HILLSBURGH PIT EXTENSION
LEVEL II NATURAL ENVIRONMENT
TECHNICAL REPORT

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1.0 Introduction

CBM Aggregates, a division of St. Marys Cement (Canada) Inc. (referred to herein as "St. Marys CBM"), retained Stantec Consulting Ltd. (referred to herein as "Stantec") in February 2006 to complete a Level II Natural Environment Technical report as required under Aggregate Resources of Ontario Provincial Standards Manual, 1997 (Provincial Standards) for aggregate license applications. The proposed pit is to be an extension of the existing licensed Hillsburgh Pit. The subject property (defined as the existing Hillsburgh Pit licence area and the proposed extension area) studied for this Level II Natural Environment Technical Report is located in Wellington County, Town of Erin, Part Lots 29 and 30, Concession 8, and is shown on **Figure 1**[1].

The subject property includes the existing pit and three extension parcels adjacent to the existing pit, to the west, north and southeast. The study area for this assessment encompasses the subject property and a 120 m zone of investigation around these lands (**Figure 2.0**). A regional review of natural heritage features and their potential interconnection was completed within a 5 km radius around the subject property as part of this Level II study, and is referred to herein as the regional study area (**Figure 3.0**). This area of focus was selected to ensure a comprehensive understanding of the natural and water resources features and functions in the general vicinity of the subject property.

The subject property falls within the planning area of the Town of Erin in Wellington County. The Wellington County Official Plan (2011) identifies three planning designations on the subject property: Prime Agricultural, Secondary Agricultural and Greenlands.[2] The Town of Erin Official Plan (2007) also designates the subject property as Prime Agricultural, Secondary Agricultural and Greenlands.

The subject property is located within the Greenbelt Plan Area, Protected Countryside [Ministry of Municipal Affairs and Housing (MMAH), 2005].

Regionally, the land use in the Town of Erin is primarily agriculture with good to moderate quality farmland. High quality aggregate resources are also found in the Town of Erin and aggregate extraction occurs at a number of locations within the Town.

1.1 APPLICABLE LEGISLATION

St. Marys CBM is making application for a Category 1 Class 'A' license under the *Aggregate Resources Act* (ARA) (MNR, 2009). Category 1 Class 'A' licenses are for aggregate pit operations with extraction occurring below the established water table. The Provincial Standards (MNR, 1997) require a Level I Natural Environment Technical Report to determine whether any

[1] Figures referenced throughout this report are provided in Appendix A.
[2] The existing Hillsburgh Pit is identified as a Mineral Aggregate Area.

of the following natural heritage features, as described in the Provincial Policy Statement (PPS) (MMAH, 2005), exist on and/or within 120 m of the site:

- Significant wetlands;
- Significant habitat of endangered or threatened species;
- Fish habitat;
- Significant woodlands;
- Significant valleylands;
- Significant wildlife habitat; and,
- Significant Areas of Natural and Scientific Interest (ANSI).

If any of the seven natural heritage features are present, the Aggregate Resources Policies and Procedures Manual (MNR) states that a Level II Natural Environment Technical Report is required to:

- Determine any negative impacts on the natural features or ecological functions for which they are identified; and
- Propose any preventative, mitigative or remedial measures that may be necessary.

Potential for one or more of the seven PPS natural heritage features has been identified to occur within the study area. As such, this Level II Natural Environment Technical Report has been prepared. In addition to the ARA this report addresses the PPS and issues that are encompassed within municipal planning processes.

1.2 GREENBELT PLAN

The Greenbelt Plan was created to provide a broad band of permanently-protected land that protects the agricultural land base, protects the natural heritage and water resource systems, and provides for a diverse range of economic and social activities, including resource uses. Within the Greenbelt Plan the subject property is identified as part of the Protected Countryside, which permits activities related to the use of non-renewable resources, including mineral aggregate resources, subject to all other applicable legislation, regulations, and municipal official plans, policies and by-laws. The availability of mineral aggregate resources for long-term use is determined in accordance with the PPS. The subject property is not identified as part of the Natural Heritage System of the Greenbelt Plan (see **Figure 3.0**). Section 4.3.2. of the Greenbelt Plan provides policy direction for non renewable resources within the Protected Countryside.

In terms of environmental protection, the Greenbelt Plan promotes the following matters within the Protected Countryside:

- Protection, maintenance and enhancement of natural heritage, hydrologic and landform features and functions, including protection of habitat for flora and fauna [policy 1.2.2.2 a)];

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- Protection, restoration and maintenance of natural and open space areas and connections between the broader natural systems of southern Ontario within and beyond the Golden Horseshoe [policy 1.2.2.2 b)];
- Protection, improvement or restoration of the quality and quantity of ground and surface water and the hydrological integrity of watersheds [policy 1.2.2.2 c)]; and
- Provision of long-term guidance for the management of natural heritage and water resources when contemplating such matters as development, infrastructure, open space planning and management, aggregate rehabilitation and private or public stewardship programs [policy 1.2.2.2 d)].

Key Natural Heritage Features (KNHFs), as defined by the Greenbelt Plan, are assessed within this document, and the relevant sections of the Greenbelt Plan are discussed herein with respect to mineral aggregate operations within the Protected Countryside areas.

2.0 Approach

The purpose of this Level II Natural Environment Technical Report is to identify environmental features and functions on the subject property (if any) and within the study area, and to evaluate the potential impacts of the proposed aggregate operation on these features with and without mitigation. The preparation of this report involved a review of background documents, a series of site visits to complete an inventory of natural features and resources on and adjacent to the subject property, and communications with agencies having regulatory authority over the environmental features in the area.

2.1 BACKGROUND RESOURCES

Background data were collected and reviewed to identify significant natural areas, significant species occurrences and the landscape context. These data were used to supplement and guide the field surveys completed for the study area. Documents reviewed and agencies contacted included, but were not limited to:

- 1:10,000 First Base solutions (2011), imagery date 2006;
- Atlas of the Mammals of Ontario (Dobbyn, 1994), the Ontario Herpetofaunal Atlas (Oldham and Weller, 2000), the Ontario Breeding Bird Atlas internet database (2005);
- Credit River Watershed Environmentally Significant Areas (Ecologistics Ltd., 1979);
- Draft Erin Servicing and Settlement Master Plan, Phase 1, Environmental Component, Existing Conditions Report (CVC et al., 2011)
- Greenbelt Plan (MMAH, 2005);
- Land Information Ontario (LIO) digital mapping of natural heritage features (MNR, 2011);
- Natural Heritage Information Centre (NHIC) online database (MNR, 2011);
- Personal communication with MNR Guelph District Resource Technician (J.C. Laurence);
- Personal communication with Credit Valley Conservation Authority (Jon Clayton, Liam Murray);
- Personal communication with County of Wellington (Aldo Salis and Mark Paoli);
- The Physiography of Southern Ontario, Third Edition. Ontario Geological Survey Special Volume 2, Ministry of Natural Resources. 270 pp. (Chapman and Putnam, 1984);
- Town of Erin Official Plan (2007);
- Wellington County Official Plan (2011).

2.2 REGIONAL REVIEW

The preliminary stage of an environmental evaluation is to conduct a literature and map review of the regional environmental features. This review identified natural heritage features and functions, and associated ecological linkages in the regional study area within a 5 km radius of the subject property. These features and functions were considered with respect to the PPS and municipal policies. In the regional context, ecological linkages are important to understanding the regional environmental framework and potential effects that could be caused by on-site

operations. Understanding the linkages also assisted in scoping the extent of the field investigation program required (i.e. fisheries assessments in nearby creeks).

The Regional Context is detailed in **Section 3** of this report. The identified natural features that occur within the boundaries of the regional study area are illustrated on **Figure 3.0**.

2.3 METHODS

The field investigations for this assessment were completed over a period of one year on the subject property (i.e. existing pit and three pit extension parcels) and the study area (120 m zone of investigation). The field investigations occurred over a four season period and involved detailed reviews of the vegetation communities and wildlife monitoring surveys (i.e. mammals, amphibians, reptiles, owls, and breeding birds). No aquatic habitat is located on or immediately adjacent to the subject property or the study area. The investigations conducted for this study are listed in **Table 1** (Appendix B). The following provides details of the survey methods.

2.3.1 Vegetation Community Assessment

Field investigations for this project included Ecological Land Classification (ELC) of vegetation communities and a floristic survey of the study area, conducted on April 17, 2006, May 2, 2006 and September 11, 2007. Vegetation communities were delineated on aerial photographs and checked in the field; community characterizations (ecosites and ecotypes) were then based on the ELC system (Lee *et al.*, 1998). Colloquial and Latin nomenclature of plant species generally follows Newmaster *et al.* (1998).

Vegetation community and plant species information collected for the study area was evaluated to determine potential significance at a number of different levels. Provincial significance of vegetation communities was based on the draft rankings assigned by the Natural Heritage Information Centre (NHIC) (Bakowsky, 1996). The provincial status of all plant species is based on Newmaster *et al.* (1998), with updates from the database of the Natural Heritage Information Centre (NHIC, 2010). Identification of potentially sensitive plant species is based on the assignment of a coefficient of conservatism value (CC) to each native species in southern Ontario (Oldham *et al.*, 1995). The CC value, ranging from 0 (low) to 10 (high), is based on a species' tolerance of disturbance and fidelity to a specific natural habitat. Species with a CC value of 9 or 10 generally exhibit a high degree of fidelity to a narrow range of habitat parameters.

The Natural Heritage Information Centre (NHIC) database was accessed to identify any records of nationally or provincially significant species in the vicinity of the subject property. The NHIC provided global, national and provincial status of wildlife. Regional plants were obtained from a document by Riley (1989).

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2.3.2 Woodland Assessment

A portion of a woodland occurs on the subject property that includes the proposed aggregate extraction area for the proposed Hillsburgh Pit extension. A detailed assessment of the woodland was completed to assist in determining its significance. The woodland assessment included a review of the ELC and floristics information collected on May 2, 2006 and September 11, 2007 and a complementary woodland community survey completed on February 7, 2007. Results of these surveys were assessed using the general guidelines for determining significance of woodlands that are presented in the *'Natural Heritage Reference Manual For Natural Heritage Policies of the Provincial Policy Statement, 2005 Second Edition'* (NHRM 2nd Ed.) (MNR, 2010). In addition, various wildlife surveys, habitat information and management history were used to assess the significance of wildlife habitat of this area using the guidelines presented in the NHRM 2nd Ed. and information contained within the *'Significant Wildlife Habitat Technical Guide'* (SWHTG) (MNR, 2000).

Detailed forestry data were collected within the woodlot. Three plots with 10 m radii were established in the woodlot to measure the size and composition of trees. The species and diameter at breast height (DBH) of each tree (greater than 1cm/DBH) within the plot was recorded. The data collected on tree species and size were used to assess the relative age (i.e. early successional, mid age, mature, old growth) of each community. Parameters calculated to aid in this analysis were:

- Basal area per hectare of mature trees (i.e. those over 25 cm/DBH) of mid to late successional tree species;
- Number of stems per hectare;
- Median diameter of each tree species;
- Stand composition based on number of stems; and
- Number and DBH of dead trees.

The *'CBM Hillsburgh Pit Proposed Extension Woodland Assessment'* report that was completed by Stantec (2011), and subsequently revised in October, 2011, is appended hereto (**Appendix F**). The woodland assessment report was completed to assist in determining the significance of the woodlot; it details and characterizes the wooded area situated on the subject property.

2.3.3 Herpetofaunal Survey (Amphibians and Reptiles)

The study area does not contain wetland habitats. Based on an initial amphibian habitat survey, performed on April 20, 2006, no areas for potential amphibian breeding were identified for subsequent monitoring. Incidental observations of amphibians and reptiles are recorded during all field visits.

2.3.4 Breeding Birds

Owl Survey

An owl survey using Bird Studies Canada (BSC) methods and broadcast recording of owl calls was conducted on the subject property on April 20, 2006 between 20:45 and 21:45. Conditions were cloudy (100% cloud cover) with a temperature of 8°C and winds of 1-2 on the Beaufort Scale. Two survey stations were chosen based on proximity to suitable habitat. Also taken into consideration when determining the number of survey stations was the size of the study area to ensure the sampling was representative of the entire area. The survey stations were located away from the road and it was relatively quiet with little noise interference. The survey was completed using a protocol similar to the *'Nocturnal Owl Surveys in Central Ontario: A Citizen Scientists Guide'* (BSC, 1995). This involves playing a call-back CD of the following owl species: Great Horned Owl *(Bubo virginianus)*; Eastern Screech-Owl *(Otus asio)*; Northern Saw-whet Owl *(Aegolius acadicus)*; Short-eared Owl *(Asio flammeus)*; Barred Owl *(Strix varia)*; and Long-eared Owl *(Asio otus)*.

Each species call was played for 5 minutes, with brief breaks during the species call to listen for a response.

Red-shouldered Hawk Survey

A survey for Red-shouldered Hawk was conducted following Bird Studies Canada's Red-shouldered Hawk Survey protocol. It is noted that the federal status of Red-shouldered Hawk was re-evaluated by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) in 2006, and was delisted from "special concern" to "not at risk" in March, 2007. Provincially, the Red-shouldered Hawk was not included on Schedules 1-5 of the Endangered Species Act, 2007 (Bill 184).

The survey was conducted April 27, 2006 between 06:20 and 07:15 am. Three stations, located adjacent to suitable habitat for Red-shouldered Hawk, were surveyed using the BSC standardized playback. Visual or auditory responses of Red-shouldered Hawk were noted at each station.

Cooper's Hawk Survey

Investigations were completed to assess the status of a potential Cooper's Hawk nest observed on-site on May 1, 2007. A survey for Cooper's Hawk activity was conducted on June 14, 2007 from 09:00 to 10:00. Conditions were 22°C with wind at 1 on the Beaufort Scale and 10% cloud cover. The survey involved a review of the nest for signs of activity and a search of the site for signs of adult Cooper's Hawks.

Breeding Bird Surveys

Breeding bird surveys were conducted on June 5 and June 28, 2006 using Ontario Breeding Bird Atlas protocols for collecting and reporting data (Ontario Breeding Bird Atlas, 2001). The

June 5, 2006 survey was conducted between 05:45 and 07:45. Conditions were 13°C, with 20% cloud cover and a wind of 2 on the Beaufort Scale. The June 28, 2006 survey was conducted between 06:00 and 08:00. Conditions were 20°C and calm (wind of 0 on the Beaufort Scale) with 40% cloud cover. All habitat types were covered on foot and all birds seen or heard were documented. A conservative approach was taken to assess the status of breeding birds on the subject property and within the study area; if birds were observed in suitable habitat within their normal breeding season, it was assumed that they were breeding on-site.

2.3.5 Butterflies and Odonata Survey

A survey for butterflies and odonata (i.e. dragonflies and damselflies) was conducted on May 28, 2006 between 09:30 and 13:00. Conditions were 25°C, calm (winds of 1-2 on the Beaufort Scale) with 10% cloud cover. The survey was conducted by using area searches along a predetermined route. The route was designed to pass through all habitat types where butterflies or odonata were expected to occur. Emphasis was placed on woodland clearings and edges where butterflies and odonata are most likely to concentrate. The route was altered during the survey to incorporate observed features where odonata or butterflies may concentrate (e.g. a shrub in bloom). Density within a set area is difficult to determine accurately, however, tallies of butterfly and odonata species were recorded for a rough comparison of species abundance.

2.3.6 Mammals and Other Terrestrial Wildlife

Terrestrial wildlife investigations were conducted in the study area in combination with the assessment of vegetation and terrestrial-specific surveys.

A winter wildlife survey was conducted on February 7, 2007 to survey the study area for wildlife, particularly deer and wild turkey. The survey was conducted during daytime hours (09:30 to 12:30) and following fresh snowfall. Conditions were -15°C with clear skies and winds of 4-5 on the Beaufort Scale. A route was walked around the site covering all habitats and recording all evidence (i.e. tracks, scat, calls, etc.) observed.

Incidental observations of mammals, butterflies and other wildlife were noted during all field surveys. Inventories of wildlife were compiled from sightings as well as distinctive sounds and signs.

Background research from secondary source data was used to augment this information to determine potential wildlife use in the study area. Inventories of wildlife were compiled from the Atlas of the Mammals of Ontario (Dobbyn, 1994), the Ontario Herpetofaunal Summary (Oldham and Weller, 2000) and the Ontario Breeding Bird Atlas (OBBA, 2005). The Natural Heritage Information Centre database was accessed to identify any records of nationally or provincially significant species in the vicinity of the subject property.

It is important to note that the exact locations of species occurrences are not available from the atlases and, instead, are recorded within 10 km squares. Therefore, although they can be useful

resources, the identified species records from these databases may not occur within the proposed Hillsburgh Pit extension boundaries or study area.

3.0 Regional Context – Overview of Natural Features

3.1 REGIONAL DESCRIPTION

The regional context is illustrated on **Figure 3.** The subject property lies within the Hillsburgh Sandhills physiographic region (Chapman and Putnam, 1984). This area is characterized by deeply rolling topography and sandy substrates. The subject property is situated within the Credit River watershed.

The study area is within the Huron-Ontario section of the Great Lakes Forest Region (Rowe, 1972). Natural upland forest in this region is generally dominated by sugar maple, American beech, basswood, white ash, white oak, bur oak, eastern hemlock and eastern white pine. Forests of silver maple, white elm, red elm, black ash and eastern white cedar generally develop in lowland areas. Large-tooth aspen and white birch often form secondary communities. Forest cover in Wellington County is approximately 18.2% (Riley and Mohr, 1994), and approximately 29.1% in the Town of Erin.

There are four communities in the regional study area. Located east of the property are: Hillsburgh, and Erin and Cedar Valley to the southeast. Directly to the north is Binkham. These settlements support the local rural community.

The more prominent natural heritage system can be seen on **Figure 3.0**. The Credit River Valley and the series of wetland complexes and wooded valley channels offer a contiguous natural heritage linkage along this corridor. This system is situated east and northeast of the subject property. Similar natural heritage linkages are found along the Speed River to the southwest of the subject property.

3.2 SUMMARY OF NATURAL HERITAGE LINKAGES

Policy 2.1.2 of the PPS (MMAH, 2005) specifically addresses the need to consider linkages in the landscape. The presence and function of linkages between features is best assessed in the context of the regional landscape.

There are no provincially or regionally significant features such as wetlands, ANSIs or ESAs located in the immediate vicinity of the subject property. The small wooded areas located within the 120 m investigation zone, are isolated from larger features found in the regional study area. The wooded areas in the immediate vicinity of the subject property are isolated from each other, providing poor natural linkages in the local area. Opportunities do exist to link the currently small, fragmented parcels of woodland in the local area of the Hillsburgh Pit.

4.0 Site Conditions

4.1 TOPOGRAPHY

The study area is dominated by the existing extraction area where a lowered landscape is found from aggregate operations. The study area is surrounded by agriculture on all sides, with a woodland parcel to the east and southwest, as shown on **Figures 3.0** and **4.0**. The subject property consists of three parcels (**Figure 2.0**); their topography is discussed here. The northwest parcel is relatively flat and occupied by agricultural fields. The parcel north of the extraction area includes approximately 43% of a small deciduous forest that slopes gently upward to the north. The south parcel consists of a former farmstead and surrounding agricultural land. This parcel slopes to the northeast. Overall the land encompassing the entire study area gradually slopes downward through the extraction area to the east, and into a shallow agricultural field swale. The highest point of elevation outside the existing extraction area occurs in the southwest portion of the subject property, where the ground surface is 497 m above sea level (masl). The lowest point on the subject property is approximately 482 masl at the northern boundary.

4.2 SOILS AND HYDROGEOLOGY

A review of the soils within the study area was undertaken using the Soil Survey of Wellington County (Hoffman *et al.*, 1963). The soils found on the subject property are predominantly Hillsburgh soils with an area of Brant soils to the northeast. **Table 2** (Appendix B) summarizes the two soil types identified on the subject property.

The hydrologic and hydrogeologic setting of the subject property is described in the *'Hydrogeological Assessment, Hillsburgh Pit Amendment and Extension'* (Cambium Environmental, 2011).

4.3 AGRICULTURAL LANDS

The subject property is located in the Town of Erin in the County of Wellington. Wellington has approximately 2,600 active farms (OMAFRA, 2006), which accounts for over 196,000 ha of land.

The Town of Erin was amalgamated in 1997, and covers 360 km^2, and includes the former villages of Erin and Hillsburgh, Township of Erin and the hamlets of Ballinafad, Brisbane, Cedar Valley, Crewson's Corners, Orton and Ospringe.

Agriculture is the primary land use in the Town of Erin and in areas of outwash soil, such as those that occur on the subject property, cash crops (i.e. small grains, corn, etc.) and some vegetable crops are predominant.

The main soil types as noted above are Hillsburgh and Brant soils. The majority of the land (>85%) on the subject property is identified as Class 3 land for the production of agricultural crops, followed by a smaller percentage of Class 1. The Class 1 land consists of a thin length of land found at the northeastern boundary of the site, and is generally associated with actively cultivated lands and an existing woodland.

In total, there are approximately 55 tillable hectares on the subject property. No areas of tile drainage have been identified on the subject property.

4.4 SURFACE DRAINAGE AND AQUATIC RESOURCES

There are no watercourses located on the subject property. A field swale for surface water runoff is present on the agricultural lands along the eastern boundary of the study area. The general surface drainage pattern of the subject property is illustrated on **Figure 5**. A branch of the West Credit River flows through the Town of Hillsburgh approximately 1.75 km to the east and southeast of the study area. Fisheries data was obtained for this reach from the Credit Valley Conservation Authority (CVC). This reach is considered coldwater fish habitat, and is known to support important species such as Brook Trout and Brown Trout. Areas within this reach have also been identified as potential Brook Trout spawning habitat. The fishery found in the West Credit River is noted to be a significant distance from the Hillsburgh Pit and proposed extension area, and is not directly linked to the property via any surface water connection. A small tributary is noted to exist north of Hillsburgh in the southernmost portion of the Village of Hillsburgh, 8th Line, the Erin/East Garafraxa Townline (CVC *et al.*, 2011). This tributary is over 1 km from the site, and is not considered to be in a potential impact area. The hydrogeology of the area is described in the Hydrogeological Assessment (Cambium Environmental, 2011). Based on a review of this report, there appears to be no direct connection between the site and the river system.

4.5 VEGETATION COMMUNITIES

4.5.1 Vegetation Communities

Botanical surveys were completed April 17, 2006, May 2, 2006 and September 11, 2007. The vegetation communities identified on the subject property, based on the Ecological Land Classification (ELC) system (Lee *et al.*, 1998), are shown on **Figure 4**. The subject property generally consists of agricultural lands with a rural residence located in the southeast corner, and one woodland straddling the northern portion of the property. Small, fragmented woodland patches occur to the east, southeast, and south of the subject property lands. Agricultural lands occur on the remaining adjacent lands.

The vegetation community types are described in **Table 3** (Appendix B). Vegetation communities adjacent to the subject property were observed without entering private properties, and characterizations are based on subject property and roadside observations, aerial photographs and background data.

