Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

LAKESHORE TRANSPORTATION STUDIES - NEW CREDIT RIVER ACTIVE TRANSPORTATION (AT) BRIDGE STUDY

NATURAL ENVIRONMENT ASSESSMENT
MISSISSAUGA, ONTARIO

Prepared for:
HDR CORPORATION

Prepared by:
MATRIX SOLUTIONS INC.

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Mississauga, Ontario

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Prepared for HDR Corporation, January 2023

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1 INTRODUCTION

HDR Corporation and the City of Mississauga (the City) retained Matrix Solutions Inc. to complete a natural environment assessment (NEA) as part of the Lakeshore Transportation Studies. The studies include three infrastructure projects in the Lakeview, Port Credit, and Clarkson communities that build from the 2019 Lakeshore Connecting Communities Transportation Master Plan. These studies include the Lakeshore Bus Rapid Transit (BRT) Study, Lakeshore Complete Street Study, and the New Credit River Active Transportation (AT) Bridge Study.

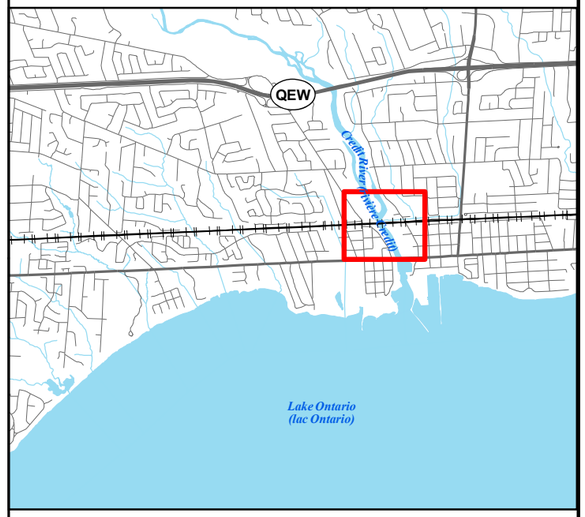
As part of the Lakeshore Transportation Studies, HDR is developing the preliminary design and completing the Schedule B Class Environmental Assessment for a new AT bridge over the Credit River north of Lakeshore Road. The new span bridge will connect the existing multi-use path on Mississauga Road to an existing multi-use path on the east side of Credit River. This bridge will enhance mobility across the river for pedestrians.

This NEA report will focus on the natural heritage features and functions associated within the New Credit River AT Bridge study area, with the remaining two studies to be discussed in separate reports. The NEA report will characterize the existing conditions through a background review and site investigation results, evaluate the significant heritage features and functions, determine what potential impacts the proposed design may have on significant features or functions, and recommend measures to avoid or mitigate the potential impacts.

1.1 Study Area

The Credit River AT bridge study area includes the proposed crossing of the Credit River located just south of the rail bridge (Figure 1). The study area extends on either side of the Credit River from Mississauga Road to Stavebank Road. To account for impacts to adjacent features, the NEA study area includes all areas within 50 m of the new Credit River AT bridge alignment, which also encompasses all anticipated temporary impact areas. Much of the area surrounding the Credit River is regulated by Credit Valley Conservation (CVC). The Credit River AT bridge study area includes paved roads/parking lots, forested riparian communities, and manicured parkland.

Study Area
Watercourse
Railway
Highway
Road



Reference: Contains information licensed under the Open Government Licence – Ontario. Imagery © 2022 Microsoft Corporation © 2022 Maxar ©CNES (2022) Distribution Airbus DS

1:3,000 metres
30 0 30 60
NAD 1983 UTM Zone 17N

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

HDR Corporation
New Credit River Active Transportation Bridge

Study Area

Date:	Project:	Submitter:	Reviewer:
June 2022	33023	K. Reis	R. Leppington

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Figure 1

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2 REGULATORY FRAMEWORK

Review of the regulatory framework provides guidance on the protection of natural heritage features and evaluation of significance. Natural heritage features identified within the study area were evaluated against the federal, provincial, and municipal planning policies applicable to the study area (Table 1).

TABLE 1 Applicable Federal, Provincial and Municipal Policies

Acts and Regulations	Summary of Contents	Project Implication
Federal Acts and Regulations		
Migratory Birds Convention Act (MBCA)	Environment and Climate Change Canada (ECCC) administers the MBCA through the Migratory Birds Regulations and Migratory Birds Sanctuary Regulations. Ensures the conservation of migratory bird populations by regulating potentially harmful human activities.	Any tree removals would need to be completed outside of the breeding bird season (April 1 to August 30) to avoid disturbing active nests of migratory birds protected under the MBCA.
Species at Risk Act (SARA)	Intended to help prevent the decline in wildlife populations due to human activity. Species classified as extirpated, endangered, and threatened in Schedule 1 of the SARA are protected under the provisions of the SARA. This includes protection to the species and their critical habitat.	While SARA applies to species on federal land, such as Canadian oceans and waterways; national parks; national wildlife areas; some migratory bird sanctuaries; and First Nations reserve lands, it also applies to species at risk (SAR) migratory birds protected under the MBCA and fish, anywhere they occur. Therefore, SARA only applies to SAR migratory birds, fish, and mussels for this project. Any impacts to these species protected under SARA would require a permit.
Fisheries Act	The *Fisheries Act* sets out provisions to protect fish and fish habitat, including prohibiting the death of fish and the harmful alteration, disruption, or destruction (HADD) of fish habitat as well as the deposition of deleterious substances into watercourses.	The *Fisheries Act* requires that projects avoid causing death of fish or a HADD of fish habitat unless authorized by the Minister of Fisheries and Oceans Canada (DFO) or a designated representative. The determination of risk for death of fish or HADD to fish habitat is typically done through a self-assessment process. The self assessment lists a number of criteria which identify whether or not the project may result in death of fish or HADD of fish habitat (DFO 2020). If the self assessment indicates that the project cannot avoid death of fish or HADD of fish habitat, then a formal request for review must be submitted to DFO. The request for review must include all finalized construction drawings including grading plan, erosion and sediment controls, construction details, dewatering plans, and replanting plans (DFO 2020).

Acts and Regulations	Summary of Contents	Project Implication
Provincial Acts and Regulations		
Endangered Species Act (ESA)	Provides for the conservation and protection of species in Ontario classified as SAR under the ESA. General habitat protection applies to all endangered and threatened species. Species-specific habitat protection is also given to those species with regulated habitat, as identified in Ontario Regulation 242/08. Species designated as special concern are not given species or habitat protection under the ESA.	The ESA applies to all SAR species within provincial lands protected under the ESA. Any impacts to these species or habitats protected under the ESA would require a permit.
Provincial Policy Statement (PPS; MMAH 2020)	Provides policy direction from the provincial government relating to land use planning. The PPS addresses the need to protect natural heritage features to ensure Ontario's long-term prosperity, environmental health, and social well being. The following guidelines assist with the implementation of the PPS: • *Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005* (MNR 2010) • *Significant Wildlife Habitat Technical Guide* (MNR 2000) • *Significant Wildlife Habitat Criteria Schedules for Ecoregion 7E* (MNRF 2015)	This is a guiding document for municipalities and indicates where site development shall not be permitted, unless it has been demonstrated that there will be no negative impacts on the natural features or their ecological functions, such as: • significant wetlands in the Canadian Shield north of Ecoregions 5E, 6E, and 7E • significant woodlands in Ecoregion 6E and 7E • significant valleylands in Ecoregion 6E and 7E • significant wildlife habitat • significant areas of natural and scientific interest • coastal wetlands in Ecoregions 5E, 6E, and 7E that are not subject to Policy 2.1.4 (b)
Conservation Authorities Act	Empowers conservation authorities to regulate activities that may have an impact on watercourses within their watershed jurisdiction.	The study area is located within the Credit Valley Conservation (CVC) watershed and is regulated under Ontario Regulation 160/06: *Regulation of Development, Interference with Wetlands and Alterations to Shorelines and Watercourses.* Any works within either regulatory limit will require a permit.
Municipal Acts and Regulations		
Mississauga Official Plan (City of Mississauga 2021)	A long-range community planning document used to guide development in Mississauga, Ontario.	A review of the official plan and natural heritage mapping was completed to incorporate Mississauga's natural heritage features and functions within the natural environment assessment report. The study area is mapped as a Significant Natural Area and Natural Green Space. The study area also contains a Special Management Area.

3 STUDY APPROACH AND METHODOLOGY

Information pertaining to natural heritage resources within or adjacent to the study area was obtained through a review of background studies, databases, and field investigations.

3.1 Background Review

The following information sources were reviewed for records related to natural heritage features that have the potential or are known to occur within the study area.

