Durham Region, rare (R8) in Site District 6E-7 (Varga et al. 2000) and as a Moraine Rare Species. The woodlot east of the Middleton property is outside of the proposed licenced limit and will be protected.

Black Walnut (*Juglans nigra*) was observed on the slope immediately west of unit SWT3-2b (OMNR wetland #157); this may not be a native occurrence of this species. Black walnut is listed as uncommon (U) in Durham Region, rare (R) in Site District 6E-7 (Varga et al. 2000) and as a Moraine Rare Species. This area will not be disturbed.

Bristly Crowfoot (*Ranunculus pensylvanicus*) was observed in unit SWT2-2 (OMNR wetland #155). Bristly Crowfoot is listed as rare (R10) in Durham Region, rare (R19) in Site District 6E-7 (Varga et al. 2000) and as a Moraine Rare Species. Unit SWT2-2 will not be directly impacted by extraction activity and this area will be protected.

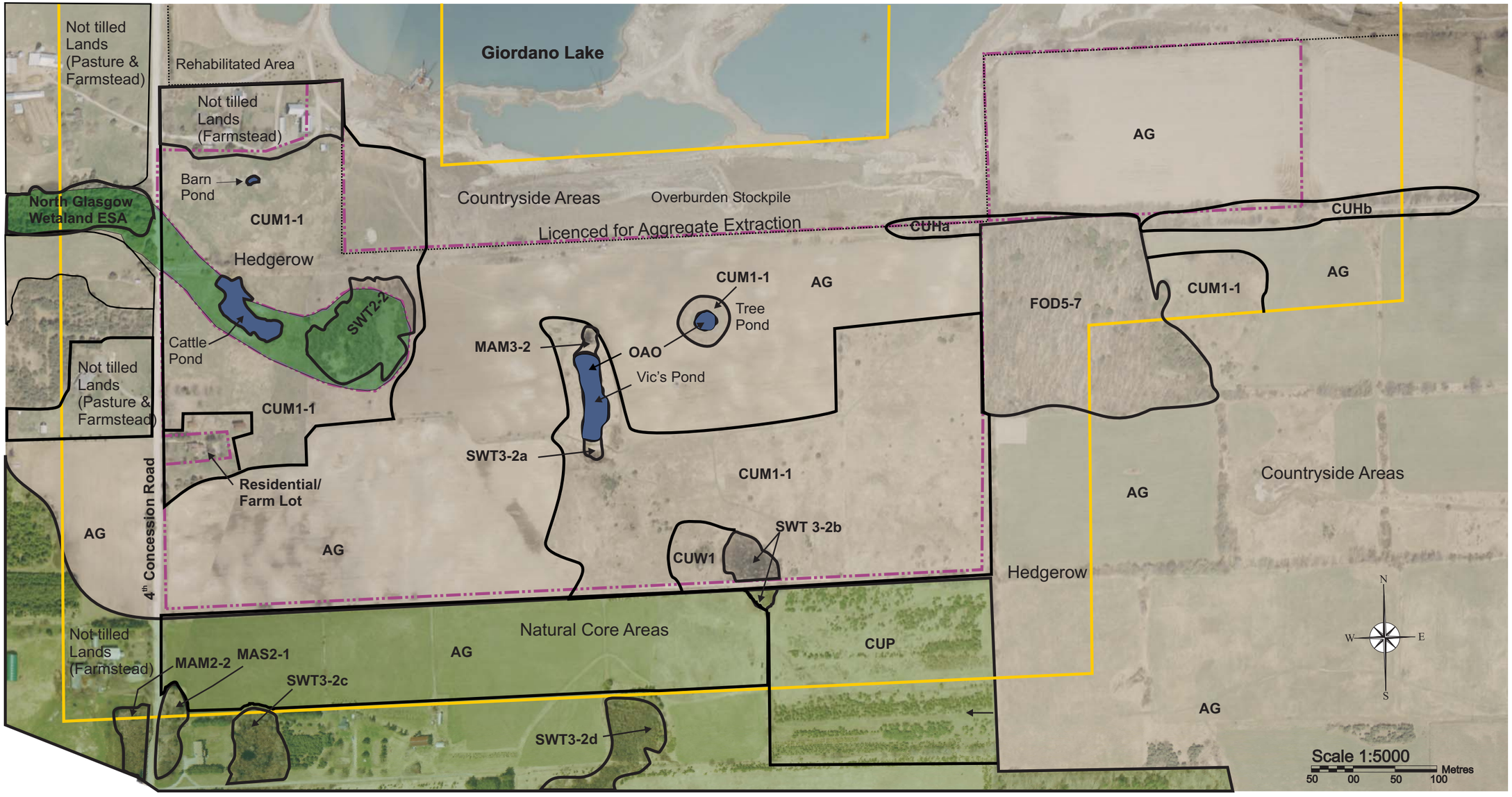
All seven species are ranked S5, which indicates that they are common, widespread and abundant in Ontario. These species are not considered to be rare, threatened and endangered (RTE) species by the ORMCP definition.

Table 2. Vegetation Communities recorded from the Subject Lands and Adjacent Lands

ELC Unit	Description
Terrestrial – Natural	
FOD 5-7: Dry-Fresh Sugar Maple-Black Cherry	The forest unit is located on adjacent lands (east half of Lot 10). At the edge of the forest, vegetation composition varies somewhat from the core area of FOD5-7. In addition to the sugar maple (*Acer saccharum* ssp. *saccharum*) and black cherry (*Prunus serotina*), basswood (*Tilia americana*) and trembling aspen (*Populus tremuloides*) occur with a scattered to dense shrub cover of raspberry (*Rubus idaeus* spp. *melanolasius*) and riverbank grape (*Vitis riparia*). Herbaceous cover at the edge of this unit is dominated by one-sided aster (*Aster lateriflorus*).
Terrestrial – Cultural	
CUW1 Cultural Woodland	Small patch of Scots pine (*Pinus sylvestris*), trembling aspen (*Populus tremuloides*) and white elm (*Ulmus americana*) on slope. Other woody species include common buckthorn (*Rhamnus cathartica*), hawthorns (*Crataegus* spp.) and chokecherry (*Prunus virginiana*). Patches of brambles occur here (*Rubus alleghaniensis*, *Rubus idaeus* ssp. *melanolasius*).
CUM1-1 Dry-Fresh Old Field Meadow Type	Several sections of the rolling hills onsite are covered with old fields. Canada goldenrod (*Solidago canadensis*) and various grass species, including Canada blue grass (*Poa compressa*), Poverty Oat Grass (*Danthonia spicata*) are the main ground covers. Scattered patches of chokecherry (*Prunus virginiana*), trembling aspen (*Populus tremuloides*) and Scots pine (*Pinus sylvestris*) are scattered throughout.
CUH	Perimeter hedgerows - discontinuous. Variable mix of mainly Sugar Maple (*Acer saccharum* ssp. *saccharum*), Black Cherry (*Prunus serotina*) and Manitoba Maple (*Acer negundo*).
CUP	Immature conifer plantation – off-site

Table 2. Vegetation Communities recorded from the Subject Lands and Adjacent Lands (Cont.)

ELC Unit	Description
Wetland	
SWT2-2 Willow Mineral Thicket Swamp Type	Dominant species include shrub willows (*Salix bebbiana*, *S. eriocephala, S. petiolaris*) and red-osier dogwood (Cornus stolonifera). Scattered trees include peach-leaved willow (*Salix amygdaloides*), crack willow (*Salix X rubens*) and Manitoba maple (*Acer negundo*). Groundcovers include reed canary grass (*Phalaris arundinacea*), tall white aster (*Aster lanceolatus*) and spotted joe-pye-weed (*Eupatorium maculatum*).
SWT3-2 Willow Organic Thicket Swamp Type	One tiny pocket of this vegetation (typically too small to map using ELC – min. 0.5 ha mapping units) occurs at the south end of Vic's Pond (SWT3-2a). Another pocket of this type (SWT3-2b) occurs along the south property line. It is crossed by a farm lane, and the small culvert is placed such that water ponds on the upgradient side, promoting the growth of shrub willows in particular. Shrub willows (*Salix bebbiana, S. eriocephala, S. petiolaris*) and red-osier dogwood (*Cornus stolonifera*) are the dominant cover. Groundcovers include reed canary grass (*Phalaris arundinacea*), rice cut grass (*Leersia oryzoides*), common cattail (*Typha latifolia*), tall white aster (*Aster lanceolatus*), orange touch-me-not (*Impatiens capensis*) and water-plantain (*Alisma plantago-aquatica*). Soils are marginally organic, generally 30-50 cm in depth. Scattered yellow birch (*Betula alleghaniensis*) and white elm (*Ulmus americana*) trees occur around the fringes.
MAM3-2 Reed Canary Grass Organic Meadow Marsh	One tiny pocket of this vegetation unit (typically too small to map using ELC – min. 0.5 ha mapping units) occurs at the north end of Vic's Pond. This pocket dominated by reed canary grass (*Phalaris arundinacea*) is situated at the seasonal outlet for Vic's Pond.
Aquatic	
SAS1 Submerged Shallow Aquatic	Deeper water associated with Vic's Pond. Dug pond feature. Mainly stonewort (*Chara* sp.) and Common Coontail (*Ceratophyllum demersum*), with some floating pondweed (*Potamogeton natans*). Small patches of cattails (*Typha angustifolia, T. latifolia*), green-fruited bur-reed (*Sparganium emersum*) and reed canary grass (*Phalaris arundinacea*) occur around pond margins.



Legend

- Proposed Extraction Limits Middleton Pit
- Licenced Limits
- 120 m limits surrounding Proposed Middleton Pit
- Proposed Licenced Boundary
- Open Water (Pond)
- Core Natural Areas

Vegetation Communities

Terrestrial Natural

FOD 5-7	Dry fresh Sugar Maple - Black Cherry Deciduous Forest

Terrestrial Cultural

CUM1-1	Cultural Meadow
CUW1	Cultural Woodland
CUH	Hedgerow
CUP	Conifer Plantation
AG	Agricultural

Wetland

SWT 2-2	Willow Mineral Thicket Swamp
SWT 3-2	Willow Organic Thicket Swamp
MAS 2-1	Cattail Mineral Shallow Marsh
MAM 2-2	Reed Canary Grass Mineral Meadow Marsh
MAM 3-2	Reed Canary Grass Organic Meadow Marsh

Aquatic

OAO	Open Aquatic

FIGURE 4
Vegetation Communities

Proposed Brock Road Pit Expansion

Prepared for:
VicDom Sand & Gravel Ltd.

Prepared by: Colville Consulting Inc.

DATE: June 2011

FILE: C03004_04

3. KEY NATURAL HERITAGE FEATURES

This section evaluates the key natural heritage features identified from background information and site inventories. The evaluation is based on the criteria used in the ORMCP and specifically the Technical Papers Nos. 1-8 developed by the OMNR to assist in the identification and delineation of Key Natural Heritage Features on the Oak Ridges Moraine. This evaluation will also meet the requirements of the ARA. The KNHFs identified on the Subject Lands are shown in Figure 5.

Key Natural Heritage Features include:

- wetlands;
- significant portions of the habitat of endangered, rare, and threatened species;
- fish habitat;
- areas of natural and scientific interest (life science);
- significant valleylands;
- significant woodlands;
- significant wildlife habitat; and
- sand barrens, savannahs, and tallgrass prairies.

Hydrologically Sensitive Features include:

- kettle Lakes;
- permanent and intermittent streams; and
- seepage areas and springs.

3.1 Wetlands

The ORMCP defines a wetland as "land such as swamp, marsh, bog or fen (not including land that is being used for agricultural purposes and no longer exhibits wetland characteristics) that;

- is seasonally or permanently covered by shallow water or has the water table close to or at the surface;
- has hydric soils and vegetation dominated by hyrdrophitic or water-tolerant plants; and
- has been further identified by, the Ministry of Natural Resources or by other person, according to evaluation procedures established by the Ministry of Natural Resources as amended from time to time."

The ORMCP policies consider wetlands to be:

- all wetlands regardless of size, evaluated as provincially significant in accordance with the Ontario Wetland Evaluation System (OWES);
- all other identified wetlands 0.5 ha or greater in size; and
- all other identified wetlands less than 0.5 ha in size except where it can be demonstrated to the satisfaction of the approval authority that the wetland does not constitute to provide one or more of the following features or functions:
  - a hydrologically sensitive feature as identified by the MOE;
  - a KNHF for purposes other than a wetland (including significant wildlife habitat);
  - important ecological linkages to adjacent KNHFs or between two or more KNHFs; or
  - habitat for a diverse range of native plants and animal species with emphasis on Oak Ridges Moraine Rare Species.

3.1.1 Wetlands on the Subject Lands

The background data shows that a portion of the Subject Lands and Site is located within part of the Goodwood Glasgow Provincially Significant Wetland Complex. According to OMNR's Natural Areas Report, the Goodwood Glasgow PSW is approximately 70.57 ha in size and is comprised of seventeen individual wetlands. The predominant wetland type is swamp (>90%) but also includes minor components of fen and marsh wetland types. The majority of the Goodwood Glasgow PSW is located to the west of the Subject Lands although originally approximately half of the Site was mapped within its boundaries (Figure 2). The inventories completed 2000, 2001, 2005 and 2008 identified three areas that exhibit wetland characteristics. These are labelled Wetlands A, B and C in Figure 5 and correspond to OMNR's wetland descriptions for the Goodwood-Glasgow wetland complex components 156, 157 and 155, respectively (shown in Figure 2).

On August 20, 2008, the wetland boundaries were staked and surveyed with Mr. Steve Varga, OMNR's Inventory Biologist in attendance. Based on this exercise, the OMNR updated the wetland limits for components 155, 156 and 157 of the Goodwood-Glasgow Wetland Complex (Appendix D).

Wetland A – OMNR Unit 156

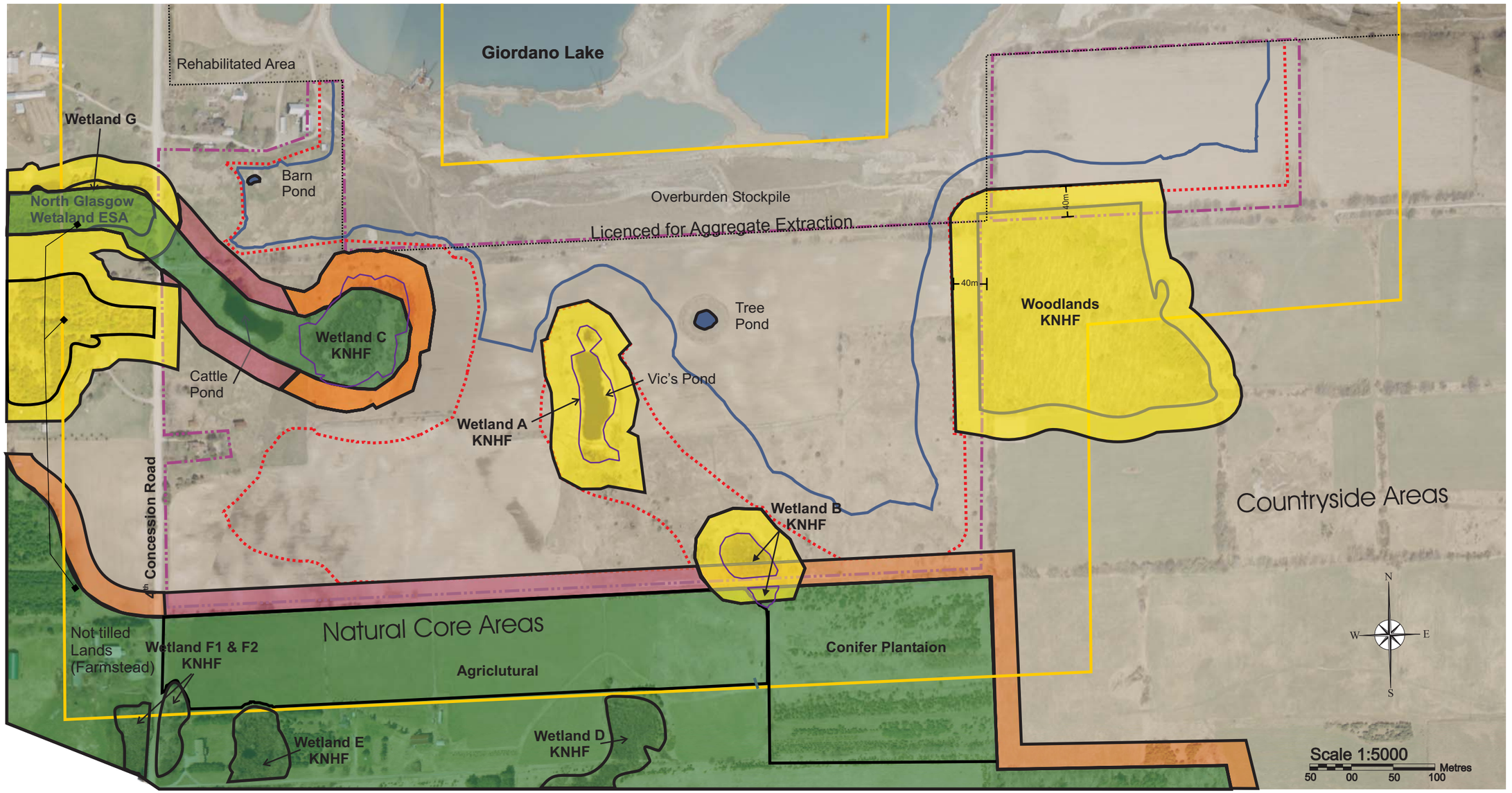
Wetland A is centrally located within the Subject Lands. As discussed previously in Section 2.1, Wetland A includes Vic's Pond and some of the adjoining lands. It corresponds to the OMNR's wetland component 156 (Appendix D) of the Goodwood-Glasgow wetland complex. Note that the letter from the OMNR in Appendix D contains one minor error which we understand was subsequently recognized and corrected in the Ministry's files. The letter incorrectly refers to this wetland area as Unit 155 and describes it as a kettle wetland. The correct label should be Unit 156. The OMNR wetland description includes three components; a shallow open water marsh (0.24 ha), a small marsh (0.14 ha) located at the southern end, and a small swamp thicket (0.14 ha) located at the northern end of the pond. The latter two wetland areas receive water primarily from overflow of Vic's Pond during the spring months.

It is not hydrologically connected to the regional groundwater table and the Goodwood Glasgow PSW. The February 12, 2009 letter from the OMNR refers to this wetland as an isolated kettle wetland. It is hydrologically connected to the perched water table. Wetland A is, however, a PSW as classified by the OMNR and included within the Goodwood Glasgow wetland complex.

In total, it was measured to be approximately 0.52 ha in size (OMNR, 2009 – Appendix D). Given its size (i.e., greater than 0.5 ha) and the fact that it is recognized as a wetland by the OMNR, according to Technical Paper #12 of the ORMCP, this feature is a hydrologically sensitive feature. Hydrologically sensitive features (HSF) include kettle lakes, permanent and intermittent streams, and seepage areas and springs. This wetland feature also qualifies as a KNHF.

It was determined that the wetland and the immediate adjacent lands do not contain significant portions of the habitat of endangered, rare, and threatened species; fish habitat; areas of natural and scientific interest (life science); significant valleylands; significant woodlands; significant wildlife habitat; or sand barrens, savannahs, and tallgrass prairies. The OMNR did note the presence of one locally rare plant species (rare on the ORM), *Ranunculus pensylvanicus* (Bristly Crowfoot). This species has an S-Rank of S5-Secure, indicating that it is common, widespread, and abundant in the province.

Variegated horsetail (*Equisetum variegatum*) was originally identified on the spoil pile adjacent to Vic's Pond during the 2001 field inventory. Subsequent inventories have failed to identify this species although potential habitat for the species still exists. This species is listed as common in Durham Region, rare (R13) in Site District 6E-7 and is listed as a Moraine Rare Species.



Legend

- Licenced Limits
- Proposed Extraction Limits Middleton Pit
- Below Water Extraction
- Proposed Licenced Boundary

Natural Core Areas
- No Development/Site Alteration
- Cannot Licence

Key Natural Heritage Feature and Vegetated Protection Zone
- No Development/Site Alteration
- A minimum 30 m setback from feature

Setback from Natural Core Area with KNHF
- A minimum 30 m setback
- No disturbance permitted
- Cannot Store Topsoil

Setback from Natural Core Area (not with KNHF)
- Limited & temporary site disturbance permitted
- Can store topsoil to be used for rehabilitation purposes

FIGURE 5
KNHF's, Setbacks & Development Constraints

Proposed Brock Road Pit Expansion

Prepared for:
VicDom Sand & Gravel Ltd.

Prepared by: COLVILLE CONSULTING INC.

DATE: June 2011

FILE: C03004_05

The wetland does provide some habitat for amphibians and a beaver inhabited the pond for a season. The water depths of the pond and the sparse vegetation surrounding the wetland limit the potential for establishing a beaver population at this location.

As a KNHF and HSF, a vegetation protection zone (VPZ) with a minimum of 30 metres is required for this feature. No aggregate extraction will occur within 30 m of Wetland A as required in the ORMCP.

Wetland B - OMNR Unit 157

Another wetland feature is located along the southern boundary of the Site and approximately 180 metres south of Vic's Pond. It has been identified as Wetland B and is mapped as SWT3-2b. This wetland community has been modified by human activity. A sand and gravel road was constructed along the perimeter of the southern boundary of the Site. It bisects the lower portion of Wetland B. The road impedes the drainage of this area and has resulted in or contributed to the formation of this wetland feature. A drainage pipe installed in the road drains the area discharging through the pipe from north to south. The drainage pipe maintains a relatively constant water depth of approximately 13 cm to the north of the road. Surface water ponding south of the road was not observed.

At this location, the perched water table is close to the surface and is located at an elevation of approximately 323.5 masl, several metres above the regional groundwater table (315 masl). Genivar's hydrological investigations have concluded that it is not hydrologically connected to the regional groundwater table (Genivar, 2010). However, the OMNR states that Wetland 157 is "at the terminus of West Duffin's Creek tributaries and hydrologically connected to larger downstream wetlands"(OMNR, 2009 – Appendix D).

Although this wetland is only 0.39 ha in size and is less than the minimum size requirement (e.g., < 0.5 ha) according to the ORMCP criteria for a wetland, the OMNR has included this feature within the Goodwood-Glasgow wetland complex (a PSW). Therefore this feature qualifies as a KNHF and HSF.

It was determined that the Subject Lands do not contain significant portions of the habitat of endangered, rare, and threatened species; fish habitat; areas of natural and scientific interest (life science); significant valleylands; significant woodlands; significant wildlife habitat; or sand barrens, savannahs, and tallgrass prairies.

OMNR's Significant Wildlife Habitat Technical Paper for the Oak Ridges Moraine (ORM) – Technical Paper 2 (http://www.mah.gov.on.ca/AssetFactory.aspx?did=4887, last accessed November 16, 2010) was used to determine whether this feature qualifies as a candidate site for significant wildlife habitat. This feature is predominantly surrounded by open grass lands and is isolated from other natural areas on and adjacent to the Subject Lands. A small wetland is located approximately 180 m to the south (at an elevation of approximately 317 masl and likely part of the Goodwood Glasgow PSW). It is immediately adjacent to the ORM's Natural Core Area and it does provide some habitat for amphibians.

No species of conservation concern or rare moraine species were identified in this area. However, the remains of a snapping turtle nest were observed in close proximity to the wetland (2008 observation). The nest was located within the road cut which has been dedicated to form part of the ORM trail. It is possible that the snapping turtle inhabits Wetland B and therefore there is the potential for this wetland to also be considered a candidate SWH.

Wetland B is considered to be a KNHF and as such a vegetation protection zone with a minimum of 30 metres will be required for this feature. No aggregate extraction or site alteration will occur within 30 m of this feature.

Wetland C – OMNR Unit 155

The vegetation community SWT2-2 (Figure 4) is mapped near the Cattle Pond in the northwest corner of the Subject Lands. It is located within the Goodwood Glasgow PSW and is in close proximity to the North Glasgow Wetland ESA which is mapped west of Concession Road #4. Wetland C vegetation unit is 1.26 ha in size and is partially located within the ORMCP's Core Natural Area which is not located on the Site. Its elevation of 315.9 masl is close to the elevation of the regional groundwater table which ranges from approximately 313.0 to 315.4 masl. Genivar reports that it is hydrologically connected to the regional groundwater table. Wetland C is a PSW and is considered a KNHF and HSF.

As required by the ORMCP, a vegetation protection zone with a minimum width of 30 metres has been placed around this vegetation unit. Aggregate extraction is not permitted within the 30 metre vegetation protection zone. As it is expected that aggregate extraction will not measurably affect the regional groundwater table, it is expected that this 30-metre buffer will provide adequate protection for the wetlands and no negative impacts are expected as a result of aggregate extraction.

The original field inventories were completed at a time when cattle were not being pastured in this area as they were in later years (i.e., 2003 – 2010). A small wetland community was originally mapped along the edges of the Cattle Pond. This wetland community no longer exists due to disturbance from pasturing cattle. However, if in the future, this area is no longer used for agriculture it may revert back to a wetland as defined by the ORMCP.

3.1.2 Other Wetlands

As previously mentioned, the Goodwood Glasgow Provincially Significant Wetland Complex is located in close proximity to the Subject Lands. There are several small wetland pockets which the OMNR has included within the wetland complex. There are several small wetlands located within 120 m to the west and south of the Subject Lands. These have been identified in Figure 5 as Wetlands D, E, F1 & F2, and G. The vegetation communities mapped for these wetlands are shown in Figure 4 and include mainly swamp and march wetland types.

The elevation of these wetlands range from approximately 313 masl to 317 masl which suggests that they are hydrogeologically connected to the regional groundwater table. They are therefore all considered part of the Goodwood-Glasgow Provincially Significant Wetland Complex.

The proposed limit of extraction is more than 100 m from each wetland except for Wetland G. Wetland G is the only wetland located west of the Subject Lands and it is part of the North Glasgow Wetland ESA. The licensed limit will be within 50 m of this wetland however it is separated by Concession Road #4. Wetland G was investigated on April 14, 2011 by Darcy Boudreau (Colville Consulting Inc.) and Anthony Goodban (Goodban Ecological Consulting Inc.). The investigation confirmed that there is a wetland features and a small creek channel flowing west through the feature. Prior to the visit we were advised that a dam may be located downstream of Concession Road #4. No dam was observed but the farmer of the property has created a shallow ponded area by extracting within the creek. It is assumed that the in-line pond was created to provide cattle a source of water. A number of seeps were observed adjacent to the creek and in the wetland feature and are likely the headwater source of creek. None of the seeps were observed on the Subject Lands. No rare or endangered species were observed west of 4th Concession Road #4.

Aggregate extraction is not expected to measurably affect the regional groundwater table. Therefore no negative impacts on these off site wetlands are expected as a result of aggregate extraction.

3.2 Significant Portions of the Habitat of Endangered, Rare, and Threatened Species

Habitat of endangered, rare and threatened species as defined in the ORMCP:

a) is an area where individuals of an endangered species, a rare species or a threatened species live or have the potential to live and find adequate amounts of food, water, shelter, and space needed to sustain their population, including an area where a species concentrates at a vulnerable point in its annual or life cycle and an area that is important to a migratory or non-migratory species; and

b) has been further identified, by the Ministry of Natural Resources or by any other person, according to evaluation procedures established by the Ministry of Natural Resources, as amended from time to time."

Significant as defined in the ORMCP:

"means identified as significant by the Ministry of Natural Resources, using evaluation procedures established by that Ministry, as amended from time to time."

Rare, threatened and endangered species (RTE's) as described by the ORMCP include those species identified in any one of the following categories:

- Provincially Rare;
- Vulnerable, Threatened or Endangered by the Committee on the Status of Species at Risk in Ontario (COSSARO); and
- Species of Concern, Threatened or Endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

Habitat for Moraine Rare Species is not considered in the identification of "significant portions of the habitat of endangered, rare and threatened species" for the ORM.

RiverStone (2010) noted that there was the potential for Butternut, Acadian Flycatcher, Henslow's Sparrow, Whip-poor-will, and Chimney Swift to occur on or adjacent to the Subject Lands. All of these species have been designated endangered or threatened federally and provincially and therefore their habitat could qualify as significant portions of the habitat of endangered, rare, and threatened species. In addition, fieldwork revealed the presence of the Bobolink which is a threatened species. Fieldwork also confirmed the presence of the western chorus frog which has been designated threatened north of the Carolinian Zone but has been designated not at risk by the Ministry of Natural Resources. As mentioned previously, the presence of the snapping turtle has also been confirmed and habitat for this species could constitute significant portions of the habitat of a rare species. All of these species are discussed in more detail below.

3.2.1 Butternut

The botanical surveys were intensive and covered the entire area, and no butternut trees were observed on the Subject Lands. Although there is suitable habitat for this species, it is absent from the Subject Lands. One specimen in poor health was found however on adjacent lands east of the Middleton property.

3.2.2 Whip-poor-will

The Whip-poor-will nests in forested habitat where it is usually associated with openings. It avoids deep forest and extensive open areas, however, in Ontario, preferred habitats include rock and sand barrens with scattered trees, savannahs, old burns with early successional forest growth, and large, open coniferous plantations, especially those dominated by pines (Mills, 2007; Peck and James, 1983).