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4.5.2 Vascular Plant Species

One hundred and forty three (143) species of vascular plants were recorded in the study area during botanical inventories. Of these, 57% or 81 species are native, and 43% or 62 species are exotic.

With the exception of one, all of the native species are ranked S5 (i.e. Secure-Common, widespread, and abundant in Ontario). The only S4 species (i.e. Apparently Secure-Uncommon but not rare; some cause for long-term concern due to declines or other factors), is Blunt-leaf Waterleaf *(Hydrophyllum canadense)*. Several patches of this species occur beyond the subject property near the eastern edge of the eastern sugar maple woodland (ELC FOD 5-8), at the outer edge on the 120 m investigation zone (**Figure 4**).

No nationally, provincially, regionally or locally rare, threatened or endangered species were found on the subject property. The complete table of vascular plants is included in **Appendix D**.

4.5.3 Woodland Assessment

In order to assist in determining the significance of the woodland that partially extends into a small portion of the proposed extraction area of the subject property, a detailed woodland field survey was completed. The woodland assessment included the following investigation and elements:

Analysis of woodland using the *'Natural Heritage Reference Manual For Natural Heritage Policies of the Provincial Policy Statement, 2005 Second Edition'* (NHRM 2nd Ed.) (MNR, 2010) criteria:

- woodland size;
- ecological function;
- uncommon characteristics; and
- economic and social functional values.

In addition, specific analyses were made of significant wildlife habitat as it relates to the woodland; rare species in the woodland (including endangered and threatened species); and additional on-site surveys to collect detailed information on the woodlands characteristics.

The full woodland assessment report (Stantec, 2011) is provided in **Appendix F** and is discussed further in **Section 5.1.4** of this report, as it relates to planning policies.

4.6 WILDLIFE

Appendix E includes a list of the wildlife species observed on the site during site investigations. They include 2 odonata species, 7 butterfly species, 1 amphibian species, 32 breeding bird species and 7 mammal species.

4.6.1 Reptiles and Amphibians

The site does not support amphibian habitat and while multiple surveys were conducted, only one species of amphibian, the American Toad (*Anaxyrus americanus*), was encountered during the initial amphibian habitat survey.

No reptiles were observed during any of the site visits, however, common species such as Eastern Gartersnake and Brownsnake would be expected to be present. Eastern Milksnake, a provincial and federal species of special concern, with a provincial ranking of S3 (vulnerable), occurs throughout a large portion of Ontario, including the area that encompassed by the study area. Based on the distribution of this snake from the NHIC background information sources, it is possible that it could occur on the subject property. This is discussed further in **Section 4.6.7** of this report.

4.6.2 Breeding Birds

Owl Surveys

The owl survey conducted on April 20, 2006 did not result in any positive call-back responses to the broadcast CD.

Red-shouldered Hawk Surveys

The Red-shouldered Hawk survey conducted on May 5, 2006 did not result in any positive Red-shouldered Hawk responses to the broadcast CD.

Cooper's Hawk Survey

A potential Cooper's Hawk (*Accipiter cooperii*) nest was observed on the subject property in the southern portion of the woodland on May 1, 2007. A Cooper's Hawk was noted in the study area during the breeding bird survey, however, the nest showed no signs of being currently active (i.e. bird on nest, whitewash, feathers of prey nearby). Cooper's Hawks tend to be wary, and the female can quickly leave the nest, even when incubating eggs. A second survey was completed on June 14, 2007 to check the status of the potential Cooper's Hawk nest. The nest showed no signs of being, or having been, active. There was no bird on or near the nest, no nestlings, no whitewash, and no prey feathers in the vicinity of the nest. Cooper's Hawk is ranked S4 (common in Ontario) and has been determined to be Not in Any Category of Risk by the Committee on the Status of Species at Risk in Ontario (COSSARO) and Not at Risk by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

Breeding Birds

In total, 37 species of birds were observed; 31 of which were likely to be breeding on the subject lands. Observed species not expected to be breeding within the subject lands include Mallard, Northern Harrier, Coopers Hawk, Ruby-crown Kinglet, White-throated Sparrow, Bobolink. The Mallard and Harrier where seen flying over the site. The Coopers Hawk, Ruby-crown Kinglet,

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White-throated Sparrow, and Bobolink were seen during other surveys and the latter three were considered to be migrating. The Coopers Hawk was observed near the site during a red tailed hawk survey. A stick nest that resembled a Coopers was observed on site and was studied in greater detail. All species observed are ranked S5 (Secure; common and widespread), or S4 (Apparently secure; uncommon but not rare), with the exception of Bobolink.

Bobolink has recently been assessed by COSEWIC and COSSARO as a threatened species. It was added as a threatened species to the Species at Risk in Ontario (SARO) List on September 28, 2010, but has not yet been added to a schedule under the SARA. Bobolink is generally referred to as a 'grassland species'. It nests primarily in forage crops with a mixture of grasses and broad-leaved forbs, predominantly hayfields and pastures. Bobolink was observed by Stantec as a migrant in May of 5 2006 and not observed during the breeding season. In addition, the fields in the extraction area are noted to have been planted to corn in 2011, as such, no Bobolink habitat is found on the subject property.

Area sensitive birds are defined as those species that prefer to breed in habitat patches greater than 10 ha in size. Four(4) area sensitive species were observed during the breeding bird surveys directly or through evidence of potential nests. These species would be considered to be breeding in the study area which includes the 120 investigation zone, and included Cooper's Hawk, Hairy Woodpecker, Pileated Woodpecker, and White-breasted Nuthatch.

The Hairy Woodpecker and White-breasted Nuthatch prefer to breed in forested habitat greater than 10 ha in size. Pileated Woodpecker (*Dryocopus pileatus*) cavities were observed within the woodland, in the older portion of the woodland that was not subject to intense harvesting (i.e. the northern half of woodland). Pileated Woodpecker appear to require 30-50 ha of habitat for breeding, but will incorporate smaller woodlands into their range, therefore it may not be a true area-sensitive species (Naylor *et al.*, 1996). Pileated Woodpecker require mature forest and trees at least 40 dbh for nesting and roosting (Naylor *et al.*, 1996).

Cooper's Hawk require 4-50 ha of suitable habitat for breeding. Cooper's Hawks nest primarily in deciduous forests, however are increasingly using plantations in Ontario (Sandilands, 2005).

4.6.3 Butterflies and Odonata

The 2 odonate species and 7 butterfly species observed on the subject property are common provincially and locally. One species, the Cabbage White butterfly, is considered exotic and not a native component of Ontario's fauna. Uncommon or rare butterfly species would not be expected on this site, as it supports no rare communities or populations of rare plant species. Butterflies have specific habitat and host plant species requirements, and rare butterflies are typically those species that are dependent upon rare habitats or plants.

4.6.4 Mammals

The 7 mammal species observed are all very common provincially and locally. They are typical of agricultural landscapes associated with an area of woodland. The winter wildlife survey identified deer tracks, with some well used trails within the woodland. The tracks were mainly concentrated in the northern, older portion of the woodland that is found within the 120 m zone of investigation, that was not subject to intense harvesting. However, no conifers are present to provide shelter and no potential habitat for winter deeryards was identified within the study area.

4.6.5 Background Wildlife Survey Information

Secondary source data were also used to augment data gathered during field investigations, in order to determine potential wildlife use in the study area. Wildlife species recorded in the Atlas of the Mammals of Ontario (Dobbyn, 1994), the Ontario Herpetofaunal Summary (Oldham and Weller, 2000), and the Ontario Breeding Bird Atlas (OBBA, 2005) were reviewed. Fifteen (15) species of amphibian, 9 species of reptiles, 86 species of breeding birds and 32 species of mammal were reported in wildlife atlas results from a search completed for the regional study area and beyond. It is important to note that the exact locations of species occurrences are not available from these atlases and, instead, are recorded within 10km x 10km squares. Therefore, although they can be useful resources, it is also likely that many of the identified species do not occur on the subject property. All species reported in the wildlife atlas results were common or very common in Ontario with the exception of the Eastern Milksnake, a federal and provincial Species of Special Concern. This species is further discussed in **Section 4.6.7** of this report.

In addition, a list of Species at Risk that occur in Wellington County was provided by the MNR and considered in this assessment as well as Species at Risk noted to occur in Table 2.3.5 of the Erin Servicing and Settlement Master Plan (CVC *et al.*, 2011). These species were not observed on site and the habitat for these species was not available on site. **Table 4** summarizes the potential for these Species at Risk to occur on the subject property (see Appendix B).

4.6.6 Threatened and Endangered Species

A review of the background information compiled and field investigations conducted provides information on potential threatened and endangered species that may occur on or in the vicinity of the subject property. No rare species were reported on the subject property in the NHIC database, wildlife atlases or observed during Stantec's field investigations.

The bobolink was observed on May 5, 2006 during other wildlife surveys. The date of observation suggests that this bird was a migratory individual. Bobolink were not observed on the subject property during the subsequent June 5 and June 28 surveys; as such, it is not recorded to be breeding on site. There is no grassland habitat suitable for Bobolink to breed on site.

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4.6.7 Other Significant Species

Background information indicated that one species of Special Concern, the Eastern Milksnake, has historically occurred in the vicinity of the study area (Dobbyn, 1994). The Eastern Milksnake is a provincial and federal species of Special Concern, and is ranked S3 (Vulnerable in the province of Ontario). The Eastern Milksnake occurs throughout southern Ontario and is considered uncommon and local throughout its range (Lamond, 1994). Eastern Milksnakes can occur in most rural habitats. They favour a wide range of habitats, including open woodlands, fields and farm buildings. These landscape features are predominant in Wellington County. Potentially suitable habitat for the Eastern Milksnake is present on the subject property, however it was not observed during field studies conducted throughout the year.

5.0 Analysis of Natural Heritage Features

5.1 PROVINCIAL POLICY STATEMENT (PPS)

The seven natural heritage features to be considered under the ARA, as noted in the ARA standards, are the same as those listed in Policy 2.1 of the Provincial Policy Statement (PPS) (MNR, 2005) as identified in **Section 1.0** of this report. With regard to the subject property, these features are discussed in the following sections.

5.1.1 Significant Wetlands

No provincially significant wetlands are found on or adjacent to the subject property. The nearest wetland is located more than 1 km to the east and is associated with the Credit River Valley area. Development lands on the subject property are not considered to be adjacent to wetland or with a potential hydrological or hydrogeological zone of influence; as such, there are no possible impacts to wetland features.

5.1.2 Significant Habitat of Endangered and Threatened Species

Endangered and threatened species are identified by the OMNR using procedures established by the Committee on the Status of Species at Risk in Ontario (COSSARO). As discussed in **Section 4.6.6** of this report, no endangered or threatened species were identified through a Natural Heritage Information Centre database search or during on-site field investigations. The only threatened species recorded during site observations was the Bobolink. Bobolink was observed as a migrant, and there is not habitat available on site (i.e. grassland) that would be considered regulated Bobolink habitat; as such, there are no impacts to significant habitat of endangered and threatened species associated with the Hillsburgh Pit extension.

5.1.3 Fish Habitat

Fish habitat is defined as the spawning grounds and nursery, rearing, food supply, and migration areas on which fish depend directly or indirectly in order to carry out their life processes (OMNR, 1999). As discussed in **Section 4.4** of this report, there are no watercourses located on the subject property and no watercourses in the vicinity; as such, there are no possible impacts to fish habitat associated with the Hillsburgh Pit extension.

5.1.4 Significant Woodlands

There is one 12.6 ha woodland that straddles the subject property boundary, approximately 5.4 ha of which are situated within the proposed extraction area. The County of Wellington Official Plan (2011) states in Section 5.5.4 that: "*Woodlands over 10 ha in area are considered to be significant by the County and are included in the Greenlands System*". The woodland in question is part of the Greenland System, and Section 5.6.1 recognizes that mineral aggregates

are permitted uses in the Greenland System provided "*there are no negative impacts on provincially significant features and functions and no significant negative impact on other Greenland features and functions*". In addition, the Plan states that "Significant" as it pertains to Woodlands is "*an area which is: ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition or past management history*".

The County of Wellington confirmed that while the County Official Plan has established that woodlands over 10 ha are considered significant, mineral aggregate operations can be considered in woodlands subject to the policies of the Plan and in consideration of the definition of significance. A specific assessment was undertaken to provide a detailed assessment of significance, taking into account other factors in addition to size and assessing these attributes and functions.

General guidelines for determining significance of woodlands are presented in the *'Natural Heritage Reference Manual For Natural Heritage Policies of the Provincial Policy Statement, 2005 Second Edition'* (NHRM 2nd Ed.) (MNR, 2010). Criteria suggested by the NHRM 2nd Ed. for designating significant woodlands include woodland size, ecological function (woodland interior, proximity to other woodlands and other habitats, linkages, water protection, woodland diversity), uncommon characteristics, economic and social functional values. In order to assist in determining the significance of the woodland, a detailed woodland assessment was undertaken. The results of the assessment are presented in **Appendix F**. The woodland assessment includes analysis of woodland as described in the Natural Heritage Reference Manual (MNR, 2010), as well as an analysis of wildlife habitat as it occurs in the woodland. Based on the results of this assessment, the woodland does not fit the criteria of significant woodland as presented in the Natural Heritage Reference Manual. The woodland does not posses the size, ecological function, uncommon characteristics or economic and social value of a provincially significant woodland. The size of the woodland parcel (12.6 ha) suggests that, within the Town of Erin, this parcel is locally important. There are no other anticipated impacts from development, such as water related impacts, on or adjacent to the woodland feature, given that it is an upland environment and it does not offer specialized vegetation or wildlife habitat.

Based on the comprehensive and detailed assessment of the subject property woodland, and in consideration of County of Wellington Official Plan (2011) policies, including the definition of significance related to woodlands, the Woodland Assessment demonstrates that the onsite woodland is not significant.

5.1.5 Significant Valleylands

Criteria for designating significant valleylands include prominence as a distinctive landform, degree of naturalness, importance of its ecological functions, restoration potential, and historical

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and cultural values. Given a review of these criteria, there are no significant valleylands on or with 120 m of the subject property; as such, there are no possible impacts to significant valleylands associated with the Hillsburgh Pit extension.

5.1.6 Significant Wildlife Habitat

The Significant Wildlife Habitat Technical Guide may be used to help decide what areas and features should be considered significant wildlife habitat (MNR, 2000).

The different categories that require consideration in order for areas to be considered as significant wildlife habitat are as follows:

- seasonal concentration habitats;
- rare vegetation communities or specialized wildlife habitat;
- species habitat of conservation concern; and
- animal movement corridors.

Seasonal Concentration Habitats

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 Significant Wildlife Habitat Technical Guide identifies 14 potential types of seasonal concentration areas. 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.

The 14 types of seasonal concentrations are:

1. winter deer yards;
2. moose late winter habitat;
3. colonial bird nesting sites;
4. waterfowl stopover and staging areas;
5. waterfowl nesting sites;
6. shorebird migratory stopover areas;
7. landbird migratory stopover areas;
8. raptor winter feeding and roosting areas;
9. Wild Turkey winter range;
10. Turkey Vulture summer roosting areas;
11. reptile hibernacula;
12. bat hibernacula;
13. bullfrog concentration areas; and
14. migratory butterfly stopover areas.

The winter wildlife survey identified deer tracks, with some well used trails within the woodland. The tracks were mainly concentrated in the northern, older portion of the woodland, beyond the proposed licence area. No conifers, however, are present to provide shelter, and no potential habitat for winter deeryards was identified within the study area.

No evidence was found to suggest the site is used for seasonal concentration of other groups of wildlife species (i.e. migratory birds, reptiles, bats, bullfrogs, butterflies, wintering wild turkey or bald eagle).

Studies and background review conducted for this study did not identify any seasonal concentration areas in the study area.

Rare Vegetation Communities or Specialized Wildlife Habitat

Rare or specialized habitats are two separate components. Rare habitats are those with vegetation communities that are considered rare in the province. SRANKS are rarity rankings applied to species at the "state" level, or in Canada at the provincial level, and are part of a system developed under the auspices of the Nature Conservancy (Arlington, VA). Generally, community types with SRANKS of S1 to S3 (critically imperiled to vulnerable in Ontario), as defined by the Natural Heritage Information Centre (NHIC), could qualify. It is assumed that these habitats are at risk and that they are also likely to support additional wildlife species that are considered significant.

No rare vegetation communities occur on, or within 120 m adjacent to the subject property.

Specialized habitats are microhabitats that are critical to some wildlife species. The Significant Wildlife Habitat Technical Guide identifies the following potential specialized habitats:

1. habitat for area-sensitive species;
2. forests providing a high diversity of habitats;
3. old-growth or mature forest stands;
4. foraging areas with abundant mast;
5. amphibian woodland breeding ponds;
6. turtle nesting habitat;
7. osprey or bald eagle nesting habitat;
8. moose calving areas;
9. moose aquatic feeding areas;
10. mineral licks;
11. mink, otter, marten, and fisher denning sites;
12. highly diverse sites;
13. cliffs; and
14. seeps and springs.

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Specialized habitats listed from 2 through 14, above, do not occur on the subject property or on adjacent lands.

Four area-sensitive species of birds were recorded in the woodland area that straddles the licensed area in the study area: Cooper's Hawk, Hairy Woodpecker, Pileated Woodpecker and White Breasted Nuthatch. A potential Cooper's Hawk nest was observed in the woodland on the subject property. Cooper's Hawks have been found to be tolerant of human disturbance and habitat fragmentation and increasingly, in recent years, breeds in suburban and urban areas (Curtis *et al.*, 2006). Because Cooper's Hawk breeding and nest site habitats are diverse, and this nest was observed to be an inactive, unsuccessful nest, the woodland is not considered to be providing significant wildlife habitat under the criteria of the Wildlife Habitat Technical Guide (2000). Pileated Woodpecker cavities were observed in the woodland area containing old trees, beyond the subject property and the licensed area, but within the 120 m zone of investigation. The woodland provides only marginally suitable habitat for Pileated Woodpecker. The small median tree DBHs and the small size of the woodland (12.6 ha) indicate that it does not provide sufficient area or habitat to support a breeding pair. It may be used for foraging activities. Both Pileated Woodpecker and Cooper's Hawk are considered common and are not known to be declining. There are numerous woodlands within the municipality that would support both of these species, and that also support a greater diversity of area-sensitive species and many more individual pairs. Consequently, the area would not qualify as significant wildlife habitat for area-sensitive species.

No rare vegetation communities or specialized wildlife habitats were identified on the subject property.

Species of Conservation Concern

The most significant criterion for the determination of significant wildlife habitat is evidence of species of conservation concern. This includes four types of species: those that are rare, those whose populations are significantly declining, those that have been identified as being at risk to certain common activities, and those with relatively large populations in Ontario compared to the remainder of the globe.

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). This is also the order or priority that should be attached to the importance of maintaining species. Some species have been identified as being susceptible to certain practices, and their presence may result in an area being designated significant wildlife habitat. Examples include species vulnerable to forest fragmentation and species such as woodland raptors that may be vulnerable to forest management or human disturbance. The final group of species of conservation concern includes species that have a high proportion of their global population in Ontario. Although they may be common in Ontario, they are found in low numbers in other jurisdictions.

One species of special concern was identified through a review of wildlife atlases. Eastern Milksnake uses a range of habitats that are similar to some found within the subject property, and might potentially be utilizing the site. However, no Eastern Milksnake were observed on the subject property during the course of field investigations, and quality of the available habitat is relatively poor.

Species observed on-site are considered common to very common in agricultural landscapes.

Animal Movement Corridors

Animal movement corridors are areas 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.

While deer trails were observed on the subject property and in the 120 m zone of investigation in the eastern corner of the study area to the east of the woodland, these tracks are typical of rural landscapes and normal habitat usage, and not considered to be an important linkage corridor. No migration corridors were identified on the subject property.

In summary, using criteria in the *'Natural Heritage Reference Manual For Natural Heritage Policies of the Provincial Policy Statement, 2005 Second Edition'* (NHRM 2nd Ed.) (MNR, 2010), there are no seasonal concentration habitats, rare vegetation communities or specialized wildlife habitat, habitat of species of conservation concern, or animal movement corridors, as discussed in foregoing sections of this report. As such, the features on the subject property would not be considered to be significant wildlife habitat.

5.1.7 Significant Areas of Natural and Scientific Interest (ANSIs)

The province, according to standardized evaluation procedures, determines the significance of ANSIs. There are no ANSIs of provincial significance either on or within 120 m of the subject property.

5.2 GREENBELT PLAN

5.2.1 Key Natural Heritage Features

Key natural heritage features within the Greenbelt Plan are identified in Policy 3.2.4. Further, it is indicated that key natural heritage features are not subject to the natural features policies of section 3.2.4 of the Greenbelt Plan in those instances where they occur beyond the mapped Natural Heritage System. As the subject property is not located within the Natural Heritage System of the Greenbelt Plan, any key natural heritage features are defined, and subject to, the policies of the PPS. All natural heritage features have been addressed in accordance with the PPS in the preceding **Sections 5.1.1** to **5.1.7**.

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5.2.2 Key Hydrologic Features

Key hydrologic features as defined in the Greenbelt Plan (permanent and intermittent streams, lakes, seepage areas and springs and wetlands) beyond the Natural Heritage System are subject of Policy 3.2.4. None of these hydrologic features occur on-site or within the 120 m study area.

6.0 Project Description

MacNaughton Hermsen Britton Clarkson Planning Limited (herein referred to as "MHBC") has prepared the proposed Aggregate Resources Act site plans (the site plans) for the proposed Hillsburgh Pit extension. The site plans and license will control the aggregate extraction process as well as the rehabilitation of the pit once extraction is completed. The proposed licensed area for the Hillsburgh Pit extension is approximately 62 ha, with a proposed extraction area of approximately 50 ha.

Extraction will occur both above and below the water table in the areas shown on the site plans (see **Figure 6.0**). Most of the below water extraction will occur within the existing licence area. The above water portion of the proposed Hillsburgh Pit extension (±49.2 ha) and the existing Hillsburgh Pit (±32.8 ha) will cover a total area of approximately 82 ha. The below water portion of the proposed Hillsburgh Pit extension (±0.8 ha) and the existing Hillsburgh Pit (±11.2 ha) will cover a total area of approximately 12 ha of agricultural land that will be rehabilitated to a pond and wetland area.

The majority of the areas to be extracted are currently in agricultural use or rural residential associated with other agricultural operations, with the exception of a wooded area to the north of the existing Hillsburgh Pit. This wooded area covers approximately 5.4 ha within the extraction footprint. Rehabilitation plans include a continuous strip of mixed tree planting, deciduous and coniferous, along the north, east and south slope faces. The initiative will provide a series of new linkages to existing, isolated woodland parcels surrounding the subject property and existing Hillsburgh Pit (see **Figure 7.0**). The total area of replanting will include replacement at the same location of approximately 3.5 ha of the 5.4 ha woodland area that will be removed, and an overall total planting of 15.5 ha of contiguous woodland area, which equal a net gain of 10.1 ha of wooded area in the long-term and an ecological enhancement compared to current conditions.

