Puslinch Industrial Development (Lambda Properties) c/o Black, Shoemaker, Robinson & Donaldson Limited

R.J. Burnside & Associates Limited
292 Speedvale Avenue West Unit 20
Guelph ON N1H 1C4 CANADA

November 2014
300032929

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1.0 Introduction

R.J. Burnside & Associates Limited (Burnside) has been retained by Black, Shoemaker, Robinson & Donaldson Limited (BSRD) to conduct an Environmental Impact Study (EIS) for a proposed Plan of Subdivision to permit the development of a new Industrial Park. This development is proposed to be located on a triangular-shaped property on Lots 26 and 27, Concession VII, Township of Puslinch, County of Wellington (the "subject lands"), shown on **Figure 1.1**.

The subject lands are currently comprised of active agricultural lands and a small gravel pit, as well as a small woodlot and disturbed, early successional areas. The site is bounded by active aggregate extraction operations to the west and north and industrial development to the east. A narrow strip of land between the subject lands and Highway 401 to the south includes the road easement for future expansion to Highway 6 and is thus not included as part of the subject lands.

This document was prepared in accordance with the Natural Heritage Reference Manual (2014) and the Significant Wildlife Habitat Technical Guide (2000). As such, this EIS includes:

- A review of applicable environmental policies and regulations affecting the subject lands;
- A review of existing secondary source data to identify any known natural features;
- Pre-submission consultation with various agencies to identify additional features and to confirm field study methodologies;
- Field studies and a natural resources inventory to confirm the presence, significance and sensitivity of any natural features;
- A description of the proposed industrial subdivision concept;
- Identification of a development envelope within which all components of the development should be located;
- Assessment of potential impacts resulting from the proposed development;
- Recommended mitigating measures that will allow development to proceed in a manner that is consistent with local, regional, provincial and federal policies and regulations.

The EIS is organized according to this approach. Each of the following report sections corresponds with the above objectives.

LEGEND

Approximate Property Boundary

Sources:

1. Ministry of Natural Resources, © Queen's Printer for Ontario
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N

0 100 200 300 400 500 600

Metres

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Figure Title

ENVIRONMENTAL IMPACT STUDY

SITE LOCATION

Drawn	Checked	Date	Figure No.
CD	NS	November 2014	1.1
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2.0 Environmental Policy Context

2.1 Provincial Policy Statement

The Provincial Policy Statement (PPS) provides general policies on land use patterns, resources, and public health and safety that guide development across Ontario. The PPS dated 2005 has been updated for 2014 and includes some changes to the policies for Natural Heritage, Wetlands and Water. Specifically related to this location is the requirement to identify natural heritage systems in southern Ontario (Ecoregions 6E and 7E), Policy 2.1.3. This report will address Section 2.1 (Natural Heritage).

Eight types of natural heritage features are identified in Section 2.1 of the PPS, as follows:

2.1.4 Development and site alteration shall not be permitted in:

a) Significant wetlands in Ecoregions 5E, 6E and 7E; and,

b) Significant coastal wetlands in Ecoregions 6E and 7E (excluding islands in Lake Huron and St. Mary's River);

c) Significant valleylands in Ecoregions 6E and 7E (excluding islands in Lake Huron and St. Mary's River);

d) Significant wildlife habitat;

e) Significant areas of natural and scientific interest; and,

f) Coastal wetlands in Ecoregions 6E and 7E that are not subject to policy 2.1.4(b).

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

2.1.6 Development and site alteration shall not be permitted in fish habitat except in accordance with provincial and federal requirements.

2.1.7 development and site alteration shall not be permitted in habitat of endangered species and threatened species, except in accordance with provincial and federal requirements.

2.1.8 development and site alteration shall not be permitted on adjacent lands to the natural heritage features and areas identified in policies 2.1.4, 2.1.5, and 2.1.6 unless the ecological function of the adjacent lands has been evaluated and it has been

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

The presence or potential presence of these features will be identified within this report.

2.2 Wellington County Official Plan

Schedule A-7 (Puslinch Township) of the County of Wellington Official Plan (CWOP) (2010, 2013 amendment) designates the majority of the subject lands as "Secondary Agricultural" with a small portion in the far southeastern corner as "Greenlands".

The Secondary Agricultural designation applies to lands within the rural system which are not prime agricultural lands but which can support some agricultural activities. Permitted uses include agriculture, and small scale commercial, industrial and institutional uses.

The Greenlands designation applies to natural features that are less sensitive than those found within the Core Greenlands designation but which still afforded some protection from development and site alteration which might have negative impacts. The Greenlands designation applies to features including wildlife habitat, valleylands, woodlands and ANSIs, among others.

According to Section 5.6.1 of the Official Plan, within the Greenlands designation, land uses in the adjacent designation may be permitted if it can be demonstrated that there will be no negative impacts on the applicable natural features.

The entire site is within the Puslinch Economic Development Policy Area (PA7-1) which has been identified as the predominant location for business and industry in Puslinch Township.

2.3 Development, Interference with Wetlands and Alterations to Shorelines and Watercourses, O. Reg. 150/06

The Grand River Conservation Authority (GRCA) regulates development in or around hazard lands (i.e., floodplains, slopes, wetlands) through *Ontario Regulation 150/06* (January 25, 2013 revision). Regulated lands have been mapped adjacent to the site, and include a small wetland near the far southeastern corner of the property (**Figure 2.1**).

The Authority *"may grant permission for development in [regulated areas] if, in its opinion, the control of flooding, …pollution or the conservation of land will not be affected by the proposed development."* (Section 3(1)).

2.4 Mill Creek Subwatershed Study

The subject lands fall within the Mill Creek subwatershed, specifically sub-catchment 126. According to the Mill Creek Subwatershed Study (GRCA, 1996), development adjacent to greenspace may proceed as long as it does not impair greenspace functions, features or attributes. Environmental Impact Studies are generally required if development falls within 120 m of greenspace. These studies should assess the potential impacts of development proposals on local greenspace systems and their features and functions as well as other subwatershed plan targets (e.g., infiltration).

LEGEND

- Approximate Property Boundary
- Surveyed Wetland Boundary
- 30m Buffer from Surveyed Wetland Boundary
- GRCA Regulation Limit (GRCA)
- County Greenlands Designation

Sources:

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0 50 100 150 200 250 300 350 400

Metres

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Figure Title

ENVIRONMENTAL IMPACT STUDY

GRCA REGULATED
LANDS & GREENLANDS

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3.0 Review of Secondary Source Information

The following documents were reviewed to assess the environmental constraints to, and opportunities for, development of a business park on the subject lands:

- Aerial photography (2006);
- The Natural Heritage Information Centre ("NHIC") database to identify records of rare wildlife species on, and in the vicinity of, the study area;
- GRCA's Regulation 150/06 Mapping;
- Mill Creek Subwatershed Study;
- NRVIS data provided on the GRCA's Grand River Watershed Viewer online mapping site to identify provincially significant wetlands, valleylands, ANSIs, watercourses;
- The County of Wellington Official Plan (2010, 203 amendment);
- The Ontario Breeding Bird Atlas for records of birds breeding in the area.

3.1 Results of Background Data Review

The results of the background data review are presented in **Table 3.1**. Based on the review, the following features may be present within 120 m of the subject lands:

- Significant habitat of Endangered and Threatened Species;
- Significant Woodlands;
- Significant Wildlife Habitat, including:
  - Seasonal Concentration Areas of Animals
  - Rare Vegetation Communities or Specialized Habitat for Wildlife
  - Habitat for Species of Conservation Concern (not including Endangered or Threatened Species)
- Unevaluated wetlands; and,
- A Regional Earth Science ANSI.

Table 3.1 Potential Natural Heritage Features Within Vicinity of Subject Lands

Feature	Existing Records	Data Source
Features of Provincial Significance		
Significant Habitat of Endangered and Threatened Species	Potentially present due to records for: • chimney swift, THR • barn swallow, THR • bobolink, THR • eastern meadowlark, THR	OBBA (square 17NJ61)

Feature	Existing Records	Data Source
Significant Wetlands Ecoregions 5E, 6E, 7E	No records identified	NHIC, GRCA (GRIN mapping), Wellington County Official Plan Appendix 3
Significant Coastal Wetlands	No records identified	NHIC, GRCA
Significant Woodlands	Potentially present in association with the small woodland in the southeast corner of the subject lands	Aerial Photography
Significant Valleylands	No records identified	GRCA
Significant Wildlife Habitat Ecoregion 7E	**Seasonal Concentrations of Animals** Colonially Nesting Bird Breeding Habitat (Tree/Shrub) Potentially present due to records of: • great blue heron • green heron	OBBA, NHIC
	Rare Vegetation Communities of Specialized Habitat for Wildlife No records identified.	OBBA, NHIC
	Habitats for Species of Conservation Concern (Not Including Endangered or Threatened Species) Woodland Areas-Sensitive Bird Breeding Habitat Potentially present due to records of: • American redstart • black-throated green warbler • blue-headed vireo • broad-winged hawk • brown creeper • Cooper's hawk • hairy woodpecker • least flycatcher • ovenbird • pileated woodpecker • pine warbler • red-breasted nuthatch • scarlet tanager • sharp-shinned hawk	OBBA, NHIC

Feature	Existing Records	Data Source
	• veery • white-breasted nuthatch • winter wren Open County Bird Breeding Habitat Potentially present due to records of: • grasshopper sparrow • savannah sparrow Special Concern and Rare Wildlife Potentially present due to records of: • northern map turtle, SC • eastern milksnake, SC • eastern ribbonsnake, SC • common nighthawk, SC • red-headed woodpecker, SC • ram's-head lady's slipper, S3 • shrubby St. John's-wort, S2 • scarlet beebalm, S3	
	Animal Movement Corridors No records identified.	NHIC, GRCA
Significant Areas of Natural and Scientific Interest	No records identified	NHIC, GRCA
Fish Habitat	No records identified	GRCA
Features of Other Significance		
Unevaluated Wetlands	A wetland pocket in the southeastern corner of the property. GRCA notes indicate that they were identified from aerial photography only and have not been confirmed on site.	GRCA
Regional Areas of Natural and Scientific Interest	Drumlin in Outwash Gravel Regional Earth Science ANSI	GRCA
County Greenlands	Greenlands designated in the County of Wellington Official Plan	Wellington County

END= Endangered
THR= Threatened
SC= Special Concern
SRank= Species ranked S1-S3 are considered to be rare in the province. Species ranked S4-S5 are considered to be common and secure.

4.0 Pre-submission Consultation with Agencies

Results of the background data review were provided to the GRCA, County of Wellington and MNR for review along with a proposed methodology for field work.

Copies of written correspondence with agencies can be found in **Appendix A**.

5.0 Fieldwork Methodology

5.1 Field Studies and Natural Resources Inventory

Field investigations were conducted in the spring and summer of 2013, according to the schedule listed in **Table 5.1**. The purpose of field investigation was to confirm whether the features identified in the background data review are, in fact, present on the subject lands and whether any additional natural heritage features may be present.

All field investigations were conducted according to the parameters provided in the Terms of Reference submitted to the County of Wellington, GRCA and MNRF in February 2013, **Appendix A**.

Table 5.1 Field Study Methodology

Field Study	Methodology	Staff Involved	Date(s)	Time of Day	Weather Conditions		
					Precipitation/ Cloud Cover	Temperature (°C)	Wind (Beaufort Wind Scale)[1]
Ecological Land Classification	Ecological Land Classification for Southern Ontario (Lee et. al., 1998)	Dominique Evans, Environmental Technologist	June 21, 2013	0648 – 1143	No precipitation Cloud very high and thin	11°C on arrival 19C on departure	0 - none
Wetland Identification	Field verification of wetland boundary with GRCA	Dominique Evans, Environmental Technologist	June 21, 2013	0648 – 1143	No precipitation Cloud very high and thin	11°C on arrival 19°C on departure	0 - none
Search for potential wildlife habitats	Meandering survey throughout property. Search for features such as: • reptile hibernacula • old barns, structures, uncapped chimneys, foundations	Hannah Maciver, Terrestrial Ecologist Dominique Evans, Environmental Technologist	May 31, 2013 June 17, 2013 June 21, 2013	0608-0910 0630-1015 0648 – 1143	No precipitation Clear skies, no cloud cover No precipitation Partly cloudy or variable No precipitation Cloud very high and thin	19°C on arrival 23°C on departure 14°C on arrival 22°C on departure 11°C on arrival 19°C on departure	2 0-1 0 - none
Incidental flora and fauna observations	Visual observations of animals, tracks or scat; compilation of a plant inventory	Dominique Evans, Environmental Technologist Hannah Maciver, Terrestrial Ecologist	June 21, 2013	0648 – 1143	No precipitation Cloud very high and thin	11°C on arrival 19°C on departure	0 - none
Wetland/ Woodland Delineation	GRCA field verified, surveyed using handheld GPS	Dominique Evans, Environmental Technologist	June 21, 2013	0648 – 1143	No precipitation Cloud very high and thin	11°C on arrival 19°C on departure	0 - none
Breeding Bird Survey	Entire property surveyed. Area specific searches were also conducted in potentially significant habitats.	Hannah Maciver, Terrestrial Ecologist	May 31, 2013 June 17, 2013	0608-0910 0630-1015	No precipitation Clear skies, no cloud cover No precipitation Partly cloudy or variable	19°C on arrival 23°C on departure 14°C on arrival 22°C on departure	2 0-1
Wildlife Inventory	Opportunistic observations during all site visits.	All field staff.	All site visits				

1 Beaufort Wind Scale0 = calm, smoke rises vertically (0-2 km/hr); 1 = light air movement, smoke drifts (3-5); 3 = gentle breeze, wind felt on face; leaves rustle (6-11); 4 = moderate breeze, small branches moving, raises dust & loose paper (20-30); 5 = fresh breeze, small trees begin to sway (31-39); 6 = strong breeze, large branches in motion (40-50)

6.0 Site Characterization

6.1 Soils

The subject lands are underlain by limestone and dolomite bedrock of the Lockport formation, while overburden is characterized by surficial deposits of glacial till, as summarized in **Table 6.1** and shown on **Figure 6.1** (Hoffman et. al., 1962).

