APPENDIX B:
TERRESTRIAL ECOSYSTEMS EXISTING CONDITIONS AND PRELIMINARY IMPACT ASSESSMENT REPORT

April 10, 2023

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Terrestrial Ecosystems Existing Conditions and Preliminary Impact Assessment Report

Highway 401 Planning Study,
Brockville (GWP 4003-19-00)

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Sign-off Page

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1.0 Introduction

The Ontario Ministry of Transportation (MTO) is undertaking the Preliminary Design and Class Environmental Assessment (EA) for an approximate length of 4.5 kilometers (km) along Highway 401 in Brockville, from 2 km west of Stewart Boulevard to 750 meters (m) east of North Augusta Road (GWP 4003-19-00) (the Study Area). The purpose of the study is to develop a plan for the rehabilitation and/or replacement of five (5) structures; determine the long-term plans for the Stewart Boulevard and North Augusta Road interchanges and establish the footprint for interim six-lanes and ultimate eight-lanes of Highway 401 within the City of Brockville. This study includes a review of existing conditions, development and evaluation of alternatives, identification of appropriate improvements, and development of environmental protection/mitigation measures. A Recommended Plan will be confirmed and designated (protected) at the completion of the study. The project is following the approved planning process for a Group 'B' project in accordance with the *MTO Class EA for Provincial Transportation Facilities (2000)* (MTO 1999).

This *Terrestrial Ecosystems Existing Conditions and Preliminary Impact Assessment Report* was completed in accordance with Section 3.2 – Terrestrial Ecosystems of the *Environmental Reference for Highway Design* (MTO 2013) and Section 4 – Wildlife and Wildlife Management of the *Environmental Reference for Contract Preparation* (MTO 2007). Fish and fish habitat features for this project are described in a separate report (Stantec 2021; Stantec 2023a).

The purpose of this report is to:

- describe vegetation communities, wildlife, and wildlife habitat
- assess impacts to the terrestrial environment, including sensitive natural features, species at risk (SAR), and species of conservation concern (SOCC)
- recommend preliminary standard and site-specific mitigation measures and environmental management
- identify requirements for SAR approvals
- For this report, the Study Area is the Highway 401 right-of-way (ROW) within the project limits, plus 120 m, as shown on Figure 1 below.

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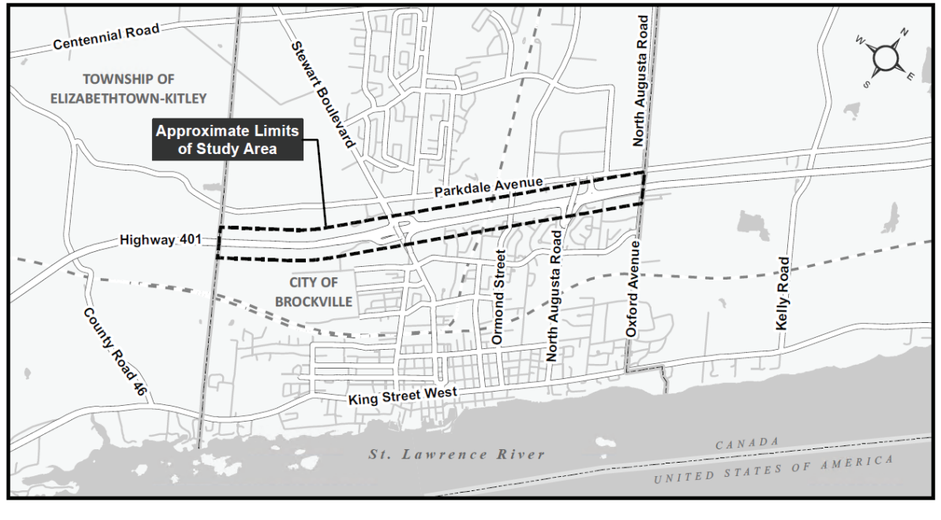

Figure 1: Approximate limits of the Highway 401 Brockville (GWP 4003-19-00) Study Area.

2.0 Background Data

2.1 Data Sources

The Study Area is located within the jurisdictions of the Kemptville District of the Ministry of Natural Resources and Forestry (MNRF) and the Cataraqui Region Conservation Authority (CRCA). The MNRF was consulted on October 14, 2020, to request information on natural heritage features in the Study Area. Copies of MNRF correspondence are in **Appendix B**.

The following background information sources were reviewed to identify natural heritage features within or near the Study Area, including designated natural areas, and records of significant species:

- MNRF Land Information Ontario (LIO) digital mapping of natural heritage features (MNRF 2021a)
- Natural Heritage Information Centre (NHIC) database (MNRF 2021b)

- Species at Risk in Ontario (SARO) List (MECP 2023)
- *Species at Risk Act* (SARA), Schedule 1 (Government of Canada 2023), including the Critical Habitat mapping database (Government of Canada 2021)
- 2nd Ontario Breeding Bird Atlas (Cadman et al. 2007)
- Atlas of Mammals of Ontario (Dobbyn 1994)
- Ontario Reptile and Amphibian Atlas (Ontario Nature 2020)
- Ontario Butterfly Atlas (Macnaughton et al. 2021)
- eBird Canada database (eBird 2021)
- iNaturalist (iNaturalist 2021)
- Various recovery strategies for SAR

The results of these searches were used to guide field investigations and to identify significant species that may be present in the Study Area. These resources do not provide exact locations, and accuracy ranges from 1 km^2 (NHIC) to 10 km^2 (wildlife atlases) or to municipal boundaries or watersheds. As such, they are used as an indicator of potential occurrence in the Study Area.

In addition to the sources listed above, the *Highway 401 at Stewart Boulevard, Brockville Interchange Improvements (GWP 4179-13-00) Terrestrial Ecosystems Existing Conditions Memo* (Dillon Consulting 2019) and *Highway 401 and North Augusta Road Interchange, City of Brockville (GWP 4179-13-00) Terrestrial Ecosystems Existing Conditions Memo* (Dillon Consulting 2019) reports were reviewed for information related to natural features and/or SAR/SOCC observed in the Study Area. Based on Stantec's review of these previous reports, no considerable changes have been made to the terrestrial environment within the Study Area since 2019. No SAR or Barn Swallow nests were observed during the 2019 studies. Candidate SAR bat maternity habitat, candidate SAR snake hibernacula habitat, and candidate amphibian breeding habitat were identified in the Study Area in 2019 and were confirmed as still present in 2021.

2.1.1 Significant Species

For this assessment, significant species include SAR and SOCC.

SAR are defined as species that are listed as Threatened or Endangered on the SARO list. The Ontario *Endangered Species Act, 2007* (ESA) prohibits harm or harassment to Threatened or Endangered species, and damage or disturbance to their habitat. The ESA applies on all private and Crown lands in Ontario.

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SOCC are considered at several levels, including globally, nationally, and provincially. For this report, SOCC includes species that are provincially rare (with a provincial S-rank of S1 to S3), listed as Special Concern (SC) on the SARO list, or listed on Schedule 1 of SARA but not included on the SARO list. Provincial ranks (S-ranks) are used by the NHIC to set protection priorities for rare species and vegetation communities, and are defined as follows:

- S1 - critically imperiled; usually fewer than 5 occurrences
- S2 - imperiled; usually fewer than 20 occurrences
- S3 - vulnerable; usually fewer than 100 occurrences
- S4 - apparently secure; uncommon but not rare, usually more than 100 occurrences
- S5 - secure; common, widespread, and abundant
- ? - S-rank followed by a "?" indicates the rank is uncertain

The potential for SAR to be present in the Study Area was evaluated based on the review of background information, agency consultation, and field investigations.

2.2 Results

The Study Area is within the Great Lakes/St. Lawrence Forest Region (Rowe 1972) and Ecoregion 6E – Lake Simcoe Rideau (MNRF 2021a). Forest communities in the Great Lakes/St. Lawrence Forest Region are dominated by hardwood trees such as maple, oak, birch, and basswood but also commonly include white pine, red pine, hemlock, and white cedar (Crins et al. 2009).

The Study Area is in Ecoregion 6E-11 (Smiths Falls Ecodistrict). The Ecodistrict is characterized by shallow, calcareous morainal material over Paleozoic bedrock and gently rolling topography (Wester et al. 2018). Forested habitat is the dominant land cover with deciduous forest occupying 30%, mixed forest 20%, and coniferous forest 6% of the landscape. Agriculture (pasture/cropland) occupies 35% of the landscape with urban habitat at 1% (Wester et al. 2018).

A significant woodland was present at the southwestern end of the Study Area. A significant woodland is defined in the City of Brockville Official Plan (2012) as "*areas which are ecologically important in terms of species composition, age of trees and stand history. . . [and] functionally important due to their contribution to the broader landscape*".

The Frontenac Arch Biosphere Reserve is also present throughout the extent of the Study Area. This biosphere reserve has been designated as an international UNESCO (United Nations Educational, Scientific and Cultural Organization) biosphere region that spans 2700 square kilometers (km^2) from Gananoque to Brockville, and Sydenham to Westport and Rideau Lakes. It is an area that contains unique geology, diverse forest communities, and biodiversity in Ontario.

No other designated natural areas or provincially significant natural heritage features such as Provincially Significant Wetlands, Areas of Natural or Scientific Interest, provincial parks, or Significant Wildlife Habitat (SWH) were present in the Study Area (MNRF 2021a). MNRF (2021a) mapping included the following natural heritage features (**Figure 2, Appendix A**):

- significant ecological areas (Frontenac Arch Biosphere Reserve and City of Brockville Significant Woodlands)
- wooded areas
- unevaluated wetlands
- Buells Creek watercourse

2.2.1 Significant Species

The NHIC database contained 11 occurrence records of significant species for the Study Area (MNRF 2021b):

- **Birds** - Bobolink (*Dolichonyx oryzivorus*), Eastern Meadowlark (*Sturnella magna*), Wood Thrush (*Hylocichla mustelina*)
- **Reptiles** – Blanding's Turtle (*Emydoidea blandingii*), Snapping Turtle (*Chelydra serpentina*), Midland Painted Turtle (*Chrysemys picta marginata*), Eastern Milksnake (*Lampropeltis triangulum*)
- **Insects** – Yellow-banded Bumble Bee (*Bombus terricola*), Transverse Lady Beetle (*Coccinella transversoguttata*)
- **Plants** – Butternut (*Juglans cinerea*), Olney's Grimmia (*Grimmia olneyi*)

An additional 29 significant species with potential to occur within the Study Area were identified in wildlife atlases and other background data sources. A complete list of the 40 potential significant species and their status is provided in **Table 2.1**. The list includes 15 SAR and 25 SOCC.

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Table 2.1: Background Review of SAR and SOCC in the Study Area

Type	Common Name	Scientific Name	SARO List	SARA Schedule 1	S-Rank
SAR	Transverse Lady Beetle	*Coccinella transversoguttata*	END	SC	S1
SAR	Blanding's Turtle	*Emydoidea blandingii*	THR	END	S3
SAR	Gray Ratsnake (Frontenac)	*Pantherophis spiloides*	THR	THR	S3
SAR	Eastern Whip-poor-will	*Antrostomus vociferus*	THR	THR	S4B
SAR	Chimney Swift	*Chaetura pelagica*	THR	THR	S4B, S4N
SAR	Least Bittern	*Ixobrychus exilis*	THR	THR	S4B
SAR	Bank Swallow	*Riparia riparia*	THR	THR	S4B
SAR	Bobolink	*Dolichonyx oryzivorous*	THR	THR	S4B
SAR	Eastern Meadowlark	*Sturnella magna*	THR	THR	S4B
SAR	Eastern Small-footed Myotis	*Myotis leibii*	END	-	S2S3
SAR	Little Brown Myotis	*Myotis lucifugus*	END	END	S4
SAR	Northern Myotis	*Myotis septentrionalis*	END	END	S3?
SAR	Tri-colored Bat	*Perimyotis subflavus*	END	END	S3?
SAR	Butternut	*Juglans cinerea*	END	END	S2?
SAR	American Ginseng	*Panax quinquefolius*	END	END	S2
SOCC	Monarch	*Danaus plexippus*	SC	SC	S4B, S2N
SOCC	Yellow-banded Bumble Bee	*Bombus terricola*	SC	SC	S3S5
SOCC	Western Chorus Frog	*Pseudacris triseriata*	NAR	THR	S3

Type	Common Name	Scientific Name	SARO List	SARA Schedule 1	S-Rank
SOCC	Eastern Milksnake	*Lampropeltis triangulum*	NAR	SC	S3
SOCC	Eastern Ribbonsnake	*Thamnophis sauritus*	SC	SC	S4
SOCC	Northern Map Turtle	*Graptemys geographica*	SC	SC	S3
SOCC	Snapping Turtle	*Chelydra serpentina*	SC	SC	S3
SOCC	Eastern Musk Turtle	*Sternotherus odoratus*	SC	SC	S3
SOCC	Midland Painted Turtle	*Chrysemys picta marginata*		SC	S5
SOCC	Common Nighthawk	*Chordeiles minor*	SC	SC	S4B
SOCC	Great Black-backed Gull	*Larus marinus*			S2B
SOCC	Caspian Tern	*Hydroprogne caspia*	NAR	NAR	S3B
SOCC	Black Tern	*Chlidonias niger*	SC	NAR	S3B
SOCC	Black-crowned Night-heron	*Nycticorax nycticorax*			S3B, S2N, S4M
SOCC	Great Egret	*Ardea alba*			S2B
SOCC	Bald Eagle	*Haliaeetus leucocephalus*	SC	NAR	S4B, S2N
SOCC	Peregrine Falcon	*Falco peregrinus*	SC	SC	S3B
SOCC	Eastern Wood-Pewee	*Contopus virens*	SC	SC	S4B
SOCC	Wood Thrush	*Hylocichla mustelina*	SC	THR	S4B
SOCC	Barn Swallow	*Hirundo rustica*	SC	THR	S4B
SOCC	Evening Grosbeak	*Coccothraustes vespertinus*	SC	SC	S4

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Type	Common Name	Scientific Name	SARO List	SARA Schedule 1	S-Rank
SOCC	Grasshopper Sparrow	*Ammodramus savannarum*	SC	SC	S4B
SOCC	Golden-winged Warbler	*Vermivora chrysoptera*	SC	THR	S4B
SOCC	Canada Warbler	*Cardellina canadensis*	SC	THR	S4B
SOCC	Olney's Grimmia	*Grimmia olneyi*			S2

S1: Critically Imperiled—Critically imperiled in the province (often 5 or fewer occurrences)

S2: Imperiled— Imperiled in the province, few populations (often 20 or fewer)

S3: Vulnerable—Vulnerable in the province, relatively few populations (often 80 or fewer)

S4: Apparently Secure—Uncommon but not rare

S? – Rank Uncertain

SH: Possibly Extirpated (Historical)

S#B- Breeding status rank

S#N- Non-Breeding status rank

END: Endangered

THR: Threatened

SC: Special Concern

NAR: Not at Risk

3.0 Field Investigations

3.1 Methods

Field investigations were completed on August 10, 2020, and June 14, 2021. Surveys included a vegetation community classification, wildlife habitat assessment, a SAR habitat assessment, a migratory bird nest survey, delineation of European reed (*Phragmites australis ssp. australis*), and incidental wildlife observations. Due to property access restrictions, field investigations were performed from within the highway ROW.

Field data forms collected by Stantec fisheries specialists were also reviewed to incorporate relevant notes at watercourse crossing locations, including observations of bird nests on structures and incidental observations of wildlife. Fish and fish habitat related to the project are described in a separate report (Stantec 2021).

3.1.1 Vegetation Assessment

Vegetation community mapping followed the Ecological Land Classification (ELC) system for southern Ontario (Lee et al. 1998) and, where appropriate, the updated ELC Catalogue (2008). Vegetation communities were delineated on satellite photographs and verified in the field. Provincial significance of vegetation communities was based on the rankings assigned by the NHIC (MNRF 2021c).

A list of plant species identified from the ROW was compiled. The nomenclature and provincial status of all plant species was based on a vascular plant species list provided by the NHIC (MNRF 2020c). Identification of potentially sensitive native plant species was based on their assigned coefficient of conservatism (CC) value, as determined by Oldham et al. (1995). This CC value, ranging from 0 (low) to 10 (high), is based on a species' tolerance of disturbance and fidelity to a specific natural habitat. Species with a CC value of 9 or 10 generally exhibit a high degree of fidelity to a narrow range of habitat parameters.

Occurrences of European reed were mapped in the field by delineating polygons to show the location and extent of large colonies. Point locations were recorded for stands that were too small to delineate.

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3.1.2 Wildlife and Wildlife Habitat

3.1.2.1 Significant Species

As described in **Section 2.1** and **2.2**, a list of SAR and SOCC with occurrence records in the Study Area was obtained through background review. Assessments were completed in the field to determine if there is suitable habitat for these species in the Study Area. Field investigations were supplemented with data obtained through satellite photo interpretation and background information on species' habitat preferences. SAR and SOCC with suitable habitat and at least one recent record with an overlapping range in the Study Area were considered to have a reasonable probability of occurring. Species with no preferred habitat in the Study Area are assumed to be absent.

Results of the habitat assessment for SAR are included in **Appendix F1**, while results for SOCC are included in **Appendix F2** and in the SWH assessment (**Section 3.2.2.2; Table** 3.2).

3.1.2.2 Significant Wildlife Habitat

The *Significant Wildlife Habitat Technical Guide* (SWHTG) (MNR 2000) describes SWH in four categories:

1. Seasonal concentration areas
2. Rare vegetation communities or specialized habitats for wildlife
3. Habitats of SOCC (excluding the habitats of Endangered or Threatened species)
4. Animal movement corridors

Habitats within the Study Area were assessed for candidate SWH using the *Ecoregion 6E Criterion Schedule* (MNRF 2015).

Targeted species-use surveys are required to determine if candidate features qualify as confirmed SWH. Because targeted species-use surveys were not conducted, SWH features identified during field investigations are considered candidate, unless they were confirmed through direct observations or background review.

3.1.2.3 Nest Surveys

Migratory birds and their nests are protected under the *Migratory Bird Convention Act, 1994* (MBCA). Suitable drainage structures, interchange structures, and overpasses in the ROW were searched for the presence of migratory bird nests. These structures have the potential to provide nesting habitat for Barn Swallow, Cliff Swallow, Eastern Phoebe, and other migratory birds, which receive protection under the MBCA.

For structures with limited visibility due to traffic and/or rail hazards, a 25-minute survey was completed at the base of the structure from a safe location to determine if migratory birds were accessing the structures. For the North Augusta Road (Structure 16-124) and Stewart Boulevard (Structure 16-121) interchanges, the survey was completed twice, once from the eastbound land and once from the westbound lane.

Field staff also recorded the dimensions and physical characteristics of the structures and whether potential nesting ledges were present where access was possible. Nest searches were completed on June 14, 2021, to correspond with the active breeding bird season (i.e., late May through early July).

3.1.2.4 Incidental Observations

Wildlife observations and/or evidence of wildlife (e.g., tracks, burrows, vocalizations) were recorded during all field visits.

3.2 Results

3.2.1 Vegetation

Land cover in the Study Area included constructed, meadow, thicket, woodland, and wetland ELC community types. Constructed land use types included transportation and utility corridors, light industry and businesses, residential development, parkland, and a golf course, which occupied approximately 61% of the Study Area.

Natural areas were predominately woodland (19%) and successional communities (meadows and thicket), which occupied 13% and 5% of the Study Area, respectively. Woodlands were predominantly deciduous forest communities dominated by sugar maple, red maple, Norway maple, red oak, ash species, and white elm (**Photos 1-2, Appendix C**). Mixed and coniferous forests also included white pine, red pine, Scots pine, and spruce species (**Photo 6, Appendix C**). Thicket communities contained staghorn sumac, common juniper, Manitoba maple, European buckthorn, and young aspen species. Wetlands and aquatic communities occupied 1% of the Study Area and included cattail meadow marsh (**Photos 12** and **15, Appendix C**), Buells Creek (**Photos 8** and **10, Appendix C**), and water hazards in the unnamed golf course northwest of Highway 401.

The vegetation communities observed in the Study Area were common in southern Ontario, and typical of the Great Lakes/St. Lawrence Forest Region (Rowe 1972) and Ecoregion 6E.

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Areas within the ROW including lands adjacent to the shoulder and areas around interchanges were dominated by meadow communities (**Photos 5, 7, 14,** and **17, Appendix C**). These meadows were comprised of common roadside vascular plant species such as wild carrot, wild parsnip, Canada thistle, Canada goldenrod, aster species, purple crown-vetch, clover species, smooth brome, European reed, and other common old field vascular plants.

A summary of the ELC communities in the Study Area is provided in **Table 3.1**. The complete list of community types in provided in **Appendix D**, and ELC mapping is provided on **Figures 3-1** through **3-4, Appendix A**.