Initial background requests regarding species at risk (SAR) were submitted to the Ontario Ministry of the Environment, Conservation and Parks (MECP). In addition to information provided by these regulatory agencies, other publicly available data sources were reviewed to determine potential species of conservation concern (SCC) and SAR whose occurrence ranges overlap with the study area. Lastly, the Golder (2016) natural environment constraints assessment was reviewed to ensure any conclusions and constraints have been included. Background review material for the study area has also been obtained from available secondary source reports.

TABLE 2 Background Data Sources Reviewed

Name	Type	Description
Ministry of Environment, Conservation and Parks (MECP)	Data Request	A project screening request was sent to MECP on May 27, 2021, for information related to natural heritage features and species at risk (SAR) potential within the study area. The MECP responded on June 3, 2021 (Snell 2021, Pers. Comm.), indicating there were multiple additional species that have potential to be within the study area (see results in Appendix A).
Credit Valley Conservation	Data Request	A background request for natural heritage information was submitted to the CVC via HDR. This information was incorporated into the report.
Golder Associates Ltd. (2016)	Previous Natural Environment Report	A desktop level review of the natural environment within the study area. Report provides potential constraints to support the Lakeshore Road Transportation Master Plan.
Aquatic SAR Distribution of Fish Species at Risk Maps (DFO 2019)	Online Database	Aquatic SAR mapping is made available online by Fisheries and Oceans Canada for species listed as endangered, threatened, or special concern under the *Species at Risk Act*.
Natural Heritage Information Centre (NHIC) Natural Heritage Areas Make a Map (NHA MaM; MNRF 2021a)	Online Database	A web application that provides information on provincial parks, conservation reserves, and natural heritage features (i.e., Areas of Natural and Scientific Interest (ANSIs), wetlands, woodlands, and natural heritage systems related to provincial policy plan areas, such as the Niagara Escarpment, Oak Ridges Moraine, and Greenbelt Plans.) The NHA MaM also provides NHIC data, which is organized into 1 km^2 map squares and includes information on species of conservation concern (SCC) and SAR records (Appendix A).

Name	Type	Description
Lands Information Ontario (LIO) Geospatial Data (MNRF 2021b)	Online Database	LIO data is maintained by the Ontario Ministry of Northern Development, Mining, Natural Resources and Forestry (MNDMNRF) and provides key provincial geospatial data for Ontario. Shapefiles obtained from the LIO open datasets were used to show the natural features within the study area. Key datasets that were reviewed for the study area include policy plan areas, municipal land use designations, ANSIs, provincial parks and conservation areas, wetlands, woodlands, and watercourses.
Ontario Reptile and Amphibian Atlas (ORAA; Ontario Nature 2015)	Online Atlas	The ORAA provides known ranges of reptiles and amphibian species in Ontario based on historic and current species occurrences (Appendix A).
Ontario Breeding Bird Atlas (OBBA; OBBA 2001)	Online Atlas	The OBBA provides a list of bird species that have been observed during surveys completed between 1981 and 1985 and 2001 and 2005. Species that were documented between 2001 and 2005 were considered as part of this study (Appendix A).
Ontario Butterfly Atlas (OBA; TEA 2019)	Online Atlas	The OBA collects observations of butterflies within Ontario. Sightings were reviewed from 2016 onward (Appendix A).
Atlas of the Mammals of Ontario (Dobbyn 1994)	Online Atlas	The *Atlas of the Mammals of Ontario* shows the geographic distribution of mammals for three time periods: pre-1900, 1900 to 1969, and 1970 to 1993. A review of the 1970 to 1993 period was completed. Results are included in Appendix C.

3.2 Field Survey Methodology

Matrix staff completed field inventories within the study area during the summer of 2021. The names and field inventories completed by each staff member is provided in Table 3.

TABLE 3 Summary of Field Surveys

Field Inventory	Date	Matrix Staff
Vegetation (Ecological Land Classification, Botanical Inventory, Invasive Species)	June 3, 2021	Peter De Carvalho
Fish and Fish Habitat	June 3, 2021	Robyn Leppington
Breeding Bird Survey	June 1, 2021 June 22, 2021	Matt Isles
Incidental Observations	All Dates	Peter De Carvalho Robyn Leppington

It has been noted that some trees and shrubby vegetation in the study area have been impacted by Metrolinx works at the fenced Canadian National Railway (CN) property after field studies had been completed. These subsequent impacts are not reflected in the findings of this report.

3.2.1 Ecological Land Classification

Vegetation community delineation was completed within the study area using aerial photography and refined thorough investigations in the field. The standard Ecological Land Classification (ELC) system for southern Ontario (Lee et al. 1998) was applied. Details of the vegetation communities were recorded including species composition and dominance, community structure, uncommon species or features, and evidence of anthropogenic disturbance. Vegetation community status rarity was assessed through Natural Heritage Information Centre (NHIC) vegetation community rankings (MNRF 2021a).

3.2.2 Botanical Inventories

A botanical inventory was completed during the field inventories for each of the vegetation communities. The field investigations were completed during the summer of 2021. A list of species was compiled to determine the presence of SCC, SAR, and invasive species. Habitats of SCC, SAR, and invasive species identified during the field inventories were mapped for the ELC community in which they encompassed.

Plants were identified to family, genus, species, subspecies, and hybrid level according to the Newmaster (1998) *Ontario Plant List* and cross-referenced with the *Database of Vascular Plants of Canada* (VASCAN; Brouillet et al. 2020) for scientifically accepted nomenclature.

3.2.3 Breeding Bird Survey

Breeding bird surveys were conducted following the protocol outlined in the *Ontario Breeding Bird Atlas Guide for Participants* (OBBA 2001). The protocol states that two rounds of surveys should be completed between May 24 and July 10, between 05:00 and 10:00, and under reasonable weather conditions. Surveys are not to be completed if there is heavy rain, heavy fog, or if winds are greater than 3 on the Beaufort scale (i.e., >19 km/hour). A total of two stations were surveyed to reflect the different habitats within the study areas. These stations were spaced approximately 300 m apart to reduce any overlap in observations between stations. Survey conditions are summarized below in Table 4.

TABLE 4 Avian Breeding Survey Conditions

Station	Date	Time	Temperature (°C)	Wind (Beaufort)	Cloud Cover (%)
C1	June 1, 2021	0532-060	11	0	10
	June 22, 2021	0558-0608	14	0	100
C2	June 1, 2021	0530-0540	11	0	10
	June 22, 2021	0605-0615	14	0	80

Observations were made using direct (visual observation) and indirect (songs and alarm call) methods to identify the level of breeding evidence. Observations of breeding evidence for each species were recorded based on the definitions provided by the *Ontario Breeding Bird Atlas Guide of Participants* (2001). Dates of the field inventories are provided in Table 3.

3.2.4 Significant Wildlife Habitat and Species at Risk Assessment

An assessment of potential significant wildlife habitat (SWH) and potential SAR habitat within the study area was conducted during the field surveys. The study area was assessed for habitat identified within the criteria outlined in the *Significant Wildlife Habitat Technical Guide* (SWHTG; MNR 2000) and the *Significant Wildlife Habitat Criterion Schedules for Ecoregion 7E* (Ecoregion 7E Schedules; MNRF 2015). Natural areas were also assessed for their potential to provide habitat for those SAR and SCC identified during background review or observed during field investigations.

3.2.5 Fish Habitat Assessment

A qualitative assessment of the habitat potential based on a modified *Ontario Stream Assessment Protocol* (OSAP; Stanfield 2017) was conducted in all watercourse crossings within the study area. The objective of this assessment was to characterize the local aquatic habitat and assign a qualitative habitat potential ranking. Characteristics of high-quality aquatic habitat include natural sinuosity with a well-defined riffle/pool sequence, variability in water depth and bed substrate, naturally occurring woody debris, undercut banks, and natural riparian vegetation overhanging the banks that provides food for various aquatic organisms. The greater the quantity of preferred habitat features present, the higher potential aquatic habitat ranking. The creek was inventoried throughout the reach for a variety of geomorphic features (i.e., riffles, pools, and runs). The modified qualitative OSAP approach included documentation and assessment of the following watercourse conditions:

- general watercourse characteristics (i.e., stream pattern, general gradient, and flow)
- channel characteristics (i.e., wetted width and depth, bankfull width and depth, and depth of riffles/pools/run)
- substrate and bank materials
- other pertinent habitat features (i.e., spawning, nursery, and refuge areas, barriers to fish movement, and macrophyte growth)
- disturbances and evidence of past habitat alterations (i.e., channelization, channel hardening or straightening)

After the completion of the aquatic habitat assessment, field data were summarized to determine the overall habitat potential.

3.3 Analysis of Significance and Sensitivity

The ecological features identified within the study area are evaluated to determine the significance of each feature. Significance is based on regional, provincial, and federal designations, which are described in the following subsections.