Total estimated reserves based on the proposed extraction limits and setbacks shown on the site plans are approximately 13.7 million tonnes. Of the total tonnage, approximately 94% is considered above the water table with the remaining 6% below water table.

Proposed annual tonnage limit of 1,000,000 tonnes, with a maximum of 500,000 tonnes per year proposed to be extracted from below water.

7.0 Potential Impacts and Mitigation

The analysis of the seven natural heritage features to be considered under the PPS indicates that there are no significant natural heritage features in the study area, however the assessment has identified one environmental feature that occurs within a small portion of the licensed area, a local Woodland area. Although the woodland on-site does not meet the criteria to be considered provincially significant based on the *'Natural Heritage Reference Manual For Natural Heritage Policies of the Provincial Policy Statement, 2005 Second Edition'* (NHRM 2nd Ed.) (MNR, 2010), it does meet the general 10 ha size criteria established by the County and Town for woodlands. The detailed assessment completed for the woodland (Stantec, 2008, **Appendix F**), suggests it is locally important and, as such, potential impacts are examined and recommended mitigation measures are provided.

For the purposes of planning and development, provincial policies provide different levels of protection to various natural heritage features. Features of local significance are not afforded the same level of protection when compared to those determined to have provincial significance. No provincially significant features are found on the subject property, but the locally important woodland and the impacts to it are assessed below. To the extent possible, design changes and mitigation measures are recommended to provide as much protection to these resources as practically possible and through design and rehabilitation efforts to provide a net benefit to the existing system of natural heritage features that exist in the local landscape.

7.1 WOODLAND CONSIDERATIONS

As noted in the woodland assessment report (Stantec, 2010, **Appendix F**), the woodland area is not significant, based on a review of its characteristics (i.e. size, ecological function, uncommon characteristics, and economic and social functional values), using the approach presented in the NHRM 2nd Ed., and in consideration of the upper tier Official Plan policies. However, many woodland areas in southern Ontario are important at some level, and efforts to maintain and enhance their function or offset impacts where possible should be undertaken. Implementation of the proposed Hillsburgh Pit extension application would remove 5.4 ha of a 12.6 ha woodland area (42.9%) in order to make available a provincially significant aggregate resource. A majority of removed wooded area could be replanted in its current location post-extraction (3.5 ha, and an additional 12 ha of woodland added within the licensed area).

The portion of the woodland to be removed, as described in the woodland assessment report, is a relatively young stand that has limited diversity from an ecological perspective. The woodland parcel is situated in the center of the concession block with approximately 200 m of separation from the nearest woodland area to the east, which is described as a narrow (<100 m wide), isolated strip of woodland. In consideration of the local landscape characteristics and, in particular, the fragmented nature of the surrounding woodland parcels, a potential opportunity that may benefit the limited ecological function of the existing smaller woodland parcels would be the creation of wooded linkages.

A significant provincial aggregate resource lies beneath the woodland. The plan for extraction requires removal of 5.4 ha of the woodland in order to access this significant resource. A rehabilitation plan has been prepared that illustrates a planting plan, which includes planting of side slopes to reestablish 3.5 ha of the original woodland where vegetation removal will occur, and provides additional plantings to the east, south and west of approximately 12 additional hectares. These plantings total 15.5 ha and offer linkage opportunities to small woodland parcels found adjacent to the subject property (**Figure 7**). These linkages will provide wildlife corridors, which do not currently exist, to the otherwise isolated and fragmented woodland patches in the local area, which include the woodland that straddles the extraction area, the woodland to the east of the subject property, and the woodlands to the south and north of the subject property.

7.2 SEDIMENT AND EROSION CONTROL, DUST EFFECTS

Certain construction-related and/or extraction-related impacts, such as dust generation, sedimentation and erosion, can be mitigated through the use of standard site control measures. Mitigation measures for sediment, erosion and dust control should be implemented in the vicinity of the remaining portion of the north woodland and the woodland located on the east boundary of the study area in order to prevent sediment and dust from having a negative impact on the ecological functions of these areas during site preparation and operation. The notes found on the ARA Site Plans for the Hillsburgh site (MHBC, 2011) are considered to be effective and appropriate to protect the remaining woodland and other adjacent woodland from sedimentation and dust effects.

7.3 DISTURBANCE TO WILDLIFE

There are no historic or current field investigation records of endangered or threatened species on the subject property. There are no habitats on site that would support any endangered or threatened species known to potentially occur in the area. A number of common wildlife species are also known to use habitat within the study area. The majority of wildlife-related impacts from the proposed pit extension would be caused by direct removal of terrestrial habitat. As extraction activities are already occurring in the area, the proposed extension is not expected to have detrimental impacts on wildlife from noise and the presence of heavy machinery. It is likely that resident wildlife has either adapted to periodic daily noise or has already relocated to areas beyond their individual noise impact thresholds.

7.3.1 Noise

A noise study was conducted by Aercoustics (2011) that addressed noise levels at the site. This study was reviewed and was considered in the general assessment of noise impacts on wildlife populations.

There have been scientific studies of man-made noise effects on wildlife conducted, however many of these are limited to behavioural effects from periodic and/or very loud sources (e.g.

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aircraft over-flights) and are rarely linked to constant industrial sound exposure levels (e.g. numeric values averaging 50 dBA).

There have been some studies that indicate the potential for effects of noise on birds, calling frogs and other wildlife for various human activities such as aviation, transportation corridors and other human activities with high potential for acoustic effects. Studies also indicate a wide range of species-specific changes in behavior to various noise levels.

Primary effects of noise include direct physical auditory changes, such as hearing loss or hearing threshold shifts, and the masking of auditory environmental signals, such as mating calls, predator approach, or prey sounds. Secondary effects can include non-auditory effects such as stress and changes in mating, feeding, or resting patterns and abilities (Manci *et al.*, 1988).

The most common concern regarding the effects of noise on wildlife is the masking of acoustic signals on which an animal relies for survival. For example, high levels of noise can make it more difficult for an animal to defend its territory, attract mates, or participate in alarm or distress calls (Warren *et al.*, 2006). In California, for instance, anti-predator alarm signals from squirrels overlapped with wind turbine noise (experimental site noise ranging from 93 – 118 dB), limiting their ability to effectively communicate with each other (Rabin *et al.*, 2006). The study noted that because the squirrels' acoustic signals overlapped with the turbine noise, behavioural visual responses and a closer proximity to shelters were adapted.

With respect to the masking of auditory signals, there is a "small but growing body of evidence" that songbirds can change different components of their songs to reduce masking by anthropogenic noise (Patricelli and Blickley, 2006). It has been demonstrated that Song Sparrows and other species can adjust the frequency structure of their songs, putting less energy into the lower-frequency range of their songs to avoid competition with the lower frequencies associated with urban noise in the order of 54.8 to 71.3 dBA (e.g., 1-4 kHz) (Wood and Yezerinac, 2006). Birds in noisy habitats may increase the signal-to-noise ratio during song (i.e. sing louder) (Brumm 2004, Patricelli and Blickley 2006), increase the duration and repetition of song (i.e. sing more often), and adjust the timing of vocalization to avoid predictably variable noise (Patricelli and Blickley 2006). Furthermore, other types of bird vocalizations such as call notes may also be adjusted (Warren *et al.*, 2006). Some bird species increased their calling pitch in 'noisy' territories (up to 63 dB) (Slabbehoorn and Peet, 2003 in Penna, 2005) to compensate for environmental noises masking their calls.

Given that the area is subject to current aggregate operation effects, and these will not increase in the general area, it is reasonable to conclude that the bird and wildlife community has already adapted and acclimatized to elevated levels of background noise.

With respect to secondary effects such as stress, studies have concluded that many species of wildlife easily become habituated to constant noise (Labbehoorn and Peet 2003), such as traffic, and even become habituated to "startle" noises intended to scare nuisance waterfowl from

crops. As such, it is anticipated that an increased level of the existing types of noise would not result in significant secondary behavioural effects. Thus, it is expected that noise from the project will not have an adverse effect on wildlife.

7.3.2 Milksnake Consideration

The Milksnake is a species that has been historically recorded in the general vicinity of the subject property. Given that woodland linkages are proposed for the rehabilitation, an extended range of linked habitat zones will be created. The creation of snake hibernacula is recommended in these areas to further provide opportunities for snakes that may inhabit or travel along the linkage areas in the future (see **Figures 7.0** and **9.0**). As a result, the proposed extraction and rehabilitation will result in ecological enhancements with respect to wildlife habitat and wildlife movements.

7.4 SOIL CONSERVATION

Soil conservation is an important element in effective site rehabilitation. The methods used in soil handling and its use for progressive rehabilitation can be undertaken in a manner to ensure soil characteristics are maintained. During stripping and stockpiling, each layer of soil material (i.e. topsoil, subsoil and overburden, if present) should be stripped and stockpiled separately, under dry conditions to minimize soil mixing and compaction, and stockpiles should be immediately treated for erosion protection. Soil surveys completed prior to site preparation can assist in determining the mean depth of the different soil layers and where they are found on the site. The total volume of saved topsoil should be calculated, in order to determine an even depth of topsoil to be applied to the rehabilitation area.

Rehabilitation is commonly completed in progressive stages. To maximize the effectiveness of soil management, and reduce the amount of handling, it is recommended that soil (topsoil) be stripped progressively in stages, and progressively replaced, to avoid the length of time the soil is stockpiled. This is not always possible, but should be considered and implemented to the extent possible. This can be accomplished by taking soil from a new stage of operation to an area where extraction is ending and rehabilitation is occurring.

In some instances, topsoil from the forest floor can be stockpiled separately from other topsoil areas. It is beneficial if these soils, where possible, can be reapplied to areas known to be planned for woodland rehabilitation.

8.0 Environmental Enhancement – Progressive and Final Rehabilitation Plan

The lands in the study area, including the proposed extension area and the existing Hillsburgh Pit, are to be rehabilitated to a pond with wetland habitat, planted woodland areas, including the creation of reptile hibernacula and wildlife habitat features. As per the requirements of the Greenbelt Plan (MMAH, 2005) the site will also be rehabilitated for agricultural use. The rehabilitation plan is illustrated on **Figure 7.0**, with details provided on **Figures 8.0**, **9.0** and **10.0**. The enhancement and rehabilitation initiatives are discussed below in further detail.

The rehabilitation initiatives are intended to increase the ecological value of the subject property and surrounding lands by providing increased habitat (i.e. pond, wetlands and woodlands) and connectivity to adjacent woodland features situated to the east, south and west of the subject property.

8.1 GREENBELT PLAN

Section 4.3.2.3 c) of the Greenbelt Plan (MMAH, 2005) requires that any application for a new mineral aggregate operation or the expansion of an existing mineral aggregate operation shall be required to demonstrate:

i) "How the connectivity between key natural heritage features and key hydrologic features will be maintained before, during and after the extraction of mineral aggregates';
ii) 'How the operator could immediately replace any habitat that would be lost from the site with equivalent habitat on another part of the site or on adjacent lands'; and
iii) 'How the Water Resource System will be protected or enhanced.'"
(Greenbelt Plan, 2005)

In addition, Section 4.3.2 of the Greenbelt Plan, and subsections 4, 5 and 6 address progressive and final rehabilitation of mineral aggregate operations within the Protected Countryside of the Greenbelt planning area.

These subsections pursue environmental initiatives for the Protected Countryside, which include:

- Maximizing rehabilitation areas and minimizing disturbed areas on an ongoing basis during operations;
- Maintaining quantity and quality of groundwater and surface water resources;
- Developing and implementing a comprehensive rehabilitation plan;
- Rehabilitating to a state of equal or greater ecological value and maintaining or restoring long-term ecological integrity or improving long-term ecological integrity; and

- Maintaining, restoring and, to the extent possible, improving health, diversity and size of key natural heritage features and key hydrological features to promote a net gain of ecological health.

The rehabilitation plan for the Hillsburgh Pit and proposed extension has been designed to meet the criteria of the Greenbelt Plan sections 4.3.2.3 c), 4.3.2.4, 4.3.2.5 and 4.3.2.6.

8.2 WETLAND AND POND

The proposed 12.4 ha pond contains created shoreline wetland areas and adjacent transition zones. Approximately 2.2 ha of shoreline wetland habitat will be created. This will contribute to increasing the overall diversity of the site. The general location of the proposed shoreline wetland are shown on **Figure 7.0**, and the proposed details of the created shoreline wetland are shown on **Figure 10.0**.

The target communities for the created wetland will be a combination of shallow water and shallow marsh submergent and emergent zones transitioning to the proposed woodland replanting zones to the east and agricultural lands to the west. The shallow water portions of the wetland would initially be composed of sparse floating vegetation, submergent and emergent aquatic vegetation that would increase in density over time. Small clumps and propagules of appropriate floating and emergent species will be introduced from local wetlands to ensure genotype suitability and to quick start the natural process of succession. This shoreline wetland area would provide habitat for species with a greater affinity to these areas such as waterfowl and turtles. In addition, the shallow water areas will contain standing water year round providing habitat for species requiring permanent water bodies such as bullfrogs and green frogs.

The edges of the proposed shoreline wetland areas, where shallow slopes and irregular grading are proposed, will create variable depths of water from approximately 10 centimetres below ground surface to less than 100 cm above substrate. The shoreline of the wetland areas will be graded to create an uneven or irregular edge in the plan view as well as in depth. This approach increases the length of shoreline around the open areas, and provides many small bays of variable configuration and size as shown on **Figure 10.0**. Generally, these areas have the ability to support a number and wide range of both facultative and obligate wetland flora and fauna. The 2.2 ha of created shoreline wetland will enhance the created pond feature. The wetland shoreline will be adjacent to a nearshore zone that will include lowland species moving toward an upland forest.

The creation of the pond environment and surrounding wetland (and adjacent woodland connection) is consistent with the intent of the rehabilitation requirements in the Greenbelt Plan (MMAH, 2005) (Sections 4.3.2.4, 4.3.2.5 and 4.3.2.7) for mineral aggregate operations, as follows:

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- The rehabilitation plan improves ecological diversity by providing a new pond and wetland environment that complements the woodland linkage, not previously available on the subject property and surrounding lands;
- Rehabilitation restores and improves the long-term ecological value of the area by providing a significantly larger area of contiguous natural heritage features (i.e. pond, wetland and woodlands);
- Rehabilitation maintains the quality of groundwater and surface water resources.

8.3 WOODLANDS

To offset the loss of 5.4 ha of the local woodland, an opportunity is available on this site to replant portions of the wooded area on the subject property. A replanting plan has been developed to provide woodland linkages and increase the connectivity of the local landscape. Approximately 3.5 ha of the 5.4 ha area will be replanted in the same location, and an additional 12.0 ha (for a total of 15.5 ha) on the northeast, southeast and southwest sides of the subject property, surrounding the created pond and wetland features. This will result in a net gain of 10.1 ha. The total re-naturalized area includes replanted upland woodland areas, a pond and wetland features that will total 27.9 ha.

8.3.1 Components of the Forest Restoration Plan

The goal of this forest restoration plan is to provide an area of increased ecological function in the local area and a greater diversity of wildlife habitat and food sources, as well as to provide a mixed forest community over time. A forest restoration plan designed to maximize structural diversity has been adopted to improve forest ecosystem function. The location of the proposed woodland rehabilitation zone is illustrated on **Figure 7.0**, and details are provided on **Figures 8.0** and **9.0**. Planting is proposed in three reforestation zones; the north, east and south side slopes on the eastern portion of the study area, which encompasses two of the subject property parcels. The rehabilitation of the woodlands is to commence in the initial phases, 1 and 2, to ensure that the plan is progressive and initiated earlier in the operations period. This approach supports Section 4.3.2.4 of the Greenbelt Plan, which encourages maximizing rehabilitation areas and minimizing disturbed areas on an ongoing basis during the lifecycle of the operation. These proposed enhancements will increase the overall wooded area in the Town of Erin by 10.1 ha, and provide a series of wildlife corridors, which will serve to join several, presently separated small woodland fragments. The addition of wooded land around the existing features and the design of linkages and corridors will involve the planting of native species that are presently found in the existing environments as well as native species that will provide food sources and shelter to the wildlife found in the area combined with natural regeneration processes from existing seed sources.

Given the differences in sunlight exposure, individual planting strategies are recommended for each of the three planting zones shown on **Figure 7.0**. This detailed planting plan has been designed to meet the Greenbelt Plan (MMAH, 2005) requirements, which includes the

development and implementation of a comprehensive rehabilitation plan. Within each zone the plantings are proposed to be completed using a grid pattern, with planting zones mixed between the treatments of deciduous trees, coniferous seedlings and deciduous shrubs as shown on **Figure 8.0**. The treatment species for each zone (locations shown on Figure 7.0 and block planting on Figure 8.0) are as follows:

Zone 1 (South facing slopes): *Quercus rubra*, *Quercus macrocarpa*, *Acer rubrum*, *Prunus serotina*, *Carya codiformis*, *Pinus strobus*, *Rhus typhina*, *Amelanchier arborea*, *Prunus pensylvanica*, *Juniperus communis*.

Zone 2 (East and West facing slopes): *Populus tremuloides*, *Populus balsamifera*, *Fraxinus americana*, *Acer saccharum*, *Prunus serotina*, *Picea glauca*, *Viburnum lentago*, *Salix bebbiana*, *Amelanchier arborea*, *Rubus odoratus*.

Zone 3 (North facing slopes): *Acer rubrum*, *Fraxinus americana*, *Betula papyrifera*, *Tilia americana*, *Betula allegheniensis*, *Thuja occidentalis*, *Prunus virginiana*, *Salix bebbiana*, *Parthenocissus quinquifolia*, *Sambucus americana*.

Side Slope: plantings in agricultural areas to the west and north west include an erosion control agricultural seed mix of 55% Creeping Red Fescue (*Festuca rubra*), 27% Kentucky Bluegrass (*Poa pratensis*), 15% Perennial Ryegrass (*Lolium Perrenne*), 3% White Clover (*Trifolium repens*).

8.3.2 Creation of Habitat and Hibernacula

Although significant wildlife habitat is not found on-site, the planting plan has been designed to provide habitat (i.e. food and shelter) for local wildlife resources. Two created snake hibernacula and wildlife refuges have also been incorporated into the rehabilitation plan.

The proposed locations of the hibernacula are shown on **Figure 7.0**. They will be situated on south facing slopes to maximize exposure to direct sun. The details of the hibernacula design are illustrated on **Figure 8.0**. Habitat creation features including microtopographic contouring and habitat structure are incorporated into the rehabilitation plan and illustrated on **Figure 9.0**.

8.4 REHABILITATION AND GREENBELT PLAN SUMMARY

The woodland replanting areas that surround the pond and wetlands have been developed and designed to fulfill the intent of the noted rehabilitation requirements of the Greenbelt Plan as follows:

- The long-term disturbance to the woodland area has been minimized with the replanting of approximately 3.5 ha of the existing 5.4 ha at the same location, and additional planting of 12.0 ha of wooded area for a total planting of 15.5 ha, resulting in an overall net gain of 10.1 ha of woodland;

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- The rehabilitation plan is designed to maximize rehabilitation area and minimize disturbed areas on an ongoing basis during operations;
- The health, diversity and size of the natural heritage features has been restored and improved [i.e. more diverse woodlands (see proposed planting zones), increased wooded area, increased specialized wildlife habitat (i.e. snake hibernacula, microtopographic coutouring and log habitat)];
- The replanting zones in combination with the new pond and wetland areas provide a notable net gain to the ecological function and diversity of the area (i.e. pond, wetland, woodland interaction), and are complementary to the diversity of the woodland Key Natural Heritage Feature, and add a new Key Natural Heritage Feature to the site and local natural heritage system; and
- The replanting zones provide new connectivity to the adjacent woodland patches that were previously isolated in the landscape. Maintaining and enhancing connectivity of natural heritage features is a key goal of the Greenbelt Plan.

9.0 Conclusions and Recommendations

This Level II Natural Environment study was undertaken to identify the significance of the natural features that occur on, and in the vincinity of, the subject property and assess the potential impacts of the proposed aggregate extraction plan. Based on the field investigations undertaken and subsequent analysis, the following conclusions have been reached:

- No provincially significant features are located on the subject property or in the study area;
- A locally significant woodland was identified on the subject property; and
- Potential impacts were assessed by evaluating the significance of predicted effects on the form, function and long-term sustainability of the general ecological health of the woodland and area.

Progressive site rehabilitation will, over time, increase the area and function of the wooded area and associated wildlife habitat linkages, compared with conditions in the existing agricultural landscape. The rehabilitation will provide a new pond environment surrounded by shoreline wetland and wooded areas. The comprehensive rehabilitation plan offers a net gain to the existing woodland natural heritage feature. The pond and wetland not only add ecological diversity to the site, but incorporate the progressive rehabilitation of the interim aggregate land use into a long term natural heritage system. This plan includes a diversity of vegetated environments and aquatic environments, and is consistent with the specific requirements of the Greenbelt plan.

These conclusions are based on implementation of the following protection initiatives and technical recommendations.

9.1 PROTECTION INITIATIVES

The following initiatives are provided to ensure the protection of the natural environment features identified on and adjacent lands to the subject property. The protection initiatives for natural environment attributes are incorporated into the Site Plans. These include the following:

- Dust control will be implemented as per the ARA Prescribed Conditions 3.1, 3.2 and 3.3;
- Topsoil and overburden shall be stripped and stored separately in bermed stockpiles in a manner as outlined in the report to conserve soil properties; and
- Berms and stockpiles of topsoil will be graded to stable slopes and seeded to prevent erosion and minimize dust.

9.2 TECHNICAL ENVIRONMENTAL RECOMMENDATIONS

The following natural environment technical recommendation should be included on the Site Plans:

- Forest soils will be stored separately and where possible be placed in final reforestation areas to avoid the need for stockpiling.
- Soils will be managed onsite in accord with **Section 7.4** of this report.
- Silt fencing to be installed where necessary during stripping operations. Protective fencing will be monitored during operations along with sediment and erosion control measures.
- Progressive rehabilitation will be implemented as specified in the Site Plans. The mitigation measures noted above as well as industry standard best management practices will be included in the Site Plans and monitored and enforced under the provision of the Aggregate Resources Act.
- Replanting will commence as early as possible, with an emphasis on the area that straddles the existing woodland to the north.
- All planting species will be obtained from local sources to the extent possible.
- Shoreline wetlands will be planted with only native species.