Table 3.1: Summary of ELC Communities in the Study Area

Type	Area (ha)	Percent of Total Area
Aquatic	0.38	0.20%
Constructed	114.91	61.38%
Deciduous Thicket	10.27	5.48%
Meadow	23.92	12.77%
Rock Barren	0.36	0.19%
Wetland	1.96	1.05%
Woodland - Coniferous	1.24	0.66%
Woodland – Deciduous	33.55	17.92%
Woodland – Mixed	0.34	0.18%
Woodland – Plantation	0.30	0.16%
Total	**187.22**	**100.00**

3.2.1.1 Vascular Plants

Ninety (90) distinct vascular plants were recorded from the ROW and in adjacent natural features, including taxa identified to genus, species, subspecies (ssp.) and variation (var.) levels. The following is a summary of vascular plants recorded:

- Forty-eight (48) of the recorded species are native to Ontario, while the remaining taxa are either not native to Ontario or their origin is unknown.
- All but one native species has a provincial rank of S4 or S5, which indicates that they are common or uncommon but not rare in Ontario, and populations are secure or apparently secure in Ontario.

- One species is ranked as S2? (butternut) indicating they are rare or very rare in Ontario.
- One SAR (butternut)
- No species with a CC value of 9 or 10.

A single butternut tree was observed in a deciduous thicket community approximately 90 m north of Highway 401 near Station 20+793L (**Figure 3-2, Appendix A; Photos 19** and **20, Appendix C**). The tree was observed from a hotel parking lot and butternut canker was observed on the trunk and roots, which identifies it as a pure butternut and not a hybrid butternut.

European reed (invasive Phragmites) was observed in the Highway 401 ROW around the North Augusta Road interchange. European reed is associated with meadow and marsh habitat along ditches in areas that had been previously disturbed (i.e., grading, construction) in the Study Area and is mapped on **Figures 3-3** and **3-4, Appendix A (Photo 17, Appendix C)**.

A detailed list with scientific plant names and species statuses is provided in **Appendix E**.

3.2.2 Wildlife and Wildlife Habitat

3.2.2.1 Species at Risk

There were 16 SAR identified in the background review that may occur in the Study Area (**Section 2.2.1**). Field investigations confirmed that one of these species is present (butternut) and habitat assessments determined there is suitable habitat in the Study Area for an additional 11 species. Observations of butternut are discussed in **Sections 3.2.1.1.** and a habitat description and assessment for each of the 16 SAR is provided in **Appendix F1.**

3.2.2.2 Significant Wildlife Habitat

The presence of the four categories of SWH (briefly described below) was assessed for the Study Area. A summary table of the SWH assessment is provided in **Table 3.2**. SWH is primarily associated with woodland and wetland communities and the highest quality features and interior habitat occur outside the ROW. Constructed features are generally not considered SWH, such as turtle nesting areas in gravel/sandy highway shoulders.

Seasonal Concentration Areas

Seasonal concentration areas are those sites where large numbers of a species gather at one time of the year, or where several species congregate. Examples include deer yards, snake and bat hibernacula, waterfowl staging and molting areas, raptor roosts, bird

nesting colonies, shorebird staging areas, and passerine migration concentrations. Usually only the best examples of these concentration areas are designated as SWH. Results of the assessment of seasonal concentration areas are summarized in **Table 3.2.**

Rare or Specialized Habitat

Rare or specialized habitats are two separate components of SWH. Rare habitats are those with vegetation communities that are considered rare in the province. Specialized habitats are microhabitats that are critical to some wildlife species. The SWHTG (MNR 2000) identifies many habitats that could be considered specialized habitats, such as habitat for area-sensitive species, forests providing a high diversity of habitats, amphibian woodland breeding ponds, turtle nesting habitat, highly diverse sites, as well as seeps and springs. High quality habitat features generally occur within interior landscapes and not influenced by edge effects and wildlife mortality that are associated with major roadways. Results of the assessment of rare or specialized habitat for wildlife are summarized in **Table 3.2**.

Habitat for Species of Conservation Concern

The background review identified 25 SOCC with potential to occur in the Study Area (**Section 2.2.1**). Field investigations and habitat assessments determined that 12 of these 25 SOCC may occur in the ROW. A habitat description and assessment for each of the 25 SOCC is provided in **Appendix F2.** One SOCC (Monarch), was observed during field investigations foraging in meadow habitat in the ROW.

Animal Movement Corridors

Migration corridors are areas that are traditionally used by wildlife to move from one habitat to another. This is usually in response to different seasonal habitat requirements. There are two types of animal movement corridors in Ecoregion 6E: amphibian and deer. Such corridors are identified after amphibian breeding habitat (woodlands) and/or deer wintering/yarding areas are confirmed. Amphibian breeding surveys were not conducted for the project and are beyond the scope of this assessment. Candidate animal movement corridors are identified in **Table 3.2.**

Table 3.2: Significant Wildlife Habitat Assessment for the Study Area

Type	Habitat Type (MNRF 2015)	Habitat Description	Candidate SWH
Seasonal Concentration Areas	Bat hibernacula	Abandoned mine shafts, underground foundations, caves, and crevices.	Absent. Features were not observed during field investigations or identified during background data review.
	Deer wintering congregation areas and deer yards	Deer yards are mapped by MNRF.	Absent. No deer yards were mapped by MNRF in the Study Area (MNRF 2021a).
	Colonially – nesting bird breeding habitat (bank and cliff)	Eroding banks, sandy hills, steep slopes, rock faces or piles. Cliff faces. Does not include disturbed soil areas such as berms, embankments, oil, or aggregate stockpiles.	Absent. Suitable bank and cliff habitat were not observed during field investigations.
	Colonially – nesting bird breeding habitat (trees/shrubs)	Dead trees in large marshes and lakes, flooded timber, and shrubs, with nests of Great Blue Heron, Great Egret, Green Heron, or Black-crowned Night-Heron.	Absent. Suitable wetland habitat was not observed during field investigations or identified on satellite imagery.
	Colonially – nesting bird breeding habitat (ground)	Rock islands and peninsulas in a lake or large river.	Absent. Features were not observed during field investigations or identified on satellite imagery.

Type	Habitat Type (MNRF 2015)	Habitat Description	Candidate SWH
	Waterfowl stopover and staging areas	Fields with evidence of annual spring flooding from meltwater or runoff; aquatic habitats such as ponds, marshes, lakes, bays, and watercourses used during migration, including large marshy wetlands.	Absent. Suitable habitat was not observed during field investigations or identified on satellite imagery.
	Shorebird migratory stopover area	Muddy and unvegetated shorelines, beach areas, bars.	Absent. Natural features were not observed during field investigations or identified on satellite imagery.
	Raptor wintering areas	**Combination of fields and woodland (≥ 20 ha).**	**Candidate. The significant woodland in the southwest of the Study Area may support overwintering raptors.**
	Bat maternity colonies	**Mixed and deciduous forests and swamps with large diameter trees with cavities.**	**Candidate. Deciduous and mixed forests (FOD, FOM, WOD, WOM) and deciduous swamp (SWDM4) may support bat maternity roosting habitat.**

Type	Habitat Type (MNRF 2015)	Habitat Description	Candidate SWH
	Reptile hibernacula	**Rock piles or slopes, stone fences, crumbling foundations.**	**Candidate. Exposed rock was observed along the highway (example 21+179R and 21-533R on Figure 3-2, Appendix A; Photos 21 and 22 in Appendix C), and other suitable hibernacula features are also likely present in the Study Area.**
	Turtle wintering area	Permanent waterbodies and large wetlands with sufficient dissolved oxygen; man-made ponds are not considered SWH.	Absent. Natural permanent waterbodies deep enough not to freeze were not observed in the Study Area.
	Migratory butterfly stopover area	Fields and forests that are a minimum of 10 ha and are located within 5 km of Lake Erie or Lake Ontario.	Absent. Study Area is > 5 km from Lake Erie and Lake Ontario.
	Land bird migratory stopover area	Woodlands of a minimum size located within 5 km of Lake Erie or Lake Ontario.	Absent. Study Area is > 5 km from Lake Erie and Lake Ontario.
Rare Vegetation Communities	Sand barren, alvar, cliffs and talus slopes	Sand barren, alvar, cliff and talus ELC community classes, and other areas of exposed bedrock and patchy soil development, near vertical exposed bedrock and slopes of rock rubble.	Absent. Communities were not observed during field investigations or identified on satellite imagery.

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Type	Habitat Type (MNRF 2015)	Habitat Description	Candidate SWH
	Prairie and savannah	Open canopy habitats (tree cover < 60%) dominated by prairie species.	Absent. Communities were not observed during field investigations or identified on satellite imagery.
	Old growth forest	Relatively undisturbed, structurally complex; dominant trees > 100 years' old.	Absent. Features were not observed during field investigations or identified during background data review.
	Other rare vegetation communities	Vegetation communities ranked S1-S3 by the NHIC.	Absent. Communities were not observed during field investigations or identified on satellite imagery.
Specialized Habitat for Wildlife	Waterfowl nesting areas	Upland habitats adjacent to wetlands.	Absent. Wetland/upland complexes in the Study Area may support nesting waterfowl. However, the wetlands are generally small and unlikely to support nesting activity required to confirm SWH.
	Bald Eagle and Osprey nesting, foraging and perching habitat	Treed communities adjacent to rivers, lakes, ponds, and other wetlands with stick nests of Bald Eagle or Osprey.	Absent. No large waterbodies or watercourses in Study Area, no stick nests observed during field investigations.

Type	Habitat Type (MNRF 2015)	Habitat Description	Candidate SWH
	Woodland raptor nesting habitat	**Stick nests in forested ELC communities ≥ 30 ha with 10 ha of interior habitat.**	**Candidate. Large woodland communities in the Study Area may support woodland raptor nests; particularly in the significant woodland in the southwest of the Study Area.**
	Turtle nesting areas	**Exposed soil, including sand and gravel in open sunny areas in proximity to wetlands.**	**Candidate. Large open sand traps are present within the unnamed golf course located northwest of Highway 401.** **There is also potential for turtles to nest in road shoulders. However, this habitat type does not qualify as SWH.** **No predated turtle nests were observed on the road shoulder during field investigations.**
	Seeps and springs	Any forested area with groundwater at surface within the headwaters of a stream or river system.	Undetermined. There were no seeps or springs identified during field investigations. However, not all portions of the Study Area could be thoroughly surveyed due to access restrictions.

Type	Habitat Type (MNRF 2015)	Habitat Description	Candidate SWH
	Amphibian breeding habitat (woodland and wetland)	**Treed uplands with vernal pools and wetland ecosites.**	**Candidate. A deciduous swamp (SWDM4) was identified as a suitable amphibian breeding habitat during field investigations (Figure 3-3, Appendix A). There is potential for amphibian breeding activity in other woodlands, wetlands, and watercourses in the Study Area.**
	Woodland area sensitive breeding bird habitat	Large mature forest stands, woodlots > 30 ha with interior forest habitat (i.e., at least 200 m from edge).	Absent. Interior habitat is absent from the ROW. The significant woodland in the Study Area is located between Highway 401 and the Canadian Pacific (CP) railway and does not contain interior forest habitat.

Type	Habitat Type (MNRF 2015)	Habitat Description	Candidate SWH
Habitat for Species of Conservation Concern	Open country bird breeding habitat	Large grasslands and fields (> 30 ha) with two or more of the following species: Upland Sandpiper, Grasshopper Sparrow, Vesper Sparrow, Northern Harrier, Savannah Sparrow, OR with nesting Short-eared Owls.	Absent. Communities were not observed during field investigations or identified on satellite imagery.
	Shrub/early successional bird breeding habitat	Large shrub and thicket habitats (> 10 ha) with: - At least one Brown Thrasher or Clay-colored Sparrow breeding, OR - At least two of Field Sparrow, Black-billed Cuckoo, Eastern Towhee and Willow Flycatcher, OR - Nesting Yellow-breasted Chat OR Golden-winged Warbler.	Absent. Communities were not observed during field investigations or identified on satellite imagery.

Type	Habitat Type (MNRF 2015)	Habitat Description	Candidate SWH
	Marsh bird breeding habitat	Wetlands with shallow water and emergent aquatic vegetation with American Bittern, Virginia Rail, Sora, Common Moorhen, American Coot, Pied-billed Grebe, Marsh Wren, Sedge Wren, Common Loon, Sandhill Crane, Green Heron, Trumpeter Swan, Black Tern, or Yellow Rail.	Absent. Communities were not observed during field investigations or identified on satellite imagery.
	Special Concern and provincially rare (S1-S3) wildlife	**A habitat assessment for special concern and provincially rare wildlife (i.e., SOCC) is included in Appendix F2.**	**Habitat assessments determined there is suitable habitat in the Study Area for 13 SOCC. A habitat description and assessment for the SOCC is provided in Appendix F2. Field investigations confirmed the presence of one of these species (Monarch)**
Animal Movement Corridors	Amphibian movement corridors	Associated with confirmed amphibian breeding habitat.	Undetermined. Cannot be confirmed without targeted amphibian surveys.
	Deer movement corridors	Associated with confirmed deer wintering habitat.	Absent. No deer wintering habitat was identified by the MNRF. Therefore, candidate habitat for deer movement corridors in the Study Area is absent.

3.2.2.3 Nest Surveys

No bird nests were observed during field investigations. The Buells Creek Culvert (Structure 16-237/C) and four overpass/bridge structures (16-121, 16-122, 16-123, and 16-123) were surveyed (**Photos 8** and **18, Appendix C**). No nests or birds were observed accessing any of the structures.

As mentioned in **Section 3.1.2.3**, nest searches were conducted on June 14, 2021, to correspond with the active breeding season. Therefore, the lack of bird observations and/or nests indicated that the structures in the Study Area are not currently being used as nesting habitat.

3.2.2.4 Incidental Wildlife

The following species were recorded incidentally during field observations:

- Insects - Monarch
- **Birds -** American Crow, American Goldfinch, American Robin, Black-capped Chickadee, Blue Jay, Common Grackle, European Starling, House Finch, House Sparrow, Rock Pigeon, Red-eyed Vireo, Ring-billed Gull, Song Sparrow
- **Mammals -** Gray Squirrel, Red Squirrel

Monarch is a SOCC and the observation location is shown in **Figure 3-4, Appendix A.**

The complete list of wildlife observed in the Study Area including scientific names and statuses is provided in **Appendix G**.

3.2.3 Invasive Phragmites Mapping

Phragmites was present within the Highway 401 Brockville ROW. Occurrences were usually along watercourses and in ditch bottoms; however, the species is known to quickly colonize a variety of disturbed areas. Phragmites propagate through the spread of root fragments and seeds. MTO East Region is working to control Phragmites within its highway corridors through the use of an Integrated Pest Management Plan, which includes chemical control (i.e., pesticide application) and mechanical control (i.e., mowing).

The locations of Phragmites are shown throughout **Figures 3.1 – 3.4, Appendix A**.

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3.3 Summary of Existing Conditions

The natural heritage features listed in **Table 3.3** were present in the Study Area and were carried forward to the Impact Assessment in **Section 5.0,** where standard and site-specific protection measures are provided.

Table 3.3: Summary of Natural Heritage Features that are Addressed in the Impact Assessment

Type	Species/Feature	Description
Migratory Birds	Bird Nests	May occur in vegetation and structures. Although not present at the time of 2021 field investigations, migratory bird nests have potential to be present in subsequent breeding seasons.
Vegetation/Natural Features and Areas	Wetlands	Deciduous swamp and meadow marsh features were present in the Study Area. Four wetland communities are present in the proposed area of impact.
	Phragmites	Common around the North Augusta Road interchange and associated ROW.
	Significant Ecological Area - Significant Woodlands	Three areas of significant woodlands are present in the Study Area. One significant woodland is present in the proposed area of impact; FODM5-11 (**Figure 3-1, Appendix A**) in the southwest portion of the Study Area.
	Significant Ecological Area - Frontenac Arch Biosphere Reserve	The biosphere reserve is a regional feature, so the entire Study Area is within the reserve.
Candidate SWH	Raptor Wintering Area	Large woodlands are present in the Study Area and within in the proposed area of impact, specifically in FODM5-11 (Figure 3-1, App A).

Type	Species/Feature	Description
	Bat maternity colonies	Forests with mature trees are present in the Study Area and may provide habitat for maternity roosting bat colonies. They are also present in the proposed area of impact.
	Reptile hibernacula	Exposed rocks with cracks and crevices were observed along the Highway 401 ROW and six locations have been documented to occur within the proposed area of impact.
	Woodland Raptor Nesting Habitat	Large woodland communities in the Study Area may support woodland raptor nests; particularly in the significant woodland in the southwest corner of the Study Area (Figure 3-1, App A).
	Turtle nesting areas	May be present within the Study Area in the form of sand traps associated with the unnamed golf course northwest of Highway 401. No natural habitat was observed in the ROW; however, turtles may nest in road shoulders. Road shoulders do not qualify as SWH.
	Amphibian Breeding Habitat (Woodland and Wetland)	A deciduous swamp (SWDM4) was identified as a suitable amphibian breeding habitat within the Study Area. There is potential for amphibian breeding activity in other woodlands, wetlands, and watercourses in the Study Area and proposed area of impact.
SOCC Confirmed in the Study Area	Monarch	Adult observed foraging in the Study Area during field investigations (**Figure 3-4, Appendix A**).
SOCC with potential to be present in the Study Area	**Insect SOCC:** Yellow-banded Bumble Bee	Flowering plants and suitable habitat in the form of meadows, gardens, forests, etc. are present in the Study Area and proposed area of impact.

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Type	Species/Feature	Description
	Amphibian SOCC: Western Chorus Frog	Suitable habitat of wetlands and ditches are present in the Study Area and proposed area of impact.
	Reptile SOCC: Eastern Milksnake Snapping Turtle Eastern Musk Turtle Midland Painted Turtle	Potential habitat is present in wetlands, aquatic features, forests, and meadows in the Study Area and proposed area of impact. All four species have potential to enter the ROW or work zones during construction.
	Bird SOCC: Common Nighthawk Barn Swallow Eastern Wood-Pewee Wood Thrush Evening Grosbeak Canada Warbler	Forest communities within the Study Area may support most of these species. Forest edges are present in the proposed area of impact, which may provide suitable habitat for breeding Eastern Wood-Pewee. It is unlikely for Common Nighthawk, Wood Thrush, Evening Grosbeak, and Canada Warbler to occur in the work zones as this species prefers interior habitats away from disturbance and forest edges. Although no nests of Barn Swallow were observed on the structures there is potential for new nests to become established in future breeding seasons.
SAR confirmed in the Study Area	Butternut	Confirmed habitat for this species is present in the Study Area. One Butternut was observed in the Study Area (Figure 3-4, Appendix A) but is outside of the proposed area of impact. Additional Butternut trees may be present in open woodlands, woodland edges, and other open habitat in the Study Area and/or proposed are of impact.

Type	Species/Feature	Description
SAR with potential to be present in the Study Area	**Reptile SAR:** Blanding's Turtle Gray Ratsnake	Potential habitat is present in wetlands, aquatic features, forests, and meadows in the Study Area. Both species have potential to enter the ROW/work zones.
	Bird SAR: Eastern Whip-poor-will Chimney Swift Bank Swallow	Forest communities within the Study Area may support Eastern Whip-poor-will. However, it is unlikely for this species to occur in the area of impact as this species prefers interior habitats away from disturbance and forest edges. For Chimney Swift, buildings with chimney structures are present within the Study Area but not within the proposed area of impact. Suitable breeding habitat of vertical embankments for Bank Swallow may occur within the Study Area but not there is no suitable habitat within the proposed area of impact.
	Mammal SAR: Small-footed Myotis Little Brown Myotis Northern Myotis Tri-colored Bat	Forests with mature trees are present in the Study Area and may provide suitable roost habitat for bat SAR. Suitable bat roosting trees may be present within the proposed area of impact.
	Plant SAR: American Ginseng	This species may be present within the deciduous forests in the Study Area. However, this plant prefers nutrient-rich soils found in mature interior habitats and would not be present within disturbed areas such as the ROW and/or proposed area of impact.

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4.0 Description of Work

The Preferred Plan includes:

- Reconfiguration of the Stewart Boulevard interchange to a Single Point Urban Intersection (SPUI) configuration.
- Replacement of the Ormond Street overpass and the Buells Creek culvert with a combined overpass structure, including the localized realignment of Buells Creek beneath Highway 401.
- Reconfiguration of the North Augusta Road interchange to a Parclo A2/Diamond configuration.
- Establishing the future footprint for interim six lanes and ultimate eight lanes of Highway 401.
- Drainage improvements and three new stormwater management (SWM) ponds.

5.0 Impact Assessment

Impacts to natural features from Project construction are presented based on the Preferred Plan. For this assessment, it is assumed that natural areas within the construction limits will be partially removed for construction. Precise limits of vegetation removal will be confirmed during Detail Design.

