Riverside South

IBI

Riverside South Development Corporation - Employment Lands

Environmental Impact Statement & Tree Conservation Report

Submitted to Riverside South Development Corporation
by IBI Group
July 2022

Prepared for:
Marcel Denomme
Riverside South Development Corporation
2193 Arch Street, Ottawa, ON K1G2H5
613-731-6712 ext. 1230
mdenomme@urbandale.com

Prepared by:
Lindsay Jackson
IBI Group
Suite 400, 333 Preston Street, Ottawa, ON K1S 5N4
613-225-1311 ext 64067
lindsay.jackson@ibigroup.com

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Project # 137705

Environmental Impact Study and Tree Conservation Report

RSDC – Employment Lands

Prepared for Riverside South Development Corporation
by IBI Group
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REVIEWER:	Alex Zeller, Associate – Manager, Natural Systems
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1 Introduction

1.1 Purpose

IBI Group (IBI) was retained by Riverside South Development Corporation (RSDC) to complete an Environmental Impact Study (EIS) and Tree Conservation Report (TCR) for the proposed RSDC Employment Lands development, located at 3700 Twin Falls Place, in the City of Ottawa's Riverside South Community. (**Figure 1**).

This EIS and TCR has been prepared to describe the natural heritage features within the Study Area and to evaluate the potential for environmental impacts associated with the proposed development and to recommend mitigation measures to offset those impacts. The findings in this report are base on field investigations and desktop screening results.

For this report, the Study Area includes the area within 120 metres (m) of the Project footprint to account for policy requirements and setback distances outlines in the *Provincial Policy Statement (2020)* and the accompanying *Natural Heritage Reference Manual (MNRF, 2010)* (see **Figure 1**). In addition, specific Species at Risk (SAR) and natural heritage features will be considered up to two kilometres (km) from the proposed development as it may relate to specific environmental policy or legislation.

1.2 Background

The City of Ottawa requires that an EIS and TCR be completed when development or site alteration is proposed on or adjacent to environmentally sensitive lands or other features outlined in the City's Natural Heritage System (NHS). This site is located next to a Natural Heritage Feature that corresponds with the Mosquito Creek corridor, which is identified within the City's Official Plan Schedule C11-C – Natural Heritage System (East) (City of Ottawa, 2021), with contributing tributaries transecting the Property. In addition to this major feature, there are also woodlands and an unevaluated wetland located within, or adjacent to, the Project footprint. This report has been prepared to consider federal, provincial, and municipal policies and regulations that may pertain to the Project.

A pre-consultation meeting was held on February 23rd, 2022 where requirements of the EIS and TCR were discussed with the City of Ottawa. This meeting identified the requirements to complete the following Species at Risk surveys:

- → Blanding's Turtle Visual Encounter Surveys along the Mosquito Creek corridor;
- → Grassland Breeding Bird Surveys;
- → Amphibian Breeding Surveys.

The EIS and TCR has been prepared to; ensure the development does not contravene the Endangered Species Act (ESA, 2007), support the retention of natural vegetation where possible, evaluate potential environmental impacts, and develop mitigation plans addressing potential impacts.

N

Legend

- Study Area
- Mosquito Creek
- Headwater Drainage Feature
- Subject Property
- Natural Heritage Feature
- Wetland

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Client:

Riverside South Development Corporation (RSDC)

Title:

RSDC Employment Lands: Study Area and Natural Heritage Features

Prepared By:

IBI Defining the cities of tomorrow

Project: 137705

Date: 2022-08-10

Figure: 1

1.3 Property Information

Owner:	Riverside South Development Corporation
Address:	3700 Twin Falls Place, Ottawa, Ontario
Lot and concession:	Part Lot 18, Concession 2
Property Identification Number(s):	043314099
Zoning:	DR – Development Reserve Zone
Official Plan designation (Schedule B):	Urban Employment Area/General Urban Area/Major Open Space
Existing Land Uses:	Agricultural/Industrial/Commercial, Forested Land, Meadow

Location

The Study Area is located in the community of Riverside South and is located at 3700 Twin Falls Place. It is situated at the northwest corner of Spratt Road and Limebank Road, extending west to the limits of the Major Open Space area associated with Mosquito Creek, and north towards Leitrim Road (**Figure 1**)

Land Use and Zoning

The study Area falls withing the Riverside South Community Design Plan (CDP), the City of Ottawa's Official Plan (OP) has designated the Study Area as Urban Employment Area, General Urban Area, and Major Open Space associated with the Mosquito Creek corridor. The property is zoned as Development Reserve (DR).

1.4 Study Approach

The following approach has been developed to provide a clear methodological direction towards characterizing the natural environment and assessing the potential for significant species and habitats within the Study Area.

Policy Framework:	This section outlines the policies and legislation that apply to the protection of natural heritage features within the Study Area as it relates the Project.
Natural Heritage Screening:	This section provides the detailed background information collected from a variety of publicly accessible resource databases to describe the natural heritage features and significant features that may occur within the Study Area.
Methodology:	This section provides a summary of the specific protocols and methods used to evaluate potential natural heritage features and species identified within the natural heritage screening.
Survey Results:	This section provides the results from the field surveys. This also includes any incidental observations or notable observations made by the field biologists.
Description of the Proposed Project:	This section provides a summary of the Project, including the construction activities and other activities which may have an impact on the natural environment.
Impact Assessment and Mitigation:	This section provides the assessment of potential environmental impacts associated with the Project on the natural heritage system, including the natural heritage features and species surveyed in this study. The mitigation measures proposed in this section are aimed at reducing or eliminating potential impacts to natural heritage features.

	Where mitigation may not be possible, compensation may be proposed. This section will also identify any future permitting or agency authorizations that may be required before the Project may proceed.
Summary and Conclusions:	This section provides a summary of the Study's findings, outlines ay notable provisions, and provides WSP's general recommendation on whether this project should proceed as planned.

Tree Conservation Report Requirements

For the purposes of this integrated report, the Tree Conservation Report (TCR) requirements will be addressed throughout this report. To aid in the review, sections which address specific **requirements under the TCR guidelines will be marked with the "tree" symbol** as illustrated to the left.

2 Policy Framework

This study references the regulatory agencies and legislative authorities mandated to protect different elements of the NHS, features, and functions within the City of Ottawa, Ontario, and Canada. **Table 1** provides a list of the applicable policies and legislation for the protection of natural heritage features and SAR either municipally, provincially, and/or federally. The scope of this report evaluates the natural heritage features and SAR governed by the policies outlined in the table below.

The Ontario ESA (Government of Ontario, 2007) prohibits the killing or harming of species identified as Threatened and Endangered under the Act. Section 10 of the ESA prohibits the damage or destruction of a species' habitat that have been classified as Endangered or Threatened on the Species at Risk in Ontario (SARO) List in Ontario Regulation (O. Reg.) 230/08.

Under the ESA "habitat" is defined as:

> *"with respect to any other species of animal, plant or other organism, an area on which the species depends, directly or indirectly, to carry on its life processes, including life processes such as reproduction, rearing, hibernation, migration or feeding."*

General habitat protection is afforded to all species once they become listed as Threatened or Endangered and remains in place until regulated habitat is designated.

Regulated habitat is defined as:

> *"with respect to a species of animal, plant, or any other organism for which a regulation made under Clause 55 (1) (a) is in force, the area prescribed by that regulation as the habitat of the species."*

Regulated habitat provides more precise details on the species-specific habitats such as specific features, geographic boundaries, or unique requirements of a species.

To balance social and economic considerations with protection and recovery goals, the ESA also enables the Ministry of Environment, Conservation and Parks (MECP) to issue permits or enter into agreements with proponents to authorize activities that would otherwise be prohibited by subsections 9(1) or 10(1) of the Act provided the legal requirements of the Act are met.

If Ontario designated Endangered/Threatened species or their habitat are believed to be directly harmed on non-federally owned land, an ESA authorization and/or permit may be required.

Table 1 Policies, Legislation and Background Sources

POLICY	GUIDELINES AND SUPPORTING DOCUMENTS
Federal Government of Canada	
Migratory Birds Convention Act (MBCA, 1994) (S.C. 1994, c. 22)	Environment and Climate Change Canada (ECCC) – online resources
Species at Risk Act (SARA, 2002) (S.C. 2002, c. 29)	Federal Species at Risk Public Registry: - Distribution of Aquatic Species at Risk mapping (Accessed: 04/2022)
Fisheries Act (1985) (R.S.C., 1985, c. F-14)	Fisheries and Oceans Canada – online resources
Province of Ontario	
Provincial Policy Statement (2020)	Ministry of Natural Resources and Forestry (MNRF) – Kemptville District
	MNRF Natural Heritage Information Centre (NHIC) - *Species at Risk occurrence records* - *Species of Conservation Concern* - *Natural Heritage Features*
	Significant Wildlife Habitat Technical Guide (MNRF, 2000): - Significant wildlife Habitat Eco-region 6E Criterion Schedule (MNRF, 2015).
	Ministry of the Environment, Conservation and Parks (MECP): - Species ad Risk in Ontario (SARO) List (O.Reg. 230.08)
	Ecological Land Classification for Southern Ontario, First Approximation, and its Application (Lee, et al., 1998)

POLICY	GUIDELINES AND SUPPORTING DOCUMENTS
	Ontario Breeding Bird Atlas (OBBA) – Online (Accessed: 04/2022)
	Ontario Reptile and Amphibian Atlas (ORAA) – Online (Accessed: 04/2022)
	Ontario Butterfly Atlas (OBA) – Online
	iNaturalist Observation Records – Online
	Atlas of the Mammals of Ontario (AMO) (Dobbyn, 1994)
City of Ottawa	
City of Ottawa Official Plan (2022)	Official Plan;
	Environmental Impact Statement Guidelines
	City of Ottawa Tree Conservation Report Guidelines – Online
	Site Alteration By-Law
	Protocol for Wildlife Protection During Construction
Rideau Valley Conservation Authority (RVCA)	
Rideau Valley Conservation Authority: Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses (Ontario Regulation 174/06), under Conservation Authorities Act, (R.S.O. 1990, c. C.27)	- Floodplain mapping - Evaluation, Classification and Management of Headwater Drainage Features Guidelines

3 Description of the Natural Environment

A desktop review of the existing natural environment features identified within the Study Area was completed prior to field investigations to inform the studies require for this EIS and TCR. This section outlines the relevant natural heritage background.

3.1 Historic Land Use

A desktop review of recent and historic aerial imagery highlights the land uses within and adjacent to the Study Area (City of Ottawa, 2022) (**Figure 2**). From this review, the landscape has been predominantly agricultural dating back to 1976. Residential developments to the west and south of the Study Area have expanded beginning around the mid 1990's to the present day. Within the Property the land use has been used for agricultural purposes, with parts of the property associated with the Mosquito Creek corridor regenerating into woodland and meadow habitat to the west and southern extents of the property.

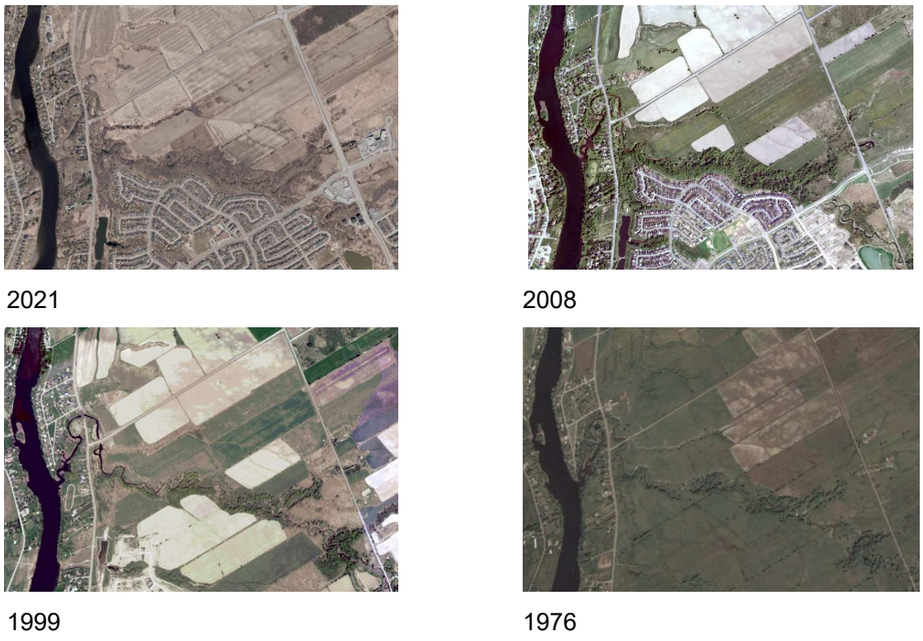

Figure 2 Land Use Change

3.2 Landform, Soils and Geology

The Study Area is situated within the Ottawa Valley Clay Plains physiographic region (Ministry of Northern Development and Mines, 2017).

The surficial geology of the Study Area is composed of fine-textured glaciomarine deposits that are primarily silt and clay, with minor sand and gravel deposits. This material is generally well drained.

The underlying bedrock of the Study Area is part of the Oxford Formation, consisting of dolomite and limestone (Natural Resources Canada, 2016).

Overall, the Study Area is comprised of neutral, fine textured materials, with layers of silty sediments and eroded channels along the Mosquito Creek corridor. It is likely that due to the soil and physiographic conditions withing the Study Area, that there are lower rates of infiltration, with damp to wet soils.

3.3 Aquatic Environment

3.3.1 Floodplain and Regulated Limit

The RVCA is the governing body that regulates zones with potential for flooding, protects associated natural features, and restores and enhances ecosystems within the Rideau Valley watershed. Development within these regulated areas is governed by *O. Reg. 174/06 Development, Interference with Wetlands, and Alterations to Shorelines and Watercourses*. RVCA also maintains, monitors, and collects information related to water quality/quantity, fisheries resources, forestry, land use, and wetlands.

The RVCA floodplain mapping confirms that there are Regulated Limits areas throughout the Study Area and bordering the southern limit of the Project footprint (Rideau Valley Conservation Authority, 2022). The Regulation Limit is shown in **Figure 3.**

The Study Area lies within the Mosquito Creek Subwatershed, which flows north into the Ottawa River (RVCA, 2022). Due to the intensification of urban development within this area, the drainage and watershed conditions have been heavily studied and natural heritage features have been well documented within the Study Area.

3.3.2 Fish Habitat

The Study Area includes to Mosquito Creek, which runs north and drains into the Rideau River. The limit of development is adjacent to the watercourse and there is no development proposed withing the hazard lands associated with the unstable slope of the watercourse. Development of the Project footprint will remain 30 m from the top of bank in accordance with the City of Ottawa's setback, or 15 m from the existing stable top of slope where there is a defined valley slope or ravine (City of Ottawa, 2022). Lands within the minimum setback shall remain in a naturally vegetated condition to protect the ecological function of surface water features. A background review suggests that there are tributaries to Mosquito Creek within the Study Area which may provide fish habitat.

3.3.3 Headwater Drainage Features

Mapping by the RVCA and the City of Ottawa indicates the presence of watercourses within and adjacent to the Study Area. Most notably to the west of the study Area exists Mosquito Creek, with tributaries to the creek existing at the northwestern and southern extents of the Study Area.

The tributary to the north drains towards and enters Mosquito Creek north of the Study Area, whereas the tributary to the south drains directly into Mosquito Creek and exists within the Project footprint.

HDF assessments were completed in 2012 by Niblett Environmental Associates Inc (Niblett), and the assessment results found that the HDF at the northern limit of the Study Area is a natural feature with intermittent flows, where as the HDF at the southern limit of the Study Area is a natural feature with permanent flows.

RVCA Regulations Mapping

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Conservation Areas

Structures

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Rideau Valley Conservation Authority (RVCA), City of Ottawa, Province of Ontario, Esri Canada, Esri, HERE, Garmin, GeoTechnologies, Inc., USGS,

RVCA Regulations Mapping - Online Mapping

Rideau Valley Conservation Authority (RVCA)

3.4 Natural Heritage Features

Several specific natural heritage features require consideration for protection under the Ontario PPS (Ministry of Municipal Affairs and Housing, 2020). The protection of these features is generally administered by the City of Ottawa, consistent with relevant provincial and federal legislation. These features are:

- Provincially Significant Wetlands;
- Significant Woodlands;
- Significant Valleylands;
- Areas of Natural and Scientific Interest (ANSI);
- Significant Wildlife Habitat (SWH);
- Species at Risk (SAR) habitat; and,
- Fish habitat.

The section below provides a review of available background records to determine the potential presence of these natural heritage features within the Study Area. Where possible, natural heritage features have been illustrated in **Figure 1.**

3.4.1 Wetlands

A review of the City of Ottawa online mapping services (geoOttawa) and provincial natural heritage mapping (NHIC) indicates the presence of small pockets of unevaluated wetlands adjacent to the Study Area (see **Figure 1**) which correspond to the Mosquito Creek floodplain.

Wetland delineations were complete by Niblett in 2012 and determined that there were no Provincially Significant Wetlands within the Study Area.

3.4.2 Woodlands

A review of the City of Ottawa online mapping services and provincial natural heritage mapping indicates the presence of woodlands within the Study Area that correspond with the Mosquito Creek floodplain which will remain undeveloped.

3.4.3 Valleylands

The City of Ottawa OP Schedule K mapping indicates that the Mosquito Creek corridor is classified as an area with unstable slopes, and thus is categorized as a Valleyland. Development of the Project footprint will remain 15 m from the existing stable top of slope where there is a defined valley slope or ravine, in accordance with the City of Ottawa's setback provided in the OP (City of Ottawa, 2021). Lands within the minimum setback shall remain in a naturally vegetated condition to protect the ecological function of surface water features.

3.4.4 Areas of Natural and Scientific Interest

No ANSI's are present within or adjacent to the Study Area.

3.4.5 Significant Wildlife Habitat

Four categories of Significant Wildlife Habitat (SWH) exist within the eastern Ontario ecoregion 6E (MNRF, 2015). These include:

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

The potential for the presence of habitats matching the description of these SWH within and adjacent to the Study Area was reviews using available background information, and aerial imagery. It was determined that there may be presence of "Seasonal Concentration Areas of Animals", "Specialized Habitat of Wildlife", and "Habitat for Species of Conservation Concern". The following sections describe the candidate SWH categories that may be present.

SEASONAL CONCENTRATION AREAS OF ANIMALS

Based on the criteria established for Candidate SWH, the following seasonal concentration areas of animals may be found within or adjacent to the Study Area:

- Bat Maternity Colonies: The presence of mature woodlands with large cavity trees may provide suitable conditions for maternity colonies of SAR and non-SAR bats.

SPECIALIZED HABITAT FOR WILDLIFE

Based on the criteria established for Candidate SWH, the following specialized habitat for wildlife may be found within the Study Area:

- Amphibian Breeding Habitat: the presence of wet forest community and headwater drainage features that may be ephemeral in nature may provide habitat for amphibian breeding.

HABITAT FOR SPECIES OF CONSERVATION CONCERN

The Significant Wildlife Habitat Technical Guide (MNR, 2000) defines Species of Conservation Concern as globally, nationally, provincially, regionally, or locally rare (S-Rank of S2 or S3). S-Ranks are an indicator of commonness within the province of Ontario, on a scale of 1-5. S2 represents a species that is considered imperiled within Ontario. S3 represents a species considered as vulnerable within Ontario. Species of Conservation Concern does not include SAR (listed as Endangered or Threatened under the ESA, 2007). A review of background data suggests that candidate SWH for breeding birds, reptiles, insects, and fish may occur within or adjacent to the Study Area. Those species identified have potential to be associated with the forest, meadow, creek, and wetland communities. **Table 2** provides a list of Species of Conservation Concern with occurrence records within and/or adjacent to the Study Area.

3.5 Species at Risk and Species at Risk Habitat

A desktop review identified the potential for several Species at Risk (SAR) to occur within and adjacent to the Study Area. Under the ESA, all species listed as Threatened or Endangered in Ontario receive immediate ‘general habitat protection’. This includes places that are used as dens, nests, hibernacula, or other residences. For some species, agencies have defined general habitat descriptions that provide science-based criteria for the habitat to be protected for some SAR species.