3.3.1 Natural Area Designations

Natural area designations are those that are recognized as significant on official plans or in other policy planning documents. This includes Areas of Natural or Significant Interest (ANSIs; provincially, regionally, or other), significant wetlands (provincially, regionally, or locally), significant woodlands, and Environmentally Significant Areas. ANSIs and Environmentally Significant Areas are evaluated by the province or municipality, while of these designations, only wetlands and woodlands can be assessed for significance by non-government organizations.

3.3.2 Significant Wildlife Habitat Screening

The Ontario Ministry of Northern Development, Mines, Natural Resources and Forestry (MNDMNRF) provides specific guidance on identifying and assessing wildlife habitat in the SWHTG (MNR 2000), the Ecoregion 7E Schedules (MNRF 2015), and the *Natural Heritage Reference Manual for Natural Heritage Policies of the Provincial Policy Statement, 2005* (NHRM; MNR 2010). The MNDMNRF recognizes five main categories of wildlife habitat, each with several wildlife habitat types, each with criteria to evaluate significance. A description of each of the wildlife habitat categories is provided further in this section.

- **Seasonal concentration areas of animals:** defined as “areas where animals occur in relatively high densities for the species at specific periods in their life cycles and/or in particular seasons” and areas that are “localized and relatively small in relation to the area of habitat used at other times of the year” (MNR 2010).

- **Rare vegetation communities:** defined as “areas that contain a provincially rare vegetation community and areas that contain a vegetation community that is rare within the planning area” (MNR 2010).

- **Specialized habitat for wildlife:** defined as “areas that support wildlife species that have highly specific habitat requirements, areas with high species and community diversity, and areas that provide habitat that greatly enhances species' survival” (MNR 2010).

- **Habitat for SCC:** defined as “habitats of species that are designated at the national level as endangered or threatened by COSEWIC [the Committee on the Status of Endangered Wildlife in Canada], which are not protected in regulation under Ontario's ESA [the *Endangered Species Act*]; habitats of species listed as special concern under the ESA on the SARO [Species at Risk in Ontario] List (formerly referred to as "vulnerable" in the SWHTG); and habitats of species that are assigned a provincial (i.e., sub-national) conservation status rank of S1, S2 or S3 and are not on the SARO List” (MNR 2010). The SWHTG (MNR 2000) defines SCC (i.e., rare species) at five levels: globally, nationally, provincially, regionally, locally (within a site district):

- **Animal Movement Corridors:** defined as “elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another” (MNR 2000).

To determine if confirmed or candidate SWH is present within the study area, field investigations and background review data was evaluated using the criteria from the SWH Ecoregion 7E Schedules (MNRF 2015). The results of the SWH habitat screening are provided in Section 4.3.4.

3.3.3 Species at Risk Screening

The background review identified potential SAR that could occur within the study area. All SAR identified were screened to determine the likelihood of occurrence and whether suitable habitat is present.

SAR are defined in this report to include the following provincial and federal designations:

- ESA (provincial): all provincially designated species that are listed as extirpated, endangered, or threatened on the SARO list and protected under the ESA; species listed as special concern are considered a SCC, as they are not protected under the ESA.

- SARA (federal): only applies to fish and migratory birds protected under the *Migratory Birds Convention Act* (MBCA), anywhere they occur (e.g., includes non-federal land), that are designated as extirpated, endangered, and/or threatened under the SARA. All other species are only protected if special provisions or executive orders are made.

A list of SAR with potential to occur within or adjacent to the study area was compiled from background review and agency consultation (Table 5). To determine if suitable habitat for SAR is available within the study area, the preferred habitat requirements for reported SAR were compared to vegetation communities, aquatic habitats, and niche habitats identified during field inventories and the background review. The results of the SAR habitat screening are provided in Section 5.7.

TABLE 5 Potential Species at Risk Within the Credit River AT Bridge Study Area

Species Common Name	Species Scientific Name	Source	SARA Status	ESA Status
Herpetofauna (6)				
Blanding's Turtle	*Emydoidea blandingii*	MNRF 2021a/Golder 2016	THR	THR
Eastern Musk Turtle	*Sternotherus odoratus*	Golder 2016	SC	SC
Eastern Ribbonsnake	*Thamnophis sauritus*	Golder 2016	THR	SC
Jefferson Salamander	*Ambystoma jeffersonianum*	MNRF 2021a	END	END
Northern Map Turtle	*Graptemys geographica*	Golder 2016/ Ontario Nature 2015	SC	SC
Snapping Turtle	*Chelydra serpentina*	MNRF 2021a/Ontario Nature 2015/Golder 2016	SC	SC
Birds (16)				
Bank Swallow	*Riparia*	MNRF 2021a/ OBBA 2001/Golder 2016	THR	THR
Barn Swallow	*Hirundo rustica*	MNRF 2021a/ OBBA 2001/Golder 2016	THR	THR
Bobolink	*Dolichonyx oryzivorus*	MNRF 2021a/ OBBA 2001/Golder 2016	THR	THR
Cerulean Warbler	*Setophaga cerulea*	Golder 2016	END	THR
Chimney Swift	*Chaetura pelagica*	MNRF 2021a/OBBA 2001	THR	THR
Common Nighthawk	*Chordeiles minor*	OBBA 2001	THR	SC
Eastern Meadowlark	*Sturnella magna*	MNRF 2021a/ OBBA 2001/Golder 2016	THR	THR
Eastern Wood-pewee	*Contopus virens*	OBBA 2001	SC	SC
Henslow's Sparrow	*Ammodramus henslowii*	MNRF 2021a/Golder 2016	END	END
Least Bittern	*Ixobrychus exilis*	Golder 2016	THR	THR
Loggerhead Shrike	*Lanius ludovicianus*	Golder 2016	-	END
Louisiana Waterthrush	*Parkesia motacilla*	MNRF 2021a	THR	THR
Northern Bobwhite	*Colinus virginianus*	Golder 2016	END	END
Peregrine Falcon	*Falco peregrinus*	MNRF 2021a/OBBA 2001/ Golder 2016	SC	SC
Short-eared Owl	*Asio flammeus*	Snell 2021, Pers. Comm.	SC	SC
Wood Thrush	*Hylocichla musteline*	MNRF 2021a/OBBA 2001	THR	SC
Mammals (5)				
American Badger	*Taxidea taxus jacksoni*	Dobbyn 1994	END	END
Eastern Small-footed Myotis	*Myotis leibii*	Dobbyn 1994	END	END
Little Brown Myotis	*Myotis lucifugus*	Dobbyn 1994/Golder 2016	END	END
Northern Myotis	*Myotis septentrionalis*	Dobbyn 1994/Golder 2016	END	END
Tricolored Bat	*Perimyotis subflavus*	Dobbyn 1994	END	END
Insects (3)				
Monarch	*Danus plexipus*	TEA 2019	SC	SC
Mottled Duskywing	*Erynnis martialis*	TEA 2019/Golder 2016	-	END
Transverse Lady Beetle	*Coccinella transversoguttata*	MNRF 2021a	-	END

Species Common Name	Species Scientific Name	Source	SARA Status	ESA Status
Fish (8)				
American Eel	*Anguilla rostrata*	MNRF 2021a/Golder 2016/ Credit Valley Conservation	-	END
Deepwater Sculpin	*Myoxocephalus thompsonii pop. 2*	MNRF 2021a	SC	-
Greater Redhorse	*Moxostoma valenciennesi*	MNRF 2021a/Credit Valley Conservation	-	-
Lake Sturgeon (Great Lakes population)	*Acipenser fulvescens*	Golder 2016	-	END
Redside Dace	*Clinostomus elongatus*	MNRF 2021a/Golder 2016	END	END
Shortnose Cisco	*Coregonus reighardi*	Golder 2016	END	END
Upper Great Lakes Kiyi	*Coregonus kiyi*	Golder 2016	SC	SC
Lake Ontario Kiyi	*Coregonus kiyi orientalis*	MNRF 2021a	EXT	EXT
Flora (5)				
American Chestnut	*Castanea dentata*	MECP 2021a	END	END
Butternut	*Juglans cinerea*	MNRF 2021a/Golder 2016	END	END
Clinton's Clubrush	*Trichophorum clintonii*	MNRF 2021a	-	-
Virginia Bluebells	*Mertensia virginica*	MNRF 2021a	-	-
White Wood Aster	*Eurybia divaricata*	Golder 2016	THR	THR

SARA - *Species at Risk Act*
ESA - *Endangered Species Act*
END- endangered
THR- threatened
SC- special concern
EXT - extinct

As noted previously, SAR species that are designated as special concern listing in Table 5 do not receive habitat protection under the ESA and are therefore considered SCC. Species with no ESA or SARA status in Table 5 are species that are ranked S1 to S3 which are also considered SCC. SCC species are discussed further in Section 4.3.4 when discussing significant wildlife habitat.