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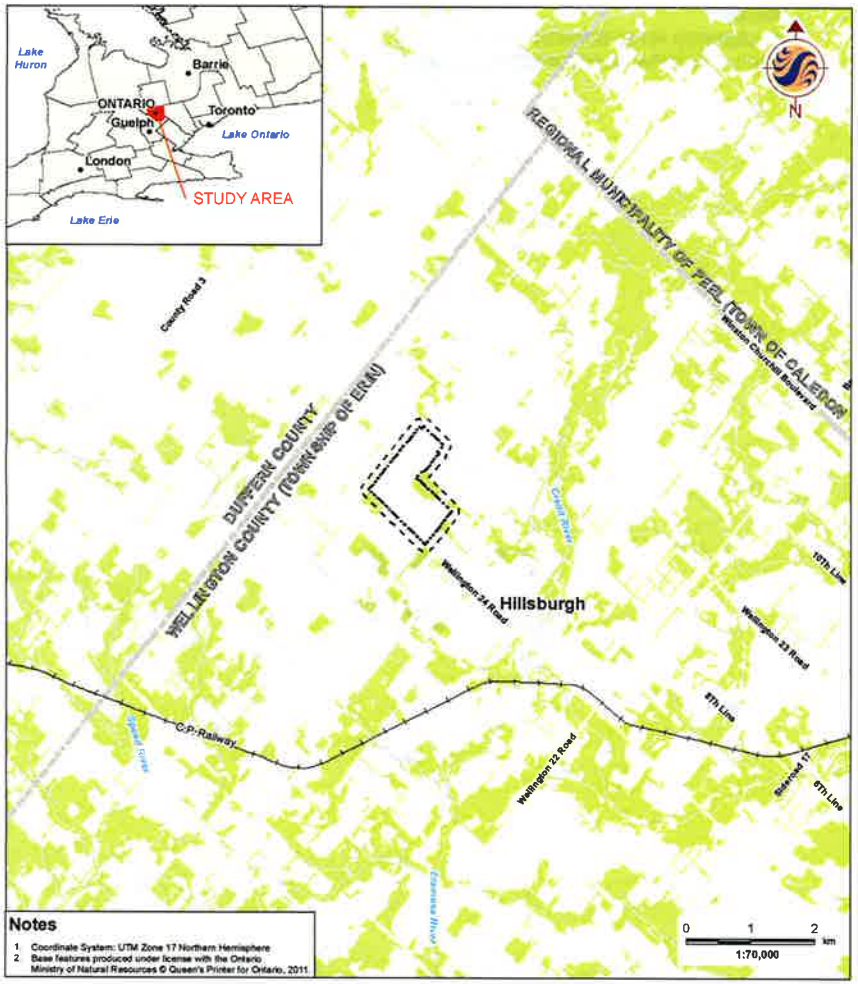
APPENDIX A.
Figures



Legend

- Subject Property
- Study Area (120m Investigation Zone)
- Highway
- Major Road
- Local Road
- Railway
- Municipal Boundary
- Wooded Area
- Watercourse
- Waterbody

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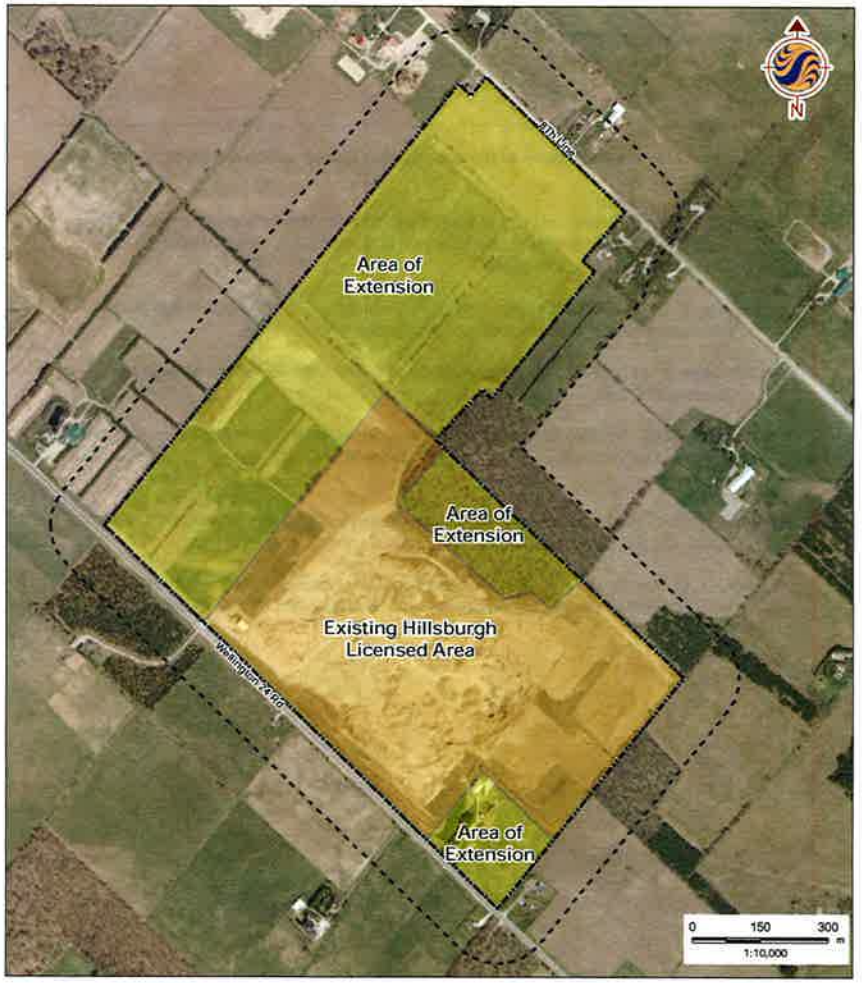
Client/Project
HILLSBURGH PIT EXTENSION
CBM AGGREGATES [A DIVISION OF ST. MARYS CEMENT (CANADA) INC.]

Figure No.
1.0

Title
LOCATION OF SUBJECT PROPERTY



Legend

- 5km Regional Study Area
- Study Area (120m Investigation Zone)
- Subject Property
- Existing Licensed Area
- Area of Extension

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Notes

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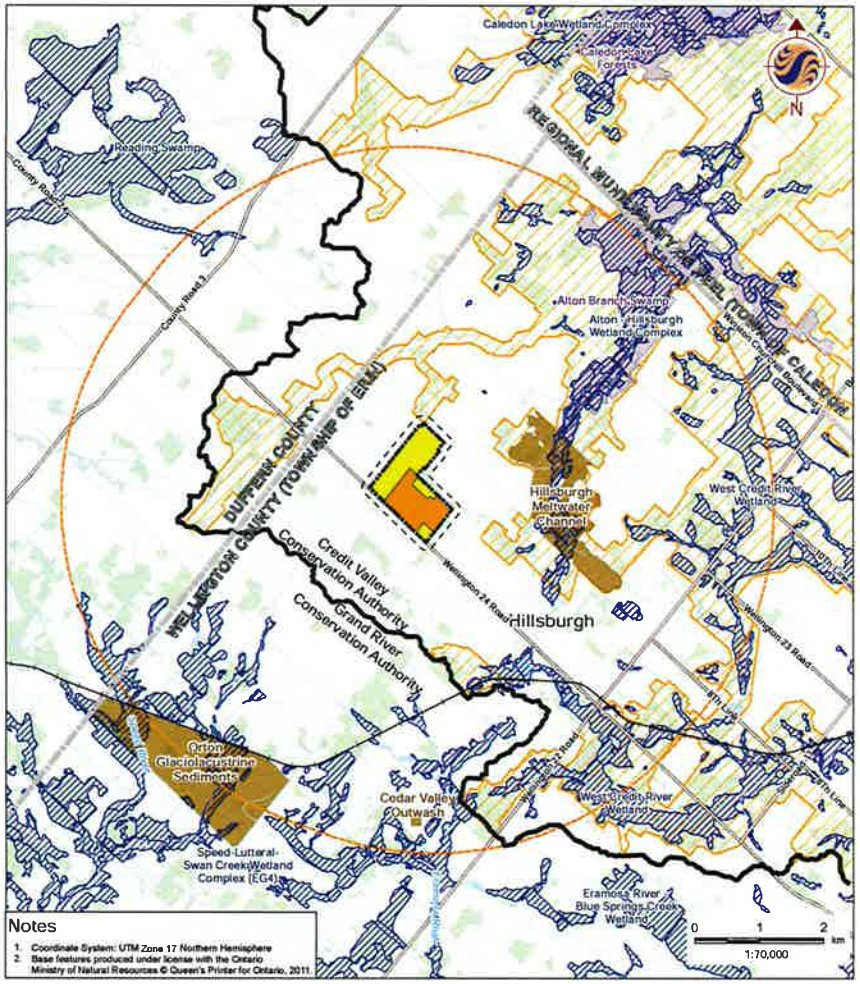
Client/Project
HILLSBURGH PIT EXTENSION
CBM AGGREGATES [A DIVISION OF ST. MARYS CEMENT (CANADA) INC.]

Figure No.
2.0

Title
STUDY AREA



December, 2011
160960152

Legend

- 5km Regional Study Area
- Study Area (120m Investigation Zone)
- Subject Property
- Existing Licensed Area
- Area of Extension
- Highway
- Major Road
- Local Road
- Railway
- Municipal Boundary
- Conservation Authority Boundary
- Greenbelt Natural Heritage System
- ANSI, Earth Science
- ANSI, Life Science
- Provincially Significant Wetland
- Wooded Area
- Watercourse
- Waterbody

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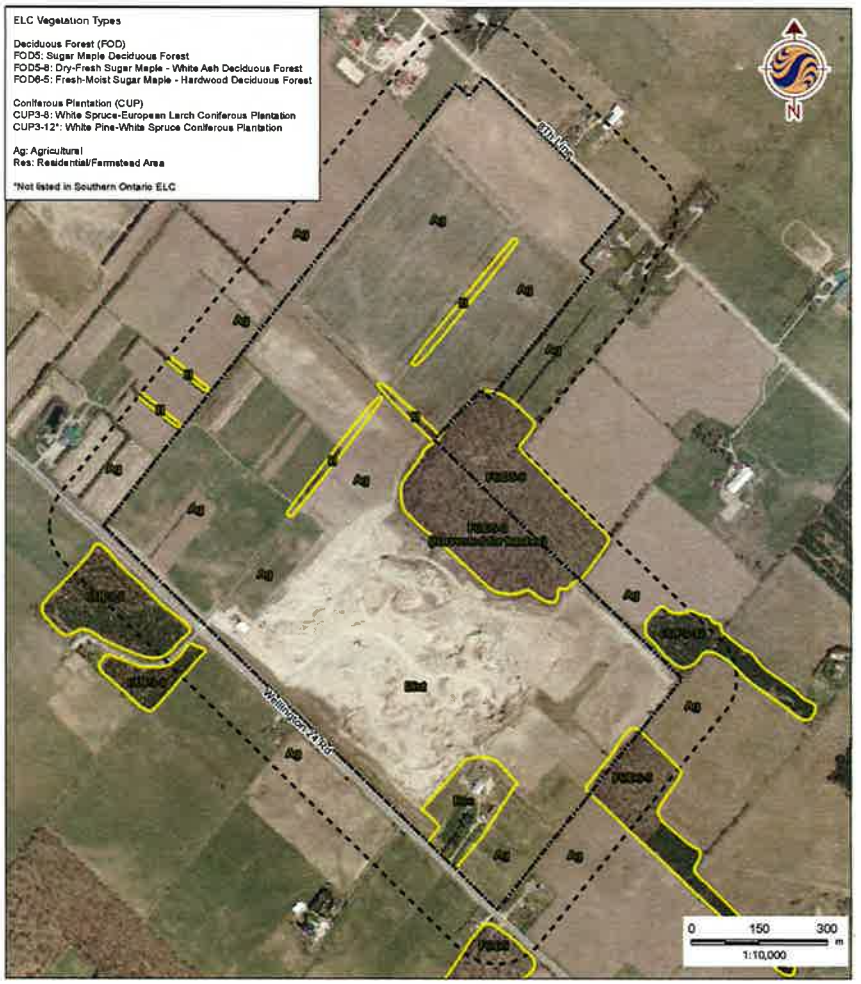
Figure No.
3.0

Title
REGIONAL STUDY AREA - NATURAL HERITAGE FEATURES



October, 2011
160960152

Legend

- Subject Property
- Study Area (120m Investigation Zone)
- ELC Boundary

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Notes
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Figure No.
4.0

Title
ELC VEGETATION COMMUNITIES

October, 2011
160901182

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Legend

- Subject Property
- Study Area (120m Investigation Zone)
- General Topographic Slope and Surface Drainage

Notes

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Figure No.
5.0

Title
SURFACE DRAINAGE

October, 2011
160901182

Stantec

Legend

- Study Area (120m Investigation Zone)
- Subject Property
- Extraction Phases
- Proposed Below-Water Extraction Area

Notes

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Figure No.
6.0

Title
PROPOSED EXTRACTION PHASES

December 2011
160960182

Legend

- Study Area (120m Investigation Zone)
- Subject Property
- Replanting Zone
- Proposed Vegetation Replanting
- Agriculture Rehabilitation
- Existing Woodland
- Wetland
- Proposed Pond
- Created Snake Hibernaculum
- New Wildlife Linkages

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Notes

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HILLSBURGH PIT EXTENSION
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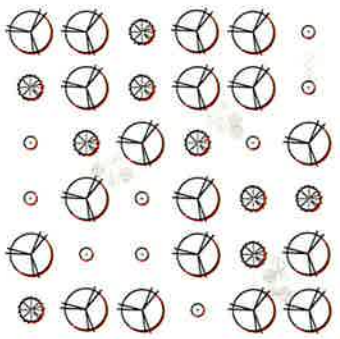
Figure No.
7.0

Title
REHABILITATION PLAN



PLANTING DETAIL 1:
TYPICAL PLANTING BLOCK LAYOUT

TYPICAL PLANTING BLOCK LAYOUT

Typical 15m x 15m planting block.
Approxmately 30 blocks per hectare.
Plant trees and shrubs at approximately 3m o.c.

Species composition varies by Reforestation Zone.
See Restoration Plan and Plant List for details.

Planting blocks to graded prior to planting, as per Planting Detail 3. Apply erosion control seed mix to all disturbed areas prior to planting.

Planting layout within each block to be determined by microtopography. Plant moisture tolerant species in topographic depressions; plant drought tolerant species on elevated mounds.

Place clusters of stumps, boulders and brush in the planting block, as per Planting Detail 3. 2-3 clusters per planting block.

REFORESTATION ZONES - PLANT LIST

Species	Quantity (per block)	Species	Quantity (per block)
ZONE 1: SOUTH-FACING SLOPES		ZONE 3: NORTH-FACING SLOPES	
Quercus rubra	5	Acer rubrum	5
Quercus macrocarpa	5	Fraxinus americana	5
Acer rubrum	3	Betula papyrifera	3
Prunus serotina	3	Tilia americana	3
Carya cordiformis	2	Betula allegheniensis	2
Pinus strobus	9	Thuja occidentalis	9
Rhus typhina	3	Prunus virginiana	3
Amelanchier arborea	1	Salix bebbiana	1
Prunus pensylvanica	3	Parthenocissus quinquifolia	2
Juniperus communis	2	Sambucus americana	3
ZONE 2: EAST & WEST-FACING SLOPES			
Populus tremuloides	5		
Populus balsamifera	5		
Fraxinus americana	4	EROSION CONTROL SEED MIX	
Acer saccharum	2		
Prunus serotina	2	50% Annual Rye	
		23% Oats	
Picea glauca	9	23% Winter Rye	
		4% White Clover	
Viburnum lentago	3		
Salix bebbiana	1	Seed at a rate of 35kg/ha.	
Amelanchier arborea	2		
Rubus odoratus	3		

DECIDUOUS WHIP

CONIFEROUS SEEDLING

DECIDUOUS SHRUB

Initiated: July 2007
Revised: December 2011

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FIGURE NO. 8.0

PLANTING BLOCK LAYOUT

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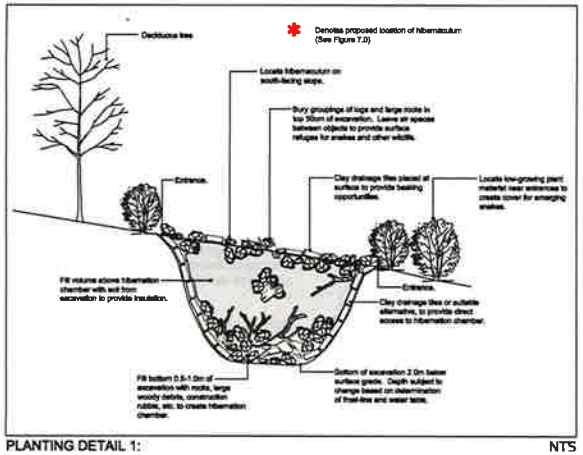
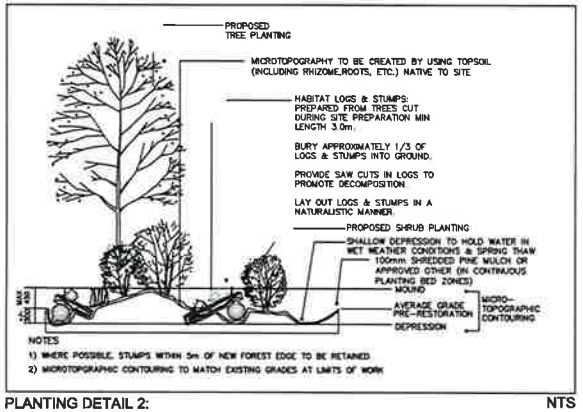


PLANTING DETAIL 1: NTS
TYPICAL SNAKE HIBERNACULUM AND WILDLIFE REFUGE



PLANTING DETAIL 2: NTS
TYPICAL HABITAT LOG & MICROTOPOGRAPHIC CONTOURING DETAIL

Initiated: July 2007
Revised: December 2011

File: V:\01609\active\60980152\landscape architecture\60980152_Figure_9.0_2011.11.02.cdr

PREPARED FOR:
HILLSBURGH PIT EXTENSION
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FIGURE NO. 9.0

WILDLIFE HABITAT FEATURES

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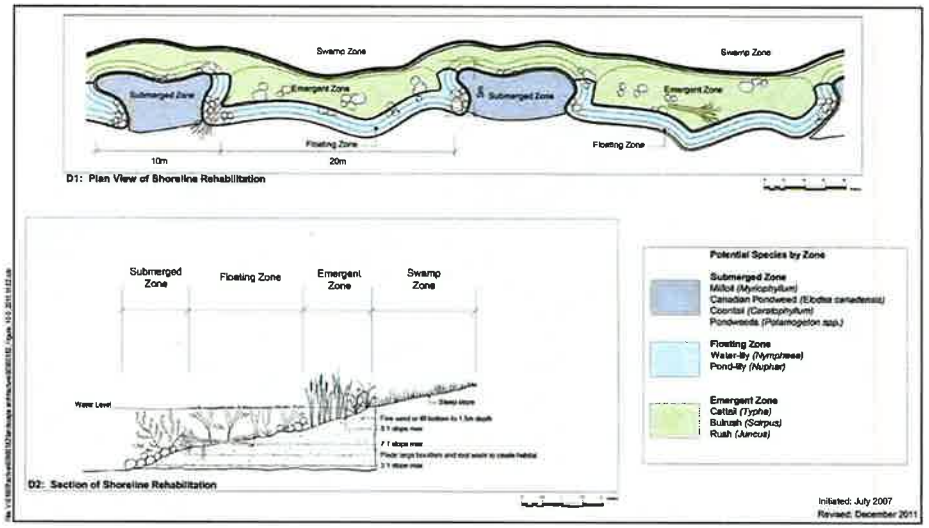

Initiated: July 2007
Revised: December 2011

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FIGURE NO. 10.0

SHORELINE PLAN & SECTION

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APPENDIX B. Tables

Stantec
HILLSBURGH PIT EXTENSION
LEVEL II NATURAL ENVIRONMENT TECHNICAL REPORT

Appendix B. Tables

Table 1. Summary of Study Area Field Investigations – Proposed Hillsburgh Pit Extension

Type of Survey	Date of Survey	Stantec Staff
Wildlife Surveys		
Amphibians	April 20, 2006	GW, ART
Breeding birds	June 5 and 28 2006	KD
Red-shouldered Hawk	May 5, 2006	KD
Odonata (Dragonfly) Butterfly (Lepidoptera)	May 28th, 2006	ART
Reptiles (snakes, turtles)	Incidental observations	ART, GW
Owl survey (night)	April 20, 2006	ART
Cooper's Hawk nest survey	May 1, 2007 June 14, 2007	NK
Winter wildlife	February 7, 2007	GW, ST
Vegetation Surveys		
ELC	May 2, 2006	CZ
Woodlands/ Tree Survey	February 7, 2007	GW, ST
Botanical (Spring, Summer)	May 2, 2006 September 11, 2007	CZ
Butternut survey (Specific)	April 17, 2006 May 2, 2006 February 7, 2007	CZ, DE, GW, ART
General site reconnaissance (focus on vegetation and surface water)	April 17, 2006 May 1, 2007	DE, GW NK
Site reconnaissance (vegetation and field crop grassland review)	June 9, 2011	DE, DC
Aquatic Surveys		
Fisheries Assessment and Aquatic Habitat	Not applicable	
Electro-fishing	Not applicable	
Spawning/upwelling survey	Not applicable	

Table 2. Soil Types in the Study Area – Proposed Hillsburgh Pit Extension

Soil Type	Texture	Drainage
Brant Soil	Fine Sandy Loam	Good
Hillsburgh Soil	Fine Sandy Loam	Good

Table 3. ELC Vegetation Types – Proposed Hillsburgh Pit Extension

ELC Type	Description
DECIDUOUS FOREST (FOD)	
FOD5 Sugar Maple Deciduous Forest	Located south of County Road 24, dominated by sugar maple, this upland forest also contains white ash, black cherry and beech in the main tree layer. Common understorey species, such as choke cherry are well represented.
FOD5-8 Dry-Fresh Sugar Maple – White Ash Deciduous Forest	A young stand, essentially a regeneration community following a severe cut that removed all of the mature trees (numerous rotten stumps are present). The maple and ash trees are small to medium size at the most, and only along the southern edge are there scattered American beech trees. The shrub layer consists of densely growing maple saplings which are undergoing intense self-thinning. The herbaceous understorey is rich in the spring, with such species as squirrel-corn, Duchman's-breeches, yellow dog's-tooth violet, purple trillium, and very abundant wild leek and blue cohosh.
FOD6-5 Fresh-Moist Sugar Maple-Hardwood Deciduous Forest	A moderate-aged forest dominated by sugar maple, with local presence of beech and white ash. Maple saplings form the bulk of the shrub layer. The herbaceous spring flora is composed of carpets of yellow dog's-tooth violet, Virginia water-leaf, blue cohosh and wild leek.
CONIFEROUS PLANTATION (CUP)	
CUP3-8 White Spruce-European Larch Coniferous Plantation	Located south of County Road 24, this young plantation is composed of various proportions of European larch, white and Norway spruce and white pine. Several young white ash have also already established. Very little ground cover is present underneath the densely growing trees, except for the small gaps where old field meadow species occur: tall goldenrod, red top, awnless brome and wild carrot.
*CUP3-12 White Pine-White Spruce Coniferous Plantation	A young plantation of spruce and pine. Under the dense tree canopy there is very little if any herbacious cover. Only in small openings and gaps old field meadow species manage to grow, including awnless brome, tall goldenrod, tufted vetch, common milkweed and field horsetail.