A review of aerial imagery was used to identify general candidate habitat for SAR based on the description of habitat provided. **Table 3** provides a list of species identified as having potential to occur withing the vicinity of the Study Area, and an assessment of habitat potential based on the MNRF’s habitat description. Based on the habitat requirements described in the table, the following species may be present withing the Study Area:

- Barn Swallow (Hirundo rustica),
- Bobolink (*Dolichonyx oryzivorus*),
- Eastern Meadowlark (*Sturnella magna*),
- Eastern Wood-Pewee (*Contopus virens*),
- Midland Painted Turtle (*Chrysemys picta marginata*),
- Snapping Turtle (*Chelydra serpentina*),
- Monarch (*Danaus plexippus*),
- Butternut (*Juglans cinerea*),
- Little Brown Bat (*Myotis lucifugus*),
- Northern Myotis (*Myotis septentrionalis*), and
- Tri-colored Bat (*Perimyotis subflavus*)
- Blanding’s Turtle (*Emydoidea blandingii*)

Table 2 Species of Conservation Concern

COMMON NAME	SCIENTIFIC NAME	HABITAT DESCRIPTION	CONSERVATION STATUS			SOURCE		RATIONALE
			Federal (SARA, 2002)	Provincial (ESA, 2007)	S-Rank			
Birds								
Eastern Wood-Peeee	*Contopus virens*	Open, deciduous, mixed or coniferous forest; predominated by oak with little understory; forest clearings, edges; farm woodlots, parks.	SC	SC	S5	OBBA	No	Open deciduous forest associated with the Mosquito Creek corridor is within the Study Area, however, is outside the limit of development therefore no impacts are anticipated.
Short-eared Owl	*Asio flammeus*	Grasslands, open areas or meadows that are grassy or bushy; marshes, bogs or tundra; both diurnal and nocturnal habits; ground nester; destruction of wetlands by drainage for agriculture is an important factor in the decline of this species; home range 25 -125 ha; requires 75-100 ha of contiguous open habitat	SC	SC	S2	OBBA	No	Grasslands are dispersed throughout agricultural fields and are not 75 ha of contiguous habitat within the Study Area.
Herpetozoa								
Blanding's Turtle	*Emydoidea blandingii*	Shallow water marshes, bogs, ponds or swamps, or coves in larger lakes with soft muddy bottoms and aquatic vegetation; they frequently move from aquatic habitat to terrestrial habitats; hibernates in bogs; not readily observed.	END	THR	S3	ON	NoNo	Study Area does not provide connectivity to hibernating habitat. Mosquito Creek corridor connects to Rideau River. The Study Area does not contain shallow water marshes, bogs, ponds, or coves of larger lakes.
Midland Painted Turtle	*Chrysemys picta marginata*	Quiet, warm, shallow water with abundant aquatic vegetation such as ponds, large pools, streams, ditches, swamps, marshy meadows; eggs are laid in sandy places, usually in a bank or hillside, or in fields; basks in groups; not territorial	SC	N/A	S4	ON	No	Mosquito Creek is a quiet, warm, shallow water creek with aquatic vegetation and pools. Connectivity from the watercourse to the forest and adjacent gardens may provide nesting opportunity. These areas are not within the limit of development.

Northern Map Turtle	*Graptemys geographica*	Large bodies of water with soft bottoms, and aquatic vegetation; basks on logs or rocks or on beaches and grassy edges, will bask in groups; uses soft soil or clean dry sand for nest sites; may nest at some distance from water; 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. stream) are required for movement; not readily observed	SC	SC	S3	ON	No	The Study Area does not provide appropriate nesting habitat for Northern Map Turtles, and the Mosquito Creek corridor does not provide suitable aquatic habitat.
Snapping Turtle	*Chelydra serpentina*	Permanent, semi-permanent freshwater; marshes, swamps or bogs; rivers and streams with soft muddy banks or bottoms; often uses soft soil or clean dry sand on south-facing slopes for nest sites; may nest at some distance from water; often hibernate together in groups in mud under water; home range size ~28 ha.	SC	SC	S4	ON	No	Permanent freshwater occurs within the Mosquito Creek corridor. Slopes adjacent to the creek could provide adequate nesting habitat however these areas are not within the limit of development.
Insects								
Monarch	*Danaus plexippus*	The habitat is typically a combination of field and forest and provides the butterflies with a location to rest. Caterpillars eat exclusively milkweed and adults require the nectar of wildflowers to feed.	END	SC	S2	BA	**Yes**	Meadow communities within the Study Area contain a large presence of milkweed plants that potentially provide feeding and breeding habitat.
Fish								
River Redhorse	*Moxostoma carinatum*	The River redhorse inhabits medium to large-size rivers that have substantial flows. In May and June, adults migrate from deeper, slower moving pools and run habitats to shallow riffle-run habitats having coarse substrate and moderate to swift flow.	SC	SC	S2	NHIC	No	Mosquito Creek is a small-sized, slow moving body of water with minimal shallow riffle-run habitats and has a soft substrate bottom.
Vascular Plants								
Butternut	*Juglans cinerea*	In Ontario, Butternut usually grows alone or in small groups in deciduous forests. It prefers moist, well-drained soil and is often found along streams. It is also found on well-drained gravel sites and rarely on dry rocky soil. This species does not do well in the shade, and often grows in sunny openings and near forest edges.	END	END	S2	NHIC	**Yes**	Grassland and fields containing milkweed are present within the Study Area and are adjacent to forested habitat.
Mammals								

Little Brown	*Myotis lucifugus*	Uses caves, quarries, tunnels, hollow trees or buildings for roosting; winters in humid caves; maternity sites in dark warm areas such as attics and barns; feeds primarily in wetlands, forest edges.	END	END	S3	OMA	**Yes**	Study Area contains deciduous forests with large diameter trees with cavities suited for roosting, and forest edges for feeding habitat.
Northern Myotis	*Myotis septentrionalis*	Hibernates during winter in mines or caves; during summer males roost alone and females form maternity colonies of up to 60 adults; roosts in houses, manmade structures but prefers hollow trees or under loose bark; hunts within forests, below canopy	END	END	S3	OMA	**Yes**	Study Area contains deciduous forests with large diameter trees with cavities and loose bark, suited for roosting, and forests for feeding habitat.
Tri-colored Bat	*Perimyotis subflavus*	Open woods near water; roosts in trees, cliff crevices, buildings or caves; hibernates in damp, draft-free, warm caves, mines or rock crevices.	END	END	S3	OMA	**Yes**	Study Area contains open woods near water suited for roosting and foraging.

1General Habitat According to the MNRF Significant Wildlife Habitat Technical Guide (MNR, 2000) used when Critical Habitat not defined. 2S-Rank is an indicator of commonness in the Province of Ontario. A scale between 1 and 5, with 5 being very common and 1 being the least common. 2Information sources include: MNRF = Ministry of Natural Resources and Forestry Response to Information Request; NHIC = Natural Heritage Information Centre; OBBA = Ontario Breeding Bird Atlas; ON = Ontario Nature: Ontario Reptile and Amphibian Atlas; BA = Toronto Entomologists' Association: Butterfly Atlas; DFO = Fisheries and Oceans Canada --- denotes no information or not applicable. 3Preliminary determination based on desktop review of available imagery and information.

3.6 Trees

A review of aerial imagery suggests that the Study Area contains a forested area associated with the Mosquito Creek corridor and its tributaries that contain a mix of mature native trees and shrubs. Hedgerows exist between open agricultural fields throughout the Study Area, as well as bordering the northern extent of the property. A small woodland (0.3 ha) exists near a headwater drainage feature at the northeastern edge of the Study Area.

3.7 Wildlife Habitat

In addition to the SAR noted above, a review of current and historic aerial photos of the Study Area were used to identify potential wildlife habitat. Several species of fauna common to the City of Ottawa rural and urban areas are known to live in the habitats present within the Study Area. These species may include, but are not limited to:

- **Mammals**: Coyote (*Canis latrans*), Raccoon (*Procyon lotor*), White-tailed deer (*Odocoileus virginianus*), Eastern Gray Squirrel (*Sciurus carolinensis*), Eastern Cottontail (*Sylvilagus floridanus*), among others.
- **Reptiles & Amphibians**: Eastern Garter Snake (Thamnophis sirtalis), Leopard Frog (*Lithobates pipiens*), Gray Tree Frog (*Hyla versicolor*), among others.
- **Birds**: American Crow (*Corvus brachyrhynchos*), American Goldfinch (*Spinus trtitis*), Black-capped Chickadee (*Poecile atricapillus*), Blue Jay (*Cyanocitta cristata*), Cedar Waxwing (*Bombycilla cedrorum*), Canada Goose (*Branta canadensis*), Downy Woodpecker (*Picoides pubescens*), Killdeer (*Charadrius vociferus*), Song Sparrow (*Melospiza melodia*), among others.

3.8 Ecological Linkages

A review of aerial photos suggest that the Mosquito Creek corridor may provided a functional ecological linkage. However, as this linkage does not connect any established core natural areas, the function is likely limited to the general movement of wildlife throughout the landscape. Additionally, this property is not identified within an ecological linkage by the City of Ottawa (City of Ottawa, 2013).

3.9 Other Development Constraints

A review of the City of Ottawa's Official Plan Schedule C11-C – Natural Heritage System (East) mapping (2021) part of the property is located within the City's Natural Heritage System. The corridor associated with Mosquito Creek is designated as a Natural Heritage Feature.

Additionally, a hydro corridor bisects the property, with a hydro tower located at the southeast corner of the Study Area (northeast corner of Spratt Road and Limebank Road). The hydro line runs towards the north, with another tower located centrally within an agricultural field.

Table 3 Species at Risk

COMMON NAME	SCIENTIFIC NAME	HABITAT DESCRIPTION	CONSERVATION STATUS			SOURCE	POTENTIAL FOR HABITAT WITHIN STUDY AREA	RATIONALE
			Federal (SARA, 2002)	Provincial (ESA, 2007)	S-Rank			
Birds								
Barn Swallow	*Hirundo rustica*	Farmlands or rural areas; cliffs, caves, rock niches; buildings or other man-made structures for nesting; open country near body of water.	THR	THR	S5	OBBA	**Yes**	Foraging habitat may be present, however no structures for nesting were observed within the Study Area. Building's located outside of the property boundary may provide nesting habitat.
Bobolink	*Dolichonyx oryzivorus*	Large, open expansive grasslands with dense ground cover; hayfields, meadows or fallow fields; marshes; requires tracts of grassland >50 ha.	THR	THR	S3	NHIC	**Yes**	Some grassland meadow habitat is present withing the Study Area. However, there are no tracts of grassland >50 ha.
Eastern Meadowlark	*Sturnella magna*	Open, grassy meadows, farmland, pastures, hayfields or grasslands with elevated singing perches; cultivated landand weedy areas with trees; old orchards with adjacent, open grassy areas >10 ha in size	THR	THR	S5	NHIC	**Yes**	Open grassland area and cultivated land greater than 10 ha is present withing the Study Area.
Herpetozoa								
Blanding's Turtle	*Emydoidea blandingii*	Shallow water marshes, bogs, ponds or swamps, or coves in larger lakes with soft muddy bottoms and aquatic vegetation; they frequently move from aquatic habitat to terrestrial habitats; hibernates in bogs; not readily observed.	END	THR	S3	ON	No	Study Area does not provide connectivity to hibernating habitat. Mosquito Creek corridor connects to Rideau River. The Study Area does not contain shallow water marshes, bogs, ponds, or coves of larger lakes.
Vascular Plants								
Butternut	*Juglans cinerea*	Prefers moist, well-drained soil and is often found along streams. It is also found on well-drained gravel sites and rarely on dry rocky soil. Often grows in sunny openings and near forest edges.	END	END	S2	NHIC	**Yes**	Riparian corridor may present candidate habitat for Butternut trees.

1General Habitat According to the MNRF Significant Wildlife Habitat Technical Guide (MNR, 2000) used when Critical Habitat not defined. 2S-Rank is an indicator of commonness in the Province of Ontario. A scale between 1 and 5, with 5 being very common and 1 being the least common. 2Information sources include: MNRF = Ministry of Natural Resources and Forestry Response to Information Request; NHIC = Natural Heritage Information Centre; OBBA = Ontario Breeding Bird Atlas; ON = Ontario Nature: Ontario Reptile and Amphibian Atlas; BA = Toronto Entomologists' Association: Butterfly Atlas; DFO = Fisheries and Oceans Canada --- denotes no information or not applicable. 3Preliminary determination based on desktop review of available imagery and information.

4 Methodology

4.1 Scope of Work

Based on the description of the existing natural environment outlined above, the natural heritage surveys outlined below have been scoped to assess the impacts of the proposed development on the natural environment. These surveys followed industry standard protocols and are intended to establish baseline conditions.

These surveys are used to evaluate the potential for negative impacts which may occur as a result from the proposed development project. Surveys were undertaken only within the subject property. If possible, natural features within the larger Study Area were evaluated from a distance or via air-photo interpretation.

AQUATIC ENVIRONMENT

- Headwater Drainage Feature Assessment

NATURAL HERITAGE FEATURES

- Ecological Land Classification (ELC), including:
  - Vegetation survey
  - Wetland identification
  - Woodland delineation and evaluation
- Identification of potential SWH, including:
  - Breeding Bird Surveys
  - Amphibian Breeding Surveys
  - General habitat assessment for Species of Conservation Concern
  - Incidental SWH observations

SPECIES AT RISK

- Identification of potential Species at Risk and Species at Risk habitat

TREES

- Tree inventory and assessment

INCIDENTAL WILDLIFE

- Visual and auditory observations of wildlife during all field studies

4.2 Aquatic Environment

The Headwater Drainage Features (HDF) assessment will follow the Toronto and Region Conservation Authority and Credit Valley Conservation protocol, ‘Evaluation, Classification and Management of Headwater Drainage Features Guidelines’ (Toronto and Region Conservation Authority and Credit Valley Conservation, 2014). Field surveys will be carried out following the rapid assessment method, which utilizes the Unconstrained Headwater Sampling (Section 4, Module 11) methodology in the Ontario Stream Assessment Protocol (Stanfield, 2017).

4.3 Natural Heritage Features

4.3.1 Vegetation Community

Vegetation communities within the Study Area were characterized and mapped using the ELC system for Southern Ontario (Lee, et al., 1988). The ecological community boundaries were determined through the review of aerial photography and then further refined through on-site vegetation surveys as specified by the protocol. For areas where access was not granted, observations were conducted from either the road right-of-way or the property edge to the extent visible.

The ELC protocol recommends that a vegetation community be a minimum of 0.5 ha in size before they are defined as a discrete community. Unique communities less than 0.5 ha or disturbed/planted vegetation have been described to the community level only or have been described as an inclusion or complex to an exiting vegetation community. In some instances, where vegetation is less than 0.5 ha, but appears relatively undisturbed and clearly fits within an ELC vegetation type, the more refined classification was used.

In 2007, the MNRF refined their original vegetation type codes to more fully encompass the vast range of natural and cultural communities across Southern Ontario. Through this process, many new codes have been added while some have changed slightly. These new ELC codes have been used for reporting purposes in this study as they are more representative of the vegetation communities within the Study Area.

Vegetation Survey

Vegetation was inventoried in tandem with ELC surveys and a corresponding vascular plant list was compiled. All other plant species identified from other survey results are also included in the list. In addition, the vascular plants observed at the time of survey have been used to screen for any provincially rare species or SAR not previously identified within the Study Area.

Scientific nomenclature, English colloquial names, and scientific binomials of plant species generally followed Newmaster et al. (2005), with updates taken from published volumes of the Flora of North America Editorial Committee (2005) and Michigan Flora Online (2015).

4.3.2 Wetlands

There is a wetland identified within the Natural Heritage Feature adjacent to the study area, located well outside of the limit of development. Delineation of these features was completed in 2015 by Niblett, and a site visit was conducted to confirm the location of the mapped wetland.

4.3.3 Woodlands

The woodlands within the Study Area were assessed for significant following the updates guidelines provided by the City of Ottawa in the Significant Woodlands: Guidelines for Identification, Evaluation, and Impact Assessment. In the urban expansion areas, significant woodlands are evaluated using criteria under the ‘Established Urban Process’ (City of Ottawa, 2021). If the following criteria is met, the woodland is considered significant:

1. *Any treed area meeting the definition of woodlands in the Forestry Act, R.S.O 1990, c.F.26 or forest in Ecological Land Classification for Southern Ontario; and*
2. *In the rural area, meeting any one of the criteria in the Natural Heritage Reference Manual, as assessed in a subwatershed planning context and applied in accordance with Council-approved guidelines, where such guidelines exist; or*
3. *In the urban area, any contiguous area 0.8 hectares in size or larger, supporting woodland 60 years of age and older at the time of evaluation.*

The significance of woodlands within this Study Area will be determined using criteria #1 and #3. The ELC delineation was used to determine the size of woodlands and historic aerial imagery and tree inventories were used to estimate the age.

However, as outlined in the City's *Significant Woodlands: Guidelines for Identification, Evaluation, and Impact Assessment* (2019b), new significant woodlands will not be identified in urban areas where the NHS was already identified through Secondary Plans. As no Secondary Plans exist for this site, this policy would not apply.

4.3.4 Significant Wildlife Habitat

Breeding bird, amphibian breeding, and bat echolocation surveys were conducted in order to establish baseline conditions within the Study Area.

Breeding Bird Survey

Diurnal breeding bird surveys conducted within the Study Area followed the methods outlined in the *Ontario Breeding Bird Atlas Guide for Participants* (Cadman et al 2007) and were completed between late May and early July (three surveys). Specifically, breeding bird surveys consisted of three-minute point counts that were used to establish quantitative estimates of bird abundance in habitat types within the Study Area (see **Figure 4** for survey locations). To supplement the surveys, area searches of the habitat were completed using binoculars to observe species presence and breeding activity. Area searches involved noting all individual bird species and their corresponding breeding evidence while traversing the habitat on foot.

Amphibian Breeding Survey

Amphibian monitoring will follow *the Marsh Monitoring Program Participant's Handbook for Surveying Amphibians protocol* (Bird Studies Canada, 2009 Edition). In accordance with the survey protocol, three different surveys will be conducted between April 15th and June 30th, with at least two weeks between each visit (see **Figure 4** for survey locations). Surveys begin at least one-half hour after sunset during evenings with a minimum night temperature of 5ºC, 10ºC, and 17ºC for each of the three respective surveys.

Each amphibian survey generally involves standing at a predetermined station for three minutes and listening for frog calls. The calling activity of individuals estimated to be within 100 m of the observation point is documented. All individuals beyond 100 m are recorded as outside the count circle and calling activity was not recorded. Calling activity is then ranked using one of the three abundance code categories:

— Code 1: Calls not simultaneous, number of individuals can be accurately counted;

— Code 2: Some calls simultaneous, number of individuals can be reliably estimated; and,

— Code 3: Calls continuous and overlapping, number of individuals cannot be estimated.

In areas where candidate amphibian habitat exists, vernal pools will be visually examined for egg masses and amphibian larvae in conjunction with other field surveys. These searches will occur between April and June when amphibians were concentrated around suitable breeding habitat.

Bat Acoustic Monitoring

To assess for candidate bat maternity colony habitat, a snag/cavity tree count will be conducted within the forested habitats and follow the methodology outlined in the *Bat Survey Methodology – Hibernacula and Maternity Roosts informal publication distributed by the MNRF* (MNRF, 2015).

The survey is intended to count snag/cavity trees to ascertain whether the habitat is candidate SWH for maternity colony habitat for several non-SAR bats as well as SAR bats, including; Little Brown Myotis (*Myotis lucifungus*), Eastern Small-footed Myotis (*Myotis leibii*), Northern Myotis (*Myotis septentrionalis*), and Tri-colored Bat (*Perimyotis subflavus*) The four bat SAR are listed as Endangered, federally and provincially.

This survey is conducted in forested areas, during the leaf-off period, using a fixed area circular plot of a 12.6 metre radius, this equates to 0.05 ha. The presence of each snag/cavity tree equal to or greater than (≥) 25 cm DBH is recorded within each circular plot. The formula πr2 is applied to determine the number of snags/cavity trees per ha. If the snag density within the surveyed area is calculated to be ≥10 snags per ha, then the area should be considered candidate SWH for bat maternity colony habitat.

To supplement the snag density surveys, an acoustic survey for bats will be conducted using a Wildlife Acoustic's Echo Meter Touch 2 Pro ultrasonic module. The survey will involve listening for bat calls in conjunction with amphibian breeding surveys at determined locations within the Study Area. The survey will be conducted a half-hour after sunset when bats typically emerge from roosts to forage.

The results of the acoustic surveys were used to identify bat species present within the Survey Area.