The Whip-poor-will appears to avoid areas of pure conifers, except for plantations, and prefers young poplar-birch stands, early successional areas, and hardwood and mixed-wood forests as mature as pole stage. Mature stands are seldom used, and it shows a preference for even-aged stands. Pastures, shrubby meadows, pipeline and hydro rights-of-way, and rock outcrops adjacent to or in extensive forest may provide good nesting habitat. Key habitat features are shade, proximity to open areas for foraging, and fairly sparse ground cover. Most nesting occurs in dry habitat (Cink, 2002; Cooper ,1981; Raynor, 1941; Taylor and Taylor, 1979; Tyler in Bent, 1940).

Although it is associated with forest edges and openings, the Whip-poor-will is an area-sensitive species that requires extensive forest. It may occasionally nest in smaller woodlots, but only where there is a high percentage of forest cover in the general region. In Maryland, it continued to nest in woodlots as small as 40 ha, but only after the amount of forest cover increased from 38% to 51%. In agricultural southern Ontario, it appears to be restricted to areas of contiguous forest that are at least 100 ha in areas: 500-1,000 ha may be necessary to support more than a very few pairs (Bushman and Therres, 1988; Cooper, 1981; Robbins, 1979; Robbins et al., 1989).

Habitat in the general vicinity of the Subject Lands is marginal for the Whip-poor-will. The forests within the area are relatively small and considerably smaller than those typically occupied by this species. The only potentially suitable habitat is the pine plantation on the southern side of the Site, which is far too small to support the Whip-poor-will.

An evening survey was conducted during the full moon in late May 2010, during a period when this species would have been calling if it were present. No Whip-poor-wills were heard during that survey. Given that this species can be heard from a distance of about 1 km and that the surrounding habitat is marginal at best for it, it is concluded that the Whip-poor-will is absent from the general area.

3.2.3 Chimney Swift

In southern Ontario, off of the Canadian Shield, the Chimney Swift nests predominantly in urban areas. Its ancestral habitat was mature forest or forest containing trees with suitable nest cavities, typical of its current range on the southern Shield. After European settlement, the Chimney Swift quickly adapted to human-made structures for nesting, particularly chimneys. In the south, it appears to have abandoned its ancestral habitat and is associated almost entirely with developed areas. In natural habitat, it requires trees with cavities. Trees with a minimum diameter at breast height (dbh) of 30-40 cm are necessary, but much larger trees are preferred, typically 60 cm dbh of larger. In developed areas, chimneys, barns, and other human-made structures provide suitable nesting habitat. In urban and agricultural areas, human-made structures appear to be used almost exclusively now. Nesting in natural areas has not been documented recently in the province within regions where forests have been cleared for agriculture and in urban centres (Fischer, 1958; Mayfield, 1988; Peck and James, 1983).

Chimneys that are suitable for nesting are larger than 28.5 cm in diameter with a rough inner surface of brick, cement, and tile offering protection against cold weather. Most suitable chimneys were built before 1960 with modern chimneys being smaller and suitable for supporting only a single nest (Gauthier et al., 2007).

Within the area proposed for extraction, there is no suitable habitat for the Chimney Swift. The houses along the Fourth Concession have chimneys but these are not being used by the Chimney Swift. This species is conspicuous while it forages aerially for insects and would have been detected on the breeding bird surveys if it was present. The Chimney Swift is considered absent within the study area.

3.2.4 Acadian Flycatcher

The Acadian Flycatcher has very demanding habitat requirements, which partially explains why it is not a common species. These habitat requirements are summarized below.

It is an area-sensitive species. Although it occasionally occurs in woodlots as small as 1 to 5 ha, forests 30 to 36 ha in area appear to be the minimum size to support a viable population (Austin et al., 1994; Page and Cadman, 1994).

Considerable information is available on its forest preferences in Ontario, with forest composition and structure being very important. The first Ontario nest was found in a mature, extensive black ash forest. It also nests in mature red and silver maple swamps, but appears to prefer sugar maple-beech forests and black maple forests if water is present. Wooded ravines are favoured habitat. Almost invariably, canopy trees are tall and the canopy is completely or almost closed; uneven-aged stands may be preferred. The understory is very open with very few saplings, few if any shrubs and the ground is virtually devoid of vegetation in prime habitat (Bisson et al., 2000; Heagy, 1997; Martin et al., 1999; McCracken, 1999; Page and Cadman, 1994; Snyder, 1953; Wormington, 1977).

The presence of water appears to be an essential habitat component, and most nests are over pools of water or streams. Forested streams of almost any size may be used including small spring branches well up into wooded hills. Territories are often linear along watercourses. Preferred watercourses usually have steep ravines with closed-canopy forest. Complete breeding failure in Haldimand in 1998 was attributed to drought that resulted in woodland pools drying up. Territorial males failed to attract mates, presumably because the habitat lacked the necessary open pools of standing water. This suggests that water is critical in the territory of Acadian Flycatchers (Christy in Bent, 1942; Martin et al., 1999; McCracken, 1999; Page and Cadman, 1994).

There is no suitable habitat for the Acadian Flycatcher on the Subject Lands. The forested area west of the Middleton property is also unsuitable habitat. It lacks the required woodland pools and has an understory that has too much woody vegetation to provide suitable habitat. It is also smaller than the minimum-sized woodland that is typically inhabited by the Acadian Flycatcher.

The Acadian Flycatcher was not detected during the five breeding bird surveys that were completed on site. It is concluded that this species is absent from the Subject Lands and its adjacent areas.

3.2.5 Henslow's Sparrow

The Henslow's Sparrow is a grassland species and it may use native tallgrass prairie and anthropogenic old-field meadows, pastures, and hayfields; sedge marshes may also be inhabited. Fields that are used are frequently moist and have tall rank vegetation with scattered shrubs, although shrubs may not be essential if there are tall plants present that provide suitable singing perches (Herkert et al., 2002; Peck and James, 1987; Tuininga, 2007). Pruitt (1996) described the key breeding season habitat requirements as: tall, dense grass; a well-developed litter area; standing dead vegetation; availability of song perches; and sparse or no woody vegetation. The primary vegetation requirements for the Henslow's Sparrow are a deep litter area and abundant standing dead vegetation, tall dense herbaceous or graminoid vegetation, and little woody cover (Hands et al., 1989; Hanson, 1994: Reinking and Hendricks, 1993; Robins, 1971; Swanson, 1996; Verser, 1990; Wiens, 1969; Zimmerman, 1988).

The Henslow's Sparrow is an area-sensitive species that probably requires fields 40-100 ha in area (OMNR, 2000). Earlier information (Austen et al., 1994) suggested that fields as small as 10-30 ha were adequate to support this species in Ontario. The recovery plan for the Henslow's Sparrow suggested that restored grasslands should be larger than 50 ha, and preferably larger than 100 ha (Environment Canada, 2006).

The Henslow's Sparrow has declined significantly in Ontario and most records in the NHIC database are historical. During the second atlas, this species was found in only 9 squares within the province, none of which were anywhere near the Subject Lands. Breeding was not confirmed in the province during the second atlas, and probable breeding was documented in only 2 squares (Tuininga 2007).

Habitat on the Subject Land is unsuitable for the Henslow's Sparrow. It is too dry, too small, and does not have the correct habitat structure of deep litter and rank vegetation.

The Henslow's Sparrow is considered absent on the Subject Lands. It was not detected during any of the breeding bird surveys and the habitat is considered unsuitable. In addition, there are no recent records of this species within the general region of the Subject Lands.

3.2.6 Western Chorus Frog

During the 2005 and 2006 frog call surveys, single western chorus frogs were heard calling from Vic's Pond the pond in Wetland B. In this area, the chorus frog is designated threatened nationally, but the species has been evaluated by the Ministry of Natural Resources and determined to be not at risk in Ontario.

The federal *Species at Risk Act* applies only to federal lands, except in the case of species covered under the federal *Fisheries Act* or the *Migratory Birds Convention Act*. The chorus frog is not protected by either of these acts, so normally the presence of the western chorus frog would not be a constraint. Officially and legally, it would not be protected by the SARA or the PPS. However, the ORMCP also has jurisdiction over the Subject Lands and in its definition of species that are considered endangered or threatened it includes those species designated as such by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC). Consequently, the western chorus frog should be considered threatened on private land that is on the Moraine even though it would have no status on private land off the Moraine.

The numbers of this species on the Site are very low. In 2010 only one was heard in each of Vic's Pond and Wetland B. Nonetheless, these areas are considered significant portions of the habitat of the western chorus frog.

3.2.7 Bobolink

Both the federal and provincial governments have assessed the status of the Bobolink and determined that it is threatened. Under the SARA, it is not listed on any schedules and is listed as not having any status. The Bobolink was formally listed under the ESA in early October 2010 and is consequently protected by the provisions of the ESA.

The Bobolink is a grassland species that nests in fields with a mixture of grasses and broad-leaved forbs. Originally it was a prairie species. With the onset of European settlement, its original habitat was mostly destroyed and it adapted to using agricultural land. Consequently, it is much more abundant in Ontario now than it was prior to conversion of forests to agricultural land.

The Bobolink prefers fields with relatively low amounts of total vegetative cover, low coverage by alfalfa (*Medicago sativa*), and low total legume cover, but with high litter cover and grass-to-legume ratios (Bollinger and Gavin 1992; Martin and Gavin 1995). These habitat conditions generally occur in fields that are 8 or more years old. The Bobolink may be somewhat area sensitive. Fields larger than 30 ha support nearly twice the density of Bobolinks as fields smaller than 10 ha, but it is known to inhabit fields as small as 2 ha (Bollinger and Gavin 1992).

The current decline of the Bobolink is linked to changes in agricultural practices. These include declining area in hay, increasing use of alfalfa as the primary forage crop, earlier hay-cropping dates, earlier rotation of hayfields to other crops, and declines in the amount of pasture (Bollinger and Gavin 1992;

Savignac 2010). Other factors contributing to its decline are natural succession, planting of marginal agricultural land to plantations, and urban development.

Small numbers of Bobolinks have been documented on the Subject Lands and Site each year that inventories have been completed. Originally, these occupied the cultural meadow habitat in the southwest portion of the Site. In 2010, a single male was present and it appeared to be nesting within the hayfield. This field was in row crops during previous inventories. The hayfield was dominated by alfalfa and therefore may be considered marginal habitat. A single male was also noted on adjacent lands south of the Subject Lands.

Habitat for the Bobolink is considered marginal on the Subject Lands. It is likely that the cultural meadow is becoming too shrubby for this species, which would explain why it was nesting in the alfalfa field in 2010 instead of in the meadow. In addition, the meadow is relatively small compared with the habitat requirements of the Bobolink. Alfalfa fields have been demonstrated to be relatively poor habitat that is frequently mowed before the birds can successfully raise their first brood. The presence of a single male within the hayfield is not an indication that any young were successfully reared on the Subject Lands. In fact it was confirmed through the farmer that the first cut of hay is generally taken within the first week of June. Hay fields harvested before July 12th do not provide suitable habitat (pers. comm., Karine Beriault, Biodiversity Species at Risk Biologist, OMNR).

The Subject Lands do not provide significant habitat for the Bobolink and therefore do not constitute significant portions of the habitat of an endangered, rare, or threatened species. The reasons for not considering this significant habitat are:

- The Subject Lands including the Site support a low population, with only one male present in 2010. No counts of numbers were made in previous years except in 2006 when 2 males were present, but the Subject Lands and Site never supported a large population;
- Because the species is now nesting in an alfalfa field, the likelihood of successfully rearing young is low. Consequently, the Subject Lands contribute little if anything to the overall Bobolink population; and
- The alfalfa habitat is transitional and would eventually be removed as part of normal agricultural rotational practices.

It should be noted that the ORM Technical Guidelines and the PPS criterion for habitat of an endangered or threatened species is "significant portion of the habitat" or "significant habitat". Under the ESA, however, the terminology used is simply "habitat". In the ESA, habitat is defined as:

> *(a) with respect to a species of animal, plant or other organism for which a regulation made under clause 55(1) (a) is in force, the area prescribed by that regulation as the habitat of the species, or*
>
> *(b) with respect to any other species of animal, plant or other organism, an area on which the species depends, directly or indirectly, to carry on its life processes, including life processes such as reproduction, rearing, hibernation, migration or feeding, and includes places in the area described in clause (a) or (b), whichever is applicable, that are used by members of the species as dens, nests, hibernacula or other residences.*

The Bobolink is not yet regulated under the ESA, so clause (b) of the definition of habitat applies to it.

It is also concluded that the alfalfa field does not constitute habitat for the Bobolink under the ESA. The field is more of an ecological trap than habitat. Birds may be attracted to the area to nest but reproductive success is highly unlikely to be successful due to early cutting of hay. The literature also confirms that alfalfa fields are poor habitat for this species. Also of note, the ORM Technical Paper on Significant

Wildlife Habitat requires that 20 pairs of Bobolinks be present to qualify as SWH. Consequently, the Subject Lands would not qualify even as SWH for Bobolink if it were not designated threatened.

3.2.8 Snapping Turtle

The snapping turtle has recently been designated special concern nationally and provincially, so the NHIC has few records of this species. Its status in Ontario has also recently been changed from secure to vulnerable. Actually, it is quite common and widespread in Ontario, but is considered at risk because it takes so long to reach sexual maturity, it has a very low reproductive success rate, and there is high mortality of hatchlings (Cameron 2008). Because it is considered special concern nationally and provincially, its habitat potentially qualifies as the significant portion of the habitat of a rare species.

The snapping turtle is a highly aquatic species that leaves water only to lay eggs and rarely to bask. Even when it basks, it usually does so on standing or floating timber in water. It occurs in lakes, large ponds, rivers, and swamps that retain water year-round. Nesting usually occurs in gravel or sand deposits, often in anthropogenic sites such as roadsides and along railways (Cameron 2008).

An old snapping turtle nest was discovered on the Subject Lands and not on the Site. It was found along an old road cut that is in the area dedicated to the Oak Ridges Moraine Trail. The turtle likely inhabits Wetland B which is located on the Site. Although only one nest was observed, Wetland B is considered Significant Wildlife Habitat for the snapping turtle. Although probably only a single pair is present, this species has high site fidelity and the area may be used for an extended period by the turtles. Its habitat will be maintained and potentially expanded following extraction and rehabilitation.

3.2.9 Summary of Significant Portions of the Habitat of Endangered, Rare, and Threatened Species

Search of background data revealed that there was the potential for five endangered and threatened species to occur on or adjacent to the Subject Lands. An analysis of their habitat requirements compared with habitat available within the study area revealed that there was no suitable habitat for these species. The field inventories also demonstrated that these species were absent.

The western chorus frog was confirmed as being present in both Wetland A (Vic's Pond) and Wetland B. This species is designated threatened nationally but is considered not at risk provincially. Normally the chorus frog would have no special status on private land in Ontario, but the ORMCP considers all species designated as endangered or threatened by COSEWIC to be significant on the Moraine. Consequently, Vic's Pond and Wetland B are considered significant portions of the habitat of an endangered, rare, or threatened species because of the presence of the chorus frog.

The presence of another threatened species, Bobolink, was confirmed on the Site. The habitat in which it was found is considered an ecological trap as it is highly unlikely that any young would be fledged from this habitat. It is concluded that the Subject Lands do not support any significant portions of the habitat of a threatened species under either the ORMCP or the PPS, or any habitat under the ESA. The Bobolink was nesting in adjacent lands south of the Subject Lands. This habitat was not assessed in detail but may provide habitat for this threatened species.

A single snapping turtle nest was found and it is probable that this species inhabits Wetland B. This wetland is considered the significant portion of the habitat of a rare species as it is likely to support this species on a long-term basis due to the species' high site fidelity and longevity.

Aggregate extraction within the Site will have no impact on portions of the habitat of rare, threatened, or endangered species. The only habitat for the snapping turtle was identified and a buffer will be maintained around the wetland that constitutes its significant habitat. The area that is used for nesting will also be maintained and protected within the Oak Ridges Moraine Trail.

3.3 Fish Habitat

Fish habitat as defined in the ORMCP:

> "means the spawning grounds and nursery, rearing, food supply and migration areas on which fish depend directly or indirectly in order to carry out the life processes, as further identified by the Department of Fisheries and Oceans (Canada)."

The location of fish habitat can be determined by:

- mapping and information provided or approved by OMNR, Federal Department of Fisheries and Oceans (DFO) or a delegated authority of DFO; or
- where no detailed fish habitat mapping has been completed all permanent or intermittent streams, kettle lakes, and all ponds other than off stream man-made ponds shall be deemed to be fish habitat unless it can be demonstrated to the satisfaction of the approval authority that the feature does not constitute fish habitat as defined by the DFO.

The ponds on the Subject Lands and within the Site are man-made and are not connected to any streams in the area and therefore do not comprise fish habitat. No fish habitat was identified on the Subject Lands. The closest fish habitat identified is approximately 300 m south of the Subject Lands.

3.4 Areas of Natural and Scientific Interest

Life Science ANSIs as defined in the ORMCP:

> "means an area that has been, (a) identified as having life science values related to protection, scientific study or education; and (b) further identified by the Ministry of Natural Resources using evaluation procedures established by that Ministry, as amended from time to time."

Life Science ANSIs includes all ANSIs identified by the OMNR including Provincially and Regionally Significant ANSIs.

There are no Life Science ANSIs located on or adjacent to the Subject Lands.

3.5 Significant Valley Lands

Valleylands as defined in the ORMCP (ORMCP Technical Papers, http://www.mah.gov.on.ca/AssetFactory.aspx?did=4887, last accessed November 16, 2010):

> "means a natural area that occurs in a valley or other landform depression that has water flowing through or standing for some period of the year."

Significant as defined in the ORMCP:

> "means identified as significant by the Ministry of Natural Resources, using evaluation procedures established by that Ministry, as amended from time to time."

Significant valley lands include:

- all streams with well defined valley morphology (i.e. floodplains, meander belts and valley slopes) having an average width of 25 m or more;
- all spillways and ravines with the presence of flowing or standing water for a period of no less than two months in an average year. Such features must be greater than 50 metres in length; 25 metres in average width with a well defined morphology (i.e. two valley walls of 15% slope or greater with a minimum height of 5 metres, and valley floor), and having an overall area of 0.5 ha or greater; and
- additional features identified by the approval authority, that are consistent with one or more of the functions described above.

The OMNR has not identified significant valley lands (SVL) on or adjacent to the Subject Lands and no SVLs were identified as a result of this study.

3.6 Significant Woodlands

Woodlands as defined in the ORMCP:

> "means a treed area, woodlot or forested area, other than a cultivated fruit or nut orchard or a plantation established for the purpose of producing Christmas trees."

Significant as defined in the ORMCP:

> "means identified as significant by the Ministry of Natural Resources, using evaluation procedures established by that Ministry, as amended from time to time."

There are no woodlands on the Subject Lands, however, a forested area is located immediately adjacent to the Subject Lands which is approximately 6 ha in size (Figure 4). The dominant species in this forest are Sugar Maple and Black Cherry, although Basswood and Trembling Aspen are also common. This forest community is considered to be very common and demonstrably secure. In the Countryside area of the ORMCP, woodlands 4 ha and greater are considered to be significant. Therefore, the Subject Lands are adjacent to a significant woodland.

On June 7, 2010 the OMNR once again visited the Subject Lands with Colville Consulting to review the site conditions and proposed setbacks from natural heritage features. Six representatives from the OMNR attended the meeting including Mr. Bohdan Kowalyk (Forester). Initially Mr. Kowalyk had accepted a 30 metre vegetation protection zone from the outside edge of the base of the trees. However, during the site visit the OMNR observed that approximately 20 trees have been removed from the west side of the Significant Woodlands. A subsequent visit to the woodlands by Colville Consulting and Mr. Kowalyk determined that the average distance from the original property line to the trees that were removed was 10 metres. It was also determined that the extent of the north portion of the woodlot was approximately 10 m north of the property line. To compensate for the loss of these trees, the OMNR has requested that instead of 30 metre vegetation zone from the outside of the trees trunks, a 40 m protection zone from the original property line be used.

Aggregate extraction will not be permitted within the 40 metre VPZ. The majority of the lands within the 40 metre VPZ are presently in agricultural production or are part of the old field vegetation community. It is expected that area within the 40-metre buffer will naturalize during and post extraction activities. The 40 m VPZ will provide an adequate area of protection for the woodlands and no negative impacts are expected as a result of aggregate extraction. The 0.6 m wide ORM Trail will be located within the VPZ.

3.7 Significant Wildlife Habitat

Wildlife Habitat as defined in the ORMCP:

"means land that,

a) is an area where plants, animals and other organisms live or have the potential to live and find adequate amounts of food, water, shelter and space to sustain their population, including an area where a species concentrates at a vulnerable point in its annual or life cycle and an area that is important to a migratory or non-migratory species, and

b) has been further identified by the Ministry of Natural Resources or by any other person, according to evaluation procedures established by the Ministry of Natural Resources, as amended from time to time."

Significant as defined in the ORMCP:

> "means identified as significant by the Ministry of Natural Resources, using evaluation procedures established by that Ministry, as amended from time to time."

The Significant Wildlife Habitat Technical Guide (OMNR 2010) identifies four categories of Significant Wildlife Habitat:

- Seasonal Concentration Areas;
- Rare Vegetation Communities or Specialized Habitat for Wildlife;
- Habitat for Species of Conservation Concern (Not including Rare, Threatened or Endangered Species); and
- Animal Movement Corridors.

The methodology used to identify significant wildlife habitat (SWH) is provided by the OMNR's Significant Wildlife Habitat Technical Paper for the Oak Ridges Moraine – Technical Paper 2 (ORMCP Technical Papers, http://www.mah.gov.on.ca/AssetFactory.aspx?did=4887, last accessed November 16, 2010). This technical paper provides the description and requirements for a wildlife habitat to become significant on the ORM for each of the above categories. The process starts with a review of background information, ELC mapping, and the identification of candidate SWH. Schedules 1 and 2 of Technical Paper 2 were used to assess the candidate SWHs (Appendix E). This section of the report provides the rationale for determining which features qualified as SWH and the results are summarized in Appendix E.

There are no seasonal concentration areas on the Subject Lands or its adjacent lands. Waterfowl stopover and staging areas, deer wintering areas, colonial nesting bird habitat, waterfowl nesting areas, and snake hibernacula are absent.

3.7.1 Rare Vegetation Communities or Specialized Habitat for Wildlife

There are no rare vegetation communities within the study area.

The SWH Technical Paper (ORMCP Technical Papers. http://www.mah.gov.on.ca/AssetFactory.aspx ?did=4887, last accessed November 16, 2010) identifies the following specialized habitats as potential SWH: amphibian woodland breeding habitat, interior forest breeding bird species, open-country breeding birds, wetland breeding birds, amphibian breeding habitat (wetlands), raptor nesting habitat, turtle nesting habitat and turtle overwintering habitat, and seeps and springs. Of these, there is no amphibian woodland breeding habitat, wetland breeding birds, raptor nesting habitat, or seeps and springs. Although a Northern Harrier was observed within the study area, it was concluded that it was not nesting so there is no raptor nesting habitat.

The only interior forest breeding bird species that is listed within the SWH Technical Paper that was found within the study area was the Ovenbird. It occurred in the adjacent lands east of the Subject Lands and only one pair was present during each year. Consequently, there is no SWH for forest interior breeding bird species present.

To qualify as SWH for open-country birds, an area must be a grassland at least 10 ha in area and support breeding pairs of at least 5 of the identified species. Several of these open-country birds were observed within the study area: Bobolink (1 pair nesting within the alfalfa field instead of the grassland area), Brown Thrasher (1 pair nesting in a hedgerow on the southeastern boundary of the Site but not in the grassland), Gray Catbird (1 pair nesting in shrub thicket swamp but not in the grassland), Clay-colored Sparrow (4 pairs nesting in the grassland), Eastern Kingbird (1 pair nesting in the grassland), Eastern Meadowlark (1 pair nesting near the abandoned barn but not in the grassland), Field Sparrow (1 pair

nesting in the grassland), Grasshopper Sparrow (1 pair nesting in the grassland), Savannah Sparrow (at least 6 pairs nesting in the hayfield but not in the grassland), and Vesper Sparrow (1 pair nesting in adjacent agricultural land east of the Subject Lands but not in the grassland). Consequently, there were four open-country birds nesting in the grassland (Clay-colored Sparrow, Eastern Kingbird, Field Sparrow, and Grasshopper Sparrow). In addition to these species, the Bobolink and Savannah Sparrow occasionally perched and sang at the edges of the grassland even though they were nesting in the alfalfa field. This area is marginal for qualifying as SWH for open-country birds. It is slightly above the minimum threshold size of 10 ha, with a total size of 11.7 ha, and it supports four of the listed species but the criterion is five species. However, an additional two listed species incorporated small portions of the grassland into their territories even though they were not nesting in it. To err on the conservative side, the grassland area is identified as SWH for open-country breeding bird species. However, the SWH Technical Paper states that there is no requirement to protect this habitat as SWH. Nonetheless, portions of this habitat will be retained as part of the VPZs around the ponds and wetlands and in the intervening areas between these habitats. Because this habitat is not protected as SWH at this time under the ORMCP, it has not been identified as a constraint to aggregate extraction.

Amphibian breeding surveys were undertaken to determine if any of the on-site wetlands and ponds qualified as significant wildlife habitat for Amphibian Breeding Habitat. Results of the amphibian surveys are presented in Appendix B. Although most of the wetlands and ponds supported two or more of the species listed in the ORM Technical Paper on Significant Wildlife Habitat, not all of these areas supported at least 20 breeding pairs of two or more species. Cattle Pond, Vic's Pond, and Wetland B probably met the minimum requirement of at least 20 breeding pairs. Tree Pond supported two amphibian species but in low numbers and did not meet the minimum criterion. All areas that are SWH for breeding amphibians will not be adversely affected by the proposed extraction and breeding habitat for amphibians will be maintained on the Site.

Two turtle species were found on the Subject Lands but not on the Site. One of these, the common snapping turtle, has had its status upgraded to special concern so it is dealt with in Section 3.2 under the significant portions of the habitat of endangered, rare, and threatened species. The Midland painted turtle is the other species that was observed. Only one was seen in Cattle Pond on one occasion. To qualify as SWH there must be at least 5 turtles present. It is concluded that none of the Subject Lands habitats meet this criterion.

3.7.2 Habitats of Species of Conservation Concern

Species that are considered locally rare on the ORM may qualify as SWH, and the SWH Technical Paper identifies other species that may be considered candidate SWH provided that a minimum number of these species are present.

Locally Rare Species

Two significant plant species were found on or adjacent to the Subject Lands. Habitat for these species could potentially qualify as significant wildlife habitat. These include the Variegated Horsetail, which is considered rare on the Oak Ridges Moraine and Spotted Cranesbill, which is locally significant in Durham Region but are not considered rare on the Oak Ridges Moraine. The Variegated Horsetail was found on the Site and on a spoil pile around Vic's Pond in 2000, but was apparently absent in 2005. Habitat for it is not identified as SWH as the species may no longer be present. However, the area in which it was found will be retained. The Spotted Cranesbill was found off the Subject Lands in the deciduous woodland to the east. It will also not be affected by the proposed extension of the gravel pit. Habitat for it has not been identified as SWH as this is already within a significant woodland.

The Clay-colored Sparrow is considered rare on the ORM according to the ORM Technical Paper on Rare, Threatened and Endangered Species (ORMCP Technical Papers, http://www.mah.gov.on.ca/AssetFactory.aspx?did=4891, last accessed November 16, 2010). The Clay-colored Sparrow was present during the first year of inventory. It was searched for diligently in 2006, but could not be found. In 2010, however, four pairs were nesting in the cultural meadow east of Vic's Pond.

In Ontario, the Clay-colored Sparrow is usually found in scattered young conifers in open fields, but it may also occur in other shrubby areas. The only apparently suitable habitat on the Site is a very small stand of conifers south of Vic's Pond and the cultural meadow. In 2006, there were clearly no Clay-colored Sparrows within this area. The extensive coniferous plantations south of the Subject Lands have recently been thinned and portions of them have been removed. This may have created more suitable habitat for the Clay-colored Sparrow in adjacent lands than is currently present on the Site.

The Clay-colored Sparrow is not actually rare on the ORM. The Technical Papers were released prior to completion of the second Ontario Breeding Bird Atlas. Results from the atlas indicate that the Clay-colored Sparrow has greatly expanded its breeding range in Ontario, and it is now widespread on the ORM. The Clay-colored Sparrow no longer meets the definition of a rare breeding bird species on the ORM (ORMCP Technical Papers. http://www.mah.gov.on.ca/AssetFactory.aspx?did=4891, last accessed November 16, 2010). Rare species are defined as those known to occur at 20 or fewer sites on the Moraine. Results of the second Ontario Breeding Bird Atlas show that the Clay-colored Sparrow is widely distributed across the Moraine. This species has increased substantially since the first atlas. In Site Region 6, where the ORM is located, the Clay-colored Sparrow was documented in 96 squares during the first atlas and 246 during the second atlas (Rising 2007). In addition, there are likely multiple locations for this species in some squares.

Consequently, the habitat for the Clay-colored Sparrow on the Site is not considered SWH because the species is no longer rare on the Moraine.