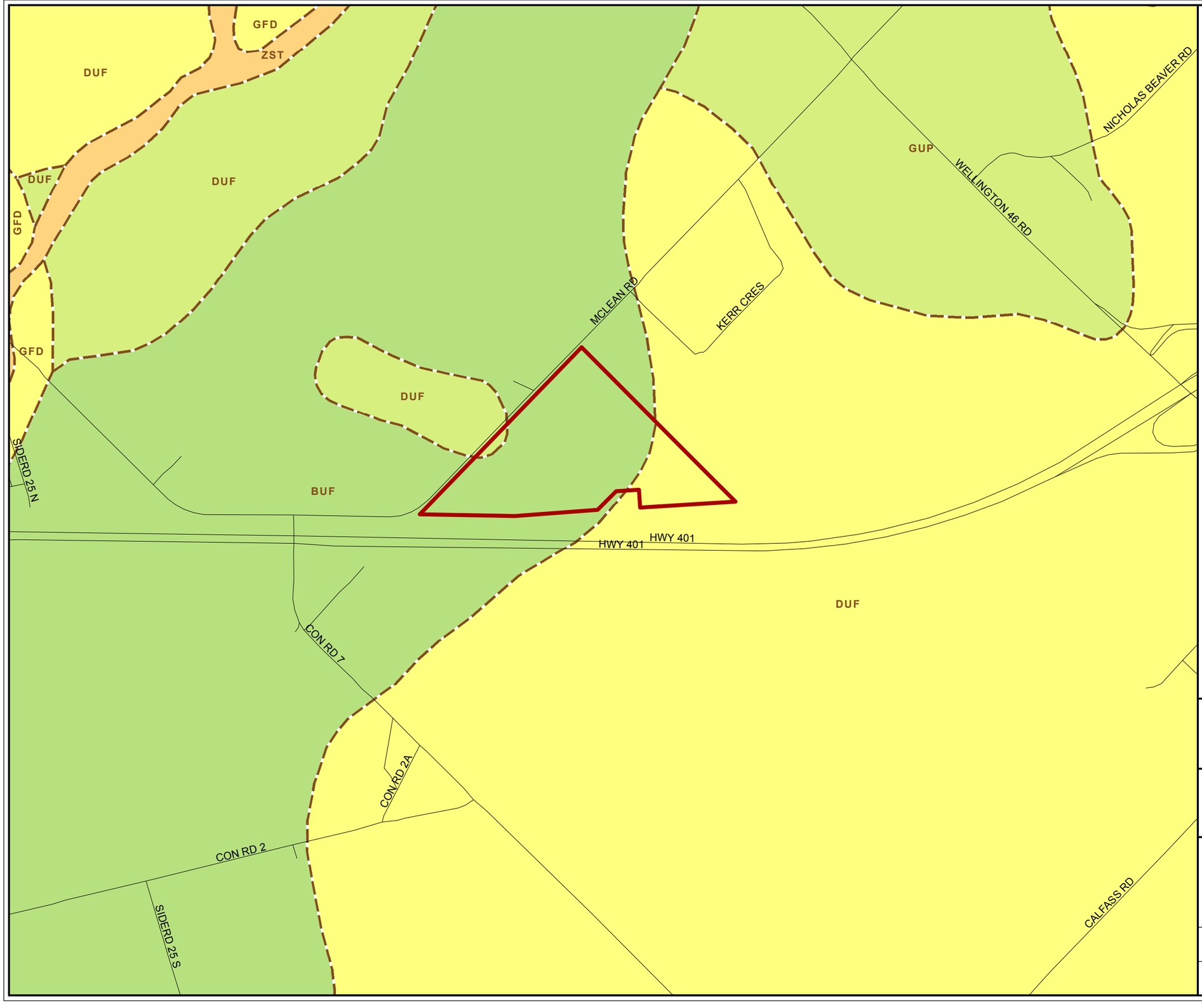
Table 6.1 Soil Types

Soil Code	Name	Characteristics	Location	% of Site
Dl/B5S3	Dumfries	Gravel soil material, good drainage, smooth very gently sloping, slightly stony	Southeastern portion of property	40%
Bg/A2S1	Burford Loam	Stony, sandy loam till, good drainage, irregular/steeply sloping, very stony	North and western portion of property	60%

Source: Hoffman et. al., 1962

6.2 Hydrology and Drainage

No surface water features are present on the subject lands. Several small open water wetlands are present south of the subject lands, adjacent to Highway 401 and the industrial development to the east, as shown on **Figure 6.2**.



LEGEND

- Approximate Property Boundary
- Soil Unit Boundary (Approximate)
- No Data

Soil Agricultural Class (CLI)

- 1. No significant limitations in use for Crops
- 2. Moderate limitations on use for crops
- 3. Moderately severe limitations on use for crops
- 4. Severe limitations on use for crops
- 5. Very severe limitations preclude annual cultivation; improvements feasible
- 6. Natural grazing only; no improvements feasible
- 7. No capability for agriculture

Soil Unit Description (Primary for Legend)

- BUF: Burford Loam
- DUF: Dumfries Sandy Loam
- GFD: Gilford Loam
- GUP: Guelph Loam
- ZST: Stream Courses

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0 100 200 300 400 500 600 700 800

Metres

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Figure Title

ENVIRONMENTAL IMPACT STUDY

SOILS

Drawn	Checked	Date	Figure No.
CD	NS	November 2014	6.1
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6.3 Vegetation Communities

The subject lands included a variety of human influenced or cultural communities as well as forest and wetland features. Burnside staff conducted a site investigation on June 21, 2013.

Based on Lee et. al, 1998, six vegetation community types were located on, or proximal to, the subject lands. All of the communities identified are considered to be relatively common in Ontario. A summary of these units is provided in **Table 6.2** and are shown on **Figure 6.2**.

Cultural, CU

The western half of the site is currently under active agriculture and was planted in soybeans during the site investigation. Due to the limitations of the ELC system, this community cannot be classified any further.

Mineral Cultural Thicket , CUT1 (A & B)

The eastern portion of the site was found to be dominated by cultural thicket with less than 25% tree cover and shrub cover greater than 25%. Although there are two communities identified, they are joined as shown on **Figure 6.2**. The larger of the two communities was primarily characterized by a canopy featuring occasional eastern white cedar, black cherry, Scots pine, trembling aspen and wild lilac, subcanopy of choke cherry and willow species, and ground cover reminiscent of common meadow species including goldenrods, common milkweed, and curled vetch. The smaller area located along a slope from the upper and lower portions of the agricultural field were characterized by buckthorn and crabapple. Understory dominated by Virginia creeper and wild grape. This area was too steep to be used for agricultural purposes, but appeared to be highly disturbed.

Mineral Cultural Woodland Ecosite, CUW

This community was located in a small corner of the western edge of the study limits, where the site comes to a point. The pocket was young and disturbed. Dominant species included field bindweed and goldenrod, with a few mature trees located along the fringes of the Highway 401 and McLean Road corridors.

Dry-Fresh White Pine-Sugar Maple Mixed Forest Type, FOM2-2

This community was located along the southeast limits of the study area, surrounded by meadow and wetland. This portion of the site is designated as Greenlands. Canopy cover was dense and contained pockets of pure conifers, with the remaining area a

mixture of deciduous and conifers. Ground cover was very limited due to the density of the canopy.

Reed-canary Grass Mineral Meadow Marsh, MAM2-2

This meadow marsh was dominated by reed canary grass. The marsh appears to be maintained by surface water runoff from two culverts draining the adjoining property to a natural depression found along the eastern limits of the subject lands. This wetland pocket contained a large amount of waste plastics and appeared to be stagnant, with no evidence of additional ground water or channels feeding the marsh.

Shallow Marsh, MAS

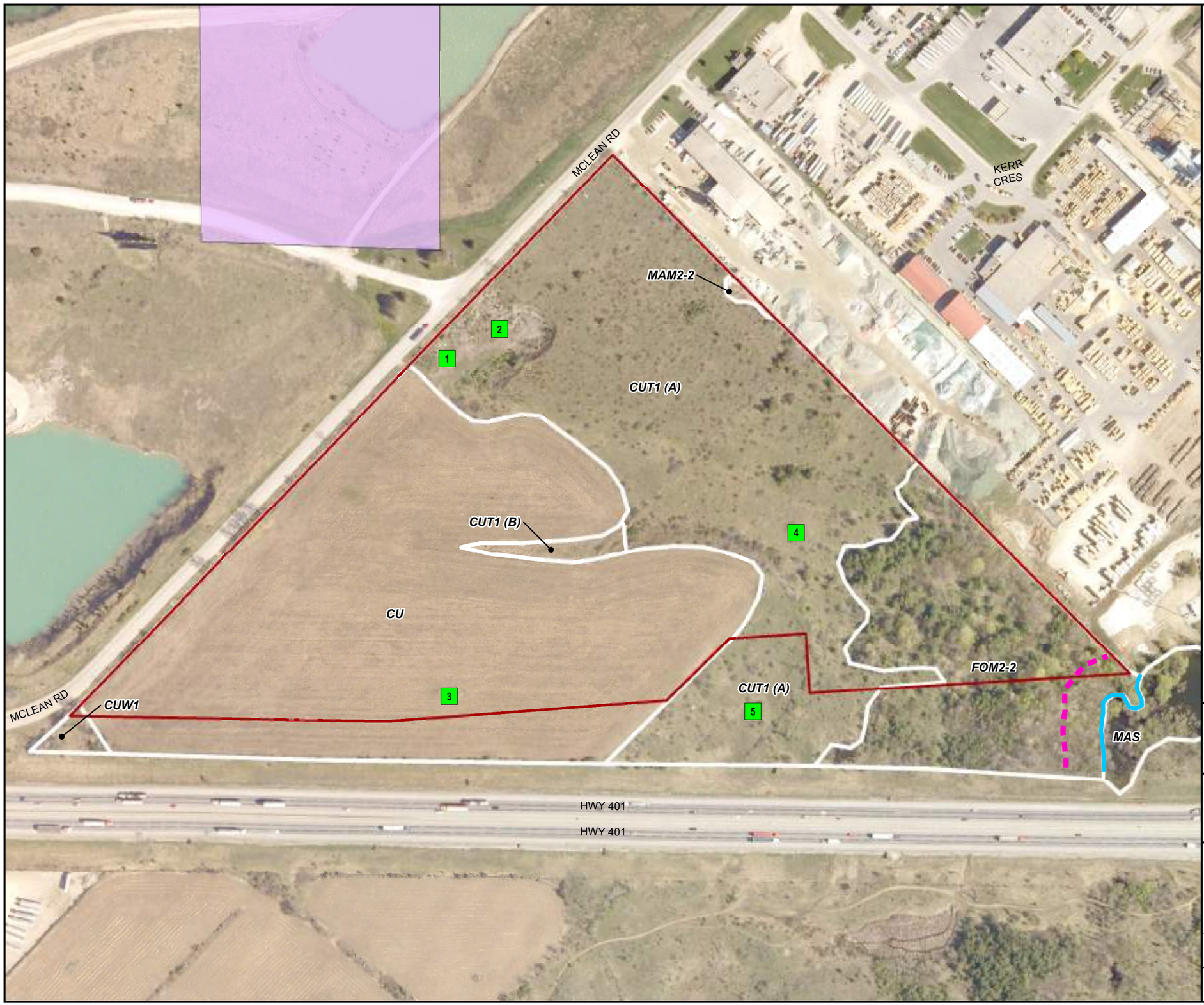
This community was located in the southeast corner of the site. The community is located in a natural depression and is very well defined. There is a very small fringe of eastern white cedar and reeds within the centre of the marsh open water. Due to the limited size of the wetland, breaking this community into two classifications was not appropriate.

Table 6.2 Vegetation Communities

ELC Code	Vegetation Type	Species Association	Comments
CULTURAL COMMUNITIES			
CU			
	Unable to classify further	Ground Cover: soybean crop with vetch species, wild grape, common milkweed, ox-eye daisy, common dandelion and field bindweed around the perimeter.	Tree and shrub cover <25%. Dominant species was the soybean crop. Mineral Soil.
CUM	CULTURAL MEADOW		
CUT1 (A)	Mineral Cultural Thicket	Canopy: Occasional eastern white cedar, black cherry, Scots pine, trembling aspen and common lilac. Understory: Occasional choke cherry and willow species. Ground Cover: various brome species, goldenrod species,	Tree cover $\leq$ 25%; shrub cover > 25% Dominant species included eastern white cedar, black cherry, Scots pine, goldenrod species, brome, vetch species and common milkweed.

ELC Code	Vegetation Type	Species Association	Comments
		vetch species, ox-eye daisy, cockles, red clover, Canada thistle, common dandelion, common milkweed and Queen Anne's lace.	Mineral Soil.
CUT1 (B)	Mineral Cultural Thicket	Canopy: Occasional glossy buckthorn and crabapple species. Understory: wild grape and Virginia creeper. Ground Cover: goldenrod species and common dandelion.	Tree cover ≤ 25%; shrub cover > 25% Dominant species included glossy buckthorn, crabapple species, Virginia creeper and wild grape. Mineral Soil.
CUW	CULTURAL WOODLAND		
CUW	Mineral Cultural Woodland Ecosite	Canopy: white spruce, eastern white cedar, white ash and sugar maple. Understory: glossy buckthorn, wild grape, Virginia creeper and field bindweed. Ground Cover: goldenrod species , and field bindweed	Tree cover 35% - 60% Dominant species included goldenrod species and field bindweed. Mineral Soil.
FOREST COMMUNITIES			
FOM	MIXED FOREST		
FOM2-2	Dry-Fresh White Pine-Sugar Maple Mixed Forest Type	Canopy: white pine, Scots pine, sugar maple, American beech and trembling aspen with rare occurrences of eastern hemlock and eastern white cedar. Understory: chokecherry, and glossy buckthorn. Ground Cover: Canada may-	Tree cover >60% Dominant species included white pine, sugar maple and Scots pine. Mineral Soil. This community appears to be portions of an old

ELC Code	Vegetation Type	Species Association	Comments
		apple.	plantation that has begun to naturalize.
WETLAND COMMUNITIES			
MAM	MEADOW MARSH		
MAM2-2	Reed-canary Grass Mineral Meadow Marsh	Understory / Ground Cover: Reed-canary grass and limited common cattail.	Tree cover and shrub cover <25% Dominant species was Reed-canary grass. Mineral Soil.
MAS	SHALLOW MARSH		
	Unable to classify further	Canopy: Occasional eastern white cedar, American beech and trembling aspen Understory: none. Ground Cover: field horsetail and marsh marigold.	Tree cover and shrub cover <25% Mineral Soil.



LEGEND

- Approximate Property Boundary
- Approximate Rock Pile Location
- 30m Buffer from Surveyed Wetland Boundary
- Surveyed Wetland Boundary
- Regional Earth Science ANSI Location

Ecological Land Classification (ELC)

- CU = Cultural - Active Field
- CUT1 (A) = Mineral Cultural Thicket
- CUT1 (B) = Mineral Cultural Thicket
- CUW1 = Mineral Cultural Woodland Ecosite
- FOM2-2 = Dry-Fresh White Pine-Sugar Maple Mixed Forest Type
- MAM2-2 = Reed-canary Grass Mineral Meadow Marsh Type
- MAS = Shallow Marsh

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0 50 100 150 200

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Figure Title

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NATURAL ENVIRONMENT

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6.4 Agricultural Lands

The western half of the subject lands was in soybean production during the site investigation. There was evidence of many years of farming, with many field stone outcrops noted throughout the site. This type of crop requires intensive harvesting and tends to provide minimal wildlife habitat conditions.

6.5 Avifauna

Burnside observed a total of 28 species of birds during breeding bird surveys conducted on May 31 and June 17, 2013. These were observed within the subject lands and within 120 m of the subject lands. These are listed in **Appendix B**. These species are expected for the habitats present (see Section 6.3). None of these species are considered at risk either federally or provincially, and are generally widespread in Ontario.