Habitat for Species of Conservation Concern

In addition to the targeted wildlife and vegetation community surveys described above, general habitat observations will be noted as it relates to the habitat requirements for Species of Conservation Concern identified in **Table 2**.

Incidental Observations of Significant Wildlife Habitat

Any incidental observations of other candidate SWH features will be documented during all site visits. Specifically, observations associated with Seasonal Concentrations of Wildlife Habitat and Specialized Habitat for Wildlife will be made during all site visits.

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AMP-4
BBS-2
BBS-1
BBS-6
HPVS-5
HPVS-4
AMP-3
HPVS-3
HPVS-2
BBS-5
AMP-2
HPVS-1
BBS-3
AMP-1
BBS-4

Maxar

Legend

- Study Area
- Mosquito Creek
- Headwater Drainage Feature
- Subject Property
- Wetland
- Herptofauna Visual Encounter Survey Point
- Suitable Basking Habitat
- Breeding Bird Point Count Survey
- Amphibian Survey Points
- Red Tail Hawk Nest

0 0.04 0.09 0.18 0.27 0.36
Kilometers

1:5,900

Client:

Riverside South Development Corporation (RSDC)

Title:

RSDC Employment Lands: Field Survey Points

Prepared By:

IBI Defining the cities of tomorrow

Project: 137705

Date: 2022-08-10

Figure: 4

4.4 Species at Risk and Species at Risk Habitat

Targeted SAR surveys for Blanding's Turtle, Monarch, Butternut, and SAR bats were completed. The surveys also included general breeding bird surveys to record any potential SAR birds, specifically grassland birds. The bird survey is described in section 4.4.4.

Blanding's Turtle Basking Survey

Blanding's Turtle Visual Encounter surveys were undertaken as per the guidance provided in the '*Survey Protocol for Blanding's Turtle* (*Emydoidea blandingii*) *in Ontario'* (MNRF, 2015). Basking surveys (**see Figure 4 for survey locations**) are conducted within open wetland areas after the ice cover has melted and no later than June 15th. Surveys are to occur between 8 am and 5 pm during sunny periods when air temperature is warmer than the water temperature and is above 5˚C. Surveys can be conducted on overcast days when air temperature is above 15˚C and is higher than the water temperature. Five surveys were conducted.

Following are a few examples of how environmental conditions influence turtle detectability:

- On cool or warm sunny days, turtles will bask to warm up (high detectability).
- On cold overcast days turtles will have little energy and no opportunity to warm up so they will remain hidden and relatively inactive (low detectability).
- On hot sunny afternoons, especially in the summer, turtles will stay underwater or hide in dense vegetation avoid the sun and stay cool (low detectability).

Visual encounter surveys were conducted along the shoreline of the Mosquito Creek corridor, with identified potential basking sites being identified by personnel. Open water habitat was scanned using binoculars and vegetated shoreline was investigated by walking through the dense vegetation when present.

Monarch

Monarch detection and habitat assessment surveys were completed throughout the Study Area. The survey focused on areas with suitable habitat conditions (e.g. areas with abundant Milkweed (Asclepias sp.) and nectar producing plants. Surveys were completed between June and July 2022.

Butternut

IBI biologist conducted systematic searches for Butternut throughout the Study Area between July and August 2022. In addition, searches for Butternuts were also simultaneously completed during wildlife and vegetation surveys within Study Area during the 2022 field program.

The survey consisted of walking throughout the Study Area and identifying Butternut specimens. Once located, qualified biologist performed a preliminary Butternut Health Assessment (BHA) and followed guidelines outlined in Butternut Health Assessor's Field Guide (MNRF, 2015) and Butternut Assessment Guidelines: Assessment of Butternut Tree Health for the Purposes of the Endangered Species Act, 2007 (MNRF, 2014).

SAR Bats

The presence or absence of SAR bat habitat was evaluated by using methods described in Section 4.3.4. Subsequently, one round of acoustic monitoring was performed to determine the likelihood of SAR bats roosting within the Study Area. Suitable bat maternity colony habitat is present in the Study Area in the form of woodlands with multiple large diameter cavity trees.

Incidental Species at Risk and Species at Risk Habitat Observations

In addition to those species' surveys noted above, incidental SAR and SAR habitat observations were noted during all site visits.

Should any SAR or SAR habitat be identified within or adjacent to the site during field surveys, appropriate measures will be proposed to reduce or eliminate the impact of the proposed development on the observed species or habitat. This may include further consultation with the MECP and/or additional species-specific surveys.

4.5 Trees

Following the City of Ottawa's *Tree Conservation Report Guidelines* (City of Ottawa, 2019a), a tree inventory was completed in July 2020. As the entirety of the Study Area is dominated by either woodland or forest vegetation communities, a tree inventory was conducted by sampling nine 10' x 10'randomly selected plots (Error! Reference source not found.**5**).

Within each plot, any tree or shrub species that were 10 cm diameter at breast height (DBH) or greater were recorded and assessed. Each tree assessment recorded the following; species, DBH, health condition (trunk integrity, canopy structure, canopy vigor), UTM coordinate, and any other defects.

To identify Distinctive trees (≥50 cm DBH) on site, the Study Area was scoped on foot by walking transects throughout and recording the location, species, DBH, and health conditions of all Distinctive trees. Such surveys were conducted by an approved professional as outlined in the City guidelines.

4.6 Incidental Wildlife

A wildlife assessment within the property was completed through incidental observations during all site visits. Any incidental observations of wildlife as well as other wildlife evidence such as dens, tracks, and scat were documented by means of observational notes, and photographed. Such observations help validate our conclusions on the ecological function of the Study Area.

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Maxar

Legend

- Study Area
- Development Footprint
- Mosquito Creek
- Headwater Drainage Feature
- Subject Property
- Wetland
- Distinctive Trees
- Tree Inventory Survey Point

0 0.04 0.09 0.18 0.27 0.36

Kilometers

1:5,900

Client:

Riverside South Development Corporation (RSDC)

Title:

RSDC Employment Lands: Tree Inventory and Distinctive Trees

Prepared By:

IBI Defining the cities of tomorrow

Project: 137705

Date: 2022-08-10

Figure: 5

5 Results

The following sections outline the findings from the field surveys and characterize the existing conditions within the Study Area. Survey results are discussed below and illustrated in **Figures 4, 5, 6 and 7** depending on survey context.

Table 4 Field Survey Details (2022)

PURPOSE OF VISIT	DATE	TIME	PERSONNEL	WEATHER CONDITIONS	AIR TEMP (C)
Headwater Drainage Feature Assessment	29/04/2022	9:00 AM - 12:30 PM	L.Jackson	Sunny, moderate breeze	13
Amphibian Survey #1	04/05/2022	8:30 PM - 10:00 PM	L.Jackson	Clear skies, calm winds	13
Blanding's Turtle survey #1/ELC	12/05/2022	11:00 AM - 1:00 PM	L.Jackson & B.Semmler	Partly sunny, gentle breeze	30
Blanding's Turtle survey #2	20/05/2022	10:00 AM - 12:00 PM	L.Jackson & B.Semmler	Partly sunny, moderate breeze	27
Blanding's Turtle survey #3	25/05/2022	12:30 PM - 2:45 PM	L.Jackson & B.Semmler	Sunny, light breeze	21
Blanding's Turtle survey #4	31/05/2022	10:00 AM - 11:30 AM	B.Semmler	Sunny, moderate breeze	21
Amphibian Survey #2, Bat Survey #1	31/05/2022	8:30 PM - 10:30 PM	L.Jackson & B.Semmler	Night, 30% Cover, Moderate Breeze	17
Breeding Bird Point Count Survey #1/ELC	19/05/2022	9:00 AM - 12:30 PM	L. Jackson & B.Semmler	Cloudy/overcast, Slight breeze	13
Blanding's Turtle Survey #5	08/06/2022	1:30 PM - 3:00 PM	B.Semmler	Partly sunny, Moderate Breeze	22
Breeding Bird Point Count Survey #2	21/06/2022	8:00 AM - 10:00 AM	L.Jackson	Partly cloudy, Light breeze	20
Amphibian Survey #3, Bat Survey #2	23/06/2022	9:30 AM - 10:30 PM	L. Jackson & B.Semmler	Foggy/Hazey, Calm breeze	18
Breeding Bird Point Count Survey #3	29/06/2022	9:00 AM - 10:00 AM	L.Jackson	Cloudy/overcast, calm breeze	18
Tree Inventory/ELC	05/08/2022	10:00 AM - 3:00 PM	B.Semmler	Overcast, slight breeze	22

5.1 Site Investigations

Fieldwork conducted for the EIS and TCR took place between April 2022, and August 2022, when weather conditions and timing were deemed suitable based on the survey protocols being implemented. Fieldwork consisted of ELC of vegetation communities, Tree Inventory, HDF Assessment, breeding bird surveys, and amphibian breeding surveys. Any incidental wildlife observations made during the surveys were also documented. Curricula Vitae of key staff

involved in the project have been included in **Appendix A.** The dates, times, surveyor names, and weather conditions for all surveys are listed in **Table 4** above**.**

5.2 Aquatic Environment

A few intermittent and ephemeral watercourses were identified within the Study Area during the HDF Assessment. These features primarily consist of natural channels within the wooded valleylands, flowing toward Mosquito Creek.

The site drains north towards Mosquito Creek, with tributaries conveying flow from spring thaw, heavy rain events, and stormwater from recent development to the south, downstream toward the creek. The main tributary running north through the centre of the Study Area originates at a stormwater outlet on the north side of Spratt Road. Background mapping indicates that the upstream reaches of the tributary south of the Study Area have been removed and transformed into stormwater drainage for the extension of Spratt Road and recent development on the south side of Spratt Road. Other tributaries within the site convey drainage from the top of slope and are smaller, ephemeral features.

Fish Habitat

No important fish habitat was located within the Study Area outside the boundaries of the protected Natural Heritage Feature.

Headwater Drainage Features

HDF surveys conducted in 2022 evaluated a total of six (6) tributaries throughout the entire Study Area (**Figure 6**) to evaluate connectivity and contribution of surface water features to other natural heritage system features and functions, as well as the potential for amphibian and fish habitat.

The assessment determined that the headwater drainage features within the Natural Heritage Feature important fish habitat is limited to the This is dues to the ephemeral nature of the features, or barriers due to stormwater outlets making the reaches unsuitable for fish. Management recommendations are described in **Table 5** below**.**

HDF1-A

This reach borders the northern edge of the subject property and serves as a drainage ditch for agricultural fields to the north and the south. Water is also contributed to this feature during snowmelt and precipitation events from a ditch that runs adjacent to Limebank Road. The reach slopes towards a tributary that outlets towards the northwestern edge of the property, into the Mosquito Creek corridor. The ditch runs through a hedgerow towards a small stand of trees approximately 0.3 ha in size prior to discharging into the tributary.

The reach has an approximate depth of 110 mm and a bankfull width of approximately 1.3m. The reach runs within a hedgerow bordering two active agricultural fields on the left and the right with no in-stream vegetation noted apart from some hydrophilic terrestrial vegetation. Substrate within the features is predominantly organics and silt as the subdominant substrate. Deposition within this reach is consistent with sheet flow erosion from the adjacent agricultural fields and the deposition of organics from broadleaf tree and shrub species within the hedgerow. This reach has a slight gradient to the west allowing for some water flow, but the water appeared to be standing at the time of evaluation in April 2022. The feature lacks any defined pools.

No fish or wildlife were observed within this reach at the time of surveys.

HDF1-B

This reach borders the northern edge of the subject property and serves as a drainage ditch for agricultural fields to the south. The reach slopes towards a tributary that outlets towards the northwestern edge of the property, into the Mosquito Creek corridor. The ditch runs through an agricultural field and a meadow towards a small stand of trees approximately 0.3 ha in size prior to discharging into the tributary and is parallel to HDF1-A.

The reach has an approximate depth of 60 mm and a bankful width of approximately 3 m. The reach runs within a meadow bordering the feature, no in-stream vegetation noted apart from some hydrophilic terrestrial vegetation. Substrate within the features is predominantly organics and silt as the subdominant substrate. Deposition within this reach is consistent with sheet flow erosion from the adjacent agricultural fields and the deposition of organics from broadleaf tree and shrub species within the hedgerow. This reach has a slight gradient to the west allowing for some water flow, but the water appeared to be standing at the time of evaluation in April 2022. The feature lacks any defined pools.

No fish or wildlife were observed within this reach at the time of surveys.

HDF1-C

This reach borders the northern edge of the subject property and serves as a drainage ditch for agricultural fields to the east. The reach slopes towards a tributary that outlets towards the northwestern edge of the property, into the Mosquito Creek corridor. The ditch runs through a broadleaf meadow towards a small stand of trees approximately 0.3 ha in size prior to discharging into the tributary and is parallel to HDF1-B.

The reach has an approximate depth of 60 mm and a bankful width of approximately 1 m. The reach runs within a meadow bordering the feature, no in-stream vegetation was noted. Substrate within the features is predominantly sand and silt as the subdominant substrate. Deposition within this reach is consistent with sheet flow erosion from the adjacent agricultural fields. This reach has a slight gradient to the west allowing for some water flow, with minimal surface flows observed at the time of evaluation in April 2022. The feature lacks any defined pools.

No fish or wildlife were observed within this reach at the time of surveys.

HDF1-D

This reach extends from the agricultural field to the south and appears to have groundwater inputs. The reach slopes towards a tributary that outlets towards the northwestern edge of the property, into the Mosquito Creek corridor. The ditch runs through the agricultural filed, and then enters a broadleaf meadow before going through a deciduous forest type approximately 0.3 ha in size prior to discharging into the tributary and is perpendicular to HDF1-C.

The reach has an approximate depth of 75 mm and a bankful width of approximately 1 m. The reach runs within a meadow and forest bordering the feature, no in-stream vegetation was noted. Substrate within the features is predominantly sand and silt as the subdominant substrate. Deposition within this reach is consistent with sheet flow erosion from the adjacent agricultural fields. This reach has a slight gradient to the northwest allowing for the water to run towards the tributary. Substantial surface flows were observed at the time of evaluation in April 2022. The feature lacks any defined pools.

No fish or wildlife were observed within this reach at the time of surveys.

HDF2-A

This reach extends from a stormwater culvert located at the edge of Spratt Road and runs north through a deciduous forest type before discharging into reach HDF2-B. This reach runs within the boundary of the Natural Heritage Feature.

The reach has an average depth of approximately 110 mm, and a bankful width of 1 m and contains some in-stream vegetation. Deposition within this reach is consistent with deposition from upstream inputs, with large deposits of sand and silt. This reach lacks defined pools but had slight natural channel definition. Minimal surface flows were observed at the time of evaluation in April 2022, with only some standing water observed during field studies conducted in June.

No fish or wildlife were observed within this reach at the time of surveys.

HDF2-B

This reach extends from a culvert located at the edge of Limebank Road and runs west through scrubland and a forested valley before discharging into Mosquito Creek. This reach runs within the boundary of the Natural Heritage Feature.

The reach has an average depth of approximately 180 mm, and a bankful width of 3 m and contains some in-stream vegetation. Deposition within this reach is consistent with deposition from upstream inputs, with large deposits of sand and silt. This reach has some defined pools, with run and riffle sequences and natural channel definition. Substantial surface flows were observed at the time of evaluation in April 2022 and were still present during Amphibian Survey #3 on June 23, 2022.

Baitfish were observed within the reach at the time of surveys, and surveys completed by Niblett in 2012 confirmed that this reach is direct fish habitat.

HDF2-C

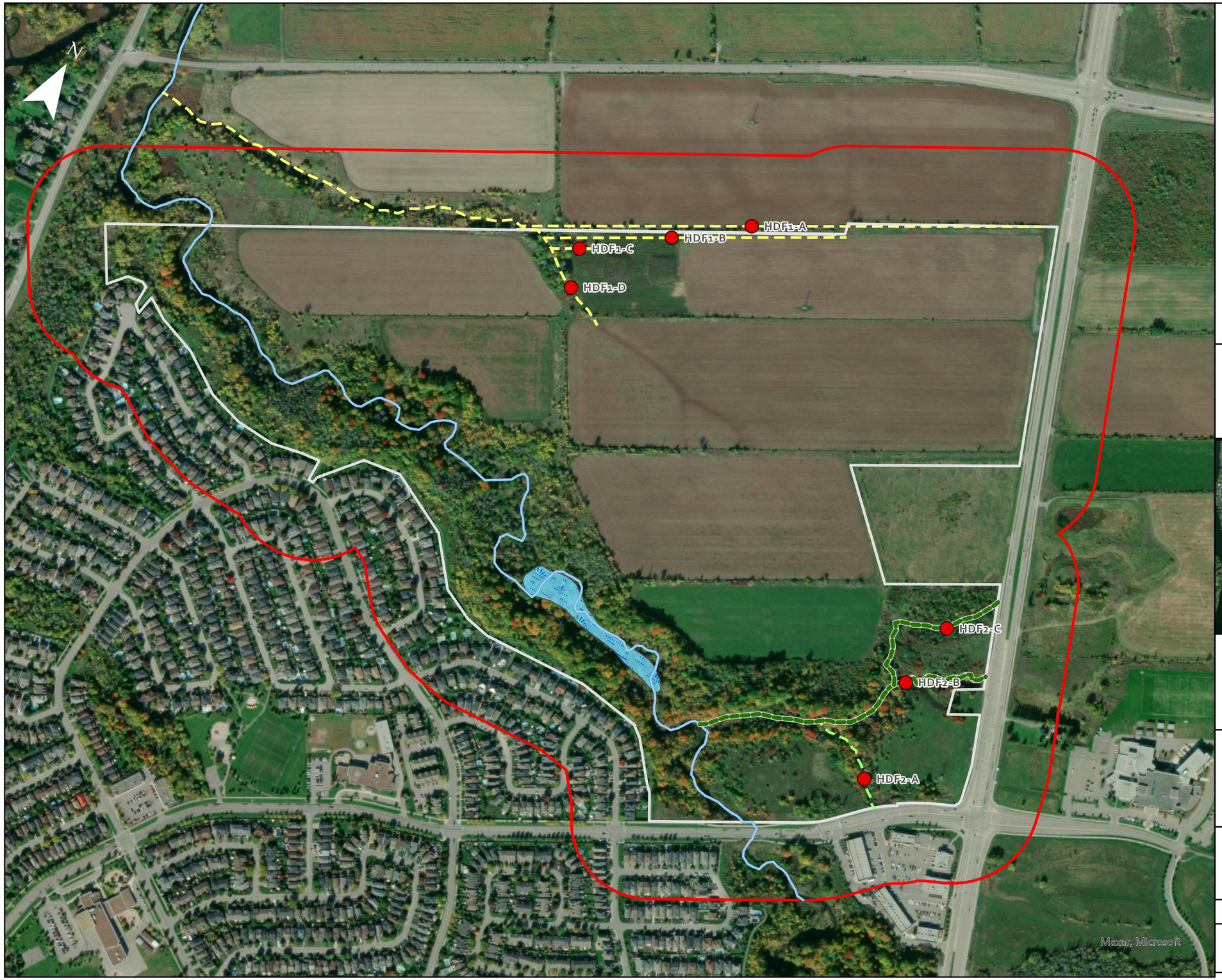
This reach extends from a culvert located at the edge of Limebank Road and runs west through scrubland, and then south towards a deciduous forest type towards a tributary and discharges into HDF2-B. This reach runs within the boundary of the Natural Heritage Feature.

The reach has an average depth of approximately 114 mm, and a bankful width of 2 m and contains some in-stream vegetation. Deposition within this reach is consistent with deposition from upstream inputs, with large deposits of sand and silt. This reach has some defined pools, with run and riffle sequences and natural channel definition. Substantial surface flows were observed at the time of evaluation in April 2022 and were still present during Amphibian Survey #3 on June 23, 2022.

Baitfish were observed within the reach at the time of surveys, and surveys completed by Niblett in 2012 confirmed that this reach is direct fish habitat.