4 EXISTING NATURAL ENVIRONMENT

Characterization of the natural environment is provided in the following subsections. A complete list of species identified during the background review is located in Appendix A. The results of the field programs are described in the following subsections, with site photographs presented in Appendix B.

4.1 Topography

The major physiographic region within the Credit River AT bridge study area is the Iroquois Sand Plain (TRCA 2010). The Iroquois Sand Plain comprises sand, silt, and clay deposits, with the finer materials being closer to the current Lake Ontario shoreline (TRCA 2010).

4.2 Identified Natural Heritage Features

There are no Environmentally Significant Areas, locally significant wetlands, or unevaluated wetlands or Special Management Areas present within the study area.

The City's Official Plan (City of Mississauga 2021) Schedule 3 identifies Credit River and its associated valleylands are a part of the City's "Significant Natural Area." The study area is also located within the 120 m Area of Influence (AOI) for the Credit River Marshes Provincially Significant Wetland (PSW) and ANSI, which is located upstream of the CN railroad.

4.3 Terrestrial Resources

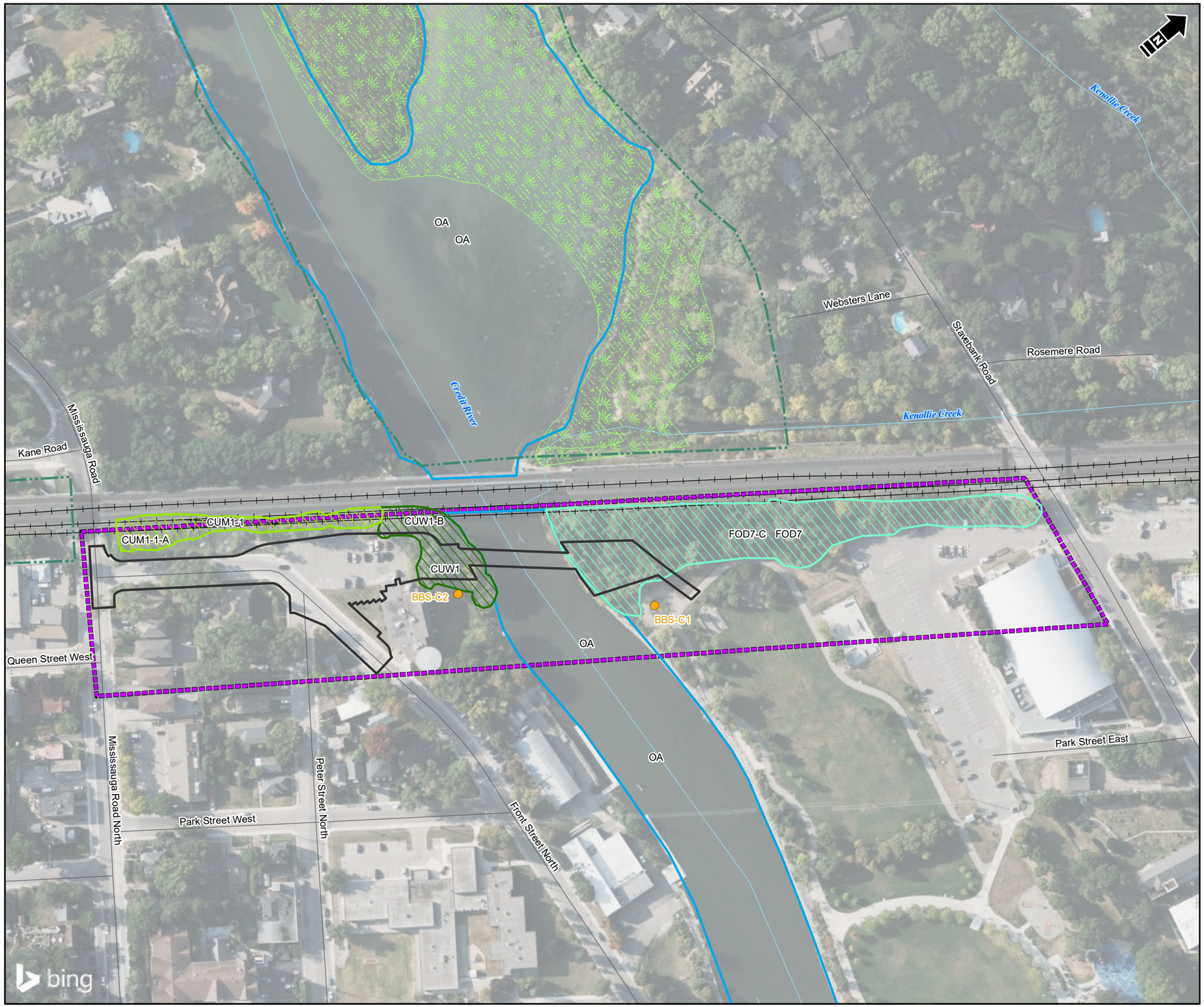
4.3.1 Vegetation Communities

Vegetation communities within the study area are mapped on Figure 2 and described in further detail in Table 6. In total, three terrestrial communities and one aquatic community were documented based on field assessments conducted by Matrix in 2021. Of the native vegetation communities found within the study area none are considered to be rare and are ranked as either S4 or S5.

TABLE 6 Ecological Land Classification Communities

Ecological Land Classification Community Type	Location	Community Description
CUW1: Mineral Cultural Woodland 0.14 ha	West side of Credit River	A small woodlot is present along the Credit River north of the Royal Canadian Legion parking lot. This woodlot lies on a steep northeast-facing slope and was noted as containing large areas of bare mineral soil. The canopy was dominated by Manitoba Maple. Canopy-cover was assessed to be approximately 60%, though the small size of this ecosite resulted in greatly reduced interior habitat. Other common canopy species included Black Walnut (*Juglans nigra*), Norway Maple (*Acer platanoides*), and Siberian Elm. A single large (>100 diameter at breast height [DBH]) multi-stem Crack Willow (*Salix fragilis*) covers a large portion of the bank in this area. Species diversity in the understory was noted as being low, with dense areas of Garlic Mustard (*Alliaria petiolata*) and Dog-strangling Vine (*Cynanchum rossicum*).

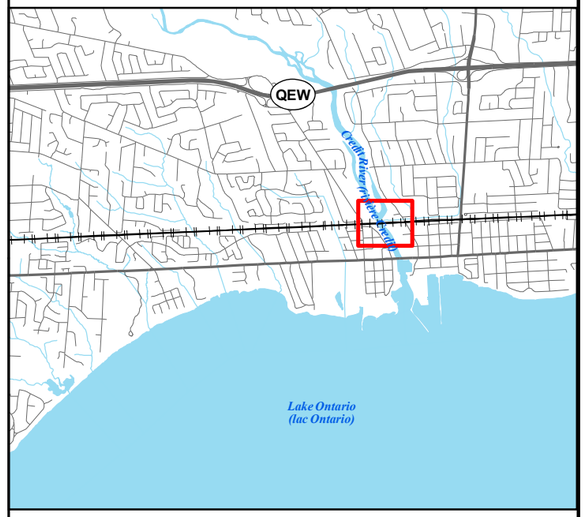
Ecological Land Classification Community Type	Location	Community Description
FOD7: Dry- Fresh Deciduous Forest 0.61 ha	East side of Credit River	A linear woodlot is present east of the Credit River adjacent to Port Credit Memorial Park south of the railway. This treed area features a diverse canopy, though Manitoba Maple dominates throughout. Other common species include Basswood (*Tilia americana*), Norway Maple, Siberian Elm, and Mountain Ash (*Sorbus americana*). The eastern canopy features a higher proportion of maples and oaks (Sugar Maple [*Acer saccharum*]; Silver Maple [*Acer saccharinum*]; Red Oak [*Quercus rubra*]; Bur Oak [*Quercus macrocarpa*]), which may more closely resemble FOD6-5 (Fresh-moist Sugar Maple - Hardwood Deciduous Forest), though Sugar Maple does not dominate the canopy here. Additionally, along the southern margin areas of dense Staghorn Sumac (*Rhus typhina*) form small Sumac Cultural Thicket (CUT1-1) inclusions. The understory within this woodlot was found to be almost entirely overgrown with Garlic Mustard. Other signs of disturbance include the presence of multiple walking trails and litter.
CUM1-1: Mineral Cultural Meadow 0.13 ha	Along rail bridge west of cultural woodland	A graminoid-dominated cultural meadow is located along the rail right-of-way (RoW). Vegetation was assessed from the roadside, as Matrix did not have access to the rail corridor. The ecosite was flat and level. This ecosite was dominated in areas by Canada/Tall Goldenrod (*Solidago canadensis/altissima*), Reed-canary Grass (*Phalaris arundinacea*), Teasel (*Dipsacus sylvestris*), and Canada Thistle (*Cirsium arvense*). Other common species included Smooth Brome, (*Bromus inermis*) Wild Carrot (*Daucus carota*), Tufted Vetch (*Vicia cracca*), Red/White Clover (*Trifolium pratense/repens*), Bird's-foot Trefoil (*Lotus corniculatus*). The RoW was enclosed by a chain-link fence. Along the fence numerous woody species and several mature trees were present. These included Manitoba Maple (*Acer negundo*), Siberian Elm (*Ulmus pumilia*), Eastern Cottonwood (*Populus deltoides*), and Eastern White Cedar (*Thuja occidentalis*), with dense growth of River Grape (*Vitis riparia*) and Virginia Creeper (*Parthenocissus quinquefolia*) noted as well.
OA: Open Aquatic	Credit River	This community consists of the open aquatic system of the Credit River.