6.6 Mammals

No mammals were observed during Burnside's field investigations, however the following mammals are expected given the habitats present (see Section 6.3): eastern grey squirrel (*Sciurus carolinensis)*, eastern chipmunk (*Tamias minimus*), raccoon (*Procyon lotor*), eastern cottontail (*Sylvilagus floridanus*), white-tailed deer (*Odocoileis verginianus*), striped skunk (*Mephitis mephitis*). None of these species are considered at risk either federally or provincially, and are widespread generally in Ontario.

7.0 Provincially Significant Natural Heritage Features

7.1 Significant Habitat of Endangered and Threatened Species

The background data review indicated the potential presence of the following species in the general vicinity of the subject lands (OBBA 2001-2005, NHIC 2013):

- chimney swift, THR;
- barn swallow, THR;
- bobolink, THR; and,
- eastern meadowlark, THR.

None of these species were observed on the subject lands or within 120 m of the subject lands during breeding bird surveys completed on May 31, 2013 and June 17, 2013. No evidence of their presence (i.e. males on territory, singing males, potential nesting sites, etc.) was observed. No structures were present on the subject lands that would provide potential breeding habitat for chimney swift or barn swallow (e.g., chimneys, barns). Breeding habitat for bobolink and eastern meadowlark is not present on the subject lands. Both of these species are obligate-grassland species which nest primarily in hayfields and pastures. Bobolink will avoid fields where the cover of woody shrubs and saplings exceeds approximately 25% of the area. While eastern meadowlark tend to have a higher tolerance for shrub encroachment, they generally will avoid areas with greater than 35% shrub cover (McCracken, J.D. et al. 2013). While old field meadow species are present as ground cover within the cultural thicket (CUT1) habitat identified on the subject lands, this area is dominated by shrubs and trees that account for greater than 35% of the vegetation cover.

As such, it was concluded that these species are not present on the subject lands or within 120 m of the subject lands and no further investigation or assessment is required. A full species list from breeding bird surveys is presented in **Appendix B**.

7.2 Significant Woodlands

According to the Natural Heritage Reference Manual (MNR, 2010), Significant Woodlands are identified at the municipal level. According to Section 5.5.4 of the Wellington County Official Plan, woodlands over 10 ha are considered to be significant. It is also noted that smaller woodlands may have local significance and should be protected, where practical.

The wooded areas at the far southeastern corner of the subject lands are approximately 3.5 ha in size and thus do not meet the criteria for significance. Additional discussion is provided in Section 8.3 regarding their designation as Greenlands.

7.3 Significant Wildlife Habitat

According to the Natural Heritage Reference Manual (MNR, 2010) and Significant Wildlife Habitat Technical Guide (MNR, 2000), there are four types of Significant Wildlife Habitat ("SWH"), as follows:

- Habitats of Seasonal Concentrations of Animals;
- Rare Vegetation Communities/ Specialized Habitats;
- Habitats of Species of Conservation Concern; and,
- Animal Movement Corridors.

Significant Wildlife Habitat (SWH) must be identified at the local planning level (i.e., municipality). This is because conditions and feature vary widely between municipalities and what is important and unique in one area may be common and secure in another. The County of Wellington has not specifically identified criteria for defining SWH, however, Section 5.5.1 of the Official Plan indicates that known wildlife habitat is generally encompassed within the Greenlands System.

As such, this assessment will use broad habitat descriptions from the Significant Wildlife Habitat Technical Guide (SWHTG) and the SWHTG Ecoregion 7E Criterion Schedule (MNR, February 2012) as well as our own professional judgement to determine whether any habitats may be potentially present within and outside of the Greenlands System.

A discussion of each type of wildlife habitat is presented in the following sections.

7.3.1 Habitats of Seasonal Concentrations of Animals

These are habitats for species which congregate at certain times of the year, typically during migration, breeding or hibernation periods. The background data review identified one type of seasonal habitat potentially present on or within 120 m of the subject lands: Colonially Nesting Bird Breeding Habitat. During the field investigations two additional habitat types were also identified: Snake Hibernaculum and Turtle Wintering Areas. Each is described below.

Colonial Nesting Bird Sites

Records of two colonial nesting species were identified in the vicinity of the property through Ontario Breeding Bird Atlas ("OBBA") records. These included:

- great blue heron; and,
- green heron.

Neither of these species, nor any other colonially nesting bird species were observed during breeding bird surveys conducted during the spring 2013 season. Furthermore, site investigations did not identify any large stick nests or other remnants of other colonial nesting sites.

As such, this type of habitat is not present and will not be assessed further in this report.

Snake Hibernaculum

Several rock and debris piles were observed throughout the subject lands, as shown on **Figure 6.2**. Most appeared to have been in place for many years and were well worked into the ground, likely extending below the frost line. As such, these piles could provide potential snake hibernacula. Rocks were lifted and these sites were examined for evidence of snake use during site visits on May 31, June 17, and June 21, 2013; however, no snakes were observed.

Nonetheless, it is likely that habitat is present and, for the purposes of this assessment, it will be assumed that reptiles are making use of rock piles on the subject lands for hibernation purposes. Potential impacts to these features as a result of the development and proposed mitigation measures are described in Section 11.0.

Turtle Wintering Areas

Turtle wintering areas may be present within the shallow marsh habitat (MAS) adjacent to the southeast corner of the subject lands. This wetland is immediately outside the limits of the subject lands and therefore will not be directly impacted by the proposed development.

According to the *Draft Significant Wildlife Habitat Ecoregion 7E Criterion Schedule* (February 2012), the presence of five over-wintering Midland painted turtles is considered significant. In addition, the presence of one or more snapping turtles over-wintering within a wetland is considered significant. While basking surveys were not conducted during the post-hibernation emergence window (i.e., early spring), basking surveys were conducted in May and June when turtles could still be observed basking out of water. Up to seventy Midland painted turtles were observed on June 17, 2013 and high numbers in the same approximate range were seen on May 31 and June 21st, 2013. One snapping turtle was observed on June 17, 2013. According to the document referenced above, wintering areas are in the same general area as their core habitat. Given the large number of individuals observed during the breeding season, it can be assumed that this wetland is also significant as overwintering habitat given the lack of other wetland habitats present in proximity to the subject lands.

The proposed development will not result in any direct effects to the turtle habitat located on the lands adjacent to the subject lands. There are no turtle wintering areas present within the subject lands.

7.3.2 Rare Vegetation Communities/Specialized Habitats for Wildlife

There are no rare vegetation communities present on the subject lands. All of the communities described in Section 6.3 are common in southern Ontario. No significantly old or uniquely diverse habitats are present.

While the background data review did not identify records of any Specialized Habitats, two types were observed during field investigations: Turtle Nesting Areas and Amphibian Breeding Habitat (Woodland).

Each type of habitat is described below.

Turtle Nesting Areas

As discussed in Section 7.3.1, during field investigations, numerous midland painted turtles (*Chrysemys picta marginata*), were observed in the shallow marsh (MAS) pond southeast of the subject lands. Up to seventy individuals were observed on June 17, 2013 and high numbers in the same approximate range were seen on May 31 and June 21, 2013. One snapping turtle was also observed on June 17, 2013.

According to the *Draft Significant Wildlife Habitat Ecoregion 7E Criterion Schedule* (February 2012), the presence of five or more nesting Midland painted turtles is considered significant. In addition, the presence of one or more nesting snapping turtles is considered significant. Nesting sites are defined as exposed mineral soil (sand or gravel) areas adjacent (<100 m) or within shallow marsh ecosites. While targeted nesting surveys were not conducted during field investigations, basking surveys were conducted in May and June when turtles could still be observed basking out of water. Given the large number of individuals observed during the breeding season, it can be assumed that this wetland and surrounding habitat is also significant as nesting habitat given the lack of other wetland habitats present in proximity to the subject lands, and the presence of potential nesting habitat. This wetland is isolated in nature given the southern limits are bounded by Highway 401 and the eastern and northern limits are bounded by aggregate/glass recycling operations which are part of a large industrial complex.

The pond is adjacent to the subject lands and will not be directly impacted. Potential indirect impacts are assessed in Section 11.0 of this report.

Amphibian Breeding Habitat (Woodland)

The shallow marsh (MAS) pond on the adjacent property to the southeast provides breeding habitat for amphibians. No amphibian surveys were conducted; however, it is assumed that species such as spring peeper, northern leopard frog, gray tree frog and wood frog are likely present. Green frog was heard calling within the pond during field investigations in 2013. Surrounding woodland habitat is likely used during summer months.

According to the *Draft Significant Wildlife Habitat Ecoregion 7E Criterion Schedule* (February 2012), this marsh may be considered significant if studies confirm the presence of breeding population of one or more of the listed salamander species or two or more of the listed frog species with at least 20 individuals. Habitat criteria include the presence of a wetland, lake or pond within or adjacent (within 120 m) to a woodland. Woodlands with permanent ponds or those containing water in most years are more likely to be used as breeding habitat (2012).

The pond is adjacent to the subject lands and will not be directly impacted, however the woodland (FOM2-2) adjacent to this pond is within the subject lands and as part of the defining criteria for candidate significant amphibian breeding woodland habitat, the habitat is the woodland and wetland combined as this is likely a travel corridor for amphibian species connecting the woodland and the wetland habitat (MNR 2012).

Potential impacts to adjacent upland habitat will be assessed in Section 11.0 of this report.

7.3.3 Habitat for Species of Conservation Concern

The background records review identified Woodland Area-Sensitive Bird Breeding Habitat, Open Country Bird Breeding Habitat and Habitat for Special Concern and Rare Wildlife as being potentially present. During the field investigation it was determined that areas thought to be grassland based on air photo interpretation, were actually early successional shrublands. Thus, grassland habitat for Open Country Breeding Birds is not present but Shrub/Early Successional Bird Breeding Habitat may be.

These habitat types are discussed below.

Woodland Area-Sensitive Bird Breeding Habitat

These are habitats for species which require large tracts of habitat away from edges in order to carry out important life functions, such as breeding. Records from the Ontario Breeding Bird Atlas (Square Number 17NJ61) identified a number of woodland area-

sensitive species which have been recorded in the vicinity of the subject lands (i.e., within 10 km), including:

- American redstart
- black-throated green warbler
- blue-headed vireo
- broad-winged hawk
- brown creeper
- Cooper's hawk
- hairy woodpecker
- least flycatcher
- ovenbird
- pileated woodpecker
- pine warbler
- red-breasted nuthatch
- scarlet tanager
- sharp-shinned hawk
- veery
- white-breasted nuthatch
- winter wren

The wooded area in the southeast corner of the subject lands is 3.5 ha in size and does not provide interior forest habitat. Two area-sensitive species, American redstart and pine warbler, were observed during breeding bird surveys in both the cultural thicket (CUT1) and woodland (FOM2-2) habitat. While the Significant Wildlife Habitat Technical Guide (MNR, 2000) (SWHTG) states that American redstarts require greater than 100 ha of forest habitat and pine warbler require 15-30 ha, this is not generally true in Southern Ontario where larger tracts of forest habitat are not available. As such, these species will utilize smaller, more marginal habitat of second-growth forest for breeding in the absence of more suitable habitat. Nonetheless, the habitat itself does not qualify as habitat for area-sensitive species and will not be further assessed in this report.

Open Country Bird Breeding Habitat

Records from the Ontario Breeding Bird Atlas (Square Number 17NJ61) identified two grassland area-sensitive species which have been recorded in the vicinity of the subject lands (i.e., within 10 km), including:

- grasshopper sparrow
- savannah sparrow

Upon further investigation on the property, it was determined that no grassland habitat was present. Abandoned farmland areas have succeeded beyond meadows to more shrub/tree covered areas.

The grassland bird species were not observed on the subject property and no suitable habitat exists. Therefore, this type of habitat will not be considered further.

Shrub/Early Successional Bird Breeding Habitat

Cultural thicket habitat present on the subject lands (CUT1 A &B) covers 8.7 ha in total. This area features shrub/early successional breeding bird habitat, however no area-sensitive species were recorded during breeding bird surveys. As such, this type of habitat will not be considered further.

Special Concern and Rare Wildlife Species

This includes habitat for species which are not listed as Endangered or Threatened provincially but may have a federal designation, may be listed as Special Concern in the province or may be provincially rare, based on their S-rank[1]. Through a review of aerial photography, the NHIC and OBBA on-line databases (**Appendix A**), the species listed in **Table 7.1** were identified as being potentially present in the vicinity of the subject lands.

As summarized in **Table 7.1**, habitat for most species is not present and none of the species were observed within the subject lands. However, detailed surveys for certain species were not conducted due to timing restrictions. As such, there is some potential that eastern milk snake be present and may make use of rock piles on the subject property for hibernation.

There is also some potential that eastern ribbon snake and scarlett beebalm could be present within, and around, the wetland habitat adjacent to the subject lands to the southeast.

Potential direct and indirect impacts to these species are assessed in Section 11.0.

1 Species with S-rank S1-S3 are considered to be rare in the province, while S4-S5 are considered to be relatively common and secure.

Table 7.1 Species of Conservation Concern Potentially Present On or Within 120 m of the Subject Lands

COMMON NAME	***SCIENTIFIC NAME***	***SRANK1***	***Federal SARA Status2***	***Federal SARA Schedule3***	***Provincial ESA Status4***	***Habitat Description5***	***Habitat Present on Site?***	***Species Observed?***
BIRDS								
Common Nighthawk	*Chordeiles minor*	S4B	SC	THR	SC	Open ground; clearings in dense forests; ploughed fields; gravel beaches or barren areas with rocky soils; open woodlands; flat gravel roofs.	Very unlikely. Although there are some areas of open ground with gravelly substrate on the subject lands, no evidence of nesting sites were observed. Aggregate sites immediately adjacent to the subject lands may provide potential habitat.	None observed during two breeding bird surveys conducted on May 31 and June 17, 2013.Crepuscular surveys were not conducted.
Red-headed Woodpecker	*Melanerpes erythrocephalus*	S4B	SC	THR	SC	Open, deciduous forest with little understory; fields or pasture lands with scattered large trees; wooded swamps; orchards, small woodlots or forest edges; groves of dead or dying trees; feeds on insects and stores nuts or acorns for winter; require dead deciduous trees or dead branches of live trees for nesting; loss of habitat is limiting factor; requires cavity trees with at least 40 cm dbh; require about 4 ha for a territory.	Limited. Marginal habitat is present within the woodland in the southeast corner of the subject lands, however this woodland does not feature many dead standing trees which this species prefers for nesting.	None observed during two breeding bird surveys conducted on May 31 and June 17, 2013
REPTILES								
Northern Map Turtle	*Graptemys geographica*	S3	SC	SC	SC	Slow moving waters of large rivers, lakes, reservoirs, oxbow sloughs, and open marshes if they are connected to larger bodies of water. Preference for soft bottoms, and aquatic vegetation; basks on logs or rocks or on beaches and grassy edges, will bask in groups; uses soft soil or clean dry sand for nest sites; may nest at some distance from water; home range size is larger for females (about 70 ha) than males (about 30 ha) and includes hibernation, basking, nesting and feeding areas; aquatic corridors (e.g.	No. Suitable habitat not present on the subject lands or adjacent lands.	No.