Table 5 Headwater Draingae Feature Assessment Results

Drainage Feature Segment	Step 1		Step 2	Step 3	Step 4	Management Recommendation
	Hydrology	Modifiers	Riparian	Fish Habitat	Terrestrial Habitat	
HDF1-A	Contributing functions: Contains ephemeral flows fed by snowmelt, precipitation, and drainage from agricultural features and likely some stormwater inputs from Limebank Road	Flows within the hedgerow along two agricultural fields and discharges into the defined channel in the FODM-4 community.	Limited function: agricultural fields, hedgerow	Contributing functions	Limited functions	**Mitigation**
HDF1-B	Contributing functions: Contains ephemeral flows fed by snowmelt, precipitation, and drainage from agricultural features.	Flows within agricultural and meadow habitat into the defined channel in the FODM-4 community.	Limited function: agricultural fields, hedgerow, meadow	Contributing functions	Limited functions	**Mitigation**
HDF1-C	Contributing functions: Contains ephemeral flows fed by snowmelt, precipitation, and drainage from agricultural features.	Flows within meadow habitat into the defined channel in the FODM-4 community.	Limited function: agricultural fields, hedgerow, meadow	Contributing functions	Limited functions	**Mitigation**
HDF1-D	Valued functions: Contains intermittent flows fed by ground water inputs, snowmelt, precipitation, and drainage from agricultural features.	Flows begin within the agricultural field collecting into a defined channel within a meadow and continuing into FODM-4 community.	Valued function: meadow, scrubland, deciduous forest	Contributing functions	Limited functions	**Mitigation**
HDF2-A	Valued functions: Contains intermittent flows fed by snowmelt, precipitation, and drainage from adjacent land-use via stormwater infrastructure.	Flows from upland CUM habitat into a defined channel.	Important function: scrubland	Contributing functions	Contributing Functions	**Conservation**
HDF2-B	Important functions: Contains permanent flows fed by snowmelt, precipitation, and drainage from adjacent land-use.	Culvert – receives inputs from property southeast of Limebank Road and Spratt Road intersection	Important function: deciduous forest	Valued Functions	Valued functions	**Protection**
HDF2-C	Important functions: Contains permanent flows fed by upstream water feature.	Culvert – receives inputs from property east of Limebank Road	Important function: scrubland	Valued Functions	Valued functions	**Protection**



Legend

- Study Area
- Mosquito Creek
- Subject Property
- Wetland
- Headwater Drainage Feature Survey Point
- HDF - Protection
- HDF - Conservation
- HDF - Mitigation

0 0.04 0.09 0.18 0.27 0.36 Kilometers

1:5,900

Client:

Riverside South Development Corporation (RSDC)

Title:

RSDC Employment Lands: Headwater Drainage Features

Prepared By:

IBI Defining the cities of tomorrow

Project: 137705

Date: 2022-08-10

Figure: 6

5.3 Natural Heritage Features

5.3.1 Ecological Land Classification

The ELC survey identified a total of ten (10) vegetation communities within the Study Area, in addition to two (2) communities that are associated with transportation or agricultural land use.

The prominent vegetation communities within the Survey Area were meadow along with woodlands and thickets. All vegetation communities surveyed within the Survey Area are considered common within Ontario. **Table 6** below outlines the communities documented during ELC surveys and summarizes the abundant vegetation cover. The location, type, and boundaries of vegetation communities are delineated in **Figure 7**. Reference photos for the vegetation communities are included in **Appendix B**.

VEGETATION SURVEY

The vegetation survey identified 76 vegetation species within the Survey Area. 82% of the species identified were evaluated as being common within Ontario, having S-Ranks of S4 or S5. Nearly 16% of the species identified are considered as non-native or invasive in Ontario. Butternut was observed on site and contains as S-Rank of S2 (i.e. imperiled in Ontario).

Butternut, which is a provincial and federal SAR was within the Study Area within the FOD5-6 woodland communities. This species has an S-Rank of S2 and is currently listed as Endangered by the Committee on the Status of Endangered Wildlife in Canada (COSEWIC) and has protections under both SARA and the ESA. Vascular plant species observed within the Study Area are listed in Appendix C.

Table 6 Ecological Land Classification Survey Results

ELC TYPE	TOTAL AREA WITHIN STUDY	COMMUNITY DESCRIPTION
Annual Row Crops (OAGM1)		
OAGM1	35.6 ha	Agricultural land use is prevalent within the Subject Site. Row Crops of soybeans are planted within soils dominated with clay and silt.
Deciduous Thicket (THDM3)		
THDM3-2 Native Shrub Deciduous Hedgerow Thicket Type	2.57 ha	This community encompasses the areas between agricultural fields. Canopy and sub canopies were composed of American elm (*Ulmus americana*), green ash (*Fraxinus pensylvanica*) and Manitoba maples (*Acer negundo*). Various graminoids are within the ground cover layer.
THDM2-11 Hawthorne Deciduous Shrub Thicket Type	0.23 ha	This community was dominated by hawthorne (*Crataegus spp.*) species, common buckthorn (*Rhamnus cathartica*), and Canada plum (*Prunuis nigra*) of varying sizes.
THDM3 Dry-Fresh Deciduous Hedgerow Thicket Type	0.68 ha	Hedgerow thickets outline existing and decommissioned agricultural fields. Trembling aspen (*Populus tremuloides*) and American elm are present within the upper canopy, non-native honeysuckles (*Lonicera spp.*), wild red raspberries (*Rubus idaeus*), and river grapes (*Vitis riparia*) dominate the lower canopy.
THDM2-8 Raspberry Deciduous Thicket Type	3.82 ha	Dense wild red raspberry dominated thicket communities border the eastern edge of the deciduous forest.
THDM2-1 Sumac Deciduous Shrub Thicket Type	0.79 ha	This community is dominated by staghorn sumac (*Rhus typhina*), hawthorne sp., and common buckthorn.
Transportation and Utilities (CVI)		
CVI_1 Transportation	0.51 ha	This area consists of a gravel access pathway for agricultural vehicles.
Cultural		
CUM Cultural Meadow	10.15	Associated with areas of decommissioned agricultural fields. Canada goldenrod (*Solidago canadensis*), common milkweed (*Asclepias syriaca*), asters, mustards, and clovers were most present within these areas. These areas are associated with past agricultural land-use and have been recolonized predominantly by non-native species. Sections of this ELC type within the Study Area appear to be maintained adjacent to the intersection of Spratt Road and Limebank Road.
Deciduous Forest (FOD)		
FODM7 Fresh-Moist Lowland Deciduous Forest Type	24.87	This forest community contains variable species diversity and abundance. The canopy layer is composed of sugar maples (*Acer saccharum spp. saccharum*), basswood (*Tillia americana*), American elm and Ironwood (*Ostrya virginiana*). Lesser occurrences of red maples (*Acer rubrum*), burr oaks (*Quercus macrocarpa*), American beech (*Fagus grandifolia*) and butternut (*Juglans cinerea*) were observed along the sloped edge of Mosquito Creek. Ostrich fern (*Matteuccia struthiopteris*), sensitive fern (*Onoclea sensibilis*), red-osier dogwood (*Cornus sericea*), and young green ash are present within the understory. A variety of broadleaf herbaceous plants such as violets (*Viola spp.*), Canada anemone (*Anemonastrum canadense*), yellow trout lily (*Erythronium Americanum*), and Blue Cohosh (*Actaea racemose*) cover the ground layer.
FODM8-1 Fresh-Moist Poplar Deciduous Forest Type	2.03	This community is located at the northern end of the property. The core of the woodland is composed of burr oak, basswood and green ash whereas the edges of the woodland have a large presence of trembling aspen and common buckthorn. Understory and ground cover assemblages include Virginia creeper (*Parthenocissus quinquefolia*), red osier dogwoods, woodland strawberries (*Fragaria vesca*), violet species, spotted jewelweed (*Impatiens capensis*), Canada anemone and wild ginger (*Asarum canadense*)
Mixed Meadow (MEM)		
MEMM3 Dry-Fresh Mixed Meadow Ecosite	2.03	A naturalized meadow inclusive of goldenrod species, common vetch (*Vicia sativa*), clover, cinq-foil, and various graminoids dominate this area.
MEMM4 Fresh Moist Mixed Meadow Ecosite	3.81	Canary reed grass, goldenrod, asters, common dandelion (*Taraxacum officinale*), fragrant bedstraw (*Galium triflorum*) and rough bedstraw

Legend

- Study Area
- Subject Property

ELCDelineation

Habitat Notes

- CGL_2
- CUM
- MEMM3
- MEMM4
- OAGM1
- THDM2-1
- THDM2-6
- THDM2-8
- THDM3
- THDM3-1
- THDM3-2
- FODM8-1
- FODM7

0 0.04 0.09 0.18 0.27 0.36 Kilometers

1:5,900

Client:

Riverside South Development Corporation (RSDC)

Title:

RSDC Employment Lands: Ecological Land Classification

Prepared By:

IBI Defining the cities of tomorrow

Project: 137705

Date: 2022-08-08

Figure: 7

5.3.2 Wetlands

An unevaluated wetland is mapped in the NHIC database within the Natural Heritage Feature located approximately 100 m from the limit of development **(see Figure 8)**. Upon field investigation is was found that there was no standing water within the mapped area, but that rather this was a flat, low-lying riparian area that likely holds some water seasonally, and likely has a high water table due to the proximity to Mosquito Creek.

The wetland areas contain hydrophilic tree species such as green ash, silver maple, and sandbar willows (*Salix interior*) as well as ostrich ferns, sensitive ferns and horsetails. At the time of the ELC survey, there was no observed water within the limits of the wetland footprint. The ELC survey identified the area to be part of a broader ELC Fresh-Moist Lowland Deciduous Forest Type community. The area is a riparian area directly adjacent to Mosquito Creek.

Provincially Significant Wetlands (PSW) are absent from the Study Area.

5.3.3 Woodlands

The Fresh-Moist Deciduous Woodland / Buckthorn Deciduous Shrub Thicket (FODM7/THDM2-6) complex that occurs along the southern boundary of the Survey Area meets the prerequisite woodland designation as set out in the Forestry Act, R.S.O 1990, c.F.26.

In reviewing historic aerial imagery dating back to 1965 (57 years, current to 2022), the Mosquito Creek corridor appears to have been largely forested. The imagery suggests that the vegetation along the corridor likely exceeds 60 years in age, and therefore meet the minimum age requirement to be considered significant. The Woodland-1 areas are part of the FOD community located within the Natural Heritage Feature (see **Figure 1**). The aerial imagery from 1976 suggests that there are 3 distinct sections of woodlands that could be 60 years of age or older, all three areas are greater than 0.8 ha in size in 1976 therefore meet the minimum size requirements to be considered significant.

As an overall assessment of the entire FODM-7/THDM2-6 Woodland #1 complex found that the woodland associated with the Mosquito Creek corridor has been impacted by invasive species such as common buckthorn with areas transitioning from woodlot to buckthorn thicket as well as the Emerald Ash Borer and Dutch Elm disease. The canopy of the woodlot remains in overall good health, with a number of mature trees of larger DBH.

Woodland #2 is associated with the FOD8-1 forest located at the northern extent of the Study Area. Historic aerial imagery from 1976 suggests that only a very small patch of trees (~0.1 ha) within this woodland was present at that time, meaning that it does not meet the minimum size requirements to be considered significant. An overall assessment of this woodland found that it is impacted by pests such as the Emerald Ash Borer, and invasive species such as common buckthorn, with sparse occurrence of larger diameter trees.

Portions of the FODM7 forest complex (Woodland #1) are considered significant and are located within the Natural Heritage Feature and are not within the limit of development.

The thicket habitat associated with the woodland complex, as well as the FOD8-1 woodland at the northern extent of the Study Area are not considered significant.

5.3.4 Valleylands

During site visits, Valleylands were identified along the Mosquito Creek corridor. Significant Valleylands are defined within the City of Ottawa's Environmental Impact Study Guidelines as a valley with slopes greater than 15% and lengths over 50 m.

According to Paterson Group Inc. (2014), the valley running north through the Study Area is approximately 4 to 5 m in depth, while the width of the feature is approximately 15 to 20 m on

either side. Therefore, the percent slope on average would be greater than 30%. In addition, this feature is greater than 50 m within the Study Area, and contiguous with the greater Mosquito Creek valley outside of the Study Area boundary.

Therefore, the Mosquito Creek corridor is considered to be a significant valleyland.

The limit of development occurs at least 15 m from the stable top of slope in accordance to the City of Ottawa's Official plan, and therefore no impacts are predicted to the significant valleyland.

5.3.5 Significant Wildlife Habitat

Breeding bird, amphibian breeding, and bat echolocation surveys were conducted to establish baseline conditions within the Study Area.

Breeding Bird Survey

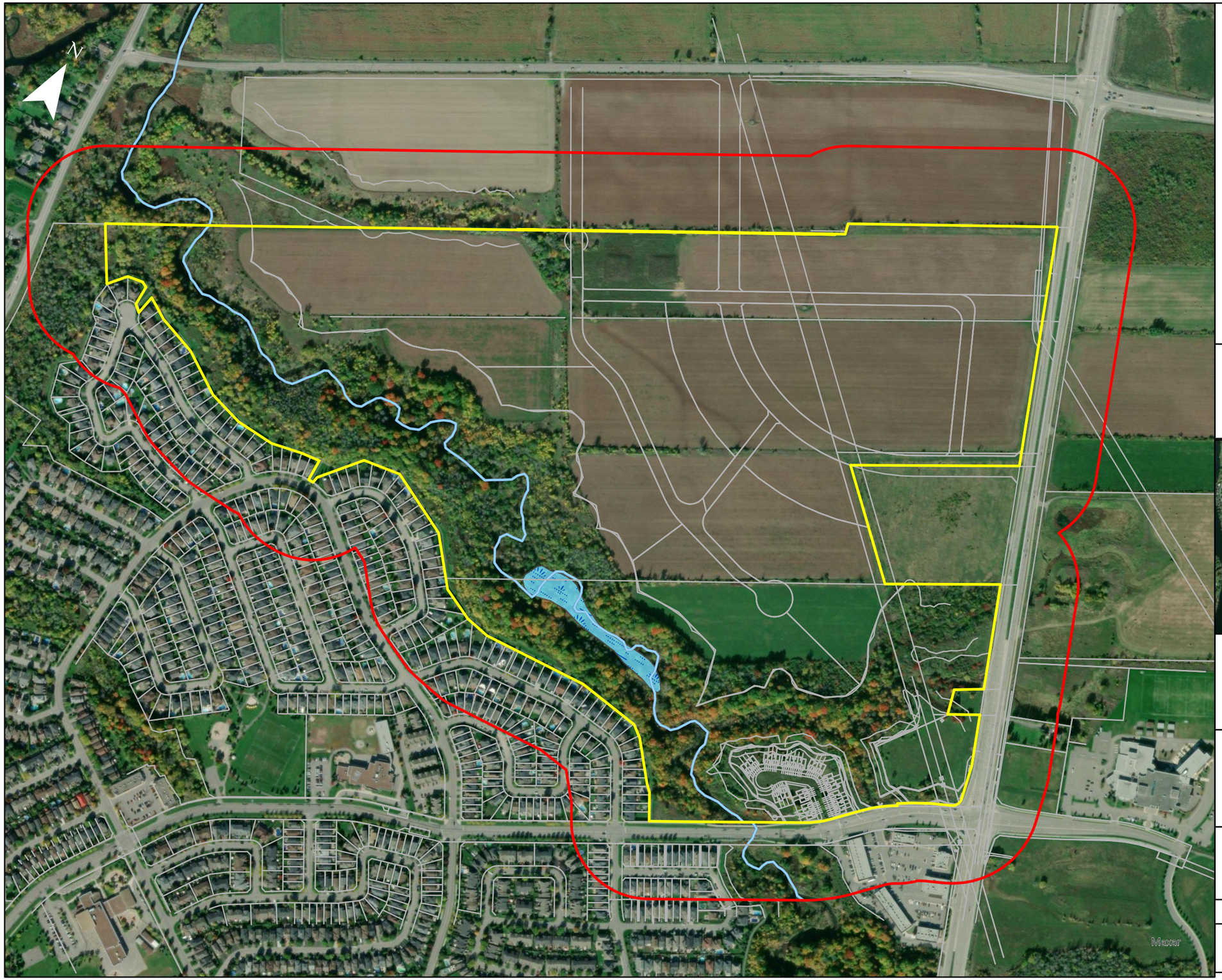
A total of 48 species were recorded during the surveys, and an additional two (2) were recorded incidentally during other field surveys. A record of the bird species observed within the Study Area, and their conservation status can be found **in Appendix D.** Of the species recorded, the majority exhibited probable or confirmed breeding evidence. Many of the birds recorded are common within the City of Ottawa. Only two (2) SAR birds, Bobolink and Chimney Swift, were recorded during the surveys. Some birds were considered to be fly-overs and were not using the study area as nesting habitat. Most birds observed on-site are common in Ottawa and have generally secure populations within Ontario.

No suitable nesting habitat was present within the Study Area for the Chimney Swift, and the bird was considered to be a fly-over and is likely using a structure in the adjacent lands for nesting or roosting.

Though Bobolinks were observed during field visit #1 (BBS-3) and #3 (BBS-2), significant habitat requires >50 ha of contiguous suitable habitat (meadows, grasslands, fallow fields) which are not present within the Study Area. It is possible that Bobolinks are using the fields to the east of Limebank Road, and to the north of Leitrim Road where suitable habitat exists.

A red-tailed hawk nest was observed within a large white oak tree within the central hedge row. A fledgling red-tailed hawk was observed perched at the edge of the nest during breeding bird survey #3, as well as two (2) adults who were vocally defending the nest. Location of the nest is identified in Figure 4.

Based on surveys conducted by IBI, the Study Area contains suitable habitat conditions to support breeding birds common to Ottawa and eastern Ontario. However, he results indicate that the Study Area is not considered SWH for breeding birds.



Legend

- Study Area
- Development Footprint
- Mosquito Creek
- Subject Property
- Wetland

0 0.04 0.09 0.18 0.27 0.36
Kilometers

1:5,900

Client:

Riverside South Development Corporation (RSDC)

Title:

RSDC Employment Lands: Ecological Land Classification

Prepared By:

IBI Defining the cities of tomorrow

Project: 137705

Date: 2022-08-10

Figure: 8

Amphibian Breeding Survey

In accordance with the Ecoregion 6E Criterion Schedule (MNRF, 2015b), three amphibian breeding surveys were completed to determine the presence of Amphibian Breeding Habitat for woodlands and wetlands within the Study Area. Woodland and wetland Amphibian Breeding Surveys were conducted in forest features with lowland depressions, as well as adjacent to shallow aquatic features that occurred within or in proximity to the 120 m Study Area.

Five (5) stations were monitored on three (3) separate occasions for frog calls, **no amphibians were heard vocalizing within any of the monitoring stations, or within the Study Area upon field visits.**

One (1) leopard frog was observed incidentally during daytime field surveys. No suitable vernal pools were identified within the Study Area.

In addition to those observations made during the formal surveys, amphibian species such as western chorus frogs, spring peepers, American toads and gray treefrogs were heard calling at the time of surveys, but never within the Study Area. Amphibian species such as the gray treefrogs, spring peepers, American toads, and western chorus frogs were heard calling from within the grasslands to the east of Limebank Road. Gray treefrogs were also heard calling on the west bank of the Mosquito Creek corridor. American toads were also heard calling north of the Study Area.

Based on the results of the amphibian surveys and general field observations in 2022, it is **not** likely that the Study Area contains suitable conditions to support wetland and woodland amphibian breeding – **and is not considered to be significant under provincial criteria.**

Bat Acoustic Monitoring

Potential suitable maternity colony habitat was found to be located outside the project footprint and therefore no candidate cavity and snag tree assessment was completed within the FODM-7 community. Due to the size and age of FODM8-1 woodland #2, it was determined that no significant habitat would be located within this stand. However, during the ELC survey and tree inventory field biologists encountered minimal amounts of candidate cavity and snag trees within the FODM8-1 community.

The acoustic monitoring detected a total of four species within the Mosquito Creek corridor (Woodland #1) these included; Big Brown Myotis, Hoary Bat, Silver Haired Bat and one SAR bat, the Little Brown Bat.

Based on the results of the acoustic surveys, it is likely that the Woodland # 1 and meadow habitats provide suitable foraging habitat. It is likely that Woodland #1 provides suitable maternity colony habitat SWH, however probable suitable habitat is located outside the limit of development and is located within a protected Natural Heritage Feature.

Habitat for Species of Conservation Concern

Potential habitat for three SCC (***Table 2***) were confirmed during the ELC assessment. Results of suitable habitat and the presence/absence of SCC within the Study Area include:

- **Monarch**: no monarchs were observed directly during field surveys, however several areas of suitable habitat containing Milkweed were recorded throughout the Study Area. It is likely that the Study Area contains breeding and feeding habitat for Monarch.

Incidental Observations of Significant Wildlife Habitat

There were no incidental observations of SWH during the preliminary site visit or ELC and tree surveys.