- AT Bridge Footprint
- Study Area
- Area of Natural and Scientific Interest
- Provincially Significant Wetland
- Watercourse
- Railway
- Road
- Breeding Bird Station

Ecological Land Classification

- CUM1-1: Mineral Cultural Meadow
- CUW1: Mineral Cultural Woodland
- FOD7: Dry-Fresh Deciduous Forest
- OA: Open Aquatic



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1:2,000 metres
20 0 20 40
NAD 1983 UTM Zone 17N

Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

HDR Corporation
New Credit River Active Transportation Bridge

Ecological Land Classification

Date:	Project:	Submitter:	Reviewer:
June 2022	33023	K. Reis	R. Leppington

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Figure 2

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4.3.2 Flora

A total of 167 vascular plant species were identified within the study area through the botanical inventory (Appendix C). Of the 167 species identified, 52% of species are considered native or naturalized within the province; 45% are considered non-native, introduced, or a cultivar; and 3% were unclassified. No SAR or SCC were noted during field surveys; however, a habitat assessment of potential SAR and SCC based on the background review is presented within Appendix D.

4.3.3 Avian Species

Based on the database inquiries, there were a total of 105 avian species within the study area that had the potential to occur. Of the 105 species identified within the background review, 13 SAR and 3 SCC were noted to potentially occur within the study area. The SAR and SCC species were assessed to identify the habitat potential within the study areas (Appendix D), the results of the SAR assessment are detailed within Section 5.7, and SCC are discussed in relation to SWH in Section 4.3.4.

Breeding bird surveys were conducted on June 1 and 22, 2021, and included two breeding bird stations (Figure 2). The breeding bird survey confirmed the presence of 21 species, which included two SAR within the study area (Table 7). The confirmed SAR are discussed further in Section 5.7. No SCC were observed within the study area.

TABLE 7 Breeding Bird Survey Results Within the Credit River AT Bridge Study Area

Species		ESA Status	SARA Status	S-Rank	Highest Breeding Evidence	
Common Name	Scientific Name				BBS-C1	BBS-C2
American Goldfinch	*Spinus tristis*	-	-	S5B	-	Possible
American Robin	*Turdus migratorius*	-	-	S5B	Possible	Possible
Baltimore Oriole	*Icterus galbula*	-	-	S4B	Possible	-
Barn Swallow	*Hirundo rustica*	THR	THR	S4B	Confirmed[1]	Observed[2]
Brown-headed Cowbird	*Molothrus ater*	-	-	S4B	Possible	-
Canada Goose	*Branta canadensis*	-	-	S5	Observed	Observed
Cedar Waxwing	*Bombycilla cedrorum*	-	-	S5B	-	Possible
Chimney Swift	*Chaetura pelagica*	THR	THR	S4B, S4N	-	Observed[3]
Common Grackle	*Quiscalus quiscula*	-	-	S5B	Possible	Possible
Common Merganser	*Mergus merganser*	-	-	S5B	-	Observed
Eastern Kingbird	*Tyrannus tyrannus*	-	-	S4B	Possible	-
European Starling	*Sturnus vulgaris*	-	-	SNA	Confirmed	Confirmed
Herring Gull	*Larus argentatus*	-	-	S5B	Observed	Observed
Killdeer	*Charadrius vociferus*	-	-	S5B, S5N	-	Possible
Mallard	*Anas platyrhynchos*	-	-	S5	Probable	Observed
Mourning Dove	*Zenaida macroura*	-	-	S5	-	Possible
Rock Pigeon	*Columba livia*	-	-	SNA	Observed	-
Red-winged Blackbird	*Agelaius phoeniceus*	-	-	S4	Probable	Probable
Song Sparrow	*Melospiza melodia*	-	-	S5B	Possible	Possible
Warbling Vireo	*Vireo gilvus*	-	-	S5B	Possible	Possible
Yellow Warbler	*Setophaga petechia*	-	-	S5B	Possible	Possible

1 Nesting on Royal Canadian Legion building.
2 Observed foraging over the Credit River.
3 Observed flying over the study area. No nesting observed.
ESA - *Endangered Species Act*
SARA - *Species at Risk Act*
THR - threatened

4.3.4 Significant Wildlife Habitat

The wildlife habitat assessment was based on vegetation communities and incidental wildlife observations documented during the site investigations as well as data collected from the background review.

A screening-level assessment of candidate SWH was completed based on the results of the background review and field data collection. The wildlife habitats screened are summarized in Table 8 and are based on those identified by the SWH Ecoregion 7E Schedules (MNRF 2015). A detailed analysis of SWH can be found in Appendix E.

The assessment of SWH follows the guidelines in the NHRM (MNR 2010) and the criteria from the SWH Ecoregion 7E Schedules (MNRF 2015), with support from the SWHTG (MNR 2000) as appropriate. There are four categories of SWH which include the following:

- seasonal concentration areas of animals
- rare vegetation communities or specialized habitat for wildlife
- habitat for SCC
- animal movement corridors

Each of these categories includes various SWH types and with criteria to evaluate significance. These four categories were assessed based on aerial photography, background review, and field investigations performed by Matrix. A full SWH evaluation is provided in Appendix E, with a summary of the confirmed or candidate SWH is provided in Table 8. To support the evaluation of SCC habitat in Appendix E, a specific evaluation with regards to SCC and their potential to occur within the study area is provided in Appendix E.

TABLE 8 Significant Wildlife Habitat Assessment Summary

Category	Wildlife Habitat Feature	Confirmed/Candidate
Seasonal Concentration Areas of Animals	Bat Maternity Colonies	Candidate - FOD communities are present.
	Turtle Wintering Areas	Candidate - OA communities are present.
Rare Vegetation Communities and Specialized Habitat for Wildlife	Bald Eagle and Osprey Nesting/Foraging/Perching	Candidate - Woodland communities are directly adjacent to river riparian areas.
Habitat for Species of Conservation Concern	Special Concern and Rare Plant and Wildlife Species	Candidate - Eastern Wood-Pewee, Northern Map Turtle, Greater Redhorse and Snapping Turtle
Animal Movement Corridors	Amphibian Movement Corridor	Candidate - Ecosites associated with water (i.e., SWD, MAM, etc.) are present but significant breeding habitat is unconfirmed at this time.

4.4 Aquatic Resources

4.4.1 Credit River Aquatic Habitat

Upstream of Lakeshore Road East to a railway overpass, the Credit River flows as a defined watercourse within a narrow natural corridor through a highly urbanized environment. The water flows south toward Lake Ontario. Both banks contain a very narrow band of vegetation consisting of trees and shrubs. Between the two overpasses there is a canoe club with docks in the river on the west bank. The east bank has undergone channel hardening along the length of the Port Credit Memorial Park. The channel is sparsely shaded by overhead deciduous trees and overhanging shrubs in the understory along the banks.

Channel morphology within the study area of Credit River measured an average width of approximately 55 m and a depth of 4.2 m in the centre, 3.5 m on the right, and 3.7 m on the left to create a bowl shape channel. The substrate is muck and the water is murky. There is no aquatic vegetation in the channel. Some of the bank has been naturalized just south of the railway however the banks are mainly armourstone lines with sparse overhanging vegetation. Riparian vegetation within the study area consisted primarily of deciduous trees and shrubs (FOD7 and CUW1). No instream vegetation was observed within the channel.

Habitat within the study area was limited. Overhanging trees and shrubs providing shade along with cracks in the armour stone create some habitat.

4.4.2 Credit River Fish Community

The Credit River is a warm water system which contains a variety of cyprinid species as well as sport fish. According to the CVC (2021) one American Eel and one Atlantic Salmon were captured on June 12, 2009 (Table 9). Two additional American Eels were captured from the Port Credit Marina, which is fed by the Credit River. American Eels are listed as endangered under the ESA. Atlantic Salmon (Lake Ontario population) are listed as extirpated under SARA.