*not listed in Southern Ontario ELC

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HILLSBURGH PIT EXTENSION
LEVEL II NATURAL ENVIRONMENT TECHNICAL REPORT
APPENDIX B. Tables
December 1, 2011

Table 4. Wellington County Known Species-at-Risk

CLASSIFICATION	Habitat Requirements	COMMENTS
Endangered Species		
American Chestnut	Generally occurs in forested habitat, mixed with other hardwoods. Common associations include sugar maple, red oak, black cherry and American beech.	Not found on site during detailed woodlot and planted areas assessment
American Ginseng	Ginseng occurs in rich, moist, relatively mature sugar maple dominated woodlands. It prefers shallow soils over limestone or marble bedrock, often occurring on rocky outcrops (COSEWIC 2000).	Not found on site
Barn Owl*	Often found in open, low level areas such as pastures, hayfields, marshes and other grassy habitats where rodent populations are high (Cadman *et al.*, 2007). This species will nest in cliffs and hollow trees, but most often makes its home in abandoned buildings. It is considered very rare in Ontario with its total population estimated at 5-10 pairs. Occurrences are restricted to extreme southern Ontario (Cadman *et al.*, 2007).	No available habitat on site
Butternut†	Found in a variety of habitat including woodlands and hedgerows. It is generally shade intolerant, most frequently found in early successional habitat. However, it can occasionally make up a minor component of mature forested community (COSEWIC 2003).	Not found on site during detailed woodlot and planted areas assessment
Henslow's Sparrow**	The Henslow's Sparrow is a species of open habitats, consisting of weedy fields and meadows, preferably moist, with a mixture of grasses, forbs and scattered shrubs (Herkert *et al.*, 2002). In general, the species prefers large areas of tall, dense grass with a well-developed litter layer and standing dead forb vegetation for singing perches. Sparse to no woody vegetation is important. They have also been known to have a preference for flatter portions of fields. Henslow's Sparrows are area sensitive generally requiring 50 ha or more of suitable nesting habitat (Herkert, 1991).	Not observed during surveys, no habitat on site

Table 4. Wellington County Known Species-at-Risk

CLASSIFICATION	Habitat Requirements	COMMENTS
Loggerhead Shrike (no recent records)**	This species is typically found in open areas with minimal tree and shrub cover, often in grazing and pasture lands which provide ideal feeding sites where the grass is short. Larger sites have proven to increase the breeding success of the Shrike, as an increased nesting distance from the fencerow decreases the risk of predation.	Not observed during surveys, no habitat on site
Redside Dace	Spawning occurs in May in or near the gravelly nests of Creek Chub. Redside Dace forage for food in pools and spawn in gravel areas. They prefer clear, cool, flowing water with gravel or stoney bottom and are sensitive to turbidity.	No watercourse on site
Spotted Turtle	Requires unpolluted, shallow bodies of water such as streams, ponds, wet meadows, marshes or swamps with aquatic vegetation, logs or clumps of vegetation for basking; nest is dug near water in fine-textured soil (e.g. sand) or moss.	No habitat on site
Threatened Species		
Black Redhorse	Black Redhorse spawn in spring on shallow gravel shoals in streams. They inhabit pools in swifter flowing portions of medium to large streams with clear water and gravel, rock or sand bottoms.	No watercourse on site
Blanding's Turtle	Occur in ponds, lakes, streams, swamps and marshes, often with soft substrates and usually shallower than 2 m in depth (COSEWIC 2005). They have a preference for larger bodies of water. The Study area occurs outside of the main distribution of Blanding's Turtles in Ontario (i.e. near Lake Erie, at the south edge of the shield or areas of shallow soils in eastern Ontario) (Oldham and Weller, 2000).	No habitat on site

Stantec
HILLSBURGH PIT EXTENSION
LEVEL II NATURAL ENVIRONMENT TECHNICAL REPORT
APPENDIX B. Tables
December 1, 2011

Table 4. Wellington County Known Species-at-Risk

CLASSIFICATION	Habitat Requirements	COMMENTS
Bobolink**	The Bobolink is generally referred to as a "grassland species". It nests primarily in forage crops with a relatively high proportion of grasses, predominantly hayfields and pastures. Preferred ground cover species include cool season grasses such as timothy and Kentucky bluegrass and forbs such as clover and dandelion (COSEWIC, 2010). The region of Ontario containing the Study Area is predominately intensive agricultural land use and contains very low relative abundances of Bobolink (Cadman *et al.*, 2007). Bobolinks generally do not breed in row crops such as corn, soybean or wheat (Sample, 1989 and Jobin *et al.*, 1996).	No habitat on site; fields noted to be planted with corn in 2011
Butler's Gartersnake	Most often associated with marshy areas in prairie systems (MacCulloch, 2002), but will also utilize old fields, wet meadows and pastures.	No habitat on site
Canada Warbler†	The Canada Warbler is usually found in moist mixed deciduous-coniferous forests with a well-developed understorey. It is estimated that about one third of the Canada Warbler population breeds in Ontario. Although relatively abundant in Ontario, this species has been identified at risk due to a steady decline in the breeding population of about 2.4% per year. The main threat to this species appears to be habitat loss on its wintering grounds in South America, where approximately 90% of the cloud rainforest has been lost since the 1970s. Loss of breeding habitat to agriculture and a decline in prey (spruce budworm) may also be contributing factors to the Canada Warbler's decline.	No habitat on site

Table 4. Wellington County Known Species-at-Risk

CLASSIFICATION	Habitat Requirements	COMMENTS
Chimney Swift**	Chimney Swift typically occurs in urban areas where it roosts and nests in chimneys, air vents, attics or other such structures. In present day southern Ontario, the Chimney Swift is rarely found in natural structures, although hollow trees were the predominant natural nesting structure prior to European settlement (COSEWIC, 2007). Anthropogenic nesting and roosting structures (i.e. chimneys) used by Chimney Swifts typically have internal diameters of at least 30cm, but larger structures are preferred. For natural nesting and roosting structures, hollow trees greater than 60cm DBH are preferred (Sandilands, 2010). Usually, nesting occurs near bodies of water, where insect prey is more abundant (COSEWIC 2007, Sandilands 2010).	No habitat on site
Grey Fox	The southern Ontario population of Grey Fox generally occurs in open agricultural fields with scattered deciduous woodlots. Denning sites may include rock outcrops, hollow trees or logs, cavities under rocks, burrows dug by other animals, brush piles or abandoned buildings (COSEWIC 2002).	No habitat on site
Hooded Warbler†	This species can be found in mature, upland deciduous or mixed forest, with an area of more than 15 hectares, where clearings have been created naturally or by logging (Evans Ogden and Stutchbury, 1994). It prefers clearings with low, dense, shrubby vegetation less than two meters in height.	No habitat on site

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HILLSBURGH PIT EXTENSION
LEVEL II NATURAL ENVIRONMENT TECHNICAL REPORT
APPENDIX B. Tables
December 1, 2011

Table 4. Wellington County Known Species-at-Risk

CLASSIFICATION	Habitat Requirements	COMMENTS
Jefferson Salamander*	This species is typically found in Carolinian deciduous forests with vernal pools, kettle ponds, sinkhole ponds or natural basins suitable for breeding. It resides in terrestrial habitat, consisting of mature, upland deciduous or mixed forests, for most of the year. Breeding occurs in early spring in woodland pools that are typically vernal in nature, drying by midsummer. Breeding pools typically occur under tree canopy cover and contained submerged low shrub branches, twigs, fallen tree branches as egg attachment sites (Jefferson Salamander Recovery Team, 2010). The population of Jefferson Salamander in Wellington County south of Guelph is considered extirpated. No known populations occur in close vicinity to the Study Area. The nearest known populations occur in Waterloo Region, forested habitat along the Niagara Escarpment and isolated localities in Halton and Peel Regions (Jefferson Salamander Recovery Team, 2010).	No habitat on site
Least Bittern	Least Bittern require freshwater marshes where dense aquatic vegetation occurs with woody vegetation and open water. They are found most commonly in marshes greater than 5 ha in size (Gibbs *et al.*, 1992).	No habitat on site
Massassauga (no recent records)	In Ontario, this species is found primarily in rocky and scrub habitat along the shores of lakes Erie and Huron (including Georgian Bay) (Fisher *et al.*, 2007). It's range has become restricted primarily to the Bruce Peninsula and the eastern side of Georgian Bay.	No habitat on site
Rainbow Mussel	Rainbow Mussels reside mainly in small streams to small rivers in coarse sand or gravel substrates, in or near riffles and along the edges of emergent vegetation in moderate to strong current (Metcalfe-Smith *et al.*, 2005). Rainbow Mussels are known to occur in the Grand River and its larger tributaries.	No watercourse on site

Table 4. Wellington County Known Species-at-Risk

CLASSIFICATION	Habitat Requirements	COMMENTS
Wavy-rayed Lampmussel	The preferred habitat of the Wavy-rayed Lampmussel includes small to medium-sized rivers with steady flows and clear water in and around riffle areas in gravel or sand , often stabilized with cobble or boulders. (Metcalfe-Smith *et al.*, 2005) A relatively healthy population of Wavy-rayed Lampussel is known to occur in the Grand River and its larger tributaries.	No watercourse on site
Western Chorus Frog (Great Lakes/St. Lawrence – Canadian Shield Population)†	Western chorus frogs inhabit a range of habitat types including woodlands, meadows, and cultivated land. They overwinter in leaf litter and shallow soil, and breed in open ponds or ditches, and the eggs are laid in small clumps attached to submerged vegetation. The western chorus frog will often move into grassy or weedy fields during the non-breeding summer season.	No habitat on site
Whip-poor-will**	In Ontario, the Whip-poor-will breeds in dry open woodland and is typically associated with forest edges and openings. It prefers rock or sand barrens with scattered trees, savannahs, old burns in a state of early forest succession, and open conifer plantations for breeding (Cadman *et al.*, 2007). Pastures, shrubby meadows, pipeline and hydro rights-of-way adjacent to, or in, extensive forests may provide good nesting habitat. Whip-poor-will is considered an area-sensitive species that requires extensive forest. In Ontario, it is thought to require at least 100 hectares, with 500-1000 hectares thought to be necessary to support more than a few pairs (Sandilands, 2010).	No habitat on site
Special Concern Species		
Bald Eagle	The Bald Eagle almost always nests near water, usually on large lakes. Large stick nests are typically placed in trees located within mature woodlots. They usually require 250 ha of mature forest (Sandilands 2005).	No habitat on site
Black Tern	Nests semi-colonially in freshwater marshes with emergent vegetation. This species prefers marshes or marsh complexes of more than 20 ha in size for breeding (Dunn and Agro, 1995).	No habitat on site

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Table 4. Wellington County Known Species-at-Risk

CLASSIFICATION	Habitat Requirements	COMMENTS
Common Nighthawk	In rural areas of southern Ontario the species nests in grasslands, pastures, agricultural fields, gravel pits, prairies, alvars and at airports (Sandilands, 2010).	No habitat on site
Eastern Ribbonsnake	Semi-aquatic and will utilize a variety of habitats, but rarely ventures far from streams, ponds, bogs, or swamps (Conant and Collins, 1998). This species may hibernate in mammal burrows, ant mounds, underground and occasionally underwater. (COSEWIC 2002).	No habitat on site
Hill's Pondweed	Occurs in cold, clear, slow moving streams, ditches and pond with muddy substrates. It is typically found in calcareous areas with dolomite limestone (COSEWIC 2005).	No habitat on site
Milksnake	In Ontario, Eastern Milksnake is more common in heavily forested areas (COSEWIC, 2002b). Utilize a variety of habitats, including fields, woodlands, rocky hillsides, and valley bottoms (Conant and Collins, 1998). This species is known to utilize human-made structures for hibernation and hiding, and also hibernates underground or in rock crevices. The milksnake lays eggs in abandoned mammal burrows or rotting logs, or sand.	Potential habitat on site
Monarch†	Much of the concern regarding the status of the eastern populations of monarchs is a result of the loss of habitat in their Mexican wintering grounds. In southern Ontario the Monarch is considered common and exists primarily wherever milkweed and wildflowers exist. This includes abandoned farmland, along roadsides, and other open spaces where these plants grow.	No habitat on site (no milkweed on site)
Silver Shiner	Preferred habitat for the Silver Shiner is moderately-flowing sections of larger streams, and is typically found in the Thames and Grand Rivers.	No watercourse on site

Table 4. Wellington County Known Species-at-Risk

CLASSIFICATION	Habitat Requirements	COMMENTS
Short-eared Owl	Short-eared Owls breed in open country, including large expanses of prairie and coastal grasslands, heathlands, shrub-steppe, and tundra but also in agricultural areas (Wiggins *et al.*, 2006). In Ontario, Short-eared Owls typically breed in cattail and sedge marshes, adjacent fields, pasture, old fields, heath bogs and tundra (Cadman, 1994). The species is area sensitive, requiring a minimum amount of suitable grassland habitat for breeding. In Ontario, 75 to 100 ha of suitable habitat is thought to be necessary for breeding (Sandilands, 2010). Short-eared Owls also tend to nest away from development, with a minimum distance of 250 m from buildings (Combs-Beattie, 1993).	No habitat on site
Snapping Turtle†	Occurs in a variety of wetlands with standing water, often preferring habitat with dense vegetation. The Snapping Turtle usually occurs in large wetland or bodies of water, but can sometimes be encountered in small ponds or creeks. Nesting occurs in loose soils in the proximity of wetlands.	No habitat on site
Tuberous Indian-plantain	Found in wet, sandy areas along river banks and wetlands. Restricted to limited occurrences within shoreline areas of Lake Huron.	Not observed on site during floristic inventories
Yellow-breasted Chat (no recent records	It is not widespread in Ontario, and most records from the province are from the Carolinian region (Eagles, 1987). This species prefers early second-growth forest and shrub in abandoned agricultural fields, fencerows, forest edges and openings, and near streams (Eckerle and Thompson, 2001). In Ontario, it is usually found in shrubby tangles and deciduous thickets (Eagles, 1987).	Not observed on site during breeding bird surveys

* Species' habitat is protected by regulation
** Species' habitat is protected as of listing
†Species at Risk recorded in the Draft Erin Servicing and Settlement Master Plan (CVC *et al.*, 2011)

APPENDIX C.
Regionally Designated Features

Appendix C: Regionally Designated Features – Wetlands, ANSIs, ESAs and Watercourses

This appendix describes the natural features in the vicinity of the subject property, in the area described as the regional study area (i.e. 5 km radius around the subject property) as designated by the provincial and municipal authorities.

Watercourses

The Credit River occurs approximately 3.5 km to the east of the subject property. In this area, the reach is considered coldwater fish habitat, and is known to support important species such as Brook Trout and Brown Trout. Areas within this reach have also been identified as potential Brook Trout spawning habitat.

Wetlands

The regional area includes several large wetland complexes. The Alton-Hillsburgh Wetland Complex was evaluated in 1984, and is considered a Provincially Significant Wetland (PSW). This wetland complex includes a total area of 411 ha and is made up of seven individual wetland pockets, all lying within the Credit Valley Watershed. Also located in the regional study area is the West Credit River PSW Complex. This extensive wetland complex covers 861 ha and is located along the West Credit River, approximately 3 km south of Hillsburgh.

The Caledon Lake Wetland Complex, located approximately 7 km north of the subject property, is a PSW made up of nine individual wetlands, is composed of three wetland types (2% fen, 91% swamp, 7% marsh) and encompasses 554.6 ha and lies within the Credit Valley Watershed.

Eramosa River-Blue Springs Creek, a 1,045 ha PSW, is composed of two wetland types (95.0% swamp, 5.0% marsh) and is located roughly 11 km southeast of the subject property, within the Grand River Watershed.

Reading Swamp, located a little over 4 km northwest of the subject property, within the Grand River Watershed, is a 426.3 ha PSW made up of three individual wetlands, composed of two wetland types (97% swamp and 3% marsh).

Speed-Lutteral-Swan Creek, approximately 5.5 km to the south, is made up of 20+ individual wetlands, composed of two wetland types (95% swamp and 5% marsh). This vast PSW encompasses 5,710 ha and lies within the Grand River Watershed.

The Alton Branch Swamp is located approximately 1.5 km northeast of the subject property, and is considered a Regionally Significant Life Science ANSI, and not a PSW. This area is designated as significant because of its importance as a source area for the Credit River, as well as for supporting regionally rare species.

The designated wetlands within the regional study area (i.e. 5 km radius) are illustrated on **Figure 3**. There are no provincially designated wetlands located on or within 120 m of the subject property.

ANSIs and ESAs

Four provincially significant Areas of Natural and Scientific Interest (ANSI) are located within the regional study area. The Hillsburgh Meltwater Channel (approximately 1.5 km from the site), a provincially significant Earth Science ANSI, covers approximately 167 ha. The area is geologically significant and is represented by a deep channel that served to drain glacial meltwater from the Ontario ice lobe during the last ice age. Outwash sediments of sands and gravels, as well as less represented glacio-lacustrine silts characterize the channel.

The Orangeville Moraine and Caledon Lakes provincially significant Earth Science ANSI (approximately 1.5 km southeast of the site), is comprised of the Cedar Valley outwash, the Orton Glaciolacustrine sediments (located in the main body of the Orangeville Interlobate Moraine); and the Hillsburgh Meltwater Channel. The western part of the area on the Orangeville Moraine is considered to be a sand and gravel area of secondary significance.

The Eramosa River Valley (approximately 2.5 km south of the site) is a provincially significant Life Science ANSI, as well as an ESA (environmentally sensitive area). This river valley system has high-quality sections of braided stream, gravel terraces, rapids and limestone potholes. The site offers a high diversity of wetland vegetation types, including White Cedar swamps, alder thickets, Black Ash – elm swamps, small wild rice and cattail marshes, and White Cedar – fern – moss island wetlands. Beech – maple forests predominate on the valley slopes and rim. Also present are meadows and old fields.

As noted in the preceding section that pertains to Wetlands, the Alton Branch Swamp is also designated a regionally significant Life Science ANSI that is located 1.25 km northeast of the study area. Two regionally significant Earth Science ANSI sites are also present in the regional study area, south-southwest of the subject property. These areas are known as the Orton Glaciolacustrine Sediments and the Cedar Valley Outwash, respectively. Both sites are landforms that represent glacial processes on the landscape.

Two Environmentally Sensitive Areas (ESAs) occur in the regional study area in Wellington County. Hillsburgh Sandhills is located approximately 1.5 km south of Highway 25 and 2 km west of County Road 22. The sandhills extend from Hillsburgh to Orangeville, covering 186 ha and form a natural boundary on the southeast side of the Dundalk till plain. As a distinctive landform within south Wellington County, these knobby hills reach 488 masl (metres above sea level) at a lookout location, while the topography is representative of old rural Ontario, with its very rough terrain and picturesque landscape. They are located approximately 4.25 km from the study area.

The Eramosa River Valley, mentioned above, is also found in the region. The Eramosa River links together a number of smaller natural areas adjacent to the river valley.

The general locations of the designated features within the regional study area are illustrated on **Figure 3**.

The noted regional features are located onsiderable distances from the subject property and, as such, there will be no impact to these features from the proposed Hillsburgh Pit extension.

APPENDIX D.
Vascular Plant Species List

List of Vascular Plants Recorded from the Hillsburgh Pit

LATIN NAME		COMMON NAME								
	LOCAL STATUS SOURCE LAST UPDATE/ INITIALS									
PTERIDOPHYTES		**FERNS & ALLIES**								
Dryopteridaceae		**Wood Fern Family**								
Athyrium	*filix-femina var. angustum*	Northern Lady Fern	4	0		S5			GSTS	X
Dryopteris	*carthusiana*	Spinulose Wood Fern	5	-2		S5			G5	X
Onoclea	*sensibilis*	Sensitive Fern	4	-3		S5			G5	X
Equisetaceae		**Horsetail Family**								
Equisetum	*arvense*	Field Horsetail	0	0		S5			G5	X
Equisetum	*hyemale ssp. affine*	Scouring-rush	2	-2		S5			GSTS	X
GYMNOSPERMS		**CONIFERS**								
Pinaceae		**Pine Family**								
Larix	*decidua*	European Larch		5	-1	SE2			G?	
Picea	*abies*	Norway Spruce		3	-1	SE3			G?	X
Picea	*glauca*	White Spruce	6	3		S5			G5	X
Pinus	*strobus*	Eastern White Pine	4	3		S5			G5	X
Pinus	*sylvestris*	Scotch Pine		5	-3	SE5			G?	X
DICOTYLEDONS		**DICOTS**								
Aceraceae		**Maple Family**								
Acer	*negundo*	Manitoba Maple	0	-2		S5			G5	X
Acer	*saccharinum*	Silver Maple	5	-3		S5			G5	X
Acer	*saccharum ssp. saccharum*	Sugar Maple	4	3		S5			GSTP	X
Amaranthaceae		**Amaranth Family**								
Amaranthus	*albus*	White Tumbleweed		3	-1	SE3			G5	
Amaranthus	*powellii*	Powell's Amaranth		3	-1	SE3			G5	
Apiaceae		**Carrot or Parsley Family**								
Daucus	*carota*	Wild Carrot		5	-2	SE5			G?	X
Aristolochiaceae		**Duchman's-pipe Family**								
Asarum	*canadense*	Wild Ginger	6	5		S5			G5	X
Asclepiadaceae		**Milkweed Family**								
Asclepias	*syriaca*	Common Milkweed	0	5		S5			G5	X

List of Vascular Plants Recorded from the Hillsburgh Pit

LATIN NAME		COMMON NAME								
	LOCAL STATUS SOURCE LAST UPDATE/ INITIALS									
Asteraceae		**Composite or Aster Family**								
Achillea	*millefolium ssp. millefolium*	Common Yarrow		3	-1	SE?			GSTP	X
Ambrosia	*artemisiifolia*	Common Ragweed	0	3		S5			G5	X
Arctium	*lappa*	Great Burdock				SE5			G?	
Arctium	*minus*	Common Burdock		5	-2	SE5			GTP	X
Aster	*lanceolatus ssp. lanceolatus*	Tall White Aster	3	-3		S5			GSTP	X
Carduus	*nutans ssp. nutans*	Musk Thistle		5	-1	SE?			GTP	X
Cichorium	*intybus*	Chicory		5	-1	SE5			G?	X
Cirsium	*arvense*	Canada Thistle		3	-1	SE5			G?	X
Cirsium	*vulgare*	Bull Thistle		4	-1	SE5			G5	X
Conyza	*canadensis*	Horseweed	0	1		S5			G5	X
Crepis	*tectorum*	Narrow-leaved Hawk's Bea		5	-1	SE5			G?	
Erigeron	*annuus*	Annual Fleabane	0	1		S5			G5	
Erigeron	*strigosus*	Daisy Fleabane	0	1		S5			G5	
Eutherma	*graminifolia*	Flat-topped Bushy Goldenr	2	-2		S5			G5	X
Lactuca	*serriola*	Prickly Lettuce		0	-1	SE5			G?	X
Leucanthemum	*vulgare*	Ox-eye Daisy		5	-1	SE5			G?	X
Rudbeckia	*hirta*	Black-eyed Susan	0	3		S5			G5	X
Senecio	*vulgaris*	Common Groundsel		5	-1	SE5			G?	X
Solidago	*altissima var. altissima*	Tall Goldenrod	1	3		S5				X
Solidago	*nemoralis var. nemoralis*	Gray Goldenrod	2	5		S5			GSTP	X
Sonchus	*arvensis ssp. arvensis*	Field Sow-thistle				SE5			GTP	X
Symphyotrichum	*novae-angliae*	New England Aster	2	-3		S5			G5	X
Taraxacum	*officinale*	Common Dandelion		3	-2	SE5			G5	X
Tragopogon	*dubius*	Doubtful Goat's-beard		5	-1	SE5			G?	
Tussilago	*farfara*	Coltsfoot		3	-2	SE5			G?	X
Balsaminaceae		**Touch-me-not Family**								
Impatiens	*capensis*	Spotted Touch-me-not	4	-3		S5			G5	X
Berberidaceae		**Barberry Family**								
Caulophyllum	*giganteum*	Blue Cohosh				S5			G	
Podophyllum	*peltatum*	May-apple	5	3		S5			G5	X
Betulaceae		**Birch Family**								
Ostrya	*virginiana*	Hop Hornbeam	4	4		S5			G5	X
Boraginaceae		**Borage Family**								
Echium	*vulgare*	Bluewead		5	-2	SE5			G?	X