Potential impacts associated with the construction of drainage improvements, interchange improvements, realignment of Buells Creek, and future expansion of the highway footprint could include soil compaction, siltation of nearby wetland communities, terrestrial habitat loss and vegetation removal, disturbance to wildlife species, spills of deleterious substances into natural communities, and noise disturbance. Most impacts are expected to be short term and localized to the Study Area during construction activities and lessened through the application of appropriate construction techniques and mitigation measures. Some terrestrial habitats and vegetation communities will be permanently lost due to vegetation clearing and subsequent road footprint. Standard environmental protection and feature-specific mitigation measures are discussed in separate sections below.

5.1 Loss of Terrestrial Habitat

The proposed realignment of Buells Creek, drainage improvements, interchange improvements, and future expansion of the highway footprint will require vegetation removal, earth clearing, and grading, and will result in the loss of approximately 23.6 ha of terrestrial habitat within the Study Area (see **Figure 3**, **Appendix A**). Most of the proposed works will occur within the ROW and require little disturbance to natural vegetation cover and terrestrial habitat to accommodate construction activities. However, construction activities in some areas will extend beyond the current ROW to accommodate the highway's future footprint. Therefore, vegetation removal and earth grading will be required, which will result in a loss of natural vegetation communities, including meadows, forested communities. The Study Area contains approximately 16.33 ha of significant woodland, of which 1.95 ha will be impacted by the proposed work. **Table 5.1** below shows the amount of impacted area per vegetation community within the Study Area.

Table 5.1: Terrestrial Habitat Impacted within the Study Area

Vegetation Community	ELC Code	Impacted Area (ha)	Total Impacted Area (ha) by Vegetation Community
Meadow	Mixed Meadow (MEM)	11.22	12.78
	Graminoid Meadow (MEG)	1.56	
Rock Barren	Rock Barren Outcrop (RBO)	0.03	0.03
Thicket	Deciduous (THD)	3.25	3.25
Woodland	Deciduous (WOD)	0.38	1.53
	Coniferous (WOC)	0.91	
	Mixed (WOM)	0.24	
Forest	Deciduous (FOD)	4.84	4.84
Hedgerow	Deciduous Hedgerow	0.05	0.05
Swamp	Deciduous (SWD)	0.54	0.54
Marsh	Marsh (MA)	0.58	0.58
Total Impacted			**23.6**

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5.2 Potential Disturbance to Wetlands

Portions of one swamp and three marsh communities (SWDM4, MAMM1-2, MAMO1-2, and MASO1-1) are anticipated to be impacted by grading and new construction (approximately 1.12 ha loss). These small wetland features are low quality and are unlikely to support wildlife habitat (i.e., unlikely to be SWH for amphibians) because they are present within urban infrastructure, adjacent to Highway 401, and primarily associated with roadside drainage.

Standard Sediment and Erosion Control (**Section 6.1.1**) methods are recommended along all wetland communities (i.e., key hydrological features) and near watercourse boundaries (**Figure 3, Appendix A**).

Vegetation protection measures in **Section 6.1.2** and invasive species management measures in **Section 6.1.3**, are also recommended to reduce indirect impacts to wetlands.

5.3 Potential Disturbance to Vegetation and Terrestrial Habitat

It is anticipated that the proposed works will disturb approximately 23.6 ha of vegetation cover and terrestrial habitat during construction. There will be temporary and permanent loss or disturbance to native vegetation communities because of the clearing required to accommodate construction activities (i.e., excavation, demolition, staging). These impacts are anticipated to be minor in nature.

The following impacts may also occur as a result of construction:

- accidental damage or loss of trees and other vegetation features because of site alteration or construction activities
- indirect temporary disturbance of noise, vibration, and vegetation removal to terrestrial wildlife habitat
- erosion and sedimentation into adjacent vegetation communities
- permanent loss of native vegetation due to the spread of non-native and invasive vegetation species into disturbed areas after construction

5.4 Potential Disturbance to Sensitive Features

Buells Creek and its associated riparian corridor are classified by CRCA as a Flood Hazard/Screening Area within the regulatory floodplain (Schedule 3; City of Brockville 2012). Lands within the CRCA Flood Hazard/Screening Area may be subject to the *Development, Interference with Wetlands and Alteration to Shorelines and Watercourses Regulations* (O. Reg. 148/06). It is anticipated that Buells Creek will be impacted from the proposed works.

The edge of the Significant Woodland, identified as FODM5-11 (**Figure 3-1, Appendix A**), may also be impacted from the future footprint of Highway 401. Approximately 1.95 ha of vegetation is proposed to be removed from this community.

The Study Area is part of the Frontenac Arch Biosphere Reserve, so 26.61 ha within the reserve may be impacted.

Potential impacts to sensitive features include the following:

- discharge/spills of contaminants/pollutants into Buells Creek
- sedimentation and erosion impacts, including transport of sediment into Buells Creek
- accidental damage or loss of trees and other vegetation features because of site alteration or construction activities
- indirect temporary disturbance of terrestrial wildlife habitat
- erosion and sedimentation into adjacent vegetation communities
- permanent loss of native vegetation due to the spread of non-native and invasive vegetation species into disturbed areas after construction

Measures to mitigate impacts to the CRCA Flood Hazard/Screening Area, Significant Woodland, and Frontenac Arch Biosphere Reserve will be implemented as outlined in **Section 6.1.1 and 6.1.2** and in **Section 6.1.1** and **6.2.2**.

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5.5 Potential Interference with Migratory Birds

Although not present during field investigations, there is potential for Barn Swallow, Cliff Swallow, Eastern Phoebe, and other migratory birds to nest under the following structures within the Study Area:

- Stewart Boulevard Overpass (16-121)
- CP Rail bridge (16-122)
- Buells Creek Culvert (16-237/C)
- Ormond Street Overpass (16-123)
- North Augusta Road Overpass (16-124)

Vegetation throughout the Study Area may also support nesting birds. Any work near active bird nests has the potential to disturb nesting behavior or damage/destroy the nests, particularly if vegetation clearing occurs during the active breeding bird window (i.e., April 1 - August 31). Measures to mitigate impacts to protected bird nests will be implemented as outlined in **Section 6.1.4**.

5.6 Potential Disturbance to Significant Wildlife Habitat

Five candidate SWH features were identified within the Study Area and were associated with deciduous woodlands, wetlands, and open meadow communities:

- raptor wintering area
- bat maternity colonies
- reptile hibernacula
- woodland raptor nesting
- habitat for SOCC

The best habitat for these features generally occurs within interior areas of habitats where disturbance levels are low. Although portions of the proposed area of impact are forested and contain trees, the likelihood of impacts to candidate SWH are low for this reason. Construction phase disturbance to candidate SWH can be mitigated through standard environmental protection measures for sediment and erosion control and

vegetation protection, as discussed in **Section 6.1.1** and **Section 6.1.2**. Measures to mitigate impacts to bird nests are outlined in **Section 6.1.4**. Standard mitigation to reduce harm to wildlife is provided in **Section 6.1.5**, while site-specific mitigation for bat maternity colonies, SOCC insects, reptiles, and amphibians are provided in **Section 6.2.3**.

5.7 Potential Disturbance to Species at Risk and Species of Conservation Concern

Suitable habitat for SAR and SOCC in the Study Area was primarily associated with deciduous forests, open meadow, and wetland communities. Although portions of the proposed area of impact are forested and contain trees, the likelihood of impacts to SAR and SOCC are low as best habitats occur beyond the ROW. At the time of field investigations, one SAR (Butternut) and one SOCC (Monarch) were observed within the Study Area. Only the Monarch occurred within the ROW. No other SAR or SOCC were observed. However, seven SAR and eight SOCC have potential to occur and interact with project activities.

Construction phase disturbance to habitat of SAR and SOCC can be mitigated through standard environmental protection measures for sediment and erosion control and vegetation protection, as discussed in **Section 6.1.1 and Section 6.1.2,** respectively, and through site-specific measures as discussed in **Section 6.2**. Measures to mitigate impacts to protected bird nests is outlined in **Section 6.1.4**. Mitigation to reduce harm to wildlife is provided in **Section 6.1.5**.

5.7.1 Species at Risk

The following eight SAR have potential to be directly impacted during construction activities due to their behavior, habitat preferences, or movement patterns:

- **Butternut –** One butternut tree was observed within the Study Area (**Figure 3-2, Appendix A**) but is not within the proposed area of impact. Other suitable habitats including forest edges, open areas, and Buells Creek riparian corridor may also support this species.
- **Blanding's Turtle** - Interaction with Blanding's Turtle during construction activities could result in direct mortality. The Buells Creek and wetlands in the Study Area may provide suitable habitat for Blanding's Turtles and individuals may also travel through work zones. Turtles may be particularly vulnerable during peak activity periods (April 1 to October 31), including movement between wintering and nesting sites, nesting in the road shoulder and basking or foraging in the ROW. Site-

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specific mitigation measures to reduce potential impacts to turtles are discussed in **Section 6.2.3.3.**

- **Gray Ratsnake** - Construction activity can result in direct mortality to snakes. Snakes may be vulnerable during emergence from a hibernaculum, re-entrance, and basking periods, and may preferentially seek out construction materials to bask under. Peak activity for snakes is typically between late April and late June (MNR 2013). Roadside meadows and ditches may provide habitat for the Gray Ratsnake. With the implementation of site-specific mitigation measures for snakes (**Section 6.2.3.3**), no direct impacts are expected.
- **Bat SAR (Little Brown Myotis, Northern Myotis, Eastern Small-footed Myotis, and Tri-colored Bat)** – Bat maternity roost habitat is present within deciduous forests in the Study Area and proposed area of impact. Tree removal can result in directly mortality to bat SAR and loss of habitat. Protection for bats is provided by the timing restrictions identified in **Section 6.2.3.4.**

5.7.2 Species of Conservation Concern

Nine SOCC have potential to be directly impacted during construction activities due to their behavior, habitat preferences, or movement patterns.

Disturbance to habitat of Common Nighthawk, Eastern Wood-Pewee, Wood Thrush, Canada Warbler, and Evening Grosbeak is not anticipated because this species' habitat is either outside the ROW or unlikely to be occupied near Highway 401 where tree removals are proposed. Potential impacts to species that are more tolerant of disturbed habitats, such as those found in the ROW, or which may be encountered in work zones due to their behavior or movement patterns, are discussed below.

- **Monarch** - primarily found in areas containing milkweed and wildflowers (including goldenrods, asters, and purple loosestrife) (MECP 2021a). The larvae occur only where milkweed exists, whereas adults are more generalized, feeding on a variety of wildflower nectar (MECP 2021a). Monarch and its habitat (i.e., milkweed patches) were observed in roadside meadows, which will experience temporary and permanent disturbance during construction. Site-specific mitigation measures for Monarch are discussed in **Section 6.2.3.2.**
- **Yellow-banded Bumble Bee –** Meadow habitats that contain flowering plants are present in the ROW, which will experience temporary and permanent disturbance during construction. Approximately 11.22 ha of mixed meadow will be impacted. Standard mitigation measures of vegetation protection (**Section 6.1.2**) should be followed for Yellow-banded Bumble Bee.

- **Western Chorus Frog –** Construction activities can result in direct mortality to amphibians as this species may be present within drains and wetlands in the ROW and may be present in work zones. These wetland habitats will experience temporary and/or permanent disturbance during construction. Site-specific mitigation measures for amphibians are discussed in **Section 6.2.3.3.**

- **Eastern Milksnake -** Construction activities can result in direct mortality to snakes. Snakes may be vulnerable during emergence from a hibernaculum, re-entrance, and basking periods, and may preferentially seek out construction materials to bask under. Peak activity for Eastern Milksnake is typically between late April and late June (MNR 2012). With the implementation of mitigation measures (**Section 6.2.3.3**), no direct impacts are expected.

- **Turtle SOCC (Snapping Turtle, Eastern Musk Turtle, and Midland Painted Turtle)** - Interaction with turtle SOCC during construction activities could result in direct mortality. The Buells Creek and wetlands in the ROW may provide suitable habitat for SOCC turtles and individuals may also travel though work zones when seeking nesting sites, such as the sand/gravel highway shoulders. Site-specific mitigation measures to reduce potential impacts to turtles are discussed in **Section 6.2.3.3**

- **Barn Swallow –** although not present during the 2021 field investigations, structures in the proposed area of impact may provide suitable habitat (i.e., vertical walls, ledges) and Barn Swallows may establish nests at new locations in future nesting seasons. Standard mitigation measures for nesting birds are discussed in **Section 6.1.4.**

6.0 Mitigation Measures

Mitigation will be employed to reduce the likelihood of impacts to the natural environment. The following section describes standard measures that will be applied to all work areas. These general measures recommended for the protection and reduction of impacts to natural features, general wildlife and wildlife habitat will also reduce risk of potential impacts to SAR and SOCC. Site-specific recommendations for natural features, SWH, or habitat of SAR/SOCC confirmed in the Study Area or conservatively assumed to be present, are discussed in **Section 6.2**.

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6.1 Standard Environmental Protection Measures

6.1.1 Erosion and Sedimentation Control

Mitigation measures for sedimentation, erosion, and dust control should be implemented to prevent sediment and dust from entering sensitive natural features. The primary principles associated with sedimentation and erosion protection measures are to:

- reduce the duration of soil exposure
- retain existing vegetation, where feasible
- encourage re-vegetation
- divert runoff away from exposed soils
- keep runoff velocities low
- trap sediment as close to the source as possible

To address these principles, the following mitigation measures are recommended:

- Silt fencing and/or barriers are recommended along the work zone where there is potential for sedimentation of watercourses or wetlands, or inadvertent encroachment of construction vehicles into natural areas of Significant Woodlands, wetlands, and watercourses.

- Avoid entering any natural areas beyond the barrier fencing with equipment and avoid excess vegetation removal.

- Stabilize exposed soil areas (native seed mixes; sourced locally if possible) and re-vegetate through the placement of seed and mulching or seed and an erosion control blanket, promptly upon completion of construction activities. All disturbed substrates are recommended to be re-vegetated using seed mixes of species that are native to the site and suitable for site conditions. Introduce seed to disturbed substrates as soon as feasible following construction, and sediment fencing is recommended to remain in place until vegetation cover is re-established.

- Re-fuel equipment 30 m away from watercourses to reduce potential impacts if an accidental spill occurs.

- In addition to any specified requirements, make additional silt fence available on site, prior to grading operations, to provide a contingency supply in the event of an emergency.
- Monitor all erosion and sedimentation controls regularly and properly maintain, as required. Remove controls only after the soils of the construction area have been stabilized and adequately protected or until cover is re-established.
- Monitor limits of construction adjacent to natural features during construction (along with erosion and sedimentation control measures) to ensure that the limits are maintained with respect to vehicular traffic and soil or equipment stockpiling.
- Avoid stockpiling excess materials on site within proximity of Significant Woodlands, wetlands, and watercourses.
- Restore any disturbed natural areas to pre-construction conditions.

6.1.2 Vegetation Protection

Precise limits of vegetation removal will be confirmed during Detail Design and are anticipated to be smaller than the estimates presented in this report. Vegetation removal should be limited to the extent possible and undertaken outside the migratory bird nesting period (**Section 6.1.4**). Sediment fencing should be used to clearly mark and separate work areas from sensitive natural features (e.g., significant woodlands, wetlands, and watercourses). Sediment fencing (**Section 6.1.1**) will reduce the likelihood of release of sediments and other deleterious substances into adjacent areas of natural vegetation.

Topsoil and organic matter should be salvaged and reused in areas disturbed during construction, as appropriate. Replaced soils will contain native seed bank, which will help facilitate successful revegetation. Post-construction seeding of the disturbed ROW should be done with a suitable native seed mix and in consideration of Monarch and Yellow-banded Bumble Bee habitat (**Section 6.2.3.2**). Seed mixes should include fast-growing, short-lived perennial cover crop to stabilize soil and reduce competition from weedy exotics. Native cover crops are preferred. New seed should be introduced to disturbed substrates as soon as feasible following construction (within 15 days for areas less than 200 m from a watercourse, and 45 days for other areas), and sediment fencing should remain in place until vegetation cover is re-established. Seeded areas shall receive water either through precipitation or irrigation after every seven successive days without rainfall for the first two months after seeding.

A landscape restoration plan should be developed for all areas disturbed during construction, as well as any proposed compensation areas, and incorporated into the Detail Design package. The plan would include recommendations for use of native species in restoration planting as well as methods for management of invasive species. Currently, a preliminary landscape design plan has been prepared for the Project (Stantec 2023b).

6.1.3 Invasive Phragmites Management

The invasive Common Reed (Phragmites) is a ‘restricted’ plant species regulated by the *Ontario Invasive Species Act* (2015), and under the Act, it is illegal to import, deposit, release, grow, buy, sell, lease, or trade this species. Phragmites was identified throughout the Study Area, typically in in roadside ditches and other drainage features and low-lying areas (**Figure 3, Appendix A**). If work will occur in or near features with Phragmites, equipment will be cleaned before leaving the site to avoid transport of soil containing Phragmites to other sites.

6.1.4 Protection of Migratory Birds

Although no nests were observed under any of the five structures at the time of field investigations, there is potential for such structures to support nests of migratory birds in subsequent seasons.

The MBCA protects nests of migratory birds from damage while they are active, including nests in vegetation and on structures. For all migratory birds, the core nesting period is identified as April 1 to August 31 (Government of Canada 2018). Vegetation clearing during nesting periods in migratory bird breeding habitat can destroy active nests and contravene the MBCA. Vegetation clearing is recommended to occur outside the core nesting period to eliminate the need for migratory bird nest searches. If work must take place during the core nesting period and the area is small enough to be effectively searched for nesting birds (e.g., isolated trees or hedgerows), then a breeding bird survey can be completed by a Qualified Biologist. The pre-construction breeding bird survey is also recommended to occur at structures proposed for rehabilitation/removal within the work zone. The area where bird nests may be impacted must be searched within five days prior to the work commencing. If breeding pairs are located, then they will be protected with a buffer until the nest is no longer active.

If an active nest is observed during construction, a designated buffer will be delineated within which no activity will be allowed to occur while the nest is active (i.e., with eggs or young). The radius of the buffer will also be determined by a Qualified Biologist. Once the nest is determined to be inactive (e.g., the young have fledged the nest), clearing and other activities in the area may proceed.

6.1.5 Wildlife Protection

The following environmental mitigation and protective measures for wildlife and wildlife habitat are recommended:

- construction equipment and vehicles are to yield to wildlife
- inform construction personnel not to threaten, harass or injure wildlife
- If wildlife are encountered during construction, personnel are required to move away from the animal and wait for the animal to move off the construction site. If slow-moving wildlife (e.g., turtles, snakes) are observed on the road and are in danger, and if safe to do so, they should be moved off the road by gently guiding the individual in the direction it was traveling. Handling of SAR is not permitted without an ESA authorization.

6.2 Site-specific Protection Measures

Site-specific protection measures are required for sensitive species or habitats that may be present within the Study Area and where standard mitigation measures alone do not provide sufficient protection.

6.2.1 Wetlands

Standard Sediment and Erosion Control measures (**Section 6.1.1**) are recommended where work will occur within 30 m of wetland communities.

6.2.2 Woodlands

Newly created edges that are cut along existing woodlands and significant woodlands should be addressed with restoration plantings to protect and mitigate for potential negative effects, such as increased sunlight penetration, susceptibility to windthrow, desiccation, and spread of invasive species. Restoration plans should use native species that are tolerant of the site conditions, including roadside stresses such as salt, pollution, and soil compaction. Restoration should include broadcast seeding to replace seed banks that are lost, as well as planting of woody shrubs and trees to create vertical structure. Monitoring plans should track survivorship and effectiveness of restoration plans and include recommendations to adapt management as appropriate.

TERRESTRIAL ECOSYSTEMS EXISTING CONDITIONS AND PRELIMINARY IMPACT ASSESSMENT REPORT
Highway 401 Planning Study, Brockville (GWP 4003-19-00)

April 10, 2023

6.2.3 Species at Risk and Species of Conservation Concern

The mitigation measures presented below follow general guidance for the protection of SAR/SOCC and are consistent with approved measures implemented on similar projects in Ontario. Species-specific measures are provided for species commonly encountered along roadways or in construction zones, however these are not project or site-specific as targeted surveys to confirm species presence were beyond the scope of this Preliminary Design study. Further field investigations, including targeted surveys, should be undertaken at Detail Design to confirm the presence of SAR or SOCC and their habitat. Authorization requirements, if any, for SAR will be determined at Detail Design.

The following mitigation provides recommendations to reduce the risk to SAR and SOCC through avoidance of habitat features, timing windows and observations of potential refuges.