COMMON NAME	***SCIENTIFIC NAME***	***SRANK1***	***Federal SARA Status2***	***Federal SARA Schedule3***	***Provincial ESA Status4***	***Habitat Description5***	***Habitat Present on Site?***	***Species Observed?***
						stream) are required for movement; not readily observed.		
Eastern Milksnake	*Lampropeltis triangulum*	S3	SC	SC	SC	Generalist species inhabiting a wide variety of habitats, from open woodlands, bgos, swamps, and woods edges, to marshes, lakeshores, old fields, pastures, farmyards, and suburban parks and gardens. They often occur in or near farm outbuildings, barns and sheds, and are attracted to piles of rocks, logs, firewood, or building materials, or any place that offers shelter to the snakes and their rodent food. often uses communal nest sites.	Yes. Suitable habitat may be present within the cultural habitats, woodlands, adjacent wetland (MAS); potential hibernation habitat may be present within the various rock piles located on the subject lands.	No. Rock piles were inspected on May 31, June 17 and 21, 2013 but no snakes were observed. Early spring hibernation emergence surveys were not conducted due to the timing of study commencement.
Eastern Ribbonsnake	*Thamnophis sauritus septentrionalis*	S3	SC	SC	SC	Semi-aquatic. It is most frequently found along the edges of shallow ponds, streams, marshes, swamps, or bogs that are bordered by dense vegetation that provides cover. Generally in or near wetlands adjacent to forests. Abundant exposure to sunlight is also required, and adjacent upland areas may be used for nesting. Suitable hibernation habitat include animal burrows such as crayfish, voles, muskrats, or in anthills, either close to the water or in higher, well-drained sites. Rock crevices are also used.	Potentially. Suitable habitat may be present within and adjacent to the shallow marsh (MAS) present adjacent to the subject lands.	No. Early spring hibernation emergence surveys were not conducted due to the timing of study commencement.
FLORA								
Scarlet Beebalm	*Monarda didyma*	S3	N/A	N/A	N/A	Moist woods, swampy thickets and roadsides.	Potentially. Limited potential for it to be found in the moist forests surrounding the MAS pond south of the subject lands.	No. Species not observed during site visits; however timing did not coincide with this species flowering period and thus it could have been overlooked.

COMMON NAME	***SCIENTIFIC NAME***	***SRANK1***	***Federal SARA Status2***	***Federal SARA Schedule3***	***Provincial ESA Status4***	***Habitat Description5***	***Habitat Present on Site?***	***Species Observed?***
Ram's-head Lady's Slipper	*Cypripedium arietinum*	S3	N/A	N/A	N/A	Cedar woodland on limestone plains, wooded fens and sandy sites.	No. Habitat not ideal. More likely to be found on alvars, less disturbed areas.	No. Species blooms from May-June and therefore would have been observed during site investigations, if present.
Shrubby St. John's Wort	*Hypericum prolificum*	S2	N/A	N/A	N/A	Fields, prairies and open woods.	Potentially. Could potentially be found within the cultural meadow communities (CUM1-1).	No. Species blooms from June to August and would have been observed if present.

[1]S-Ranks (provincial)
Provincial (or Subnational) ranks are used by the Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. These ranks are not legal designations. Provincial ranks are assigned in a manner similar to that described for global ranks, but consider only those factors within the political boundaries of Ontario.
(Provinical Status from MNR Biodiversity Explorer September 2012)

S1 Critically Imperiled - Critically imperiled in the nation or state/province because of extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation from the state/province.
S2 Imperiled - Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.
S3 Vulnerable - Vulnerable in the nation or state/province due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.

[2]SARA (Species at Risk Act) Status and Schedule
The Act establishes Schedule 1, as the official list of wildlife species at risk. It classifies those species as being either Extirpated, Endangered, Threatened, or a Special Concern. Once listed, the measures to protect and recover a listed wildlife species are implemented.
EXT Extinct - A wildlife species that no longer exists.
EXP Extirpated - A wildlife species that no longer exists in the wild in Canada, but exists elsewhere in the wild.
END Endangered - A wildlife species that is facing imminent extirpation or extinction.
THR Threatened - A wildlife species that is likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.
SC Special Concern - A wildlife species that may become a threatened or an endangered species because of a combination of biological characteristics and identified threats.

[3]Schedule 1: is the official list of species that are classified as extirpated, endangered, threatened, and of special concern.
Schedule 2: species listed in Schedule 2 are species that had been designated as endangered or threatened, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.
Schedule 3: species listed in Schedule 3 are species that had been designated as special concern, and have yet to be re-assessed by COSEWIC using revised criteria. Once these species have been re-assessed, they may be considered for inclusion in Schedule 1.

The Act establishes Schedule 1 as the official list of wildlife species at risk. However, please note that while Schedule 1 lists species that are extirpated, endangered, threatened and of special concern, the prohibitions do not apply to species of special concern.

Species that were designated at risk by COSEWIC prior to October 1999 (Schedule 2 & 3) must be reassessed using revised criteria before they can be considered for addition to Schedule 1 of SARA. After they have been assessed, the Governor in Council may on the recommendation of the Minister, decide on whether or not they should be added to the List of Wildlife Species at Risk.

[4]**OMNR (Ontario Ministry of Natural Resources)**
(provincial status from MNR January 13, 2012)
The provincial review process is implemented by the MNR's Committee on the Status of Species at Risk in Ontario (COSSARO).

EXT Extinct - A species that no longer exists anywhere.
EXP Extirpated - A species that no longer exists in the wild in Ontario but still occurs elsewhere.
END Endangered - A species facing imminent extinction or extirpation in Ontario which is a candidate for regulation under Ontario's Endangered Species Act (ESA) (END-R designations are no longer relevant as species are covered under new ESA April 2009)
THR Threatened - A species that is at risk of becoming endangered in Ontario if limiting factors are not reversed.
SC Special Concern (formerly Vulnerable) - A species with characteristics that make it sensitive to human activities or natural events.
NAR Not at Risk - A species that has been evaluated and found to be not at risk.
DD Data Deficient (formerly Indeterminate) - A species for which there is insufficient information for a provincial status recommendation.

[5]Source: Ontario Ministry of Natural Resources. 2000. Significant Wildlife Habitat Technical Guide & Appendices; Harding, J. H. 2007. Amphibians and Reptiles of the Great Lakes Region. The University of Michigan Press.

7.3.4 Animal Movement Corridors

The natural areas on, and south of, the subject lands, are isolated. There is no linkage to other natural features as a result of Highway 401 to the south and other industrial and aggregate extraction land uses to the east, north and west, which act as significant barriers to wildlife movement.

As such no animal movement corridor is present on, or in the vicinity of, the subject lands. No further consideration of this type of habitat is required.

7.4 Fish Habitat

There is no fish habitat present on the subject lands. Fish may be present in the wetlands on the adjacent property to the south. However, these wetlands are isolated not connected to any other surface water features thus the presence and sustainability of populations in these ponds is limited.

7.5 Other Provincially Significant Natural Heritage Features

As noted during the background data search, there are no Provincially Significant Wetlands, valleylands or ANSIs present on, or adjacent to, the subject lands. This was confirmed during site visits. A Regional Earth Science ANSI is located to the northwest of McLean Road, but is not connected to the subject lands. No additional types of Significant Wildlife Habitat were identified during the site investigations.

8.0 Natural Heritage Features of Other Significance

8.1 Unevaluated wetlands

As described in Section 6.3, an unevaluated wetland is located adjacent to the subject lands. The boundaries of the wetland are very well defined as it has formed in a natural depression. Due to the limited access to the wetland, only the western edge of the wetland was delineated with the GRCA on June 21, 2013. The defined boundary can be seen on **Figure 2.1**. A full evaluation of the wetland was not completed as the wetland is adjacent to the subject lands and is within an area proposed for the future Highway 6 expansion.

8.2 Regional Earth Science ANSI

The Drumlin in Outwash Gravel Regional Earth Science ANSI is located on an adjacent property to the northwest, as shown on **Figure 6.2**. No alterations to the terrain or physiography of this feature will be made, thus, no impacts are anticipated.

No further assessment of this feature is required.

8.3 County of Wellington Greenlands

The County of Wellington has designated an area in the southeastern corner of the subject lands as “Greenlands”, as shown on **Figure 2.1**. The area includes the MAS wetland as well as the majority of the woodland area.

Potential impacts to the Greenlands as a result of the proposed development are described in Section 11.0, along with recommended mitigation measures.

8.4 Migratory Birds

The *Migratory Bird Convention Act* prohibits the killing or harming of migratory birds. Several migratory species were observed during field investigations. A full list of birds observed on the subject lands is provided in **Appendix B**.

Potential impacts to these species are assessed in Section 11.0 of this report.

9.0 Summary of Natural Heritage Features

The following features are have been confirmed present on the subject lands or within 120 m of the subject lands and could potentially directly or indirectly impacted by the proposed development:

- County Greenlands;
- Seasonal concentration of animals:
  - potential snake hibernacula (including potential habitat for rare reptile species); and,
  - turtle wintering areas;
- Specialized habitat for wildlife:
  - turtle nesting areas, and,
  - amphibian woodland breeding habitat;
- Habitat for species of conservation concern (not including Endangered or Threatened species);
  - Habitat for Special Concern and Rare Species (milksnake, eastern ribbonsnake and scarlett beebalm).
- Unevaluated wetlands;
- Potential fish habitat; and,
- Migratory birds.

Section 11.0 of this report will identify potential impacts to each of these features as well as mitigation measures to minimize impacts.

10.0 Development Concept

10.1 Proposal

The general development concept includes three industrial designation lots of varying sizes, as shown in **Figure 10.1**. Each lot may be developed separately. A preliminary "buildable area" for each lot was identified within which all buildings and associated parking will be located. It is noted that lots and buildable areas are conceptual at this stage and may be subject to change during detailed design.

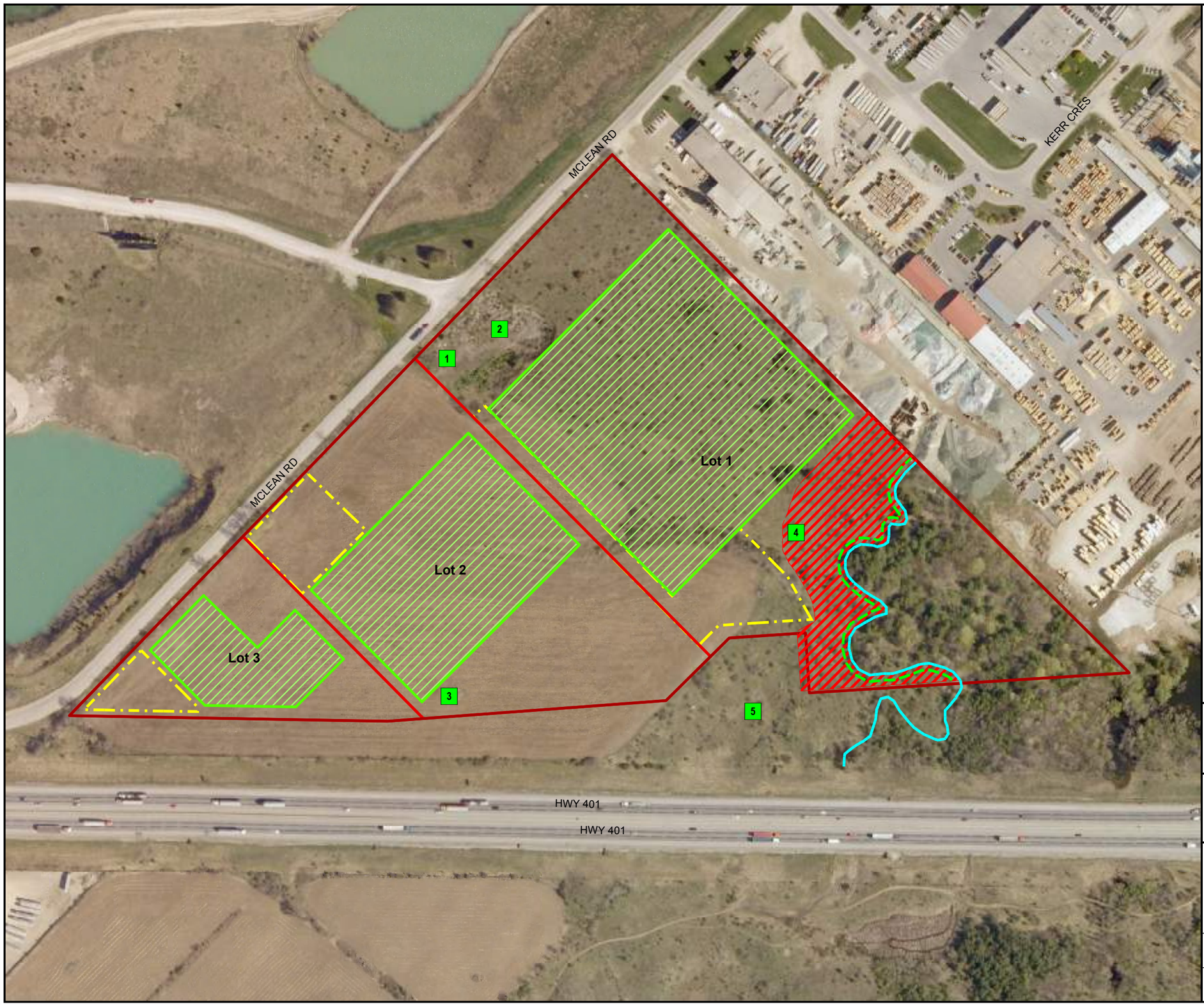
10.2 Proposed Servicing

There are currently no municipal water services to the site and there are no records of existing wells. As such, it is intended that each lot will be serviced with single or multiple private well(s).

Similarly, each lot can be serviced with individual onsite sewage treatment and disposal systems, which will generally consist of a septic tank, pump chamber and subsurface disposal bed. Additional details are provided in the Functional Servicing Report (Burnside, 2013).

10.3 Stormwater Management

Stormwater will be managed through individual infiltration basins located on each lot, as shown on **Figure 10.1**. Basins are sized to accommodate the 100-year storm and meet the Ministry of Environment's "Enhanced" level design standard as well as the recommendations of the Mill Creek Subwatershed Study (GRCA, 1996). Additional details are presented in the Functional Servicing Report (Burnside, 2013).



LEGEND

- Approximate Rock Pile Location
- Woodland Boundary
- 5m Buffer from Woodland
- Potential Area for Relocation of Snake Hibernacula
- Approximate Property Boundary
- Proposed Lot Boundaries
- Buildable Area
- Conceptual Infiltration Basin

Sources:

1. Ministry of Natural Resources, © Queen's Printer for Ontario
2. Natural Resources Canada © Her Majesty the Queen in Right of Canada.