5.4 Species at Risk

The following sections describe the findings of the targeted SAR surveys.

Blanding's Turtle

Five (5) visual encounter surveys were conducted within the Mosquito Creek corridor. No Blanding's Turtles were observed during the survey and it was deemed that the corridor does not provide linkages to any breeding, feeding, or overwintering habitat for this turtle species due to the lack of marsh or open water habitat located within the Study Area. A Midland Painted Turtle and a Snapping Turtle were observed basking on woody debris within Mosquito Creek during Survey #1 and Survey #4.

Bobolink and Eastern Meadowlark

Three (3) breeding bird surveys were completed in suitable grassland habitat throughout the Study Area for Bobolink and Eastern Meadowlark. Three (3) male Bobolink were observed and heard calling at BBS-3 at the time of the first survey on May 20, 2022, however no nesting activity/behaviours were observed at the time of survey. Subsequent targeted surveys (or incidental observations) in this area did not identify further observations of Bobolink. As there were no substantive change to the available habitat, it is assumed that these birds chose other habitats/regions to pursue nesting.

Another two (2) Bobolink were heard calling from BBS-2 outside of the Study Area at the time of the third survey on June 30, 2022. No other Bobolink were observed within the Study Area during targeted surveys, or through incidental observation. No Eastern Meadowlark were observed during the targeted surveys or incidentally during other site visits.

Results from targeted field surveys indicated that no bobolink nesting activity or courtship behaviours was occurring within the Study Area. This suggests that that bobolink were simply using the habitat within the property for forging or as a stop over prior to the breeding season. Therefore, no "general habitat" is located within the Study Area.

Monarch

During all field investigations, surveys were conducted for Common Milkweed. Large concentrations of milkweed plants were present in all the MEMM3, CUM, THDM2-8 and MEMM4 ecosites and are likely to provide appropriate breeding ang feeding habitat for the Monarch.

Butternut

A search for butternut trees was conducted during the grouped tree inventory and two (2) butternut trees were identified within the proposed limit of development within the edge of the FODM7 (**Figure 10**).

SAR Bats

Two acoustic bat surveys were conducted within the Study Area and in total 32 bats were identified. Species recorded included Big Brown Myotis, Hoary Bat, Silver Haired Bat and one SAR bat, the Little Brown Bat.

The Little Brown Bat was identified foraging over the meadow habitat that is adjacent to the deciduous forest associated with the Mosquito Creek corridor.

Suitable maternity habitat for the Little Brown Bat is limited to cavity trees within Woodland #1 associated with the Mosquito Creek corridor and is located outside the limit of development. No impacts are predicted to maternity habitat for SAR bats. Foraging habitat exists along the forest edges, specifically where the forest edge is adjacent to meadow-type habitat such as MEMM3, CUM, and MEMM4 vegetation communities.

5.5 Trees

The woodland at the northern extent of the Study Area, the hedgerows, as well as a portion of FODM7 that is predicted to be impacted by the development (see **Figure 5** for inventory plot locations) were inventoried using groupings in forests with similar assemblages to characterize impacted trees.

Three (3) distinctive trees (Burr Oak, American Elm, Sugar Maple) (**see Table 7**) were identified during the tree inventory and are listed within **Table 7**. One Bur Oak was located withing FODM8-1 and the American Elm and Sugar Maple were located within the edge of FODM5-6.

The largest woodland within the Study Area (Woodland #1) is located within the Urban Natural Feature associated with the Mosquito Creek corridor. Only the small portion of the woodland that conflicted with the development area was inventoried as noted below.

Twenty-two (22) tree species were observed within the Subject Property and are listed below (trees marked with an asterisk (*) are non-native or invasive):

- **Balsam Popla**r (*Populus balsamifera*)
- **Bur Oak** (*Quercus macrocarpa*)
- **Butternut** (*Juglans cinerea*)
- **Canada Plum** (*Prunus nigra)*
- **Eastern Hemlock** (*Tsuga canadensis*)
- **Ironwood** (*Ostrya virginiana*)
- **Eastern White Cedar** (*Thuja occidentalis*)
- **Manitoba Maple** (*Acer negund*o)
- **Red Maple** (*Acer rubrum*)
- **Scots pine** (*Pinus sylvestris*)
- **American elm** (*Ulmus americana*)
- **Sugar Maple** (*Acer saccharum spp. saccharum*)
- **Trembling Aspen** (*Populus tremuloides*)
- **White Ash** (*Fraxinus americana*)
- **White Oak** (*Quercus alba*)
- **White Spruce** (*Picea glauca*)
- **Eastern Hemlock** (*Tsuga canadensis*)
- **Basswood** (*Tilia americana*)
- **Black Walnut** (*Juglans nigra*)
- **Common Buckthorn** (*Rhanmnus cathartica*)*
- **Green Ash** (*Fraxinus pennsylvanica*)
- **White Ash** (*Fraxinus americana*)

Randomly selected tree inventory plots (10’x10’) were surveyed within areas of anticipated vegetation removal in Woodland-1 (FODM7), Woodland-2 (FODM8-1), and Hedgerow (THDM3-1). The section of Woodland-1 that was surveyed has a high concentration of buckthorn (24%) with equal parts American elm (14%) and basswood (14%). DBH measurements indicate a young to mid-aged stand. An inclusion of THDM2-6 is located along the north-eastern edge of Woodland-1 and was additionally surveyed as the area is located within the line of development.

THDM2-6 is composed of young American elm with an average DBH of 5 cm. Young buckthorns are prevalent within the inclusion that additionally features no canopy or sub-canopy.

Survey results from Woodland-2 show that basswood is the most abundant tree species (37%) followed by Trembling Aspen (21%), and Hawthorne (16%) species. Trees within this stand were relatively young with a DBH of 9.2 cm. More mature tree species are centrally concentrated in the stand in addition to poplars lining the edges of the stand.

Inventory results from the surveyed Hedgerow indicate that younger green ash (80%) are dominant with smaller quantities of white ash (10%) and red oak (10%). The DBH measurements for these trees are 11cm.

Table 7 Distinctive Trees

TREE ID	COMMON NAME	SCIENTIFIC NAME	DBH (CM)	CONDITION	EASTING	NORTHING
1	Burr Oak	*Quercus macrocarpa*	95	Very Good	446676	5015391
2	Sugar Maple	*Acer saccharum*	69	Good	446677	5015391
3	American Elm	*Ulmus americana*	61	Good	446676	5015391

5.6 Ecological Linkages

Based on the background review it was noted that the Study Area may provide some linkage functions connecting habits along Mosquito Creek corridor to the Rideau River shoreline. The width of this corridor provides suitable habitat for wildlife to move across the landscape without substantive disturbance from people or other adverse effects. However, there is no substantive 'core area' that this habitat connects which limits the ultimate function of this linkage.

5.7 Incidental Wildlife

In addition to the incidental bird observations which have been listed in Appendix D, the following incidental wildlife observations were made during site visits:

- White-tailed deer and evidence of deer bedding (depressed grass and vegetation, as well as visual encounters with deer on two occasions);
- Visual encounters as well as auditory evidence of coyotes;
- Common raccoon tracks within the Study Area;
- Meadow vole (*Microtus pennsylvanicus*);
- Eastern Gray Squirrel (*Sciurus carolinensis*);
- Eastern Cottontail (*Sylvilagus floridanus*); and,
- Eastern garter snake (*Thamnophis sirtalis sirtalis*).

6 Description of the Proposed Project

Riverside South Development Corporation is proposing to develop a multi-land use development including; single family townhomes in the south-western quadrant, and institutional and/or employment development including rights-of-way connecting to Limebank Road and Spratt Road throughout the southeastern and northern portions of the Study Area. The majority of the proposed development does not have a confirmed site plan, however the limit of development and proposed block plan is illustrated on **Figure 8.**

As illustrated, the proposed plan has been developed to minimize impacts on natural features within and adjacent to the limit of development. The development also provides pedestrian access to the Natural Heritage Features through a multi-use path system that would run adjacent to the Natural Heritage Feature and provide connectivity to the broader active transportation network.

6.1 Construction Activities

It is assumed the development of this property will include the following major project components:

- Surveying and staking out the development;
- Clearing, excavation, and grading property to accommodate construction;
- Installation of storm water drainage network and related infrastructure;
- Excavation to accommodate underground utilities including water, sewer, gas, and hydro;
- Construction of buildings, driveways, and access roads;
- Paving parking areas and access roads;
- Landscaping and fencing;
- On-going usage and maintenance.

Legend

- Mosquito Creek
- Study Area
- HDF - Removal
- Subject Property
- Vegetation Removal
- Wetland

ELC Delineation

- CGL_2
- CUM
- FODM4
- FODM5-6
- MEMM3
- MEMM4
- OAGM1
- THDM2-1
- THDM2-6
- THDM2-8
- THDM3
- THDM3-1
- THDM3-2

0 0.04 0.09 0.18 0.27 0.36 Kilometers

1:5,900

Client:

Riverside South Development Corporation (RSDC)

Title:

RSDC Employment Lands: Anticipated Impacts

Prepared By:

IBI Defining the cities of tomorrow

Project: 137705

Date: 2022-08-08

Figure: 9

7 Impact Assessment and Mitigation

The following sections describe the anticipated environmental impacts associated with the proposed development and the general measures that should be considered to mitigate the associated impacts. The impact assessment and associated mitigation considers both temporary (i.e. construction related) impacts and permanent impacts associated with the occupation of the development. The anticipated impacts are illustrated in Error! Reference source not found.

7.1 Aquatic Habitat and Headwater Drainage Features

Based on the proposed Draft Plan of Subdivision and expected remediation and construction activities, it is anticipated that the HDF's at the northern extent of the Study Area will be permanently removed. However, as noted in the Headwater Drainage Feature classification results table (**Table 5**), these HDF features have been classified as requiring 'Mitigation' due to their limited ecological function. Their permanent removal is not expected to have a significant negative ecological affect on aquatic habitat within the Study Area or in the surrounding landscape.

The following impacts to aquatic habitat from the proposed development and associated construction activities are expected:

- Permanent removal of disconnected swales from the subject property; and,
- Reduction of natural drainage features and patterns, specifically as potential inputs to wetland cells.

Proposed Mitigation Measures – Planning and Design Stage

- ✓ Stormwater retention, site grading, and quality control measures should be designed to appropriately direct stormwater and surface flows to maintain the function of the HDF features identified.

Proposed Mitigation Measures – Construction Implementation

The following general mitigation measures are recommended to address impacts on the aquatic habitat adjacent to the development area:

- ✓ Light-duty silt fencing (OPSD 219.110) and / or other equivalent erosion and sediment control measures should be installed round the perimeter along the edge of the Natural Heritage Feature to clearly demarcate the development area and prevent erosion and sedimentation into adjacent habitats (i.e. ditches along railway to the south of the subject property). Erosion and sediment control measures should be monitored weekly to ensure they are functioning properly and if issues are identified should be dealt with within 48 hours of notification;
- ✓ Stockpiling of excavated material should not occur outside the delineated work area. If stockpiling is to occur outside of this area, double-row silt fencing and straw bales shall be used to contain any spoil piles to prevent sedimentation into adjacent areas;
- ✓ A spill response plan shall be developed by the contractor and implemented as required.

With the successful implementation of the mitigation measures outlined above, impacts from the proposed development on the aquatic environment is expected to be permanent, but negligible in the context of the greater watershed due to the limited function and connectivity of aquatic habitat features of the impacted drainage features.

7.2 Natural Heritage Features

7.2.1 Vegetation Communities

It is anticipated to accommodate the construction of the residential and commercial development, including parking and access roads, portions of the Study Area and associated vegetation communities will be cleared and graded. The impacts associated with this clearing will include:

- The permanent loss of or disturbance to native vegetation is approximately 25.19 ha of native vegetation and approximately 35.6 ha of agricultural row crop (see Error! Reference source not found. **9**). This disturbance is directly associated with the clearing required to accommodate the Project. The area of vegetation planned for removal is separated below per ELC community:
    - 1.15 ha of FODM7
    - 2.04 ha of FODM8-1
    - 2.03 ha of MEMM3
    - 3.81 ha of MEMM4
    - 0.34 ha of THDM2-6
    - 3.82 ha of THDM2-8
    - 0.48 ha of THDM3
    - 1.6 ha of THDM3-1
    - 0.44 ha of THDM3-2
    - 0.79 ha of THDM2-1
    - 8.92 ha of CUM
- Accidental damage or loss of trees and other vegetation features because of site alteration or construction activities;
- The permanent loss of habitat for wildlife dependent upon the terrestrial communities;
- Changes in natural drainage;
- Decreased biodiversity, reduced number of species, or abundance of species;
- Erosion and sedimentation into adjacent vegetation communities;
- Permanent loss of native vegetation due to increased potential for non-native and invasive vegetation species after development.

Proposed Mitigation Measures – Planning and Design Stage

- ✓ Landscaping plans shall incorporate naturalized features with native vegetation seeding and plantings where feasible. For example, a naturalized pollinator gardens and rain gardens should be designed and planted adjacent to parking lots to provide native vegetation as well as an opportunity for infiltration of stormwater run off to minimize erosion within the adjacent valleylands.
- ✓ Where development encroaches into the FODM7 and THDM2-6 habitat, a forest edge restoration plan shall be developed to replace removed native trees and shrubs. This should include a monitoring plan to monitor the establishment of non-native and invasive species.
- ✓ Development and implementation of invasive species management plan for vegetation removals and landscaping, specifically to address abundant species such as Buckthorn.
    - Management plan should be consistent with federal standards under the federal Invasive alien species strategy (Environment Canada, 2004)

Proposed Mitigation Measures – Construction Implementation

The following general mitigation measures are recommended to address impacts on the terrestrial environment adjacent to the development area:

- ✓ Orange snow fencing or other suitable security fencing shall be used to delineate the construction limits from the adjacent habitat of the existing Natural Heritage Feature. This will prevent encroachment of construction activities into the adjacent natural feature. This fencing should be monitored weekly to ensure it is functioning properly. Any deficiency in the fencing should be dealt with within 48 hours of notification;
- ✓ Erosion and sediment control plan shall be implemented to prevent sedimentation outside of work areas, specifically within the Natural Heritage Feature;
- ✓ Landscaping plans shall make use of appropriate native species to offset the loss of species and biodiversity from vegetation removals;
- ✓ Invasive species to be removed shall be done so using species-appropriate methods to prevent further contamination, and comply with invasive species legislation;
- ✓ Machinery will arrive on site in a clean condition and will be free of fluid leaks, invasive species, and noxious weeds;
- ✓ Machinery shall remain within the limit of development and shall be stored in an area that is isolated from the Natural Heritage Feature to ensure that no deleterious substances enter the adjacent watercourse;
- ✓ All excess construction material will be removed from site and the area restored with seeding of native species upon project completion as required.

Proposed Mitigation Measures – Post-Construction

- ✓ Naturalized features such as pollinator gardens, rain gardens and native tree and shrub planting shall be monitored according to the developed monitoring plans;
- ✓ Installation of garbage bins in public spaces is recommended to limit trash habitats adjacent to the development area;
- ✓ 'No Littering' signage is recommended around the property to discourage littering; and,

With the successful implementation of the mitigation measures outlined above, a low decrease in native terrestrial vegetation is anticipated due to a minor amount of vegetation proposed for removal.

7.2.2 Woodlands

It is expected that approximately 1.49 ha of Fresh-Moist Lowland Deciduous/Buckthorn Deciduous Shrub Thicket complex (FODM7/THDM2-6) will be cleared to accommodate site remediation, development of the commercial units. Additionally, approximately 2.04 ha of Fresh-Moist Poplar Deciduous Forest Type (FODM8-1) will be removed.

This section of the FODM7/THDM2-6 woodland has some remaining mature and healthy trees but there is widespread evidence of Emerald Ash Borer damage to mature ash trees throughout the woodland. Additionally, there is a large presence of common buckthorn encroaching from the THDM2-6 community, and butternut trees impacted by butternut canker have been identified within this section of woodland.

Woodland removal in this area will negatively impact the abundance and diversity of native woodland vegetation, decrease canopy cover and permeable surfaces, and reduce available terrestrial habitat for wildlife.

To offset the loss of woodlands within the subject property, it is recommended to develop an enhanced planting and reforestation plan with native trees and shrubs throughout the edge of the Natural Heritage Feature along the proposed multi-use path.

Re-planting and vegetating the edge of forest with native vegetation with appropriate native species would improve the biodiversity and ecological functions of these areas, as well as improve the social functions and benefits (i.e. aesthetic appeal, opportunities for interaction) for nearby residents.

The development of a planting plan should be done in coordination with the City of Ottawa to identify targets for planting and appropriate species.

The anticipated impacts to woodlands include:

- The permanent loss of approximately 3.53 ha of non-significant woodlands within the proposed development area, including;
  - 1.15 ha of Fresh-Moist Lowland Deciduous Forest (FODM7)
  - 0.34 ha of Buckthorn Deciduous Shrub Thicket (THDM2-6)
  - 2.04 of Fresh-Moist Poplar Deciduous (FODM8-1)
- Decreased biodiversity, reduced number of species, or abundance of species;
- The permanent loss of habitat for wildlife dependent upon these woodlands;
- Decrease of permeable surfaces and surface drainage;
- Reduced canopy cover; and,
- Erosion and sedimentation into adjacent habitats.

Proposed Mitigation Measures – Planning and Design Stage

- ✓ Development of enhanced tree planting and reforestation plan as compensation for woodland habitat loss, as described in Section 7.2.1.

Proposed Mitigation Measures - Construction Stage

The following general mitigation measures are recommended to address impacts on the woodlands within the proposed development blocks:

- ✓ General project landscaping plans should consider use of appropriate native species to offset loss of species, biodiversity, and canopy cover from vegetation removals; and,
- ✓ General mitigation for vegetation removals as described in Section 7.2.1.

It is anticipated that the clearing of woodlands within the subject property will result in an overall reduction of woodland habitat within the property; although this will be offset by an increase of native plant diversity and a large reduction of non-native vegetation.

7.2.3 Significant Wildlife Habitat

BREEDING BIRDS

It is expected that the removal and disturbance to forest, thicket, and meadow within the proposed development area will result in a loss of potential nesting and foraging habitat for birds.

The following direct and indirect impacts on breeding birds are a possible result of the proposed development:

- The permanent loss of nesting and foraging habitat will likely result from the clearing of vegetation within the property;
- Potential physical harm to birds or birds' nests during clearing and construction activities;
- Reduced composition, distribution, and abundance of a bird species within the area;
- Predation by domestic cats during occupation; and,
- The increased potential for fatal bird collisions associated with building windows following construction.

Proposed Mitigation Measures – Planning and Design Stage

"Bird-friendly" building design principals should be considered in the design of the development. Potential measures may include the following:

- ✓ General building design should incorporate the City of Ottawa's bird-friendly design guidelines where possible (City of Ottawa, 2020);
- ✓ Enhanced tree planting and reforestation measures should consider bird breeding and foraging habitat within the subject property.

Proposed Mitigation Measures – Construction Implementation

The following mitigation measures are intended to address potential impacts to breeding birds resulting from the proposed development:

- ✓ Clearing of vegetation should be avoided during the breeding bird season, between April 15th and August 15th. Should any clearing be required during the breeding bird season, nest searches shall be conducted by a qualified person must be completed 48 hours prior to clearing activities. If nests are found, an appropriate setback will be established by the qualified professional. No work will be permitted within this setback in accordance with the federal Migratory Birds Convention Act (MBCA) (Government of Canada, 1994);
- ✓ A qualified bird rehabilitation centre should be contacted if any birds are injured or found injured during construction activity. Injured birds should be transported to a qualified for care with a small donation of money to help pay for the care (a local facility is the *Ottawa Valley Wild Bird Care Centre*);
- ✓ The construction area should be pre-stressed prior to any vegetation clearing within the proposed development area; and,
- ✓ Other mitigation measures outlined in the *Protocol for Wildlife Protection during Construction* (City of Ottawa, 2015) should be considered prior to construction of the proposed development.

With the successful implementation of the recommended mitigation, a temporary site-wide loss of breeding and foraging habitat for birds is expected.

BAT MATERNITY COLONY SWH

Based on the Draft Development Concept Plan and the extent of grading, it is anticipated that a small fragment of the available bat habitat will be impacted. With the implementation of tree planting throughout the subject property, specifically within the forest edge of the Natural Heritage Feature, it is likely that these areas may provide suitable habitat in the future once

planted trees grow to maturity. Artificial roosting structures such as bat boxes can be constructed to provide immediate available roosting habitat within the edge of the limit of development.