Other Species of Conservation Concern

The ORM SWH Technical Paper identifies some other species of conservation concern, and their habitat may be considered SWH. These are Brown Thrasher, Bobolink, Eastern Meadowlark, Field Sparrow, Western Meadowlark, Upland Sandpiper, bullfrog, and Ruffed Grouse. The latter four species were not found within the study area. For each of the species present, there must be a minimum number of breeding pairs present for the area to qualify as SWH.

A single pair of Brown Thrashers was seen, well below the minimum requirement of 12 pairs. The number of pairs present for the other species was also below the minimum requirements to qualify as SWH: 1 pair of Bobolinks (20 or more pairs required), 1 pair of Eastern Meadowlarks (5 or more pairs required), and 1 pair of Field Sparrows, 2 in 2006 (15 or more pairs required).

Although the Bobolink is now considered threatened and is discussed in Section 3.2, it is important to note that the on-site habitat for this species would not qualify as SWH according to the ORM SWH Technical Paper.

3.7.3 Animal Movement Corridors

No animal movement corridors were defined within the study area. The separation areas, as discussed in Section 4, will provide adequate movement corridors following rehabilitation.

3.7.4 Summary of Significant Wildlife Habitat

The analysis of the habitats and features within the study area were compared with the definitions and requirements of the ORM SWH Technical Paper.

It was concluded that the following areas/features constitute SWH:

- The cultural meadow east of Vic's Pond was identified as habitat for open-country breeding birds. This area is marginal and may not actually meet the criterion for qualification of SWH. The criterion requires five of the listed bird species to be nesting. Only four of the listed species were nesting within the habitat, but two other species nested in the adjacent alfalfa field and occasionally used singing perches within the meadow. Under the ORM SWH Technical Paper, there is no requirement to protect habitat for open-country breeding birds so this is not a constraint to aggregate extraction. Portions of this habitat will be retained in the VPZs around Vic's Pond and Wetland B and in the area between these two areas.
- Cattle Pond, Vic's Pond, and Wetland B met the criterion for significant habitat for breeding amphibians in wetland habitat.

The Subject Lands support breeding pairs of the Clay-colored Sparrow, which is identified as being rare on the Moraine. More recent data provided by the second Ontario Breeding Bird Atlas confirm that this species occurs in more than 20 locations on the Moraine and is no longer rare. Consequently, habitat for the Clay-colored Sparrow is not considered significant. Nonetheless, some habitat will be retained for this species.

4. ASSESSMENT OF CONNECTIVITY

Connectivity, as defined in the ORMCP, "means the degree to which key natural heritage features are connected to one another by links such as plant and animal movement corridors, hydrological and nutrient cycling, genetic transfer, and energy flows through food webs" (Oak Ridges Moraine Technical Paper 3 – Supporting Connectivity, http://www.mah.gov.on.ca/AssetFactory.aspx?did=4888, last accessed November 16, 2010). The ORMCP requires "every application for development or site alteration shall identify planning, design and construction practices that ensure that no buildings or other site alterations impede the movement of plants and animals among key natural heritage features, hydrologically sensitive features and adjacent land within Natural Core Areas and Natural Linkage Areas."

The OMNR has developed specific criteria for identifying, supporting, and managing key linkages as part of the more detailed planning and design component for all planning applications. Major development applications in Countryside Areas, including proposed aggregate operations, are required to include an assessment of connectivity along with or as part of the natural heritage evaluation. The Oak Ridges Moraine Technical Paper 3 provides direction on how to address connectivity for development applications on the Moraine.

For mineral aggregate operations, one of the first steps is to identify all "separation areas" located on the Subject Lands and the Site. Separation Areas are defined as "All intervening lands between one key natural heritage features (KNHF) or hydrologically sensitive feature (HSF) and another KNHF or HSF; or between one KNHF or HSF and lands designated as Natural Core/Linkage Area, in which the intervening distance is 240 metres or less" (Oak Ridges Moraine Technical Paper 3, 2004).

Proposed mineral aggregate operations in the Countryside Areas shall:

a) identify all separation areas that are located on the lands subject to a planning application (Note: this will require identifying and considering all known Key Natural Heritage Features and Hydrologically Significant Features and Natural Core/Linkage areas on site and within 240m of the subject land); and

b) develop a rehabilitation plan that demonstrates how all lands within the separation areas will be restored to an open corridor similar to those identified in Section 5.2.1 of Technical Paper 3 which states that the rehabilitation plan should demonstrate how all lands within the separation areas will be restored to a continuous open corridor. The width of the corridor should be at least 60m wide, or half the width of the separation area (to a maximum of 240m), whichever is greater. All wooded area (including hedgerows) will be maintained or enhanced except where:

- there is no reasonable alternative to the removal of the vegetation;
- the removal will not significantly diminish ecological value especially for species that are most dependant on wooded linkages; and
- other portions of the separation area are returned to a natural vegetated state wherever possible to compensate for losses due to removal of the natural vegetation.

No buildings or structures are permitted in the open corridor except roads or utilities that may be considered where no reasonable alternative exists and where they do not impede the movement of native plant and animal species. The rehabilitation plan should demonstrate that as much of the open corridor as possible will be maintained or restored to native self-sustaining vegetation cover. Alternatively, the proponent shall demonstrate to the satisfaction of the approval authority that a continuous open corridor with the same attributes similar to the above can be preserved wholly, or partially outside the separation area and that this alternative would be a more effective connection for plant and animal movement.

4.1 Separation Areas on the Subject Lands

Only three KNHF's protected by the ORMCP have been identified on the Site. These KNFH's include the components of the Goodwood Glasgow PSW Complex; Wetlands A, B and C. Other KNHFs identified include the Significant Woodlands situated immediately adjacent to the Subject Lands in the east half of Lot 10 and the Goodwood Glasgow PSW Complex wetland area located west of 4th Concession Road. The area south of the Site (west half of Lot 9) is part of the Natural Core Area. Separation areas must be identified for each of these areas where they are within 240 metres of each other. The separation areas are shown in Figure 6.

4.1.1 Wetland KNHF

There are several wetland KNHFs identified and shown in Figure 6. A separation area connects several Wetland KNHFs (Wetlands A, B, C, D and G) located on and off the Subject Lands. Wetlands A and B are within 240 m of the Core Natural Area and therefore a separation area has been identified between these KNHFs and the Core Natural Area.

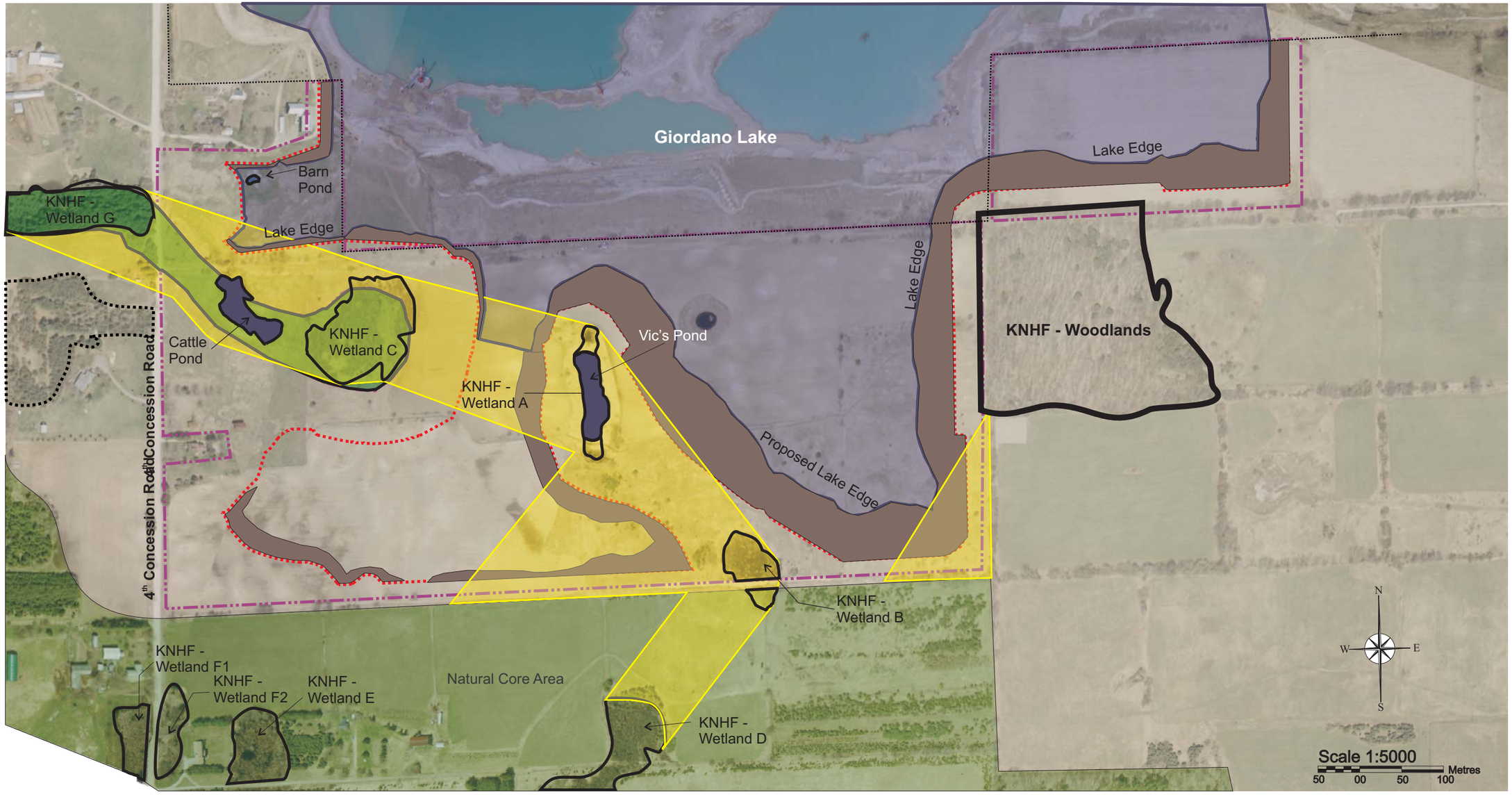
No aggregate extraction, development or site alteration is proposed within 30 metres of these wetland areas (Figure 5). Extraction is proposed within portions of the separation areas between Wetlands A and C, between Wetlands C and G, and between Wetlands A, B and the Core Natural Area south of the Subject Lands. These areas are shown in Figure 6. No significant natural features are located within these separation areas. The portion of the separation areas affected includes agricultural lands and cultural meadow (former agricultural lands). The removal of these lands will not significantly diminish ecological value of the area and in fact the proposed rehabilitation plan recommends creating new wetland areas, open grasslands and naturally vegetated side slopes within the affected separation areas. The majority of the separation areas identified between these wetland features and much of the adjoining lands beyond the separation areas will be restored to native, self-sustaining vegetation cover. An open corridor between the KNHFs and between KNHFs and Core Natural Areas will be restored and enhanced following rehabilitation of the site.

Since all other KNHFs, HSFs and Core Natural/Linkage Areas are greater than 240 m from wetland KNHFs additional separation areas are not required by the ORMCP to maintain connectivity.

4.1.2 Woodland KNHF

The woodland KNHF is within 240 m of the Natural Core Area to the south. At its closest point the separation distance is approximately 200 m. The separation area shown in Figure 6 is approximately 130 m wide at the base (the southern boundary of the Subject Lands) and 240 m long. The lands within the separation area consist of both early successional vegetation and cultivated fields. Some extraction of aggregate is proposed within the portions of this separation area. However, rehabilitation of the Site will restore a self-sustaining vegetation cover and ensure that a continuous open corridor is again established following extraction activities. Upon successful rehabilitation of the Site the separation areas will increase significantly in size.

A hedgerow located along the road allowance between Lots 10 and 11 forms a portion of the Site's northern boundary. It extends westwards from the woodland KNHF approximately 120 metres and is approximately 30 m in width. The hedgerow is greater than 550 metres from Wetland C (a KHNF); it is approximately 375 metres from Wetland A (Vic's Pond) and more than 400 m from Wetland B along the southern boundary. Its function as an ecological linkage to these features is minimal. Expansion of the Uxbridge Pit to include the Middleton property will result in the removal of approximately 90 metres of this hedgerow.



Legend

- Licenced Limits
- Proposed Extraction Limits Middleton Pit
- Proposed Licenced Area
- Proposed Below Water Extraction
- Steep Slopes - Maximum Grade 3:1
- Separation Areas
- Natural Core Areas

FIGURE 6
Separation Areas

Proposed Brock Road Pit Expansion

Prepared for:
VicDom Sand & Gravel Ltd.

Prepared by: COLVILLE CONSULTING INC.

DATE: June 2011

FILE: C03004_06

This hedgerow continues along the southern boundary of Lot 11 east of the woodlot along the road allowance. The hedgerow is discontinuous and less than 30 m in width. Other than the woodland KNHF it is not within 240 m of another KNHF, a HSF or Core Natural/Linkage Areas. Aggregate extraction is not proposed within 30 metres of the Woodland KNHF which includes some portions of the hedgerow. The remaining portion of the hedgerow east of the Woodland KNHF will be entirely outside of the extraction limits and is not expected to be impacted by extraction activity.

All other intervening lands between the KNHF's and Core/Linkage Areas on and adjacent to the Subject Lands exceed 240 metres and therefore do not meet the definition of a separation area. However, following rehabilitation of the Site, it is expected that several new natural areas will be created.

4.2 Restoration of Separation Areas

As shown in Figure 6, the proposed extraction limits extend into the separation areas identified at three locations. The separation areas at each of these locations will be restored as per the rehabilitation plan and will include:

- steep uplands (side slopes);
- removal of the sound attenuation berms around the Wetland C VPZ;
- very gently sloping lowlands to be restored to open grasslands;
- forested lands (to total approximately one third of the licenced area above the water table);
- open water (lake) and potentially small, open water sloughs; and
- open water marsh in littoral zone of Giordano Lake.

In addition, the proposed rehabilitation plan will further augment and enhance the areas adjacent to the identified separation areas.

5. IMPACT ASSESSMENT

Assessment of impacts includes an examination of potential adverse effects caused before, during, and after aggregate extraction.

The proposed aggregate extraction application for the Middleton Pit will affect predominantly cultivated fields used for row cropping and old agricultural fields. A significant amount of the aggregate resource on this property is located below the water table and therefore the licence application is to extract below the water table as is occurring in the existing pit. The planned after use for the much of the Site will be to an aquatic environment. The proposed below water extraction will increase the size of the existing water body, Giordano Lake, that is currently situated north of the Site and which was formed as a result of VicDom's existing aggregate operation. Wetland and upland environments will be created through rehabilitation efforts adjacent to the shores of Giordano Lake. This will create new habitats for a greater variety of plant and animal species and will improve the productivity of the lake for fish.

That portion of the proposed pit area where extraction will not occur below the water table will be rehabilitated to a combination of open grasslands and woodlands.

5.1 Natural Heritage Features

The inventories and review of background information revealed that four of the seven natural heritage features identified by the Provincial Policy Statement and ORMCP occur on and adjacent to the proposed expansion lands. These are significant wetlands; significant portions of the habitat of endangered, rare, and threatened species (western chorus frog and snapping turtle); significant woodlands (on adjacent lands only); and significant wildlife habitat. The Goodwood Glasgow PSW complex is comprised of several wetland areas of various size, form, and function. Three small wetland pockets on the Site are included within the Goodwood Glasgow PSW. The wetland complex also includes the North Glasgow Wetland Area ESA located west of the Subject Lands. The Subject Lands support two provincially significant wildlife species (Bobolink and snapping turtle) and two locally significant plant species (Variegated Horsetail and Bristly Crowfoot). The Clay-colored Sparrows is present on the Site and is identified as being rare on the ORM by the ORM Technical Paper, but more recent data indicate that this species is actually widespread and common on the Moraine. Three of the on-site wetlands support breeding amphibian populations that constitute SWH.

The study identified four types of KNHFs as defined by the ORMCP. They include the wetlands, significant portions of the habitat of endangered, rare, and threatened species, significant wildlife habitat (Wetland B) and significant woodlands located on the east part of Lot 10 adjacent to the Subject Lands. The wetlands are also considered to be hydrologically sensitive features. There are Natural Core Areas west of the Site west of the Middleton Property and on adjacent lands to the south.

5.2 Potential Impacts

5.2.1 Wetlands

All of the wetland areas identified on Subject Lands will be protected. None of the wetlands on the Subject Lands will be directly impacted by extraction activity provided that a minimum 30 m vegetation zone is established and maintained. The site plans developed by Skelton Brumwell show that the extraction limits will not encroach within a minimum of 30 m of the wetland limits and in some cases the VPZ is much larger. Genivar has demonstrated that extraction activities will not negatively affect the net recharge to the regional groundwater table and therefore no impacts to the wetlands hydrogeologically connected to the regional groundwater table (e.g., Goodwood Glasgow, Wetlands C, D, E, F and G) are expected.

Potential indirect impacts relate to the loss of catchment area resulting from extraction and changes to the perched groundwater tables. The Proposed VicDom Brock Road Pit Expansion and Middleton and Feasby Properties Hydrological Assessment (May 2011) completed by Genivar assessed the water balance within each of the subcatchment areas on and adjacent to the Subject Lands. It was determined that although there would be some changes to the catchment areas for each of the wetlands on the Subject Lands and a resulting reduction in runoff to the ponds and wetland areas, they would continue to receive surplus water. Genivar concludes that there will be no detectable changes to the water levels in the wetlands or the functions of the wetlands.

5.2.2 Significant Portions of the Habitat of Endangered, Rare, and Threatened Species

The only species present that qualify for this natural heritage category are the Bobolink, the western chorus frog and the snapping turtle.

Small numbers (one) of the western chorus frog were identified as being present and breeding in each of Vic's Pond and Wetland B. These two areas will be maintained along with a VPZ. The proposed extraction should have no effect on this species.

The snapping turtle is an aquatic species that resides in Wetland B and nests along the trail to the south of the wetland. The wetland and the nesting area will be retained and will not be affected by the proposed extraction envelope.

During active extraction, turtles may be attracted to the pit floor to nest as these areas typically provide ideal nesting substrate. Nests in these areas have very low probability of success due to movement of vehicles and equipment, and potential disturbance of the substrate. While the pit is active, the pit edge should be fenced with a silt barrier to prevent turtles from accessing the pit.

5.2.3 Significant Woodlands

The woodlands located on east half of Lot 10 adjacent to the Subject Lands are greater than 4 ha and are considered to be significant woodlands under the ORMCP. Subsequent to site visits in June 2010 a 40 metre vegetation protection zone will be established from the old property line along the west edge of the woodlands and the northern portion of the woodlands to ensure the woodlot will not be negatively impacted by aggregate extraction. Over time, it is expected that the lands within the vegetation protection zone will naturalize and this Key Natural Heritage Feature will increase in size. The connectivity between the woodlot and the Natural Core Area to the south will also improve overtime as this area naturalizes. No extraction is proposed within the 40 m VPZ. Restoration of the area immediately adjacent to the woodlot will not be required.

These woodlands are connected to a discontinuous hedgerow situated along the road allowance between Lots 10 and 11. Approximately 0.36 ha of this hedgerow is located west of the woodlands. The 40-metre vegetation protection zone surrounding the main body of the woodlot will incorporate a portion of the hedgerow. That area lying outside of the vegetation protection zone will be removed as a result of aggregate extraction. The hedgerow does not provide an important ecological linkage to other key natural heritage features in the area, nor does it provide any other significant ecological function.

An Oak Ridges Moraine (ORM) trail is proposed to be constructed within the 40 metre vegetation protection zone on the west side of the Significant Woodlands. A land exchange occurred in the past between the Township and VicDom to permit the construction of the ORM Trail. The proposed trail construction is non-invasive and will not require the removal of any mature trees. Stan Butcher with the Oak Ridges Trail Association (OTRA) confirmed that the trail will be hand constructed with as little clearing as possible to accommodate a 0.6 metre wide foot path. The 0.6 trail is not expected to have a negative impact on the adjacent Significant Woodlands.

5.2.4 Significant Wildlife Habitat

Two types of significant wildlife habitat were identified on the Subject Lands: habitat for open-country nesting birds and wetland breeding amphibian habitat. Under the ORMCP, there is no requirement to protect habitat for open-country nesting birds and the habitat on site is marginal for these species, barely meeting the criteria for significant wildlife habitat. Portions of this habitat will be extracted, but some will also be retained as part of the VPZs around KNHFs. Sufficient habitat will be retained such that some of the open-country birds will still nest in the area. Open grasslands will also be restored to significant portions of the Site following rehabilitation efforts.

All of the significant amphibian and turtle breeding areas will be retained with a minimum VPZ. The extension of the existing gravel pit will have no effect on these amphibian breeding areas. Additional amphibian and turtle breeding areas will be created following rehabilitation of the site.

Eight species of conservation concern were identified on and/or adjacent to the Subject Lands. These species are located within other KMHF or within the VPZ of these features and therefore, their presence did not result in the delineation of significant wildlife habitat.

The Variegated Horsetail occurred adjacent to the north end of Vic's Pond in an area mapped as cultural meadow. It was not observed during the 2005 inventory or during subsequent inventories. This species was located within the Vegetation Protection Zone and is not expected to be impacted as a result of extraction. This species is considered a moraine rare species and is of local significance, being reported as rare in the Regional Municipality of Durham. It is widespread and abundant in the remainder of southern Ontario. Because it is so abundant elsewhere, it may not be noticed as much by botanists and may be under-reported in Durham. Nonetheless, it is still considered a significant species locally. This is an early successional species that does well on disturbed soils, particularly wet, calcareous sands. The rehabilitated shoreline along Giordano Lake will be ideal habitat for this species.

Spotted Cranesbill was found in the woodlot east of the Subject Lands and as such, its habitat will be protected by the 30 metre VPZ established around the woodland perimeter. No impact to this species is expected as a result of aggregate extraction. Habitat for this species was not identified as significant wildlife habitat because it is within an area that is already identified as significant woodland.

Bristly Crowfoot, Sprengel's sedge, Common coontail and Silky dogwood are all located within the VPZ's of the wetland KNHF's on the Subject Lands and as such they have been included within the provincially significant wetland.

The Clay-colored Sparrow was found on the Subject Lands in 2000, was absent in 2006, and present again in 2010. This species is considered rare on Oak Ridges Moraine, although the results from the second Ontario Breeding Bird Atlas demonstrate that it is widespread on the moraine. It no longer qualifies as a rare species on the ORM.

Black Walnut (*Juglans nigra*) was observed on the slope immediately west of Wetland B (OMNR wetland #157) and may not be a native occurrence of this species. These trees are located within the VPZ of Wetland B, outside of the extraction area, and will not be disturbed.

All eight species are ranked S5, which indicates that they are common, widespread and abundant in Ontario. These species are not considered to be rare, threatened and endangered (RTE) species by the ORMCP definition.

5.2.5 Separation Areas

Aggregate extraction is permitted within separation areas as long as it can be demonstrated in a rehabilitation plan that the lands within the separation area will be restored following extraction activity. We recommend that the rehabilitation plan developed for the proposed Middleton Pit show restoration of the separation areas following extraction so the connectivity between the significant ecological features identified will be maintained and likely improved.

5.2.6 Alteration of Landforms

The rolling and hummocky landform will be significantly altered in those areas where extraction occurs below the water table. This terrain will largely be replaced by an aquatic environment (lake), shallow wetland areas and a broad scoop-shaped upland located adjacent to irregular shaped side slopes that will blend into the surrounding landscape.

5.2.7 Alteration of Surficial Drainage

No surface drainage features were identified on the Subject Lands. Due to the coarse texture of the soils on the Subject Lands most surface water infiltrates the surface and drains do not form. Aggregate extraction will have no significant impact on surface drains. There will be no impact on fish habitat on adjacent lands.

5.2.8 Alteration of Subsurface Drainage

The vegetation in the significant woodland adjacent to the Subject Lands is not dependent on the perched water table. No changes are expected to the soil moisture regime in the woodlot should there be a lowering of the perched water table on adjacent lands.

5.3 Mitigation Measures

The impacts to the Key Natural Heritage Features on and adjacent to the Site are expected to be minimal. However, the following mitigation measures are recommended to ensure that these features are maintained and to create opportunities that increase their size, function, diversity, and health.

1. The vegetation within setbacks and the vegetation protection zones must be maintained and protected. Access along the perimeter of the pit must be located outside of the vegetation protection zones identified in Figure 5.
2. The licensed limits of the pit must be fenced. In addition, the 30 m vegetation protection zones should also be fenced to ensure that the KNHF's are protected from aggregate extraction activities.
3. During active extraction, fencing should be installed near Wetland B to prevent turtle access to the pit. Once extraction is complete, the fencing should be removed. The lake, island, and wetlands that are planned for rehabilitation should provide additional habitat for snapping turtles.
4. Clearing of the trees in the hedgerow (outside of the vegetation protection zone) must be done in accordance with good forestry practices to ensure that damage to remaining trees is minimized.
5. Areas that are not actively being extracted should remain vegetated to reduce the potential for soil erosion.
6. Aggregate extraction should be completed in an orderly fashion and exposure of soil should be minimized.

7. Enough topsoil should be stripped and stored on-site to be used at a later time for subsequent use when rehabilitating side slopes and other landforms (e.g., wetland areas surrounding ponds).
8. To reduce the potential for sedimentation of wetland KNHF's, storage of soil for rehabilitation purposes within 60 metres of the wetland KNHF should be minimized.
9. Silt fencing should be installed and maintained along sensitive areas (e.g., soil storage stockpiles, locations with exposed soil, the eastern portion of the VPZ surrounding Wetland C, etc.).
10. The sound attenuation berms adjacent to Wetland C's vegetative protection zone should be removed post extraction to facilitate the movement of species within the separation areas.
11. Exposed sides slopes must be rehabilitated and seeded as soon as possible to limit the potential for erosion. Side slopes above the water table should be varied to blend into the existing landform and not exceed grades of 3:1.
12. All exposed areas above the final water level will be covered with topsoil and seeded with a suitable grass-legume mixture such as a mix of 15% Annual Rye, 20% Crown Vetch, 20% Alfalfa, 15% White Clover, 15% Perennial Rye, and 15% Tall Rye.
13. Consider transplanting of Variegated Horsetail (if found again) to other suitable locations adjacent to the rehabilitated areas adjacent to Giordano Lake.
14. There is a need to maintain viable terrestrial linkages between the wetlands (amphibian breeding ponds) and upland habitats (native forest) to maintain populations of amphibians. The naturalization of old fields surrounding the wetlands/ponds will enhance the quality of upland habitats adjacent to the wetland pockets and enhance the level of connectivity with the adjacent woodlot to the east (FOD5). Implementation of the recommendations in this report will ensure the viability of these terrestrial linkages.
15. Maintenance of existing wetland hydrology, to the extent feasible, is highly recommended. Under existing conditions, it may be that not all species reproduce successfully each year, i.e., there are good years and bad years depending on climatic and other factors. Annual monitoring will distinguish between impacts from removal of the subcatchment areas and naturally occurring changes (dry or wet periods). Therefore it is recommended that the Performance Monitoring Program proposed by Genivar (Proposed VicDom Brock Road Pit Expansion and Middleton and Feasby Properties Hydrogeologic Assessment, (May 2011) be undertaken and implement the mitigation measures recommended if groundwater or surface water conditions are impacted by the extraction process. The monitoring program recommended by Genivar will ensure that this is maintained.
16. Vic's Pond should remain permanently flooded and have sufficient depth of water during the winter months so that it will not freeze solid. Maintaining water levels as recommended by Genivar will ensure suitable water depths are maintained.
17. The creation of access lanes or roads should be avoided whenever possible for lands outside of the proposed extraction area, and particularly in the vicinity of the wetlands and rehabilitation areas to avoid mortality during migration periods to/from breeding pools and summer/winter habitat.

5.4 Monitoring Requirements

A number of monitoring programs should be put in place to ensure negative impacts to the natural environment are minimized or prevented and mitigation measures are followed and are successful. The monitoring programs include:

1. The hydrogeological monitoring program established for VicDom's Main Pit should be expanded to include the proposed expansion to ensure that unexpected impacts to the groundwater table are identified and changes to the extraction program can be implemented to avoid detrimental impacts to the groundwater table and the Provincially Significant Wetlands.

2. As resource areas are depleted and rehabilitation efforts begin, annual monitoring of the rehabilitated areas should be conducted by a qualified professional to:

- Ensure rehabilitation is proceeding as per the requirements of the rehabilitation plan and that mitigation measures are successful;
- Review rehabilitation efforts completed in the preceding year(s), assess their success, reassess rehabilitation goals based on the results and make recommendations for forthcoming year(s); and
- Identify additional opportunities to improve ecological features and functions.

3. Side slopes should be monitored to:

- identify areas that become unstable and require remediation modifications to ensure stability; and
- identify areas where erosion is occurring and reseeding is required.

6. REHABILITATION – OPPORTUNITIES FOR HABITAT CREATION

This aggregate extraction proposal provides an opportunity to rehabilitate the Site to after-uses that can support a variety of habitats that may be important to fish and wildlife. Rehabilitation of the pit will take the form of a large pond (Lake Giordano) with a naturally sustaining upland vegetation community and wetland vegetation communities. Three specific rehabilitation approaches have been taken to enhance habitat for fish and wildlife. These include creation of shallow-water habitat within the larger water body, maintenance of steeply sloped areas, and restricting excavation to the area above the water table in a portion of the extraction area thereby permitting the restoration/creation of naturally sustaining upland habitats. The target for the Subject Lands as requested by the OMNR during pre-consultation with the OMNR was for approximately one third of the area to be forested. It is anticipated that a minimum of 35% forest cover can be easily achieved over the long term. The resulting mix of terrestrial (forested and open grassland) and aquatic habitats will provide a higher diversity of habitat than current conditions, which are limited by the predominantly agricultural land use.