General mitigation to reduce impacts to SAR or SOCC and their habitats include:

- Inform on-site personnel of the potential presence of the SAR/SOCC identified in the Study Area, obligations under the ESA (2007), and recommended actions in the event of an encounter.
- Species listed as endangered or threatened on the SARO list that are present in the Study Area must be protected from harm and harassment.
- Any SAR that is incidentally encountered in the Study Area must be allowed to leave of its own accord. Activities within 20 m should cease until the individual disperses. Construction machinery/equipment must maintain a minimum operating distance of 20 m from the individual until it disperses from the work zone of its own accord.
- Should on-site personnel be unable to allow an incidentally encountered SAR to disperse from the active construction area under its own ability, MECP must be contacted immediately for additional guidance.
- Any SAR that is encountered in the work zone should be reported to the MECP staff within 48 hours of the observation or the next working day, whichever comes first.
- Handling of SAR is not permitted without an ESA authorization.
- If an injured or deceased SAR is found, the specimen must be placed in a non-airtight container that is maintained at an appropriate temperature and MECP must be contacted immediately for additional guidance.

- Temporary alterations to SAR habitat must be limited to the duration and spatial extent possible and be remediated upon completion of activity and monitored as necessary.

6.2.3.1 Butternut

Treed habitats are present within the proposed area of impact and will experience permanent disturbance where tree removals are proposed. There is potential that Butternut trees are present within the treed habitats. The following mitigation measures are recommended to address Butternut.

To identify Butternut trees within the work zone, a follow-up survey (during Detail Design) is recommended during leaf-on conditions within, and 50 m adjacent to, the work zones. If a butternut health assessment shall be required, guidance within the *Butternut Assessment Guidelines: Assessment of Butternut Tree Health for the Purposes of the Endangered Species Act, 2007* (MECP 2021b) will be followed.

6.2.3.2 Monarch

Construction activities with the potential to harm Monarch eggs, caterpillar or pupae (e.g., vegetation clearing in meadow areas) should not be undertaken during the larval period which is approximately May 1 to September 30 (Mission-Monarch 2020).

If vegetation clearing will proceed when Monarch larvae may be present (May 1 to September 30), inspection of milkweed plants is recommended to locate Monarch larvae. If larvae are present, they may be moved to a location that is suitable and safe under the direction of a qualified professional. Monarch caterpillars may be moved to other milkweed plants; for other larval stages (i.e., eggs and chrysalis), entire milkweed plants should be transplanted.

Milkweed and nectar producing plants should be included in seed mixes for areas restored to meadow to provide habitat for Monarch. Planting should follow mitigation recommendations from **Section 6.1.2** above.

6.2.3.3 Reptiles and Amphibians

Because general mitigation measures may not provide sufficient protection, avoidance of sensitive wildlife periods and temporary wildlife exclusion are recommended for reptiles and amphibians.

The peak active season for reptiles and amphibians is from approximately April 1 to October 31. Installation of wildlife exclusion fencing is recommended before May 15 or after September 15 (i.e., outside of key breeding period) to define work zones and restrict the movement of reptiles and amphibians into the working area. If construction

must be initiated during the turtle nesting or snake gestation season (approximately June 1 to September 1), a qualified biologist will visually inspect the site for evidence of nesting or individual reptiles and direct installation of construction barrier fencing to avoid nests. If it is not possible to isolate a nest from construction, work will be delayed until it is determined that the nest no longer includes viable eggs (hatchlings have emerged, or eggs were predated).

Potential snake hibernation sites (rock outcroppings or stumps extending below-grade, or animal burrows) should not be disturbed during the hibernation period (November 1 to March 31). If removal of above-ground habitat features (rock slabs or piles, brush) is needed, these features will be retained outside the active work zone during construction and returned post-construction to the same or a nearby location.

During ditching and grading activities undertaken between April 1 and October 31, disturbance will be limited to the greatest extent possible to protect reptiles or amphibians that may be present. A spotter could be used to identify individuals present in the work area.

6.2.3.4 Bat Species at Risk

Trees > 10 cm DBH are present in the Study Area and within the proposed area of impact. These trees may be used by bat SAR as maternity habitat. The following mitigation measures are recommended to address bat SAR.

Trees that have the potential to be used as maternity habitat by bat SAR may be present within the areas proposed for vegetation removal. To identify potentially suitable bat SAR trees, follow-up surveys (during Detail Design) are recommended during leaf-off in areas where vegetation removal is proposed. Trees will be surveyed to identify trees that are >10 cm DBH, with cavities or loose, peeling bark and will be completed following the guidance outlined in MECP's survey protocol: *Treed Habitats – Maternity Roost Surveys* (2022), which references the *Bats and Bat Habitats: Guidelines for Wind Power Projects* (MNR 2011). If potential bat trees are identified within the area proposed for removal, acoustic surveys or maternity exit surveys may be needed prior to tree removals.

Additionally, to further reduce the likelihood of harm to bats, removal of trees > 10 cm DBH is recommended to take place outside the period when bats use trees for maternity roosts. Myotis species typically give birth in late-May to early-June, and females fly with newborn young until they become too heavy. Young begin to fly in mid- to late-June, at age three to four weeks. Rearing is completed in August when the bats move to hibernacula (Broders et al. 2006, Cagle and Cockrum 1943, Gerson 1984). Therefore, tree removal should not occur between May 1 to August 31. If tree clearing is required within this window, maternity exit surveys may be conducted prior to the tree

removals, as mentioned above. Maternity exit surveys are conducted during the evening and should include visual and acoustic surveys using accepted protocols.

Consultation with MECP is recommended prior to any tree removals in order to receive up-to-date guidance on appropriate surveys and mitigation measures to remain compliant under the ESA.

7.0 Consideration of the Endangered Species Act, 2007

The provincial ESA prohibits the killing, harming, harassing, capturing, or taking of a living member of a species listed as threatened, endangered, or extirpated by the SARO list (O. Reg. 230/08) (S. 9). Damage to habitat (S. 10) is also prohibited except where a permit is issued under S. 17(2) of the same Act or the Activity is registered under the Species at Risk Registry.

Potential habitat for SAR (Butternut, Blanding's Turtle, Gray Ratsnake, Eastern Small-footed Myotis, Little Brown Myotis, Northern Myotis and Tri-coloured Bat) was identified in the Study Area but could not be confirmed during preliminary field investigations. Targeted surveys for Butternut and bat SAR are recommended at Detail Design to determine if species and/or habitat is present within work zones.

Consultation with MECP is recommended during Detail Design to discuss potential impacts to bat SAR that may result from the Project after mitigation, and to determine potential authorizations/permits.

8.0 Summary

This *Terrestrial Ecosystems Preliminary Existing Conditions and Preliminary Impact Assessment Report* evaluated the potential for sensitive natural heritage features, SAR and SOCC within the Highway 401 Planning Study, Brockville Study Area using guidance from the *Environmental Reference for Highway Design* (MTO 2013).

The Study Area is a mixture of meadow, marsh, and deciduous forest communities. Key natural heritage features mapped in the Study Area include significant woodlands, Frontenac Arch Biosphere Reserve, Buells Creek and associated CRCA regulated area. SAR and SOCC confirmed for the Study Area include Butternut and Monarch, respectively.

Candidate habitat for SAR and SOCC was present in the Study Area. Candidate habitat for SAR included Blanding's Turtle nesting and overwintering habitat, Gray Ratsnake transient use and hibernacula habitat, and bat SAR maternity and roosting habitat (i.e., Little Brown Myotis, Small-footed Myotis, Northern Myotis, and Tri-coloured Bat). Candidate habitat for SOCC includes turtle nesting and overwintering habitat (i.e., Snapping Turtle, Eastern Musk Turtle, and Midland Painted Turtle), and amphibian breeding habitat for Western Chorus Frog.

Standard and site-specific mitigation measures are recommended to address the anticipated impacts, including timing restrictions to address protected bird nests, physical protection measures such as sediment and erosion control or barrier fencing, and post-construction restoration.

Authorization requirements for SAR will be determined at Detail Design, following completion of targeted surveys to confirm species and habitat presence. Long-term, landscape-level effects from the highway and intersection improvements are considered negligible with the implementation of the standard and site-specific environmental protection measures.

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Appendix A:
Figures

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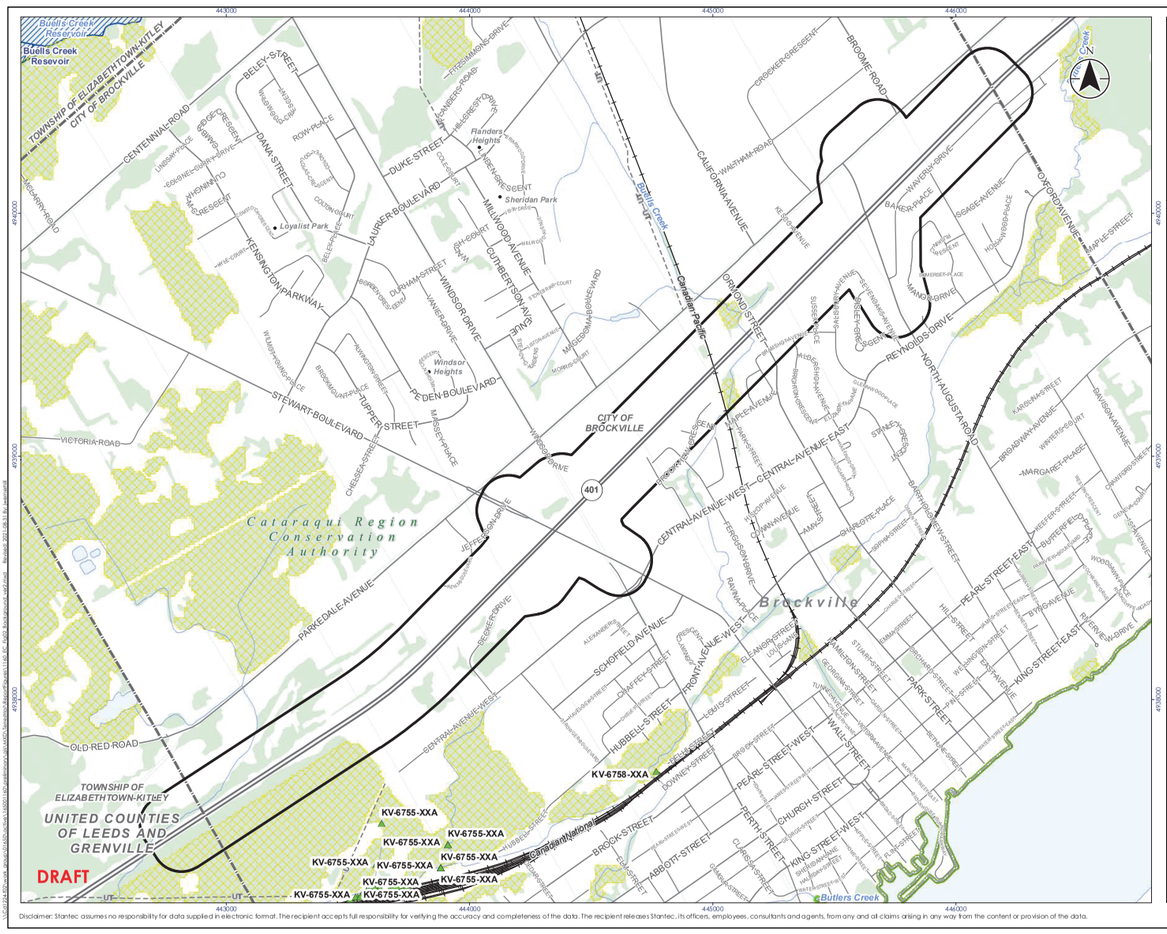

Stantec

Legend

- Fish Survey Point (ARA)
- Railway
- Unknown Transmission Line
- Watercourse (Permanent)
- Conservation Authority Administrative Boundary
- Significant Ecological Area
- Thermal Regime, Warm
- Aquatic Species at Risk Distribution
- Waterbody
- Wetland, Provincially Significant
- Wooded Area
- Lot
- Municipal Boundary, Upper
- Municipal Boundary, Lower

0 0.9 km

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Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
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Project Location
City of Brockville

165001160 REV4
Prepared by JW on 2021-08-31

Client/Project
ONTARIO MINISTRY OF TRANSPORTATION
HIGHWAY 401 REHABILITATION/ RECONSTRUCTION
GWP 4003-19-00/ WP 4006-1901

Figure No.
2

DRAFT

Title
Background Data

Stantec

Legend

- Potential snake hibernacula
- European reed (location)
- MTO Right-of-way
- Preferred Plan
- Study
- Impacted
- ELC

ELC Code 1, ELC Code 2

- CGL_1 (Golf Course)
- CVC_2 (Light Industry)
- CVI_1 (Transportation)
- FOD (Deciduous Forest)
- FODM5-11 (Dry – Fresh Sugar Maple – Hardwood Deciduous Forest Type)
- FODM6-4 (Fresh – Moist Sugar Maple – White Elm Deciduous Forest Type)
- MEGM3 (Dry - Fresh Graminoid Meadow Ecosite)
- MEMM3 (Dry - Fresh Mixed Meadow Ecosite)
- MEMM4 (Fresh - Moist Mixed Meadow Ecosite), MEMM3 (Dry - Fresh Mixed Meadow Ecosite)
- SA (Shallow Water)
- THDM3-2 (Native Shrub Deciduous Hedgerow Thicket Type)
- THDM4 (Dry - Fresh Deciduous Regeneration Thicket Ecosite)
- THDM4-1 (Native Deciduous Regeneration Thicket Type)
- THDR1 (Dry - Fresh Calcareous Bedrock Deciduous Thicket Ecosite)
- WOD (Deciduous Woodland)
- WODM4-3 (Sugar Maple Deciduous Woodland Type)

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Notes

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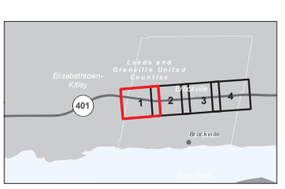


Project Location
City of Brockville

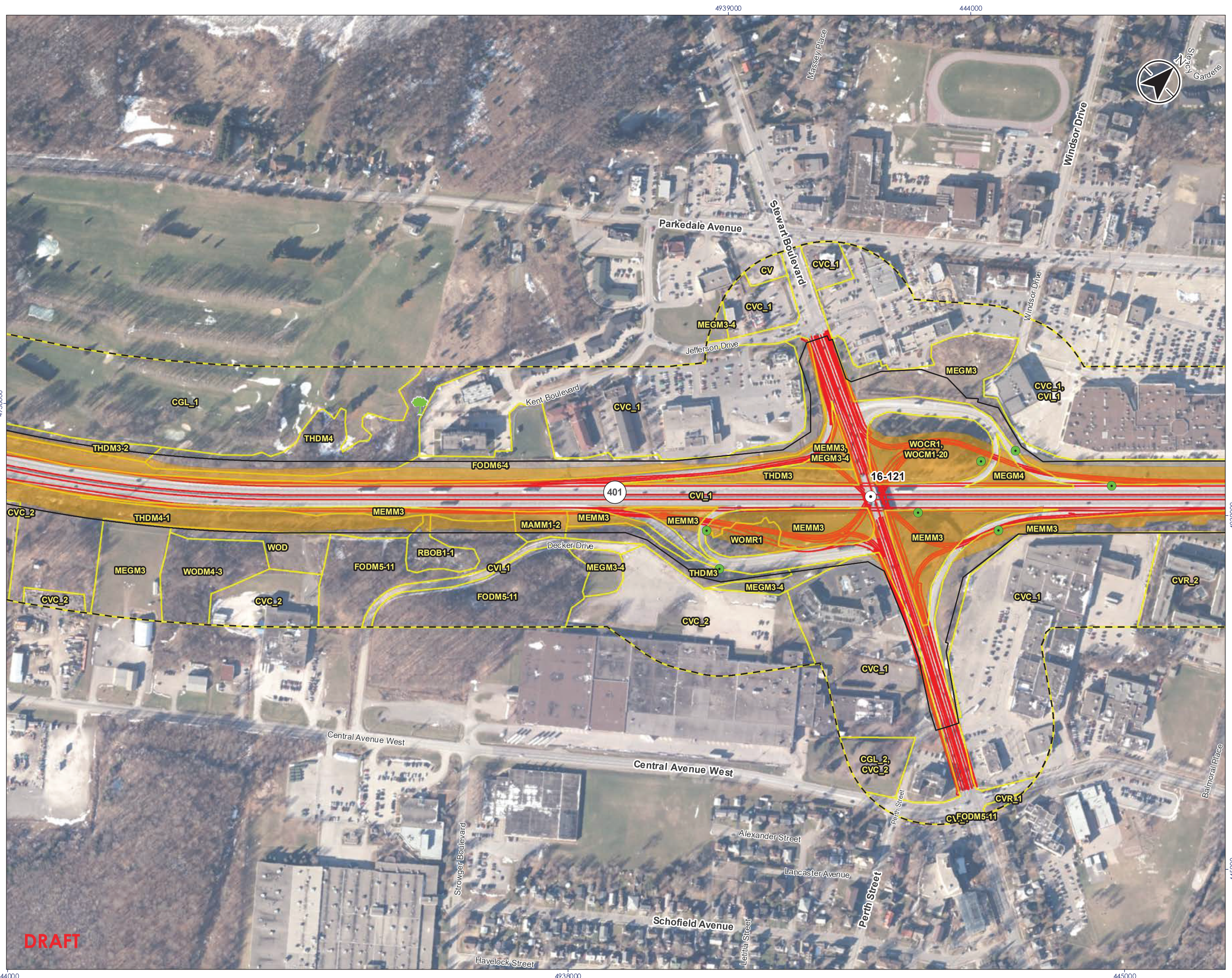
165001160 REVA
Prepared by JSa on 2023-01-23

Client/Project
ONTARIO MINISTRY OF TRANSPORTATION
HIGHWAY 401 REHABILITATION/ RECONSTRUCTION
GWP 4003-19-00/ WP 4006-1901

Figure No.
3-1

DRAFT

Title
Field Observations, ELC and Impact Areas



Legend

Project Structure	MAMM1-2 (Cattail Graminoid Mineral Meadow Marsh Type)
Butternut	MEGM3 (Dry - Fresh Graminoid Meadow Ecosite)
Potential snake hibernacula	MEGM3-4 (Kentucky Blue Gras Graminoid Meadow Type)
MTO Right-of-way	MEGM4 (Fresh - Moist Graminoid Meadow Ecosite)
Preferred Plan	MEMM3 (Dry - Fresh Mixed Meadow Ecosite)
Study	MEMM3 (Dry - Fresh Mixed Meadow Ecosite), MEGM3-4 (Kentucky Blue Gras Graminoid Meadow Type)
Impacted	RBOB1-1 (Calcareous Open Rock Barren Outcrop Type)
ELC	THDM3 (Dry - Fresh Deciduous Hedgerow Thicket Ecosite)
ELC Code 1, ELC Code 2	THDM3-2 (Native Shrub Deciduous Hedgerow Thicket Type)
CGL_1 (Golf Course)	THDM4 (Dry - Fresh Deciduous Regeneration Thicket Ecosite)
CGL_2 (Parkland), CVC_2 (Light Industry)	THDM4-1 (Native Deciduous Regeneration Thicket Type)
CV (Constructed)	WOCR1 (Dry - Fresh Calcareous Bedrock Coniferous Woodland Ecosite), WOCM1-20 (Dry-Fresh Scots Pine Coniferous Woodland Type)
CVC_1 (Business Sector)	WOD (Deciduous Woodland)
CVC_1 (Business Sector), CVI_1 (Transportation)	WODM4-3 (Sugar Maple Deciduous Woodland Type)
CVC_2 (Light Industry)	WOMR1 (Dry - Fresh Calcareous Bedrock Mixed Woodland Ecosite)
CVI_1 (Transportation)	
CVR_1 (Low Density Residential)	
CVR_2 (High Density Residential)	
FODM5-11 (Dry – Fresh Sugar Maple – Hardwood Deciduous Forest Type)	
FODM6-4 (Fresh – Moist Sugar Maple – White Elm Deciduous Forest Type)	

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Notes

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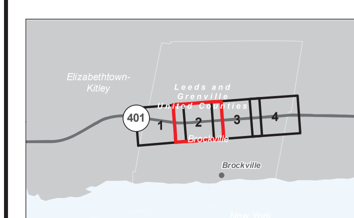

Project Location
City of Brockville

165001160 REVA
Prepared by JSa on 2023-01-23

Client/Project
ONTARIO MINISTRY OF TRANSPORTATION
HIGHWAY 401 REHABILITATION/ RECONSTRUCTION
GWP 4003-19-00/ WP 4006-1901