The following impacts on bat maternity roost habitat are possible:

- Permanent loss of candidate roost trees within forested habitat from vegetation removals;
- Permanent loss of candidate foraging area within meadow habitat from vegetation removals and construction activities;
- Temporary loss of woodland habitat; and,
- Accidental displacement, injury, or death of bats which may be using woodlands as temporary roosting habitat during roosting period.

Proposed Mitigation Measures – Construction Implementation

- ✓ Enhanced tree planting measures should be implemented into the landscape design. Planted trees may provide suitable roosting habitat upon reaching maturity;
- ✓ Installation of four large bat boxes (two per post); placed in appropriate open areas, associated the edge of forest;
- ✓ Clearing of vegetation should be avoided during the general active and maternity roosting periods for bats (May 1st to October 15th).

With the successful implementation of the mitigation measures outlined above, it is anticipated that the proposed development will result in a negligible impact to bats and bat habitat within the Study Area.

HABITAT FOR SPECIES OF CONSERVATION CONCERN

Habitat for one (1) Species of Conservation Concern (Monarch) was encountered on-site during field investigations and candidate habitat for five other Species of Conservation Concern was identified within the Study Area. The following impacts to Species of Conservation Concern are expected:

- Disturbance or removal of suitable marginal breeding and feeding habitat for Monarch;
- Accidental harm or injury to Monarch during construction activities.

Proposed Mitigation Measures – Planning and Design Stage

- ✓ Development and implementation of invasive species management plan, specifically addressing dog strangling vine (*Cynanchum rossicum*), should be implemented to limit risk of harmful plants to Monarch and Species of Conservation Concern birds.

Proposed Mitigation Measures – Construction Implementation

- ✓ Clearing of vegetation should be avoided between April 15th and September 15th, to avoid potential physical harm to Monarch and Species of Conservation Concern birds during breeding and foraging seasons; and,
- ✓ Construction areas should be pre-stressed during clearing to allow Species of Conservation Concern to safely leave the area.

Proposed Mitigation Measures – Post-Construction

- ✓ Pesticide use should be limited, or avoided when possible, in landscape maintenance to reduce risk of exposure to Monarch.

With the successful implementation of the mitigation measures outlined above, it is anticipated that there will be minimal impacts to Species of Conservation Concern.

7.3 Species at Risk

Butternut

Two (2) Butternut trees (listed as Endangered both federally and provincially) were observed within the Study Area at the time of field investigations and therefore, have a high potential to be impacted by the proposed construction activities. **Figure 10** displays the impact to Butternuts, and Table 8 provides the trees location, DBH, and their associated health categories.

Table 7 Distinctive Trees

TREE ID	COMMON NAME	SCIENTIFIC NAME	DBH (CM)	CONDITION	EASTING	NORTHING
BN-1	Butternut	*Juglans cinerea*	25	Poor	446676	5015391
BN-2	Butternut	*Acer saccharum*	8	Very Good	446676	5015391

Butternut is protected under the ESA. Section 9 of the ESA includes prohibitions against activities, such as killing or harming a living Butternut specimen. Section 10 of the ESA includes prohibitions against damage or destruction of Butternut habitat. However, the ESA and Ontario Regulation (O. Reg.) 242/08 includes exemptions that would otherwise be prohibited by the Act. O. Reg. 242/08 provides conditional exemptions from prohibitions for certain activities that may affect Butternut.

For most activities that involve killing or harming a species, a proponent's eligibility for exemptions is dependent on the Category of a tree, which has been assigned by a Butternut Health Assessor. For example, Category 1 (non-retainable) trees are exempted from clause 9 (1) (a) of the ESA, and trees under this category can be killed, harmed, or taken without authorization if all the exemption provisions have been met (s. 23.7 of O. Reg. 242/08). This also applies to Category 2 (retainable) trees, where ≤ 10 trees are proposed to be killed, harmed, or taken. If greater than 10 trees are proposed for removal, an ESA authorization will be required and exemption provisions under s. 23.7 of O. Reg 242/08 does not apply. Exemption provisions under s. 23.7 of O. Reg 242/08 does not apply to Category 3 (retainable and archivable) trees and proponents must seek an ESA authorization.

Category 1 and 2 trees are eligible for exemption under the Act, while the Category 3 trees will require an ESA authorization. A preliminary assessment those trees found within the Study Area suggests they are Category 2 and eligible for an exemption under the Act. However, further butternut health assessments are required to confirm prior to the removal of these trees.

Legend

- Study Area
- Development Footprint
- Mosquito Creek
- Headwater Drainage Feature
- Subject Property
- Butternut

0.00 0.01 0 0.01 0.02 0.03 0.04
Kilometers

1:1,047

Client:

Riverside South Development Corporation (RSDC)

Title:

Employment Lands:
Butternut Location

Prepared By:

IBI Defining the cities of tomorrow

Project: 102101

Date: 2022-08-09

Figure: 10

Proposed Mitigation Measures – Planning and Design Stage

- ✓ Prior to the removal of butternut trees within the Study Area, a Butternut Health Assessment will need to be completed by a qualified individual.
- ✓ Submission of Butternut Health Assessment report to MECP and consultation to discuss next steps in the approvals process;
- ✓ Retention of Butternut trees within the Project footprint, plus a 50 m buffer, until activities have been registered or a permit has been issued.

Proposed Mitigation Measures – Construction Implementation

- ✓ Construction awareness training package should be provided to contractors working on-site. The package will provide general information and mitigation for Butternut and other natural heritage features that may be encountered directly or indirectly on site and standard procedures if encountered;
- ✓ Butternut clearing should occur when construction activities (e.g. grading, excavation) are imminent to reduce the potential for new seedlings to regenerate.

It is likely that ESA authorization (registration) will be required prior to the removal of the butternut trees on this property. Site alteration should be avoided until appropriate authorization is given.

Bobolink and Eastern Meadowlark.

It is anticipated that vegetation clearing and construction within the meadow habitat within the development area will result in the permanent but non-limiting removal of foraging habitat for Bobolink and Eastern Meadowlark habitat. It is also possible that vegetation clearing may result in the displacement, injury, or death of Bobolink or Eastern Meadowlark which may occur within the Survey Area.

Mitigation During Construction

- ✓ Vegetation clearing should be avoided between April 15th and August 15th to avoid potential physical harm to Bobolink and Eastern Meadowlark; and
- ✓ Environmental awareness information package should be delivered to construction staff to make them aware of potential presence of SAR and protocols if SAR are found incidentally during work activities.

With the successful implementation of the recommended mitigation, it is expected that the proposed development will have no direct impacts to Bobolink or Eastern Meadowlark.

SAR BATS

It is expected that the proposed development will have limited negative impacts to SAR bats within the Study Area. The limited tree clearing proposed will remove small numbers of candidate roost trees and disturbance to meadow habitats will remove potential foraging habitat. Impacts include:

- — Permanent loss of candidate roost trees within forest habitat from vegetation removals;
- — Permanent loss of candidate foraging area within meadow habitat from vegetation removals and construction activities; and,

— Accidental displacement, injury, or death of bats which may be using woodlands as temporary roosting habitat during roosting period.

Mitigation During Construction

- ✓ Clearing of vegetation should be avoided during the general active and maternity roosting periods for bats (May 1st to October 15th);
- ✓ Construction areas should be pre-stressed during clearing to allow SAR bats to safely leave the area; and,
- ✓ Installation of bat boxes as per the recommendations in Section 7.2.3.
- ✓ Environmental awareness training and materials should be provided to construction staff by a qualified biologist to make construction staff aware of safety protocols should SAR be encountered directly during construction activities.

With the successful implementation of the recommended mitigation, it is expected that the proposed development will have no direct impacts to SAR Bats and any impacts to SAR Bat habitat will be non-limiting.

7.4 Trees

It is understood that the site development will require grading and will therefore require tree clearing, including all distinctive trees throughout a portion of the FODM7/THCM2-6 community. The tree removals will result in a permanent decrease in primarily young to mid-aged trees. As described in **Section 5.4**, the tree community within the limit of development consists mainly of less desirable native and/or invasive species with an average DBH 9.2 cm. Older trees are predominantly located within the FODM8-1 forest community, with trees in the FODM7/THCM2-6 community being composed of some mature canopy trees, but largely understory and sub-canopy level trees and less suitable canopy cover. These trees have populated the subject property as a result of widespread dieback of Ash trees (from EAB), and the regeneration of cultural thickets.

To offset the loss of trees within the subject property, it is recommended to incorporate tree plantings throughout the development. This includes streetscape and parkland plantings, as well as increased tree planting within the forest edge and along the proposed multi-use path and in appropriate areas around the development. Replanting native trees throughout the subject property will increase the overall diversity, mitigate against the encroachment, and spread of non-native tree and shrub species such as Buckthorn, and generally improve the long-term health and function of trees.

Proposed Mitigation Measures – Planning and Design Stage

- ✓ The landscape plan should include tree planting recommendations consistent with the City of Ottawa's target for increased canopy cover to the extent possible within the property;
- ✓ Invasive species, such as Buckthorn should be prioritized for removal and replacement with suitable native species; and,
- ✓ Prior to construction activities, overhanging limbs and any exposed tree roots of trees to be retained (property boundary) should be pruned in a manner that minimizes physical damage and promotes quick wound closure and regeneration. Maintenance of roots or limbs should be carried out by an ISA Certified Arborist or a tree care specialist under the supervision of an ISA Certified Arborist.

Proposed Mitigation Measures – Construction Implementation

- ✓ Tree removals should occur throughout the subject property at the same time rather than in a phased approach;
- ✓ Trees protection fencing should be installed around all trees that will be retained (i.e. property boundary) within and around work areas;
    - Protection fencing around trees that will be retained shall be installed at the critical root zone (CRZ) to ensure no impacts to this area. The CRZ is calculated as the DBH x 10 cm;
    - Groups of trees can be fenced together as long as the fencing still meets the recommended placement described above;
    - Fencing should be installed following the City of Ottawa's Tree Protection Specification (City of Ottawa, 2019);
- ✓ Do not place any material or equipment within the CRZ of any trees to be preserved;
- ✓ Do not attach any signs, notices, or posters to any tree;
- ✓ Do not raise or lower the existing grade within the CRZ of trees without approval;
- ✓ Do not tunnel or bore when digging within the CRZ of a tree;
- ✓ Excavation activities around trees shall not damage the root system, trunk or branches of any tree to be preserved;
- ✓ Exhaust fumes from all heavy machinery, vehicles, generators, and other equipment shall not be directed towards any trees for prolonged periods of time;
- ✓ Tree removals should be avoided during the breeding bird season (April 1st to August 31) to limit disturbance to nesting birds and their nests or young and comply with the MBCA, 1994;
    - If trees are to be removed during the breeding bird season, it should be preceded by a nest survey by a qualified avian biologist. Surveys should be undertaken a maximum of 48 hours prior to the commencement of removals. If nests are found during a survey, or during construction, an appropriate buffer must be applied and the nest must not be disturbed until the young have fledged; and,
- ✓ All Green and White Ash trees removed should be treated as infected by the Emerald Ash Borer beetle and appropriately disposed of so not to infect other areas of the city.

Proposed Mitigation Measures – Post-Construction

- ✓ Post-construction tree maintenance methods should be used to repair any damage caused to trees by construction activities. These may include, but is not limited to: treating trunk and crown injuries, irrigation and drainage, mulching, and aeration of root zone; and,
- ✓ Within 12 months of completion of construction, an assessment of preserved trees should be conducted. Trees that are dead, in poor health, or hazardous should be removed or pruned, as determined by an ISA Certified Arborist. Tree removal, if necessary, should occur promptly to avoid foreseeable risk of trees falling and causing damage or harm to people and/or property.

With the successful implementation of the mitigation measures recommended above, it is anticipated that the proposed development will result in an overall decrease in young to mid-aged low quality native and invasive trees.

7.5 Incidental Wildlife

The proposed development is expected to have negative impact on local wildlife due to the general loss of natural habitat and direct impacts related to construction activities. Potential impacts to wildlife resulting from the proposed development include the following:

- Displacement, injury, or death resulting from contact with heavy equipment during clearing and grading activities;
- Loss of general natural habitat suitable for the life processes of common urban and rural wildlife;
- Disturbance to wildlife resulting from noise associated with construction activities, particularly during breeding periods; and,
- Conflict between wildlife and humans following development, including mortality from vehicles.

Proposed Mitigation Measures – Planning and Design Stage

The best practices outlined in the *Protocol for Wildlife Protection during Construction* (City of Ottawa, 2015) should be followed during all construction activities associated with the development. The following measures are consistent with the protocol:

- ✓ Pre-stress the area on a regular basis leading up to construction to encourage wildlife to leave the area before construction starts. Other recommendations for pre-stressing are outlined in the *Protocol for Wildlife Protection During Construction* (City of Ottawa, 2015);
- ✓ Orange snow fencing should be installed around the perimeter of the work area to clearly demarcate the development area and prevent wildlife from entering the construction zone. Fencing should be monitored regularly to ensure they are functioning properly and if issues are identified should be dealt with promptly;
- ✓ Perimeter fencing should not prevent wildlife from leaving the site during clearing activities by clearing the area prior to installing the fence;
- ✓ Wildlife located within the construction area will be relocated to an area outside of the development into an area of appropriate habitat by a qualified professional, as necessary;
- ✓ Avoid vegetation clearing during sensitive times of year for local wildlife (e.g. spring and early summer);
- ✓ Construction crews working on site should be educated on local wildlife and take appropriate measures for avoiding wildlife;
- ✓ A qualified wildlife rehabilitation centre should be contacted if any animals are injured or found injured during construction. Injured animals should be transported to an appropriate wildlife rehabilitation centre for care with a small donation of money to help pay for the care (a local facility is the Rideau Valley Wildlife Sanctuary).

With the mitigation measures outlined above, it is anticipated that the proposed development will result in a net loss of urban wildlife habitat.

8 Cumulative Impacts

The proposed development is in urban Ottawa and cumulative impacts must be considered in the context of the local and regional environment in which the site is situated. Much of the land surrounding the Study Area is a mix of residential, commercial, industrial and agricultural uses, with most of the impacts to the larger natural heritage system occurring during area development over 20 years ago. The subject property itself had previously been used for agricultural land-use with portions being naturalized following the discontinuation of agricultural land-use practices throughout portions of the Study Area.

Based on field assessments and available information, the removal of the natural heritage features within the subject property will have a negligible negative impact on the natural heritage system. Potential cumulative impacts to the natural heritage system resulting from the proposed development include the following:

- General loss of biodiversity and available habitat; and,
- Increase in impervious surfaces increasing runoff potential.

Proposed Mitigation Measures – Planning and Design Stage

In addition to the mitigation measures listed above, the following mitigation should be considered to address the cumulative impacts resulting from the proposed development:

- ✓ Landscaping plans should intend to compensate for the removal of natural heritage features and vegetation; and,
- ✓ Promote the use of permeable landscaping materials and rain capture systems like rain gardens and permeable pavers.

9 Summary and Conclusions

This report provides an evaluation of the anticipated impacts associated with the construction and long-term occupation of the proposed subdivision development located at ADDRESS (Figure 1). The environmental impacts and mitigation are based off field investigations completed in 2022, the findings of the Headwater Drainage Feature Assessment report (NEA, 2019), and a review of available desktop and background information.

Notable observations during IBI's field investigations include the presence of a significant valleyland. As well as portions of significant woodlands within the western extent of the Study Area and are associated with the Mosquito Creek corridor. Additionally, HDFs were noted along the northern edge, and the south-eastern quadrant of the Study Area. The HDFs in the south-eastern quadrant, the significant valleyland and significant woodlands are protected due to its designation as a Natural Heritage Feature according the City of Ottawa's Official Plan (2021).

The SAR study found confirmed presence of one SAR (Little Brown Bat) and habitat for one Species of Conservation Concern (Monarch). The Little Brown Bat was recorded along the edge of the FODM7 community adjacent to the meadows, although there was only one (1) recording of this species during the acoustic surveys. Monarch habitat was observed was recorded in the meadows throughout the Study Area.

FODM7 Woodlands are present within the Study Area, and portions are considered to be significant based on size and age criteria, however these sections of woodland are not predicted to be impacted by construction activities. The FODM8-1 Poplar forest is not considered to be significant due to the size and age and are exempt from the significant woodlands policy as per section 6.4.4.1 of the guidelines. The woodlands within the Study Area show signs of disturbance due to the presence of invasive Buckthorn. Garlic Mustard is also prevalent within the ground layer. Furthermore, there is widespread evidence of Emerald Ash Borer throughout the woodlands.

The ELC survey noted ten vegetation communities, plus an additional two that are associated with urban and cultural uses. All of the ELC communities identified are common within Ottawa. The vegetation survey results indicate an abundance of non-native species within the property in concentrated areas, invasive and non-native species comprise approximately 16 percent of the vegetation species recorded.

Twenty-three species of trees were recorded in the Study Area. Trees that are predicted to be impacted are generally young to mid-aged (average DBH <10 cm). The most abundant species are primarily Buckthorn, Trembling Aspen, and Manitoba Maple.

Evidence of tree pests (Emerald Ash Borer) are evident throughout the Study Area. Three (3) distinctive trees were recorded during the tree survey, all of which are predicted to be removed.

The field evaluation suggests that natural features provide some connectivity to adjacent natural features, however the linkage does not have any significant function, likely serving as general movement corridors for urban wildlife.

Based on this evaluation, there are opportunities for habitat compensation and enhancement, particularly along the edge of forest, and within parking lots for employment lands. This includes the following:

- Enhanced tree planting and reforestation along the forest edge of the Natural Heritage Feature. Additional tree planting will increase diversity and canopy cover, reduce invasive species abundance, and provide habitat for urban wildlife;
- Installation of appropriate bird nesting features, such as Wren or Swallow houses, to attract urban bird populations;
- Installation of bat boxes to compensate for loss of candidate roost and maternity colony habitat and support urban bat populations;
- Creation of pollinator gardens and rain gardens to enhance habitat for wild bees and other pollinators species as well as provide opportunity for infiltration; and,
- In addition to the expected ecological benefits from the above recommendations, it is anticipated that these features will provide social and educational value to local residents.

The mitigation and compensation measures described in this report have been developed to avoid or limit negative environmental impacts associated with the proposed development. Based on the information available, it is our opinion that this proposed development, on what is functionally an infill lot on disturbed land, makes sound use of land which provides only marginal ecological value. This study was completed by Alex Zeller, MSc. with technical and field assistance provided by; Lindsay Jackson, HBSc., and Brittany Semmler. HBSc. Resumes of key staff are included in Appendix A. The results and findings of this study have been reported without bias or prejudice. The conclusions of this study are based on our own professional opinion, substantiated by the findings of this study, and have not been influenced in any way.

Prepared by:

Lindsay Jackson, HBSc
Sr. Ecologist
Phone: 613 225 1311 x 6406
email: Lindsay.jackson@ibigroup.com

Reviewed by:

Alex Zeller, MSc
Associate – Manager, Natural Systems
Phone:343 997 6648
email: Alex.zeller@ibigroup.com

C.C. Marcel Denomme, Riverside South Development Corporation

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APPENDIX A

Curriculum Vitae

Alex Zeller M.SC
Natural Systems, Associate – Manager

Role on Project – Project Manager & Sr Ecologist

Alexander is a Project Manager and Senior Ecologist with 20 years of experience in terrestrial and aquatic ecology, open space planning, and natural heritage authorizations. With a broad experience in both Aquatic and Terrestrial ecology, Alex has led, managed, and supported many natural heritage studies within the City of Ottawa and across Canada. These studies have included; Environmental Impact Studies, Municipal and Federal Environmental Assessments, Species at Risk permitting, wetland evaluations, post – construction monitoring, Community Design Plans, and other natural heritage projects associated with land development, transportation and other sectors.

Education

Master of Science in Biology, Lakehead University, Thunder Bay, ON/CA, 2007

Honours Bachelor Environmental Science, Lakehead University, Thunder Bay, ON/CA, 2003

Experience

2021–Present
IBI Group Professional (Canada) Inc., Ottawa, ON/CA, Natural System, Associate – Manager

2018–2021
WSP, Ottawa, ON/CA, Senior Ecologist, Environment

2013–2018
Dillion Consulting Limited, Ottawa, ON/CA, Associate

2006–2013
Dillion Consulting Limited, Ottawa, ON/CA, Ecologist

Representative Experience

Land Development

Canada Lands Company – 470 Tremblay Road, Ottawa, ON (2019 – 2021) – Lead Ecologist responsible for the preparation of an Environmental Impact Statement and Tree Conservation Report for a brownfield re-development in Ottawa. This project involved both CLC and Public Services and Procurement Canada (PSPC) working together to develop a mixed used development while managing the ecological constraints and opportunities. Species at Risk and wetland constraints were the primary features managed during this study.