Habitat in the resulting water body (Lake Giordano) can be provided to ensure that there is suitable spawning, nursery, and foraging habitat for the target fish species. Depending on the final depth of the lake, it may be possible to support both cold and warmwater fish species. This can be accomplished by leaving shallow terraces around portions of the lake. Two shallow-water habitat areas are indicated on the conceptual rehabilitation plan (Figure 7) and are labelled New Wetland Area H and I. Final rehabilitation will ensure that these areas will be no more than 2 m deep. Backfilling may be required to achieve the desired depth of water in these areas. Wetlands H and I will be warmer than the rest of the lake and with a suitable substrate can develop into wetland areas that will be important sources of food and shelter for both warm and coldwater fish. The shallow areas should also provide spawning and nursery habitat for warmwater species. It may be necessary to introduce some logs and gravelly areas to ensure that all habitat requirements of key species are met. Shallow wetland areas are also likely to be attractive to waterfowl and other wetland birds, as well as amphibians.

Generally, amphibian populations are typically low in relatively deep, man-made water bodies that support fish. Salamanders are often absent in such water bodies. Providing shallow shelves and wetland habitat around the larger water body will also improve habitat conditions for amphibians.

As indicated on the conceptual rehabilitation plan, a band of steep topography will be rehabilitated along the eastern boundary of the extraction area and around portions of the southern boundary. The purpose of this is to improve connectivity with adjacent features (both on-site and off-site) and to allow continued wildlife movement between Key Natural Heritage Features and Core Areas.

Extraction below the water table will be minimized in the southwest corner of the Site. Belwo water extraction will only occur under specific circumstances (e.g., if a high quality lense of aggregate is found). The majority of this area will remain above the water table and will be restored predominantly to open grassland habitat. This is recommended for several reasons. The habitat diversity on the Site by creating upland habitat as opposed to aquatic habitat will increase. The final grade within this area will be such that drainage will be maintained within each subcatchment so that the hydrology of downstream areas outside of the Subject Lands is not affected by the extraction. A third benefit is that it will be possible to vary the topography within this area which will mimic existing topographic conditions.

One shallow-water habitat area in the southwest corner of the extraction area is indicated on the conceptual rehabilitation plan (Figure 7) and is labelled New Wetland J. This area has been identified for potential extraction below the water table to take advance of high quality aggregate deposits. If required, this area will be backfilled with on site material to create a shallow-water wetland habitat area no greater

than 2.0 metres deep and no less than 20 square metres and no more than 0.5 ha in area. This area will provide additional amphibian habitat.

The following are recommendations that should be part of the final rehabilitation plan:

1. Wetland Areas
   Create shallow-water habitat (Wetland H and I Figure 7) no deeper than 2 m grading gently from the lake's shoreline. The width of the shelf created will vary from a maximum of 30 m for Wetland I to approximately 175 m for Wetland H. It is expected that narrower wetland shelves are likely to form along the Lake's edge. Where possible (e.g., along the lake's littoral zone) topsoil should be placed over the surface to provide a growing medium for aquatic and riparian plant species. In that aquatic plants quickly establish themselves in new habitats, planting of aquatic species is not recommended. Areas that seed in naturally typically have higher species diversity and survival rates compared to those that are planted.

   It is recommended that structures such as boulders, gravel bars and logs be placed in these shallow areas will provide additional habitat features for a variety of animal species (fish, amphibians, insects, etc.).

   Where excavation is to remain predominantly above the water table, it is recommended that in some locations small ponds be excavated. The location of these ponds should be decided as extraction is taking place and where substantial amounts of good aggregate material are found below water table. The purpose of these ponds will be to provide wetland and pond habitat that will be suitable for amphibian breeding and that will support for a variety of aquatic plants and invertebrates. These areas should be a minimum of 20 m^2 and should have a shallow grade out to a maximum of 2 m in depth. The bottom need not be uniform in grade and hummocky contours will promote diversity and interspersion of plant species and open water habitats. There should be a relatively large basin that is about 2 m deep so that the pond does not freeze to the bottom. The wetlands/ponds should be designed so that they maintain a minimum of 30 to 50 cm of water into July to ensure that tadpoles have sufficient time to transform into adults.

2. Island Area
   The conceptual rehabilitation plan shows an elongated island located at the interface between the deep water environment and the shallow water wetland area (Wetland H). This island, labelled Vic's Island in Figure 7, and its construction is recommended to provide some additional sandy, lowland habitat. This habitat may become important for nesting waterfowl, reptiles and other species due to its isolation from the shore thereby limiting the potential for predation from species such as raccoon, skunks, foxes and coyotes.

3. Fish Habitat Areas
   Structure for fish habitat should also be added to the shallow-water habitat and other suitable areas. This should include logs for cover and areas of gravel for spawning habitat. Gravel patches about 10 by 10 m and 15 cm deep should be supplied for spawning fish species such as smallmouth bass and various sunfish species.

4. Forested Areas
   The conceptual rehabilitation plan identifies areas that can potentially be rehabilitated to a woodland vegetation community. The area identified in Figure 7 is approximately 8.5 ha. During pre-consultation the OMNR requested that at least one third of the licenced area above the water table be rehabilitated to a forested vegetation community. The licenced area above the water table is 15.5 ha. Therefore, there is more than enough area available to establish a woodland vegetation community and meet the OMNR's requested target which was approximately 5.16 ha. Some of the areas

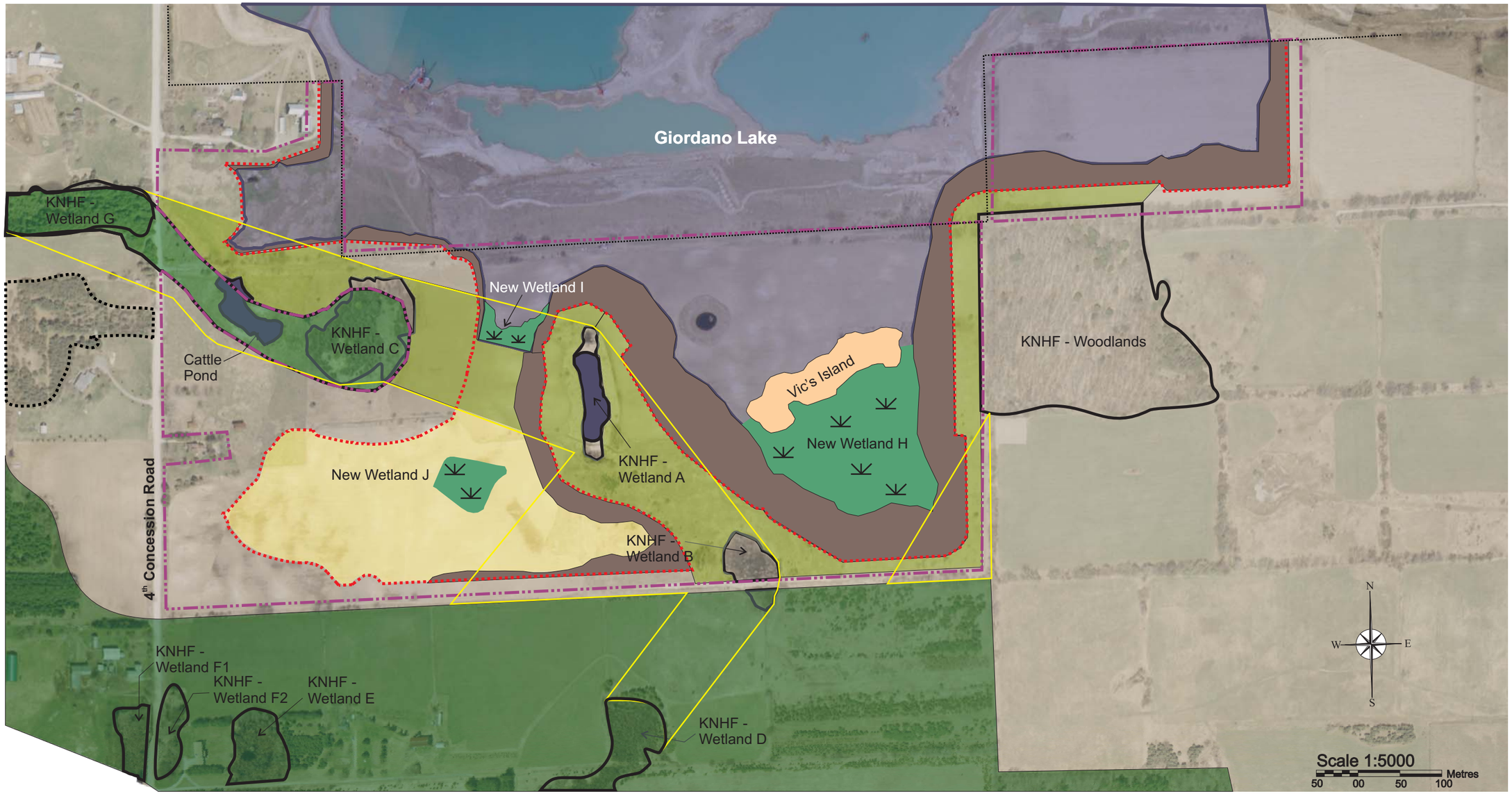
identified as forested area in the conceptual rehabilitation plan currently exhibit early successional woodland characteristics. It is anticipated that these area will continue to mature and regenerate during the operation of the pit. Other areas, particularly in the separation area between Wetland A and C may require trees to be planted following extraction. Following extraction selective planting will be done to infill areas that require additional trees. Future plantings should use native tree species that are common to the area including species that were identified on and adjacent to the Subject Lands.

4. Open Grassland Areas

   Open grassland areas should be seeded using a suitable grass/legume mix to reduce erosion potential and improve soil conditions (i.e., improve soil structure and increase soil organic matter content). The seed mix should include native species whenever possible. Seeding should not take place between June 15 and September 1 due to higher summer temperatures. Young plants may not survive the high temperatures and droughty conditions during this time. During this period, straw mulch can be applied instead to reduce the potential for erosion. Rehabilitation of the side slopes should not occur during this time period unless hydro-seeding techniques are employed.

   In areas where extraction is not permitted (i.e., the areas outside of the limits of extraction), existing vegetation should not be disturbed. It is expected that in the long term, many of the areas that are now cultural meadows will evolve into forests.

It is expected that more detailed information will be provided with the Site Plans (rehabilitation plan). These plans will ensure that suitable habitats are created for the conditions anticipated following extraction. It is recommended that as part of the final site plan, typical cross sections of rehabilitated habitat be shown. These should include at a minimum the shallow-water habitat and the woodlands and the open grassland terrestrial habitats.



Legend

- Licenced Limits
- Proposed Extraction Limits Middleton Pit
- Proposed Licenced Area
- Rehabilitated to open grasslands
- Rehabilitated to wetland area/Open water Marsh
- Rehabilitated to deep water lake
- Rehabilitated to upland area (Maximum 3:1 slopes)
- Rehabilitated Sand & Gravel Island
- Potential Forested Area
- Separation Areas
- Core Natural Areas

FIGURE 7
Conceptual Rehabilitation Plan

Proposed Brock Road Pit Expansion

Prepared for:
VicDom Sand & Gravel Ltd.

Prepared by: Colville Consulting Inc.

DATE: June 2011

FILE: C03004_07

7. CONCLUSIONS

Colville Consulting Inc. was retained by Genivar on behalf of VicDom Investments Limited to complete a Natural Environment Level 1 and a Level 2 Technical Report, and to address the requirements of the Oak Ridges Moraine Conservation Plan by completing a Natural Heritage Evaluation for the proposed Middleton Pit.

The Subject Lands are located on the Oak Ridges Moraine and are subject to the policies of the Oak Ridges Moraine Conservation Plan. The Subject Lands are shown in the Plan as part of the Countryside Areas designation where aggregate extraction below the water table is a permitted use. A small portion of the Subject Lands in the northwest corner of the property is mapped as Natural Core Area. However, there is no Natural Core Areas within the Site. The area immediately south of the Subject Lands along the boundary between west half of Lots 9 and 10 is also mapped as Natural Core Area. Aggregate extraction is not a permitted use in the Natural Core Area designation.

This study determined that there are four key natural heritage features on and adjacent to the Subject Lands; provincially significant wetlands; significant portions of the habitat of endangered, rare, and threatened species; significant woodlands; and a candidate are for significant wildlife habitat. No other key natural heritage features or hydrological sensitive features were identified.

The wetland areas are all treated as key natural heritage features. They include on site Wetlands A, B and C and off site Wetlands D, E, F1, F2 and G. Only Wetlands C, D, E, F1, F2 and G are hydrogeologically connected to the Goodwood Glasgow Provincially Significant Wetland Complex.

No extraction is proposed within a minimum of 30 m or more of the wetlands. Aggregate extraction is not expected to have an impact on the regional groundwater table or on the Goodwood Glasgow Wetland Complex. Aggregate extraction will reduce the size of the subcatchment areas that contribute surface and subsurface discharge to the perched water system. However, the wetland features and ponds within the subcatchment areas will still receive a surplus of water. Water levels in the wetlands and ponds will not be substantially altered and their functions will also remain unchanged (e.g., providing amphibian breeding habitat). The rehabilitation plan when implemented will result in the creation of new wetland areas of various size, form and function.

The woodlands immediately adjacent to the eastern boundary of the Subject Lands (east half of Lot 10), are considered to be significant woodlands according to the ORMCP. The 40 metre vegetation protection zone surrounding this Key Natural Heritage Feature will protect and improve the woodlands size, health and diversity. No negative impacts to the woodlands are expected.

Aggregate extraction on the Site will have no impact on portions of the habitat of rare, threatened, or endangered species. Four species identified as endangered, rare and threatened, as defined in the ORMCP, were identified on and adjacent to the Subject Lands. The Bobolink, which is listed as Threatened by COSSARO was observed in an annually cultivated hay field on the Site. Its habitat is considered marginal at best. Habitats for the snapping turtle, a provincially vulnerable species, and the nationally threatened (but common provincially) western chorus frog occurs on the Subject Lands and Site. The habitats for these species on the Site will be protected. A Butternut in poor condition occurs in adjacent woodlands (a KNHF). Aggregate extraction is not proposed within 40 m of the woodland in which this specimen was observed.

Eight locally significant species have been identified on or adjacent to the Subject Lands and their habitat may be considered significant wildlife habitat. The Variegated Horsetail, which may no longer occur on the Site, is considered rare on the Oak Ridges Moraine. The location in which it was found will not be disturbed by extraction as it lies within the VPZ surrounding Vic's Pond (Wetland A). Similarly, Silky

dogwood, Common coontail, Sprengel's sedge and Bristly crowfoot are all protected as they are located within the VPZ's. The Black walnut is located outside of the extraction area and will not be affected by the proposed pit expansion.

The Clay-colored Sparrow was listed as a rare species on the Oak Ridges Moraine, but it is now known to be widespread and fairly common on the Moraine. The Spotted Cranesbill, is located in the adjacent woodlands and is considered rare in Durham Region. It will not be affected by the proposed pit expansion.

Habitat for all the significant species will be maintained and the rehabilitation plan will potentially provide additional habitat on the Site for species such as the Variegated Horsetail, Bobolink, the western chorus from and for the snapping turtle as well as other common plant and wildlife species. Expansion of VicDom's aggregate extraction operation will not have a significant impact on the nationally, provincially and locally significant species or on significant wildlife habitat on and adjacent to the Subject Lands.

The connectivity between those Key Natural Heritage Features and the Natural Core Areas within 240 metres of each other will be maintained. There will be some limited extraction of aggregate within the separation areas however these areas will be rehabilitated and the connectivity between the KNHF's will be restored and improved.

Aggregate extraction will result in the removal of a portion of the hedgerow located along the road allowance west of the Subject Lands; however its function as a corridor connecting habitats or for the movement of wildlife is minimal.

Below water extraction will impact on the existing landform. Rehabilitation of the pit will result in the creation of an aquatic environment (i.e., lake) with a naturally sustaining upland vegetation community established on the side slopes of the pit and shallow wetland vegetation communities of various sizes established along the lake edges. It is expected that the proponent will develop and implement a comprehensive rehabilitation plan for the Site in consultation with the municipality and OMNR.

A list of mitigation measures are provided to minimize or avoid negative impacts to the natural features identified. Monitoring of the rehabilitation efforts and the groundwater table are also recommended.

The conclusions are based on data collected by ESG International Inc. in 2000 and 2001 and supplemented by data collected by Colville Consulting Inc. between 2003 - 2010.This report was prepared by Colville Consulting Inc. in conjunction with Genivar, Gray Owl Environmental Inc., and Goodban Ecological Consultants for VicDom Investments Limited. Appendix F provides the curriculum vitaes for the Colville Consulting Inc., Gray Owl Environmental Inc., and Goodban Ecological Consulting team members.

_____ Date: June 13 2011

Sean Colville, B.Sc., President
Colville Consulting Inc.

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APPENDIX A

EXCERPTS FROM OAK RIDGES MORAINE CONSERVATION PLAN

Section 22 - KEY NATURAL HERITAGE FEATURES

(1) The following are key natural heritage features:

1. Wetlands.

2. Significant portions of the habitat of endangered, rare and threatened species.

3. Fish habitat.

4. Areas of natural and scientific interest (life science).

5. Significant valleylands.

6. Significant woodlands.

7. Significant wildlife habitat.

8. Sand barrens, savannahs and tallgrass prairies.

(2) All development and site alteration with respect to land within a key natural heritage feature or the related minimum vegetation protection zone is prohibited, except the following:

1. Forest, fish, and wildlife management.

2. Conservation and flood or erosion control projects, but only if they have been demonstrated to be necessary in the public interest after all alternatives have been considered.

3. Transportation, infrastructure, and utilities as described in section 41, but only if the need for the project has been demonstrated and there is no reasonable alternative.

4. Low-intensity recreational uses as described in section 37.

(3) An application for development or site alteration with respect to land within the minimum area of influence that relates to a key natural heritage feature, but outside the key natural heritage feature itself and the related minimum vegetation protection zone, shall be accompanied by a natural heritage evaluation under section 23.

Section 23 - Natural Heritage Evaluation

(1) A natural heritage evaluation shall,

(a) demonstrate that the development or site alteration applied for will have no adverse effects on the key natural heritage feature or on the related ecological functions;

(b) identify planning, design and construction practices that will maintain and, where possible, improve or restore the health, diversity and size of the key natural heritage feature and its connectivity with other key natural heritage features;

(c) in the case of an application relating to land in a Natural Core Area, Natural Linkage Area or Countryside Area, demonstrate how connectivity within and between key natural heritage features will be maintained and, where possible, improved or restored before, during and after construction;

(d) if the Table to this Part specifies the dimensions of a minimum vegetation protection zone, determine whether it is sufficient, and if it is not sufficient, specify the dimensions of the required minimum vegetation protection zone and provide for the maintenance and, where possible, improvement or restoration of natural self-sustaining vegetation within it;

(e) if the Table to this Part does not specify the dimensions of a minimum vegetation protection zone, determine whether one is required, and if one is required, specify the dimensions of the required minimum vegetation protection zone and provide for the maintenance and, where possible, improvement or restoration of natural self-sustaining vegetation within it; and

(f) in the case of a key natural heritage feature that is fish habitat, ensure compliance with the requirements of the Department of Fisheries and Oceans (Canada).

(2) In the case of item 4 of the Table to this Part, the basis on which the determination and specification mentioned in clause (1) (e) is done shall include, without limitation, an analysis of land use, soil type, slope class and vegetation type, using criteria established by the Government of Ontario, as amended from time to time.

TABLE 1

KEY NATURAL HERITAGE FEATURES, HYDROLOGICALLY SENSITIVE FEATURES AND AREAS OF NATURAL AND SCIENTIFIC INTEREST (EARTH SCIENCE): MINIMUM AREAS OF INFLUENCE AND MINIMUM VEGETATION PROTECTION ZONES

Column 1	Column 2	Column 3	Column 4
Item	Feature	Minimum Area of Influence (21)	Minimum Vegetation Protection Zone (21, 23,26 (4), 30 (12))
1	Wetlands	All land within 120 metres of any part of feature	All land within 30 metres of any part of feature, subject to clause 23 (d) if a natural heritage evaluation is required
2	Significant portions of habitat of endangered, rare and threatened species	All land within 120 metres of any part of feature	As determined by a natural heritage evaluation carried out under section 23
3	Fish habitat	All land within 120 metres of any part of feature	All land within 30 metres of any part of feature, subject to clause 23 (1) (d) if a natural heritage evaluation is required
4	Areas of natural and scientific interest (life science)	All land within 120 metres of any part of feature	As determined by a natural heritage evaluation carried out under section 23
5	Areas of natural and scientific interest (earth science)	All land within 50 metres of any part of feature	As determined by an earth science heritage evaluation carried out under subsection 30 (12)
6	Significant valleylands	All land within 120 metres of stable top of bank	All land within 30 metres of stable top of bank, subject to clause 23 (1) (d) if a natural heritage evaluation is required
7	Significant woodlands	All land within 120 metres of any part of feature	All land within 30 metres of the base of outermost tree trunks within the woodland, subject to clause 23 (1) (d) if a natural heritage evaluation is required
8	Significant wildlife habitat	All land within 120 metres of any part of feature	As determined by a natural heritage evaluation carried out under section 23
9	Sand barrens, savannahs and tallgrass prairies	All land within 120 metres of any part of feature	All land within 30 metres of any part of feature, subject to clause 23 (1) (d) if a natural heritage evaluation is required
10	Kettle lakes	All land within 120 metres of the surface catchment area	All land within the surface catchment area or within 30 metres of any part of feature, whichever is greater, subject to clause 26 (4) (c) if a hydrological evaluation is required
11	Permanent and intermittent streams	All land within 120 metres of meander belt	All land within 30 metres of meander belt, subject to clause 26 (4) (c) and subsection 26 (5) if a hydrological evaluation is required
12	Seepage areas and springs	All land within 120 metres of any part of feature	All land within 30 metres of any part of feature, subject to clause 26 (4) (c) and subsection 26 (5) if a hydrological evaluation is required

Section 35 - Mineral aggregate operations and wayside pits

(1) An application for a mineral aggregate operation or wayside pit shall not be approved unless the applicant demonstrates,

(a) that the quantity and quality of groundwater and surface water in the Plan Area will be maintained and, where possible, improved or restored;

(b) that as much of the site as possible will be rehabilitated,

(i) in the case of land in a prime agricultural area, by restoring the land so that it can be used for agriculture, and

(ii) in all other cases, by establishing or restoring natural self-sustaining vegetation;

(c) if there are key natural heritage features on the site or on adjacent land, that their health, diversity, size and connectivity will be maintained and, where possible, improved or restored; and

(d) if there are areas of natural and scientific interest (earth science) on the site or on adjacent land, that the geological or geomorphological attributes for which they were identified will be protected.

(2) An application for a mineral aggregate operation or wayside pit with respect to land in a Natural Linkage Area shall not be approved unless the applicant demonstrates,

(a) that there will be compliance with subsection (1);

(b) that there will be no extraction within 1.5 metres of the water table;

(c) that the extraction of mineral aggregates from the site will be completed as quickly as possible;

(d) that the site will be rehabilitated in stages as quickly as possible; and

(e) that the entire site will be rehabilitated,

(i) in the case of land in a prime agricultural area, by restoring the land so that the average soil quality of each area is substantially returned to its previous level, and

(ii) in all other cases, by establishing or restoring natural self-sustaining vegetation.

(3) In order to maintain connectivity, when a mineral aggregate operation or a wayside pit is located in a Natural Linkage Area, there shall at all times be an excluded area (which, for greater certainty, may contain both undisturbed land and land whose rehabilitation is complete) that,

(a) is at least 1.25 kilometers wide;

(b) lies outside the active or unrehabilitated portions of the area being used; and (c) connects parts of the Natural Linkage Area outside the mineral aggregate operation or wayside pit.

(4) Despite subsection 22 (2), an application for a mineral aggregate operation or wayside pit with respect to land in a key natural heritage feature may be approved if,

(a) the key natural heritage feature is occupied by young plantations or early successional habitat; and

(b) the applicant demonstrates that,

(i) the long-term ecological integrity of the Plan Area will be maintained, or where possible improved or restored,

(ii) the extraction of mineral aggregates from the area within the key natural heritage feature will be completed, and the area will be rehabilitated, as early as possible in the life of the operation, and

(iii) the area from which mineral aggregates are extracted will be rehabilitated by establishing or restoring natural self-sustaining vegetation of equal or greater ecological value.

(5) In sub clause (4) (b) (iii),

"ecological value" means the value of vegetation in maintaining the health of the key natural heritage feature and the related ecological features and ecological functions, as measured by factors such as the diversity of species, the diversity of habitats, and the suitability and amount of habitats that are available for rare, threatened and endangered species.

(6) An application for a mineral aggregate operation or wayside pit with respect to land in a landform conservation area (Category 1 or 2) shall not be approved unless the applicant demonstrates,

(a) that the area from which mineral aggregates are extracted will be rehabilitated to establish a landform character that blends in with the landform patterns of the adjacent land; and

(b) that the long-term ecological integrity of the Plan Area will be maintained, or where possible improved or restored.

Section 36 - Comprehensive rehabilitation plans

Municipalities and the mineral aggregate industry are encouraged to work together to develop and implement comprehensive rehabilitation plans for parts of the Plan Area that are affected by mineral aggregate operations.