TABLE 9 Historical Fisheries Data for the Credit River

Common Name	Scientific Name	ESA Status	SARA Status	Most Recent Observation
American Eel	*Anguilla rostrata*	END	-	29-Jul-14
Atlantic Salmon	*Salmo salar*	-	EXT	12-Jun-09
Alewife	Alosa pseudoharengus	-	-	29-Jul-14
Black Crappie	Pomoxis nigromaculatus	-	-	28-Jul-08
Bluegill	Lepomis macrochirus	-	-	29-Jul-14
Bluntnose Minnow	*Pimephales notatus*	-	-	15-Jun-18
Brook Stickleback	*Culaea inconstans*	-	-	12-Jul-19
Brown Bullhead	*Ameiurus nebulosus*	-	-	29-Jul-14
Brown Trout	*Salmo trutta*	-	-	19-Jun-19
Chinook Salmon	*Oncorhynchus tshawytscha*	-	-	03-Jun-16
Common Carp	*Cyprinus carpio*	-	-	17-Oct-12
Common Shiner	*Luxilus cornutus*	-	-	15-Jun-18
Creek Chub	*Semotilus atromaculatus*	-	-	15-Jun-18
Emerald Shiner	*Notropis atherinoides*	-	-	29-Jul-14
Fantail Darter	*Etheostoma flabellare*	-	-	15-Jun-18
Fathead Minnow	*Pimephales promelas*	-	-	27-Jul-10
Freshwater Drum	*Aplodinotus grunniens*	-	-	29-Jul-14
Gizzard Shad	*Dorosoma cepedianum*	-	-	29-Jul-14
Golden Shiner	*Notemigonus crysoleucas*	-	-	28-Jul-14
Goldfish	*Carassius auratus*	-	-	01-Jun-15
Greater Redhorse	*Moxostoma valenciennesi*	-	-	15-Jun-18
Hornyhead Chub	*Nocomis biguttatus*	-	-	15-Jun-18
Iowa Darter	*Etheostoma exile*	-	-	12-Jun-09
Johnny Darter	*Etheostoma nigrum*	-	-	24-Jun-10
Lamprey Family	*Petromyzontidae (Family)*	-	-	30-Jun-11
Largemouth Bass	*Micropterus salmoides*	-	-	29-Jul-14
Logperch	*Percina caprodes*	-	-	15-Jun-18
Longnose Dace	*Rhinichthys cataractae*	-	-	15-Jun-18
Longnose Sucker	*Catostomus catostomus*	-	-	03-Jun-16
Minnow Family	*Leuciscidae (Family)*	-	-	12-Jun-09
Northern Hog Sucker	*Hypentelium nigricans*	-	-	15-Jun-18
Northern Pike	*Esox lucius*	-	-	28-Jul-14
Pumpkinseed	*Lepomis gibbosus*	-	-	15-Jun-18
Rainbow Darter	*Etheostoma caeruleum*	-	-	15-Jun-18
Rainbow Trout	*Oncorhynchus mykiss*	-	-	12-Jun-09
River Chub	*Nocomis micropogon*	-	-	15-Jun-18
Rock Bass	*Ambloplites rupestris*	-	-	15-Jun-18
Rosyface Shiner	*Notropis rubellus*	-	-	15-Jun-18
Round Goby	*Neogobius melanostomus*	-	-	19-Jun-19
Sea Lamprey	*Petromyzon marinus*	-	-	03-Jun-16
Shorthead Redhorse	*Moxostoma macrolepidotum*	-	-	15-Jun-18
Smallmouth Bass	*Micropterus dolomieu*	-	-	15-Jun-18

Common Name	Scientific Name	ESA Status	SARA Status	Most Recent Observation
Spotfin Shiner	*Cyprinella spiloptera*	-	-	05-Jun-14
Spottail Shiner	*Notropis hudsonius*	-	-	12-Jun-09
Stonecat	*Noturus flavus*	-	-	15-Jun-18
Sucker Family	*Catostomidae sp.*	-	-	15-Jun-18
Trout-perch	*Percopsis omiscomaycus*	-	-	06-Jul-00
White Perch	*Morone americana*	-	-	28-Jul-11
Western Blacknose Dace	*Rhinichthys obtusus*	-	-	12-Jun-09
White Bass	*Morone chrysops*	-	-	05-Jun-14
White Sucker	*Catostomus commersonii*	-	-	15-Jun-18
Yellow Perch	*Perca flavescens*	-	-	29-Jul-14

Note: data from Credit Valley Conservation historical fisheries
ESA - *Endangered Species Act*
SARA - *Species at Risk Act*
EXT - extinct
END - endangered

5 SIGNIFICANT NATURAL HERITAGE FEATURES AND FUNCTIONS

Significant natural heritage features and functions include those listed in the PPS (MMAH 2020), the NHRM (MNR 2010), the SWHTG (MNR 2000) and the SWH Ecoregion 7E Schedules (MNRF 2015). Reference was also obtained from the natural heritage system from the City's Official Plan (City of Mississauga 2021). The findings of the site investigations were cross-referenced with the criteria provided in these documents in order to identify the presence of or potential presence of significant natural heritage features.

The following significant features were not present within the study area:

- Environmentally Significant Areas
- wetlands or unevaluated wetlands
- Special Management Areas

Significant features that are present within the study area are discussed further in Sections 5.1 to 5.7.

5.1 Areas of Natural and Scientific Interest

ANSIs are features identified by the Province of Ontario to be important for natural heritage, protection, scientific study, or environmental stewardship. Two life sciences ANSIs are located within the vicinity of proposed works. The first ANSI is the Lorne Park Prairie. This feature is a linear section of residual tall-grass prairie associated with the CN rail corridor southwest of the study area. The second ANSI is the Credit River Coastal Marsh, a system of coastal wetland areas along the Credit River immediately west of the study area that extends approximately 2 km west of the CN railway bridge.

5.2 Significant Valleylands and Corridors

Valleylands are linear natural areas that occur in a valley or other landform depressions that have water flowing through or standing for some period of the year (MNR 2010). These areas are important corridors, which provide unique features and functions to an area as well as linkages between terrestrial and aquatic habitats.

The Credit River and its associated valleylands are a part of the City's "Significant Natural Area" (City of Mississauga 2021) and, as a result, are considered significant.

5.3 Provincially Significant Wetland

The Credit River marshes have been identified within Schedule 3 of the Official Plan as a PSW and ANSI system, which spans from north of the Queen Elizabeth Way to the CN railroad bridge. The marsh system ends upstream of the CN bridge; however, the works being completed on the downstream section as part of the Credit River AT bridge are within the PSW 120 m AOI.

5.4 Significant Woodlands

Section 6.3.12 of the City's Official Plan (City of Mississauga 2021) states the criteria needed to meet the significant woodlands designation within the City of Mississauga. It includes:

- *woodlands, excluding cultural savannahs, greater than or equal to four hectares*
- *woodlands, excluding cultural woodlands and cultural savannahs, greater than or equal to two hectares and less than four hectares*
- *any woodland greater than 0.5 hectares that supports old growth trees, supports a significant linkage function, is located within 100 m of another Significant Natural Area, is located within 30 m of a watercourse or significant wetland, or supports significant species or communities.*

The wooded ecosites west of the rail bridge fall below the 0.5 ha threshold for significant woodlands, but the FOD7-C ecosite associated with the Port Credit Memorial Park does fit this definition. It is greater than 0.5 ha and is within 30 m of a watercourse and a significant wetland.

5.5 Significant Wildlife Habitat

The MNDMNRFs guidance on identifying and assessing wildlife habitat recognizes five main categories of wildlife habitat, each with several wildlife habitat types, each with criteria to evaluate significance. SWH was evaluated in Section 4.3.4 and Appendix E based on field observations and background data.

The results of the assessment indicated the potential for candidate SWH and included the following:

- **Bat Maternity Colonies:** there is a FOD community within the study area that is located adjacent to water that allow for areas of feeding. In addition, both Oak (*Quercus*) and Maple (*Acer*) species were recorded in these areas which are preferred by SAR bats.

- **Turtle Wintering Area:** the Credit River outlets into Lake Ontario less than 1 km downstream of the study area; therefore, it will not freeze over in the winter. The substrate was also found to be muck, which is conducive to turtle overwintering.

- **Bald Eagle and Osprey Nesting/Foraging/Perching:** There is forested area surrounding the Credit River within the study area. No presence of Bald Eagle or Osprey were noted during avian surveys.

- **Rare Wildlife Species:** Candidate habitat for Eastern Wood-pewee, Northern Map Turtle, Deepwater Sculpin, Greater Redhorse and Snapping Turtle. No presence of Eastern Wood-pewee was noted during avian surveys.

- **Amphibian Movement Corridors:** the Credit River corridor acts as a north-south linkage associated with water that may act as a movement corridor for amphibian species.

5.6 Fish and Fish Habitat

As presented in Section 4.4, the study area does contain permanent fish habitat within the Credit River.