Figure No.
3-2

DRAFT

Title
Field Observations, ELC and Impact Areas

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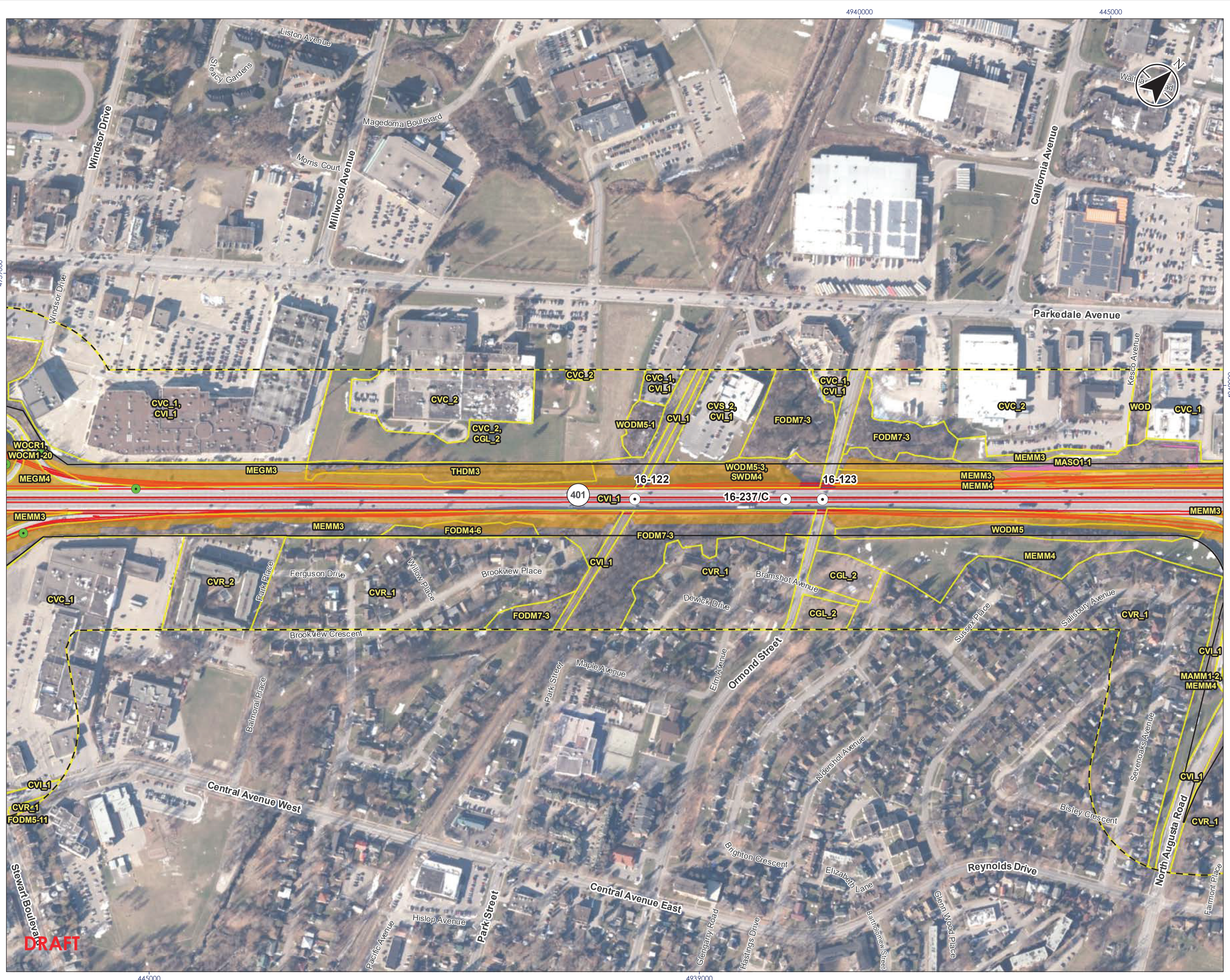

Legend

Project Structure	FODM7-3 (Fresh – Moist Willow Lowland Deciduous Forest Type)
Potential snake hibernacula	MAMM1-2 (Cattail Graminoid Mineral Meadow Marsh Type), MEMM4 (Fresh - Moist Mixed Meadow Ecosite)
European reed (area)	MASO1-1 (Cattail Organic Shallow Marsh Type)
MTO Right-of-way	MEGM3 (Dry - Fresh Graminoid Meadow Ecosite)
Preferred Plan	MEGM4 (Fresh - Moist Graminoid Meadow Ecosite)
Study Area	MEMM3 (Dry - Fresh Mixed Meadow Ecosite)
Impacted	MEMM3 (Dry - Fresh Mixed Meadow Ecosite), MEMM4 (Fresh - Moist Mixed Meadow Ecosite)
ELC	MEMM4 (Fresh - Moist Mixed Meadow Ecosite)
ELC Code 1, ELC Code 2	THDM3 (Dry - Fresh Deciduous Hedgerow Thicket Ecosite)
CGL_2 (Parkland)	WOCR1 (Dry - Fresh Calcareous Bedrock Coniferous Woodland Ecosite), WOCM1-20 (Dry-Fresh Scots Pine Coniferous Woodland Type)
CVC_1 (Business Sector)	WOD (Deciduous Woodland)
CVC_1 (Business Sector), CVI_1 (Transportation)	WODM5 (Fresh - Moist Deciduous Woodland Ecosite)
CVC_2 (Light Industry)	WODM5-1 (Fresh - Moist Poplar Deciduous Woodland Type)
CVC_2 (Light Industry), CGL_2 (Parkland)	WODM5-3 (Fresh - Moist Manitoba Maple Deciduous Woodland Type), SWDM4 (Mineral Deciduous Swamp Ecosite)
CVI_1 (Transportation)	
CVR_1 (Low Density Residential)	
CVR_2 (High Density Residential)	
CVS_2 (Health), CVI_1 (Transportation)	
FODM4-6 (Dry - Fresh Norway Maple Deciduous Forest Type)	
FODM5-11 (Dry – Fresh Sugar Maple – Hardwood Deciduous Forest Type)	

0 100 200 Meters

1:5,000 (At original document size of 11x17)

Notes

1. Coordinate System: NAD 1983 UTM Zone 18N
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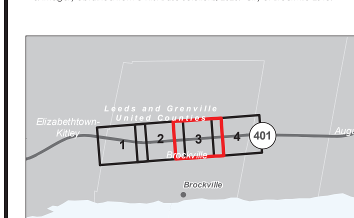


Project Location
City of Brockville

165001160 REVA
Prepared by JSa on 2023-01-23

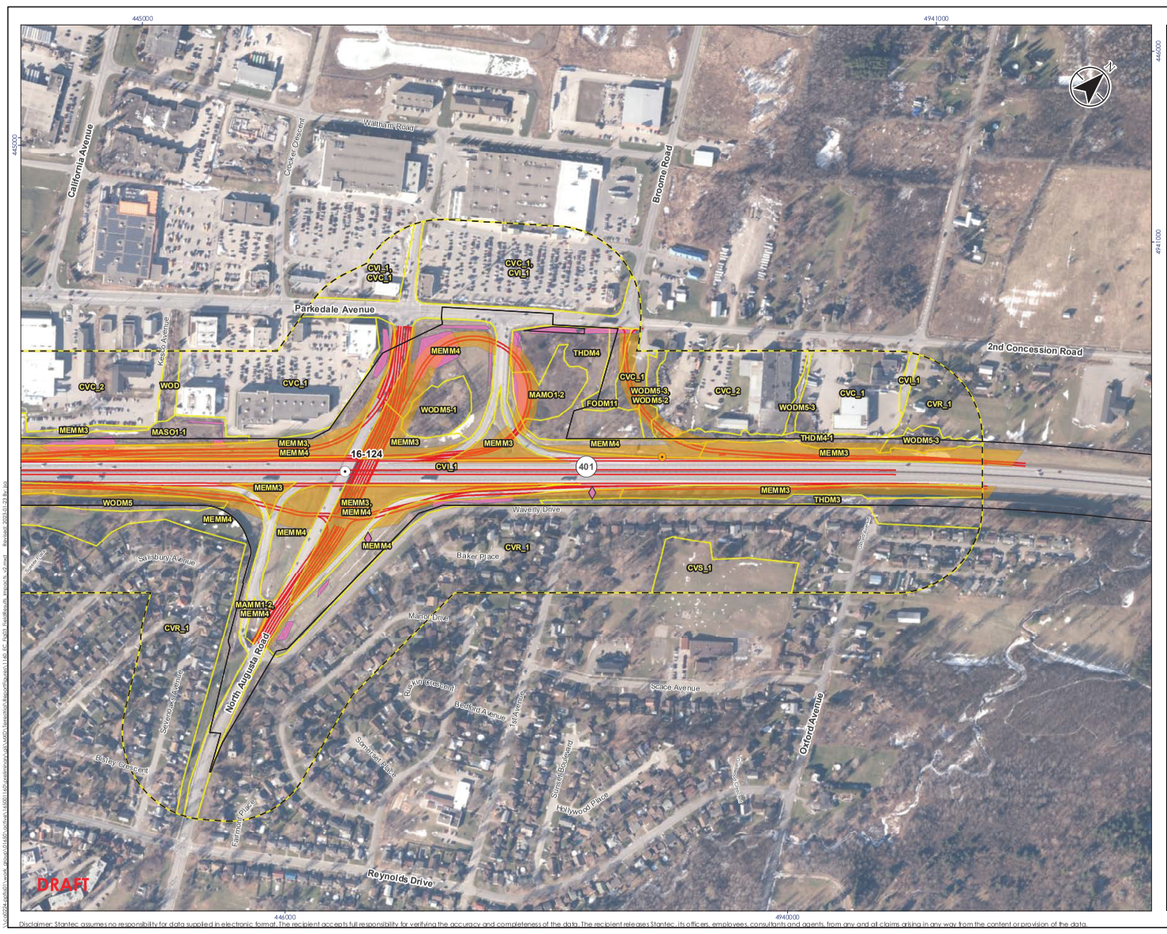
Client/Project
ONTARIO MINISTRY OF TRANSPORTATION
HIGHWAY 401 REHABILITATION/ RECONSTRUCTION
GWP 4003-19-00/ WP 4006-1901

Figure No.
3-3

DRAFT

Title
Field Observations, ELC and Impact Areas

Disclaimer: Stantec assumes no responsibility for data supplied in electronic format. The recipient accepts full responsibility for verifying the accuracy and completeness of the data. The recipient releases Stantec, its officers, employees, consultants and agents, from any and all claims arising in any way from the content or provision of the data.



Stantec

Legend

- Project Structure
- Monarch
- European reed (location)
- European reed (area)
- MTO Right-of-way
- Preferred Plan
- Study
- Impacted
- ELC

ELC Code 1, ELC Code 2

CVC_1 (Business Sector)

CVC_1 (Business Sector), CVI_1 (Transportation)

CVC_2 (Light Industry)

CVI_1 (Transportation)

CVI_1 (Transportation), CVC_1 (Business Sector)

CVR_1 (Low Density Residential)

CVS_1 (Education)

FODM11 (Naturalized Deciduous Hedge-row Ecosite)

MAMM1-2 (Cattail Graminoid Mineral Meadow Marsh Type), MEMM4 (Fresh - Moist Mixed Meadow Ecosite)

MAMO1-2 (Cattail Graminoid Organic Meadow Marsh Type)

MASO1-1 (Cattail Organic Shallow Marsh Type)

MEMM3 (Dry - Fresh Mixed Meadow Ecosite)

MEMM3 (Dry - Fresh Mixed Meadow Ecosite), MEMM4 (Fresh - Moist Mixed Meadow Ecosite)

MEMM4 (Fresh - Moist Mixed Meadow Ecosite)

THDM3 (Dry - Fresh Deciduous Hedgerow Thicket Ecosite)

THDM4 (Dry - Fresh Deciduous Regeneration Thicket Ecosite)

THDM4-1 (Native Deciduous Regeneration Thicket Type)

WOD (Deciduous Woodland)

WODM5 (Fresh - Moist Deciduous Woodland Ecosite)

WODM5-1 (Fresh - Moist Poplar Deciduous Woodland Type)

WODM5-3 (Fresh - Moist Manitoba Maple Deciduous Woodland Type)

WODM5-3 (Fresh - Moist Manitoba Maple Deciduous Woodland Type), WODM5-2 (Fresh - Moist Elm Deciduous Woodland Type)

0 100 200 Meters

1:5,000 (At original document size of 11x17)

Notes

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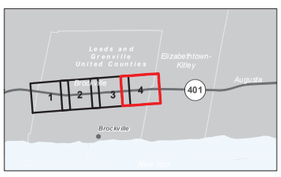


Project Location
City of Brockville

1650011160 REVA
Prepared by JSa on 2023-01-23

Client/Project
ONTARIO MINISTRY OF TRANSPORTATION
HIGHWAY 401 REHABILITATION/ RECONSTRUCTION
GWP 4003-19-00/ WP 4006-1901

Figure No.
3-4

DRAFT

Title
Field Observations, ELC and Impact Areas

Appendix B:
Agency Correspondence

Stantec Consulting Ltd.
400-1331 Clyde Ave., Ottawa, ON K2C 3G4

October 14, 2020
File: 165001160

Attention: Ministry of Natural Resources and Forestry, Kemptville District
Sent by email: Kemptville.Inforequest@ontario.ca

To Whom it May Concern,

Reference: Natural Heritage Information Request - Ministry of Transportation Highway 401 Corridor in Brockville, Ontario

The Ontario Ministry of Transportation (MTO) has retained Stantec Consulting Ltd. to complete the Preliminary Design (PD), Environmental Assessment (EA), and Design Build Ready (DBR) work for the rehabilitation and/or replacement of five structures along Highway 401 in the City of Brockville, from 2 km west of the Stewart Blvd Interchange to 750 m east of the North Augusta Road Interchange, a distance of approximately 4.5 km (the Study Area, see **Attachment A**).

The purpose of this letter is to request your input with respect to existing conditions within the Study Area, and to identify issues, concerns, or approval requirements that the Ministry of Natural Resources and Forestry (MNRF) may have. Stantec has completed a search of the Natural Heritage Information Center (NHIC) Biodiversity explorer database and summarized the results below under separate headers for fish and fish habitat, significant species, and natural features and areas. We are requesting updates and/or corrections to the information, as available. This information is required to complete our natural heritage review for the project.

FISH AND FISH HABITAT

The LIO database includes fish species lists for some of the watercourses in the Study Area (**Table 1** and **Attachment A**). As per the Step 2 of MTO/ DFO/MNRF Fisheries Protocol, we are requesting confirmation or updates to the following information related to fish and fish habitat in the Study Area:

- Species/community information from locations within 1 km upstream or downstream of the Study Area
- Watercourse thermal regime(s) and flow regime(s)
- Special habitat features
- Construction timing window(s)
- Important/exceptional fish habitat (e.g. groundwater upwelling, spawning areas, refugia, migratory routes)
- MNRF fisheries management objectives, if applicable

A summary of the information we obtained from available sources is provided in **Table 1** (see **Attachment A** for watercourse crossings). A Word version of the table is also provided to facilitate the update of information by your office.

Reference: **Natural Heritage Information Request - Ministry of Transportation Highway 401 Corridor in Brockville, Ontario**

Table 1 Highway 401 Corridor in Brockville Watercourse Crossings

Location (MTO Structure ID, see Attachment A)	Waterbody Name	Waterbody Coordinates (Zone 18T, Easting Northing)	Thermal Regime*	Habitat Information (based on Stantec field data, 2020)	Historical Data*+	MNRF Fisheries Management Objectives	In-Water Timing Window(s) for Construction
16-121	Stewart Boulevard Interchange drainage/ditch	444346E, 4938699N	No data	Engineered, trapezoidal drainage feature	MNRF 2020, NHIC 2020, DFO 2020 – No data Stantec 2020 – Not amenable to fish sampling (no water)		
16-122	Rail overpass drainage/ditch	445010E, 4939364N	No data	No feature	MNRF 2020, NHIC 2020, DFO 2020 – No data Stantec 2020 – Not amenable to fish sampling (no feature present)		
16-123	Buells Creek	445142E, 4939498N	No data	~8 m wide watercourse with natural substrates, floating and emergent aquatic vegetation.	MNRF 2020, NHIC 2020, DFO 2020 – No data Stantec 2020 – Creek Chub, Iowa Darter, Common White Sucker		
16-237/C	Buells Creek	445137E, 4939601N	No data	~4 m wide watercourse with natural substrates, floating and emergent aquatic vegetation	MNRF 2020, NHIC 2020, DFO 2020 – No data Stantec 2020 – Creek Chub, Common White Sucker, Banded Killifish		
16-124	North August Road Interchange drainage/ditch	445634E, 4939994N	No data	Engineered, trapezoidal drainage feature	MNRF 2020, NHIC 2020, DFO 2020 – No data Stantec 2020 – No catch		

Notes/References:
Highlighted cells represent data gaps where MNRF input is requested
*MNRF 2020. Land Information Ontario database. Ontario Ministry of Natural Resources and Forestry. Queen's Printer for Ontario.
+Based on presence of fish community data in NHIC and DFO Aquatic Species at Risk Map; others to be confirmed during field investigations

Reference: Natural Heritage Information Request - Ministry of Transportation Highway 401 Corridor in Brockville, Ontario

SIGNIFICANT SPECIES

Recent records (1980+) of species at risk and provincially rare species that overlap with the Study Area are summarized below:

- Snapping Turtle
- Blanding's Turtle
- Eastern Musk Turtle
- Northern Map Turtle
- Spotted Turtle
- Western Chorus Frog
- Gray Ratsnake
- Eastern Ribbon Snake
- Eastern Milksnake
- Bald Eagle
- Bank Swallow
- Barn Swallow
- Black-Crowned Night-Heron
- Bobolink
- Chimney Swift
- Common Nighthawk
- Eastern Wood-Pewee
- Eastern Whip-Poor-Will
- Eastern Meadowlark
- Evening Grosbeak
- Grasshopper Sparrow
- Great Black-Backed Gull
- Golden-Winged Warbler
- Henslow's Sparrow
- Least Bittern
- Peregrine Falcon
- Red-Headed Woodpecker
- Short-Eared Owl
- Wood Thrush
- Monarch
- Small-Footed Myotis
- Little Brown Myotis
- Northern Myotis
- Tri-Colored Bat
- Grey Fox
- Butternut
- American Ginseng
- Eastern Prairie Fringed-Orchid
- Olney's Grimmia

NATURAL FEATURES AND AREAS

The presence of natural features and areas that overlap with the Study Area are shown in **Attachment A**. This includes provincially designated features such as Provincially Significant Wetlands (PSWs) and Areas on Natural and Scientific Interest (ANSIs), and other features such as conservation areas, locally significant wetlands, woodlands, and valleylands.

CLOSING

We respectfully request confirmation of the above findings and the identification of any additional natural heritage resources information you may have for the Study Area. Please contact the undersigned if you have any questions regarding this information request.

Regards,

Reference: Natural Heritage Information Request - Ministry of Transportation Highway 401 Corridor in Brockville, Ontario

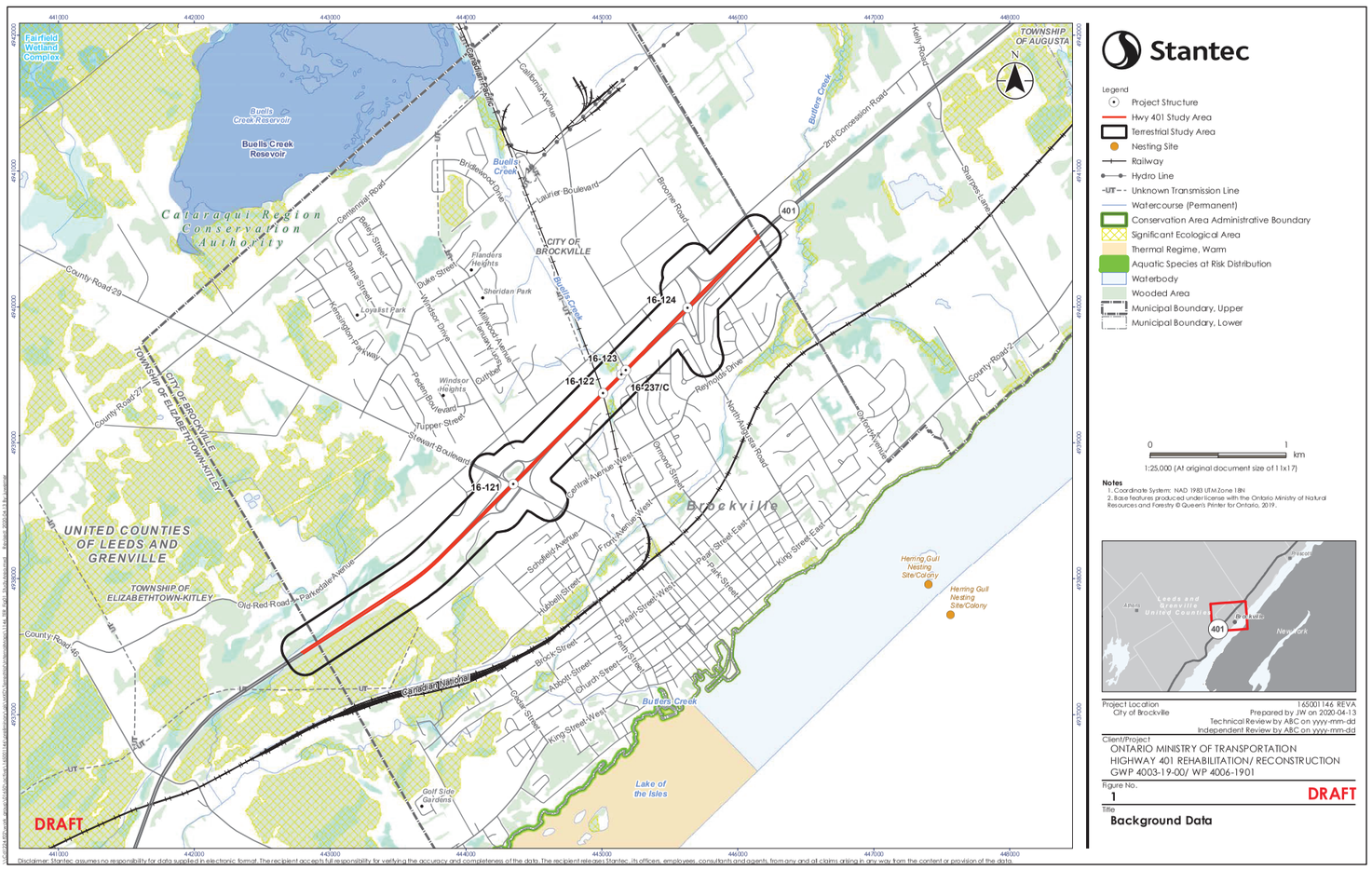
Stantec Consulting Ltd.