APPENDIX B

WILDLIFE

Appendix B - Wildlife Species Recorded

COMMON NAME	*SCIENTIFIC NAME*	ONTARIO STATUS	GLOBAL STATUS	OMNR	COSEWIC	REGION	AREA	COMMENTS
ODONATES								
DAMSELFLIES								
Familiar Bluet	*Enallagma civile*	S5	G5					site
DRAGONFLIES								
Twelve-spotted Skimmer	*Libellula pulchella*	S5	G5					site
Common Whitetail	*Plathemis lydia*	S5	G5					site
White-faced Meadowhawk	*Sympetrum obtruscum*	S5	G5					site
BUTTERFLIES								
Least Skipper	*Ancyloxypha numitor*	S5	G5					site
European Skipper	*Thymelicus lineola*	SNA	G5					site
Hobomok Skipper	*Poanes hobomok*	S5	G5					site
Canadian Tiger Swallowtail	*Papilio canadensis*	S5	G5					site, adjacent
Spring Azure	*Celastrina ladon*	S5	G5					site
Summer Azure	*Celastrina neglecta*	S5	G5					site
Northern Crescent	*Phycoides pascoensis*	S5	G5					site
Mourning Cloak	*Nymphalis antiopa*	S5	G5					site
Milbert's Tortoiseshell	*Nymphalis milberti*	S5	G5					site
Red Admiral	*Vanessa atalanta*	S5	G5					site
White Admiral	*Limenitis arthemis*	S5	G5					site
Viceroy	*Limenitis archippus*	S5	G5					site
Northern Pearly Eye	*Enodia anthedon*	S5	G5					site
Little Wood-Satyr	*Megisto cymela*	S5	G5					site
Common Ringlet	*Coenonympha tullia*	S5	G5					site
Common Wood-Nymph	*Cercyonis pegala*	S5	G5					site
AMPHIBIANS								
American Toad	*Anaxyrus americanus*	S5	G5					site
Tetraploid Gray Treefrog	*Hyla versicolor*	S5	G5					site
Western Chorus Frog	*Pseudacris triseriata*	S4	G5	NAR	THR			north of the Carolinian Zone
Spring Peeper	*Pseudacris crucifer*	S5	G5					site
Northern Green Frog	*Lithobates clamitans*	S5	G5					site
Northern Leopard Frog	*Lithobates pipiens*	S5	G5	NAR	NAR			site

Appendix B - Wildlife Species Recorded

COMMON NAME	*SCIENTIFIC NAME*	ONTARIO STATUS	GLOBAL STATUS	OMNR	COSEWIC	REGION	AREA	COMMENTS
REPTILES								
Snapping Turtle	*Chelydra serpentina*	S3	G5	SC	SC			site
Midland Painted Turtle	*Chrysemys picta marginata*	S5	G5T5					site
BIRDS								
Canada Goose	*Branta canadensis*	S5	G5					site: breeding; adjacent: breeding
Wood Duck	*Aix sponsa*	S5	G5					site: foraging
Mallard	*Anas platyrhynchos*	S5	G5					site: breeding; adjacent: breeding
Hooded Merganser	*Lophodytes cucullatus*	S5B, S5N	G5			7		adjacent: foraging
Wild Turkey	*Meleagris gallopava*	S5	G5					site: breeding
Turkey Vulture	*Cathartes aura*	S5B	G5					site: overhead; adjacent: overhead
Northern Harrier	*Circus cyaneus*	S4B	G5	NAR	NAR		30	site: foraging; adjacent: foraging
Red-tailed Hawk	*Buteo jamaicensis*	S5	G5	NAR	NAR			site: foraging; adjacent: breeding
American Kestrel	*Falco sparverius*	S5B	G5					site: breeding
Killdeer	*Charadrius vociferus*	S5B, S5N	G5					site: breeding; adjacent: breeding
Spotted Sandpiper	*Actitis macularia*	S5	G5					site: breeding; adjacent: breeding
American Woodcock	*Scolopax minor*	S4B	G5					site: adult with 3 young
Rock Pigeon	*Columba livia*	SNA	G5					site: foraging; adjacent: breeding
Mourning Dove	*Zenaida macroura*	S5	G5					site: breeding; adjacent: breeding
Black-billed Cuckoo	*Coccyzus erythropthalmus*	S5B	G5					site: breeding
Belted Kingfisher	*Megaceryle alcyon*	S4B	G5					adjacent: breeding
Downy Woodpecker	*Picoides pubescens*	S5	G5					site: breeding
Northern Flicker	*Colaptes auratus*	S4B	G5					site: breeding; adjacent: breeding
Alder Flycatcher	*Empidonax alnorum*	S5B	G5					site: breeding; adjacent: breeding
Willow Flycatcher	*Empidonax traillii*	S5B	G5			5		site: breeding
Great Crested Flycatcher	*Myiarchus crinitus*	S4B	G5					adjacent: breeding
Eastern Kingbird	*Tyrannus tyrannus*	S4B	G5					site: breeding; adjacent: breeding
Warbling Vireo	*Vireo gilvus*	S5B	G5					site: breeding
Red-eyed Vireo	*Vireo olivaceus*	S5B	G5					site: breeding; adjacent: breeding
Blue Jay	*Cyanocitta cristata*	S5	G5					site: breeding; adjacent: breeding
American Crow	*Corvus brachyrhynchos*	S5B	G5					site: foraging; adjacent: breeding
Tree Swallow	*Tachycineta bicolor*	S4B	G5					site: breeding
Bank Swallow	*Riparia riparia*	S4B	G5					site: foraging; adjcant: breeding
Barn Swallow	*Hirundo rustica*	S4B	G5					site: breeding; adjacent: breeding
Black-capped Chickadee	*Poecile atricapillus*	S5	G5					site: breeding; adjacent: breeding
House Wren	*Troglodytes aedon*	S5B	G5					site: breeding; adjacent: breeding

Appendix B - Wildlife Species Recorded

COMMON NAME	SCIENTIFIC NAME	ONTARIO STATUS	GLOBAL STATUS	OMNR	COSEWIC	REGION	AREA	COMMENTS
American Robin	*Turdus migratorius*	S5B	G5					site: breeding; adjacent: breeding
Gray Catbird	*Dumetella carolinensis*	S4B	G5					site: breeding
Brown Thrasher	*Toxostoma rufum*	S4B	G5					adjacent: breeding
European Starling	*Sturnus vulgaris*	SNA	G5					site: breeding; adjacent: breeding
Cedar Waxwing	*Bombycilla cedrorum*	S5B	G5					site: breeding
Yellow Warbler	*Dendroica petechia*	S5B	G5					site: breeding; adjacent: breeding
Ovenbird	*Seiurus aurocapilla*	S4B	G5				20	adjacent: breeding
Mourning Warbler	*Oporornis philadelphia*	S4B	G5				30	site: possibly breeding
Common Yellowthroat	*Geothlypis trichas*	S5B	G5					site: breeding
Chipping Sparrow	*Spizella passerina*	S5B	G5					site: breeding; adjacent: breeding
Clay-colored Sparrow	*Spizella pallida*	S4B	G5			5, 7		site: breeding; adjacent: breeding
Field Sparrow	*Spizella pusilla*	S4B	G5					site: breeding; adjacent: breeding
Vesper Sparrow	*Pooecetes gramineus*	S4B	G5					adjacent: breeding
Savannah Sparrow	*Passerculus sandwichensis*	S4B	G5					site: breeding ; adjacent: breeding
Grasshopper Sparrow	*Ammodramus savannarum*	S4B	G5			5		site: breeding
Song Sparrow	*Melospiza melodia*	S5B	G5					site: breeding; adjacent: breeding
Swamp Sparrow	*Melospiza georgiana*	S5B	G5					site: breeding
Northern Cardinal	*Cardinalis cardinalis*	S5	G5			5		site: breeding
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	S4B	G5					site: breeding
Indigo Bunting	*Passerina cyanea*	S4B	G5					adjacent: breeding
Bobolink	*Dolichonyx oryzivorus*	S4B	G5	THR	THR			site: breeding; adjacent: breeding
Red-winged Blackbird	*Agelaius phoeniceus*	S5	G5					site: breeding; adjacent: breeding
Eastern Meadowlark	*Sturnella magna*	S4B	G5					site: breeding
Common Grackle	*Quiscalus quiscula*	S5B	G5					site: breeding; adjacent: breeding
Brown-headed Cowbird	*Molothrus ater*	S4B	G5					site: breeding; adjacent: breeding
Baltimore Oriole	*Icterus galbula*	S4B	G5					site: breeding; adjacent: breeding
American Goldfinch	*Spinus tristis*	S5B	G5					site: breeding; adjacent: breeding
MAMMALS								
European Hare	*Lepus europaeus*	SNA	G5					site
Eastern Chipmunk	*Tamias striatus*	S5	G5					adjacent
Woodchuck	*Marmota monax*	S5	G5					site
Beaver	*Castor canadensis*	S5	G5					site
Muskrat	*Ondatra zibethicus*	S5	G5					site
Coyote	*Canis latrans*	S5	G5					site: den
Red Fox	*Vulpes vulpes*	S5	G5					site

Appendix B - Wildlife Species Recorded

COMMON NAME	*SCIENTIFIC NAME*	ONTARIO STATUS	GLOBAL STATUS	OMNR	COSEWIC	REGION	AREA	COMMENTS
Raccoon	*Procyon lotor*	S5	G5					site, adjacent
Striped Skunk	*Mephitis mephitis*	S5	G5					site
White-tailed Deer	*Odocoileus virginianus*	S5	G5					site
SUMMARY								
Total Odonates:4	site: 4; adjacent: 0							
Total Butterflies: 16	site: 16; adjacent: 1							
Total Amphibians: 6	site: 6; adjacent: 0							
Total Reptiles:2	site: 2; adjacent: 0							
Total Birds: 58	site: 51; adjacent: 40							
Total Breeding Birds: 54	site: 46; adjacent: 36							
Total Mammals: 10	site: 9; adjacent: 2							
Total Species: 96	site: 88; adjacent: 43							
SIGNIFICANT SPECIES								
Global: 0								
National: 3								
Provincial: 2								
Regional: 0								
Local: 1								
Explanation of Status and Acronymns								
OMNR: Designations by the Ontario Ministry of Natural Resources								
COSEWIC: Committee on the Status of Endangered Wildlife in Canada								
REGION: Rare in an Ecoregion								
S3: Vulnerable in Ontario								
S4: Apparently secure in Ontario								
S5: Secure in Ontario								
SB: Status during the breeding season								
SN: Status during the nonbreeding season								
SNA: Not Applicable, not a suitable	target for conservation efforts							
G5: Very common globally								
T: Denotes that the rank applies to a subspecies or variety								
THR: Threatened								
SC: Special Concern								
NAR: Not At Risk								

Appendix B - Wildlife Species Recorded

COMMON NAME	*SCIENTIFIC NAME*	ONTARIO STATUS	GLOBAL STATUS	OMNR	COSEWIC	REGION	AREA	COMMENTS
5: Rare in Site Region 5								
6: Rare in Site Region 6								
7: Rare in Site Region 7								
Area: Minimum patch size for area-sensitive species (ha)								

Appendix B – Assessment of Amphibian Habitat & Survey Results

Amphibian Habitat Survey

Introduction

This memorandum provides a summary of frog call survey data for the subject property, along with notes of habitat requirements and life history traits for each species.

2005-2006 Frog Call Surveys - Summary

Frog call surveys were completed on April 22, May 14 and June 6, 2005, and May 3, 2006, beginning at least 30 minutes after sundown. Each monitoring location was surveyed for 3 minutes, some 5 minutes after arriving at each survey location. One of three Call Level Codes was used to characterize the intensity of calling activity for each frog species:

Level 1 = individuals can be counted; calls not simultaneous/overlapping, individual males can be estimated (estimate of #'s given in parentheses);
Level 2 = calls distinguishable; some simultaneous calling;
Level 3 = full chorus, calls continuous and overlapping, individuals not distinguishable.

Results

Amphibian calling activity was recorded in the following wetland/pond units:

- Cattle Pond - MAS2-9

- Vic's Pond - OAO
- Vic's Pond (north end – Wetland A) – MAM3-2
- Vic's Pond (south end – Wetland A) - SWT3-2a

- Wetland B - SWT3-2b

No calling activity was recorded from Pond 2 (tiny pond within row crops) and Wetland C1 (SWT2-2 - no/little standing water during breeding season).

Lists of calling frogs/toads with peak calling intensities are provided below for each wetland/pond:

- Cattle Pond - MAS2-9

Northern Spring Peeper	L2
Wood Frog	L1
Eastern American Toad	L2
Northern Leopard Frog	L2

- Vic's Pond - OAO

Northern Spring Peeper	L2
Western Chorus Frog	L1
Northern Leopard Frog	L2
Tetraploid Gray Treefrog	L1
Green Frog	L2

- Vic's Pond (north end – Wetland A1) – MAM3-2
  - Northern Spring Peeper L2
  - Northern Leopard Frog L2

- Vic's Pond (south end – Wetland A2) - SWT3-2a
  - Northern Spring Peeper L2
  - Eastern American Toad L2
  - Tetraploid Gray Treefrog L1
  - Northern Leopard Frog L1

- Wetland B - SWT3-2b
  - Northern Spring Peeper L3
  - Wood Frog L2
  - Western Chorus Frog L1
  - Eastern American Toad L2
  - Tetraploid Gray Treefrog L1

- Cumulative List

  Aquatic Species
  Northern Leopard Frog
  Green Frog

  Terrestrial Species
  Northern Spring Peeper
  Wood Frog
  Western Chorus Frog
  Eastern American Toad
  Tetraploid Gray Treefrog

2010 Frog Call Count Summary
An additional frog call survey was completed May 25, 2010 using similar methods. The results are listed below.

- Cattle Pond
  - Northern Spring Peeper L3
  - Tetraploid Gray Treefrog L3
  - Green Frog L1

- Wetland C
  - Northern Spring Peeper L1

- Vic's Pond (Wetland A)
  - Northern Spring Peeper L3
  - Tetraploid Gray Treefrog L2 – 4 individuals
  - Green Frog L2 – 4 individuals

- Wetland B
  - Northern Spring Peeper L3 – approximately 20
  - Tetraploid Gray Treefrog L1
  - Grren Frog L2 – 2 individuals

- Tree Pond
  Northern Spring Peeper L3 – approximately 10
  Tetraploid Gray Treefrog L2 – 2 individuals

- Cumulative List

  Aquatic Species
  Green Frog

  Terrestrial Species
  Northern Spring Peeper
  Tetraploid Gray Treefrog

Assessment of Amphibian Habitat

The early-calling species (Northern Spring Peeper, Western Chorus Frog, Wood Frog) are associated mainly with the vernally-flooded thicket swamps (Wetland A/SWT3-2a; Wetland B/SWT3-2b) and marsh/meadow marsh pockets (Wetland C/Cattle Pond/MAS2-9; Wetland A/Vic's Pond 1/MAM3-2); standing water does not persist through the summer months within most of these features. Northern Leopard Frog and Northern Green Frog are associated mainly with the dug pond (Vic's Pond – OAO), which contains permanent standing water.

The site summary for the *Provincially Significant Goodwood-Glasgow Wetland Complex* (OMNR July 1999) states:

> *Critical associated uplands for Goodwood-Glasgow wetland species include the native forests and plantations surrounding the wetlands. The abundant resident population of woodland frogs at Goodwood-Glasgow are dependant on these forests for hibernating and foraging, and they can travel a considerable distance to get to forests. At Goodwood-Glasgow a number of breeding ponds were 200 to 300 and even 500 m away from the nearest woodlands. It is also critical for woodland frog survival that broad travel corridors be maintained between their forests and breeding ponds …*
>
> *A number of the smaller wetlands at Goodwood-Glasgow occur in an agricultural setting. Critical uplands for these wetlands would include adjacent pastures, fields, croplands and hedgerows. These habitats are utilized by wetland species such as nesting waterfowl, which can nest several hundred meters from a wetland, and amphibians such as the Leopard Frog, which forage in uplands around their weltands. These activities were all observed at Goodwood-Glasgow.*

The preceding two paragraphs highlight the need to maintain viable terrestrial linkages between the wetlands (amphibian breeding ponds) and upland habitats (native forest and successional habitats) to maintain populations of amphibians. The naturalization of old fields surrounding the wetlands/ponds would enhance the quality of upland habitats adjacent to the wetland pockets and enhance the level of connectivity with the adjacent woodlot to the east (FOD5-7).

Aquatic Species – Habitat/Life History

Aquatic frog species occupy less-treed and more open wetlands, often with deeper, permanent water (e.g., marshes and ponds). They overwinter in ponds that are deep enough that they do not freeze solid; they may also overwinter in streams with permanent flow. Aquatic frogs overwinter by hiding in the silt and detritus; Leopard Frogs also dig pits in the pond bottom. While underwater, the frogs must obtain oxygen through the skin, so oxygen levels in the water must be sufficient for this. Aquatic frogs generally

remain within or adjacent to their breeding pools, however they may forage further away during rainy nights. A high proportion of juveniles will not stay in the same pool to breed the following year; instead, many will disperse away from the wetland to find new foraging habitats and they often find new breeding habitat in the process.

Northern Leopard Frog

Northern Leopard Frogs overwinter in deeper ponds, or in streams, with Green Frogs, but will also move in the spring to other shallow wetlands with warmer water. The movement to breeding sites occurs in mid-April, but the breeding season extends through the spring and into early summer. By early June, Leopard Frogs lay up to 6,000 eggs that hatch in 13 to 20 days. The tadpoles in seasonally flooded pools transform into adults during the same summer. Leopard Frogs can also breed later in the year (early June) in permanent pools and their tadpoles may overwinter like the Green Frog. Adult Leopard Frogs may move 36 m on average during a rainy night, up to 250 m, to forage in suitable forest and meadow habitat. Roadkill of Leopard Frogs can occur up to 1.5 km from breeding pools.

Green Frog

Green Frogs favour smaller, permanently inundated ponds that are deep enough to prevent freezing to the bottom during the winter months. They also occur in marshes that contain areas of open, permanent water. Green Frogs breed during June and July (sometimes August). Green Frogs lay 3,000 to 5,000 eggs in June-August (sometimes two clutches), which hatch in three to seven days. Tadpoles must overwinter in the same pond for one or two years. Green Frogs may disperse out 100 m from their breeding pool to forage during rainy nights, but they typically remain within 10 m of their home pool.

Terrestrial Species – Habitat/Life History

All five of the 'terrestrial' frog species in south-central Ontario have been heard calling onsite (Northern Spring Peeper, Wood Frog, Western Chorus Frog, Eastern American Toad and Tetraploid Gray Treefrog). These are species that spend most of their lives in woods and/or meadows, visiting pools primarily for breeding. All of the terrestrial frog species, except the American Toad, overwinter in forest habitats (and to lesser degree meadows) under leaf litter, logs, rocks or underground; their cells contain cryoprotectant sugars that act as 'antifreeze'. Very cold conditions for lengthy periods are not well tolerated, so a protective, insulating layer of leaf litter and duff, woody material, topsoil and snow is important. American Toads cannot tolerate freezing so they must overwinter below the frost line or in sheltered locations (within rotting logs) above it.

Northern Spring Peeper

Spring Peepers come out in early spring, moving from their woodland summer/winter habitat to breeding pools. The calling period lasts around two months, usually until towards the end of May. They lay 800-1000 eggs singly on submerged stems, which hatch within one or two weeks. The tadpole period lasts up to 90 days, with the first transformed frogs being found in the latter half of June, but sometimes not until early July.

Wood Frog

Wood Frogs are among the earliest frogs to emerge in the spring and the calling period is short, extending only a few weeks. Wood Frogs are primarily woodland species, but will cross open areas to reach breeding pools. They prefer vernal pools within forests, or swamps, for breeding. Females lay up to 2,000 eggs, which begins soon after calling begins. The tadpole stage ranges from 44 to 85 days, and juveniles can normally be observed in late June.

Western Chorus Frog

The Western Chorus Frog is usually the first frog species to be heard calling in the spring and calling usually ceases by mid-May. Chorus Frogs are found in a variety of habitats, including forests, shrub thickets, meadows and agricultural areas. For breeding, they prefer shallow temporary pools with abundant vegetation, but will use permanent standing water. Adults generally reside in wooded areas near water, but regularly forage in grasslands. Females lay small egg masses containing 10-30 (75) eggs which hatch within two weeks. Tadpoles transform as early as mid-June.

Eastern American Toad

The Eastern American Toad utilizes a broad range of breeding (permanent and temporary pools) and foraging habitats. Toads come out in early spring and make their way to breeding pools. Peak calling is in late April and May; most females in southern Ontario will have laid their eggs by the end of May. Females lay 4,000 to 7,000 eggs in double strands, which hatch in 3-12 days. The tadpole stage lasts 50-65 days, Toad tadpoles are usually the first amphibians to transform. "Toadlets" can be seen as early as the first week in June, but mainly in the latter part of the month.

Tetraploid Gray Treefrog

Treefrogs inhabit a broad range of wooded habitats, including successional areas and orchards. They utilize a variety of habitats for breeding, including swamps, marshes, farm ponds, flooded fields and river backwaters. Calling generally beings in late-April and may continue through early July. Females lay up to 2,000 eggs, in floating packets of 10-40 eggs which hatch within five days. The tadpole stage lasts 40 to 60 days and transformation may begin in early July, but generally this begins in late-July or early August.

Summary – Amphibian Habitat Requirements

Aquatic frogs (Northern Leopard Frog, Green Frog) require permanent standing water for breeding and/or overwintering habitat. Maintenance of the hydrology of Vic's Pond within Wetland A is necessary to maintain these species onsite.

Terrestrial species (Northern Spring Peeper, Wood Frog, Western Chorus Frog, Eastern American Toad and Tetraploid Gray Treefrog) spend most of their lives in terrestrial woodland and meadow habitats. They breed mainly in seasonally flooded wetlands, but some will also use permanent water; they require standing water at least into late-June or early-July in order to breed successfully (i.e., have some tadpoles transform into juveniles). Habitat for these species was identified in Vic's Pond in Wetland A, Cattle Pond/Wetland C and Wetland B.

Maintenance of existing wetland hydrology, to the extent feasible, is highly recommended. Wetlands A, B and C should ideally have standing water at least until early July, if not until early August, with minimum water depths of 30-50 cm going in to July, during this latter stage of inundation. This would ensure that most/all of the terrestrial frog tadpoles can transform into juveniles. The timing will vary from year to year, depending on the type of spring/summer season that is encountered (e.g., timing of thaw and warmer spring weather, spring water levels, spring/summer weather, degree of shading of pond/wetland, etc.). Under existing conditions, it may be that not all species reproduce successfully each year, i.e., there are good years and bad years depending on climatic and other factors.

For Vic's Pond, it should remain permanently flooded and have sufficient depth of water during the winter months so that it will not freeze solid.

It is important to maintain viable terrestrial linkages between the wetlands (amphibian breeding ponds) and upland habitats (native forest and successional habitats) to maintain populations of amphibians. The naturalization of old fields surrounding the wetlands/ponds would enhance the quality of upland habitats adjacent to the wetland pockets and enhance the level of connectivity with the adjacent woodlot to the east.

Access lanes or roads should be avoided in the vicinity of the wetlands and rehabilitation areas to avoid mortality during migration periods to/from breeding pools and summer/winter habitat.

APPENDIX C

VASCULAR PLANTS

Appendix C: Working Vascular Plant Checklist
Proposed Vic-Dom Pit Expansion, Town of Uxbridge

Field reconnaissance was completed on August 3, 2000, May 17, 2002 (D. Janas), April 22 and 29, June 6 and August 20, 2005, May 3, 2006 (A. Goodban), August 20, 2008 (S. Varga and A. Goodban), August 28 and September 18, 2010 (A. Goodban). To date, some 246 vascular plant taxa have been recorded. Seventy-two (72) taxa or 29% of the flora are considered non-native and introduced to southern Ontario.

Butternut (*Juglans cinerea*), ranked "S3?" by the NHIC, was recorded from the woodlot situated east of the subject property.

Int = introduced to southern Ontario
S-rank = subnational or state (provincial) rank (from NHIC)
CC = coefficient of conservatism (ranges from 0 to 10, from least to most conservative)
CW = coefficient of wetness (ranges from -5 to +5, from wettest to driest)

Community Occurrence

FOD5-7 Dry-Fresh Sugar Maple - Black Cherry Deciduous Forest Type
CUW1 Mineral Cultural Woodland Ecosite
CUM1-1 Dry-Moist Old Field Meadow Type
CU Other Cultural Features (e.g. hedgerows, residential/farmstead plantings)
SWT2-2 Willow Mineral Thicket Swamp Type
SWT3-2 Willow Organic Thicket Swamp Type
MAM3-2 Reed Canary Grass Organic Meadow Marsh Type
SAS1 Submerged Shallow Aquatic Ecosite

WORKING VASCULAR PLANT CHECKLIST

Scientific Name	Common Name	Int	S-rank	CC	CW	FOD 5-7	CUW 1	CUM 1-1	CU	SWT 2-2	SWT 3-2	MAM 3-2	SAS1
Acer negundo	Manitoba Maple		S5	0	-2	X	X	X	X				
Acer platanoides	Norway Maple	I	SE5	*	5				X				
Acer rubrum	Red Maple		S5	4	0	X							
Acer saccharinum	Silver Maple		S5	5	-3				X				
Acer saccharum saccharum	Sugar Maple		S5	4	3	X	X		X				
Achillea millefolium	Yarrow		S5	*	3		X	X	X				
Actaea pachypoda	White Baneberry		S5	6	5	X			X				
Agrimonia gryposepala	Yellow Agrimony		S5	2	2	X	X		X				
Alisma plantago-aquatica	Water-plantain		S5	3	-5					X	X	X	
Alliaria petiolata	Garlic Mustard	I	SE5	*	-5	X			X				
Ambrosia artemisiifolia	Common Ragweed		S5	0	3		X	X	X				
Anemone acutiloba	Sharp-lobed Hepatica		S5	6	5	X							

Scientific Name	Common Name	Int	S-rank	CC	CW	FOD 5-7	CUW 1	CUM 1-1	CU	SWT 2-2	SWT 3-2	MAM 3-2	SAS1
Anemone canadensis	Canada Anemone		S5	3	-3					X			
Anemone virginiana	Thimbleweed		S5	4	5		X	X					
Antennaria neglecta	Smooth Pussytoes		S5	3	5		X	X					
Apocynum androsaemifolium	Spreading Dogbane		S5	3	5			X	X				
Aquilegia canadensis	Wild Columbine		S5	5	1	X	X						
Aralia nudicaulis	Wild Sarsaparilla		S5	4	3	X							
Arctium minus	Common Burdock	I	SE5	*	5			X	X				
Asarum canadense	Wild Ginger		S5	6	5	X							
Asclepias incarnata incarnata	Swamp Milkweed		S5	6	-5					X	X	X	
Asclepias syriaca	Common Milkweed		S5	0	5			X	X				
Aster cordifolius	Heart-leaved Aster		S5	5	5	X	X	X	X				
Aster ericoides	Heath Aster		S5	4	4			X	X				
Aster lanceolatus	Tall White Aster		S5	3	-3				X	X	X	X	
Aster lateriflorus	One-sided Aster		S5	3	-2	X			X				
Aster macrophyllus	Large-leaved Aster		S5	5	5	X							
Aster novae-angliae	New England Aster		S5	2	-3			X	X				
Athyrium filix-femina	Northeastern Lady Fern		S5	4	0	X							
Barbarea vulgaris	Yellow Rocket	I	SE5	*	0			X	X				
Berberis vulgaris	Common Barberry	I	SE5	*	3	X	X						
Betula alleghaniensis	Yellow Birch		S5	6	0	X					X		
Betula papyrifera	White Birch		S5	2	2	X	X		X				
Bidens cernua	Nodding Beggar-ticks		S5	2	-5						X		X
Bidens frondosa	Devil’s Beggar-ticks		S5	3	-3					X	X	X	
Bromus inermis inermis	Smooth Brome Grass	I	SE5	*	5		X	X	X				
Capsella bursa-pastoris	Shepherd's-purse	I	SE5	*	1			X	X				
Cardamine diphylla	Twin-leaved Toothwort		S5	7	5	X							
Carduus nutans	Nodding Thistle		SE5	*	5			X					
Carex aurea	Golden Sedge		S5	4	-4			X					
Carex bebbii	Bebb's Sedge		S5	3	-5					X	X		

Scientific Name	Common Name	Int	S-rank	CC	CW	FOD 5-7	CUW 1	CUM 1-1	CU	SWT 2-2	SWT 3-2	MAM 3-2	SAS1
Carex cristatella	Crested Sedge		S5	3	-4						X		
Carex gracillima	Filiform Sedge		S5	4	3	X	X	X					
Carex hystericina	Porcupine Sedge		S5	5	-5					X	X		
Carex pedunculata	Peduncled Sedge		S5	5	5	X							
Carex pensylvanica	Pennsylvania Sedge		S5	5	5	X	X						
Carex retrorsa	Retrorse Sedge		S5	5	-5					X	X	X	
Carex spicata	Spiked Sedge	I	SE5	*	5			X					
Carex sprengelii	Sprengel's Sedge		S5	6	0	X							
Carex stipata	Awl-fruited Sedge		S5	3	-5						X		
Caulophyllum thalictroides	Blue Cohosh		S5	6	5	X							
Cerastium fontanum triviale	Mouse-eared Chickweed	I		*	3			X	X				
Ceratophyllum demersum	Common Coontail		S5	4	-5								X
Chelidonium majus	Greater Celandine	I	SE5	*	5		X		X				
Chenopodium album	Lamb's-quarters	I	SE5	*	1			X	X				
Chrysanthemum leucanthemum	Ox-eye Daisy	I	SE5	*	5		X	X	X				
Cichorium intybus	Chicory	I	SE5	*	5			X	X				
Circaea lutetiana canadensis	Enchanter's Nightshade		S5	3	3	X	X						
Cirsium arvense	Canada Thistle	I	SE5	*	3			X					
Cirsium vulgare	Bull Thistle	I	SE5	*	4			X					
Cornus alternifolia	Alternate-leaved Dogwood		S5	6	5	X							
Cornus amomum obliqua	Silky Dogwood		S5	5	-4						X		
Cornus stolonifera	Red-osier Dogwood		S5	2	-3					X	X		
Crataegus monogyna	English Hawthorn	I	SE5	*	5		X	X					
Crataegus punctata	Dotted Hawthorn		S5	4	5		X	X					
Cynanchum nigrum	Dog-strangling Vine	I	SE5	*	5	X	X	X	X				
Dactylis glomerata	Orchard Grass	I	SE5	*	3			X	X				
Danthonia spicata	Poverty Oat Grass		S5	5	5			X					
Daucus carota	Queen Anne's Lace	I	SE5	*	5		X	X	X				
Dianthus armeria	Deptford Pink	I	SE5	*	5			X	X				
Dryopteris carthusiana	Spinulose Wood Fern		S5	5	-2	X							

Scientific Name	Common Name	Int	S-rank	CC	CW	FOD 5-7	CUW 1	CUM 1-1	CU	SWT 2-2	SWT 3-2	MAM 3-2	SAS1
Echinocystis lobata	Wild Cucumber		S5	3	-2		X	X	X				
Echium vulgare	Blueweed	I	SE5	*	5		X	X	X				
Eleocharis erythropoda	Red-based Spike-rush		S5	4	-5						X	X	
Eleocharis obtusa	Blunt Spike-rush		S5	5	-5					X		X	
Epifagus virginiana	Beech-drops		S5	6	5	X							
Equisetum arvense	Field Horsetail		S5	0	0			X	X	X	X	X	
Equisetum hyemale affine	Scouring-rush		S5	2	-2			X				X	
Equisetum variegatum variegatum	Variegated Scouring-rush		S5	5	-3							X	
Erigeron annuus	Annual Fleabane		S5	0	1			X	X				
Erigeron philadelphicus philadelphicus	Philadelphia Fleabane		S5	1	-3			X					
Erigeron strigosus	Rough Fleabane		S5	0	1			X	X				
Erythronium americanum	Yellow Trout-lily		S5	5	5	X							
Erysimum cheiranthoides cheiranthoides	Wormseed Mustard	I	SE5	*	3			X	X				
Eupatorium maculatum	Spotted Joe-Pye-weed		S5	3	-5					X	X		
Eupatorium perfoliatum	Boneset		S5	2	-4					X	X	X	
Eupatorium rugosum	White Snakeroot		S5	5	3	X			X				
Euthamia graminifolia	Grass-leaved Goldenrod		S5	2	-2			X		X	X	X	
Fagus grandifolia	American Beech		S5	6	3	X	X						
Festuca rubra	Red Fescue	I	SE5	*	1			X					
Fragaria vesca americana	Woodland Strawberry		S5	4	4	X							
Fragaria virginiana	Field Strawberry		S5	2	1			X	X				
Fraxinus americana	White Ash		S5	4	3	X	X	X					
Fraxinus pennsylvanica	Green Ash		S5	3	-3						X		
Galium triflorum	Sweet Bedstraw		S5	4	2	X							
Galium mollugo	Wild Madder	I	SE5	*	5			X					
Galium palustre	Marsh Bedstraw		S5	5	-5						X	X	
Geranium maculatum	Wild Geranium		S5	6	3	X							