Datum: North American 1983 CSRS

Coord. System: NAD 1983 CSRS UTM Zone 17N

N

0 50 100 150 200

Metres

BURNSIDE

Client

BSR&D LTD.
PUSLINCH INDUSTRIAL DEVELOPMENT

Figure Title

ENVIRONMENTAL IMPACT STUDY

DEVELOPMENT CONCEPT

Drawn	Checked	Date	Figure No.
CD	NS	November 2014	10.1
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11.0 Potential Impacts and Proposed Mitigation

The proposed industrial development has the potential to impact the following features:

- County Greenlands;
- Unevaluated wetlands;
- Potential fish habitat;
- Migratory birds; and,
- Significant Wildlife Habitat, including:
  - Seasonal concentration of animals:
    - potential snake hibernacula (including potential habitat for rare reptile species); and,
    - turtle wintering areas;
  - Specialized habitat for wildlife:
    - turtle nesting areas, and,
    - amphibian woodland breeding habitat;
  - Habitat for species of conservation concern (not including Endangered or Threatened species);
  - Habitat for Special Concern and Rare Species (milksnake, eastern ribbonsnake and scarlett beebalm).

Potential impacts can be categorized as direct (within the footprint of the development) or indirect (adjacent to the development but affected by spin-off effects). Potential impacts include:

- Direct:
  - Loss of a number of rock piles that may provide snake hibernacula within the active agricultural field (CU) and cultural thicket (CUT1) habitat.
  - Killing of migratory birds or destruction of their nests during land clearing.
  - Loss of the small MAM2-2 wetland on the northeastern edge of Lot 1.

- Indirect:
  - Construction impacts, including erosion/sedimentation and unintentional encroachment to the Greenlands, wetland, habitat for amphibian woodland breeding, turtle nesting/overwintering habitat and habitat for special concern and rare species.
  - Changes to surface and ground water hydrology which could adversely alter upland and wetland habitat conditions.

A detailed discussion of potential impacts and proposed mitigation is present below.

11.1 Direct Impacts and Mitigation for Potential Snake Hibernacula

Potential Impacts

Five potential snake hibernacula were observed on the subject lands and its vicinity. Rock pile 5 is located south of the subject lands within lands to be acquired by the Ministry of Transportation for expansion of Hwy 6 and will thus not be affected by this development. The remaining four rock piles are located on the subject property and could be disturbed or removed during site clearing and grading. This would result in a direct loss of habitat for snakes.

Recommended Mitigation

Rock pile 3 is located outside of the conceptual buildable areas for Lots 1 and 2. Rock pile 4 is located within the building envelope. It is recommended that these rock piles be left in place; however, opportunities to relocate rock pile 4 will be examined at the detailed design phase of the project. Rock piles 1 and 2 are located in an old gravel pit near the McLean Road. Although it is not currently shown within the buildable are for Lot 1, this area will most likely be cleared and graded during construction. Opportunities to relocated these rock piles to the buffer areas within the subject lands will be explored in more detail at the detailed design phase of the project.

Rock piles should be relocated after snakes have emerged from hibernation and before they re-enter in the fall, generally between June 1 and August 31.

Lost rock piles should be replaced with similar hibernacula in the area just outside of the woodlot on Lot 1, as shown on **Figure 10.1**. Hibernacula should be created by digging a hole below the frost line and then filling with rock. Ideally they would be filled with the rocks and debris removed from the existing piles with a size and shape that mimics what is being lost. A design and exact location will be determined during the detailed design phase and will be subjected to the GRCA and/or MNR for review and approval prior to construction. Designs will be based on guidance available from the Toronto Zoo and Long Point Basin Land Trust, examples of which are provided in **Appendix C**.

11.2 Direct Impacts to Migratory Birds During Land Clearing

Potential Impacts

Migratory birds or their nests may be harmed during land clearing and grading. This is in contravention of the *Migratory Birds Convention Act*.

Recommended Mitigation

Land clearing should be completed outside of the breeding bird season (May 1 to July 31). If this is not possible, a bird specialist should survey the site prior to clearing to confirm that no active nests of migratory birds are present.

11.3 Direct Impacts Associated with the Loss of the MAM2-2 Wetland

Potential Impacts

Although this small area has been classified as a MAM2-2 wetland, it is essentially an outfall area from a culvert originating on the adjacent industrial site. It is very small, stagnant and contaminated with debris. It gave off a significant odour during site investigations. It is not connected to any surface water feature or stormwater infrastructure. Therefore, there is negligible ecological value associated with this feature. This area will be graded and rehabilitated during construction.

Recommended Mitigation

This feature does not require protection. It was observed by the GRCA during the site visit to stake the wetland in the southeast corner. It was determined at that time that no protection is required. It is recommended that this feature be incorporated into the design so that water from the culvert is directed to a more appropriate stormwater management feature. The source and quality of water should also be examined prior to construction.

11.4 Indirect Impacts Associated with Construction

Potential Impacts

No development or site alteration is proposed within the Greenlands designation or the unevaluated wetland and wildlife habitat encompassed within it. This includes the turtle nesting/overwintering habitat, potential habitat for eastern ribbonsnake and scarlett beebalm and amphibian woodland breeding habitat. No direct loss or disturbance is expected. No changes to the zoning of the Greenlands area are proposed.

Features associated with the designated area could potentially be impacted indirectly during construction from erosion/sedimentation and encroachment beyond the approved development area.

Recommended Mitigation

A 30 m buffer will be applied to the dripline of the forest. The adjacent land is disturbed to the edge of the forest, however provides opportunities for habitat enhancements. Trees have thus become tolerant of edge effects. Limiting development to land outside of

the 30 m buffer will sufficiently protect the roots of edge trees and minimize impacts to wildlife habitat associated with the woodland.

Sediment fencing should be placed along the buffer line prior to any grading or earth works. Fencing should be maintained in placed and regularly monitored for the duration of construction and until such time as lands a re-vegetated and stabilized. All stockpiles, equipment and work areas should be maintained outside of the fenced area.

A more detailed erosion and sediment control plan should be developed during the detailed design phase.

11.5 Indirect Impacts Associated with Changes to Surface and Ground Water Hydrology

Potential Impacts

Changes to surface water runoff and infiltration on the subject lands has the potential to alter hydrology in the woodland and adjacent wetland. This could negatively affect the functions of the woodland and wetland, including the type of species and habitats they support.

Recommended Mitigation

A Stormwater Management Plan has been developed (Burnside, 2013) which includes the construction of individual infiltration basins located on each lot. Basins are sized to accommodate the 100-year storm and meet the Ministry of Environment's "Enhanced" level design standard. Post-construction infiltration is expected to be similar to pre-construction levels. Thus, no changes in the quantity or quality of surface water leaving the development are anticipated.

12.0 Compliance with Applicable Policies

Table 12.1 demonstrates how the proposed development complies with applicable provincial, municipal and GRCA policies respecting natural heritage and natural hazard features.

Table 12.1 Development Compliance

Feature	Applicable Policies	Policy Intent	How Addressed
County Greenlands (including the wetland, potential fish habitat and wildlife habitat encompassed within it)	Section 5.6.1 of the County of Wellington Official Plan,	Limited development is permitted within the Greenlands designation, land uses in the adjacent designation may be permitted if it can be demonstrated that there will be no negative impacts on the applicable natural features.	No development will occur within the Greenlands designation. A 30 m buffer will be applied to the woodland boundary which extends beyond the Greenlands. Sediment and erosion control measures will be utilized to ensure that construction effects are minimized. Stormwater controls will ensure that no hydrological changes will be experienced.
Significant Wildlife Habitat	PPS – Significant Wildlife Habitat, Section 2.1.4d	Development is not permitted within, or adjacent to, significant wildlife habitat unless it can be demonstrated that no negative impact will result to the feature or its ecological function.	Most wildlife habitat on the property is located within the Greenlands designation and will thus be protected. Up to four potential snake hibernacula may be removed during construction. Removal will occur between June 1 and August 31 when snake are not using the hibernacula. Hibernacula will be re-created in the open area outside of the woodlot on Lot 1.
Unevaluated Wetlands	Development, Interference	The Authority may grant	No development or site alteration will take place within the wetland in

Feature	Applicable Policies	Policy Intent	How Addressed
	with Wetlands and Alterations to Shorelines and Watercourses, O.Reg. 150/06.	permission for development in regulated areas if, in its opinion, the control of flooding, …pollution or the conservation of land will not be affected by the proposed development.	the southeastern corner of Lot 1. The small MAM2-2 wetland will be removed and rehabilitated; however due to the small size and poor quality of this area, no permit will be required. The Stormwater Management Plan will include measures to ensure that the hydrologic characteristics and function of wetlands are maintained post-development.
Migratory Birds	Migratory Birds Convention Act	Migratory birds and their nests should not be killed or disturbed.	Land will be cleared outside of the breeding season which occurs between May 1 and July 31 in order to avoid disturbance to nests.

13.0 Conclusions

The proposed three-lot industrial development is proposed to be located on a triangular shaped lot that is primarily disturbed. The property can be described as including active agricultural lands, and old gravel pit and a disturbed but naturalizing shrub thicket area. A woodlot is located in the southeastern corner which extends beyond the subject lands to a wetland area remaining between an existing industrial site and the Highway 401.

Most significant natural features on the subject lands and vicinity are encompassed within the woodlot and wetland. These are designated as Greenlands according to the County of Wellington Official Plan. No development is proposed within this area and a 30 m buffer will be applied to the edge of the woodland. Thus, no negative effects are anticipated.

The only natural features which may be impacted are several rock piles which may act as snake hibernacula, scattered throughout the disturbed areas of the site. Surveys to confirm their use by snakes were not conducted due to timing constraints. However, it is anticipated that snakes are likely to use the piles. Several of these may need to be relocated during site clearing and construction; however they can be re-created in the area just outside the woodland within the proposed buffer.

It is, therefore, Burnside's opinion that the proposed development is consistent with all applicable natural heritage policies.

Respectfully Submitted,

R. J. Burnside & Associates Limited

Tricia Radburn, M.Sc.(PI), MCIP, RPP
Environmental Planner

Nicholle Smith, B.A., EMPD
Senior Terrestrial Ecologist

14.0 References

Grand River Conservation Authority. 1996. Mill Creek Subwatershed Study.

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Ontario Ministry of Natural Resources (OMNR). 2013. *Species at Risk in Ontario (SARO) List.* Ontario Ministry of Natural Resources. Retrieved July 16, 2013 from www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/246809.html

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Appendix A

Agency Correspondence

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Appendix B

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Appendix C

Guidance for the Creation of Snake Hibernacula

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Appendix A

Agency Correspondence

400 Clyde Road, P.O. Box 729 Cambridge, ON N1R 5W6

Phone: 519.621.2761 **Toll free:** 866.900.4722 **Fax:** 519.621.4844 **Online:** www.grandriver.ca

April 3rd, 2013

R.J. Burnside and Associates
292 Speedvale Ave. West
Unit 20
Guelph, Ontario
N1H 1C4

Attention: Tricia Radburn, MCIP, RPP

Re: Puslinch Industrial Development Environmental Impact Study Terms of Reference
Lot 26 and 27
Concession 7
Township of Puslinch

We have reviewed the Terms of Reference submitted to this office. The Terms of Reference submitted are satisfactory to the GRCA subject to the inclusion or agreement of the following comments.

1. GRCA field verification of wetland boundaries will commence after the initial evaluation of wetland delineation has been completed, not concurrently.
2. The wetland on the subject property should be evaluated using the OWES and reviewed with the MNR to determine if the Wetland should be complexed with any adjacent wetlands.
3. Collection and Review of Background Information should include the Mill Creek Subwatershed Plan.

Background Information

The site location is located within the Mill Creek Subwatershed, specifically sub-catchment 126. Please refer to the Mill Creek Subwatershed plan in the collection of Background information and in stormwater management report and water budgeting for the site.

Should you have any questions please contact Nathan Garland at 519-621-2763 ext. 2236

Yours truly,

Fred Natolochny
Supervisor Resource Planner
Grand River Conservation Authority

FN/ng

cc: Colleen Sutton, Township of Puslinch
Sarah Wilhelm, County of Wellington
Greg Scheifele, GWS Ecological and Forestry Services

RE: Comments on ToR for Township of Puslinch Industrial Subdivision
Nathan Garland
to:
'Tricia Radburn'
04/22/2013 04:16 PM
Hide Details
From: Nathan Garland <ngarland@grandriver.ca>
To: 'Tricia Radburn' <Tricia.Radburn@rjburnside.com>,

Hi Tricia,

The points are valid and thank-you for including the Hwy 6 Bypass information and mapping. Just include the information and supporting documentation in the EIS, a brief section in the EIS would likely be sufficient with inclusion of the map and the reference. I'll circulate to our Bio's and see if their OK with it.

Regards,

Nathan Garland
Resource Planner
Grand River Conservation Authority
(519) 621-2763 EXT. 2236

From: Tricia Radburn [mailto:Tricia.Radburn@rjburnside.com]
Sent: April-22-13 3:11 PM
To: Nathan Garland
Subject: Re: Comments on ToR for Township of Puslinch Industrial Subdivision

Nathan,

I am writing to follow up on your comments attached below. Specifically, Fred had commented that the wetland in the far southeastern corner should be evaluated using the Ontario Wetland Evaluation System and potentially complexed with other wetlands in the vicinity.

We now have additional information and feel that a wetland evaluation may not be required. Attached is a figure showing the location of the proposed Hwy 6 bypass. The two ponded areas on the site are within the Hwy 6 expansion lands and will thus not be developed by our client. The remainder of the wooded area is approximately 1.3ha in size. At this stage in our investigations, it appears as though most of it is upland forest (although we will confirm the boundary on site with you in the upcoming months). Any other wetlands in the vicinity are south of Hwy 401 and have thus been relatively cut-off hydrologically due to the SWM facilities associated with the highway. None of the wetlands to the south have been evaluated, as far as we can tell, and we do not have access to these properties to do such an evaluation. Thus, we are not able to consider whether a wetland complex would be appropriate.

Based on the above comments, we are not planning do conduct a wetland evaluation as part of our EIS. Please let me know if you have any additional comments or concerns about this.

Regards,

BURNSIDE

Tricia Radburn, M.Sc.(Pl), MCIP, RPP
Environmental Planner

RJ Burnside & Associates Limited

292 Speedvale Ave. W, Guelph, ON N1H 1C4
tricia.radburn@rjburnside.com
tel: (519) 823-4995 ext. 479
fax: (519) 836-5477
www.rjburnside.com

From: Nathan Garland <ngarland@grandriver.ca>
To: "Tricia Radburn (Tricia.Radburn@rjburnside.com)" <Tricia.Radburn@rjburnside.com>,
Cc: 'Colleen Sutton' <ColleenS@puslinch.ca>, "gwsefs@sympatico.ca" <gwsefs@sympatico.ca>
Date: 04/03/2013 02:55 PM
Subject: Comments on ToR for Township of Puslinch Industrial Subdivision

---

Hello Tricia,

Please find attached a copy of comments from the GRCA on the ToR submitted to our office. A copy will be mailed out as well.

Should you have any questions please feel free to call or email.