Alexis Richardson B.Sc., M.N.R.M.
Ecologist
Phone: 613-291-2638
Alexis.Richardson@stantec.com

Attachment A: Study Area and Watercourse Crossings

c. Debra.Giesbrecht@stantec.com
Kathleen.Todd@stantec.com
Josh.Mansell@stantec.com

Design with community in mind



Stantec

Legend
- Project Structure
- Hwy 401 Study Area
- Terrestrial Study Area
- Nesting Site
- Railway
- Hydro Line
- Unknown Transmission Line
- Watercourse (Permanent)
- Conservation Area Administrative Boundary
- Significant Ecological Area
- Thermal Regime, Warm
- Aquatic Species at Risk Distribution
- Waterbody
- Wooded Area
- Municipal Boundary, Upper
- Municipal Boundary, Lower

0 1 km

1:25,000 (At original document size of 11x17)

Notes
1. Coordinate System: NAD 1983 UTM Zone 18N
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Project Location
City of Brockville

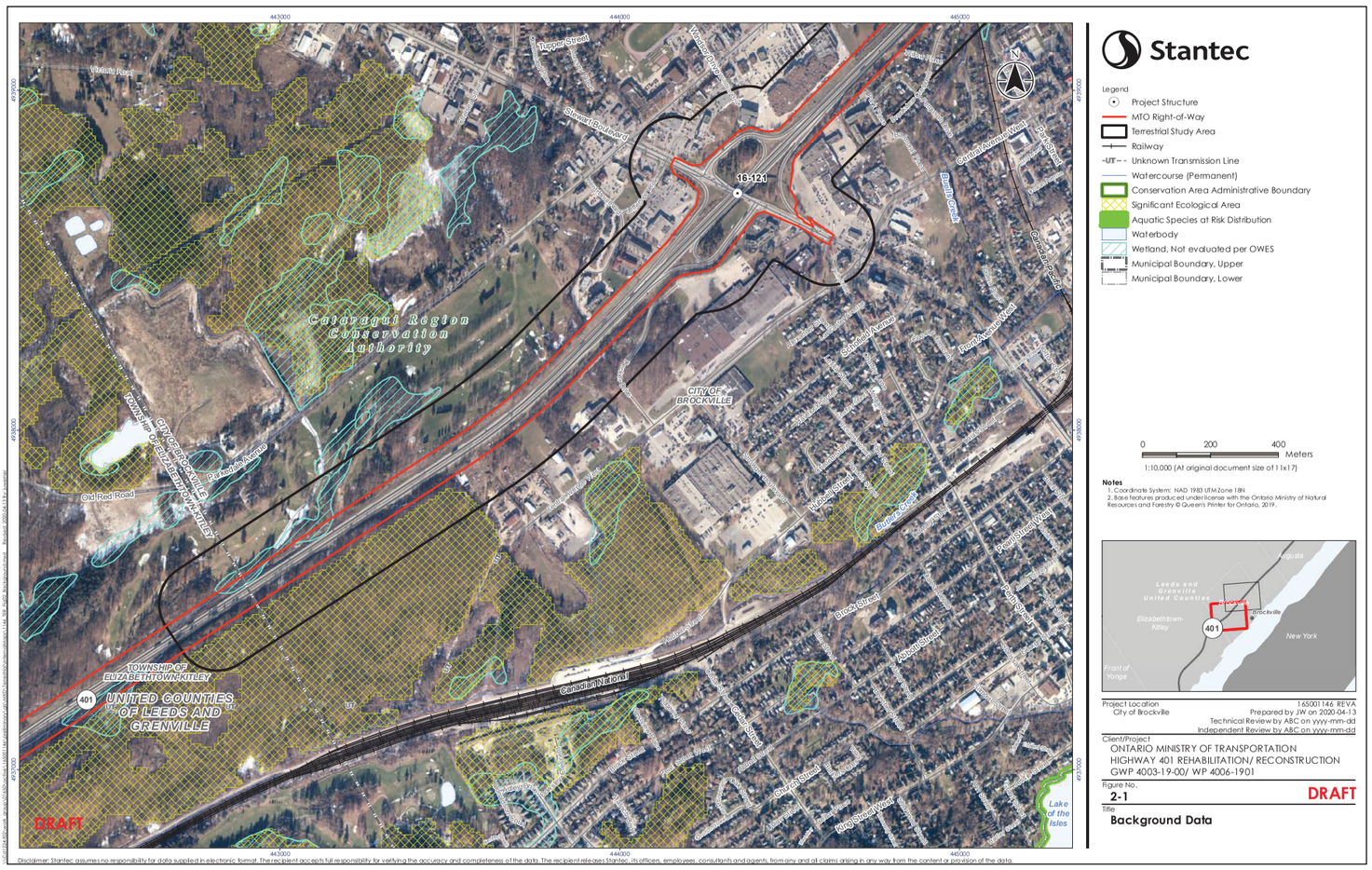
165001146 REVA
Prepared by JW on 2020-04-13
Technical Review by ABC on yyyy-mm-dd
Independent Review by ABC on yyyy-mm-dd

Client/Project
ONTARIO MINISTRY OF TRANSPORTATION
HIGHWAY 401 REHABILITATION/ RECONSTRUCTION
GWP 4003-19-00/ WP 4006-1901

Figure No.
1

DRAFT

Title
Background Data



Stantec

Legend
- Project Structure
- MTO Right-of-Way
- Terrestrial Study Area
- Railway
- Unknown Transmission Line
- Watercourse (Permanent)
- Conservation Area Administrative Boundary
- Significant Ecological Area
- Aquatic Species at Risk Distribution
- Waterbody
- Wetland, Not evaluated per OWES
- Municipal Boundary, Upper
- Municipal Boundary, Lower

0 200 400 Meters

1:10,000 (At original document size of 11x17)

Notes
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Technical Review by ABC on yyyy-mm-dd
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Client/Project
ONTARIO MINISTRY OF TRANSPORTATION
HIGHWAY 401 REHABILITATION/ RECONSTRUCTION
GWP 4003-19-00/ WP 4006-1901

Figure No.
2-1

DRAFT

Title
Background Data

Stantec

Legend
- Project Structure
- MTO Right-of-Way
- Terrestrial Study Area
- Railway
- UT Unknown Transmission Line
- Watercourse (Permanent)
- Conservation Area Administrative Boundary
- Significant Ecological Area
- Waterbody
- Wetland, Not evaluated per OWES
- Municipal Boundary, Upper
- Municipal Boundary, Lower

0 200 400 Meters
1:10,000 (At original document size of 11x17)

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Project Location
City of Brockville

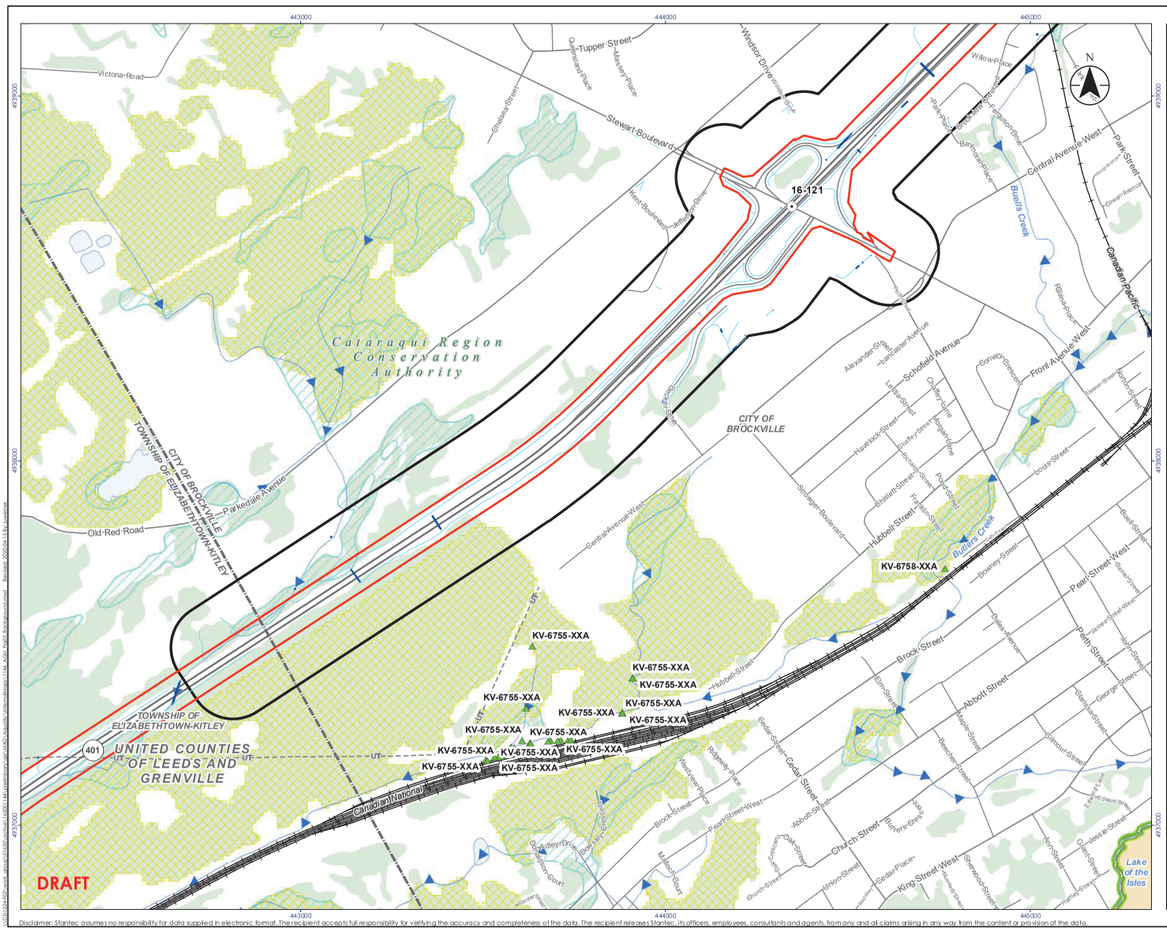
165001146 REVA
Prepared by JW on 2020-04-13
Technical Review by ABC on yyyy-mm-dd
Independent Review by ABC on yyyy-mm-dd

Client/Project
ONTARIO MINISTRY OF TRANSPORTATION
HIGHWAY 401 REHABILITATION/ RECONSTRUCTION
GWP 4003-19-00/ WP 4006-1901

Figure No.
2-2

DRAFT

Title
Background Data



Stantec

Legend
- Project Structure
- MTO Right-Of-Way
- Terrestrial Study Area
- Bottom of Ditch
- Centreline Culvert
- Railway
- UT Unknown Transmission Line
- Flow Direction
- Watercourse (Permanent)
- Conservation Area Administrative Boundary
- Significant Ecological Area
- Thermal Regime, Warm
- Aquatic Species at Risk Distribution
- Waterbody
- Wetland, Not evaluated per OWES
- Wooded Area
- Municipal Boundary, Upper
- Municipal Boundary, Lower

0 200 400 Meters
1:10,000 (At original document size of 11x17)

Notes
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Project Location
City of Brockville

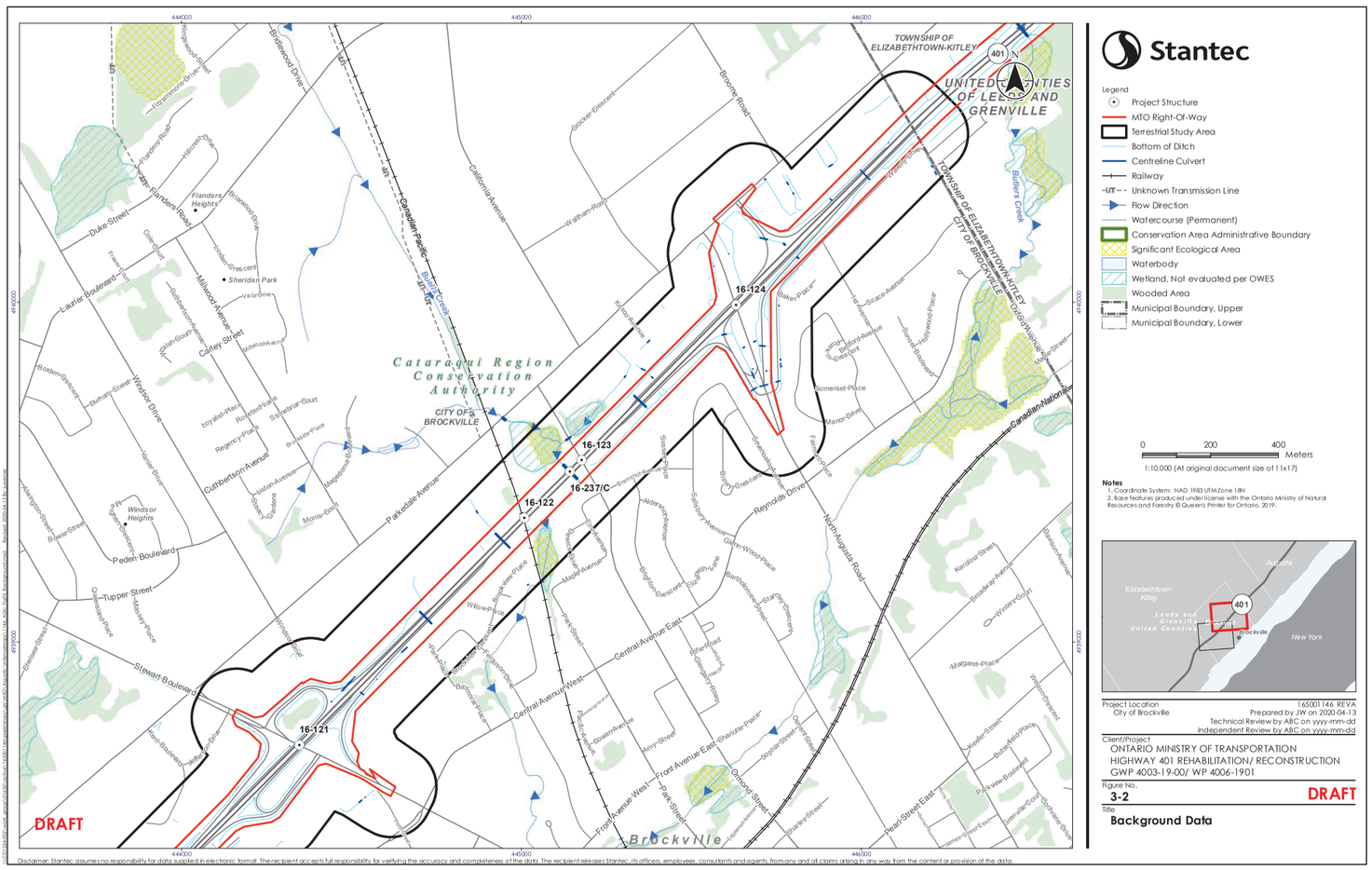
165001146 REVA
Prepared by JW on 2020-04-13
Technical Review by ABC on yyyy-mm-dd
Independent Review by ABC on yyyy-mm-dd

Client/Project
ONTARIO MINISTRY OF TRANSPORTATION
HIGHWAY 401 REHABILITATION/ RECONSTRUCTION
GWP 4003-19-00/ WP 4006-1901

Figure No.
3-1

DRAFT

Title
Background Data



Stantec

Legend

- Project Structure
- MTO Right-Of-Way
- Terrestrial Study Area
- Bottom of Ditch
- Centreline Culvert
- Railway
- Unknown Transmission Line
- Flow Direction
- Watercourse (Permanent)
- Conservation Area Administrative Boundary
- Significant Ecological Area
- Waterbody
- Wetland, Not evaluated per OWES
- Wooded Area
- Municipal Boundary, Upper
- Municipal Boundary, Lower

0 200 400 Meters

1:10,000 (At original document size of 11x17)

Notes

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Project Location
City of Brockville

165001146 REVA
Prepared by JW on 2020-04-13
Technical Review by ABC on yyyy-mm-dd
Independent Review by ABC on yyyy-mm-dd

Client/Project
ONTARIO MINISTRY OF TRANSPORTATION
HIGHWAY 401 REHABILITATION/ RECONSTRUCTION
GWP 4003-19-00/ WP 4006-19-01

Figure No.
3-2

DRAFT

Title
Background Data

From: Inforequest, Kemptville (MNRF)
To: Richardson, Alexis
Subject: RE: Information request for MTO Brockville
Date: Friday, October 16, 2020 11:53:35 AM
Attachments: KVD_In_Water_Work_Timing_Guidelines_2018-02-27(1) (1).pdf

Hi Alexis,
I am in agreement with the species assessments you have done for the watercourses, we do not have any further data for these streams/creeks. They are within FMZ 18 but there are no management objectives specific to them. I am attaching our in water work timing windows for you.
If you have any questions you can contact me directly,
Lisa

Lisa McShane |Management Biologist|Kemptville District |Ontario Ministry of Natural Resources and Forestry | (613) 504-2268| lisa.mcshane@ontario.ca

From: Richardson, Alexis <Alexis.Richardson@stantec.com>
Sent: October 14, 2020 3:14 PM
To: Inforequest, Kemptville (MNRF) <Kemptville.Inforequest@ontario.ca>
Cc: Todd, Kathleen <kathleen.todd@stantec.com>; Mansell, Josh <Josh.Mansell@stantec.com>; Giesbrecht, Debra <debbie.giesbrecht@stantec.com>
Subject: Information request for MTO Brockville

Hello,

Stantec Consulting has been hired by the Ministry of Transportation to complete an Environmental Assessment for a project along Highway 401 near the city of Brockville. Attached is an information request seeking input from the MNRF with respect to existing conditions, issues/concerns, and/or approval requirements that MNRF may have.

Please let me know if you have any questions or require further information.

Thank you,

Alexis Richardson B.Sc., M.N.R.M.
Ecologist

Mobile: 613-291-2638
Alexis.Richardson@stantec.com

Stantec
400 - 1331 Clyde Avenue
Ottawa ON K2C 3G4

Ministry of Natural Resources and Forestry

Kemptville District

10 Campus Drive
Postal Box 2002
Kemptville ON K0G 1J0
Tel.: 613 258-8204
Fax: 613 258-3920

Ministère des Richesses naturelles et des Forêts

District de Kemptville

10, promenade Campus
Case postale, 2002
Kemptville ON K0G 1J0
Tél.: 613 258-8204
Téléc.: 613 258-3920

Last Revised: February 27, 2018

SUBJECT: UPDATED IN-WATER WORK TIMING GUIDELINES IN KEMPTVILLE DISTRICT

To: all interested parties

The Ministry of Natural Resources and Forestry Kemptville District Office has recently reviewed and updated its In-water Work Timing Guidelines. These guidelines are intended to provide the timing for in-water work related to an activity, in order to protect fish during spawning and other critical life stages. Timing guidelines are based on species* presence and are therefore subject to change if new information becomes available.