Scientific Name	Common Name	Int	S-rank	CC	CW	FOD 5-7	CUW 1	CUM 1-1	CU	SWT 2-2	SWT 3-2	MAM 3-2	SAS1
Geranium robertianum	Herb Robert	I	SE5	*	5	X	X						
Geum aleppicum	Yellow Avens		S5	2	-1		X	X					
Geum canadense	White Avens		S5	3	0	X	X						
Glyceria grandis	Tall Manna Grass		S5	5	-5						X		
Glyceria striata	Fowl Manna Grass		S5	3	-5	X				X	X		
Hieracium aurantiacum	Orange Hawkweed	I	SE5	*	5			X					
Hieracium caespitosum caespitosum	Yellow Hawkweed	I		*	5			X					
Hieracium piloselloides	King Devil Hawkweed	I	SE5	*	5			X					
Hydrophyllum virginianum	Virginia Waterleaf		S5	6	-2	X	X						
Hypericum perforatum	Common St. John's-wort	I	SE5	*	5		X	X	X				
Impatiens capensis	Spotted Touch-me-not		S5	4	-3	X				X	X	X	
Iris versicolor	Wild Blue Flag		S5	5	-5					X			
Juglans cinerea	Butternut		S3?	6	2	X							
Juglans nigra	Black Walnut		S5	5	3		X	X					
Juglans regia	English Walnut	I	SE1	*	5				X				
Juncus bufonius	Toad Rush		S5	1	-4	X	X						
Juncus dudleyi	Dudley's Rush		S5	1	0			X		X			
Lactuca serriola	Prickly Lettuce	I	SE5	*	0			X					
Laportea canadensis	Wood Nettle		S5	6	-3	X							
Leersia oryzoides	Rice Cut Grass		S5	3	-5						X	X	X
Lemna minor	Common Duckweed		S5	2	-5						X	X	X
Leonurus cardiaca cardiaca	Motherwort	I	SE5	*	5	X	X		X				
Lepidium densiflorum	Common Pepper-grass		SE5	*	0			X	X				
Linaria vulgaris	Butter-and-eggs	I	SE5	*	5			X	X				
Lycopus americanus	American Water-horehound		S5	4	-5					X	X		
Lycopus uniflorus	Water-horehound		S5	5	-5					X	X		
Lysimachia ciliata	Fringed Loosestrife		S5	4	-3						X		
Maianthemum canadense	Wild Lily-of-the-valley		S5	5	0	X							

Scientific Name	Common Name	Int	S-rank	CC	CW	FOD 5-7	CUW 1	CUM 1-1	CU	SWT 2-2	SWT 3-2	MAM 3-2	SAS1
Maianthemum racemosum racemosum	Tall False Solomon's-seal		S5	4	3	X	X						
Malus pumila	Apple	I	SE5	*	5		X	X	X				
Matteuccia struthiopteris	American Ostrich Fern		S5	5	-3					X	X		
Medicago lupulina	Black Medick	I	SE5	*	1		X	X	X				
Medicago sativa	Alfalfa	I	SE5	*	5			X	X				
Melilotus alba	White Sweet-clover	I	SE5	*	3		X	X	X				
Melilotus officinalis	Yellow Sweet-clover	I	SE5	*	3			X	X				
Monarda fistulosa	Wild Bergamot		S5	6	3			X					
Nepeta cataria	Catnip	I	SE5	*	1			X	X				
Oenothera parviflora	Small-flowered Evening-primrose		S5?	1	3			X					
Onoclea sensibilis	Sensitive Fern		S5	4	-3					X	X		
Oryzopsis asperifolia	Rough-leaved Mountain-rice		S5	6	5	X							
Osmorhiza claytonii	Sweet-cicely		S5	5	4	X							
Ostrya virginiana	Ironwood		S5	4	4	X	X						
Oxalis stricta	Common Wood-sorrel		S5	0	3	X	X	X					
Panicum acuminatum (P. lanuginosum var. implicatum)	Panic Grass		S5	2	0			X					
Panicum capillare	Witch Grass		S5	0	0			X	X				
Parthenocissus inserta	Virginia Creeper		S5	3	3	X	X	X					
Phalaris arundinacea	Reed Canary Grass		S5	0	-4					X	X	X	X
Phleum pratense	Timothy Grass	I	SE5	*	3		X	X	X				
Phryma leptostachya	Lopseed		S4S5	6	5	X							
Pinus strobus	White Pine		S5	4	3	X			X				
Pinus sylvestris	Scots Pine	I	SE5	*	5		X	X					
Plantago major	Broad-leaved Plantain	I	SE5	*	-1		X	X					
Poa compressa	Canada Blue Grass		S5	0	2		X	X					
Poa palustris	Fowl Meadow Grass		S5	5	-4						X	X	
Poa pratensis	Kentucky Blue Grass		S5	0	1		X	X					
Podophyllum peltatum	May-apple		S5	5	3		X						

Scientific Name	Common Name	Int	S-rank	CC	CW	FOD 5-7	CUW 1	CUM 1-1	CU	SWT 2-2	SWT 3-2	MAM 3-2	SAS1
Polygonatum pubescens	Solomon's-seal		S5	5	5	X							
Polygonum lapathifolium	Nodding Smartweed		S5	2	-4						X		
Polygonum persicaria	Lady's Thumb	I	SE5	*	-3		X						
Populus alba	White Poplar	I	SE5	*	5			X	X				
Populus balsamifera	Balsam Poplar		S5	4	-3			X	X				
Populus tremuloides	Trembling Aspen		S5	2	0	X	X	X					
Populus nigra	Lombardy Poplar	I	SE5	*	5				X				
Potamogeton natans	Floating Pondweed		S5	5	-5								X
Potamogeton pectinatus	Sago Pondweed		S5	4	-5								X
Potentilla norvegica	Rough Cinquefoil		S5	0	0			X					
Potentilla recta	Rough-fruited Cinquefoil	I	SE5	*	5		X	X					
Prunella vulgaris	Heal-all		S5	5	5	X	X	X	X				
Prunus pensylvanica	Pin Cherry		S5	3	4		X	X	X				
Prunus serotina	Wild Black Cherry		S5	3	3	X	X	X	X				
Prunus virginiana virginiana	Chokecherry		S5	2	1	X	X	X	X				
Quercus macrocarpa	Bur Oak		S5	5	1			X					
Ranunculus abortivus	Small-flowered Buttercup		S5	2	-2	X							
Ranunculus acris	Tall Buttercup	I	SE5	*	-2	X	X		X				
Ranunculus pensylvanicus	Bristly Crowfoot		S5	3	-5					X			
Rhamnus cathartica	Common Buckthorn	I	SE5	*	3	X	X	X	X				
Ribes cynosbati	Prickly Gooseberry		S5	4	5	X							
Robinia pseudoacacia	Black Locust	I	SE5	*	4			X	X				
Rorippa sylvestris	Creeping Yellow Cress	I	SE5	*	-5						X	X	
Rosa blanda	Smooth Wild Rose		S5	3	3			X					
Rosa multiflora	Multiflora Rose	I	SE4	*	3		X	X					
Rubus allegheniensis	Common Blackberry		S5	2	2		X	X	X				

Scientific Name	Common Name	Int	S-rank	CC	CW	FOD 5-7	CUW 1	CUM 1-1	CU	SWT 2-2	SWT 3-2	MAM 3-2	SAS1
Rubus idaeus melanolasius	Wild Red Raspberry			0	-2	X	X		X	X			
Rubus occidentalis	Black Raspberry		S5	2	5	X	X		X				
Rubus odoratus	Purple-flowering Raspberry		S5	3	5	X							
Rubus pubescens	Dwarf Raspberry		S5	4	-4						X		
Rudbeckia hirta	Black-eyed Susan		S5	0	3			X	X				
Rumex acetosella	Sheep Sorrel	I	SE5	*	0			X	X				
Rumex crispus	Curly Dock	I	SE5	*	-1		X	X	X				
Salix alba	White Willow	I	SE4	*	-3			X					
Salix amygdaloides	Peach-leaved Willow		S5	6	-3					X			
Salix bebbiana	Bebb's Willow		S5	4	-4					X	X		
Salix eriocephala	Heart-leaved Willow		S5	4	-3					X	X		
Salix petiolaris	Slender Willow		S5	3	-4					X	X		
Salix X rubens	Crack Willow	I	SE5							X			
Salix X sepulcralis	Weeping Willow	I	SE5	*	-4				X				
Sambucus canadensis	Common Elder		S5	5	-2	X							
Sambucus racemosa pubens	Red-berried Elder		S5	5	2						X		
Sanguinaria canadensis	Bloodroot		S5	5	4	X	X						
Saponaria officinalis	Bouncing-bet	I	SE5	*	3		X	X					
Scirpus atrovirens	Black Bulrush		S5	3	-5			X				X	
Scirpus cyperinus	Wool-grass		S5	4	-5					X			
Scirpus validus	Softstem Bulrush		S5	5	-5						X	X	X
Setaria glauca	Yellow Foxtail	I	SE5	*	0			X	X				
Setaria viridis	Green Foxtail	I	SE5	*	5			X	X				
Silene vulgaris	Bladder Campion	I	SE5	*	5		X	X					
Sisymbrium officinale	Hedge Mustard	I	SE5	*	5			X					
Sium suave	Water-parsnip		S5	4	-5					X	X		
Smilax herbacea	Carrion-flower		S4	5	0	X							
Solanum dulcamara	Climbing Nightshade	I	SE5	*	0					X	X	X	
Solidago altissima	Tall Goldenrod			1	3		X	X					
Solidago canadensis	Canada Goldenrod		S5	1	3		X	X					
Solidago flexicaulis	Zig-zag Goldenrod		S5	6	3	X	X						

Scientific Name	Common Name	Int	S-rank	CC	CW	FOD 5-7	CUW 1	CUM 1-1	CU	SWT 2-2	SWT 3-2	MAM 3-2	SAS1
Solidago juncea	Early Goldenrod		S5	3	5			X	X				
Solidago nemoralis	Gray Goldenrod		S5	2	5			X	X				
Solidago rugosa rugosa	Rough Goldenrod		S5	4	-1					X	X		
Sonchus arvensis	Perennial Sow-thistle		SE5	*	1			X					
Sonchus asper asper	Spiny Annual Sow-thistle	I	SE5	*	0			X					
Sparganium emersum emersum	Green-fruited Bur-reed		S5	5	-5								X
Sporobolus cryptandrus	Sand Dropseed		S5	2	4				X				
Sporobolus neglectus	Overlooked Dropseed		S5	1	5				X				
Stellaria graminea	Grass-leaved Stitchwort	I	SE5	*	5			X					
Taraxacum officinale	Common Dandelion	I	SE5	*	3		X	X	X				
Thalictrum dioicum	Early Meadow-rue		S5	5	2	X							
Thlaspi arvense	Penny Grass	I	SE5	*	5			X	X				
Thuja occidentalis	White Cedar		S5	4	-3	X	X	X	X		X		
Tiarella cordifolia	Foamflower		S5	6	1	X					X		
Tilia americana	American Basswood		S5	4	3	X	X		X				
Tragopogon dubius	Goat's-beard	I	SE5	*	5			X	X				
Trifolium pratense	Red Clover	I	SE5	*	2			X	X				
Trifolium repens	White Clover	I	SE5	*	2			X	X				
Trillium erectum	Purple Trillium		S5	6	1	X							
Trillium grandiflorum	White Trillium		S5	5	5	X							
Tsuga canadensis	Eastern Hemlock		S5	7	3	X							
Tussilago farfara	Coltsfoot	I	SE5	*	3			X	X	X	X	X	
Typha angustifolia	Narrow-leaved Cattail		S5	3	-5								X
Typha latifolia	Common Cattail		S5	3	-5					X	X	X	
Ulmus americana	White Elm		S5	3	-2	X	X	X	X				
Urtica dioica gracilis	American Stinging Nettle		S5	2	-1				X	X		X	
Verbascum thapsus	Common Mullein	I	SE5	*	5			X	X				
Verbena urticifolia	White Vervain		S5	4	-1			X	X				
Viburnum trilobum	Highbush-cranberry		S5	5	-3			X	X				

Scientific Name	Common Name	Int	S-rank	CC	CW	FOD 5-7	CUW 1	CUM 1-1	CU	SWT 2-2	SWT 3-2	MAM 3-2	SAS1
Vicia cracca	Bird Vetch	I	SE5	*	5		X	X	X				
Viola canadensis	Canada Violet		S5	6	5	X							
Viola pubescens	Downy Yellow Violet		S5	5	4	X			X				
Viola rostrata	Long-spurred Violet		S5	6	3	X							
Viola sororia	Common Blue Violet		S5	4	1	X	X		X				
Vitis riparia	Riverbank Grape		S5	0	-2	X	X	X	X				

APPENDIX D

GOODWOOD-GLASGOW WETLAND COMPLEX

Ministry of
Natural Resources
Aurora District Office
50 Bloomington Road West
Aurora, Ontario L4G 3G8

Ministère des
Richesses naturelles

Telephone: (905) 713-7400
Facsimile: (905) 713-7360

Ontario

Feb. 12, 2009

Sean Colville
Colville Consulting Inc.
Agricultural and Environmental Consulting
404 Queenston Street
St. Catharines, ON L2P 2Y2

Re: Update to the Provincially Significant Goodwood-Glasgow Wetland Complex

Dear Sean:

An update has been done to the wetland boundaries for Wetland Nos.155, 156 and 157 in the provincially significant Goodwood-Glasgow Wetland Complex. The changes are based on a surveyed wetland staking carried out on August 20, 2008. The wetlands are now 1.26 ha in size for Wetland No. 155, 0.54 ha for Wetland No. 156 and O.39 ha for Wetland No. 157.

A map is enclosed showing the updated wetland boundaries and wetland vegetation communities for Wetland Nos. 155, 156 and 157 on an ortho-rectified digital photo base. The vegetation communities, wildlife notes and significant species from the site visit are summarized in the enclosed Table 1. Breeding amphibians have been noted from Wetland Nos. 156 and 157. All three wetlands are kettle wetlands with Wetland Nos. 155 and 157 at the terminus of West Duffin's Creek tributaries and hydrologically connected to larger downstream wetlands and Wetland No. 155 an isolated kettle wetland.

If you have any questions please do not hesitate to call me at 905-713-7370 or e-mail me at steve.varga@ontario.ca

Yours sincerely

Steve Varga

Steve Varga
Inventory Biologist
MNR Aurora District

cc. Durham Region
Town of Uxbridge
Toronto and Region Conservation Authority

Table 1: Updates to Wetland Vegetation Communities in the Goodwood - Glasgow Wetland Complex

Wetland #	Field No.	Map Code	Vegetation Forms	Dominant Species (Size in hectares; site type: P- Palusgtrine with no inflow, I - Isolated; soil type; O-depth of organics in cm; g-depth to mottling from top of mineral soil in cm and % coverage; G-depth to gley from top of mineral soil in cm and % coverage; sw-% standing water-depth in cm in summer; significant species; wildlife notes)
155	155	tsS51	h,ts*,gc,ne	h: Salix amygdaloides, Salix X rubens, Acer negundo; ts: Salix eriocephala; gc: Aster lanceolatus, Eupatorium maculatum; ne: Phalaris arundinacea (1.26, P, 30 cm silty clay then fine sand, g-15-5, G-15-80, sw-10%-5, Significant species: Locally rare Ranunculus pensylvanicus, Wildlife: Grey Catbird, Song Sparrow)
156	156B	neM6-A	ne*	ne: Phalaris arundinacea (0.16, I, sand)
156	156A	suW34-B	f,su*	f: Potamogeton natans; su: Chara sp., Ceratophyllum demersum (0.24, I, silty clay, sw-100%-50, Wildlife: Green Frog, Leopard Frog, Dragonfly, Damselfly, Whirligig Beetle)
156	156C	tsS20-E	ts*,gc,ne,ff	ts: Salix eriocephala, Cornus stolonifera, Salix petiolaris; gc: Solanum dulcamara, Sium suave; ne: Phalaris arundinacea; ff: Lemna minor (0.06 + 0.08 = 0.14, I, organic, sw-50%-20)
157	157	neS52	ts,gc,re,ne*,ff	ts: Salix petiolaris; gc: Aster lanceolatus, Onoclea sensibilis, Eupatorium perfoliatum, Bidens cernuus;re: Typha latifolia; ne: Glyceria grandis; ff: Lemna minor, Ricciocarpus natans (0.39, P, organic, O-60+, sw-80%-15, Wildlife: Grey Catbird)

Vegetation Forms:
ts - tall shrubs
gc - herbs (ground cover)
re - robust emergents
ne - narrow leaved emergents
f - floating plants (rooted)
ff - free floating plants
su - submerged plants
*** - dominant form**

Map Codes:
M - Marsh
S - Swamp
W - Open Water Marsh

GOODWOOD/GLASGOW WETLAND COMPLEX

Ontario

Scale 1:2,500 (approx.)

0 15 30 60 90 120 150 Meters

Legend

MNR Evaluated Wetland

Parcel

PUBLICATION

Cartography by Aurora District Geomatics.

Universal Transverse Mercator (6 degree) projection, Zone 17.
North American Datum 1983

SOURCE OF INFORMATION

Information provided by the Ministry of Natural Resources district office in Aurora.
Ministry of Natural Resources - Aurora District 50 Bloomington Road West, Aurora, ON L4G 3G8

Base information derived from the Ontario Base Map, 1983 at a scale of 1:10,000 and the Natural Resources Values Information System (NRVIS).

NOTE

The information displayed on this map has been compiled from various sources. While every effort has been made to accurately depict the information, this map should be viewed as illustrative only. Do not rely on it as being a precise indicator of routes, locations of features, nor as a guide to navigation.

For detailed information on natural features such as their location, size or status, the individual files held by the Aurora district office of the Ministry of Natural Resources should be consulted.

APPENDIX E

ASSESSMENT OF SIGNIFICANT WILDLIFE HABITAT

Table 1. Assessment of Candidate Significant Wildlife Habitats Using Schedule 1

1.1 Seasonal Concentration Areas

Seasonal Concentration Areas	**Wildlife** **- *Observed*** **- Not Observed**	**Ecosites Observed On-site**	**Habitat Characteristics & Information Sources**	**Assessment of Candidate Site for SWH**
Waterfowl Stopover and Staging Areas	Black Duck Northern Pintail Gadwell Blue-winged Teal Green-winged Teal	CUM1	♦ Most of Subject Lands are located on slopes and do not support standing water during spring ♦ Only area inundated during spring is small and not likely to support 100 or more of species listed ♦ This area is located adjacent to occupied residential development and active aggregate operation. High potential for disturbance. ♦ No anecdotal evidence from land owner ♦ Species not observed	Does Not Qualify
Colonial Nesting Bird Habitat	*Bank Swallow* Cliff Swallow	CUM1	♦ No exposed banks on Subject Lands ♦ Exposed bank to the north are part of existing & active aggregate operation	Does Not Qualify
Waterfowl Nesting Area	Black Duck Northern Pintail Northern Shoveler Gadwell Blue-winged Teal Green-winged Teal *Wood Duck* Hooded Merganser *Mallard Ducks*	Upland habitat not protected by KNHF or HSF (e.g., CUM1) adjacent to: MAS2 MAS3 SWT2	♦ Potential nesting sites (MAS2-9 and MAS3-1) including ponds are separated by more than 120 m ♦ Field studies did not confirm required number of nesting pairs for species listed ♦ Suitable large diameter trees not available near nesting habitat for Hooded Merganser and Wood Duck	Does Not Qualify

Snake Hiberbaculum	E. Garter Snake Brown Snake Smooth Green Snake E. Milk Snake N. Ribbon Snake N. Ringneck Snake N. Redbelly Snake	Rock piles, stone fences, crumbling foundations, or exposures of bedrock	♦ Suitable habitat does not exist ♦ Species not observed during field inventories	Does Not Qualify

1.2.1 Vegetation Communities or Specialized Habitat for Wildlife

Rare Woodland Type (Ecosite)	Ecosites Observed On-site	Assessment of Candidate Site for SWH
Hickory Deciduous Forest (FOD2) Oak-Hickory Deciduous Forest (FOD2) Mixed Oak Deciduous Forest (FOD1) Black Oak Deciduous Forest (FOD1) White Oak Deciduous Forest (FOD1) Sugar Maple-Black Maple Deciduous Forest (FOD6)	♦ None Observed	Does Not Qualify

1.2.2 Specialized Habitat for Wildlife

Significant Wildlife Community	Wildlife Species	Ecosites Observed On-site	Assessment of Potential Habitat and Defining Criteria	Assessment of Candidate Site for SWH
Amphibian Woodland, Corridor and Wetland Breeding Habitat	Red-spotted Newt Blue-spotted Salamander Spotted Salamander Gray Treefrog Spring Peeper	MAS2 MAS3 SWT2	♦ No woodlands 0.5 – 4.0 ha not considered significant within 120 m of wetland, lake or pond	Does Not Qualify

1.3 Habitat for Species of Conservation Concern (Not Including Endangered, Rare, or Threatened Species)			
Wildlife Species	**Ecosites Observed On-site**	**Assessment of Potential Habitat and Defining Criteria**	**Assessment of Candidate Site for SWH**
Brown Thrasher	CUT1 CUT2	♦ Ecosite not present on Subject Lands	Does Not Qualify
Bobolink	CUM1	♦ Only 12.67 ha of CUM1 on Subject Lands ♦ Required number of breeding pairs (20) not observed	Does Not Qualify
Eastern Meadowlark	CUM1	♦ Required number of breeding pairs (5) not observed	Does Not Qualify
Field Sparrow	CUM1	♦ Required number of breeding pairs (15) not observed	Does Not Qualify
Western Meadowlark	CUM1	♦ Species not observed	Does Not Qualify
Upland Sandpiper	CUM1	♦ Species not observed	Does Not Qualify

Table 2. Assessment of Candidate Significant Wildlife Habitats Using Schedule 2

2.1 Seasonal Concentration Areas

Waterfowl Stopover and Staging Areas

Species	**Habitat – Function/Form**	**Ecosites**	**Assessment of Potential Habitat and Information Sources**	**Assessment of Candidate Site for SWH**
Black Duck Northern Pintail Gadwell Wigeon Blue-winged Teal Green-winged Teal Wood Duck Hooded Merganser Lesser Scaup Ring-necked Duck	♦ Ponds, marshes, lakes and watercourses used during migration ♦ Habitats with abundant food supply (mostly aquatic invertebrates and vegetation in shallow water)	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6	♦ Not identified from background review ♦ Ecosite not present ♦ Ponds on site < 0.5 ha and larger ponds to the north are part of active aggregate operation with very little vegetation established ♦ No anecdotal evidence from land owner	Does Not Qualify

Common Goldeneye Bufflehead				
Deer Wintering Areas				
Species	**Habitat – Function/Form**	**Ecosites**	**Assessment of Potential Habitat and Information Sources**	**Assessment of Candidate Site for SWH**
White-tailed deer	♦ Wintering Areas of mainly coniferous trees ♦ Canopy cover of more than 60% ♦ Land surrounding the core area is usually agriculture, mixed deciduous forest. ♦ Absence of barriers to migration to and from yard itself. ♦ Suitable areas of cover, food and adjacent natural lands. ♦ Traditionally used by deer.	FOC1 FOC2 FOC3 FOC4 FOM1 FOM2 FOM3 FOM4 FOM5 FOM6 FOM7 FOM8 CUP2 CUP3 SWC1 SWC2 SWC3 SWC4 SWM1 SWM2 SWM3 SWM4 SWM5 SWM6	♦ Not identified from background review ♦ Ecosite not present ♦ No anecdotal evidence from land owner	Does Not Qualify

Colonial Bird Nesting Sites

Species	Habitat – Function/Form	ELC	Assessment of Potential Habitat and Information Sources	Assessment of Candidate Site for SWH
Great Blue Heron	♦ Nests in dead standing trees in large marshes. ♦ Most nests are 11 to 15 metres form ground, near top of tree.	SWM2 SWM3 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7 FET1	♦ Not identified from background review ♦ Ecosite not present ♦ No anecdotal evidence from land owner ♦ Species not observed ♦ No suitable nesting sites or large marshes on site	Does Not Qualify
Sedge Wren	♦ Nests mostly in grassy fens, occasional bogs, occasional marshes, old fields or hay fields. ♦ Nests are on the ground or far as 0.9 m from the ground. ♦ Not usually associated with standing water, but usually in imperfectly drained or poorly drained areas.	FEO1 BOO1 MAM2 MAM3 MAM4 MAM5 MAM6	♦ Not identified from background review ♦ Ecosite not present ♦ Species not observed ♦ Suitable nesting sites limited	Does Not Qualify.
Marsh Wren	♦ Nests in aggregations. ♦ Nests mostly in cattail marshes, occasionally in bulrushes, horsetails, bulreed, and emergent grasses. ♦ Nests are elevated above	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6	♦ Not identified from background review ♦ Ecosite not present ♦ Species not observed ♦ Suitable nesting sites limited	Does Not Qualify

	water, usually in cattails, may be found on damp ground.			

2.2 Rare Vegetation Communities or Specialized Habitats for Wildlife				
Rare Vegetation Communities				
Species/Habitat Type	**Habitat – Function/Form**	**Ecosites**	**Assessment of Potential Habitat and Information Sources**	**Assessment of Candidate Site for SWH**
Rare Forest Types	♦ Treed Communities with greater than 60% canopy closure		♦ Not identified from background sources ♦ No rare forest types identified from ELC	Does Not Qualify
Specialized Habitats for Wildlife				
Interior Forest Breeding Bird and Mammal Species				
Species	**Habitat – Function/Form**	**Ecosites**	**Assessment of Potential Habitat**	**Assessment of Candidate Site for SWH**
S. Flying Squirrel Whip-poor-will Yellow-bellied Sapsucker Red-breasted Nuthatch Blue-grey Knatcatcher Veery Hermit Thrush Blue-headed Vireo Northern Parula Magnolia Warbler Yellow-rumped Warbler Black-throated Green Warbler Blackburnian Warbler Pine Warbler Black-and-white Warbler Canada Warbler	♦ Several large forests (30 to 100 ha) ♦ Forests should comprise of a closed canopy of large trees ♦ Forests should have a variety of layers ♦ Minimum interior forest habitat is at least 100 m from any edge habitat	FOC1 FOD8 FOC2 FOD9 FOC3 SWC1 FOC4 SWC2 FOM1 SWC3 FOM2 SWC4 FOM3 SWM1 FOM4 SWM2 FOM5 SWM3 FOM6 SMW4 FOM7 SWM5 FOM8 SWM6 FOD1 SWD1 FOD2 SWD2 FOD3 SWD3 FOD4 SWD4 FOD5 SWD5	♦ No large forests on or immediately adjacent to Subject Lands ♦ No specialized habitat exist on site ♦ Not identified from background information sources	Does Not Qualify

Ovenbird Scarlet Tanager White-throated Sparrow		FOD6 SWD6 FOD7 SWD7		
Open Country Breeding Bird Species				
Species *(Species identified on site in italics)*	**Habitat – Function/Form**	**Ecosites**	**Assessment of Potential Habitat**	**Assessment of Candidate Site for SWH**
Open Country Bird Species: *Bobolink* *Brown Thrasher* *Clay-coloured Sparrow* Eastern Bluebird *Eastern Kingbird* *Eastern Meadowlark* *Field Sparrow* Grasshopper Sparrow Horned Lark Northern Harrier *Savannah Sparrow* Upland Sandpiper Vesper Sparrow Western Meadowlark	♦ Large grassland areas (includes natural and cultural fields and meadows) ♦ Grassland areas of at lest 10 ha, with a variety of vegetation structure and density ♦ Large grasslands on the Oak Ridges Moraine up to 30 ha in size are most likely to sustain a diversity of these species ♦ Grassland sites considered significant should have a history of longevity, either abandoned fields, mature hayfields and pasturelands that are at least 5 years or older	CUM1 CUT1 CUS1	♦ 12.67 ha of CUM1 on Subject Lands adjacent to hay fields to the south ♦ Some of the species observed on Subject Lands ♦ The number of breeding pairs required was not observed	Although considered SWH, Open Country Breeding Bird Habitats will not be protected as SWH until more detailed information is available.