Regards,

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

Toll Free: 1-866-900-4722
Phone: 519-621-2763 EXT. 2236
Fax: 519-621-4844

RE: Comments on ToR for Township of Puslinch Industrial Subdivision
Nathan Garland
to:
'Tricia Radburn'
04/17/2013 04:23 PM
Hide Details
From: Nathan Garland <ngarland@grandriver.ca>
To: 'Tricia Radburn' <Tricia.Radburn@rjburnside.com>,
History: This message has been replied to and forwarded.

1 Attachment

Mill Creek.xps

Tricia,

Attached is the last chapter of the Mill Creek Subwatershed Plan, I could only get it saved as an xps document, but if you can't open it and need it as a pdf let me know.

The subwatershed that the property you're working with is in Subwatershed 126.

Regards,

Nathan Garland
Resource Planner
Grand River Conservation Authority
(519) 621-2763 EXT. 2236

From: Tricia Radburn [mailto:Tricia.Radburn@rjburnside.com]
Sent: April-11-13 3:43 PM
To: Nathan Garland
Subject: Re: Comments on ToR for Township of Puslinch Industrial Subdivision

Nathan,

Thank you for your comments. Could you please provide us with a copy of the Mill Creek Subwatershed Plan? I cannot seem to find a link to it on your website.

Thanks.

BURNSIDE

Tricia Radburn, M.Sc.(Pl), MCIP, RPP
Environmental Planner

RJ Burnside & Associates Limited
292 Speedvale Ave. W, Guelph, ON N1H 1C4
tricia.radburn@rjburnside.com
tel: (519) 823-4995 ext. 479
fax: (519) 836-5477
www.rjburnside.com

From: Nathan Garland <ngarland@grandriver.ca>
To: "Tricia Radburn (Tricia.Radburn@rjburnside.com)" <Tricia.Radburn@rjburnside.com>,
Cc: 'Colleen Sutton' <ColleenS@puslinch.ca>, "gwsefs@sympatico.ca" <gwsefs@sympatico.ca>
Date: 04/03/2013 02:55 PM
Subject: Comments on ToR for Township of Puslinch Industrial Subdivision

---

Hello Tricia,

Please find attached a copy of comments from the GRCA on the ToR submitted to our office. A copy will be mailed out as well.

Should you have any questions please feel free to call or email.

Regards,

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

Toll Free: 1-866-900-4722
Phone: 519-621-2763 EXT. 2236
Fax: 519-621-4844

R.J. Burnside & Associates Limited 292 Speedvale Avenue West Unit 20 Guelph ON N1H 1C4 Canada
telephone (519) 823-4995 **fax** (519) 836-5477 **web** www.rjburnside.com

BURNSIDE
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February 20, 2013

Via: Email

Mr. Gary Cousins
Director Planning & Development
County of Wellington
74 Woolwich St.
Guelph, ON N1H 3T9
garyc@wellington.ca

Dear Mr. Cousins:

Re: Puslinch Industrial Development Environmental Impact Study Terms of Reference
File No.: 300032929

R.J. Burnside & Associates Limited ("Burnside") has been retained by Black, Shoemaker, Robinson & Donaldson Limited ("BSRD") to conduct an Environmental Impact Study ("EIS") for a proposed Zoning Amendment to permit the development of three new industrial lots. This development is proposed to be located on a triangular-shaped property on Lots 26 and 27, Concession VII, Township of Puslinch, County of Wellington (the "subject lands"), shown on **Figure 1.**

This letter provides Burnside's proposed Terms of Reference ("TOR") for the EIS. At this time, we are seeking your input and would appreciate any comments on our proposed approach as well as any additional information you may have which may be relevant to our study.

Background Information

Burnside has reviewed the following existing data sources:

- Aerial photography;
- The Natural Heritage Information Centre ("NHIC") database to identify records of rare wildlife species on, and in the vicinity of, the study area;
- GRCA's Regulation 150/06 Mapping;
- NRVIS data provided on the GRCA's Grand River Watershed Viewer online mapping site to identify provincially significant wetlands, valleylands, ANSIs, watercourses;
- The County of Wellington Official Plan (1999, 2011 amendment);
- The Ontario Breeding Bird Atlas ("OBBA") for records of birds breeding in the area.

Based on this review we have identified the following information:

The subject lands are currently comprised of active agricultural lands as well as a small woodlot and disturbed, early successional areas. The site is bounded by Hwy 401 to the south, active aggregate extraction operations to the west and north and industrial development to the east.

According to the Wellington County Official Plan the lands are designated primarily as Secondary Agricultural with a small portion of Greenlands in the far southeastern corner. The entire site is within the Puslinch Economic Development Policy Area (PA7-1) which has been identified as the predominant location for business and industry in Puslinch Township.

The following features may be present within 120 m of the subject lands:

- Significant Habitat of Endangered and Threatened Species;
- Significant Woodlands;
- Significant Wildlife Habitat, including:
  - Marsh Bird Breeding Habitat;
  - Area-sensitive Bird Breeding Habitat;
  - Open Country Bird Breeding Habitat;
  - Habitat for Species of Conservation Concern; and,
  - Other wildlife habitats (although no records exist, other habitats may be present);
- Unevaluated wetlands; and,
- A Regional Earth Science ANSI.

Additional details are presented in Table 1.

Table 1. Results of Background Data Review

Feature	Existing Records	Location	Data Source
Provincially Significant Features			
Significant Habitat of Endangered and Threatened Species	– chimney swift, THR – barn swallow, THR – bobolink, THR – eastern meadowlark, THR	Within 10km of subject lands	OBBA
Significant Wetlands Ecoregions 5E, 6E, 7E	No records identified	N/A	NHIC, GRCA, Wellington County Official Plan Appendix 3
Significant Coastal Wetlands	No records identified	N/A	NHIC, GRCA
Significant Wetlands Canadian Shield	Project not in the Canadian Shield	N/A	N/A

Feature	Existing Records	Location	Data Source
Significant Woodlands	County Greenlands designation corresponding with a small woodland in the southeast corner of the subject lands	On the subject lands	Wellington County Official Plan
Significant Valleylands	No records identified	N/A	GRCA
Significant Wildlife Habitat	Marsh Bird Breeding Habitat: – American bittern	Within 10km of the subject lands	OBBA
	Area-sensitive Bird Breeding Habitat: – American redstart – black-throated green warbler – blue-headed vireo – broad-winged hawk – brown creeper – Cooper's hawk – hairy woodpecker – least flycatcher – ovenbird – pileated woodpecker – pine warbler – red-breasted nuthatch – scarlet tanager – sharp-shinned hawk – veery – white-breasted nuthatch – winter wren	Within 10km of the subject lands	OBBA
	Open Country Bird Breeding Habitat: – bobolink; – eastern meadowlark – grasshopper sparrow – savannah sparrow	Within 10km of the subject lands	OBBA
	Habitat for Species of Conservation Concern: – northern map turtle, SC – milksnake, SC – eastern ribbonsnake, SC – common nighthawk, SC – red-headed woodpecker, SC – ram's-head lady's slipper, S3 – shrubby St. John's-wort, S2 – scarlet beebalm, S3		NHIC, OBBA
	Other Types of Significant Wildlife Habitat: – no records identified	N/A	NHIC, OBBA

Feature	Existing Records	Location	Data Source
Significant Areas of Natural and Scientific Interest	No records identified	N/A	NHIC, GRCA
Fish Habitat	No records identified	N/A	GRCA
Features of Other Significance			
Unevaluated Wetlands	Two small wetland pockets in the southeastern corner of the property. GRCA notes indicate that they were identified from aerial photography only and have not been confirmed on site.	On the subject lands	GRCA
Regional Areas of Natural and Scientific Interest	Drumlin in Outwash Gravel Regional Earth Science ANSI	Adjacent property to the northwest	GRCA

THR= Threated
SC= Special Concern

Proposed Fieldwork Methodology

Based on the information gathered to date, Burnside's proposed methodology is as follows:

Table 2. Methodology

Survey Type	Protocol	Location	Timing
Stage 1: Identification of Potential Features of Significance			
Ecological Land Classification	ELC for Southern Ontario (Lee et. al, 1998)	Entire property	1 visit, spring 2013
Identification of Wetlands (to confirm wetlands are present)	Ontario Wetland Evaluation System	Unevaluated wetlands within the small woodlot	1 visit, spring 2013
Search for potential habitats	Meandering survey throughout property. Search for features such as: • reptile hibernacula • old barns, structures, uncapped chimneys, foundations	Entire property	1 visit, spring 2013

Survey Type	Protocol	Location	Timing
Incidental flora and fauna observations	Visual observations of animals, tracks or scat; compilation of a plant inventory	On-going during all site visits	1 visit, spring 2013
Stage 2: Confirmation of Features and Significance (To be completed subject to findings of Stage 1, in accordance with the SWH EcoRegion Criteria Schedules)			
Grassland Breeding Bird Survey	Bobolink Survey Protocol	Within suitable grassland/agricultural habitats (if they exist)	3 surveys, 7 days apart between last week of May and first week of July. Between dawn and 9am.
Forest Edge Breeding Bird Survey (focus on red-headed woodpecker)	Ontario Breeding Bird Atlas Protocol	Within and around woodland area (if found to be possible habitat)	2 surveys, 10 days apart during spring breeding window (last week of May to first week of July). Between dawn and 9am.
Delineation of Natural Features (woodland and wetland)	Boundaries to be determined and staked with the GRCA	Boundary of woodland (if found to be significant) and wetland (if found to be present)	Spring 2013
Woodland Amphibian Breeding Habitat Call Surveys	Marsh Monitoring Protocol	At unevaluated wetlands within the small woodlot (if suitable wetland habitat is present)	3 surveys: • April 15-30 (Temp> 5^{o}C) • May 15-30 (Temp>10^{o}C) • June 15-30 (Temp >17^{o}C) Half hour after sunset-midnight
Searches for snakes and turtles if suitable habitat found	To be confirmed with MNR and GRCA upon confirmation of the presence of suitable habitat.	At habitat feature	TBD

Analysis and Recommendations

The EIS will provide an analysis of potential impacts, recommend mitigation measures to minimize impacts and demonstrate conformity with all applicable natural heritage policies. The EIS will focus primarily on terrestrial and surface water features. Impacts to groundwater will be assessed in a separate Hydrogeological Assessment.

Specifically, the EIS will include the following:

- Description of the environmental policies influencing the subject lands;
- Description of the terrestrial and aquatic ecological features, including:
  - rarity and sensitivities, on or adjacent to the subject lands (based on results of the field investigations listed above);
- Description of the proposed development including identification of a development envelop;
- Analysis of potential impacts on the natural features as a result of the proposed development, including:
  - Construction;
  - Footprint of the development;
  - Edge effects and potential introduction of non-native species;
  - Noise and lighting;
  - Any required new or expanded infrastructure; and,
  - Any other potential impacts identified during the project.
- Recommended mitigation measures to minimize impacts (including specific buffer widths); and,
- Conclusion demonstrating conformity with all applicable natural heritage policies.

Reporting

All findings will be summarized in a report, complete with figures. The locations of all provincially rare species encountered will be recorded using GPS and included on the figures. Locally rare species will also be recorded to the greatest extent possible.

Information Requests

We kindly request the following information to assist in our study:

- Any additional records of natural features in the area;
- A copy of any locally rare species lists in order to assist with the assessment of species significance and rarity.

If you have any questions or comments regarding these Terms of Reference, please feel free to contact me at 519-823-4995 ext. 479 or at tradburn@rjburnside.com.

Yours truly,

R.J. Burnside & Associates Limited

Tricia Radburn, M.Sc.(Pl), MCIP, RPP
Environmental Planner
TR/sd

Cc *Mike Stone, Ministry of Natural Resources*
Nathan Garland, GRCA

032929_Puslinch Indutrial Subdivision EIS TOR_COW.docx
20/02/2013 12:10 PM

FIGURE 1.1

BSR&D LTD.

PUSLINCH INDUSTRIAL DEVELOPMENT

ENVIRONMENTAL IMPACT STUDY

SITE LOCATION

LEGEND

Approximate Property Boundary

Credit:
Background 2006 air photo obtained from Grand River Conservation Authority (GRCA)
Produced using information under License with the Grand River Conservation Authority © Grand River Conservation Authority, 2013

N

0 120 240 360 480 600

Metres

1:7,500
February 2013
Project Number: 300032929

Projection: UTM Zone 17
Datum: NAD83

Prepared by: C. Dickie

Verified by: T. Radburn

BURNSIDE

032929 EIS SITE LOCATION.mxd

Printed: February 19, 2013, 3:18 PM

R.J. Burnside & Associates Limited 292 Speedvale Avenue West Unit 20 Guelph ON N1H 1C4 Canada
telephone (519) 823-4995 **fax** (519) 836-5477 **web** www.rjburnside.com

BURNSIDE
[THE DIFFERENCE IS OUR PEOPLE]

February 20, 2013

Via: Email

Mr. Nathan Garland
Resource Planner
Grand River Conservation Authority
400 Clyde Road
Cambridge, ON N1R 5W6
ngarland@grandriver.ca

Dear Mr. Garland:

Re: Puslinch Industrial Development Environmental Impact Study Terms of Reference
File No.: 300032929

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Fish Habitat	No records identified	N/A	GRCA
Features of Other Significance			
Unevaluated Wetlands	Two small wetland pockets in the southeastern corner of the property. GRCA notes indicate that they were identified from aerial photography only and have not been confirmed on site.	On the subject lands	GRCA
Regional Areas of Natural and Scientific Interest	Drumlin in Outwash Gravel Regional Earth Science ANSI	Adjacent property to the northwest	GRCA

THR= Threated
SC= Special Concern

Proposed Fieldwork Methodology

Based on the information gathered to date, Burnside's proposed methodology is as follows:

Table 2. Methodology

Survey Type	Protocol	Location	Timing
Stage 1: Identification of Potential Features of Significance			
Ecological Land Classification	ELC for Southern Ontario (Lee et. al, 1998)	Entire property	1 visit, spring 2013
Identification of Wetlands (to confirm wetlands are present)	Ontario Wetland Evaluation System	Unevaluated wetlands within the small woodlot	1 visit, spring 2013
Search for potential habitats	Meandering survey throughout property. Search for features such as: • reptile hibernacula • old barns, structures, uncapped chimneys, foundations	Entire property	1 visit, spring 2013

Survey Type	Protocol	Location	Timing
Incidental flora and fauna observations	Visual observations of animals, tracks or scat; compilation of a plant inventory	On-going during all site visits	1 visit, spring 2013
Stage 2: Confirmation of Features and Significance (To be completed subject to findings of Stage 1, in accordance with the SWH EcoRegion Criteria Schedules)			
Grassland Breeding Bird Survey	Bobolink Survey Protocol	Within suitable grassland/agricultural habitats (if they exist)	3 surveys, 7 days apart between last week of May and first week of July. Between dawn and 9am.
Forest Edge Breeding Bird Survey (focus on red-headed woodpecker)	Ontario Breeding Bird Atlas Protocol	Within and around woodland area (if found to be possible habitat)	2 surveys, 10 days apart during spring breeding window (last week of May to first week of July). Between dawn and 9am.
Delineation of Natural Features (woodland and wetland)	Boundaries to be determined and staked with the GRCA	Boundary of woodland (if found to be significant) and wetland (if found to be present)	Spring 2013
Woodland Amphibian Breeding Habitat Call Surveys	Marsh Monitoring Protocol	At unevaluated wetlands within the small woodlot (if suitable wetland habitat is present)	3 surveys: • April 15-30 (Temp> 5°C) • May 15-30 (Temp>10°C) • June 15-30 (Temp >17°C) Half hour after sunset-midnight
Searches for snakes and turtles if suitable habitat found	To be confirmed with MNR and GRCA upon confirmation of the presence of suitable habitat.	At habitat feature	TBD

Analysis and Recommendations

The EIS will provide an analysis of potential impacts, recommend mitigation measures to minimize impacts and demonstrate conformity with all applicable natural heritage policies. The EIS will focus primarily on terrestrial and surface water features. Impacts to groundwater will be assessed in a separate Hydrogeological Assessment.