Fish and fish habitat are regulated by Fisheries and Oceans Canada (DFO) under the *Fisheries Act*. The *Fisheries Act* requires that projects avoid causing the death of a fish or a harmful alteration, disruption or destruction (HADD) of fish habitat unless authorized by the Minister or a designated representative (Government of Canada 2019). The determination of death of fish or HADD is typically done through a self-assessment process.

5.7 Linkages and Corridors

Linkages and corridors are important features within a natural system. These features are continuous, often linear bands of vegetation in the landscape, which provide opportunities to connect natural areas and provide cover for wildlife movement and dispersal of otherwise isolated populations.

As per the City's Official Plan (City of Mississauga 2021), the Credit River is considered a linkage under their "Significant Natural Area" designation. This linkage represents a significant linkage for both terrestrial and aquatic organisms. The wooded riparian area along the edge of the river provides a linkage to other natural areas within the system.

5.8 Species at Risk

A total of 29 SAR was identified as potentially occurring within the study area based on background review and site investigations. To identify the likelihood of species occurrences within the study area, each species was assessed based on the habitat criteria of that species and the availability of habitat (Appendix D). The results of the assessment indicated that 22 SAR species were unlikely to inhabit the area based on the lack of appropriate habitat, three SAR species have potential to occur within the study area (Little Brown Myotis, Northern Myotis, and Tricolored Bat), while two species were confirmed within the study area (Barn Swallow and Chimney Swift). One additional species (American Eel) has been assessed as potentially present based on habitat preference. Potential and confirmed species are discussed below.

Barn Swallow (Threatened) - Confirmed

Barn Swallows were observed foraging over the Credit River and were seen nesting on Royal Canadian Legion building. The ESA general habitat protection identifies three categories of protection which ranges from the lowest tolerance to alteration (Category 1) to the highest tolerance to alteration (Category 3). Category 1 includes the nest, Category 2 is the area within 5 m of the nest, and Category 3 is the area between 5 to 200 m of the nest. General building use and building improvements that do not impair the function of the habitat have been identified as compatible with the habitat legislation. The Royal Canadian Legion building is not anticipated to be impacted during construction; however, construction activities will be within the Category 3 area (5 to 200 m).

Chimney Swift (Threatened) - Confirmed

Chimney Swifts were observed foraging over the Credit River. The ESA general habitat protection identifies this species habitat as human-made nesting/roosting feature or a natural nesting/roosting tree cavity and the area within 90 m of the tree. Regular building use and building improvements that do not impair the function of the habitat are considered acceptable. The study areas did not include any candidate nesting trees or chimneys; therefore, this species will not be discussed further. General protections for migratory bird species are discussed in Section 8.

Little Brown Myotis (Endangered) - Potential

Little Brown Myotis was once one of the most common bats in Ontario before White Nose Syndrome (WNS; Frick et al. 2015) and used a wide variety of places to roost. Due to significant reduction in natural forest in southern Ontario, species most frequently uses buildings for maternity roosting, but it will often use the cavities of large trees (Lacki et al. 2007). It is often found feeding over wetlands and edge habitat (Nelson and Gillam 2017) and is well accustomed to human development. During the winter, it hibernates in underground features such as caves, mines, or tunnels where the temperature and humidity are stable. The forested community (FOD7) within the study area may provide suitable habitat. The CUW1 community was not identified as high-quality habitat due to the small overall area. Prior to construction,

additional surveys should be conducted to determine if this species is utilizing potential habitat within all treed ecosites in the study area.

Northern Myotis (Endangered) - Potential

Northern myotis was also very common before WNS, but it is more closely associated with large trees in intact forests (Broders et al. 2006). It will most often have maternity roosts in tree cavities or exfoliating bark and very rarely in buildings. It often stays within the forest to feed, using open corridors and streams. During the winter, it hibernates in the same types of underground features as does the Little Brown Myotis. The forested community (FOD7) within the study area may provide suitable habitat. The CUW1 community was not identified as high-quality habitat due to the small overall area. Prior to construction, additional surveys should be conducted to determine if this species is utilizing potential habitat within all treed ecosites in the study area.

Tricolored Bat (Endangered) - Potential

Tricolored Bat biology is very poorly understood in Ontario. From studies in other regions, it typically roosts within leaf clumps, squirrel nests or hanging moss in the foliage of trees especially near water (Poissant et al. 2015). There are also anecdotal records of it using buildings as roosts. The forested community (FOD7) within the study area may provide suitable habitat. The CUW1 community was not considered suitable habitat because it lacked the oak and maple species most often utilized by Tricolored Bat for roosting. Prior to construction, additional surveys should be conducted to determine if this species is utilizing potential habitat within the study area.

American Eel (Endangered) - Potential

American Eel are a species that can use a wide range of habitat types. This species can survive in both freshwater and saltwater. American Eel are noted as being present within Lake Ontario and the Credit River system and, therefore, may be present within the aquatic portions of the study area.

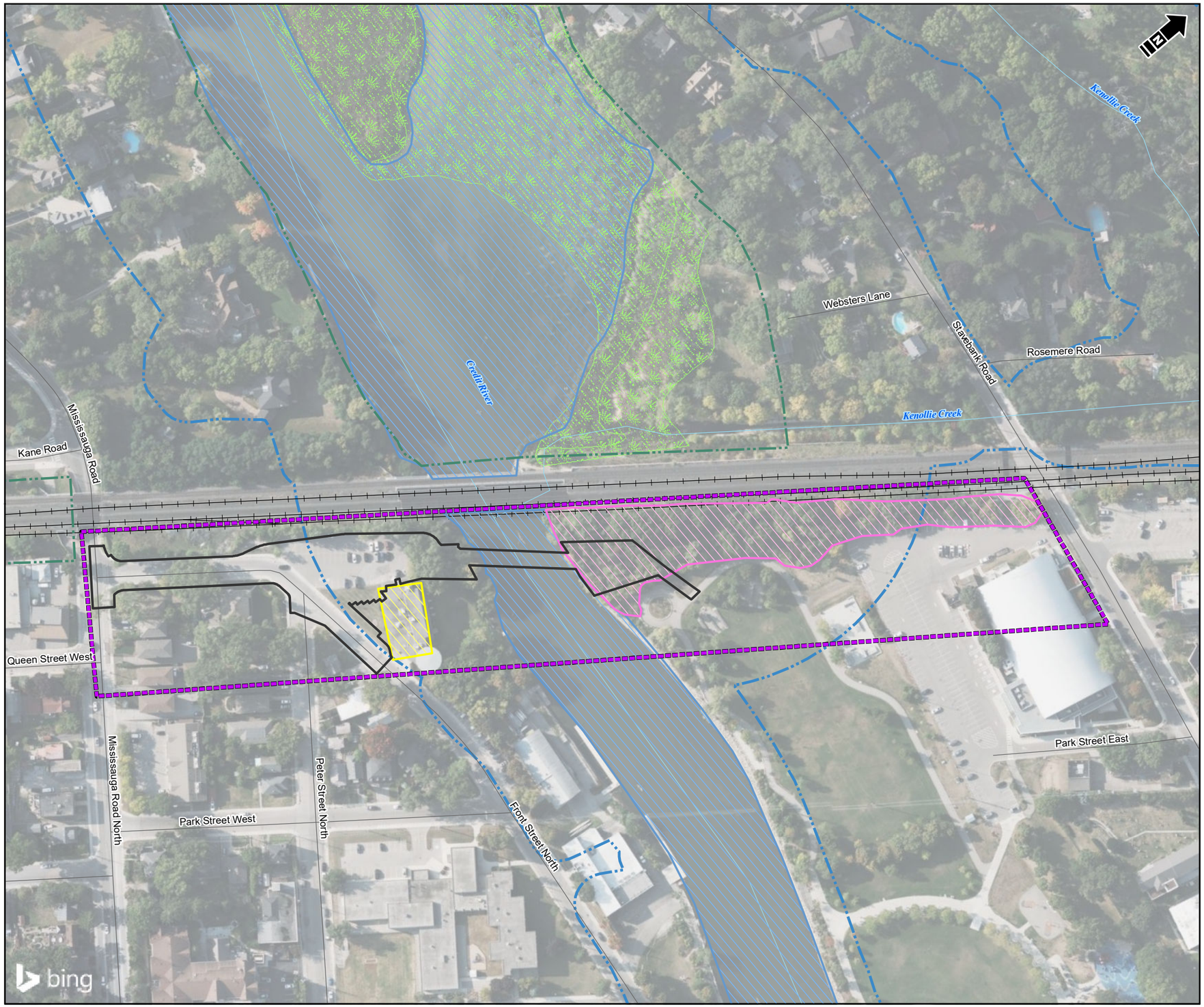
5.9 Significant Features and Functions Summary