LATIN NAME	LOCAL STATUS SOURCE/ LAST UPDATE/ INITIALS	COMMON NAME	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Brassicaceae		**Mustard Family**								
Alliaria	*petiolata*	Garlic Mustard		0	-3	SE5			G5	
Capsella	*bursa-pastoris*	Shepherd's Purse		1	-1	SE5			G?	X
Cardamine	*concatenata*	Cut-leaved Toothwort	6	3		S5			G5	X
Erysimum	*cheiranthoides ssp. cheiranthoides*	Wormseed Mustard		3	-1	SE5				X
Lepidium	*densiflorum*	Common Pepper-grass		0	-3	SE5			G5	X
Sinapis	*arvensis*	Charlock		5	-1	SE5			G?	X
Caprifoliaceae		**Honeysuckle Family**								
Sambucus	*canadensis*	Common Elderberry	5	-2		S5			G5	X
Sambucus	*racemosa ssp. pubens*	Red-berried Elderberry	5	2		S5			G5T4T5	X
Caryophyllaceae		**Pink Family**								
Silene	*latifolia*	Bladder Campion				SE5			G?	X
Silene	*vulgaris*	Catchfly		5	-1	SE5			G?	X
Chenopodiaceae		**Goosefoot Family**								
Chenopodium	*album var. album*	Lamb's Quarters		1	-1	SE5			G5T5	X
Salsola	*tragus*	Russian Thistle				SE5			G?	
Cornaceae		**Dogwood Family**								
Cornus	*alternifolia*	Alternate-leaved Dogwood	6	5		S5			G5	X
Cornus	*stolonifera*	Red-osier Dogwood	2	-3		S5			G5	X
Cucurbitaceae		**Gourd Family**								
Echinocystis	*lobata*	Prickly Cucumber	3	-2		S5			G5	X
Fabaceae		**Pea Family**								
Lotus	*corniculatus*	Bird's-foot Trefoil		1	-2	SE5			G?	X
Medicago	*sativa ssp. sativa*	Alfalfa		1	-1	SE5			G?T?	X
Melilotus	*alba*	White Sweet-clover		3	-3	SE5			G?	X
Melilotus	*officinalis*	Yellow Sweet-clover		3	-1	SE5			G?	X
Trifolium	*hybridum ssp. elegans*	Alsike Clover		1	-1	SE5				X
Trifolium	*pratense*	Red Clover		2	-2	SE5			G?	X
Vicia	*cracca*	Tufted Vetch		5	-1	SE5			G?	X
Fagaceae		**Beech Family**								
Fagus	*grandifolia*	American Beech	6	3		S5			G5	X
Fumariaceae		**Fumitory Family**								
Dicentra	*canadensis*	Squirrel-corn	7	5		S5			G5	X

LATIN NAME	LOCAL STATUS SOURCE/ LAST UPDATE/ INITIALS	COMMON NAME	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Dicentra	*cucullaria*	Dutchman's-breeches	6	3		S5			G5	X
Geraniaceae		**Geranium Family**								
Geranium	*robertianum*	Herb-robert		5	-3	SE5			G5	X
Grossulariaceae		**Currant Family**								
Ribes	*cynosbati*	Prickly Gooseberry	4	5		S5			G5	X
Hydrophyllaceae		**Water-leaf Family**								
Hydrophyllum	*canadense*	Broad-leaved Water-leaf	6	-2		S4			G5	X
Hydrophyllum	*virginianum*	Virginia Water-leaf	6	-3		S5			G5	X
Lamiaceae		**Mint Family**								
Leonurus	*cardiaca ssp. cardiaca*	Common Motherwort		1	-2	SE5			G?T?	X
Nepeta	*cataria*	Catnip		1	-2	SE5			G?	X
Malvaceae		**Mallow Family**								
Malva	*neglecta*	Cheeses		5	-1	SE5			G?	
Oleaceae		**Olive Family**								
Fraxinus	*americana*	White Ash	4	3		S5			G5	X
Fraxinus	*pennsylvanica*	Red Ash	3	-3		S5			G5	X
Onagraceae		**Evening-primrose Family**								
Circaea	*lutetiana ssp. canadensis*	Yellowish Enchanter's Nightshade	3	3		S5			G5T5	X
Epilobium	*angustifolium*	Fireweed	3	0		S5			G5	X
Oenothera	*biennis*	Common Evening-primrose	0	3		S5			G5	X
Oenothera	*parviflora*	Small-flowered Evening-primrose	1	3		S5?			G?	X
Oxalidaceae		**Wood Sorrel Family**								
Oxalis	*stricta*	Upright Yellow Wood-sorrel	0	3		S5			G5	X
Papaveraceae		**Poppy Family**								
Sanguinaria	*canadensis*	Bloodroot	5	4		S5			G5	X
Plantaginaceae		**Plantain Family**								
Plantago	*lanceolata*	Ribgrass		0	-1	SE5			G5	X
Plantago	*major*	Common Plantain		1	-1	SE5			G5	X
Polygonaceae		**Smartweed Family**								
Polygonum	*achoreum*	Knotweed	0	5		S5			G5	X

List of Vascular Plants Recorded from the Hillsburgh Pit

LATIN NAME		COMMON NAME								
	LOCAL STATUS SOURCE LAST UPDATE/ INITIALS									
Polygonum	*aviculare*	Prostrate Knotweed		1	-1	SE5			GY	X
Polygonum	*convolvulus*	Black Bindweed		1	-1	SE5			GY	X
Polygonum	*persicaria*	Lady's-thumb		-3	-1	SE5			GY	X
Rumex	*crispus*	Curly-leaf Dock		-1	-2	SE5			GY	X
Rumex	*obtusifolius ssp. obtusifolius*	Bitter Dock		-3	-1	SE5			G5	X
Portulacaceae		**Purslane Family**								
Claytonia	*caroliniana*	Carolina Spring Beauty	?	3		S5			G5	X
Ranunculaceae		**Buttercup Family**								
Actaea	*pachypoda*	White Baneberry	6	5		S5			G5	X
Actaea	*rubra*	Red Baneberry	5	5		S5			G5	X
Ranunculus	*abortivus*	Kidney-leaf Buttercup	2	-3		S5			G5	X
Rosaceae		**Rose Family**								
Fragaria	*virginiana ssp. virginiana*	Scarlet Strawberry	2	1		SU			GST?	X
Geum	*canadense*	White Avens	3	0		S5			G5	X
Potentilla	*norvegica ssp. norvegica*	Cinquefoil				SU			GST?	
Potentilla	*recta*	Rough-fruited Cinquefoil		5	-2	SE5			GY	X
Prunus	*serotina*	Black Cherry	3	3		S3			G5	X
Prunus	*virginiana ssp. virginiana*	Choke Cherry	2	1		S5			GST?	X
Rubus	*idaeus ssp. idaeus*	Red Raspberry				SE1			GST5	
Rubus	*occidentalis*	Thimble-berry	2	5		S5			G5	X
Sorbus	*aucuparia*	European Mountain-ash		3	-2	SE4			G5	X
Salicaceae		**Willow Family**								
Salix	*exigua*	Sandbar Willow	3	-5		S5			G5	
Scrophulariaceae		**Figwort Family**								
Linaria	*vulgaris*	Butter-and-eggs		5	-1	SE5			GY	X
Verbascum	*thapsus*	Common Mullein		3	-2	SE5			GY	X
Tiliaceae		**Linden Family**								
Tilia	*americana*	American Basswood	4	3		S5			G5	X
Ulmaceae		**Elm Family**								
Ulmus	*americana*	White Elm	3	-2		S5			G5?	X
Urticaceae		**Nettle Family**								
Pilea	*pumila*	Dwarf Clearweed	5	-3		S5			G5	X

List of Vascular Plants Recorded from the Hillsburgh Pit

LATIN NAME		COMMON NAME								
	LOCAL STATUS SOURCE LAST UPDATE/ INITIALS									
Violaceae		**Violet Family**								
Viola	*pubescens*	Downy Yellow Violet				S5			G5	X
Viola	*sororia*	Woolly Blue Violet				S5			G5	X
MONOCOTYLEDONS		**MONOCOTS**								
Araceae		**Arum Family**								
Arisaema	*triphyllum ssp. triphyllum*	Small Jack-in-the-pulpit	5	-2		S5			G5T5	X
Cyperaceae		**Sedge Family**								
Carex	*albursina*	White Bear Sedge	7	5		S5			G5	X
Carex	*gracillima*	Graceful Sedge	4	3		S5			G5	X
Carex	*intumescens*	Bladder Sedge	6	-4		S5			G5	X
Carex	*pedunculata*	Long-stalked Sedge	5	5		S5			G5	X
Carex	*pensylvanica*	Pennsylvania Sedge	5	5		S5			G5	X
Carex	*plantaginea*	Plantain-leaved Sedge	7	5		S5			G5	X
Carex	*radiata*	Radiate Sedge	4	5		S5			G4	
Juncaceae		**Rush Family**								
Juncus	*tenuis*	Path Rush	0	0		S5			G5	X
Liliaceae		**Lily Family**								
Allium	*tricoccum*	Wild Leek	7	2		S5			G5	X
Asparagus	*officinalis*	Garden Asparagus		3	-1	SE5			GY	X
Erythronium	*americanum ssp. americanum*	Yellow Dog's-tooth Violet	5	5		S5			G5T5	X
Maianthemum	*racemosum ssp. racemosum*	False Solomon's Seal	4	3		S5			G5T	X
Trillium	*erectum*	Purple Trillium	6	1		S5			G5	X
Trillium	*grandiflorum*	White Trillium	5	5		S5			G5	X
Poaceae		**Grass Family**								
Agrostis	*gigantea*	Red-top		0	-2	SE5			G4Q5	X
Bromus	*inermis ssp. inermis*	Awnless Brome		5	-3	SE5			G4G5T?	X
Dactylis	*glomerata*	Orchard Grass		3	-1	SE5			GY	X
Echinochloa	*crusgalli*	Common Barnyard Grass		-3	-1	SE5			GY	X
Elymus	*repens*	Quack Grass		3	-3	SE5			GY	X
Panicum	*capillare*	Witch Grass	0	0		S5			G5	X
Phalaris	*arundinacea*	Reed Canary Grass	0	-4		S5			G5	X
Phleum	*pratense*	Timothy		3	-1	SE5			GY	X
Poa	*annua*	Annual Blue Grass		1	-2	SE5			GY	X
Poa	*pratensis ssp. pratensis*	Kentucky Bluegrass	0	1		S5			G5T5	X
Setaria	*pumila*	Yellow Foxtail		0	-1	SE5			GY	X

APPENDIX E.
Wildlife Species List

List of Vascular Plants Recorded from the Hillsburgh Pit

LATIN NAME		COMMON NAME								
	LOCAL STATUS SOURCE LAST UPDATE/ INITIALS									
FLORISTIC SUMMARY & ASSESSMENT										
Species Diversity										
Total Species		**143**								
Native Species		**80**	56%							
Exotic Species		**63**	44%							
Regionally Significant Species		0								
Locally Significant Species		0								
51-53 Species		0	0%							
54 Species		1	1%							
55 Species		77	89%							
Coefficient of Conservatism and Floristic Quality Index										
Co-efficient of Conservatism (CC) (average)		**3.5**								
CC 0 to 3	*lowest sensitivity*	35	46%							
CC 4 to 6	*moderate sensitivity*	35	46%							
CC 7 to 8	*high sensitivity*	6	8%							
CC 9 to 10	*highest sensitivity*	0	0%							
Floristic Quality Index (FQI)		**39**								
Presence of Weedy & Invasive Species										
mean weediness		**-1.5**								
weediness = -1	*low potential invasiveness*	36	62%							
weediness = -2	*moderate potential invasiveness*	17	29%							
weediness = -3	*high potential invasiveness*	5	9%							
Presence of Wetland Species										
average wetness value		**2.0**								
upland		43	32%							
facultative upland		37	28%							
facultative		29	22%							
facultative wetland		24	18%							
obligate wetland		1	1%							

List of Wildlife Species Recorded from the Hillsburgh Pit

COMMON NAME	SCIENTIFIC NAME								COMMENTS
ODONATA									
Common Baskettail	*Epitheca cynosura*	S5	G5						
Four-spotted Skimmer	*Libellula quadrimaculata*	S5	G5						
BUTTERFLIES									
Black Swallowtail	*Papilio polyxenes*	S5	G5						
Cabbage White	*Pieris rapae*	SNA	G5						
Clouded Sulphur	*Colias philodice*	S5	G5						
Spring Azure	*Celastrina ladon*	S5	G5						
Meadow Fritillary	*Boloria bellona*	S5	G5						
Mourning Cloak	*Nymphalis antiopa*	S5	G5						
Milbert's Tortoiseshell	*Nymphalis milberti*	S5	G5						
AMPHIBIANS									
American Toad	*Anaxyrus americanus*	S5	G5						
BIRDS									
Mallard	*Anas platyrhynchos*	S5	G5						Flyover
Northern Harrier	*Circus cyaneus*	S4B	G5	NAR	NAR	55		X	Flyover, two males observed
Cooper's Hawk	*Accipiter cooperii*	S4	G5	NAR	NAR	4-50+			Seen during RSHA survey
Killdeer	*Charadrius vociferus*	S5B, SSN	G5						
Mourning Dove	*Zenaida macroura*	S5	G5						
Hairy Woodpecker	*Picoides villosus*	S5	G5			10			
Northern Flicker	*Colaptes auratus*	S4B	G5					X	
Pileated Woodpecker	*Dryocopus pileatus*	S5	G5			30-50*			Only cavities were found
Eastern Wood-Pewee	*Contopus virens*	S4B	G5					X	
Great Crested Flycatcher	*Myiarchus crinitus*	S4B	G5						
Red-eyed Vireo	*Vireo olivaceus*	S5B	G5						
Blue Jay	*Cyanocitta cristata*	S5	G5						
American Crow	*Corvus brachyrhynchos*	S5B	G5						
Horned Lark	*Eremophila alpestris*	S5B	G5						
Tree Swallow	*Tachycineta bicolor*	S4B	G5						
Bank Swallow	*Riparia riparia*	S4B	G5					X	
Cliff Swallow	*Petrochelidon pyrrhonota*	S4B	G5						
Black-capped Chickadee	*Poecile atricapillus*	S5	G5						
White-breasted Nuthatch	*Sitta carolinensis*	S5	G5			10			
Ruby-crowned Kinglet	*Regulus calendula*	S4B	G5				6,7		Seen on May 5 - Migrant
Wood Thrush	*Hylocichla mustelina*	S4B	G5					X	
American Robin	*Turdus migratorius*	S5B	G5						
European Starling	*Sturnus vulgaris*	SNA	G5						

List of Wildlife Species Recorded from the Hillsburgh Pit

COMMON NAME	SCIENTIFIC NAME								COMMENTS
Cedar Waxwing	*Bombycilla cedrorum*	S5B	G5						
Field Sparrow	*Spizella pusilla*	S4B	G5					X	
Vesper Sparrow	*Pooecetes gramineus*	S4B	G5					X	
Savannah Sparrow	*Passerculus sanchel-hanus*	S4B	G5					X	
Song Sparrow	*Melospiza melodia*	S5B	G5						
White-throated Sparrow	*Zonotrichia albicollis*	S5B	G5			20			Seen on May 5 - Migrant
Northern Cardinal	*Cardinalis cardinalis*	S5	G5						
Rose-breasted Grosbeak	*Pheucticus ludovicianus*	S4B	G5					X	
Indigo Bunting	*Passerina cyanea*	S4B	G5						
Bobolink	*Dolichonyx oryzivorus*	S4B	G5	THR	THR-NS	10		X	Seen on May 5 - Migrant
Red-winged Blackbird	*Agelaius phoeniceus*	S5	G5						
Common Grackle	*Quiscalus quiscula*	S5B	G5						
Brown-headed Cowbird	*Molothrus ater*	S4B	G5						
American Goldfinch	*Carduelis tristis*	S5B	G5						
MAMMALS									
Eastern Cottontail	*Sylvilagus floridanus*	S5	G5						
Eastern Chipmunk	*Tamias striatus*	S5	G5						
Woodchuck	*Marmota monax*	S5	G5						
Coyote	*Canis latrans*	S5	G5						
Red Fox	*Vulpes vulpes*	S5	G5						
Raccoon	*Procyon lotor*	S5	G5						
White-tailed Deer	*Odocoileus virginianus*	S5	G5						
SUMMARY									
Total Odonata:	2								
Total Butterflies:	7								
Total Amphibians:	1								
Total Reptiles:	0								
Total Birds:	37								
Total Breeding Birds:	32								
Total Mammals:	7								

List of Wildlife Species Recorded from the Hillsburgh Pit

COMMON NAME	SCIENTIFIC NAME								COMMENTS
SIGNIFICANT SPECIES									
Global:	0								
National:	?								
Provincial:	?								
Regional:	0								
Local:	0								
Explanation of Status and Acronyms									
COSSARO: Committee on the Status of Species at Risk in Ontario									
COSEWIC: Committee on the Status of Endangered Wildlife in Canada									
REGION: Rare in a Site Region									
S1: Critically Imperiled—Critically imperiled in the province (often 5 or fewer occurrences)									
S2: Imperiled—Imperiled in the province, very few populations (often 20 or fewer)									
S3: Vulnerable—Vulnerable in the province, relatively few populations (often 80 or fewer)									
S4: Apparently Secure—Uncommon but not rare									
S5: Secure—Common, widespread, and abundant in the province									
SX: Presumed extirpated									
SH: Possibly Extirpated (Historical)									
SNR: Unranked									
SU: Unrankable—Currently unrankable due to lack of information									
SNA: Not applicable—A conservation status rank is not applicable because the species is not a suitable target for conservation activities.									
S#S#: Range Rank—A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species									
S#B: Breeding status rank									
S#N: Non Breeding status rank									
?: Indicates uncertainty in the assigned rank									
G1: Extremely rare globally; usually fewer than 5 occurrences in the overall range									
G1G2: Extremely rare to very rare globally									
G2: Very rare globally; usually between 5-10 occurrences in the overall range									
G2G3: Very rare to uncommon globally									
G3: Rare to uncommon globally; usually between 20-100 occurrences									
G3G4: Rare to common globally									
G4: Common globally; usually more than 100 occurrences in the overall range									
G4G5: Common to very common globally									
G5: Very common globally; demonstrably secure									
T: Denotes that the rank applies to a subspecies or variety									
END: Endangered									
THR: Threatened									
SC: Special Concern									
2, 3 or NS after a COSEWIC ranking indicates the species is either on Schedule 2, Schedule 3 or No Schedule of the Species At Risk Act (SARA)									
NAR: Not At Risk									

List of Wildlife Species Recorded from the Hillsburgh Pit

COMMON NAME	SCIENTIFIC NAME								COMMENTS
IND: Indeterminant, insufficient information to assign status									
DD: Data Deficient									
6: Rare in Site Region 6									
7: Rare in Site Region 7									
Area: Minimum patch size for area-sensitive species (ha)									
H- highly significant in Hamilton Region (i.e. rare)									
m- moderately significant in Hamilton Region (i.e. uncommon)									
L1- extremely rare locally (Toronto Region)									
L2- very rare locally (Toronto Region)									
L3- rare to uncommon locally (Toronto Region)									
HR- rare in Halton Region, highly significant									
HU- uncommon in Halton Region, moderately significant									
* The Pileated Woodpecker will incorporate smaller woodlots into its homerange, therefore it may not be a true area-sensitive species (naylor et al. 1996)									
LATEST STATUS UPDATE									
Butterflies: September, 2009									
Amphibians: September, 2009									
Reptiles: June 2011									
Birds:June 2011									
Mammals: September, 2009									
S and G ranks and explanations: September, 2009									
NOTE									
All rankings for birds refer to breeding birds unless the ranking is followed by N									
REFERENCES									
COSSARO Status									
Endangered Species Act, 2007 (Bill 184) Schedules 1- 5 June 30 2008									
COSEWIC Status									
COSEWIC. 2007 Canadian Species at Risk. Committee on the Status of Endangered Wildlife in Canada. September 11, 2007 with updates from COSEWIC Assessments to November 2010.									

List of Wildlife Species Recorded from the Hillsburgh Pit

COMMON NAME	SCIENTIFIC NAME								COMMENTS
Local Status									
Dwyer, Jill K. 2003. Nature Counts Project Hamilton Natural Areas Inventory 2003. Species Checklists. Hamilton Naturalists Club. Halton Natural Areas Inventory 2006. Volume 2 Species Checklists (ISBN 0-9732486-7-4) Ontario Partners in Flight. 2008. Ontario Landbird Conservation Plan. Lower Great Lakes/St. Lawrence Plain (North American Bird Conservation Region 13). Priorities, Objectives and Recommended Actions. Environment Canada and Ontario Ministry of Natural Resources. Draft, February 2006 Region of Waterloo. 1996. Regionally Significant Breeding Birds. TRCA. 2003. Revised Fauna Scores and Ranks, February 2003. Toronto Region Conservation Authority.									
Area-sensitive information									
Austen, M.J.W., M.D. Cadman, and R.D. James. 1994. Ontario birds at risk: status and conservation needs. Toronto and Port Rowan, ON: Federation of Ontario Naturalists and Long Point Bird Observatory. 165 pp. Dunn, Erica H. and David J. Agro. 1995. Black Tern (Chlidonias niger). The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/147 Herkert, J.R. 1991. An ecological study of the breeding birds of grassland habitats within Illinois. Ph.D. dissertation. University of Illinois, Urbana, IL. 112 pp. Heyl, B.J., J.A. Holmes, and D.E. Kroodsma. 2002. Winter Wren (Troglodytes troglodytes). In Poole, A., and F. Gill, eds. The Birds of North America, No. 623. Philadelphia, PA: The Birds of North America, Inc. 31 pp. Naylor, B. J., J. A. Baker, D. M. Hogg, J. G. McNicol and W. R. Watt. 1996. Forest Management Guidelines for the Provision of Pileated Woodpecker Habitat. Ontario Ministry of Natural Resources, Forest Management Branch, Sault Ste. Marie, Ontario. 26 pp. Page, A.M., and M.D. Cadman. 1994. Status report on the Acadian Flycatcher Empidonax virescens in Canada. Prepared for the Committee on the Status of Endangered Wildlife in Canada. 27 pp. Robbins, C.S. 1979. Effect of forest fragmentation on bird populations. Pp. 198-212 in DeGraaf, R.M., and K.E. Evans, eds. Management of northcentral and northeastern forests for nongame birds. United States Department of Agriculture, Forest Service General Technical Report NC-51. 268 pp. Sandilands, A. 2005. Birds of Ontario: Habitat Requirements, Limiting Factors and Status. UBC Press.									