Specifically, the EIS will include the following:

- Description of the environmental policies influencing the subject lands;
- Description of the terrestrial and aquatic ecological features, including:
  - Rarity and sensitivities, on or adjacent to the subject lands (based on results of the field investigations listed above).
- Description of the proposed development including identification of a development envelop;
- Analysis of potential impacts on the natural features as a result of the proposed development, including:
  - Construction;
  - Footprint of the development;
  - Edge effects and potential introduction of non-native species;
  - Noise and lighting;
  - Any required new or expanded infrastructure; and,
  - Any other potential impacts identified during the project.
- Recommended mitigation measures to minimize impacts (including specific buffer widths); and,
- Conclusion demonstrating conformity with all applicable natural heritage policies.

Reporting

All findings will be summarized in a report, complete with figures. The locations of all provincially rare species encountered will be recorded using GPS and included on the figures. Locally rare species will also be recorded to the greatest extent possible.

Information Requests

We kindly request the following information to assist in our study:

- Any additional records of natural features in the area;
- A copy of any locally rare species lists in order to assist with the assessment of species significance and rarity.

If you have any questions or comments regarding these Terms of Reference, please feel free to contact me at 519-823-4995 ext. 479 or at tradburn@rjburnside.com.

Yours truly,

R.J. Burnside & Associates Limited

Tricia Radburn, M.Sc.(Pl), MCIP, RPP
Environmental Planner
TR/sd

Cc *Mike Stone, Ministry of Natural Resources*
Gary Cousins, County of Wellington

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FIGURE 1.1

BSR&D LTD.

PUSLINCH INDUSTRIAL DEVELOPMENT

ENVIRONMENTAL IMPACT STUDY

SITE LOCATION

LEGEND

Approximate Property Boundary

Credit:
Background 2006 air photo obtained from Grand River Conservation Authority (GRCA)
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N

0 120 240 360 480 600

Metres

1:7,500
February 2013
Project Number: 300032929

Projection: UTM Zone 17
Datum: NAD83

Prepared by: C. Dickie

Verified by: T. Radburn

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R.J. Burnside & Associates Limited 292 Speedvale Avenue West Unit 20 Guelph ON N1H 1C4 Canada
telephone (519) 823-4995 **fax** (519) 836-5477 **web** www.rjburnside.com

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February 20, 2013

Via: Email

Mr. Mike Stone
District Planner
Ministry of Natural Resources
1 Stone Road West
Guelph, ON N1G 4Y2
mike.stone@ontario.ca

Dear Mr. Stone:

Re: Puslinch Industrial Development Environmental Impact Study Terms of Reference
File No.: 300032929

R.J. Burnside & Associates Limited ("Burnside") has been retained by Black, Shoemaker, Robinson & Donaldson Limited ("BSRD") to conduct an Environmental Impact Study ("EIS") for a proposed Zoning Amendment to permit the development of three new industrial lots. This development is proposed to be located on a triangular-shaped property on Lots 26 and 27, Concession VII, Township of Puslinch, County of Wellington (the "subject lands"), shown on **Figure 1.**

This letter provides Burnside's proposed Terms of Reference ("TOR") for the EIS. At this time, we are seeking your input and would appreciate any comments on our proposed approach as well as any additional information you may have which may be relevant to our study.

Background Information

Burnside has reviewed the following existing data sources:

- Aerial photography;
- The Natural Heritage Information Centre ("NHIC") database to identify records of rare wildlife species on, and in the vicinity of, the study area;
- GRCA's Regulation 150/06 Mapping;
- NRVIS data provided on the GRCA's Grand River Watershed Viewer online mapping site to identify provincially significant wetlands, valleylands, ANSIs, watercourses;
- The County of Wellington Official Plan (1999, 2011 amendment);
- The Ontario Breeding Bird Atlas ("OBBA") for records of birds breeding in the area.

Based on this review we have identified the following information:

The subject lands are currently comprised of active agricultural lands as well as a small woodlot and disturbed, early successional areas. The site is bounded by Hwy 401 to the south, active aggregate extraction operations to the west and north and industrial development to the east.

According to the Wellington County Official Plan the lands are designated primarily as Secondary Agricultural with a small portion of Greenlands in the far southeastern corner. The entire site is within the Puslinch Economic Development Policy Area (PA7-1) which has been identified as the predominant location for business and industry in Puslinch Township.

The following features may be present within 120 m of the subject lands:

- Significant Habitat of Endangered and Threatened Species;
- Significant Woodlands;
- Significant Wildlife Habitat, including:
  - Marsh Bird Breeding Habitat;
  - Area-sensitive Bird Breeding Habitat;
  - Open Country Bird Breeding Habitat;
  - Habitat for Species of Conservation Concern; and,
  - Other wildlife habitats (although no records exist, other habitats may be present);
- Unevaluated wetlands; and,
- A Regional Earth Science ANSI.

Additional details are presented in Table 1.

Table 1. Results of Background Data Review

Feature	Existing Records	Location	Data Source
Provincially Significant Features			
Significant Habitat of Endangered and Threatened Species	– chimney swift, THR – barn swallow, THR – bobolink, THR – eastern meadowlark, THR	Within 10km of subject lands	OBBA
Significant Wetlands Ecoregions 5E, 6E, 7E	No records identified	N/A	NHIC, GRCA, Wellington County Official Plan Appendix 3
Significant Coastal Wetlands	No records identified	N/A	NHIC, GRCA
Significant Wetlands	Project not in the Canadian Shield	N/A	N/A

Feature	Existing Records	Location	Data Source
Canadian Shield			
Significant Woodlands	County Greenlands designation corresponding with a small woodland in the southeast corner of the subject lands	On the subject lands	Wellington County Official Plan
Significant Valleylands	No records identified	N/A	GRCA
Significant Wildlife Habitat	Marsh Bird Breeding Habitat: – American bittern	Within 10km of the subject lands	OBBA
	Area-sensitive Bird Breeding Habitat: – American redstart – black-throated green warbler – blue-headed vireo – broad-winged hawk – brown creeper – Cooper's hawk – hairy woodpecker – least flycatcher – ovenbird – pileated woodpecker – pine warbler – red-breasted nuthatch – scarlet tanager – sharp-shinned hawk – veery – white-breasted nuthatch – winter wren	Within 10km of the subject lands	OBBA
	Open Country Bird Breeding Habitat: – bobolink; – eastern meadowlark – grasshopper sparrow – savannah sparrow	Within 10km of the subject lands	OBBA
	Habitat for Species of Conservation Concern: – northern map turtle, SC – milksnake, SC – eastern ribbonsnake, SC – common nighthawk, SC – red-headed woodpecker, SC – ram's-head lady's slipper, S3 – shrubby St. John's-wort, S2 – scarlet beebalm, S3		NHIC, OBBA
	Other Types of Significant Wildlife Habitat: – no records identified	N/A	NHIC, OBBA

Feature	Existing Records	Location	Data Source
Significant Areas of Natural and Scientific Interest	No records identified	N/A	NHIC, GRCA
Fish Habitat	No records identified	N/A	GRCA
Features of Other Significance			
Unevaluated Wetlands	Two small wetland pockets in the southeastern corner of the property. GRCA notes indicate that they were identified from aerial photography only and have not been confirmed on site.	On the subject lands	GRCA
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- Conclusion demonstrating conformity with all applicable natural heritage policies.

Reporting

All findings will be summarized in a report, complete with figures. The locations of all provincially rare species encountered will be recorded using GPS and included on the figures. Locally rare species will also be recorded to the greatest extent possible.

Information Requests

We kindly request the following information to assist in our study:

- Any additional records of natural features in the area;
- Confirmation of the appropriate SWH Ecoregion Schedule to use. We are currently using the Schedule for Ecoregion 6E as found at http://publicdocs.mnr.gov.on.ca/View.asp?Document_ID=15513&Attachment_ID=32528 (link from Table B-5 in the Natural Heritage Reference Manual).

If you have any questions or comments regarding these Terms of Reference, please feel free to contact me at 519-823-4995 ext. 479 or at tradburn@rjburnside.com.

Yours truly,

R.J. Burnside & Associates Limited

Tricia Radburn, M.Sc.(Pl), MCIP, RPP
Environmental Planner

Cc *Nathan Garland, GRCA*
Gary Cousins, County of Wellington

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FIGURE 1.1

BSR&D LTD.

PUSLINCH INDUSTRIAL DEVELOPMENT

ENVIRONMENTAL IMPACT STUDY

SITE LOCATION

LEGEND

Approximate Property Boundary

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Background 2006 air photo obtained from Grand River Conservation Authority (GRCA)
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Appendix B

Breeding Bird Survey Species List

Puslinch Industrial Development
Results of Breeding Bird Surveys

Wildlife Survey Conducted by: Hannah Maciver May 31, 2013 & June 17, 2013			PROVINCIAL		FEDERAL				PROVINCIAL
COMMON NAME	***SCIENTIFIC NAME***	***LOCATION (ELC UNIT)***	***SRANK***	***SARO (Endangered Species Act, 2007)***	***COSEWIC***	***SARA (Species at Risk Act)***	***SARA Schedule***	***Migratory Bird Convention Act, 1994***	***Area Sensitive Species (as per MNR Significant Wildlife Habitat Technical Guide, 2000)***
American Crow	*Corvus brachyrhynchos*	CU, CUT1	S5B						
American Goldfinch	*Carduelis tristis*	H1/CUW1, CUT1	S5B					Yes	
American Redstart	*Setophaga ruticilla*	FOM2-2. CUT1	S5B					Yes	Yes
American Robin	*Turdus migratorius*	MAS, H1/CUW1, CUT1	S5B					Yes	
Baltimore Oriole	*Icterus galbula*	FOM2-2, CUT1	S4B					Yes	
Black-capped Chickadee	*Poecile atricapillus*	FOM2-2, CUT1	S5					Yes	
Blue Jay	*Cyanocitta cristata*	FOM2-2	S5						
Brown Thrasher	*Toxostoma rufum*	CUT1	S4B					Yes	
Brown-headed Cowbird	*Molothrus ater*	CUT1	S4B						
Cedar Waxwing	*Bombycilla cedrorum*	H1/CUW1, FOM2-2, CUT1	S5B					Yes	
Chipping Sparrow	*Spizella passerina*	CUT1	S5B					Yes	
Common Grackle	*Quiscalus quiscula*	MAS	S5B						
Eastern Kingbird	*Tyrannus tyrannus*	H1/CUW1	S4B					Yes	
European Starling	*Sturnus vulgaris*	CU, MAS, H1/CUW1, CUT1	SNA						
Field Sparrow	*Spizella pusilla*	CUT1	S4B					Yes	
Gray Catbird	*Dumetella carolinensis*	MAS, H1/CUW1, FOM2-2, CUT1	S4B					Yes	
Great Crested Flycatcher	*Myiarchus crinitus*	CUT1	S4B					Yes	
Horned Lark	*Eremophila alpestris*	CU	S5B					Yes	
Mourning Dove	*Zenaida macroura*	CU, CUT1	S5					Yes	
Northern Cardinal	*Cardinalis cardinalis*	FOM2-2	S5					Yes	
Pine Warbler	*Dendroica pinus*	FOM2-2	S5B					Yes	Yes
Red-eyed Vireo	*Vireo olivaceus*	FOM2-2, CUT1	S5B					Yes	
Red-winged Blackbird	*Agelaius phoeniceus*	MAS, CUT1	S4						
Ring-billed Gull	*Larus delawarensis*	CU	S5B,S4N					Yes	
Song Sparrow	*Melospiza melodia*	FOM2-2, CUT1	S5B					Yes	

Tree Swallow	*Tachycineta bicolor*	MAS	S4B					Yes	
Warbling Vireo	*Vireo gilvus*	MAS	S5B					Yes	
Yellow Warbler	*Dendroica petechia*	MAS, H1/CUW1, CUT1	S5B					Yes	
TOTAL SPECIES	***24***								

Rank Definitions

MNR SRANK

SX ***Presumed Extirpated****—Species or community is believed to be extirpated from the nation or state/province.*

SH ***Possibly Extirpated (Historical)****—The NH or SH rank is reserved for species for which some effort has been made to relocate occurrences.*

S1 ***Critically Imperiled****—Extreme rarity (often 5 or fewer occurrences) or because of some factor(s) such as very steep declines making it especially vulnerable to extirpation.*

S2 ***Imperiled****—Due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation.*

S3 ***Vulnerable****—Due to a restricted range, relatively few populations (often 80 or fewer), recent and widespread declines, or other factors making it vulnerable to extirpation.*

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

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

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

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

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

S#S#

C ***Captive/Cultivated;*** *existing in the province only in a cultivated state; introduced population not yet fully established and self-sustaining.*

S? ***Not Ranked Yet;*** *or if following a ranking, Rank Uncertain (e.g. S3?). S? species have not had a rank assigned.*

SA ***Accidental;*** *of accidental or casual occurrence in the province; far outside its normal range; some species may occasionally breed in the province.*

SAB ***Breeding accidental.***

SAN ***Non-breeding accidental.***

SE ***Exotic;*** *not believed to be a native component of Ontario's flora.*

SR ***Reported for Ontario,*** *but without persuasive documentation which would provide a basis for either accepting or rejecting the report.*

SRF ***Reported falsely from Ontario.***

SX

SZ

SZB ***Breeding migrants/vagrants.***

SZN ***Non-breeding migrants/vagrants.***

END

EXP ***Extirpated****. Any native species no longer existing in the wild in Ontario, but existing elsewhere in the wild.*

EXT ***Extinct****. Any species formerly native to Ontario that no longer exists.*

IND ***Indeterminate****. Any native species for which there is insufficient scientific information on which to base a status recommendation.*

NIAC

THR

SARA/COSEWIC Status

END	***Endangered**. A species facing imminent extirpation or extinction throughout its range.*
EXP	***Extirpated**. A species no longer existing in the wild in Canada, but occurring elsewhere in the wild.*
EXT	***Extinct**. A species that no longer exists.*
IND	***Indeterminate**. A species for which there is insufficient information to support a status designation.*
NAR	***Not At Risk**. A species that has been evaluated and found to be not at risk.*
SC	
THR	***Threatened**. A species likely to become endangered if nothing is done to reverse the factors leading to its extirpation or extinction.*

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Appendix C

Guidance for the Creation of Snake Hibernacula

SNAKE HIBERNACULA

Snake Hibernaculum Design

Please be patient, this section of our website is still under construction. In the meantime, here is some of the information that we have created so far:

Why Care About Snakes?