Timing Guidelines in Kemptville District are:

Waterbody (and applicable geography or Fisheries Management Zone)	Timing Guidelines (no in-water works)
○ St. Lawrence River (FMZ 20)	March 15 – July 15 (Spring spawning species)
○ Ottawa River – Lac Des Chats (FMZ 12)	October 1 to July 15 (Spring and fall spawning species, including Lake Trout and Lake Whitefish)
○ Ottawa River – Lac Deschenes (FMZ 12)	October 15 to July 15 (Spring and fall spawning species, including Cisco)
○ Ottawa River – Lac Dollard des Ormeaux (FMZ 12)	January 1 to July 15 (Winter and spring spawning species, including Burbot)
○ Big Rideau Lake (South Burgess, North Burgess, Bastard and South Elmsley Twps) ○ Charleston Lake (Lansdowne and Escott Twps) ○ Crow Lake (South Crosby Twp)	October 1 to June 30 (Spring and fall spawning species, including Lake Trout)
○ Bass Lake (South Elmsley Twp) ○ Lower Rideau Lake (South Elmsley Twp) ○ Bob's Lake (South Sherbrooke Twp) ○ Christie Lake (South Sherbrooke Twp) ○ Dalhousie Lake (Dalhousie Twp) ○ Davern Lake (South Sherbrooke Twp) ○ Farren Lake (South Sherbrooke Twp) ○ Grippen Lake (Leeds Twp) ○ Indian Lake (South Crosby Twp) ○ Little Long Lake (Lansdowne Twp) ○ Millpond Lake (South Burgess) ○ Otter Lake (South Elmsley, South Burgess and Bastard Twps)	October 15 to June 30 (Spring and Fall spawning species, including Lake Whitefish and Cisco)
○ Otty Lake (North Burgess and North Elmsley Twps) ○ Pike Lake (North Burgess Twp) ○ Silver Lake (South Sherbrooke Twp) ○ Redhorse Lake (Lansdowne Twp) ○ Tay River (South Sherbrooke, Bathurst, Drummond and North Elmsley Twps) ○ Wolfe Lake (North Crosby Twp)	
○ Bennett Lake (Bathurst Twp) ○ Crosby Lake (North Crosby Twp) ○ Gananoque River (Leeds Twp) ○ Lac Georges (Plantagenet and Alfred Twps) ○ Gillies Lake (Lanark Twp) ○ Little Crosby Lake (North Crosby Twp) ○ McLaren Lake (North Burgess Twp) ○ Mississippi Lake (Drummond, Beckwith and Ramsay Twps) ○ Mississippi River (Beckwith, Ramsay, Pakenham and Fitzroy Twps) ○ Raisin River below Martintown dam (Charlottenburgh Twp) ○ Rideau River (Wolford, Oxford, Montague, Marlborough, South Gower, North Gower, Osgood, Nepean and Gloucester Twps) ○ South Lake (Leeds Twp) ○ South Nation River below Plantagenet weir (Plantagenet Twp) ○ Upper Rideau Lake (North Crosby Twp) ○ Westport Sand Lake (North Crosby Twp)	January 1 – June 30 (Winter and spring spawning species, including Burbot)
○ Small rivers and streams (denoted on 1:50,000 National Topographic System maps as being one-lined) ○ All other waterbodies in FMZ 18	March 15 to June 30 (Spring spawning species)

**Additional timing guidelines may apply as they relate to endangered and threatened species for works in both water and wetland areas. Timing guidelines are subject to change, depending on species found in a given waterbody.*

Should you have any questions, please do not hesitate to contact Joffre Côté, Management Biologist (at 613-258-8214 or joff.cote@ontario.ca) or Jane Devlin, Management Biologist (at 613-258-8418 or jane.devlin@ontario.ca).

Sincerely,

John Boos

Resources Management Supervisor
Kemptville District Office
Ministry of Natural Resources and Forestry

Appendix C:
Photolog

Photo 1: 19+968R (Figure 3-1) FODM5-11 - Dry-Fresh Sugar Maple - Hardwood Deciduous Forest

Photo 2: 20+157R (Figure 3-1) FODM5-11 - Dry-Fresh Sugar Maple - Hardwood Deciduous Forest

Photo 3: 20+810R (Figure 3-2) RBOB-1 - Calcareous Open Rock Barren Outcrop

Photo 4: 21+291 R (Figure 3-2) CVI-1 - Transportation

Photo 5: 21+432 R (Figure 3-2) MEMM3 - Dry-Fresh Mixed Meadow

Photo 6: 21+544 L (Figure 3-2) WOCR1 - Dry-Fresh Calcareous Bedrock Coniferous Woodland

Photo 7: 21+569 L (Figure 3-2) MEGM4 - Fresh-Moist Meadow

Photo 8: 22+495 L (Figure 3-3) Culvert Buells Creek

Photo 9: 22+544 L (Figure 3-3) WODM5 - Fresh-Moist Poplar Deciduous Woodland

Photo 10: 22+465 L (Figure 3-3) FODM7-3 - Fresh-Moist Willow Lowland Deciduous Forest and Buells Creek

Photo 11: 22+914 R (Figure 3-4) WODM5 - Fresh-Moist Deciduous Woodland

Photo 12: 22+764 L (Figure 3-4) MASO1-1 Cattail Organic Shallow Marsh

Photo 13: 23+465 R (Figure 3-4) CVR-1 - Low Density Residential

Photo 14: 23+118 R (Figure 3-4) MEMM3 - Dry-Fresh Mixed Meadow

Photo 15: 23+417 L (Figure 3-4) MAMO1-2 - Cattail Graminoid Organic Meadow Marsh

Photo 16: 23+573 L (Figure 3-4) FODM11 - Naturalized Deciduous Hedgerow

Photo 17: 23+395 L (Figure 3-4) MEMM4 - Fresh-Moist Meadow with invasive Phragmites

Photo 18: 23+189 L (Figure 3-4) Structure 16-124, no bird nests observed

Photo 19: 20+793 L (Figure 3-2) Butternut tree with canker approximately 90 m north of Highway 401

Photo 20: 20+793 L (Figure 3-2) Butternut tree in THDM4 – Dry-Fresh Deciduous Regeneration Thicket

Photo 21: 21+179 R (Figure 3-2) Candidate snake hibernacula habitat, exposed rock along Highway 401

Photo 22: 21+533 R (Figure 3-2) Candidate snake hibernacula habitat, exposed rock along Highway 401

Appendix D:
Vegetation Community Types Identified in the Study Area

Appendix D: Vegetation Community Types identified in the Study Area

Highway 401 Brockville (GWP 4003-19-00)

Type	ELC Code	Vegetation Community	Area (ha)	Percent (%)
Aquatic	SA	Shallow Water	0.38	0.20
Constructed	CGL_1	Golf Course	12.12	6.47
Constructed	CGL_2	Parkland	0.68	0.36
Constructed	CGL_2, CVC_2	Parkland / Light Industry	3.48	1.86
Constructed	CV	Constructed	0.14	0.07
Constructed	CVC_1	Business Sector	19.43	10.38
Constructed	CVC_1, CVI_1	Business Sector / Transportation	10.80	5.77
Constructed	CVC_2	Light Industry	12.02	6.42
Constructed	CVI_1	Transportation	26.53	14.17
Constructed	CVR_1	Low Density Residential	26.17	13.98
Constructed	CVR_2	High Density Residential	1.46	0.78
Constructed	CVS_1	Education	1.05	0.56
Constructed	CVS_2, CVI_1	Health / Education	1.04	0.55
Deciduous Thicket	THDM3	Dry - Fresh Deciduous Hedgerow Thicket Ecosite	2.68	1.43
Deciduous Thicket	THDM3-2	Native Shrub Deciduous Hedgerow Thicket Type	0.45	0.24
Deciduous Thicket	THDM4	Dry - Fresh Deciduous Regeneration Thicket Ecosite	3.13	1.67
Deciduous Thicket	THDM4-1	Native Deciduous Regeneration Thicket Type	3.14	1.68
Deciduous Thicket	THDR1	Dry - Fresh Calcareous Bedrock Deciduous Thicket Ecosite	0.87	0.46
Meadow	MEGM3	Dry - Fresh Graminoid Meadow Ecosite	4.13	2.20
Meadow	MEGM3-4	Kentucky Blue Grass Graminoid Meadow Type	0.59	0.31
Meadow	MEGM4	Frech - Moist Graminoid Meadow Ecosite	0.23	0.12
Meadow	MEMM3	Dry - Fresh Mixed Meadow Ecosite	7.74	4.14
Meadow	MEMM3, MEGM3-4	Dry - Fresh Mixed Meadow Ecosite / Kentucky Blue Grass Graminoid Meadow Type	0.20	0.11
Meadow	MEMM3, MEMM4	Dry - Fresh Mixed Meadow Ecosite / Fresh - Moist Mixed Meadow Ecosite	3.65	1.95
Meadow	MEMM4	Fresh - Moist Mixed Meadow Ecosite	7.38	3.94
Rock Barren	RBOB1-1	Calcareous Open Rock Barren Outcrop Type	0.36	0.19
Wetland	MAMM1-2	Cattail Graminoid Mineral Meadow Marsh Type	0.23	0.12
Wetland	MAMM1-2, MEMM4	Cattail Graminoid Mineral Meadow Marsh Type / Fresh - Moist Mixed Meadow Ecosite	0.10	0.06
Wetland	MAMO1-2	Cattail Graminoid Organic Meadow Marsh Type	0.61	0.33
Wetland	MASO1-1	Cattail Organic Shallow Marsh Type	1.02	0.54
Woodland - Coniferous	WOCR1, WOCM1-20	Dry - Fresh Calcareous Bedrock Coniferous Woodland Ecosite / Dry - Fresh Scots Pine Coniferous Woodland Type	1.24	0.66
Woodland - Deciduous	FOD	Deciduous Forest	1.02	0.55
Woodland - Deciduous	FODM4-6	Dry - Fresh Norway Maple Deciduous Forest Type	0.33	0.17
Woodland - Deciduous	FODM5-11	Dry - Fresh Sugar Maple - Hardwood Deciduous Forest Type	16.33	8.72
Woodland - Deciduous	FODM6-4	Fresh - Moist Sugar Maple - White Elm Deciduous Forest Type	7.31	3.90
Woodland - Deciduous	FODM7-3	Fresh - Moist Willow Lowland Deciduous Forest Type	3.72	1.98
Woodland - Deciduous	WOD	Deciduous Woodland	0.76	0.40
Woodland - Deciduous	WODM4-3	Sugar Maple Deciduous Woodland Type	1.04	0.56
Woodland - Deciduous	WODM5	Fresh - Moist Deciduous Woodland Ecosite	0.76	0.41
Woodland - Deciduous	WODM5-1	Fresh - Moist Poplar Deciduous Woodland Type	0.81	0.43
Woodland - Deciduous	WODM5-3	Fresh - Moist Manitoba Maple Deciduous Woodland Type	0.38	0.20
Woodland - Deciduous	WODM5-3, SWDM4	Fresh - Moist Manitoba Maple Deciduous Woodland Type / Minearal Deciduous Swamp Ecosite	0.88	0.47
Woodland - Deciduous	WODM5-3, WODM5-2	Fresh - Moist Manitoba Maple Deciduous Woodland Type / Fresh - Moist Elm Deciduous Woodland Type	0.21	0.11
Woodland - Mixed	WOMR1	Dry - Fresh Calcareous Bedrock Mixed Woodland Ecosite	0.34	0.18
Woodland - Plantation	FODM11	Naturalized Deciduous Hedgerow Ecosite	0.30	0.16
Total			**187.22**	**100.00**

Appendix E:
Vascular Plants Observed in the Study Area

Appendix E: Vascular plant species observed in the Study Area

Highway 401 Brockville (GWP 4003-19-00)

CLASS	FAMILY	SCIENTIFIC_NAME	AUTHOR	ENGLISH_COMMON_NAME	S_RANK	SARO_STATUS	COSEWIC_STATUS	SARA_STATUS	COEFF_CONSERVATISM	COEFF_WETNESS
Dicotyledoneae	Aceraceae	Acer negundo	L.	Manitoba Maple	S5				0	0
Dicotyledoneae	Aceraceae	Acer platanoides	L.	Norway Maple	SNA					5
Dicotyledoneae	Aceraceae	Acer rubrum	L.	Red Maple	S5				4	0
Dicotyledoneae	Aceraceae	Acer saccharinum	L.	Silver Maple	S5				5	-3
Dicotyledoneae	Aceraceae	Acer saccharum	Marsh.	Sugar Maple	S5				4	3
Dicotyledoneae	Anacardiaceae	Rhus typhina	L.	Staghorn Sumac	S5				1	3
Dicotyledoneae	Anacardiaceae	Toxicodendron radicans	(L.) Kuntze	Poison Ivy	S5				2	0
Dicotyledoneae	Apiaceae	Anthriscus sylvestris	(L.) Hoffmann	Wild Chervil	SNA					5
Dicotyledoneae	Apiaceae	Daucus carota	L.	Wild Carrot	SNA					5
Dicotyledoneae	Apiaceae	Pastinaca sativa	L.	Wild Parsnip	SNA					5
Dicotyledoneae	Apocynaceae	Asclepias syriaca	L.	Common Milkweed	S5				0	5
Dicotyledoneae	Apocynaceae	Vincetoxicum sp.	(L.) Moench / (Kleopov) Barbarich	Dog-strangling Vine	SNA					5
Dicotyledoneae	Asteraceae	Achillea millefolium	L.	Common Yarrow	SNA					3
Dicotyledoneae	Asteraceae	Ambrosia artemisiifolia	L.	Common Ragweed	S5				0	3
Dicotyledoneae	Asteraceae	Bidens cernua	L.	Nodding Beggarticks	S5				2	-5
Dicotyledoneae	Asteraceae	Cirsium arvense	(L.) Scop.	Canada Thistle	SNA					3
Dicotyledoneae	Asteraceae	Cirsium vulgare	(Savi) Ten.	Bull Thistle	SNA					3
Dicotyledoneae	Asteraceae	Doellingeria umbellata	(P. Mill.) Nees	Flat-top White Aster	S5				6	-3
Dicotyledoneae	Asteraceae	Erigeron strigosus	Muhl. ex Willd.	Rough Fleabane	S5				4	3
Dicotyledoneae	Asteraceae	Eupatorium perfoliatum	L.	Common Boneset	S5				2	-3
Dicotyledoneae	Asteraceae	Eurybia macrophylla	(L.) Cass.	Large-leaved Aster	S5				5	5
Dicotyledoneae	Asteraceae	Euthamia graminifolia	(L.) Nutt.	Grass-leaved Goldenrod	S5				2	0
Dicotyledoneae	Asteraceae	Eutrochium maculatum	(L.) E.E. Lamont	Spotted Joe Pye Weed	S5				3	-5
Dicotyledoneae	Asteraceae	Inula helenium	L.	Elecampane	SNA					3
Dicotyledoneae	Asteraceae	Lactuca serriola	L.	Prickly Lettuce	SNA					3
Dicotyledoneae	Asteraceae	Leucanthemum vulgare	Lam.	Oxeye Daisy	SNA					5
Dicotyledoneae	Asteraceae	Pilosella piloselloides	(Villars) Soják	Tall Hawkweed	SNA					5
Dicotyledoneae	Asteraceae	Solidago altissima	L.	Tall Goldenrod	S5				1	3
Dicotyledoneae	Asteraceae	Solidago canadensis	L.	Canada Goldenrod	S5				1	3
Dicotyledoneae	Asteraceae	Solidago rugosa	P. Mill.	Rough-stemmed Goldenrod	S5				4	0
Dicotyledoneae	Asteraceae	Sonchus arvensis	L.	Field Sow-thistle	SNA					3
Dicotyledoneae	Asteraceae	Symphyotrichum ericoides	(L.) Nesom	White Heath Aster	S5				4	3
Dicotyledoneae	Asteraceae	Taraxacum officinale	G.H. Weber ex Wiggers	Common Dandelion	SNA					3
Dicotyledoneae	Asteraceae	Tussilago farfara	L.	Coltsfoot	SNA					3
Dicotyledoneae	Balsaminaceae	Impatiens glandulifera	Royle	Purple Jewelweed	SNA					-3
Dicotyledoneae	Caryophyllaceae	Silene vulgaris	(Moench) Garcke	Bladder Campion	SNA					5
Dicotyledoneae	Clusiaceae	Hypericum perforatum	L.	Common St. John's-wort	SNA					5
Dicotyledoneae	Convolvulaceae	Calystegia sepium	(L.) R. Br.	Hedge False Bindweed	S5				2	0
Dicotyledoneae	Cornaceae	Cornus racemosa	Lam.	Grey Dogwood	S5				2	0
Dicotyledoneae	Cornaceae	Cornus sericea	L.	Red-osier Dogwood	S5				2	-3
Dicotyledoneae	Fabaceae	Medicago lupulina	L.	Black Medick	SNA					3
Dicotyledoneae	Fabaceae	Medicago sativa	L.	Alfalfa	SNA					5
Dicotyledoneae	Fabaceae	Melilotus albus	Medik.	White Sweet-clover	SNA					3
Dicotyledoneae	Fabaceae	Robinia pseudoacacia	L.	Black Locust	SNA					3
Dicotyledoneae	Fabaceae	Securigera varia	(L.) Lassen	Purple Crown-vetch	SNA					5
Dicotyledoneae	Fabaceae	Trifolium repens	L.	White Clover	SNA					3

CLASS	FAMILY	SCIENTIFIC_NAME	AUTHOR	ENGLISH_COMMON_NAME	S_RANK	SARO_STATUS	COSEWIC_STATUS	SARA_STATUS	COEFF_CONSERVATISM	COEFF_WETNESS
Dicotyledoneae	Fabaceae	Vicia americana	Muhl. ex Willd.	American Vetch	S5				5	3
Dicotyledoneae	Fagaceae	Quercus rubra	L.	Northern Red Oak	S5				6	3
Dicotyledoneae	Gentianaceae	Centaurium pulchellum	(Sw.) Druce	Branching Centaury	SNA					0
Dicotyledoneae	Juglandaceae	Juglans cinerea	L.	Butternut	S2?	END	END	END	6	3
Dicotyledoneae	Lamiaceae	Prunella vulgaris	L.	Common Self-heal	S5				0	0
Dicotyledoneae	Lamiaceae	Stachys palustris	L.	Marsh Hedge-nettle	SNA					-5
Dicotyledoneae	Lonicera	Lonicera sp.		Honeysuckle sp.						
Dicotyledoneae	Lythraceae	Lythrum salicaria	L.	Purple Loosestrife	SNA					-5
Dicotyledoneae	Oleaceae	Fraxinus americana	L.	White Ash	S4				4	3
Dicotyledoneae	Oleaceae	Fraxinus pennsylvanica	Marsh.	Red Ash	S4				3	-3
Dicotyledoneae	Oleaceae	Syringa vulgaris	L.	Common Lilac	SNA					5
Dicotyledoneae	Onagraceae	Oenothera parviflora	L.	Small-flowered Evening-primrose	S5				1	3
Dicotyledoneae	Oxalidaceae	Oxalis stricta	L.	Upright Yellow Wood-sorrel	SNA					3
Dicotyledoneae	Plantaginaceae	Plantago lanceolata	L.	English Plantain	SNA					3
Dicotyledoneae	Polygonaceae	Rumex crispus	L.	Curled Dock	SNA					0
Dicotyledoneae	Ranunculaceae	Ranunculus acris	L.	Common Buttercup	SNA					0
Dicotyledoneae	Rhamnaceae	Frangula alnus	P. Mill.	Glossy Buckthorn	SNA					0
Dicotyledoneae	Rosaceae	Fragaria virginiana	Duchesne	Wild Strawberry	S5				2	3
Dicotyledoneae	Rosaceae	Geum sp.		Avens sp.						
Dicotyledoneae	Rosaceae	Prunus virginiana	L.	Chokecherry	S5				2	3
Dicotyledoneae	Rosaceae	Rubus sp.		Bramble sp.						
Dicotyledoneae	Rubiaceae	Galium mollugo	L.	Smooth Bedstraw	SNA					5
Dicotyledoneae	Salicaceae	Populus balsamifera	L.	Balsam Poplar	S5				4	-3
Dicotyledoneae	Salicaceae	Populus deltoides	Bartr. ex Marsh.	Eastern Cottonwood	S5				4	0
Dicotyledoneae	Salicaceae	Populus tremuloides	Michx.	Trembling Aspen	S5				2	0
Dicotyledoneae	Salicaceae	Salix sp.		Willow sp.						
Dicotyledoneae	Scrophulariaceae	Linaria vulgaris	P. Mill.	Butter-and-eggs	SNA					5
Dicotyledoneae	Scrophulariaceae	Verbascum thapsus	L.	Common Mullein	SNA					5
Dicotyledoneae	Solanaceae	Solanum dulcamara	L.	Bittersweet Nightshade	SNA					0
Dicotyledoneae	Tiliaceae	Tilia cordata	P. Mill.	Little-leaved Linden	SNA					5
Dicotyledoneae	Vitaceae	Parthenocissus quinquefolia	(L.) Planch.	Virginia Creeper	S4?				6	3
Dicotyledoneae	Vitaceae	Parthenocissus vitacea	(Knerr) A.S. Hitchc.	Thicket Creeper	S5				4	3
Dicotyledoneae	Vitaceae	Vitis riparia	Michx.	Riverbank Grape	S5				0	0
Monocotyledoneae	Cyperaceae	Carex sp.		Sedge sp.						
Monocotyledoneae	Cyperaceae	Schoenoplectus tabernaemontani	(K. C. Gmelin) Palla	Soft-stemmed Bulrush	S5				5	-5
Monocotyledoneae	Juncaceae	Juncus sp.		Rushes sp.						
Monocotyledoneae	Poaceae	Hordeum jubatum	L.	Foxtail Barley	S5?				0	0
Monocotyledoneae	Poaceae	Phalaris arundinacea	L.	Reed Canarygrass	S5				0	-3
Monocotyledoneae	Poaceae	Phragmites australis	(Cav.) Trin. ex Steud.	Common Reed	SU				0	-3
Monocotyledoneae	Poaceae	Poa pratensis	L.	Kentucky Bluegrass	S5				0	3
Monocotyledoneae	Poaceae	Setaria viridis	(L.) Beauv.	Green Foxtail	SNA					5
Monocotyledoneae	Polygonatum	Polygonatum sp.		Solomon's-seal sp.						
Monocotyledoneae	Typhaceae	Typha latifolia	L.	Broad-leaved Cattail	S5				1	-5
Pinopsida	Cupressaceae	Juniperus virginiana var. virginiana	L.	Eastern Red Cedar	S5				4	3
Pinopsida	Cupressaceae	Thuja occidentalis	L.	Eastern White Cedar	S5				4	-3
Pinopsida	Pinaceae	Larix laricina	(Du Roi) K. Koch	Tamarack	S5				7	-3
Pinopsida	Pinaceae	Picea abies	(L.) Karst.	Norway Spruce	SNA					5
Pinopsida	Pinaceae	Picea pungens	Engelm.	Blue Spruce	SNA					3
Pinopsida	Pinaceae	Pinus resinosa	Soland.	Red Pine	S5				8	3