APPENDIX F.
Woodland Assessment Report

(Stantec Consulting Ltd., 2011)

WOODLAND ASSESSMENT
Hillsburgh Pit Extension

Prepared for:
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Project: 160960182
Date: December 1, 2011

WOODLAND ASSESSMENT
Hillsburgh Pit Extension

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Table B-1. Tree Survey Results – Proposed Wilson – Elliot Pit

1.0 Introduction

This woodland assessment was completed for a contiguous parcel of forested area found on Part Lot 29, Concession 8, in the Township of Erin, Wellington County. The woodland occurs partially within the proposed aggregate extraction area for the St. Marys CBM Hillsburgh Pit extension. The objective of the woodland assessment was to assist in determining the significance of the woodland. The County of Wellington Official Plan (2011) defines significant woodlands as: *"an area which is: ecologically important in terms of features such as species composition, age of trees and stand history; functionally important due to its contribution to the broader landscape because of its location, size or due to the amount of forest cover in the planning area; or economically important due to site quality, species composition, or past management history."*

The woodland assessment included the following investigation and elements that were established to meet the standard woodland assessment criteria as presented in the *'Natural Heritage Reference Manual For Natural Heritage Policies of the Provincial Policy Statement, 2005 Second Edition'* (NHRM 2nd Ed.) (MNR, 2010) and County of Wellington OP (2011):

- Analysis of woodland as per Natural Heritage Reference Manual:
  - Woodland Size;
  - Ecological Functions;
  - Uncommon Characteristics;
  - Economic and Social Functional Value;
- Analysis of Significant Wildlife Habitat as it relates to the Woodland;
- Analysis of Rare Species in the Woodland including Endangered and Threatened species;
- Additional on-site surveys to collect detailed information on the woodlands characteristics.

This assessment of the woodland on the proposed Hillsburgh extension complements the wildlife, vegetation community and floristic vascular plant information present in the main document.

1.1 APPROACH

The woodland assessment included a review of the Ecological Land Classification (ELC) and floristics information collected on May 2, 2006, and a more detailed woodland community survey completed on February 7, 2007. In addition, various wildlife surveys and habitat information were used to assess the Wildlife Habitat Significance of this area. These surveys are discussed in detail in the Level II Natural Environment Technical Report for the proposed Hillsburgh extension (Stantec, 2007).

Detailed forestry data were collected for the forest communities within the woodland that extends into the proposed extraction area. Three plots with 10-metre radii were established

throughout the woodland to measure the size and composition of trees (see **Figure A1**). Two surveys were completed in the southern portion of the woodland, where the stand is dominated by young growth. The third plot was located outside the proposed extraction area, toward the north of the woodland where the stand becomes more mature. The species and diameter at breast height (DBH) of each tree (greater than 1cm/DBH) within the plot was recorded. The data collected on tree species and size were used to assess the relative age (i.e. early successional, mid age, mature, old growth) of each community. Vascular plants in the ground layer were noted on the botanical survey (May 2, 2006). Parameters calculated to aid in this analysis were:

- Basal area per hectare of mature trees (i.e., those over 25 cm/DBH) of mid to late successional tree species;
- Number of stems per hectare;
- Median diameter of each tree species;
- Stand composition based on number of stems; and
- Number and DBH of dead trees.

2.0 Assessment of Woodland Significance

A single woodland is partially situated within the proposed extraction area. This woodland measures approximately 13 ha in size, approximately 7 ha of which are located within the proposed extraction area.

The southern portion of the woodland, located within the proposed extraction area, is dominated by young growth. The northern portion of the woodland, outside the subject lands and within the 120 m zone of investigation, contains more mature (i.e. older) growth. One vegetation community has been identified within the woodland; a young deciduous forest dominated by Sugar Maple and White Ash. A few large American Beech trees are located on the western side of the woodland. There were no Butternut trees observed during the woodland assessment. The understory is rich in spring herbaceous flora including species such as Squirrel-corn, Duchman's-breeches, Yellow Dog's-tooth Violet, and very abundant with Wild Leek and Blue Cohosh. There are a number of large stumps present indicating logging activities have occurred in the past.

The following discussion provides a description of the plot areas studied during the woodland assessment that are representative of the overall woodland character. The locations of the plots are shown on **Figure A1**.

2.1 PLOTS AND ELC COMMUNITIES

Table B1 summarizes the results per plot of each parameter calculated.

Plot # 1

Plot #1 was located in the south western portion of the woodland. It was dominated by sugar maple, with a minimal amount of white ash. The plot confirms the young nature of this section of the forest based on the median diameter at breast height (DBH) being approximately 3 cm and 92% of trees being <10 cm DBH. Only 8% of trees sampled were ≥10 cm DBH. One sugar maple tree with a DBH of 40 cm was found in the plot; however, this is highly unrepresentative of the woodland, so it was removed from the basal area calculations. No other trees in the plot were greater than 25 cm at DBH, so no calculations of the basal area of mature mid-to-late successional trees were performed. This plot contained the highest number of stems per hectare compared to the other plots.

Plot #2

Plot #2 was located within a transitional zone between the more mature area of the woodland and the southern portion that contains young to mid successional growth. The plot was dominated by sugar maple. American beech and white ash were also present in the survey, but to a lesser extent than the maple. The median DBH was 2 cm, and the basal area of mature mid-to-late successional trees was 11.7 m^2/ha. This plot contained the highest basal area of mature mid to late successional trees, however only 8% of trees sampled were ≥10 cm DBH.

Plot #3

Plot #3 was located in the eastern section of the woodland. Sugar maple and white ash were co-dominant with black cherry found in lesser amounts. The median DBH was 3 cm. This plot contained the highest percentage of trees with a basal area of ≥10 DBH (15.7%). The basal area of mature trees (>25 cm/DBH) for the third plot was 3.1 m^2/ha indicating that this section of the woodland is early successional habitat.

2.2 ANALYSIS

General guidelines for determining significance of woodlands are presented in the Natural Heritage Reference Manual (NHRM 2nd Ed.) (MNR, 2010). Criteria suggested by the NHRM for designating significant woodlands include woodland size, ecological function (i.e., shape, proximity to other woodlands or natural features, linkages, species diversity), uncommon characteristics, and economic and social functional values. The local planning authority is responsible for designating significant woodlands. The County of Wellington defines significant woodland according to ecological, functional and economic criteria.

2.2.1 Woodland Size

Woodland size can be an important indicator or available habitat. In determining size significance the suggested criteria changes depending on the amount of forest cover in the planning area. For instance, where there is less than 5% forest cover, it is suggested that woodlands 2 ha in area or larger should be evaluated for significance compared to 4 ha woodlands in areas with 5 to 15% forest cover, and 40 ha woodlands for areas with 15 to 30% forest cover. Available estimates for forest cover in Wellington County are 18.2% (Riley and Mohr, 1994) and 17.2% (Couturier, 1999). Stantec completed an area calculation analysis and determined the forest cover of Wellington County to be 18.4%, and the Township of Erin to be 29.1%. The forest cover noted for the watersheds within the study area of the Draft Erin Servicing and Settlement Master Plan (CVC *et al.*, 2011) is 27.3 ha, which includes the subject property. Therefore, the NHRM 2nd Ed. (MNR, 2010) recommends a minimum woodland size of 20 ha for significant woodland evaluation. The size of this woodland is 13 ha, well below the threshold. As this woodland is separated from other woodlands by 300 m to the east and 700 m to the southeast, this woodland is considered on its own and disconnected from larger blocks of forest.

2.2.2 Ecological Function

Ecological Function can be assessed by considering woodland interior, proximity to other woodlands, or other habitats, linkages, water protection, and woodland diversity. At only 13 ha, this woodland provides limited availability of interior habitat (i.e. >100 m from the edge). The total area of interior forest habitat is estimated to be less than 2ha (1.57 ha), which is a very small amount on a regional scale and below the threshold noted in NHRM 2nd Ed. (MNR, 2010) for this size of woodland. No linkages exist that connect this woodland to other natural heritage features. The woodland is an isolated feature surrounded predominately by agricultural lands.

An active gravel pit is located immediately south of the woodland. The woodland is not associated with any aquatic features.

The site is not identified as a feature that is considered important for water protection as it is not a sensitive recharge or discharge area, headwater area, watercourse or fish habitat.

The majority of bird species using the woodland are edge dwelling species (Blue Jay, American Crow, Song Sparrow, Northern Cardinal). A few interior forest species do utilize the woodland (Eastern Wood-Pewee, Hairy Woodpecker, White-breasted Nuthatch).

Only one plant community has been identified within the woodland (FOD5-8). It is characterized as a young forest dominated by sugar maple and white ash. No nationally, provincially, regionally or locally (i.e. in Wellington) rare, threatened or endangered plant or wildlife species were found on the subject lands. The woodland does not exhibit a composition of native forest species that have declined south and east of Canadian Shield or a high diversity through a combination of composition and terrain.

2.2.3 Uncommon Characteristics

The woodland exhibits no uncommon characteristics. The vegetation communities present are generally common and symptomatic of woodlands that have experienced logging disturbances. The composition, quality and age are not uncommon or significant. It should be noted that, contrary to watershed scale mapping provided in the Draft Erin Servicing and Settlement Master Plan (CVC *et al.*, 2011), this detailed onsite assessment confirms that this woodland is not an old-growth forest.

2.2.4 Economic and Social Functional Value

There are a number of stumps present throughout the woodland indicating it may have been logged in the past. This has resulted in the removal of most mature hardwoods, and gives the site its current characterization as a young successional forest. The logging practices do not appear to have been sustainable, as few mature hardwoods remain. Regeneration of Sugar Maples is common within the woodland, however with most trees under 10 cm/DBH, they will not be harvestable for many decades to come. Overall, the economic value of this woodland is not considered to be significant and has been diminished by the past management history by non-sustainable selective logging practices in the past.

2.3 WOODLAND SIGNIFICANCE SUMMARY

The woodland within the proposed extraction area does not fit the criteria of significant woodland as presented in the NHRM 2nd Ed. (MNR, 2010). The woodland does not possess the size, ecological function, uncommon characteristics or economic and social functional value of a significant woodland.

3.0 Assessment of Significant Wildlife Habitat

3.1 ANALYSIS

The Natural Heritage Reference Manual (NHRM 2nd Ed.) (MNR, 2010) includes criteria and guidelines for designating significant wildlife habitat. The Significant Wildlife Habitat Technical Guide (MNR, 2000) may be used to help decide what areas and features should be considered significant wildlife habitat. There are four general types of significant wildlife habitat: seasonal concentration areas, migration corridors, rare or specialized habitat, and species of conservation concern. All types of significant wildlife habitat in relation to the subject lands are discussed in more detail below.

3.1.1 Seasonal Concentration Areas

Seasonal concentration areas are those sites where large numbers of a particular 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 of a particular species may be lost if the habitat is destroyed, are examples of seasonal concentration areas which should be designated as significant.

The winter wildlife survey identified deer tracks, with some well used trails within the woodland. The tracks were mainly concentrated in the northern, older portion of the woodland. However, no conifers are present to provide shelter and no potential habitat for winter deeryards was identified within the study area.

No evidence was found to suggest the site is used for seasonal concentration of other groups (migratory birds, reptiles, bats, bullfrogs, butterflies, wintering wild turkey or bald eagle).

3.1.2 Rare or Specialized Habitat

Rare and specialized habitats are two separate components. Rare habitats are those with vegetation communities that are considered rare in the province. SRANKS are rarity rankings applied to species at the "state", or in Canada at the provincial level, and are part of a system developed under the auspices of the Nature Conservancy (Arlington, VA). Generally, community types with SRANKS of S1 to S3 (extremely rare to rare-uncommon in Ontario), as defined by the Natural Heritage Information Centre (NHIC), could qualify. 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 used by Wild Turkeys.

The woodland onsite does not contain any rare vegetation communities. All plant species found in the woodland are ranked S5 (very common in Ontario) with the exception of five species considered to be exotic and not a native part of Ontario's flora. All wildlife species recorded within the woodland are ranked S5, S4 (common in Ontario) or exotic with the exception of the Pileated Woodpecker which is ranked S4S5 (common to very common in Ontario).

The woodland within the expansion area was not found to support large numbers of area sensitive species. Only two area-sensitive species requiring more than 10 ha of suitable habitat for breeding were recorded; Cooper's Hawk and Pileated Woodpecker.

Pileated Woodpecker cavities were observed within the woodland. Pileated Woodpecker requires 30-50 ha of habitat for breeding. Pileated Woodpecker generally prefer late successional stages of coniferous or deciduous forest, but also use younger forests that have scattered, large, dead trees (Bull and Jackson, 1995). The woodland provides marginally suitable habitat for Pileated Woodpecker however its small size (13 ha) does not provide sufficient area to support a breeding pair. It may be used for foraging activities.

Cooper's hawk is considered an area-sensitive species that requires 4-50 ha of suitable habitat for breeding. As an area-sensitive species, it may be considered under site-specific circumstances in the assessment of areas as potentially significant wildlife habitat. Cooper's hawk nest primarily in deciduous forests, however are increasingly using plantations in Ontario (Sandilands, 2005). A potential Cooper's hawk nest was located in the southern portion of the woodland on May 1, 2007 within the proposed licence area. A Cooper's hawk was in the vicinity of the nest, but the nest showed no signs of being currently active (i.e. bird on nest, whitewash, feathers of prey nearby). Cooper's hawk tend to be wary, and the female can quickly leave the nest when sitting on eggs. As a result it is possible the nest is active. Cooper's hawk is ranked S4 (common in Ontario) and has been determined to be Not in Any Category of Risk by the Committee on the Status of Species at Risk in Ontario (COSSARO) and Not at Risk by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

The woodland likely provides some habitat for cavity nesting bird species. The woodland does contain dead trees, which are often preferred by cavity nesting species. Hairy Woodpecker, Northern Flicker, Great-crested Flycatcher, Tree Swallow, White-breasted Nuthatch and Black-capped Chickadee, which are all cavity nesters, were observed in the vicinity of the woodland during the breeding bird survey. With the exception of the black-capped chickadee these species require trees over 10 DBH for nesting. Black-capped Chickadee require trees of 4 to 7 DBH for nesting (James, 1984). Dead trees from all three plots ranged from 0.5 to 5 DBH, with the exception of two trees measuring 8 and 9 DBH, respectively. This indicates the composition of dead trees in the woodland is likely not sufficient to provide ideal cavity nesting habitat. Plots did contain live trees with >10 DBH, however these trees were present in small percentages (8-15.7%).

The woodland is not a feature type that is poorly represented in the planning area and does not contain high diversity of habitats. The woodland does not provide rare vegetation communities or specialized habitat. It appears to provide nesting habitat for one raptor species, the Cooper's

hawk. Cooper's hawk is a common nesting species in Ontario that does not require particularly specialized habitat.

3.1.3 Species of Conservation Concern

The largest group of significant wildlife habitat is habitat for species of conservation concern. This includes four types of species: those that are rare, those whose populations are significantly declining, those that have been identified as being at risk to certain common activities, and those with relatively large populations in Ontario compared to the remainder of the globe.

Rare species are considered at five levels: globally rare, nationally rare (with designations by the Committee on the Status of Endangered Wildlife in Canada or COSEWIC), provincially rare (with designations by the Committee on the Status of Species at Risk in Ontario, or COSSARO), regionally rare (at the Site Region level) and locally rare (in the municipality or Site District). This is also the order of priority that should be attached to the importance of maintaining species.

No species of conservation concern were identified within the woodland.

3.1.4 Animal Movement Corridors

Movement corridors are areas that are traditionally used by wildlife to move from one habitat to 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.

The woodland is surrounded by active agricultural fields. No immediate linkages to other woodlands or natural heritage systems exist. In addition, no significant wildlife habitat (i.e. deer wintering yard, amphibian breeding pools), which would attract animal movement, was identified in the vicinity of the woodland. As no significant linkages or wildlife habitat were identified, significant animal movement corridors are not anticipated to run through the woodland.

3.2 SIGNIFICANT WILDLIFE HABITAT SUMMARY

The woodland does not contain significant wildlife habitat. No seasonal concentration areas were identified, as the community did not contain winter deeryards or ideal Wild Turkey winter range. The woodland contained marginal habitat for area sensitive species with only two species of area sensitive birds present in the breeding season. The woodland does provide habitat for Cooper's hawk, a forest nesting raptor. It also provides marginal nesting sites for cavity nesting species. No species of Conservation Concern were identified. The community has no linkages to other natural heritage features and no wildlife corridors.

4.0 Summary and Conclusion

The woodland assessment includes a review of the floristic and faunal information collected during the field surveys conducted onsite from April 2006 to May 2007. These surveys included detailed tree composition studies using representative plots in February 2007. The assessment included a review of the size of the woodland relative to the forest cover found in the planning area. The assessment evaluated woodland significance using criteria outlined in the NHRM 2nd Ed. (MNR, 2010) and evaluated the role of the woodland as significant wildlife habitat using guidelines in the Significant Wildlife Habitat Technical Guide (MNR, 2000).

The evaluation resulted in an assessment which demonstrated that the woodland found on the subject lands is not considered to be significant in the planning area in which it is found, based on its ecological, functional and economic characteristics as well as its potential for significant wildlife habitat.

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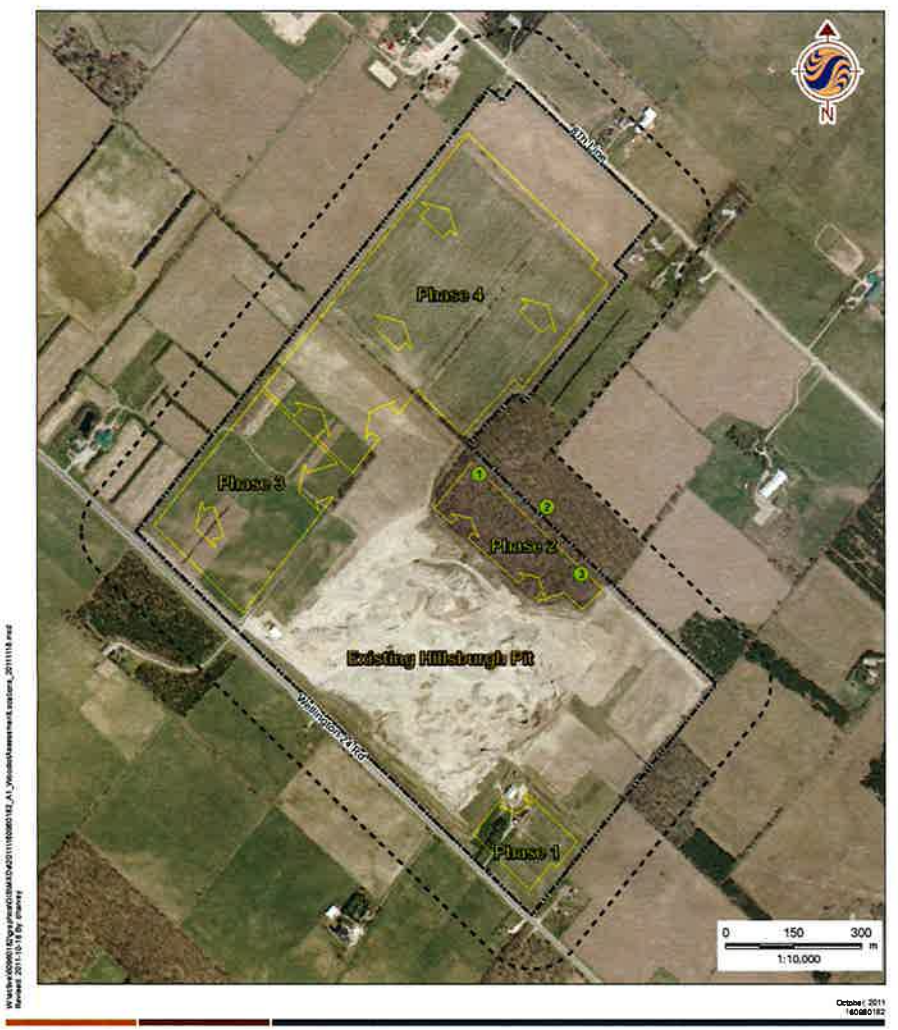
Stantec
WOODLAND ASSESSMENT
HILLSBURGH PIT EXTENSION

ATTACHMENT A: Figures



Legend
- Study Area (120m Investigation Zone)
- Subject Property
- Extraction Phases
- Woodlot Assessment Plot Location

Stantec Notes
1. Coordinate System: UTM Zone 17 Northern Hemisphere
2. Base features produced under licenses with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2011.
3. Image Source: ©First Base Solutions, 2011. Imagery date: Spring 2006

Client/Project
HILLSBURGH PIT EXTENSION
CBM AGGREGATES [A DIVISION OF ST. MARYS CEMENT (CANADA) INC.]

Figure No.
A-1

Title
WOODLOT ASSESSMENT PLOT LOCATIONS

ATTACHMENT B: Tables

Attachment B: Tables

Table B-1. Tree Survey Results – Proposed Wilson – Elliot Pit

Plot no.	Stems per Hectare	BA of Mature (>25 cm/DBH mid to late successional trees)	Median Tree Diameter (cm) By Species	Stand Composition (by no. of stems)	% trees with DBH ≥ 10 cm	DBH Range of Dead Trees
1 ($157\ m^2$)	11720	0	sugar maple: 3 white ash: 8	96% sugar maple; 4% white ash	8	2 – 5 (1 tree at 9 DBH)
2 ($314\ m^2$)	3567	11.7 m^2/ha	sugar maple: 2 white ash: 3 beech: 2	78% sugar maple; 10% white ash; 12% beech	8	0.5 – 3 (1 tree at 8 DBH)
3 ($157\ m^2$)	3248	3.1 m^2/ha	sugar maple: 2 white ash: 4 black cherry: 8	43% sugar maple; 41% white ash; 16% black cherry	15.7	1 – 4

APPENDIX G.
Curricula Vitae

Daniel Eusebi, BES, MCIP, RPP;
Nicole Kopysh, BES

Nicole Kopysh BES

Ecologist / Project Manager

Stantec

Nicole Kopysh is a Terrestrial Ecologist and Project Manager who has been involved in projects of varying sizes from multiple sectors including aggregates, renewable energy and development. Nicole has successfully managed or directed the natural terrestrial field programs and reporting requirements for Environmental Impact Assessments, constraints analyses, natural environment technical reports, Environmental Implementation Reports, Natural Heritage Assessments for the Renewable Energy Assessment program and natural heritage monitoring programs. These have included extensive agency and public consultation and Nicole demonstrates effective communication skills in the execution of these projects.