Wetland Breeding Bird Species				
Species	**Habitat – Function/Form**	**Ecosites**	**Assessment of Potential Habitat**	**Assessment of Candidate Site for SWH**
American Bittern Virginia Rail Sora Common Moorhen American Coot Pied-billed Grebe	♦ Nesting occurs in wetlands with robust emergent vegetation ♦ Size of wetland is not important as long as there is shallow water with emergent aquatic vegetation present	MAM2 MAM3 SAS1 SAM1 SAF1	♦ Habitat likely to be protected by HSF ♦ Robust emergent vegetation not found in wetlands or ponded areas ♦ Species not present	Unlikely to Qualify
Amphibian Breeding Habitat				
Species	**Habitat – Function/Form**	**Ecosites**	**Assessment of Potential Habitat**	**Assessment of Candidate Site for SWH**
Red-spotted Newt Blue-spotted Newt Blue-spotted Salamander Spotted Salamander American Toad Gray Treefrog Spring Peeper Chorus Frog Leopard Frog Pickerel Frog Green Frog	♦ Wetlands and pools supporting high species diversity are significant ♦ Presence of shrubs and logs increase significance of pond for some amphibian species because of available structure for calling, foraging, and escape and concealment from predators.	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1	♦ Habitat likely to be protected by HSF ♦ Lack of structure available in ponded areas ♦ Ponded areas do not support a high diversity of species	Unlikely to Qualify

Raptor Nesting Habitat				
Species	**Habitat – Function/Form**	**Ecosites**	**Assessment of Potential Habitat**	**Assessment of Candidate Site for SWH**
Northern Harrier Osprey Short-eared Owl	♦ Nests are associated with lakes, ponds, rivers or wetlands ♦ Osprey nests are long forested shorelines, on islands or on structures over water within dead trees; nests are usually at the top of the tree, but occasionally are in crotches ♦ Osprey may tolerate some disturbance, but should not be disturbed after onset of nesting ♦ Short-eared Owl and N. Harrier nest on wet ground in open areas, including sedge marshes and wet fields with sufficient ground cover for young and cover for food source (mice)	Ecosites immediately adjacent to riparian areas; streams, rivers, lakes, ponds and wetlands CUM1 FOM8 FOD1 FOD2 FOD3 FOD4 FOD5 FOD6 FOD7 FOD8 FOD9	♦ Species not observed on Subject Lands ♦ Nesting sites not identified from background information ♦ Most of CUM1 ecosite is well to rapidly drained ♦ Undisturbed nesting habitat for N. Harrier and Short-eared Owl not present ♦ Aggregate operation located immediately adjacent to Subject Lands; potential for disturbance during nesting period	Does Not Qualify

Raptor Nesting Associated with Woodland Habitat				
Species	**Habitat – Function/Form**	**Ecosites**	**Assessment of Potential Habitat**	**Assessment of Candidate Site for SWH**
Broad-winged Hawk Northern Goshawk Coopers Hawk Sharp-shinned Hawk Northern Saw-whet Owl	♦ Nest typically in intermediate aged to mature conifer, deciduous or mixed woodlands within tops or crotches of trees ♦ In undisturbed sites, nest	FOM8 FOD1 FOD2 FOD3 FOD4 FOD5 FOD6 FOD7 FOD8 FOD9 SWC1 SCW2 SWC3 SWC4	♦ Species not observed on Subject Lands ♦ Nesting sites not identified from background review ♦ Aggregate operation located immediately adjacent to Subject Lands; potential for disturbance	Does Not Qualify

	may be used again or in close proximity to old nest	SWM1 SWM2 SWM3 SWM4 SWM5 SWM6 SWD1 SWD2 SWD3 SWD4 SWD5 SWD6 SWD7	during nesting period ♦ Forest stands 10 ha or more are not located on Subject Lands; closest woodland of this size is more than 250 m from proposed licenced limits ♦ Suitable habitat would be protected by Significant Woodlands which are not present	

Turtle Nesting Habitat and Turtle Overwintering Areas

Species	**Habitat – Function/Form**	**Ecosites**	**Assessment of Potential Habitat**	**Assessment of Candidate Site for SWH**
Blanding's Turtle Midland Painted Turtle Common Map Turtle Common Snapping Turtle	♦ Sand and gravel beaches adjacent to undisturbed shallow weedy areas of marshes, lakes, rivers, are most frequently used ♦ For an area to function as a turtle-nesting area, it must provide sand and gravel that turtles can dig in ♦ Beaches must be wide and elevated enough that high water does not inundate nests ♦ Beaches and sand bars adjacent to permanent water bodies are preferred ♦ Overwintering sites are permanent water bodies, large wetlands and bogs	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 BOO1 FEO1	♦ Species not observed on Subject Lands ♦ Species not identified from background review ♦ Suitable shoreline nesting habitat does not exist on Subject Lands	Does Not Qualify

Seeps and Springs			
Species	**Habitat – Function/Form**	**Assessment of Potential Habitat**	**Assessment of Candidate Site for SWH**
White-tailed deer Wild Turkey	♦ Important feeding and drinking areas especially in the winter	♦ Seeps and springs not observed on the Subject Lands	Does Not Qualify

2.3 Habitats of Species of Conservation Concern

Species	**Habitat – Function/Form**	**Ecosites**	**Assessment of Potential Habitat**	**Assessment of Candidate Site for SWH**
Bullfrog	♦ Large marshes or permanent waterbodies	MAM2 MAM3 SAS1 SAM1 SAF1	♦ Species not observed on Subject Lands ♦ Large waterbodies do not exist on site	Does Not Qualify
Ruffed Grouse	♦ Nests in early successional forest; strongly associated with poplar and aspen stands but also occurs in other forest types ♦ Relatively sedentary ♦ Hunted populations need forests of about 25 ha in order to maintain populations	FOM1 FOM2 FOM3 FOM5 FOM8 FOD1 FOD2 FOD3 FOD4 FOD5 FOD6 FOD7 FOD8 FOD9 CUP1 CUP2	♦ Species not observed on or adjacent to Subject Lands ♦ Area of suitable habitat required to maintain hunted populations (i.e., 25 ha) does not exist on or immediately adjacent to Subject Lands	Does Not Qualify

2.4 Animal Movement Corridors			
Species	**Habitat – Function/Form**	**Assessment of Potential Habitat**	**Assessment of Candidate Site for SWH**
Amphibian Breeding Corridors	♦ Movement corridors between breeding habitat and summer habitat	♦ Most potential breeding sites are surrounded by active agriculture ♦ No woodlands adjacent to ponds or wetlands ♦ Amphibian Breeding Corridor not identified from background information	Does Not Qualify
White-tailed Deer	♦ Movement corridor between summer and winter range	♦ Movement corridor not identified from background information ♦ Corridor not identified by study or are truncated ♦ KNHF and other natural areas well separated	Does Not Qualify

APPENDIX F

CURRICULA VITAE

COLVILLE CONSULTING INC.

SEAN M. COLVILLE, B.Sc., P.Ag.

EDUCATION

B.Sc. Geology, Acadia University, 1986
Soil Science, University of Guelph, 1984

PROFESSIONAL AFFILIATIONS

Association of Geoscientists of Ontario
Ontario Institute of Agrology
Agricultural Institute of Canada

POSITIONS HELD

2003 – Present	Colville Consulting Inc., St. Catharines, Principle
2001 – 2003:	ESG International Inc., St. Catharines, Senior Project Manager/Office Manager
1988 – 2001:	ESG International Inc., Guelph, Senior Project Manager
1988 – 1998:	ESG International Inc., Guelph, Project Manager
1984 – 1988:	MacLaren Plansearch Ltd., Nova Scotia, Pedologist
05/1982 - 09/1983:	Nova Scotia Department of Agriculture and Marketing, Nova Scotia, Assistant Pedologist

EXPERIENCE

Sean M. Colville, president of Colville Consulting Inc., has over 20 years experience in natural resource inventory, assessment and management; environmental impact assessment; and constraint analysis for development. Sean has experience with a wide range of environmental assessment projects ranging from Class EAs for small routine projects to assessments of highly complex development proposals with potential impacts on wetland, aquatic and terrestrial ecosystems. Sean has prepared rehabilitation plans designed to restore natural habitats for several pit and quarry operations and has prepared restoration plans for both aquatic and terrestrial environments for a wide variety of development proposals. He has prepared environmental assessments under both provincial and federal legislation. In addition, he has worked on numerous studies that required environmental impact assessments under Ontario's Planning Act and Aggregate Resources Act.

Sean works independently and in collaboration with large multi-disciplinary study teams. Sean has developed a network of highly experienced environmental scientists to assist with natural heritage inventories and the evaluation of natural heritage features and functions.

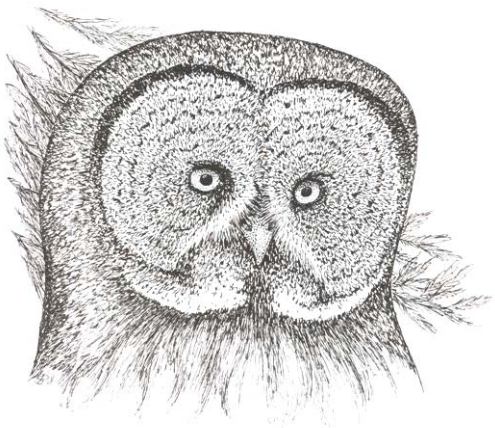
COLVILLE CONSULTING INC.
404 Queenston St., St. Catharines, Ontario L2Y 2Y2
Tel. 905 935-2161, Fax 905 935-0397 sean@colvilleconsultinginc.com

Mr. Colville has directed and managed several environmental impact assessments and natural resource inventories for new development. Some selected examples of this experience are listed below.

- Preparation of an EIS for Canadian Motor Speedway racetrack in Fort Erie (ongoing)
- Preparation of EIS for Homes by DeSantis of the Beamsville Fairgrounds (2008-09)
- Preparation of EIS for Lincoln Agricultural Society, Beamsville (2008-09)
- Preparation of an Environmental Constraint Analysis for Port Colborne Quarries Ltd. (2008)
- Environmental Screening Study for Urban Boundary Expansion of Smithville, Town of West Lincoln (2007 -2009)
- Contribution to the Woodland Restoration Plan for Reeb Quarry, City of Port Colborne (2007)
- Prepared a Scoped EIS for Nelson Quarry Inter-Road Connection to deal with significant woodlands and a globally rare plant species, Beamsville Quarry (2006)
- Development of a natural resources inventory and preparation of development constraint mapping for the Neighbourhoods of Rolling Meadows Secondary Plan Area – Black Horse Corners, City of Thorold (2005-2007)
- Preparation of an Environmental Impact Assessment (EIS) for the West Port Robinson Secondary Plan Area – City of Thorold (2006)
- Preparation of a Natural Heritage Issues Summary Report for a Proposed Subdivision – Dain City, Welland Ontario (2006)
- Prepared Level 1 and 2 Natural Environment Technical Reports under the Aggregate Resources Act and a Natural Heritage Study under the Oak Ridges Moraine Conservation Act for the proposed Middleton Pit – Uxbridge (2003-2008)
- Completed an EIS for Integrated Municipal Services' proposed compost facility – Regional Municipality of Niagara (2005)
- Developed and implemented recommendations for the restoration of forest habitat adjacent to Walker Brothers' Vineland Quarry and Crushed Stone Limited – Regional Municipality of Niagara (2004/05)
- Prepared an EIS for the City of Welland for the Harry Duffin Industrial Park – Regional Municipality of Niagara (2003)
- Prepared an EIS for The Club at Bond Head golf course – Simcoe County (2003)
- Preparation of Vegetation Screening and Naturalization reports for Walker Brother's Quarry – Niagara Falls (ongoing since 1992)
- Managed the natural resources inventory of CFB Borden's training areas and prepared an environmental assessment of training area activities – Simcoe County (1993)
- Prepared Level 1 and 2 Natural Environment Technical Reports for Lafarge's Fonthill pit (1993) and for Walker Industries Vineland Quarry Expansion – Regional Municipality of Niagara (1998)

ADDITIONAL TRAINING AND WORKSHOPS

PSMJ Project Management Training (2003)
APAO Pit and Quarry Rehabilitation Seminars (1998-2002)
Manure Management Seminar (2003)
Fundamentals of Nutrient Management Planning (2001)
Nutrient Management Planning – Applications using NMan 2001
8 hour Contaminated Sites Hazardous Waste Operations and Emergency Response (Hazwoper)
Canadian Red Cross First Aid and CPR (2002)
Valid Drivers – Class G



GRAY OWL ENVIRONMENTAL INC.

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AL SANDILANDS, B.SC.

EDUCATION

B.Sc., Biology, University of Waterloo, 1970
Temperate Wetlands Restoration Course, 1996

PROFESSIONAL AFFILIATIONS

Canadian Society of Ornithologists
American Ornithologists' Union
Ontario Field Ornithologists, Director and Editor of Ontario Birds, 1990
Wilson Ornithological Society
Bird Studies Canada, Trustee, James L. Baillie Fund, 1994-2006
Haldimand Bird Observatory, Director, 1998-2005
Ontario Breeding Bird Atlas: Chair, Publication Committee, 2002-2007
Member, Technical Committee, 2000-2004
Member, Significant Species Committee, 2000-2007
Species Account Editor, 2006-2007
Ontario Waterbird Conservation Plan: Member, Technical Working Group, 2007-2009

POSITIONS HELD

2003 to present: Gray Owl Environmental Inc., Principal, Senior Ecologist
1998-2003: ESG International, Guelph, Principal, Senior Ecologist
1995-1997: ESG International, Guelph, Senior Ecologist
1988-1995: Gore & Storrie Limited, Senior Biologist/Manager, Biology and Fisheries Section
1980-1988: Ecologistics Limited, Senior Biologist
1971-1979: Grand River Conservation Authority, Biologist

SELECTED EXPERIENCE

Ecosystem and Municipal Planning

- A Review of the Yellow Rail in Ontario. Prepared for the Canadian Wildlife Service. 2009.
- A Review of the King Rail in Ontario. Prepared for the Canadian Wildlife Service. 2009.
- Annotated Literature Review of the Least Bittern and Proposed Pilot Study for Least Bittern at St. Clair National Wildlife Area. Prepared for the Canadian Wildlife Service. 2009.
- Fourth Update of the Significant Wildlife Habitat Decision Support System. Prepared for the Ontario Ministry of Natural Resources. 2009.
- Species at Risk Best Available Information Summaries for 11 bird species. Prepared for the Ontario Ministry of Natural Resources. 2008.
- Draft Northern Bobwhite Recovery Strategy. Prepared for the Canadian Wildlife Service. 2008.
- Castle Glen Environmental Constraints Impact Analysis. Prepared for Castle Glen Development Corporation. 2007-2008.

- Technical writer for the Ontario Waterbird Conservation Plan. Prepared for the Ontario Ministry of Natural Resources and the Canadian Wildlife Service. 2007-2009.
- Background Information for the Ontario Waterbird Conservation Plan. Prepared for the Ontario Ministry of Natural Resources and the Canadian Wildlife Service. 2007.
- Second Update of the Significant Wildlife Habitat Decision Support System. Prepared for the Ontario Ministry of Natural Resources. 2007.
- Smithville Strategic Growth Management Plan. Prepared for the Township of West Lincoln. 2007-2008.
- Castle Glen Official Plan. Prepared for the Castle Glen Development Corporation. 1999-2006.
- North Leslie Secondary Plan. Prepared for Emery Investments and the Bayview East Landowners Group. 2002-2006.
- Significant Wildlife Habitat Decision Support System. Prepared for the Ontario Ministry of Natural Resources. 2002.
- Significant Wildlife Habitat Technical Guide. Prepared for the Ontario Ministry of Natural Resources. 2000.
- Temperate Wetland Restoration Guidelines. Prepared for the Ontario Ministry of Natural Resources, Canadian Wildlife Service, and Ducks Unlimited Canada. 1996.

Watershed Planning Studies

- Halton and Hamilton Water Use Study. Prepared for Conservation Halton and the Hamilton Region Conservation Authority. 2006.
- Humber River Wet Weather Flow Master Plan. Prepared for the City of Toronto. 2002.
- Completion of the biological component of 13 other watershed and Master Drainage Plans. 1988 to 2001.

Wildlife

Mr. Sandilands is currently writing a book on the habitat requirements, limiting factors and status of the birds of Ontario. He also completed a four-year field study for Ontario Hydro to determine the effects of forest fragmentation on breeding birds. He has extensive experience with herptofauna; he completed morphological studies on Butler's garter snake at Luther Marsh and wrote the COSEWIC report on it. On Pelee Island, he identified significant habitat for the endangered blue racer and Lake Erie water snake, and for the threatened eastern fox snake, eastern massasauga, and eastern hognose snake on Giant's Tomb Island. He completed studies on Jefferson salamanders and other amphibians near Milton, Acton and Cambridge and several other southern Ontario locations.

Environmental Impact Assessment

- Dain City EIS, Region of Niagara. Prepared for Colville Consulting Inc. 2006.
- Eugenia EIS, County of Grey. Prepared for Stovel & Associates Inc. 2006.
- Fox Property EIS and Peer Review, Region of Niagara. Prepared for Colville Consulting Inc. 2006-2007.
- Walker Brothers Compost Facility, Region of Niagara. Prepared for Walker Brothers. 2005.
- Block 20, Vaughan. Prepared for Ages Consultants Limited. 2005.
- Gibbs Property EIS, Simcoe County. Prepared for RJ Burnside and Associates Limited. 2004.
- Brookville Golf Course, Halton Region. Prepared for RJ Burnside and Associates Limited. 2004.
- Cambridge Golf Course Severance, Region of Waterloo. Prepared for the Cambridge Golf Course. 2004.
- Aurora Golf Course, Region of York. Prepared for Ages Consultants Limited. 2004-2005.
- Blue Water Canoe Club Subdivision, Simcoe County. Prepared for Riverdale. 2003.

- Bayfield North ANSI EIS, Huron County. Prepared for Five Seasons Estates. 2003.
- Palgrave Estates West EIS and Oak Ridges Moraine Conformity Report, Peel Region. Prepared for the Equestrian Management Group. 2003-2004.

Aggregate Resources

- Preparation and implementation of an exemption under the Endangered Species Act, 2007 for common hoptree, scarlet ammannia, and eastern foxsnake on Pelee Island. Prepared for Pelee Quarries Ltd. 2009.
- Evaluation of noise effects on wildlife for the Rockfort Quarry. Goodban Environmental Consulting. 2009.
- North Dumfries Pit Level 1 and 2 Natural Environment Report. Prepared for Cambridge Aggregate Services Inc. 2008-2009.
- Carter Gravel Pit. Prepared for The Miller Group Limited. 2008-2009.
- Preparation and implementation of a habitat enhancement plan for endangered species on Pelee Island under Section 58 of the *Endangered Species Act, 2007*. Prepared for Pelee Quarries Ltd. 2007-2009.
- Sayers and Sharp Gravel Pit Level 1 Natural Environment Report, Essex County. Prepared for Erie Sand & Gravel Limited. 2006.
- Reeb Quarry Woodland Restoration, Niagara Region. Prepared for M.A.Q. Aggregates Inc. 2006-2007.
- Acton Quarry Extensions Level 1&2 Natural Environment Report, Halton Region. Prepared for Dufferin Aggregates. 2005-2009.
- Inverhaven Gravel Pit Terrestrial Inventory, Wellington County. Prepared for the Murray Group. 2006, 2008.
- VicDom Gravel Pit Terrestrial Inventory, Durham Region. Prepared for Colville Consulting Inc. 2006.
- Dan Gravel Pit Level 1&2 Natural Environment Report, Essex County. Prepared for Erie Sand & Gravel. 2006.
- Preston Sand & Gravel Terrestrial Inventory, Wellington County. Prepared for Preston Sand & Gravel. 2005.
- Robinson-Kovacs Pit Expansion Level 1&2 Environment Report and Oak Ridges Moraine Conformity Report. Prepared for Skelton-Brumwell and Associates. 2005-2006.
- Manitoulin Island Quarry Input to Level 1&2 Natural Environment Report, Manitoulin Island. Prepared for LaFarge. 2004.
- Willroy-Brooks Pit Terrestrial Inventory, Halton Region. Prepared for J.C. Duff Sand and Gravel. 2004.
- Crystal Lake Vermiculite Mine EIS, Peterborough County. Prepared for Vermiculite Corporation of Canada. 2003-2004.
- McGill Pit Terrestrial Inventory, Kemptville. Prepared for LaFarge. 2003.
- Milton Quarry Extension Study on Jefferson Salamanders, Halton Region. Prepared for Dufferin Aggregates 2002-2004.
- Pelee Island Quarries Study on Blue Racers and Lake Erie Water Snakes, Essex County. Prepared for Pelee Quarries Limited. 1998-2004.
- Seres Pit Level 1&2 Natural Environment Report, Essex County. Prepared for Erie Sand & Gravel Limited. 2002-2003.

Environmental Assessment

- Smithville Wastewater Servicing Study. Prepared for XCG Consultants Ltd. and the Regional Municipality of Niagara. 2008.
- Former Camp Ipperwash Unexploded Ordinance Study, Search for Species at Risk. Prepared for Neegan Burnside Limited and the Department of National Defence. 2007-2008.

- Byersville/Harper Creek Flood Remediation EA, Peterborough. Prepared for the City of Peterborough. 2007.
- Bears Creek Flood Remediation EA, Peterborough. Prepared for the City of Peterborough. 2006-2007.
- Moose Deer Point First Nation Water Supply EA, District of Muskoka. Prepared for the Moose Deer Point First Nation. 2006.
- Wolfe Island Wind Farm Public Meetings. Prepared for Canadian Hydro Developers, Inc. 2006.
- Simcoe County Road 90 Upgrade, Simcoe County. Prepared for Simcoe County. 2005.
- Melanchton 1 Windfarm Bird Surveys, Dufferin County. Prepared for Canadian Hydro Developers, Inc. 2004-2005.
- Tay Area Water System, Simcoe County. Prepared for Tay Township. 2004.
- Howe Island Ferry Upgrade EA, Frontenac County. Prepared for the Ontario Ministry of Transportation. 2003.
- Feasibility Study for the Upgrade of Highway 24 between Highways 401 and 403, Brant County and Waterloo Region. Prepared for the Ontario Ministry of Transportation. 2002-2003.
- Cambridge Area Route Selection Study, Waterloo Region. Prepared for the Regional Municipality of Waterloo. 1999-2002.
- Lester B. Pearson International Airport Expansion and Airside Development EA. Prepared for Transport Canada. 1993-1994.

International Experience

Mr. Sandilands completed the natural environment component for the Qurum Beach Resort in the Sultanate of Oman. The proposal was to build a 150-room luxury hotel, a water park, and a new access road adjacent to a mangrove swamp. This required assessment of impacts on the mangrove swamp, prawns, molluscs, fish, and birds. Opportunities for enhancing the existing swamp and creating an additional 10 ha of mangrove swamp were identified.

Other international work includes Mill Creek Restoration, Cincinnati, Ohio and opportunities to restore Upper Mill Creek Watershed in Butler County, Ohio.

Hearings

Mr. Sandilands has appeared as an expert witness before the Ontario Municipal Board, the Joint Board, the Ontario Environmental Assessment Board, the Niagara Escarpment Commission, and a federal Environmental Assessment and Review Process panel.

SELECTED PUBLICATIONS

PEER-REVIEWED BOOKS

Sandilands, A. In prep. The birds of Ontario: habitat requirements, limiting factors, and status. Volume 3. Passerines, flycatchers through waxwings.

Sandilands, A. In press. The birds of Ontario: habitat requirements, limiting factors, and status. Volume 2. Nonpasserines, shorebirds through woodpeckers. UBC Press, Vancouver.

Sandilands, A. 2005. The birds of Ontario: habitat requirements, limiting factors, and status. Volume 1. Nonpasserines, waterfowl through cranes. UBC Press, Vancouver. 365 pp.

Sandilands, A.P. 1984. Annotated checklist of the vascular plants and vertebrates of Luther Marsh, Ontario. Ontario Field Biologist Special Publication 2. 134 pp.

PEER-REVIEWED ARTICLES

Sandilands, A. 2008. Recovery strategy for the Northern Bobwhite (*Colinus virginianus*) in Ontario. Draft. *Species at Risk Act* Recovery Strategy Series. Environment Canada, Ottawa, ON. 25 pp.

Sandilands, A. 2007. Northern Shoveler (*Anas clypeatus*). Pp. 82-83 *in* Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier, eds. Atlas of the breeding birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature. 706 pp.

Sandilands, A. 2007. Redhead (*Aythya americana*). Pp. 90-91 *in* Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier, eds. Atlas of the breeding birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature. 706 pp.

Sandilands, A. 2007. Gray Partridge (*Perdix perdix*). Pp. 120-121 *in* Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier, eds. Atlas of the breeding birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature. 706 pp.

Sandilands, A. 2007. Pied-billed Grebe (*Podilymbus podiceps*). Pp. 142-143 *in* Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier, eds. Atlas of the breeding birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature. 706 pp.

Sandilands, A. 2007. Green Heron (*Butorides virescens*). Pp. 162-163 *in* Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier, eds. Atlas of the breeding birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature. 706 pp.

Sandilands, A. 2007. Northern Harrier (*Circus cyaneus*). Pp. 172-173 *in* Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier, eds. Atlas of the breeding birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature. 706 pp.

Sandilands, A. 2007. American Woodcock (*Scolopax minor*). Pp. 250-251 *in* Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier, eds. Atlas of the breeding birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature. 706 pp.

Sandilands, A. 2007. Wilson's Phalarope (*Phalaropus tricolor*). Pp. 252-253 *in* Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier, eds. Atlas of the breeding birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature. 706 pp.

Sandilands, A. 2007. Rock Pigeon (*Columba livia*). Pp. 278-279 *in* Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier, eds. Atlas of the breeding birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature. 706 pp.

Sandilands, A. 2007. Yellow-billed Cuckoo (*Coccyzus americanus*). Pp. 284-285 *in* Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier, eds. Atlas of the breeding birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature. 706 pp.

Sandilands, A. 2007. Black-billed Cuckoo (*Coccyzus erythropthalmus*). Pp. 286-287 *in* Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier, eds. Atlas of the breeding birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature. 706 pp.

Sandilands, A. 2007. Common Nighthawk (*Chordeiles minor*). Pp. 308-309 *in* Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier, eds. Atlas of the breeding birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature. 706 pp.

Sandilands, A. 2007. Willow Flycatcher (*Empidonax traillii*). Pp. 348-349 *in* Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier, eds. Atlas of the breeding birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature. 706 pp.

Sandilands, A. 2007. American Crow (*Corvus branchyrhynchos*). Pp. 382-383 *in* Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier, eds. Atlas of the breeding birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature. 706 pp.

Sandilands, A. 2007. Northern Rough-winged Swallow (*Stelgidopteryx serripennis*). Pp. 392-393 *in* Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier, eds. Atlas of the breeding birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature. 706 pp.

Sandilands, A. 2007. Bank Swallow (*Riparia riparia*). Pp. 394-395 *in* Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier, eds. Atlas of the breeding birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature. 706 pp.

Sandilands, A., and D.A. Sutherland. 2007. Cinnamon Teal (*Anas cyanoptera*). P. 630 *in* Cadman, M.D., D.A. Sutherland, G.G. Beck, D. Lepage, and A.R. Couturier, eds. Atlas of the breeding birds of Ontario, 2001-2005. Bird Studies Canada, Environment Canada, Ontario Field Ornithologists, Ontario Ministry of Natural Resources, and Ontario Nature. 706 pp.

Coleman, K., A. Sandilands, T. Haxton, and J. Broadfoot. 2002. Significant Wildlife Habitat Decision Support System. Ontario Ministry of Natural Resources, Southern Science and Information Section, Kemptville, Ontario.

Coleman, K., A. Sandilands, T. Haxton, D. Bland, V. Brownell, and R. Rowe. 2000. Significant Wildlife Habitat Technical Guide. Ontario Ministry of Natural Resources, Fish and Wildlife Branch, Wildlife Section, Science Development and Transfer Branch, Southcentral Sciences Section. 139 pp + appendices.

Sandilands, A.P. 1998. Status report on the Butler's garter snake (*Thamnophis butleri*) in Canada. Prepared for the Committee on the Status of Endangered Wildlife in Canada. 21 pp.

Sandilands, A.P. and C.A. Campbell. 1988. Status report on the Least Bittern (*Ixobrychus exilis)* in Canada. Prepared for the Committee on the Status of Endangered Wildlife in Canada. 29 pp.

Sandilands, A.P. 1988. Gull behaviour and movement patterns at Maple, Ontario. Ontario Birds. 6: 61-67.

Sandilands, A.P. 1987. Biology of the lake sturgeon (*Acipenser fulvescens)* in the Kenogami River, Ontario. Pp. 33-46 *in* Olver, C.H., ed. Proceedings of a Workshop on the Lake Sturgeon (*Acipenser fulvescens)*. Ontario Fisheries Technical Report Series 23. 99 pp.

Sandilands, A.P. 1987. Green-winged Teal (*Anas crecca)*. Pp. 68-69 *in* Cadman, M.D., P.F.J. Eagles, and F.M. Helleiner, eds. Atlas of the Breeding Birds of Ontario, University of Waterloo Press. 617 pp.

Sandilands, A.P. 1987. Mallard *(Anas platyrhynchos)*. Pp. 72-73 *in* Cadman, M.D., P.F.J. Eagles, and F.M. Helleiner, eds. Atlas of the Breeding Birds of Ontario, University of Waterloo Press. 617 pp.

Sandilands, A.P. 1987. Northern Pintail (*Anas acuta).* Pp. 74-75 *in* Cadman, M.D., P.F.J. Eagles, and F.M. Helleiner, eds. Atlas of the Breeding Birds of Ontario, University of Waterloo Press. 617 pp.

Sandilands, A.P. 1987. Cinnamon Teal (*Anas cyanoptera).* Pp. 78-79 *in* Cadman, M.D., P.F.J. Eagles, and F.M. Helleiner, eds. Atlas of the Breeding Birds of Ontario, University of Waterloo Press. 617 pp.