CLASS	FAMILY	SCIENTIFIC_NAME	AUTHOR	ENGLISH_COMMON_NAME	S_RANK	SARO_STATUS	COSEWIC_STATUS	SARA_STATUS	COEFF_CONSERVATISM	COEFF_WETNESS
Pinopsida	Pinaceae	Pinus strobus	L.	Eastern White Pine	S5				4	3
Pinopsida	Pinaceae	Pinus sylvestris	L.	Scots Pine	SNA					3

Appendix F:
Significant Species Habitat Assessment

Appendix F.1:
Species at Risk Habitat Assessment

APPENDIX F1. Species at Risk Habitat Assessment
Highway 401, Brockville (GWP 4003-19-00)

Group	Common Name	Scientific Name	SARO	SARA	S-Rank	Source(s)	Habitat Description	Suitable Habitat in the Study Area
LADY BEETLE	Transverse Lady Beetle	*Coccinella transversoguttata*	END	SC	S1	NHIC (2021)	Habitat generalist including agricultural areas, suburban gardens, parks, coniferous forests, deciduous forests, grasslands, meadows, and riparian areas.	No - Although this species may occur in suburban parks, meadow, and forest habitat observed in the Study Area, the occurrence record is historical (i.e., > 30 years) and is considered to be no longer present. This species population in Ontario is also either absent or below detection levels.
REPTILES	Blanding's Turtle	*Emydoidea blandingi*	THR	END	S3	NHIC (2021)	Inhabits shallow lakes, ponds and wetlands with clean water and mucky bottoms. Hibernates in the soft bottoms of water bodies.	Yes - May use the watercourse in the Study Area as a movement corridor and nest in exposed areas, including gravel highway shoulders, sand traps in the adjacent golf course, and other disturbed areas.
REPTILES	Gray Ratsnake (Frontenac)	*Pantherophis spiloides*	THR	THR	S3	None (species has range overlap)	Requires a vareity of habitat including deciduous forest and woodlands, wetlands, rocky outcrops, and agricultural fields. Hibernates in natrual or artifical underground features that extend below the frost line including bedrock crevices and rocky slopes.	Yes - May use forest habitat in the Study Area. Exposed bedrock observed in the Study Area (i.e., 21+533 R on Figure 3-2, Appendix A) may provide overwintering habitat.
BIRDS	Eastern Whip-poor-will	*Antrostomus vociferus*	THR	THR	S4B	Ontario Bird Atlas (2007)	Areas with a mix of open and forested areas, such as savannahs, open woodlands or openings in more mature, deciduous, coniferous and mixed forests. Forages in open areas and uses forested areas for roosting and nesting.	Yes - May nest in forested areas in the Study Area.
BIRDS	Chimney Swift	*Chaetura pelagica*	THR	THR	S4B, S4N	Ontario Bird Atlas (2007)	Nest in chimneys and other manmade structures. Tend to stay close to water. Can nest on cave walls and in hollow trees or tree cavities in old growth forests.	Yes - May nest in structures of chimneys in the Study Area.
BIRDS	Least Bittern	*Ixobrychus exilis*	THR	THR	S4B	Ontario Bird Atlas (2007)	Wetland habitats, strongly prefers cattail marshes with a mix of open pools and channels.	No - Suitable wetland habitat (i.e., cattail marshes were mostly dry) was not observed during field investigations or identified on satellite imagery.
BIRDS	Bank Swallow	*Riparia riparia*	THR	THR	S4B	Ontario Bird Atlas (2007)	Nest in burrows in natural and human-made settings where there are vertical faces in silt and sand deposits. Nests on banks of rivers and lakes, also found in active sand and gravel pits.	Yes - Field investigations did not document suitable banks from assessment conducted in the ROW; however, thorough searches of the Study Area was not conducted. May also use fill piles or similar artificial features.
BIRDS	Bobolink	*Dolichonyx oryzivorus*	THR	THR	S4B	NHIC (2021)	Tallgrass prairie, other open meadows, and hayfields.	No - Suitable open habitat was not observed during the field investigation or identified on satellite imagery. Meadow habitat was limited to roadside ditches.
BIRDS	Eastern Meadowlark	*Sturnella magna*	THR	THR	S4B	NHIC (2021)	Breed in moderately tall grasslands, such as pastures and hayfields. Also found in alfalfa fields, weedy borders of croplands, roadsides, orchards, airports, shrubby overgrown fields, or other open areas.	No - Suitable open habitat was not observed during the field investigation or identified on satellite imagery. Meadow habitat was limited to roadside ditches.
MAMMALS	Small-footed Myotis	*Myotis leibii*	END		S2S3	Mammal Atlas (1994)	Roost in a variety of habitats, including in or under rocks, rock outcrops, in buildings, under bridges, or in caves, mines, or hollow trees. Hibernate in caves and abandoned mines.	Yes - May use rock outcroppings and/or large trees (>10 cm DBH) in the Study Area as maternity roosts.
MAMMALS	Little Brown Myotis	*Myotis lucifugus*	END	END	S4	Mammal Atlas (1994)	Roost in trees and buildings. Often select attics, abandoned buildings and barns. Hibernate in caves or abandoned mines.	Yes - May use large trees (>10 cm DBH) or structures in the Study Area as maternity roosts.
MAMMALS	Northern Myotis	*Myotis septentrionalis*	END	END	S3?	Mammal Atlas (1994)	Associated with boreal forests. Roost under loose bark and in tree cavities. Hibernate in caves or abandoned mines.	Yes - May use large trees (>10 cm DBH) or structures in the Study Area as maternity roosts.
MAMMALS	Tri-Colored Bat	*Perimyotis subflavus*	END	END	S3?	Humphrey and Fotherby (2019)	Roost is mature forests and buildings. Hibernate in caves or abandoned mines.	Yes - May use large trees (>10 cm DBH) or structures in the Study Area as maternity roosts.
PLANTS	Butternut	*Juglans cinerea*	END	END	S2?	NHIC (2021)	Usually grows alone or in small groups in deciduous forests. Prefers moist, well-drained soil and is often found along streams. Also found on well-drained gravel sites, does not do well in shade, and often grows in sunny openings and near forest edges.	Confirmed - One Butternut was observed in the Study Area at 20+793 L. Additionally, Butternut may occur in open woodlands, woodland edges and other open habitat in the Study Area. Butternut records are present in Brockville.
PLANTS	American Ginseng	*Panax quinquefolius*	END	END	S2	None (species has range overlap)	Rich, moist, but well-drained, and relatively mature deciduous woods dominated by Sugar Maple, White Ash, and American Basswood. Deep, nutrient rich soil over limestone or marble bedrock.	Yes - May grown in deciduous woodlands (FOD) in the Study Area

Appendix F.2:
Species of Conservation Concern Habitat Assessment

APPENDIX F2: Species of Conservation Concern Habitat Assessment
Highway 401, Brockville (GWP 4003-19-00)

Group	Common Name	Scientific Name	SARO	SARA	S-Rank	Source(s)	Habitat Description	Suitable Habitat in the Study Area (Y/N)
BUTTERFLIES	Monarch	*Danaus plexippus*	SC	SC	S4B, S2N	Butterfly Atlas (2019)	Caterpillars feed on milkweed plants and are confined to meadows and open areas where milkweed grows. Adults can be found in diverse habitats where they feed on nectar.	Confirmed - Adult observed foraging (23+625 L on Figure 3-4, Appendix A) in the Study Area during field investigations.
BUMBLEBEES	Yellow-banded Bumble Bee	*Bombus terricola*	SC	SC	S3S5	NHIC (2021)	Habitat generalist including open forest, wet and dry meadows, grasslands, urban parks, gardens, and agricultural areas which contain flowering plants.	Yes - Flowering plants and suitable habitat observed in the Study Area.
AMPHIBIANS	Western Chorus Frog (Great Lakes - Shield)	*Pseudacris triseriata*	NAR	THR	S3	Herptile Atlas (2019)	Inhabits forest openings around woodland ponds, in or around damp meadows, marshes, bottomland swamps, and temporary ponds in open country, even urban areas. Breeds in almost any fishless pond with >10cm water, including quiet, shallow, usually temporary waterbodies with vegetation that is submerged or protrudes from the water, especially in rain-flooded meadows and ditches, and temporary ponds on floodplains. Overwinters underground or under surface cover (e.g., fallen logs).	Yes - May breed in wetlands and ditches in the Study Area.
REPTILES	Snapping Turtle	*Chelydra serpentina*	SC	SC	S3	NHIC (2021)	Freshwater habitat, most often in slow-moving water with a soft mud or sand bottom and abundant vegetation. May inhabit small wetlands, ponds, and ditches. Hibernates in the mud or silt on the bottom of lakes and rivers.	Yes - May use wetlands and watercourses, including water hazards in the golf course that is present in the Study Area. May nest in exposed areas, including gravel highway shoulders, sand traps in the adjacent golf course, and other disturbed areas.
REPTILES	Eastern Musk Turtle	*Sternotherus odoratus*	SC	SC	S3	Herptile Atlas (2019)	Rivers, lakes, and ponds with slow current and soft bottom.	Yes - May use Buells Creek as a movement corridor and nest in exposed areas, including gravel highway shoulders, sand traps in adjacent golf course, and other disturbed areas.
REPTILES	Midland Painted Turtle	*Chrysemys picta marginata*		SC-NS	S5	NHIC (2021)	Ponds, marshes, lakes, and slow-moving creeks that have a soft bottom and provide abundant basking sites and aquatic vegetation. Hibernates on the bottom of water bodies.	Yes - May use wetlands and watercourses, including water hazards in the golf course that is present in the Study Area. May nest in exposed areas, including gravel highway shoulders, sand traps in adjacent golf course, and other disturbed areas.
REPTILES	Northern Map Turtle	*Graptemys geographica*	SC	SC	S3	Herptile Atlas (2019)	Large rivers and lakes with slow-moving water and a soft bottom. Require high-quality water that supports mollusc prey.	No - Large rivers and lakes are absent from the Study Area.
REPTILES	Eastern Milksnake	*Lampropeltis triangulum*		SC	S3	NHIC (2021)	Open habitats such as rocky outcrops, fields and forest edge. May be found in farmyards due to abundant mice.	Yes - May hibernate and bask in exposed or blasted bedrock (i.e., 21+179 R on Figure 3-2, Appendix A), and use a variety of natural (forest edge) and urabn (golf course) areas to hunt.
REPTILES	Eastern Ribbonsnake	*Thamnophis sauritus*	SC		S4	None (species has range overlap)	Semi-aquatic and occurs close to water (wetlands, shorelines of lakes and rivers) in forested habitat.	No - Aquatic habitat in forested habitat was not observed during the field investigation or identified on satellite imagery.
BIRDS	Common Nighthawk	*Chordeiles minor*	SC	THR	S4B	Ontario Bird Atlas (2007)	Open habitats with little to no ground vegetation such as logged or burned-over areas, forest clearings, rock barrens, peat bogs, lakeshores, and mine tailings. May also nest in cultivated fields, orchards, urban parks, mine tailings, and along gravel roads and railways; tend to prefer natural sites.	Yes - May nest in open natural or disturbed areas in the Study Area.
BIRDS	Great Black-backed Gull	*Larus marinus*			S2B	Ontario Bird Atlas (2007)	Breeds in areas inaccessible to terrestrial predators such as small islands, rocky islets, and dunes. Breed in many areas with Herring Gulls. Overwinter roosts near ports, docks, in estuaries, and landfills.	No - Suitable nesting habitat was not observed during field investigations or identified on satellite imagery.

Group	Common Name	Scientific Name	SARO	SARA	S-Rank	Source(s)	Habitat Description	Suitable Habitat in the Study Area (Y/N)
BIRDS	Caspian Tern	*Hydroprogne caspia*	NAR	NAR	S3B	eBird (2021)	Wide variety of habitats, including coastal estuarine, salt marsh, and barrier islands. May nest on islands in rivers and lakes.	No - Suitable nesting habitat was not observed during field investigations or identified on satellite imagery.
BIRDS	Black Tern	*Chlidonias niger*	SC	NAR	S3B	eBird (2021)	Loose colonies in shallow marshes, especially in cattails. Requires marshes >20 hectares in size (MNR 2000).	No - Marsh habitat in the Study Area is too small to support nesting.
BIRDS	Black-crowned Night-heron	*Nycticorax nycticorax*			S3B, S2N, S4M	Ontario Bird Atlas (2007)	Colonies, often with dozens of nests in a single tree, on an island or in a treed swamp. Associated with wetland habitat including streams, rivers, lakes, ponds, lagoons, reservoirs, and wet agricultural fields.	No - Suitable treed wetland habitat for nesting was not observed during field investigations or identified on satellite imagery.
BIRDS	Great Egret	*Ardea alba*			S2B	eBird (2021)	Colonies located in lakes, ponds, marshes, estuaries, impoundments, and islands. Nests in woody vegetation, shrubs, and trees.	No - Suitable treed wetland habitat for nesting was not observed during the field investigations or identified on satellite imagery.
BIRDS	Bald Eagle	*Haliaeetus leucocephalus*	SC	NAR	S4B,S2N	eBird (2021)	Nest in a variety of habitats and forest types, almost always near a major lake or river. Usually nest in large trees such as pine and poplar. May congregate near open water during the winter.	No - Major/large lakes or rivers are absent from the Study Area.
BIRDS	Peregrine Falcon	*Falco peregrinus*	SC	SC	S3B	eBird (2021)	Nest on tall, steep cliff ledges close to large waterbodies. Often found in urban centres, nesting on ledges of tall buildings.	No - Suitable nesting habitat was not observed during field investigations.
BIRDS	Barn Swallow	*Hirundo rustica*	SC	THR	S4B	Ontario Bird Atlas (2007)	Often live in close association with humans, building nests almost exclusively on human-made structures such as barns, under bridges and in culverts.	Yes - May nest in structures (i.e., culverts, bridges) and buildings in the Study Area. No nests were observed during the field investigation.
BIRDS	Eastern Wood-Pewee	*Contopus virens*	SC	SC	S4B	Ontario Bird Atlas (2007)	Mid-canopy layer of forest clearings and edges of deciduous and mixed forests. Most abundant in intermediate-age mature forest stands with little understory vegetation.	Yes - May use forest edge habitat in the Study Area
BIRDS	Wood Thrush	*Hylocichla mustelina*	SC	THR	S4B	NHIC (2021)	Lives in mature deciduous and mixed forests. Seeks moist stands of trees with well-developed undergrowth and tall trees for singing perches. Prefer large forests but will use smaller stands of trees. Usually build nests in sugar maple or American beech.	Yes - May use forest habitat in the Study Area.
BIRDS	Evening Grosbeak	*Coccothraustes vespertinus*	SC	SC	S4	eBird (2021)	Breeds in forest with large mature trees with a high proportion of fir, spruce, and aspen and an open canopy. Overwinting habitat is associated with availabity of seeds and berries including urban and suburban habitat.	Yes - May use suburban and urban areas in the Study Area as overwintering habitat. Breeding habitat was not observed in the Study Area.
BIRDS	Grasshopper Sparrow	*Ammodramus savannarum*	SC	SC	S4B	Ontario Bird Atlas (2007)	Open grassland areas with well-drained, sandy soil. Also nest in hayfields and pastures, as well as alvars, prairies and occasionally grain crops. Prefers areas that are sparsely vegetated.	No - Suitable open habitat was not observed during the field investigation or identified on satellite imagery. Meadow habitat was limited to roadside ditches.
BIRDS	Golden-winged Warbler	*Vermivora chrysoptera*	SC	THR	S4B	Ontario Bird Atlas (2007)	Nest in areas with young shrubs surrounded by mature forest. Areas that have recently been disturbed such as field edges, utility ROW or logged areas.	No - Suitable habitat was not observed during the field investigation or identified on satellite imagery.
BIRDS	Canada Warbler	*Cardellina canadensis*	SC	THR	S4B	eBird (2021)	Breeds in deciduous and coniferous, usually wet forest types with a well-developed, dense shrub layer.	Yes - May nest in forest habitat in the Study Area
MOSS	Olney's Grimmia	*Grimmia olneyi*			S2	NHIC (2021)	Grows in cracks and exposed faces of dry to periodically wet, acidic or calcerous rocks, commonly along streams or in splash zones of lakeshores.	No - Although this species may grow on exposed bedrock and stream banks observed in the Study Area, the occurrence record is historical (i.e., > 30 years) and is considered to be no longer present due to on-going developments.

Appendix G:
Wildlife Observed in the Study Area

APPENDIX G: Wildlife observed in the Study Area

Highway 401 Brockville (GWP 4003-19-00)

COMMON NAME	*SCIENTIFIC NAME*	ONTARIO STATUS	SARO	SARA
BUTTERFLIES				
Monarch	*Danaus plexippus*	S4B, S2N	SC	SC
BIRDS				
Ring-billed Gull	*Larus delawarensis*	S5		
Rock Pigeon	*Columba livia*	SNA		
American Crow	*Corvus brachyrhynchos*	S5		
Blue Jay	*Cyanocitta cristata*	S5		
House Finch	*Haemorhous mexicanus*	SNA		
American Goldfinch	*Spinus tristis*	S5		
Common Grackle	*Quiscalus quiscula*	S5B		
Black-capped Chickadee	*Poecile atricapillus*	S5		
Song Sparrow	*Melospiza melodia*	S5		
House Sparrow	*Passer domesticus*	SNA		
European Starling	*Sturnus vulgaris*	SNA		
American Robin	*Turdus migratorius*	S5		
Red-eyed Vireo	*Vireo olivaceus*	S5B		
MAMMALS				
Eastern Gray Squirrel	*Sciurus carolinensis*	S5		
Red Squirrel	*Tamiasciurus hudsonicus*	S5		

Explanation of Status and Acronymns

COSSARO: Committee on the Status of Species at Risk in Ontario
COSEWIC: Committee on the Status of Endangered Wildlife in Canada
S1: Critically Imperiled—Critically imperiled in the province (often 5 or fewer occurrences)
S2: Imperiled—Imperiled in the province, very few populations (often 20 or fewer),
S3: Vulnerable—Vulnerable in the province, relatively few populations (often 80 or fewer)
S4: Apparently Secure—Uncommon but not rare
S5: Secure—Common, widespread, and abundant in the province
SX: Presumed extirpated
SH: Possibly Extirpated (Historical)
SNR: Unranked
SU: Unrankable—Currently unrankable due to lack of information
SNA: Not applicable—A conservation status rank is not applicable because the species is not a suitable target for conservation activities.
S#S#: Range Rank—A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species
S#B- Breeding status rank
S#N- Non Breeding status rank
?: Indicates uncertainty in the assigned rank
END: Endangered
THR: Threatened
SC: Special Concern
2, 3 or NS after a COSEWIC ranking indicates the species is either on Schedule 2, Schedule 3 or No Schedule of the Species At Risk Act (SARA)
NAR: Not At Risk
IND: Indeterminant, insufficient information to assign status
DD: Data Deficient

LATEST STATUS UPDATE

Odonata: Sept 2020
Butterflies: Sept 2020
Bumble Bees: Sept 2020
Other Arthropods: Sept 2020
Terrestrial Molluscs: Sept 2020
Amphibans: Sept 2020
Reptiles: Sept 2020
Birds: Sept 2020
Mammals: Sept 2020
S and G ranks and explanations: December 2011

NOTE

All rankings for birds refer to breeding birds unless the ranking is followed by N

REFERENCES

COSSARO Status
Endangered Species Act, 2007 (Bill 184). Species at Risk in Ontario List.

COSEWIC Status
COSEWIC. 2007. Canadian Species at Risk. Committee on the Status of Endangered Wildlife in Canada.