Nicole's experience involves the implementation of the natural heritage policy of the Ontario Provincial Policy Statement, Greenbelt Plan, *Oak Ridges Moraine Act, Migratory Birds Convention Act, Green Energy Act* and municipal policy documents for municipal draft plan applications throughout southern Ontario. Nicole is also experienced with the interpretation and application of the *Endangered Species Act* (ESA), including the development and completion of permit applications under the ESA. Nicole is a skilled birder and has field experience conducting bird surveys, Species At Risk surveys, general terrestrial monitoring and assessments, wildlife inventories and habitat assessments. She is a member of the steering committee for Environment Canada's and the Canadian Wind Association's Bird Monitoring Database Project.

EDUCATION

BES, University of Waterloo / Bachelor of Environmental Studies, Honours Environment and Resource Studies, Co-op Program, Waterloo, Ontario, 1998

MEMBERSHIPS

Member, Society of Canadian Ornithologists

Member, Ontario Field Ornithologists

PROJECT EXPERIENCE

Aggregate Services

Hillsburgh Huxley Pit, Hillsburgh, Ontario (Project Assistant, Ecologist)
Natural environment field inventories, Woodlot Assessment of Sighificance and Level II Natural Environment Technical Report

Neubauer Pit, Township of Puslinch, Ontario (Project Assistant, Ecologist)
Natural environment field inventories and Level II Natural Environment Technical Report

Proposed Bromberg Pit, Ayr, Ontario (Project Assistant, Ecologist)
Natural environment field inventories and Level I Natural Environment Technical Report

Natural Sciences & Heritage Resources

Forest Bird Research - Canadian Wildlife Service* (Field Assistant)
Located Wood Thrush nests, monitored nesting success, banded adult and nestling birds, and conducted vegetation surveys.

Forest Bird Research - Smithsonian Institution* (Field Assistant)
Located and monitored Hooded Warbler nests and conducted insect sweep net sampling. Located Blue-headed Vireo nests and conducted playback experiments.

Ontario Breeding Bird Atlas - Ontario Nature-Federation of Ontario Naturalists* (Assistant Coordinator)
Coordinated and managed various aspects of a province-wide conservation/research project. This involved coordinating coverage to ensure project goals were met; hiring, training and managing contract staff; development of funding proposals; coordination of field work; management of volunteers and working committees; assistance in preparation of Atlas book for publication.

Colonial Marshbird Census - Bird Studies Canada* (Project Coordinator)
Developed the project outline, scope, organization and staffing. Scheduled the project timelines and tasks. Performed key field work in marshes throughout southern Ontario.

Ontario Eastern Screech-owl Survey - Ontario Breeding Bird Atlas* (Project Manager)
Developed project proposal, project timeline, schedule and budget. Responsible for communications, data management and handling. Launched survey and coordinated volunteer involvement.

** denotes projects completed with other firms*

Nicole Kopysh BES

Ecologist / Project Manager

Renewable Energy

Post-construction: Renewable Energy Projects, Various Sites, Ontario (Team Lead - Field Program and Technical Reporting)
Post-construction monitoring and reporting for various wind energy projects in Ontario, including:
- *Melancthon I Wind Plant*
- *Wolfe Island Wind Power Project*

Pre-construction: Renewable Energy Projects, Various Sites, Ontario (Team Lead - Field Program and Technical Reporting)
Study design, direction of field programs, agency and public consultation, evaluation and assessment of natural features, significant wildlife habitat, presence of Species At Risk, assessment of project impacts and preparation of final reports for the following projects:
- *White Pines Wind Project Natural Heritage Assessment, Environmental Impact Study and Endangered Species Act Assessment and Permitting*
- *Ostrander Point Wind Energy Park Natural Heritage Assessment, Environmental Impact Study and Endangered Species Act Assessment and Permitting*
- *Springwood Wind Project Natural Heritage Assessment*
- *Whittington Wind Project Natural Heritage Assessment, Environmental Impact Studies and Endangered Species Act Assessment and Permitting*
- *Port Dover and Nanticoke Wind Project Natural Heritage Assessment, Environmental Impact Study and Endangered Species Act Assessment and Permitting*
- *Brooke-Alvinston Wind Project Natural Heritage Assessment*

Chinodin Melancthon and Grey Highlands Wind Projects, Ontario (Terrestrial Ecologist)
Coordinating and conducting monitoring of bats and migratory and breeding birds for wind turbine development.

Proton Wind Program, Southgate Township, Ontario (Terrestrial Ecologist)
Coordinating and conducting monitoring of migratory and breeding birds for wind turbine development, preparation of comprehensive technical appendix to the Environmental Screening Report.

Wolfe Island Wind Power Project, Wolfe Island, Ontario (Terrestrial Ecologist)
Study design, coordination and conducting of monitoring for spring migratory birds, fall migrating raptors, staging waterfowl, winter raptors and grassland bird populations. Design and conducting specific studies to target avian Species at Risk. Assessment of amphibian populations, mammal populations, and wildlife corridors. Preparation of technical report appendix to the Environmental Screening Report.

Residential Development

Almas Property, Hamilton, Ontario (Project Manager)
Environmental Impact Statement and Natural Heritage Assessment

Golhar Residence, Hockley Valley, Ontario (Project Manager)
Development of environmental review for a proposed pond located within the Niagara Escarpment Protection Area.

Glaspell Homeowner's Guide, Whitby, Ontario (Project Manager)

Fourteen Mile Creek Long-term Natural Heritage Monitoring Program, Oakville, Ontario (Natural Heritage Monitoring Project Director)
A watershed-based inventory and monitoring program for a study area in the Fourteen Mile Creek watershed was developed in association with the Conservation Authority to assess human induced stress on the greater ecosystem. The program included one year of inventory work and four subsequent years of monitoring and incorporated the following components: streamflow and rainfall monitoring, erosion and creek morphology, groundwater, vegetation and Ecological Land Classification, breeding birds, fish, water quality and benthos.

Sports, Recreation & Leisure

Clublink Wyndance Golf Coures, Uxbridge, Ontario (Project Manager)
Natural heritage assessment and development of environmental report addendum and significant species plan.

Commercial / Retail Development

First Capital Holdings Trust, Guelph, Ontario (Project Manager)
Envrionmental Implementation Report. Vegetation buffers, wildlife corridor, tree conservation plan, planning and design of invasive species removal, design of compliance and performance monitoring program.

** denotes projects completed with other firms*

Nicole Kopysh BES
Ecologist / Project Manager

PUBLICATIONS

Eastern Screech-Owl pp. 290-291. *Atlas of the Breeding Birds of Ontario, 2007.*

Kopysh, N. Other Owls!. *Ontario Breeding Bird Atlas Newsletter. Vol 5, Issue 1.*, 2005.

Kopysh, N. On the Prowl for Owls. *OFO News 22(1): 12-13.*, 2004.

Kopysh, N. and C. Weseloh. Reporting Colonial Species. *Ontario Breeding Bird Atlas Newsletter. Vol 3, Issue 2.*, 2003.

Kopysh, N. Owling for EASO. *Ontario Breeding Bird Atlas Newsletter. Vol 3, Issue 2.*, 2003.

Buehler, D.M., D.R. Norris, B.J.M. Stuchbury and N.C. Kopysh. Food Supply and Parental Feeding Rates of Hooded Warblers in Forest Fragments. *Wilson Bulletin 114(1), 122-127.*, 2002.

Morton, E., J. Howlett, N.C. Kopysh and I. Chiver. Overcoming the cost of male incubation: blue-headed vireos memorize the locations where intruders sing. *In submission to Proc Royal Soc of London, biology letters.*, 2002.

Timmermans, S. and N. Kopysh. What's Happening With Colonial Marshbirds?. *Ontario Breeding Bird Atlas Newsletter. Vol 1, Issue 2.*, 2001.

Daniel S. Eusebi BES, MCIP, RPP

Senior Environmental Planner

Stantec

Mr. Eusebi provides services to a broad range of development clients requiring various environmental assessments. He specializes in natural science based assessments and coordinates teams of multidisciplinary professionals. Dan's experience and expertise in the environmental field allow him to assess overall environmental impacts of a variety of scenarios and provide appropriate mitigation options where feasible. He is skilled at coordinating various project stakeholders and negotiating with regulatory agencies concerning project permits and approvals. He manages the public consultation phase for high profile projects.

Dan's practical experience includes natural science based environmental assessments (flora, fauna and aquatics), Phase I and II site assessments, site decommissioning and redevelopment, site remediation, design and implementation of protection techniques for linear facilities, and on-site emergency response management, as well as compliance monitoring. His multidisciplinary background is well suited to environmental impact assessments.

Dan is involved in numerous aggregate extraction development proposals and projects, which include permitting and regulatory approvals, the production of Levels I and II Natural Environment Technical Reports, and public consultation, in addition to Adaptive Management Planning (AMP). This experience is facilitated by his strong familiarity with the Ontario Aggregate Resources Act (ARA) and its regulatory requirements.

EDUCATION

BES (Honours), Major in Environmental and Resource Studies, University of Waterloo, Waterloo, Ontario, 1988

Certificate, Ontario Ministry of Natural Resources / Ontario Wetland Evaluation Training Course, North Bay, Ontario, 2009

MEMBERSHIPS

Registered Professional Planner, Ontario Professional Planners Institute

Member, Environment Committe, Ontario Stone, Sand & Gravel Association

Member, Society of Wetland Scientists

PROJECT EXPERIENCE

Aggregate Services

Level 2 Natural Environment Technical Assessment Report for Aggregate Expansion, Hillsburgh Pit, CBM Aggregates, Erin, Ontario (Environmental Planner, Project Manager)

Adaptive Management Plan, Nelson Aggregate Co., Burlington, Ontario (Environmental Planner)

Landscape and Ecosystem Restoration Plan, Nelson Aggregate Co., Burlington, Ontario (Environmental Planner)

Level 2 Natural Environment Technical Report, Nelson Aggregate Co., Burlington, Ontario (Environmental Planner)

Duntroon Quarry Application Adaptive Management Plan (AMP), Walker Industries, Collingwood, Ontario (Environmental Planner)

Levels 1 & 2 Natural Environmental Technical Assessment Report for Proposed Aggregate Application, Montrose Pit, Capital Paving, County of Wellington, Ontario (Environmental Planner)

Levels 1 & 2 Natural Environment Technical Assessment Report for Proposed Aggregate Application, Godfrey Extension, CBM Aggregates, Peterborough County, Ontario (Environmental Planner)

Levels 1 & 2 Natural Environment Technical Assessment Report for Proposed Aggregate Application, CBM Aggregates, Township of North Dumfries, Ontario (Environmental Planner)

** denotes projects completed with other firms*

Daniel S. Eusebi BES, MCIP, RPP

Senior Environmental Planner

Levels 1 & 2 Natural Environment Assessment, Holman Pit, Guelph Eramosa Township, Ontario (Environmental Planner)

Level 2 Natural Environmental Assessment Technical Report, Capital Paving, Aikensville, Ontario (Environmental Manager)

Level 2 Natural Environmental Assessment Technical Report Aggregate Application, Region of Halton, City of Burlington, Ontario (Environmental Coordinator)

Levels 1 & 2 Natural Environmental Technical Assessment Report for Proposed Aggregate Application, CBM Aggregates, Brant County, Ontario (Environmental Planner)

Level 2 Natural Environmental and Aquatic Assessment - Aggregate Quarry Application, Federal White Cement, Oxford County, Ontario (Project Manager)

Environmental Impact Study Report Aggregate Application, Flamborough, Ontario (Project Coordinator)

Environmental Assessments

Prism Pipeline Project (Environmental Permit and Approval Manager and Acquisition Coordinator)

Fox Hollow Subdivision Phase 1 External Sanitary Sewer - Water crossing, permits and approval package (Project Manager)

Transportation Design, Construction Report and Aquatic Assessment. Highway 3 Road Improvement St. Thomas to Aylmer, Ontario Ministry of Transportation (Environmental Planner)

Fisheries Assessment and Letter of Intent - Highway 3 Improvements/Aquatic Crossings, Ministry of Transportation

Transportation Environmental Study Report, Highway 401 Bridge Rehabilitation at County Road 36 and Concession Road 7, Puslinch Township, Wellington County, Ministry of Transportation Ontario (MTO) (Environmental Planner)

Environmental Screening Document, Terrestrial and Fisheries Technical Report, Hopewell Creek Bridge Rehabilitation at Highway 7, Ministry of Transportation Ontario (MTO) (Natural Environment Planner)

Agricultural Economic Assessment, Agricultural Assessments of Tom Howe Landfill Site and Canborough Landfill Site (Project Manager)

Sithe Goreway Station, Sithe Energies Canadian Development Ltd. (Project Manager)
Represented client at public forums

Public Consultation Program for Remediation of Brownfield Site in Residential Neighbourhood, Pirelli Cable Inc (Project Manager)
Developed two phase public consultation program for remediation of brownfield site. Presented information and completed individual liaison with affected landowners

Orlean Pipeline Environmental Assessment Public Consultation Program, Consumers Gas (Project Manager)
Preparation of announcements and public forum presentations for pipeline project approvals

NEB Environmental Assessment, Great Lakes Power Ltd. (Project Manager)
Coordinated public consultation program for high voltage power cable line – NEB Environmental Assessment. Involved preparation of notifications, presentation materials and establishment of public input database

Link Pipeline Project, Environmental Assessment and Route Selection, Niagara Gas Transmission Limited (Environmental Planner)

International Power Line Project - Environmental Site Assessment and Linear Facility Route Selection, Great Lakes Power Ltd. (Environmental Planner)

Groundwater Assessment Investigations and Remediation Initiatives for southwestern Ontario Tank Farm and Pumping Station, Enbridge Pipeline Inc. (Project Manager)

Fisheries Habitat Assessment, Oshawa/Newcastle proposed Highway 407, Route Location and Environmental Assessment Study (Project Manager)

** denotes projects completed with other firms*

Environmental Property Assessments, Preliminary Phase I Assessment for Contamination Identification, 50 Sites, Canadian National Real Estate Division (Project Manager)

Environmental Management System Audit of Enbridge Pipeline Division, Enbridge Pipeline Inc. (Project Manager)

Detailed Phase II Investigations for Former Massey Ferguson Brownfield Site, City of Brantford, Ontario (Project Manager)

City of London: Fisheries Habitat Assessment - Medway Creek Trunk Sewer, City of London (Project Manager)

Brownfield Phase I Investigations for 16 Sites in the City of Brantford, City of Brantford (Project Manager)

Westover Station - Initial Screening Level Risk Assessment, Enbridge Pipeline Inc.* (Project Manager)

Meyer Pier Park - Risk Assessment Peer Review, City of Belleville, Ontario* (Senior Environmental Planner)

Sudbury Area Community Risk Assessment - Soil and Groundwater Project Component Assessments, Inco* (Planner)

New Orleans/Gatineau Pipeline Environmental Assessment and Route Selection, Consumer Gas* (Project Manager)

Site Remediation Program at Six Remote Fly-in Sites in Northern Ontario, Bell Canada* (Site Remediation Program Manager)
Conducted preliminary site assessments and coordinated site construction contractors

Peer Review of Environmental Screening Reports and Phase 1 Assessments in South Western Ontario for Property Transactions, Union Gas* (Project Manager)

Vector Pipeline Project: Phase I and II Property Investigation, Vector Pipeline Ltd.* (Project Manager)

Nanticoke Junction: Phase I and II Environmental Site Assessment, Enbridge Pipeline Inc.* (Project Manager)

Peer Review of Phase I and II ESA's for Legal Counsel, Smith Valeriote, Barristers and Solicitors* (Project Manager)

Phase I and II Environmental Property Site Assessments* (Manager)
More than 250 Phase I, and II Environmental Property Site Assessments in Ontario and Quebec for private industry, as well as federal and municipal governments

Natural Science Route Selection Environmental Assessment for Line 9C portion of the Line 9 Reversal Project, Enbridge Pipeline Inc.* (Project Manager)

Ontario Manitoba Interconnection Project. Data Collection and Regulatory Agency Issue Assessment, Ontario Hydro* (Resource Planner)

PRISM Pipeline Project Environmental Site Assessment and Route Selection, Imperial Oil Ltd* (Environmental Planner)

Environmental Site Management
PRISM Pipeline Project, Imperial Oil Ltd. (Project Manager)
Conducted on-going monitoring and compliance requirements for directional drilling operation at the Grand River

St. Clair River Directional Drilling Operations and Regulatory Approvals, Vector Pipelines Ltd. (Project Manager)
Development of environmental protection procedures for directional drilling operations of the St. Clair River and coordinated regulatory approval requirements

PRISM Pipeline Project, Imperial Oil Ltd. (Project Manager)
Managed approvals for the implementation of a drill slurry management program

Grand River Crossing at Cambridge, Union Gas (Project Manager)
Preparation of Sediment Control Plan and Watercrossing Plans

** denotes projects completed with other firms*

Daniel S. Eusebi BES, MCIP, RPP
Senior Environmental Planner

First Nations Consultation Program and Training Program at Remote Site in Northern Ontario, Bell Canada (Project Manager)
Programs involved presenting project remediation information to First Nations groups and providing training for community based employment opportunities

Crude Oil Leak Site, Enbridge Pipeline Inc. (Project Manager)
Conducted public liaison in emergency response scenario at crude oil leak site. Maintained ongoing public information liaison with affected landowners

Terrace Pipeline Project, Enbridge Pipeline Inc. (Project Manager/Inspector)
Environmental supervision of the directional drill, South Saskatchewan River (1100m drill)

St. Clair River Sediment Quality Sampling Investigations, Vector Pipelines Ltd. (Project Manager)
Coordinated sediment quality sampling investigations of the St. Clair River for proposed directional drilling operations

Westover Tank 222 Spill Response, Enbridge Pipeline Inc. (Project Manager)

Spill Response and Regulatory Agency Consultation, RCAN Environmental (Project Manager)

Line 8 Hydrostatic Testing, Interprovincial Pipe Line Inc. (Project Manager)
Coordinated environmental components and developed emergency response program and obtained regulatory approval for Line 8 hydrostatic testing

Emergency Response Management Services - Wolverton Leak Site, Enbridge Pipeline Inc. (Project Manager)

Emergency Response Management Services - Bronte Junction Historic Leak Site, Enbridge Pipeline Inc. (Project Manager)

Emergency Response Management Services - Binbrook Leak Site (Spill Response and Land Rehabilitation), Enbridge Pipeline Inc. (Project Manager)

Emergency and Spill Response Services, Alltech Canada Inc. (Project Manager)

Emergency and Spill Response Management, Sarnia Suncor Metering Facility (Project Manager)

Clarkson Station - Spill Response and Site Management, Enbridge Pipeline Inc. (Project Manager)

Decommissioning of Four Crude Oil Pumping Stations, Interprovincial Pipe Line Inc.* (Project Manager)
Managed decommissioning of Four Crude Oil Pumping Stations: Keyser, Smithville, Wolverton and Bryanston

Golf Course and Estate Residential Facility, Town of Aurora* (Project Manager)
Environmental site peer review of mitigation and construction of golf course and estate residential facility

Denso Manufacturing Inc., Guelph Industrial Site Phase I and II Environmental Site Assessment* (Project Manager)
Phase I and II Environmental Site Assessment and managed site remediation program

Plant Demolition, Building Decommissioning, Pirelli Cables and Systems Inc.* (Project Manager)
Identification and removal of PCB containing ballast

Decommissioning of Hydro Electric Transformer Stations, Guelph Hydro* (Project Manager)
Initiated soil studies and coordinated contracting of site remediation program

Pirelli Cables Corporation Site Decommissioning, Guelph, Ontario, Pirelli Cables and Systems Inc.* (Project Manager)
Site assessment and remediation of Pirelli Cables Corporation Site Decommissioning

Bronte Junction Compound Facility, Enbridge Pipelines Inc.* (Project Manager)
Remediation and Clean-up site management for the Bronte Junction compound facility

Binbrook Leak Site, Enbridge Pipelines Inc.* (Project Manager)
Remediation and Clean Up of Binbrook leak site, 600,000 L Crude Oil spill site

Housing Development On-going Site Monitoring, City of Guelph* (Project Manager)
On-going Site Monitoring of South Creek, Clairfields, Clarington Place and Whitetail Sites

** denotes projects completed with other firms*

Daniel S. Eusebi BES, MCIP, RPP
Senior Environmental Planner

Meadowlily ESA, City of London* (Project Manager)
Environmental Inspection, Meadowlily ESA, Subdivision development project. Inspection of topsoil stripping, vegetation clearing, erosion and silt control, construction activities, dewatering and rehabilitation monitoring

Line 8 Oil Products Transportation System, Interprovincial Pipe Line Inc.* (Project Manager)
Coordinated and Conducted Environmental Inspection of Line 8 Construction Program, Southern Ontario

Natural Sciences & Heritage Resources
Vector Pipeline Project, Vector Pipeline Ltd. (Project Manager)
Development of watercrossing technique design for environmental protection. Coordination of regulatory approval requirements

PRISM Pipeline Project, Imperial Oil Ltd. (Project Manager)
Environmental Construction permits and approvals for all natural environmental features

OCWA Water Pipeline at the Ausable River Watercrossing, Ontario Clean Water Agency (Project Manager)
Developed and implemented environmental protection methods on-site.

Medway Creek Trunk Sewer Crossings (5), City of London (Project Manager)
Preparation of watercrossing plans / bed-level crossing, permits and approval package.

Line Lowering at 403 Burlington - Rambo Creek Crossing, Interprovincial Pipe Line Inc. (Project Manager)
Preparation of Sediment Control Plan and Watercrossing Plans

Line 9C, Shell Take off to Sarnia Terminal, Interprovincial Pipe Line Inc. (Project Manager)
Preparation of Sediment Control Plan and Watercrossing Plans

Line 9C Sarnia Delivery Line, Enbridge Pipeline Inc. (Project Manager)
Development of watercrossing design for protection of water resource

Highway 9 Project, 5 Watercrossings, Consumers Gas (Project Manager)
Preparation of Sediment Control Plan and Watercrossing Plans

Consumers Gas Link Project, Baby Creek (Project Manager)
Preparation of Sediment Control Plan and Watercrossing Plans

Conceptual Restoration Plans, Smithville and Wolverton Pumping Station, Interprovincial Pipe Line Inc. (Project Manager)

Link Pipeline Project, Niagara Gas Transmission Limited* (Project Manager)
Conducted pre-construction woodlot appraisal for construction compensation

PUBLICATIONS

Unique Features of Environmental Management System/ISO-14001 Application to Linear Facilities. *7th International Symposium on Environmental Concerns in Right-of-Way Management*, 2002.

** denotes projects completed with other firms*