Sandilands, A.P. 1987. Northern Shoveler (*Anas clypeata)*. Pp. 80-81 *in* Cadman, M.D., P.F.J. Eagles, and F.M. Helleiner, eds. Atlas of the Breeding Birds of Ontario, University of Waterloo Press. 617 pp.

Sandilands, A.P. 1987. Gadwall (*Anas strepera)*. Pp. 82-83 *in* Cadman, M.D., P.F.J. Eagles, and F.M. Helleiner, eds. Atlas of the Breeding Birds of Ontario, University of Waterloo Press. 617 pp.

Sandilands, A.P. 1987. American Wigeon (*Anas americana)*. Pp. 84-85 *in* Cadman, M.D., P.F.J. Eagles, and F.M. Helleiner, eds. Atlas of the Breeding Birds of Ontario, University of Waterloo Press. 617 pp.

Sandilands, A.P. 1987. Canvasback (*Aythya valisineria)*. Pp. 86-87 *in* Cadman, M.D., P.F.J. Eagles, and F.M. Helleiner, eds. Atlas of the Breeding Birds of Ontario, University of Waterloo Press. 617 pp.

Sandilands, A.P. 1987. Redhead (*Aythya americana)*. Pp. 88-89 *in* Cadman, M.D., P.F.J. Eagles, and F.M. Helleiner, eds. Atlas of the Breeding Birds of Ontario, University of Waterloo Press. 617 pp.

Sandilands, A.P. and C.A. Campbell. 1987. LeConte's Sparrow (*Ammodramus leconteii)*. Pp. 454-455 *in* Cadman, M.D., P.F.J. Eagles, and F.M. Helleiner, eds. Atlas of the Breeding Birds of Ontario, University of Waterloo Press. 617 pp.

Sandilands, A.P. 1980. Short-eared Owl nest in Wellington County, Ontario. Ontario Field Biologist. 34: 95-98.

Sandilands, A.P. 1980. Artificial nesting structures for Great Blue Herons. Blue Jay 38: 187-188.

Sandilands, A.P. 1977. Green Heron nesting in a Wood Duck box. Auk 94: 390.

OTHER PUBLICATIONS

Sandilands, A. 2006. An impaled Mourning Dove. Ontario Birds 24: 47.

Sandilands, A. 2005. Circumstantial evidence for Golden Eagle predation of red fox. Ontario Birds 23: 147-148.

Sandilands, A. 2005. Publication of the Atlas. OFO News 23(2): 12.

Sandilands, A. 2004. Publishing the Atlas. Ontario Breeding Bird Atlas Newsletter 4(2): 10.

Sandilands, A. 2002. Confirming Chimney Swifts. Ontario Breeding Bird Atlas Newsletter 2(1): 13.

Sandilands, A.P. 1992. Snow bathing proves fatal for an American Goldfinch. Ontario Birds 10: 77-78.

Carson, R.K., A.P. Sandilands and R.R. Evans. 1991. Hydroelectric generating stations extensions - Mattagami River. Mattagami River hydraulic studies and impacts on fisheries habitat. Ontario Hydro Report No. 90367. 53 pp. plus figures.

Sandilands, A.P. 1989. Intraspecific aggression and nest-site tenacity by European Starlings. Ontario Birds 7: 25-28.

Sandilands, A.P. 1988. Butler's garter snake (*Thamnophis butleri)*. Pp. 126-128 i*n* Weller, W.F. and M.J. Oldham, eds. Ontario Herpetofaunal Summary 1986. Ontario Field Herpetologists. 221 pp.

Sandilands, A.P. 1988. Butler's garter snake (*Thamnophis butleri)*. Pp. 161-162 *in* Oldham, M.J., ed. 1985 Ontario Herpetofaunal Summary. World Wildlife Fund, Essex Region Conservation Authority, and the Ontario Ministry of Natural Resources. 206 pp.

Sandilands, A.P. 1986. Wetlands; evaluation or inventory? Plant Press 4: 40-41.

Sandilands, A.P. 1985. Interesting botanical areas at Luther Marsh, central Ontario. Plant Press 3: 134-136.

Dance, K.W. and A.P Sandilands. 1984. Successful introduction of vegetation on dredge spoil. Proceedings of the Annual Meeting of the Canadian Land Reclamation Association 9. 22 pp.

Sandilands, A.P. and K.W. Dance. 1984. A winter record of a Veery in Ontario. Ontario Birds 2: 84-86.

Mr. Sandilands has also completed eight Winter-Bird Population Studies that were published in American Birds and the Journal of Field Ornithology. He has acted as a referee for the Journal of Soil and Water Conservation, the Canadian Field Naturalist, the Wildlife Society Bulletin, and the Ontario Fisheries Technical Report Series.

GRAY OWL ENVIRONMENTAL INC. SPECIES AT RISK EXPERIENCE

Gray Owl Environmental Inc. and its principal, Al Sandilands, have completed numerous studies related to Ontario Species at Risk. The following is an annotated list of relevant work.

Plants

1. **American Ginseng (*Panax quinquefolius*)**: Confidential site: impact of proposed development on ginseng and preparation of mitigation plans.

2. **Bluehearts (*Buchnera americana*)**: identification of locations of bluehearts populations at former Camp Ipperwash and mitigation for their protection during an unexploded ordinance study; site visit to Ipperwash with contractors preparing the update COSEWIC report to show them the current population and where plants had been the previous two years.

3. **Butternut (*Juglans cinera*)**: Byersville Creek Flood Reduction EA: impact of flood control proposals on butternut; Castle Glen Development, impact of proposed development and formulation of policy in the Official Plan to protect butternut.

4. **Dwarf Hackberry (*Celtis tenuifolia*)**: identification of locations of dwarf hackberry at former Camp Ipperwash and mitigation for their protection during an unexploded ordinance study.

5. **Heart-leaved Plantain (*Plantago cordata*)**: identifications of heart-leaved plantain locations at former Camp Ipperwash and mitigation for their protection during an unexploded ordinance study.

6. **Common Hoptree (*Ptelea trifoliata*)**: inventory of hoptrees on and adjacent to Pelee Quarries on Pelee Island and proposed mitigation to increase numbers in setbacks and areas set aside for conservation of threatened and endangered species. Application for an exemption under the provincial *Endangered Species Act, 2007*.

7. **Scarlet Ammannia (*Ammannia robusta*)**: field check for scarlet ammannia on Pelee Quarries' holdings on Pelee Island and identification of proposed mitigation. Application for an exemption under the provincial *Endangered Species Act, 2007*.

Invertebrates

1. **West Virginia White (Pieris virginiensis)**: habitat mapping near Acton.

2. ***Monarch (Danaus plexippus)***: identification of impacts of watermain installation on monarch butterfly habitat for the Moose Deer Point First Nation Water Supply EA.

Fish

1. **Lake Sturgeon (*Acipenser fulvescens*)**: completion of a 3-year mark-recapture study on the Kenogami River for the Ministry of Natural Resources; publication of a paper on the biology of the lake sturgeon in the Kenogami River; identification of allowable harvest by sustenance fishing and angling at Mammamattawa for the Constance Lake First Nation.

Amphibians

1. **Jefferson Salamander (*Ambystoma jeffersonianum*)**: detailed egg mass survey of 50 ponds and habitat description for the proposed Milton Quarry extension and identification of proposed mitigation measures; design of constructed ponds to create breeding habitat for the Jefferson salamander (yet to be implemented).

2. **Small-mouthed Salamander (*Ambystoma texanum*)**: evaluation of the northern portion of Pelee Island as habitat for the small-mouthed salamander.

3. **Western Chorus Frog (*Pseudacris triseriata*)**: identification of locations of western chorus frog at former Camp Ipperwash.

Reptiles

1. **Butler's Garter Snake (*Thamnophis butleri*)**: preparation of the first COSEWIC status report for this species; provided comments to the contractors doing the update COSEWIC report; morphological work on Butler's garter snake at Luther Marsh with comparisons to the morphology of other populations of Butler's garter snakes and short-headed garter snakes.

2. **Eastern Ribbonsnake (*Thamnophis sauritis*)**: habitat mapping and protection of probable hibernacula for a proposed vermiculite mine near Peterborough; habitat mapping and identification of mitigation to minimize impacts of watermain installation for the Moose Deer Point First Nation Water Supply EA; habitat mapping and identification of mitigation for a proposed gravel pit in Wellington County; identification of habitat and mitigation for the former Camp Ipperwash unexploded ordnance study.

3. **Eastern Hog-nosed Snake (Heterodon platirhinos)**: habitat mapping on Giant Tomb's Island; identification of habitat at the retired IBI site at Nobel, Ontario; habitat mapping and identification of mitigation to minimize impacts of watermain installation for the Moose Deer Point First Nation Water Supply EA; identification of habitat and mitigation for the former Camp Ipperwash unexploded ordnance study.

4. **Eastern Massasauga (*Sistrurus catenatus catenatus*)**: habitat mapping on Giant Tomb's Island; habitat mapping and identification of mitigation to minimize impacts of watermain installation for the Moose Deer Point First Nation Water Supply EA.

5. **Eastern Foxsnake (*Pantherophis gloydi*)**: habitat mapping on the northern portion of Pelee Island, habitat mapping on Giant Tomb's Island, habitat mapping and identification of mitigation to minimize impacts of watermain installation for

the Moose Deer Point First Nation Water Supply EA; identification of habitat enhancement features for foxsnakes on Pelee Island including hibernacula, nesting sites, hot-rock piles, and brush piles and design and overview of construction of 5 sets of each habitat feature in 2009; application for an exemption under the provincial *Endangered Species Act, 2007*.

6. **Blue Racer (*Coluber constrictior*)**: detailed inventories and habitat mapping, including assistance in tagging on Pelee Island; preparation of a blue racer habitat enhancement plan as per Section 58 of the *Endangered Species Act, 2007*; design and overview of construction of 5 each of hibernacula, hot-rock piles, egg-laying sites, and brush piles for blue racers.

7. **Lake Erie Watersnake (*Nerodia sipedon insularis*)**: detailed inventory and mapping of habitat, including assistance with tagging on Pelee Island; preparation of a Lake Erie watersnake enhancement plan as per Section 58 of the Endangered Species Act, 2007; design and overview of construction of hibernacula, hot-rock piles, and brush piles for watersnakes.

8. **Eastern Milksnake (*Lampropletis triangulum*)**: identification of habitat at a proposed development site near Fort Erie, with plans for more detailed inventory in 2010.

9. **Five-lined Skink (*Eumeces fasciatus*)**: habitat mapping and identification of mitigation to minimize impacts of watermain installation for the Moose Deer Point First Nation Water Supply EA.

10. **Spotted turtle (*Clemmys guttata*)**: habitat mapping and identification of mitigation to minimize impacts of watermain installation for the Moose Deer Point First Nation Water Supply EA. As a result of this work, one portion of the site will remain unserviced to ensure that spotted turtles are protected; habitat mapping and assistance in a radio-tagging study at a confidential site.

11. **Blanding's turtle (*Emydoidea blandingii*)**: habitat mapping and identification of mitigation measures to minimize impacts of watermain installation for the Moose Deer Point First Nation Water Supply EA; identification of habitat and mitigation for the former Camp Ipperwash unexploded ordnance study.

12. **Map Turtle (*Graptemys geographica*)**: habitat mapping and identification of mitigation measures to minimize impacts of watermain installation for the Moose Deer Point First Nation Water Supply EA.

13. **Stinkpot (*Sternotherus odoratus*)**: habitat mapping and identification of mitigation measures to minimize impacts of watermain installation for the Moose Deer Point First Nation Water Supply EA.

<u>Birds</u>

1. **Northern Bobwhite (*Colinus virginianus*)**: preparation of the first draft of the Recovery Strategy for the Northern Bobwhite.

2. **Horned Grebe (*Podiceps auritus*)**: identification of status and risks and proposed conservation measures for Ontario for the Ontario Waterbird Conservation Plan.

3. **American White Pelican (*Pelecanus erythrorhychos*)**: preparation of the Species at Risk Best Available Information Summary for MNR; identification of status and risks and proposed conservation measures for Ontario for the Ontario Waterbird Conservation Plan.

4. **Least Bittern (*Ixobrychus exilis*)**: annotated literature review and preparation of a protocol for a pilot study at St. Clair National Wildlife Area; identification of status and risks and proposed conservation measures for Ontario for the Ontario Waterbird Conservation Plan; identification of habitat and mitigation for the former Camp Ipperwash unexploded ordnance study; survey and habitat mapping for the Tay Township Water Supply EA; preparation of the first COSEWIC status report.

5. **King Rail (Rallus elegans)**: a review of the species in Ontario for the Canadian Wildlife Service; preparation of the Species at Risk Best Available Information Summary for MNR; identification of status and risks and proposed conservation measures for Ontario for the Ontario Waterbird Conservation Plan; survey and habitat mapping for the Tay Township Water Supply EA.

6. **Yellow Rail (*Coturnicops noveboracensis*)**: a review of the species in Ontario for the Canadian Wildlife Service; identification of status and risks and proposed conservation measures for Ontario for the Ontario Waterbird Conservation Plan.

7. **Bald Eagle (*Haliaeetus leucocephalus*)**: determination of impacts of a proposed subdivision on nesting eagles near Leamington; impacts of a pedestrian bridge over the Grand River on wintering eagles; habitat mapping for wintering eagles and identification of impacts of new arterial roads for the Cambridge Area Route Selection Study.

8. **Golden Eagle (*Aquila chysaetos*)**: preparation of the Species at Risk Best Available Information Summary for MNR; publication of a note on evidence of an eagle capturing a red fox.

9. **Peregrine Falcon (*Falco peregrinus*)**: preparation of the Species at Risk Best Available Information Summary for MNR.

10. **Piping Plover (*Charadrius melodus*)**: preparation of the Species at Risk Best Available Information Summary for MNR.

11. **Eskimo Curlew (*Numenius borealis*)**: preparation of the Species at Risk Best Available Information Summary for MNR.

12. **Black Tern (*Chilidonias niger*)**: identification of status and risks and proposed conservation measures for Ontario for the Ontario Waterbird Conservation Plan; survey for this species as part of the Tay Township Water Supply EA.

13. **Barn Owl (*Tyto alba*)**: preparation of the Species at Risk Best Available Information Summary for MNR.

14. **Short-eared Owl (Asio flammeus**): publication of a note on a nest found in Wellington County.

15. **Chimney Swift (*Chaetura pelagica*)**: identification of habitat and mitigation for the former Camp Ipperwash unexploded ordnance study.

16. **Red-headed Woodpecker (*Melanerpes erythrocephalus*)**: mapping of territory and home range of a breeding pair at a proposed gravel pit.

17. **Loggerhead Shrike (*Lanius ludovicianus*)**: preparation of the Species at Risk Best Available Information Summary for MNR.

18. **Golden-winged Warbler (*Vermivora chrysoptera*)**: Design and implementation of survey techniques using broadcast tapes at Castle Glen in Grey County.

19. **Kirtland's Warbler (*Dendroica kirtlandii*)**: preparation of the Species at Risk Best Available Information Summary for MNR.

20. **Prothonotary Warbler (*Protonotaria citrea*)**: preparation of the Species at Risk Best Available Information Summary for MNR.

21. **Louisiana Waterthrush (*Seiutus motacilla*)**: identification of habitat and mitigation for the former Camp Ipperwash unexploded ordnance study.

22. **Hooded Warbler (*Wilsonia citrina*)**: habitat mapping at a proposed quarry extension; acted as an expert witness at an OMB hearing to determine if habitat at an area was significant for the Hooded Warbler.

23. **Henslow's Sparrow (*Ammodramus henslowii*)**: preparation of the Species at Risk Best Available Information Summary for MNR; detailed survey and habitat evaluation along a proposed highway route.

<u>Mammals</u>

1. **Eastern Mole (*Scalopus aquaticus*)**: identification of habitat adjacent to a proposed sand pit and identification of required mitigation measures.

In addition to the species-specific projects listed above, Al worked on several drafts of the Significant Wildlife Habitat Decision Support System and did much of the technical writing and editing. This system describes the habitat requirement of the species (or group of species) being considered, identifies the potential impacts of various types of development on these species and their habitats, and provides mitigation measures that may be implemented.

Species at Risk dealt with in this document in addition to those mentioned above include:

Invertebrates

Karner Blue
Frosted Elfin

Amphibians

Fowler's Toad

Reptiles

Eastern Spiny Softshell
Wood Turtle

Birds

Acadian Flycatcher
Whip-poor-will
Cerulean Warbler

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EDUCATION

1995 M.E.S.(Planning), Environmental Planning, York University, North York, Ontario

1992 Honours B.Sc., Ecology, University of Guelph, Guelph, Ontario

PROFESSIONAL ASSOCIATIONS

Ontario Professional Planners Institute - Full Member
Canadian Institute of Planners - Full Member

PROFESSIONAL TRAINING

2008 Mr. Goodban completed the Ministry of Natural Resources' (MNR) 5-day training course in the use of the *Ecological Land Classification System for Southern Ontario* (ELC).

1994 Mr. Goodban completed the Ministry of Natural Resources' 5-day training course in the use of the *Ontario Wetlands Evaluation System: Southern Manual* (Third Edition).

PROFESSIONAL EXPERIENCE

1999 to present Consulting Ecologist and Natural Heritage Planner, Goodban Ecological Consulting

1992-1998 Ecologist and Natural Heritage Planner, Ecoplans Limited

1991-1992 Botanist and Ecologist, Hamilton-Wentworth Natural Areas Inventory Project

1990 Field Botanist, Hamilton Region Conservation Authority and Hamilton Naturalists' Club

PROFILE

Mr. Anthony Goodban's academic background is in botany, ecology and environmental planning at the undergraduate and graduate level and he has 18 years of field and professional experience. He has expert knowledge of the vegetation and flora of southern Ontario, being especially familiar with the flora of the Hamilton and Halton Region. Mr. Goodban works either as an independent consultant or as a subconsultant to other firms. He often undertakes detailed field surveys of vegetation and flora as part of studies supporting Official Plan updates, aggregate applications, land development projects, park planning exercises, natural areas inventories, restoration and monitoring projects. Mr. Goodban has worked on many wetland projects, including wetland evaluations, boundary delineations, impact assessments and monitoring programs. He provides project input relating to planning matters such as the natural heritage components of the Provincial Policy Statement and Greenbelt Plan and has prepared numerous environmental impact statements for a wide variety of development proposals. Mr. Goodban recently prepared and updated the Flora of Hamilton, in association with the Hamilton Region Conservation Authority. He has expertise dealing with rare vegetation communities, including alvars and

PROFILE (continued)

prairies, and has written several papers and reports on prairie and savanna vegetation in the Hamilton and Halton areas. He is certified to complete wetland evaluations under the *Ontario Wetland Evaluation System: Southern Manual (3rd Edition)* and to use the *Ecological Land Classification System for Southern Ontario* (ELC). Mr. Goodban has appeared as an expert witness before the Ontario Municipal Board and the Joint Board.

PROJECT EXPERIENCE

Resource Management - Watersheds and Natural Heritage System Planning

- Participant in several watershed studies, including those for the Sixteen Mile Creek and East Morrison Creek in Halton Region.

- Responsible for the development of Natural Heritage Systems for the Sixteen Mile Creek watershed, Township of Oro-Medonte and North Oakville.

Resource Management – Wetlands, ANSI's and ESA's

- Responsible for numerous wetland evaluations and impact assessments for a range of development proposals across Ontario, including such wetlands as: Dorchester Swamp, Strasburg Creek Wetland Complex, Forks of the Credit Wetland Complex, Creditview Swamp, Victoria Point Wetland Complex and Halton Escarpment Wetland Complex. Many of these projects required the preparation of environmental impact studies/assessments, often including the detailed review and integration of water resources (hydrogeology, hydrology, stormwater engineering) and ecological (wetlands, fisheries) data.

- Main environmental consultant to the City of Orillia during an OMB hearing that focused on the issue of large-scale development within a Provincially Significant Wetland (Victoria Point Bog).

- Main environmental consultant to local residents in the Town of Essex during a 2002 OMB hearing that examined an 18-hole golf course proposal within a Provincially Significant Wetland (Marshfield Woods).

- Participant in evaluations and impact assessments for development proposals adjacent to Environmentally Sensitive Areas (ESAs) across southern Ontario, including: Sixteen Mile Creek Valley (ESA 16) and Hilton Falls Complex (ESA 25) in Halton Region, Doon Pinnacle Hill (ESPA 35) in Waterloo Region, Major Spink Area (ESA No. 97) in Durham Region and Hayesland Complex (ESA No. 28) in Hamilton.

Transportation Projects

- Participated in the preparation of a number of highway Environmental Assessments, including: the Bradford Bypass, the Leslie Street Extension in Toronto, the Parry Sound and Mactier sections of Highway 69 and Highway 7 from Kitchener to Guelph.

- Participant in Class Environmental Assessments for sensitive river, wetland and valley crossings, including: the northerly and southerly crossings of Twelve Mile Creek in Oakville, the Mountainview Road crossing of Silver Creek in Georgetown and Sixth Line crossing of Sixteen Mile Creek in Milton.

Aggregates, Landfills

- Participant in multi-disciplinary studies in support of sand and gravel pit license applications, including the Lockyer Brothers pit in Mono Township, Armbro Pinchin Pit in Caledon. Responsible for several MTO wayside permit applications (one quarry and three pits) in eastern Ontario.

- Participant in multi-disciplinary studies in support of limestone/dolostone quarry license applications, including the Tomlinson Brothers quarry in Stittsville, Holmenin quarry near Buckhorn, Dufferin Aggregates' Milton Quarry Extension and James Dick Construction Limited's proposed Rockfort Quarry in Caledon.

- Responsible for the development and implementation of wetland vegetation monitoring programs adjacent to aggregate operations. Provided input to many rehabilitation plans for pits and quarries.

- Participant in several landfill site searches, including those in the St. Thomas and Huntsville areas. Assisted in the preparation of an ecological assessment of the Keele Valley Landfill vertical expansion in Maple.

Vegetation and Flora - Inventory, Management and Monitoring

- Responsible for completing detailed botanical inventories of numerous sites in southern Ontario, including Bronte Creek Provincial Park (Halton), the Red Hill Valley (Hamilton-Wentworth) and the Dundas Valley (Hamilton-Wentworth).

- Consulting botanist and ecologist to Natural Areas Inventory Projects in southern Ontario, including Hamilton (2001-2002), Halton (2003-2004) and Niagara (2006-2008).

- Consulting Botanist/Ecologist to Dufferin Aggregates rehabilitation program at the Milton Quarry and Flamboro Quarries in Hayesland.

- Developed vegetation management plans and strategies for a number of significant natural areas and communities, including:

    - Ontario Hydro's right-of-way at Bronte Creek Provincial Park (Oakville)
    - prairie and other vegetation at Bronte Creek Provincial Park (Oakville)
    - prairie and oak woodland vegetation at Spencer Gorge Wilderness Area (Dundas/Flamborough)
    - prairie vegetation at the Ancaster Prairie
    - rare species and significant communities in the Albion Falls - Buttermilk Falls portion of the Red Hill Valley (Hamilton)
    - alvar plant species and communities at Flamboro Quarries (Hayesland)

RELATED EXPERIENCE AND COMMUNITY INVOLVEMENT

1995 to present

Mr. Goodban is the first author of a research paper on the historical and present extent and floristic composition of prairie and savanna vegetation in the vicinity of Hamilton, Ontario, prepared with the assistance of two other authors (W.D. Bakowsky and B.D. Bricker). This paper was presented at the 23rd Natural Areas, 15th North American Prairie, and Indiana Dunes Ecosystems Conferences held at St. Charles, Illinois, on October 26, 1996. It was published in the Proceedings of the 15th North American

RELATED EXPERIENCE AND COMMUNITY INVOLVEMENT (continued)

Prairie Conference (1999). Mr. Goodban is currently undertaking further research on prairie, savanna and oak woodland vegetation in the western Lake Ontario region of Ontario. He has authored several papers and studies on the prairie and oak woodland vegetation at Bronte Creek Provincial Park.

1995 to present

Mr. Goodban was a participant in the **International Alvar Conservation Initiative** or **'Alvar Working Group'**. This was a collaborative project aimed at documenting and protecting alvar sites in the Great Lakes basin. Participants from across eastern North America examined sites in Michigan, New York, Ohio and Ontario. Mr. Goodban's masters level research on alvar vegetation on the Flamborough Plain was integrated into this broader study. He prepared the text for a 24-page full color brochure and poster for the Federation of Ontario Naturalists, as one of the products generated by the Alvar Working Group, entitled *Great Lakes Alvars*. Mr. Goodban has studied alvar vegetation in all of the main alvar regions in Ontario. He has also visited alvar sites in New York and Ohio.

1991 to present

Mr. Goodban has led numerous naturalist and field botanist field trips in southern Ontario on behalf of the Field Botanists of Ontario. He has given presentations on rare vegetation communities (e.g., prairies, alvars) at conferences, meetings and naturalist club events.

1991 to present

Mr. Goodban has worked in collaboration with the Hamilton Region Conservation Authority to document the flora of the City of Hamilton. The first edition of *The Vascular Plant Flora of the Regional Municipality of Hamilton-Wentworth, Ontario,* was produced in 1995. Mr. Goodban recently produced a Second Edition of the Flora documenting more than 1400 vascular plant taxa in the City of Hamilton.

1995 to 2000

Member of the Regional Municipality of Hamilton-Wentworth's **ENVIRONMENTALLY SIGNIFICANT AREA IMPACT EVALUATION GROUP** (ESAIEG). ESAIEG considers development proposals located within or adjacent to Environmentally Significant Areas (ESAs) and provides advice to planning staff.

1991 to 1995

Member of the Regional Municipality of Halton's **Ecological and Environmental Advisory Committee** (EEAC). The basic function of EEAC is to provide technical advice, through the Planning and Development Department, to staff and Council on all environmental matters affecting Halton.

SELECTED PUBLICATIONS AND REPORTS

Crins, W.J., W.D. McIlveen, A.G. Goodban and P.G. O'Hara. 2006. The Vascular Plants of Halton Region, Ontario. pp. 1-79 In: Dwyer, J.K. (ed.), Halton Natural Areas Inventory 2006: Volume 2 – Species Checklists. Halton/North Peel Naturalists' Club, South Peel Naturalists' Club, Hamilton Naturalists' Club, Conservation Halton and the Regional Muncipality of Halton.

Goodban, A.G. 2003. The Vascular Plants of Hamilton, Ontario. pp. 1-1 to 1-99, In: Dwyer, J.K., Nature Counts Project, Hamilton Natural Areas Inventory 2003, Volume 1 – Species Checklists. Hamilton Naturalists' Club, Hamilton, Ontario.

SELECTED PUBLICATIONS AND REPORTS (continued)

Goodban, A.G. 2003. The Vegetation Communities of Hamilton, Ontario. pp. 2-1 to 2-22, In: Dwyer, J.K., Nature Counts Project, Hamilton Natural Areas Inventory 2003, Volume 1 – Species Checklists. Hamilton Naturalists' Club, Hamilton, Ontario.

Goodban, A.G. *In prep.* Bronte Creek Provincial Park (North Section): Grasslands Study. Bronte Creek Provincial Park, Burlington, Ontario Parks.

Goodban, A.G. *In prep.* A life science inventory and assessment of Bronte Creek Provincial Park (North Section). Bronte Creek Provincial Park, Burlington, Ontario Parks.

Goodban, A.G. 1999. An Overview and Assessment of Prairie and Oak Woodland Vegetation at Bronte Creek Provincial Park. pp. 263-274. In: M. Pollock-Ellwand et al., Parks and Protected Areas Research in Ontario, Proceedings of the Parks Research Forum of Ontario (PRFO) Annual General Meeting. Faculty of Environmental Studies, University of Waterloo, Waterloo, Ontario.

Goodban, A.G., W.D. Bakowsky and B.D. Bricker. 1999. The historical and present extent and floristic composition of prairie and savanna vegetation in the vicinity of Hamilton, Ontario. pp. 87-103. In: Proceedings of the 15th North American Prairie Conference. *Edited by* C. Warwick. Natural Areas Association, Bend, Oregon.

Goodban, A.G. 1998. Significant Flora Survey: Ontario Hydro Right-of-Way, Bronte Creek Provincial Park Nature Reserve Zone Area of Natural and Scientific Interest. Prepared for Ontario Hydro. 11 pp + map.

Goodban, A.G. 1997. A survey of the rare vascular plant flora of the Albion Falls - Buttermilk Falls area in the City of Hamilton, Ontario. Hamilton Region Conservation Authority, Ancaster, Ontario. 14 pp. + appendix + map.

Goodban, A.G. 1996. The vegetation and flora of the Red Hill Valley and environs. pp. 17-66. In: Biological Inventory of the Red Hill Valley, Hamilton Naturalists' Club (eds.), Hamilton, Ontario.

Goodban, A.G. 1995. Alvar Vegetation on the Flamborough Plain: Ecological Features, Planning Considerations and Conservation Recommendations. Major Paper. Faculty of Environmental Studies, York University, North York, Ontario. 88 pp. + appendices.

Goodban, A.G. 1994. *Carex virescens* (Cyperaceae) new to the Regional Municipality of Hamilton-Wentworth. Field Botanists of Ontario Newsletter 7(1): 11-12.