Snakes are often persecuted because of the mistaken belief that they are dangerous pests. However, snakes have a tremendous ecological and cultural value.

Snakes play an important role in ecosystems - they are both predator and prey. By feeding on frogs, mice and other small animals, snakes help to maintain healthy ecosystems. Snakes are also an important source of food and energy for birds and other larger animals. The Red-shouldered hawk, in particular, relies on snakes to feed their young.

Throughout history, snakes have been the subject of many myths and folklore, and several cultures regard snakes as powerful religious symbols. The Rainbow Serpent is a major mythological being for Aboriginal people across Australia. It is seen as the inhabitant of permanent waterholes and in control of water. It is the Rainbow Serpent that replenishes the stores of water, forming gullies and deep channels as he slitheres across the landscape, allowing for the collection and distribution of water. In a Christian story about the Garden of Eden, a snake convinces Adam and Eve to eat a forbidden fruit, causing them to be cast out of the garden. The snake was punished by being made to crawl on its belly from then on.

Most people?s fear of snakes is based on myths, folklore and religious symbols which seldom portray snakes accurately or positively. More often than not, snakes are portrayed as devious, dangerous creatures. In reality, snakes are shy by nature, move away from danger and try to avoid people. In addition, most snakes are harmless. In Ontario, there is only one venomous (poisonous) snake - the Massasaga rattlesnake (Sistrurus catenatus). At risk of becoming endangered, it is designated as ?threatened? by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and is legally protected. This reclusive, threatened species is only found in four regions of Ontario, the Bruce Peninsula and the eastern side of Georgian Bay, with small, isolated populations at Wainfleet Bog in the Niagara peninsula, and Ojibway Prairie in Windsor.

Why Build a Hibernaculum?

Habitat loss, degradation and fragmentation by roads have had an extremely detrimental affect on snake populations. A lack of adequate hibernacula (singular hibernaculum) has become a major limiting factor. Hibernacula are underground chambers that snakes use through winter to protect them from the cold. While people have the warmth and shelter of buildings to help them survive, snakes have hibernacula. Manmade structures such as old wells, rock and log piles, building foundations and retaining walls, and natural features such as ant mounds and groundhog or crayfish burrows are examples of snake hibernation sites.

Some snake species hibernate alone, while others may share the same site. A particular, unique congregation of snakes can be seen in **Narcisse, Manitoba.** Each spring, snakes emerge from their hibernacula to bask, breed and feed for the summer. In Narcisse, the largest over-wintering population of snakes in the world can be seen emerging from their communal dens which house up to 10,000 snakes at a time. Before frost occurs, the snakes head back to the previous year?s site for hibernation.

Hibernacula are important for snakes because they require a site below the frost line and close to the water table (so the snakes do not dehydrate) to survive cold, dry winters. Building a hibernaculum will provide more overwintering opportunities for snakes in fragmented and isolated landscapes.

Snakes are not only threatened by urban development but also by human misunderstanding. Snake hibernacula can be constructed as an expression of acceptance and to provide valuable opportunities for education and community stewardship. Visitors to hibernacula will be prompted to ask questions about the natural history of these fascinating creatures and the challenges they face in cold climates.

How to Build a Hibernaculum

1. Select a well-drained site protected from cold winds, with good sun exposure (south-facing). Ensure that surface and ground water flows away from the site (i.e. build on upland areas). If not, drainage pipes below the frost line may be required to prevent flooding.

2. Your snake hibernaculum can be sized to fit the available space, but it must be deeper than the frost line (at least 2 meters deep). Snakes prefer an overwintering site that is close to the water table, but not flooded. Moist air ensures that snakes do not dehydrate over the dry winter months.

3. Place rubble in the bottom to create chambers for the snakes. Chambers created at different depths allow the snakes to move vertically and horizontally to select a preferred temperature/humidity microhabitat.

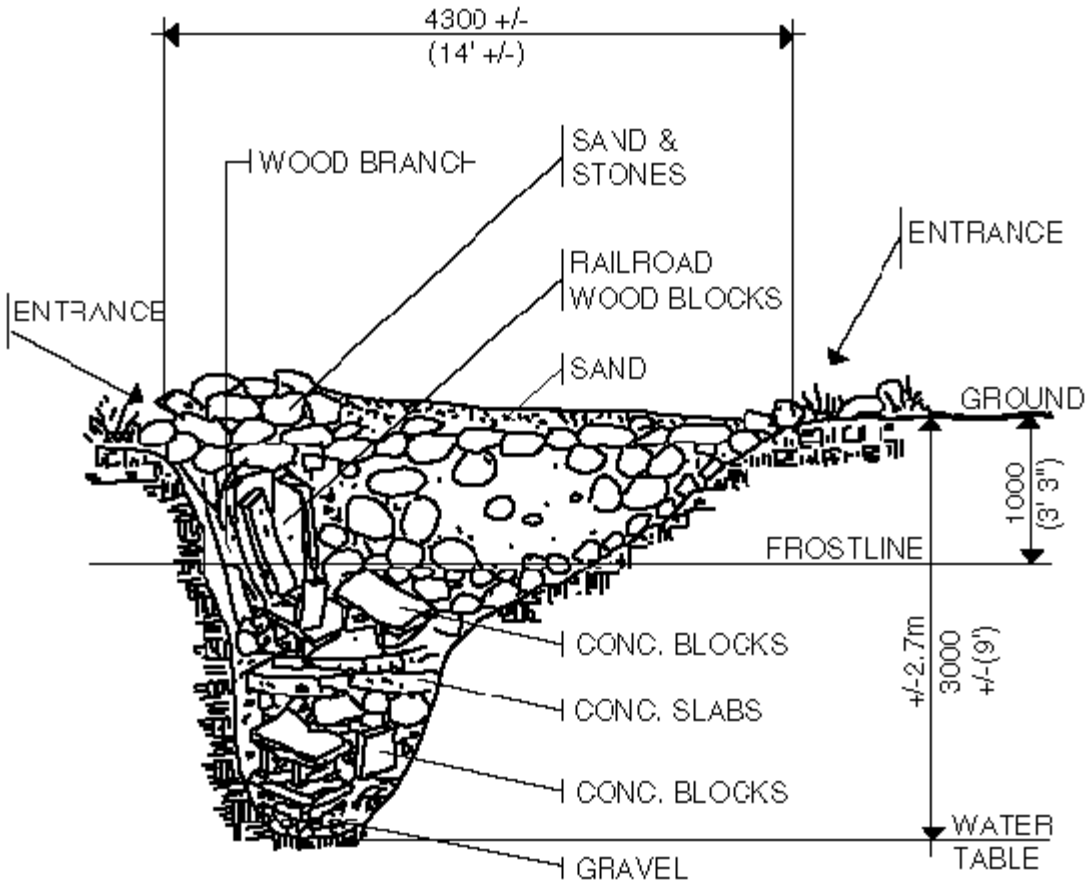
4. Concrete blocks or PVC drain pipes (with holes cut into the sides along the length of the pipe) can be used for entrances and passages to allow the snakes multi-level access. Snakes use these passage ways to move to the bottom of the pit and into the underground chambers. It is necessary to hand place the concrete blocks to ensure that a space or tunnel extends down into the bottom of the pit at each of the corners. Continue to fill the pit with larger rocks, old concrete blocks and slabs, maintaining as many openings and chambers as possible.

5. Cap with an insulating layer of smaller rock rubble. Be sure to leave the entrances open and keep the top clear of shrubs that may grow as the site matures.

6. Protect emerging snakes from predators by having cover objects such as logs, rock piles, brush and uncut grass nearby.

7. In the spring (mid April to late May), monitor your site to determine if wildlife are using the hibernaculum. Don?t get discouraged, it may take several years before snakes ?discover? your hibernaculum.

How to build a snake hibernaculum



Common Questions

What is a snake hibernaculum?
Hibernacula (single hibernaculum) are underground chambers that snakes use as refuges through the winter to protect them from the cold. Snakes prefer hibernacula that are close to the water table and have a temperature that remains above freezing. Manmade structures such as old wells, rock and log piles, retaining walls and building foundations, and natural features such as ant mounds and rodent or crayfish burrows are examples of snake hibernation sites.

Why build snake hibernacula?
Building snake hibernacula helps to create habitat and winter dens for snakes that have lost their hibernacula or cannot travel to traditional overwintering sites due to urban expansion, habitat loss and other disturbances. Often snake hibernacula will serve as a home for other animals as well.

What types of snakes might use a hibernaculum in my neighbourhood?
Eastern garter, DeKay?s brown and Milk snakes are the most likely types of snakes that you will see in your neighbourhood.

Are these snakes dangerous?
No. There is only one venomous (poisonous) snake in Ontario - the protected Massasauga rattlesnake.

Will building a hibernaculum attract more snakes to my yard?
No. Building a hibernaculum will provide more habitat opportunities for the snakes that are already around your property and supported by the landscape. It will not attract additional snakes from other areas.

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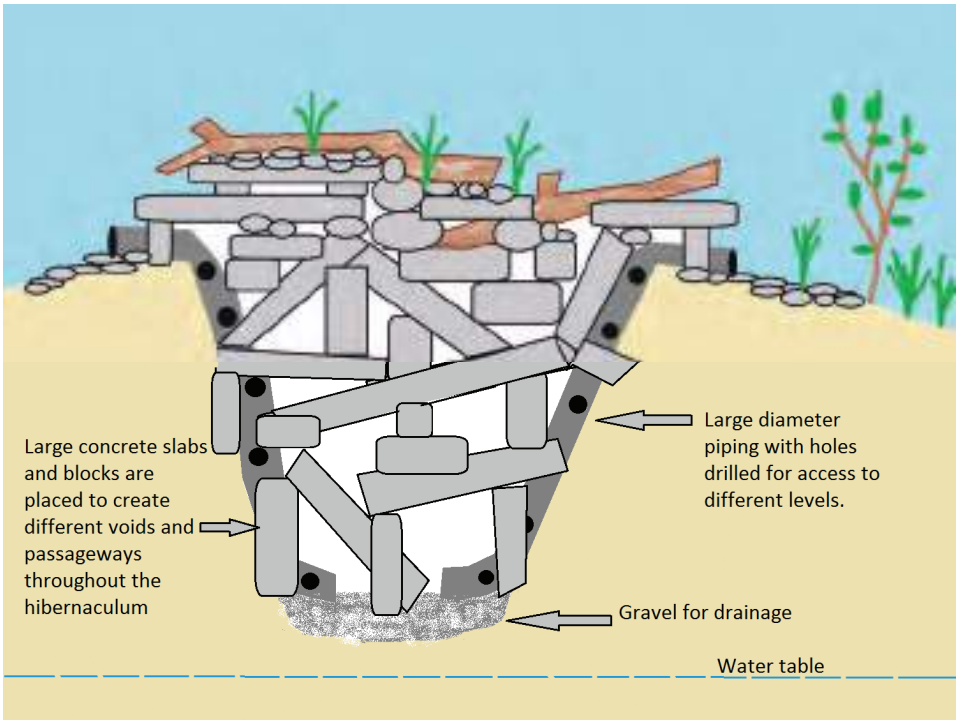
CAZA AZAC

How to Create a Snake Hibernaculum

The Carolinian Region of southern Ontario is home to 23 native reptile species, including 7 turtles, 15 snakes, and one lizard. Unfortunately, these reptiles are under pressure from centuries of settlement, agriculture, development and urbanization. Creating safe habitat away from these threats is one way we can help conserve reptile populations.

What is a snake hibernaculum and why build one?

A snake hibernaculum (plural = hibernacula) is an underground chamber where snakes can safely spend the winter protected from the cold. A hibernaculum can be a built structure, such as an old well or building foundation, or it can be naturally occurring, such as an animal burrow, rotten tree stump, or fissure in the bedrock. A good hibernaculum should be below the frost line to prevent snakes from freezing to death, be relatively humid to prevent snakes from drying out, but be above the water table to prevent snakes from drowning.



A lack of natural hibernacula can be a major factor limiting snake populations. Building a snake hibernaculum can help replace hibernacula which have been lost due to urban expansion, intensive agriculture, deforestation and other forms of habitat loss. Adding hibernacula to the landscape also means that snakes may travel shorter distances to find a suitable wintering site, lowering the chances a snake may have to cross a road or encounter other threats.

How to build a Hibernaculum

1. **Site Selection** – Select a south-facing site which receives sunlight and is protected from cold winter winds. Both surface water and ground water should flow away from the site to prevent flooding. Choose a site with well-drained, sandy or sandy loam soils. The location should be far from roads, buildings and other hazards, and close to natural areas such as woodlands and meadows. Avoid heavy, poorly-drained soil types such as clay.

2 **Dig a Hole** – A hole can be dug of varying size and scale to suit the location, but it should extend below the frost line and be close to the water table (~2 metres). It should be moist, but should not hold water or flood. Add a layer of gravel to the bottom to guard against flooding and allow the air to remain humid.

3. **Fill with Rubble** – Place rocks, concrete rubble, logs, timber, blocks and/or bricks to create chambers at different depths with connecting passageways. The snakes should be able to move throughout the structure to find their preferred wintering microhabitat. Do not use railway ties or pressure-treated lumber.

4. **Ensure Access** – Carefully place concrete blocks or PVC pipe with large holes (~6cm) cut along its length to make sure the snakes can enter and exit the structure at various locations and move to the different chambers and passageways easily.

5. **Insulate with Smaller Rocks** – After creating chambers and passageways with the larger rocks, add smaller rocks and stones (or a small amount of soil) to help insulate the structure. Rocks at the surface also make a great sunning location for the snakes to warm themselves on throughout the seasons. Make sure entrances remain accessible. It is important that the hibernaculum has fairly open, interconnected passageways, but not so many openings that cold winter air reaches the lower depths.

6. **Protect the Snakes** – Adding logs, rocks, brush piles and other debris to the site can help protect the emerging snakes from predators. The presence of plants, vines or shrubs near the hibernaculum also provides important shelter.

7. **Monitor –** Check your hibernaculum in early spring and in fall to see if any snakes are using the site. It may take some time for snakes to find your hibernaculum, and even if they are using it, it will take some luck to spot them!

Long Point Basin Land Trust protects important natural habitats in the central Carolinian Region in southern Ontario. It promotes conservation through outreach, research, habitat restoration, and species at risk recovery projects. For more information about this charitable conservation organization, please visit our website or sign up for our newsletter (print or e-news). Please report reptile sightings from the Long Point Basin to: **longpointlandtrust.ca**

Long Point Basin Land Trust
P.O. Box 468
Port Rowan, Ontario N0E 1M0
Email: nature@longpointlandtrust.ca
Web: longpointlandtrust.ca
Follow us on Twitter (@lpblt) or become a fan on Facebook