Claridge Homes – 3252 Navan Road, Ontario, Canada (2020) – Project Manager and Lead Ecologist. An Environmental Impact statement and an Environmental Impact Statement and Tree Conservation Report for a development in Ottawa. This study was completed in support of plan of subdivision for a residential development. Species at Risk, headwater drains, and wetlands were managed through this process

Canada Lands Company – 291 Carling Avenue, Ottawa, Ontario (2018) – Project Manager and Lead Ecologist. An Environmental Impact Statement and Tree Conservation Report for a development in downtown Ottawa. Urban trees, invasive species were addressed in this study.

Claridge Homes Group of Companies – 760 River Road, Ottawa, Ontario, Canada (2019) – Project Manager and Lead Ecologist. An Environmental Impact statement and an Environmental Impact Statement and Tree Conservation Reports for a development in south Ottawa. This study was completed in support of plan of subdivision for a residential development. Species at Risk habitat and a constraints associated with a watercourse were the key features managed through these studies

Urbandale Construction – Riverview Lane, Kemptville, Ontario, Canada (2018 – Present) – Project Manager and Lead Ecologist. Natural heritage approvals associated with a residential subdivision. Scope of work included SAR authorizations, Fisheries authorizations, wetland design and restoration plans; watercourse and fish habitat design and plans, and general agency consultation.

Minto Communities – Quinns Pointe, Ottawa, Ontario (2021) – Project Manager and Lead Ecologist. Responsible for natural heritage approvals associated with a residential subdivision. Scope of work included SAR surveys, vegetation survey, tree survey, significant wildlife habitat assessment, avoidance and mitigation recommendations, reporting, and general agency consultation.

Minto Communities – Avalon Isgar, Ottawa, ON (2018 – 2021) – Project Manager and Lead Ecologist. Responsible for natural heritage approvals associated with a residential subdivision.

Scope of work included SAR surveys, vegetation survey, tree survey, significant wildlife habitat assessment, avoidance and mitigation recommendations, reporting, and general agency consultation.

Minto Communities – 323 Jockvaile Road, Ottawa, Ontario, Canada (2018) – Project Manager and Lead Ecologist. An Environmental Impact statement and a tree conservation report for a proposed residential development in the south Orleans community. These reports were completed following the City of Ottawa guidelines.

Minto Communities – Barrhaven South Community Design Plan, Ottawa, Ontario, Canada (2015 – 2017) – Project Manager and Lead Biologist. Multi – disciplined consulting team undertaking the Barrhaven South Community Design Plan. Responsible for managing the natural heritage related studies, reports, and public consultation contributions. Also responsible for consulting with stakeholders to ensure the community design plan meets their expectations and requirements.

Minto Communities – Clark Lands Development, Environmental Impact Statement, Ottawa, Ontario, Canada (2013 – 2017) – Project manager and lead biologist for an Environmental Impact Statement and Tree Conservation Study for a development. This study was completed in support of plan of subdivision for a residential development.

Minto Communities – Potter's Key Development, Environmental Impact Statement, Stittsville, Ontario, Canada (2013 – 2021) – Project Manager and Lead Biologist. An Environmental Impact Statement, Tree Conservation Report, Species at Risk Permitting, Fisheries approvals, and on – going environmental monitoring for a development. The study was completed as part of an application for residential development.

Minto Communities – Chapman Mills Environmental Impact Statement Addendum, Ottawa, Ontario, Canada (2011) – Project Manager. An addendum to an environmental impact statement assessing the impact of a residential development on trees and local hydrology within a small woodlot south of Ottawa. Responsibilities included managing budget, invoicing, field survey, report writing and communicating with the client.

KNL Developments – SAR Permit Implementation and Monitoring, Ontario, Canada (2017 – Present) – Project Manager and Lead Biologist. Management and implementation of one of the most complex Species at Risk (SAR) permits issued in Ontario. Responsible for – establishing habitat creation plans, negotiating revisions to permit, coordination of environmental monitoring and species surveys, fisheries authorizations, design of habitat compensation features, consultation with relevant agencies and stakeholders, and all associated reporting and documentation.

Ironclad Developments – 800 Eagleson Road EIS and TCR, Ottawa, Ontario, Canada (2018) – Project Manager and Lead Ecologist. Responsible for completing an Environmental Impact Statement and Tree Conservation Study for a development in Ottawa West. The proposed project will consist of a six – story rental apartment building with approximately 150 units with access from Eagleson Road.

Riverside South Development Corporation – Phases 12, 13.2, 14, 15, 16, 17, and 18; Environmental Impact Statement, Ottawa, Ontario, Canada (2014 – Present) – Project Manager and Lead Biologist. A series of Environmental Impact Statements and Tree Conservation Reports for a several primarily residential developments. Terrestrial and aquatic environments were evaluated, and impacts assessed for each development. Mitigation measures and management recommendations were developed to address the identified environmental impacts associated with the proposed development.

McArthur Island Developments, Carleton Place, Ontario, Canada (2015) – Project Manager and Lead Biologist. Natural heritage compliance requirements supporting a multi – phase residential/retirement complex located on McArthur Island within the Mississippi River. This project included the redevelopment of an historic woollen mill and the construction of several other multi – story buildings. The scope of environmental services provided included Environmental Impact

Studies and associated field surveys, arborist reports, specific wildlife surveys, and environmental compensation design.

Richcraft Group of Companies, Fernbank Lands Development Environmental Impact Statement, Stittsville, Ontario Canada (2013 – 2017) – Project Manager and Lead Biologist. Environmental Impact Statement, Tree conservation Report, and Species at Risk Permitting were completed as part of an application for residential development.

Walton Developments, Environmental Screening Study, Ottawa, Ontario, Canada (2012 – 2014) – Project Manager and Terrestrial Ecologist. Natural heritage screening study for a project aimed at identifying any natural heritage constraints that may affect the ability to develop several properties in southwest Ottawa. Responsibilities include project management, reporting, terrestrial field surveys, avian surveys and GIS mapping.

City of Ottawa, Scoped Environmental Impact Statement, City of Ottawa, Ontario, Canada (2011) – Project Manager. A scoped environmental impact statement to specifically address the concern for the impact of a rural residential development in south Ottawa on Species at Risk. Responsibilities include managing budget, invoicing, field survey, report writing and communicating with the client.

Awards and Publications

Patriquin, D., Zeller, A. Truman, K., Hayes, R. and Gibbs, S. 2020. Managing and Enhancing Terrestrial Road Ecology. Ottawa, ON – Transportation Association of Canada.

Zeller.A., Patriquin, D. 2021. From Butterflies to Bears – Developing Standards for Road Ecology across Canada. Canadian Section of the Wildlife Society (CSTWS) Conference and AGM. March 2021

Zeller,A., N.Stow, S.Young, S.Boudreau, B.Aird. 2019. Connectivity for Landscape (Re)Generation. Presentation and Panel discussion at the Canadian Institute of Planners (CIP) Annual Conference, July 2019. Ottawa, Ontario.

Gleeson, J., A.Zeller and J.W. McLaughlin. 2006. Peat as a Fuel Source in Ontario – A Preliminary Literature Review, Ontario Forest Research Institute, Forest Research Information Paper 161, Sault Ste. Marie, Ontario.

Zeller, A.J. 2005. Using landscape indices to model environmental gradients within the Mixedwood Boreal Forests of northwestern Ontario, Canada. Poster Presentation at Ontario Ecology and Ethology Colloquium, 2005. Ottawa, Ontario.

Infrastructure

Public Services and Procurement Canada (PSPC) Energy Services Acquisition Program (ESAP), Ottawa, Ontario, Canada (2019 – 2021) – Lead Project Ecologist. Responsible for overseeing all ecological studies, reporting requirements, agency consultation, and associated permitting and authorizations required to facilitate the design and construction of 14 km of district heating/cooling pipeline and associated plants.

Public Services and Procurement Canada (PSPC) Centre Block Rehabilitation Project, Ottawa, Ontario, Canada (2018 – 2021) – Lead Project Ecologist. Responsible for – all ecological studies, development and management mitigation and compensation measures, reporting requirements, and agency consultation required to facilitate the project on Parliament Hill in Ottawa.

City of Ottawa in Public – Private Partnership – Confederation Line Extension Light Rail Transit (2019 – 2021) – Lead Ecologist. Responsible for the implementing the established management recommendations and facilitating the outstanding permitting requirements to accommodate detail design phase of the project.

City of Ottawa – West Transitway Extension, Phase 11 – Stillwater Creek, Ottawa, Ontario, Canada (2018) – Project Manager and Lead Ecologist. Post – construction monitoring for the realignment of Stillwater Creek required to accommodate the West Transitway Extension. This project included; a species at risk screening, amphibian breeding surveys, breeding bird surveys, vegetation community inventories, fish community sampling, aquatic habitat assessment, water quality parameters, fluvial geomorphology studies.

Hydro One – Riverview to Overbrook – transmission line upgrade, Ottawa, Ontario Canada (2016) – Lead Ecologist. Class Environmental Assessment in support of a transmission line upgrade between Overbrook and Riverview facilities. Alexander was responsible for coordinating and undertaking field surveys, participating in public consultation, reporting writing, impact assessment, and developing mitigation and avoidance measures.

Enbridge Gas Distribution Inc., Innes Road Reinforcement Pipeline Project – Environmental Monitoring and Environmental Awareness Training, Ottawa, Ontario Canada (2014-2016) – Project Manager and Lead Biologist. Environmental monitoring and environmental awareness in support of the 2.8 km pipeline installation along Innes Road. This installation included 580m of

horizontal directional drilling of NPS12 steel pipe under Highway 417. The project included the development and delivery of a bespoke environmental awareness training program and the ongoing environmental monitoring during construction.

Enbridge Gas Distribution Inc., Innes Road Reinforcement Pipeline Project – Environmental Assessment, Ottawa, Ontario Canada (2014) – Lead Biologist. Class environmental assessment for the 2.8 km gas distribution pipeline installation. Alexander was responsible for coordinating and undertaking biophysical field surveys, reporting writing, impact assessment, and developing mitigation and avoidance measures.

Enbridge Gas Distribution Inc., Ottawa West Reinforcement Pipeline Environmental Assessment, Ottawa, Ontario, Canada (2011-2013) – The local biologist for a multidisciplinary team of biologists, planners and engineers working on environmental and cumulative effects assessment for the installation of 20 km of 24-inch natural gas pipeline in Western Ottawa. Took over project management role for the construction phase. This phase included the more detailed biophysical surveys to support environmental authorizations, pre- and post-construction water well monitoring, and development of a detailed mitigation strategy. These mitigation measures included; physical mitigation measures, environmental awareness training, daily on-site environmental monitoring, environmental compensation; and an assessment of agricultural crop loss and associated compensation.

Enbridge Gas Distribution Inc., GTA Reinforcement Pipeline Environmental Assessment, Toronto, Ontario, Canada (2011) – Acting as both an ecologist and spatial analyst for a multidisciplinary team of biologists, planners, and engineers working on an environmental and cumulative effects assessment for the pipeline reinforcement in the Greater Toronto Area. Responsibilities include managing a majority of the GIS mapping pertaining to the three large study areas, conducting terrestrial biology surveys, and liaising with the client when required.

Town of Perth, Infrastructure Master Plan, Perth, Ontario, Canada (2009-2010) – Completed the ecological assessment and natural heritage inventory for an infrastructure master plan. This study involved a full vegetation survey of the study area, identification of soils, observations of wildlife and detailed mapping of the existing ecosystems within the study area. Additional responsibilities included maintaining the GIS library, consulting with stakeholders and producing GIS figures for report.

Ministry of Transportation, Truck Inspection Station Assessment, Ontario, Canada (2008) – Completed the ecological assessment and resource inventories for nine different truck inspection stations throughout northern Ontario. This study involved a full vegetation survey of the study areas, identification of soils, observations of wildlife, detailed mapping of the existing ecosystems within the study areas and publishing all mapping for reports. Additional responsibilities included maintaining the GIS library, consulting with stakeholders and producing GIS figures for report.

Natural Resource Studies

Transportation Association of Canada (TAC) Synthesis of Practice for Management and Enhancement of Terrestrial Roadway Ecology, Ottawa, ON (2020 – 2021) – Project Manager. This project developed a synthesis of Beneficial Management Practices to manage terrestrial road ecology concerns across Canada, such as wildlife crossings and invasive species control, to emerging topics like roadside naturalization and ice road concerns. Drawing on literature and expert input from within Canada and around the world; the synthesis identified practices applicable to the diverse ecosystems, climates and rural to urban transportation systems across Canada.

City of Ottawa – West Transitway – Stillwater Creek Realignment Post – construction monitoring, Ottawa, Ontario, Canada (2018 – present) – Project Manager and Lead ecologist for the post – construction monitoring of the realigned Stillwater creek. Ecological monitoring includes water quality monitoring, Fish sampling, vegetation monitoring, and incidental wildlife observations.

City of Ottawa – Kizell Wetland Trail – SAR Authorizations, Ottawa, Ontario, Canada (2019) – Project Manager and Lead Ecologist for the Species at Risk authorizations required for the construction of a pedestrian trail network within the conservation forest around the Kizell wetland in Kanata.

City of Ottawa – Goulbourn Wetland Re – delineation, Ottawa, Ontario, Canada (2015 – 2016) – Project Manager. The objective was to undertake a boundary re – delineation of the provincially significant wetland (PSW) known as the Goulbourn Wetland Complex. Alexander was responsible for ensuring the quality of the re – delineation and associated report, consulting with landowners, and reviewing the approach and findings with the City and the Ontario Ministry of Natural resources.

City of Ottawa – Feedmill Creek Species at Risk Screening, Ottawa, Ontario, Canada (2017) – Project Manager and Lead Ecologist. A species at risk screening of Feedmill Creek in support of the proposed restoration efforts included specific surveys – bat habitat surveys, Blanding's turtle basking surveys, butternut Screening, and other incidental observations.

City of Ottawa – 2014 Species at Risk Screening, Ottawa, Ontario, Canada (2014) – Project Manager and Lead Biologist. A Species at Risk screening study for the Infrastructure Branch with the objective to identify the potential threat that various planned infrastructure projects had to Species at Risk. In total 489 projects were evaluated over the course of the project. A new risk assessment approach and a series of management tools were developed to aid City Project Managers. Many of these tools continue to be used by the City for subsequent SAR Screenings. These tools included – standardized risk categories, a suite of standardized mitigation recommendations, a GIS database of the screening results, a document summarizing and illustrating the Species at Risk that may be found within the city, and a SAR screening process flowchart.

City of Ottawa – Terry Fox Drive Environmental Construction Monitoring, Ottawa, Ontario, Canada (2010 – 2012) – Assisted with the on – going environmental monitoring of the Terry Fox Drive road construction project, to ensure compliance of environmental mitigation. Duties included water quality monitoring, sediment and erosion control recommendations, wildlife observations, species at risk monitoring and environmental awareness training.

City of Ottawa – Terry Fox Drive Environmental Assessment, Ottawa, Ontario, Canada (2007 – 2010) – Completed the assessment of natural features along the future Terry Fox Drive corridor in west Ottawa. This included the electrofishing of aquatic habitat, salamander survey and general ecological observations. In addition to the field assessments, also coordinated the GIS analysis and map production for various environmental assessment reports.

National Capital Commission – Ecological Land Classification, Ontario, Canada (2015) – Project Manager and Lead Biologist. Project to map all ecotypes within the NCC's urban and greenbelt lands. Ecological mapping was done using Ontario Ecological Land Classification and covers an area of approximately 62 km^2. The mapping will be used to for various future ecological landscape management projects.

Defence Construction Canada (DCC) – Species at Risk Survey, CFB Shilo Range Training Area, Manitoba, Canada (2014) – GIS Analyst and Biologist. Responsible for the species at risk habitat suitability modelling used in the Environmental Assessment Report. This modelling was used to establish the potential threats to SAR across the base and in turn recommend best management practices for training in SAR habitat.

County of Frontenac – Natural Heritage Study, County of Frontenac, Ontario, Canada (2011 – 2012) – Lead Landscape Ecologist for the County of Frontenac's Natural Heritage Study forming the major piece of the county's Official Plan (OP) and to provide policy and zoning recommendations for future OP schedules. Marxan and corridor design modelling was done to assist in the development of ecologically sound natural heritage zoning. Responsibilities include public consultation, managing the GIS and spatial analysis, assisting with policy development, and managing GIS modelling.

Parks Canada – Rideau Canal Landscape Strategy, Ontario, Canada (2012) – Lead Ecologist. Rideau Canal Landscape Strategy study being conducted to characterize the landscape and develop

policy recommendations along the Rideau Canal in support on the UNESCO World Heritage Status. Personal responsibilities include public consultation, ecological characterization and recommendations, geospatial analysis, field survey, report writing and communicating with the client.

Municipality of Hastings Highlands – Birds Creek Secondary Plan, Banfcroft, Ontario, Canada (2011 – 2012) – Lead Ecologist. Working to produce/develop a secondary plan for the community of Birds Creek, north of Bancroft. The plan will promote a healthy living philosophy and promote sustainable development practices. Responsibilities include consultation with public and client, assessing the existing natural resources, assisting in incorporating natural heritage features into the plan and developing GIS mapping for study area.

Regional Municipality of Wood Buffalo – Regional Ecology Planning Framework, Regional Municipality of Wood Buffalo, Alberta, Canada (2008) – Lead Ecologist Working to develop an ecological planning framework that will aid the municipality in balancing development pressures with municipal – specific environmental conservation goals. Responsible for developing the GIS – based ecological planning model and decision support tools created specifically for the municipality.

City of Yellowknife – Yellowknife Smart Growth Plan – Ecological Preservation Study, Yellowknife, Northwest Territories, Canada (2007 – 2010) – Project Ecologist Working with a team of planners to advance Yellowknife's existing Ecological Resource Inventory which will allow for greater public engagement on the quality of life impacts of 40 natural sites. Personal duties include GPS data collection, GIS mapping, Remote Sensing Landcover Classification, and consultation with public and other stakeholders.

Tsuu T'ina First Nation – Satellite Image Classification, Tsuu T'ina First Nation, Alberta, Canada (2007) – Spatial Analyst Conducted a satellite image classification to update outdated vegetation mapping. Landsat – 7 TM data was classified using IDRISI Andes software. Training areas were delineated to represent the various vegetation communities in the image, and a maximum likelihood classification method was used to classify the image. The results of the image classification proved to be excellent and corresponded to ground – truth landcover classes very well.

Tlicho Government – Tlicho Land Use Plan, Northwest Territories, Canada (2006 – 2009) – Lead Ecologist. Personal responsibilities include the development of the GIS database and spatial model within the GIS to aid in the production of the final land use plan. This model incorporates traditional indigenous knowledge and ecological features with economic and social influences to identify suitable land use zones. The emphasis of the Tlicho Land Use Plan is on mitigating the cumulative effects of development on the natural and social environment while still promoting sustainable economic development.

Public Works Government Services – Mathews Lake Habitat Restoration, Northwest Territories, Canada (2008) – Assisted with the 2008 post – construction monitoring of the fish habitat enhancement in the Mathews Lake waterhead. This rehabilitation work was done to improve the fish habitat in the immediate vicinity of Salmita Mine and Tundra Mine. Duties included seine netting and fish identification, construction of new fish habitat structures, benthos and water quality assessments.

Canadian Pacific Railway – Aquatic Habitat Assessment, Peterborough, Ontario, Canada (2007) – Field Biologist Assisting in aquatic habitat assessment for a water crossing along the railways. The objective of the study was to improve habitat for native brook trout and other resident fish by providing in – stream habitat near the crossing.

St. Mary's Cement – Westside Creek and Marsh Reconfiguration, Great Lakes Region, Canada (2006) – Developed a GIS database to incorporate the annual environmental monitoring data for the reconfiguration of Westside Creek and Marsh. Produced a landcover classification from satellite imagery to assess the vegetation change within the marsh and the surrounding area.

Lindsay Jackson H.BSc.
Natural Systems, Sr. Ecologist

Role on Project: Natural Environment Specialist

Lindsay is a Senior Ecologist with 7 years professional experience in terrestrial and aquatic ecology, open space planning, natural heritage authorizations, and the implementation of low impact design. Lindsay's versatile skillset has allowed her to lead, and contribute to many natural heritage studies across Ontario, including Environmental Impact Studies, Municipal and Federal Environmental Assessments, Species at Risk permitting, wetland evaluations, construction monitoring, low impact development implementation, and other natural heritage projects associated with road infrastructure and land development.

With a background in road ecology, Lindsay has significant experience in the implementation of mitigation strategies that allow for human and wildlife interaction, creating smart road networks, while alleviating pressure on the natural environment within expanding urban areas. She is well versed in the environmental approvals process, having worked extensively with conservation authorities, as well as provincial and federal agencies.

Representative Experience

West Montrose Covered Bridge Municipal Environmental Assessment (EA) – Region of Waterloo, Woolwich (2021-2022) – Project Manager and Lead Project Ecologist
Responsible for the coordination of ecological studies, including species at risk screening, project reporting and environmental permitting requirements for the total rehabilitation of the West Montrose Covered Bridge.

Walker Homes Subdivision (Owen Sound) – Cobide Engineering Inc, Owen Sound (2021–2022) – Project Manager and Lead Project Ecologist
Led, coordinated and completed a Scoped Environmental Impact Study and tree inventory for the proposed single-home development in Owen Sound, including aquatic and terrestrial inventories, species at risk surveys, and completed all associated reporting, advising on low-impact development strategies.

JDSS Subdivision – Cobide Engineering Inc, Hanover (2021–2022) – Project Manager and Lead Project Ecologist
Led, coordinated and completed a Scoped Environmental Impact Study for a proposed residential development in Hanover, including aquatic and terrestrial inventories, species at risk surveys, and completed all associated reporting.

Gully Creek Bridge Construction –Ministry of Transportation Ontario, Bayfield (2021–2022) – Environmental Construction Monitor
Responsible for environmental monitoring, and associated reporting for the total reconstruction of the Gully Creek Bridge, ensuring the adherence to the Department of Fisheries and Oceans permit requirements associated with Red Side Dace habitat.

Shoemaker Creek Rehabilitation – Region of Waterloo (2021-2022) – Project Coordinator and Aquatic Ecologist

Education

B.Sc. Hons, Environmental and Resource Sciences, Trent University, Peterborough, ON, 2021

Fish and Wildlife Technology Advanced Diploma, Fleming College, Lindsay, ON, 2018

Fish and Wildlife Technician Diploma, Fleming College, Lindsay, ON, 2017

Public Relations, Algonquin College, Ottawa, ON, 2009-2010

Experience

2022–Present
IBI Group, Ottawa, ON, Senior Ecologist

2021-2022
EcoTec Environmental Consultants Inc, Acton, ON, Intermediate Ecologist

2018–2021
York Region, Newmarket, ON, Road Ecologist

2017
Morrison Hershfield, Ottawa, ON, Environmental Technician

2012 - 2013

Ottawa Humane Society, Ottawa, ON, Communications Coordinator

Memberships

Ontario Chapter of The Wildlife Society

Canadian Herpetology Society

Ontario Road Ecology Group

Language Proficiencies

English – Bilingual

French – Bilingual

Led and coordinated fish removal activities related to the total rehabilitation of Shoemaker Creek between Homer Watson Boulevard and Mill Street.

Grey Rat Snake (*Pantheropis spiloides*) Habitat Construction and Monitoring – Ministry of Transportation Ontario, Leeds and the Thousand Islands (2021-2022) –
Project Ecologist
Completed the monitoring and construction of nesting box sites, as well as the monitoring of constructed thermoregulation sites across Leeds and the Thousand Islands. The research study was completed to meet the requirements set out in an Endangered Species Act (ESA) Permit related to road improvements to Highway 15. The project included the construction of 15 thermoregulation and egg-laying structures and the associated maintenance, monitoring and project reporting.

Transportation Services, Capital Planning and Delivery – York Region (2018-2021) –
Road Ecologist
Responsible for the environmental review, and environmental monitoring of multiple large-scale transportation projects. Ensured the implementation of environmental protection measures, and when possible, the inclusion of low impact design to the York Region road network. Responsible for evaluating standard construction practices and collaborating with project teams to ensure that all environmental regulations were adhered to, as well as capitalizing on restoration opportunities in partnership with the Toronto and Region Conservation Authority and the Lake Simcoe and Region Conservation authority, and implementing environmentally friendly solutions within right-of-way projects.

Confederation Line Extension Ottawa Light Rail EA – City of Ottawa, Ottawa (2017) –
Project Ecologist
Completed the assessment of natural heritage features associated with the reconstruction of the Confederation Line Extension. This included completing a wetland evaluation, breeding bird surveys, tree inventory, bat monitoring studies and species at risk surveys.

Trillium Line Extension Ottawa Light Rail EA – City of Ottawa, Ottawa (2017) –
Project Ecologist
Completed the assessment of natural heritage features associated with the Trillium Line Extension. This included completing breeding bird surveys, marsh monitoring surveys, tree inventory, bat monitoring studies and species at risk surveys.

Rideau River Pedestrian Bridge Ottawa Light Rail EA – City of Ottawa, Ottawa (2017) –
Project Ecologist
Completed the assessment of natural heritage features associated with the reconstruction of the Rideau River Pedestrian Bridge. This included completing a wetland evaluation, breeding bird surveys, tree inventory, bat monitoring studies and species at risk surveys.

Highway 28 Shoulder Widening and Paving from Lakefield to Bancroft – Ministry of Transportation Ontario, Bancroft (2017) –
Project Ecologist
Completed a road ecology study along the Highway 28 corridor between Lakefield and Bancroft to identify and generate mapping for potential road mortality hotspots for herpetofauna. Project reporting included creating recommendations for appropriate mitigation associated with road widening activities intersecting significant wildlife habitat.

Highway 17/508 Interchange – Ministry of Transportation Ontario, Renfrew (2017) –
Project Ecologist
Completed the assessment of natural heritage features associated with the construction of the Highway 17/508 Interchange in Renfrew County. This included completing marsh monitoring, breeding bird surveys, crepuscular bird surveys, tree inventory, bat monitoring studies and species at risk surveys.

APPENDIX B

Photo Record

Photo 1: ***May 19, 2022*** Notes: Fresh-Moist Deciduous Forest Ecosite (FODM7).	
Photo 2: ***June 8, 2022*** Notes: A Snapping Turtle (*Chelydra serpentina*) observed in Mosquito Creek (FODM7).	

Photo 3: ***May 29, 2022*** Notes: Dry – Mixed Meadow Ecosite (MEMM3).	
Photo 4: ***May 19, 2022*** Notes: Fresh – Moist Mixed Meadow Ecosite (MEMM4).	

Photo 5: ***May 19, 2022*** Notes: Raspberry Deciduous Shrub Thicket Type (THDM2-8).	
Photo 6: ***May 19, 2022*** Notes: Buckthorn Deciduous Hedgerow Type (THDM3-1).	

Photo 7: ***June 2, 2022*** Notes: Annual Row Crops (OAGM1) with Fresh-Moist Deciduous Forest Ecosite (FODM7) in the background.	
Photo 8: ***June 2, 2022*** Notes: Native Shrub Hedgerow Thicket (THDM3-2) with Fresh-Moist Deciduous Forest Ecosite (FODM7) to the left of the photo.	

Photo 9: ***June 28, 2022*** Notes: Red-tail Hawk nest located within a hedgerow in the Study Area.	
Photo 10: ***August 4, 2022*** Notes: Butternut tree with a DBH of 8 cm in very good condition within the FODM7 community.	

APPENDIX C

Vascular Plant Species List

COMMON NAME	SCIENTIFIC NAME	CONSERVATION STATUS			COEFFICIENT OF CONSERVATISM	COEFFICIENT OF WETNESS
		Federal (SARA, 2002)	Provincial (ESA, 2007)	S-Rank[1]		
Alternate-leaved Dogwood	*Cornus alternifolia*	---	---	S5	6	3
American Basswood	*Tilia americana*	---	---	S5	4	3
American Beech	*Fagus grandifolia*	---	---	S4	6	3
American Elm	*Ulmus americana*	---	---	S5	3	-3
Amur Honeysuckle	*Lonicera maackii*	---	---	SNA	---	5
Balsam Poplar	*Populus balsamifera*	---	---	S5	4	-3
Bloodroot	*Sanguinaria canadensis*	---	---	S5	5	3
Blue Cohosh	*Caulophyllum thalictroides*	---	---	S5	5	5
Bur Oak	*Quercus macrocarpa*	---	---	S5	5	3
Butternut	*Juglans cinerea*	END	END	S2?	6	3
Canada Anemone	*Anemonastrum canadense*	---	---	S5	3	-3
Canada Goldenrod	*Solidago canadensis var. canadensis*	---	---	S5	1	3
Canada Plum	*Prunus nigra*	---	---	S4	4	3
Choke Cherry	*Prunus virginiana*	---	---	S5	2	3
Common Burdock	*Arctium minus*	---	---	SNA	---	3
Common Dandelion	*Taraxacum officinale*	---	---	SNA	---	3
Common Elderberry	*Sambucus canadensis*	---	---	S5	5	-3
Common Lady Fern	*Athyrium filix-femina*	---	---	S5	4	0
Common Lilac	*Syringa vulgaris*	---	---	SNA	---	5
Common Milkweed	*Asclepias syriaca*	---	---	S5	0	5
Common Red Raspberry	*Rubus idaeus*	---	---	SNA	---	3
Common Vetch	*Vicia sativa*	---	---	SNA	---	3

Cranberry Viburnum	*Viburnum opulus*	---	---	S5	5	-3
Downy Serviceberry	*Amelanchier arborea*	---	---	S5	5	3
Downy Yellow Violet	*Viola pubescens var. pubescens*	---	---	S5	5	3
Early Meadow-rue	*Thalictrum dioicum*	---	---	S5	6	3
Eastern Hemlock	*Tsuga canadensis*	---	---	S5	7	3
Ironwood	*Ostrya virginiana*	---	---	S5	4	3
Eastern White Cedar	*Thuja occidentalis*	---	---	S5	4	-3
Field Mustard	*Brassica rapa*	---	---	SNA	---	5
Fragrant Bedstraw	*Galium triflorum*	--	--	S5	4	3
Garlic Mustard	*Alliaria petiolata*	---	---	SNA	---	3
Green Ash	*Fraxinus pennsylvanica*	---	---	S4	3	-3
Heart-leaved Foam-flower	*Tiarella cordifolia*	---	---	S5	6	3
Jack-in-the-pulpit	*Arisaema triphyllum ssp. triphyllum*	---	---	S5	5	-3
Large Toothwort	*Cardamine maxima*	---	---	S3	10	3
Manitoba Maple	*Acer negundo*	---	---	S5	0	0
Nannyberry	*Viburnum lentago*	---	---	S5	4	0
Ostrich Fern	*Matteuccia struthiopteris var. pensylvanica*	---	---	S5	5	0
Pin Cherry	*Prunus pensylvanica*	---	---	S5	3	3
Prickly Gooseberry	*Ribes cynosbati*	---	---	S5	4	3
Purple-flowering Raspberry	*Rubus odoratus*	---	---	S5	3	5
Red Baneberry	*Actaea rubra ssp. rubra*	---	---	S5	6	3
Red Maple	*Acer rubrum*	---	---	S5	4	0
Red Trillium	*Trillium erectum*	---	---	S5	6	3
Red-osier Dogwood	*Cornus sericea*	---	---	S5	2	3
Riverbank Grape	*Vitis riparia*	---	---	S5	0	0
Rough Bedstraw	*Galium asprellum*	--	--	S5	6	-5

Sandbar Willow	*Salix interior*	---	---	S5	1	-3
Scots Pine	*Pinus sylvestris var. sylvestris*	---	---	SNA	---	3
Sensitive Fern	*Onoclea sensibilis*	---	---	S5	4	-3
Silver Maple	*Acer saccharinum*	---	---	S5	5	-3
Smooth Gooseberry	*Ribes hirtellum*	---	---	S5	6	-3
Spotted Jewelweed	*Impatiens capensis*	---	---	S5	4	-3
Squirrel-corn	*Dicentra canadensis*	---	---	S5	7	5
Staghorn Sumac	*Rhus typhina*	---	---	S5	1	3
Sugar Maple	*Acer saccharum*	---	---	S5	4	3
Sulphur Cinquefoil	*Potentilla recta*	---	---	SNA		5
Swamp Red Currant	*Ribes triste*	---	---	S5	6	-5
Trembling Aspen	*Populus tremuloides*	---	---	S5	2	0
Virginia Creeper	*Parthenocissus quinquefolia*	---	---	S4?	6	3
White Ash	*Fraxinus americana*	---	---	S4	4	3
White Meadowsweet	*Spiraea alba*	---	---	S5	3	-3
White Oak	*Quercus alba*	---	---	S5	6	3
White Spruce	*Picea glauca*	---	---	S5	6	3
White Trillium	*Trillium grandiflorum*	---	---	S5	5	3
Wild Lily-of-the-valley	*Maianthemum canadense*	---	---	S5	5	3
Wild Parsnip	*Pastinaca sativa*	---	---	SNA	---	5
Wild Strawberry	*Fragaria virginiana*	---	---	S5	2	3
Wood Avens	*Geum urbanum*	---	---	SNA	---	3
Woodland Strawberry	*Fragaria vesca*	---	---	S5	3	4
Woolly Blue Violet	*Viola sororia*	---	---	S5	4	0
Woolly Blue Violet	*Viola sororia*	---	---	S5	4	0
Yellow Trout-lily	*Erythronium americanum*	---	---	S5	5	0
Yellow Violet	*Viola pubescens*	---	---	S5	5	3

Aster Species	*Aster spp.*	---	---	---	---	---
Bedstraw spp.	*Galium spp.*	---	---	---	---	---
Blackberry spp.	*Rubus*	---	---	---	---	5
Cherry spp.	*Prunus spp.*	---	---	---	---	---
Clover Species	*Clover spp.*	---	---	---	---	---
Grass Species	*Grass spp.*	---	---	---	---	---
Hawthorn Spp.	*Crataegus Spp.*	---	---	---	---	---
Horsetail spp.	*Equisetum spp.*	---	---	---	---	-3
Willow spp.	*Salix spp.*	---	---	---	---	---

[1]S-Rank (Provincial Status (NHIC))	S1:	Critically Imperiled – Critically imperiled in the 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 province.
	S2:	Imperiled – Imperiled in the 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 province.
	S3:	Vulnerable – Vulnerable in the nation or sprovince 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 longterm concern due to declines or other factors.
	S5:	Secure – Common, widespread, and abundant in the province.
	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.
[2]Coefficient of Conservatism *Oldham, M. J., W. D. Bakowsky and D. A. Sutherland. 1995. Floristic Quality Assessment System for Southern Ontario. Natural Heritage Information Centre, Ministry of Natural Resources. Peterborough, Ontario.*	Coefficient of Conservatism. Rank of 0 to 10 based on plants degree of fidelity to a range of synecological parameters: (0-3) Taxa found in a variety of plant communities; (4-6) Taxa typically associated with a specific plant community but tolerate moderate disturbance; (7-8) Taxa associated with a plant community in an advanced successional stage that has undergone minor disturbance; (9-10) Taxa with a high fidelity to a narrow range of synecological parameters.	
[3]Coefficient of Wetness *Oldham, M. J., W. D. Bakowsky and D. A. Sutherland. 1995. Floristic Quality Assessment System for Southern Ontario. Natural Heritage Information Centre, Ministry of Natural Resources. Peterborough, Ontario.*	-5	Obligate Wetland - Occurs almost always in wetlands under natural conditions (99% probability)
	-4	Facultative Wetland - Usually occurs in wetlands, but occasionally found in non-wetlands (67-99%)
	-3	
	-2	
	-1	Facultative - Equally likely to occur in wetlands or non-wetlands (34-66%)
	0	
	1	
	2	Facultative Upland - Occasionally occurs in wetlands, but usually occurs in non-wetlands (1-33%)
	3	
	4	
	5	Upland - Occurs almost never in wetlands under natural conditions (<1%)

APPENDIX D

Breeding Bird Species List

COMMON NAME	SCIENTIFIC NAME	CONSERVATION STATUS		
		Federal (SARA, 2002)	Provincial (ESA, 2007)	S-Rank[1]
American Crow	*Corvus brachyrhynchos*	N/A	N/A	S5
American Goldfinch	*Carduelis tristis*	N/A	N/A	S5B
American Redstart	*Setophaga ruticilla*	N/A	N/A	S5
American Robin	*Turdus migratorius*	N/A	N/A	S5B
Baltimore Oriole	Icterus galbula	N/A	N/A	S5B
Black-capped Chickadee	*Parus atricapillus*	N/A	N/A	S5
Blue Jay	*Cyanocitta cristata*	N/A	N/A	S5
Bobolink	*Dolichonyx oryzivorus*	THR	THR	S4B
Broad-winged Hawk	*Buteo platypterus*	N/A	N/A	S5B
Brown Thrasher	*Toxostoma rufum*	N/A	N/A	S5B
Brown-headed Cowbird	*Molothrus ater*	N/A	N/A	S5B
Canada Goose	*Branta canadensis*	N/A	N/A	S5
Cedar Waxwing	*Bombycilla cedrorum*	N/A	N/A	S5B
Chestnut-sided Warbler	*Dendroica pensylvanica*	N/A	N/A	S5B
Chimney Swift	*Chaetura pelagica*	THR	THR	S5B
Chipping Sparrow	*Spizella passerina*	N/A	N/A	S5B
Clay-coloured Sparrow	*Spizella pallida*	N/A	N/A	S4B
Common Grackle	*Quiscalus quiscula*	N/A	N/A	S5B
Common Yellowthroat	*Geothlypis trichas*	N/A	N/A	S5B
Dark Eyed Junco	*Junco hyemalis*	N/A	N/A	S5B
Downy Woodpecker	*Picoides pubescens*	N/A	N/A	S5
Eastern Kingbird	*Tyrannus tyrannus*	N/A	N/A	S5B
Eastern wood-pewee	*Contopus virens*	N/A	N/A	S5B
European Starling	Sturnus vulgaris	N/A	N/A	SNA
Field Sparrow	*Spizella pusilla*	N/A	N/A	S5B
Great Crested Flycatcher	*Myiarchus crinitus*	N/A	N/A	S5B
Gray Catbird	*Dumetella carolinensis*	N/A	N/A	S5B
Hairy Woodpecker	*Picoides villosus*	N/A	N/A	S5
House Finch	Haemorhous mexicanus	N/A	N/A	SNA
House Wren	*Troglodytes aedon*	N/A	N/A	S5B
Killdeer	*Charadrius vociferus*	N/A	N/A	S5B
Mallard	*Anas platyrhynchos*	N/A	N/A	S5

Mourning Dove	*Zenaida macroura*	N/A	N/A	S5
Northern Cardinal	*Cardinalis cardinalis*	N/A	N/A	S5
Northern Flicker	*Colaptes auratus*	N/A	N/A	S5B
Pileated Woodpecker	*Dryocopus pileatus*	N/A	N/A	S4S5
Purple Finch	*Carpodacus purpureus*	N/A	N/A	S5B
Rose -breasted Grosbeak	*Pheucticus ludovicianus*	N/A	N/A	*S5B*
Red-eyed Vireo	*Vireo olivaceus*	N/A	N/A	S5B
Red-tailed Hawk	*Buteo jamaicensis*	N/A	N/A	S5B
Red-winged Blackbird	*Agelaius phoeniceus*	N/A	N/A	S5B
Ring-billed Gull	*Larus delawarensis*	N/A	N/A	S5
Savannah Sparrow	*Passerculus sandwichensis*	N/A	N/A	S5B
Song Sparrow	*Melospiza melodia*	N/A	N/A	S5B
Tree Swallow	*Tachycineta bicolor*	N/A	N/A	S5B
White-breasted Nuthatch	*Sitta carolinensis*	N/A	N/A	S5
White-throated Sparrow	*Zonotrichia albicollis*	N/A	N/A	S5B
Wild Turkey	*Meleagris gallopavo*	N/A	N/A	S3S4
Yellow Warbler	*Dendroica petechia*	N/A	N/A	S5B
Yellow-rumped Warbler	*Dendroica coronata*	N/A	N/A	S5B

[1]S-Rank is an indicator of commonness in the Province of Ontario. A scale between 1 and 5, with 5 being very common and 1 being the least common. SNA indicates species is not native to province.