Based on the background review and site investigations to date, the potential and confirmed significant features and functions that are present within the study area are summarized here and depicted in Figure 3:

- significant valleyland (confirmed)
- PSW/ANSI (confirmed)
- significant woodlands (confirmed)
- fish and fish habitat (confirmed)
    - SWH (potential):
    - bat maternity colonies

- turtle wintering area
- Bald Eagle and Osprey nesting/foraging/perching
- rare wildlife species:
    - potential: Northern Map Turtle, Deepwater Sculpin, Greater Redhorse and Snapping Turtle
- amphibian movement corridors

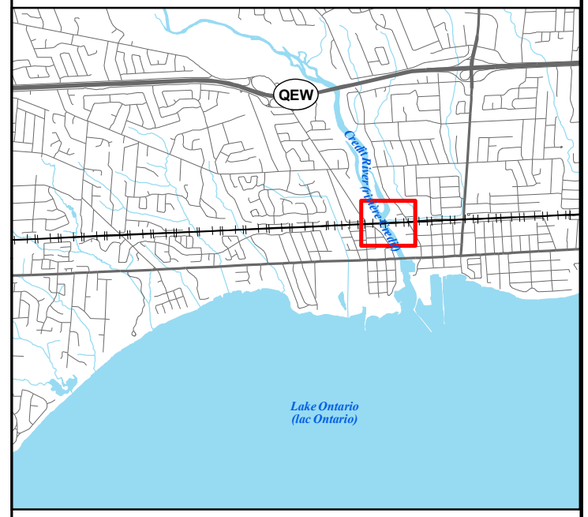
- SAR:
    - Barn Swallow (confirmed)
    - Little Brown Myotis (potential)
    - Northern Myotis (potential)
    - Tricolored Bat (potential)
    - American Eel (Potential



- AT Bridge Footprint
- Study Area
- Credit Valley Conservation Regulation Limit
- Area of Natural and Scientific Interest
- Watercourse
- Railway
- Road

Significant Features and Functions

- Confirmed SAR Habitat
- Potential SAR and SWH Habitat
- Significant Valleyland, Potential SCC and SWH



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20 0 20 40
NAD 1983 UTM Zone 17N

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Matrix Solutions Inc.
ENVIRONMENT & ENGINEERING

HDR Corporation
New Credit River Active Transportation Bridge

Significant Features and Functions

Date:	Project:	Submitter:	Reviewer:
June 2022	33023	K. Reis	R. Leppington

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Figure 3

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6 PROPOSED DEVELOPMENT

As part of planned improvements to active transport options and connectivity, a new AT bridge is proposed to be built across the Credit River. The new span bridge will connect the existing multi-use path on Mississauga Road to an existing multi-use path on the east side of Credit River. This bridge will feature a 1.5 m sidewalk and 3.0 m two-way cycling facility on the north side of Front Street; this would require Front Street to be realigned to the south. The span bridge will include both permanent and temporary removal of vegetation along the west side (CUW1) and east side (FOD7) of the Credit River. This will include the temporary removal of 141 m^2 and a permanent removal 544 m^2 of land with the CUW1 community. Within the FOD7 community there will be a temporary removal of 1928 m^2 and a permanent removal of 868 m^2. The bridge footing will be placed along the shoreline, out of the water channel. No in-water works are anticipated for the design of this bridge; however, near-water works will need to consider potential aquatic impacts.

7 PROJECT ACTIVITIES

The impact assessment will focus on the following activities associated with the construction of the new Credit River AT bridge that will influence the natural environment:

- construction access, staging, and laydown areas
- vegetation clearing, earthworks/grubbing, and disposal
- near-water works (within 30 m) and potential works below the high-water mark
- dewatering impacts on adjacent natural receptors resulting from footing installation above the high-water line of the Credit River

The anticipated effects and mitigations of these construction works will be discussed further in Section 8.

8 EFFECTS ASSESSMENT

The results of the NEA indicate a number of ecological features that are present within the study area:

- significant valleyland (confirmed)
- PSW/ANSI (confirmed)
- significant woodlands (confirmed)
- fish and fish habitat (confirmed)
- SWH (potential):
    - bat maternity colonies
    - turtle wintering area
    - Bald Eagle and Osprey nesting/foraging/perching
    - rare wildlife species:

    - potential: Northern Map Turtle, Deepwater Sculpin, Greater Redhorse and Snapping Turtle
  - amphibian movement corridors

- SAR:

  - Barn Swallow (confirmed)
  - Little Brown Myotis (potential)
  - Northern Myotis (potential)
  - Tricolored Bat (potential)
  - American Eel (potential)

Each of these natural features are significant, as they support flora and fauna communities, connections between aquatic and terrestrial environments and, in the case of the SAR, support species that have limited habitats elsewhere both nationally and provincially. If the preferred alternative damages or interferes with these features and their function, habitat and species loss can occur.

Both direct and indirect impacts on natural heritage features and functions can occur as a result of the preferred alternative. Impacts and residual effects on natural heritage features were assessed based on the following criteria:

- duration: long or short term
- extent: localized or expansive
- permanent: permanent or temporary
- severity: positive or negative

Many direct impacts occur during the construction phase of a project and contain localized, short-term, temporary, negative effects that can be reduced through avoidance and proper construction practices. After construction, there may be more long-term, indirect impacts while the site recovers and vegetation growth takes place. Typically, after the site revegetates, there is either a neutral or positive impact due to intentional native plantings, improved sediment control, and runoff control. It is acknowledged that the compensation of mature tree removal with immature plantings does not fully account for the negative impact of removing mature woodland. The compensation and restoration of these areas will utilize mature species and augment existing and adjacent habitat, to the greatest possible extent, through implementation of the Municipal Class Environment Assessment process and final design.

8.1 Potential Impacts

The construction of the active transport bridge will require dewatering at the proposed bridge footing above the high-water mark on either side of the Credit River as well as permanent land alteration and revegetation of the study areas. Table 10 illustrates the potential impacts to the natural heritage features as well as mitigation measures that should be followed to avoid serious harm during construction. Once

the mitigation measures are implemented, the residual effects are assessed to determine their duration, extent, severity, and permanence.

The greatest potential impacts are associated with the removal of vegetation within the significant valleylands and significant woodlands of the Credit River as well as near-water works and potential effects of localized groundwater table drawdown due to dewatering activities. This work could include the removal of SAR trees or SAR bat habitat, destruction or harm to fish and fish habitat, and impacts to nearby PSW areas.

TABLE 10 Impacts, Mitigations, and Net Effects of the Short-list Alternatives

Project Activity	Natural Heritage Features	Potential Impacts	Mitigation Measures	Net Effects
Construction access, staging, and laydown areas	General wildlife and habitat	<u>Habitat Loss and/or Alteration</u> • soil compaction and rutting outside of construction zone • damage to edge trees (i.e., outside of construction zone) • fugitive dust • spills (e.g., fuel) • erosion and sedimentation	Timing Windows • 1A-2A, 4A Best Construction Practices • 1B-8B Prevention of Terrestrial Disturbance • 1D-6D Erosion and Sedimentation Control • 1E-6E, 8E-9E, 11E	• Construction access and laydown areas will utilize existing roadings, pathways, and parking lots. • In order to access the banks, there will be a temporary removal of vegetation within the FOD7 (1,938 m^2) and CUW1 (141 m^2). This will result in short term impacts and removal of habitat while construction is taking place. • Trees removed with the construction laydown areas will be replaced according to specifications within the arborist report and will be used to revegetate impacted areas due to construction. • It is acknowledged that the compensation of mature tree removal with immature plantings does not fully account for the negative impact of removing mature woodland. The compensation and restoration of these areas will utilize native species and augment existing and adjacent habitat to the greatest possible extent.
		<u>Disturbance/Avoidance of Habitat</u> • increase noise during construction • increased human presence	Timing Windows • 1A-2A, 4A Prevention of Wildlife Mortality and Disturbance • 1C-5C	
		<u>Injury or Incidental Take</u> (particularly during migration to and/or emergence from hibernacula, nesting sites, or during natural travel patterns to and from habitats) • increased collision with machinery	Timing Windows • 1A-2A, 4A Prevention of Wildlife Mortality and Disturbance • 1C-5C	
Vegetation clearing, earthworks/grubbing, and disposal	Potential significant wildlife habitat (SWH): • Bat Maternity • Bald Eagle and Osprey nesting/foraging/perching Potential species at risk (SAR): • Little Brown Myotis • Northern Myotis • Tricolored Bat Confirmed SAR: • Barn Swallow (Category 3 habitat) Confirmed Significant Woodland: • FOD7-C Ecosite	<u>Habitat Loss and/or Alteration</u> • permanent/temporary loss of the FOD7 habitat which is considered candidate SWH and significant woodlands. • soil compaction and changes in moisture regime • changes to the structure and composition of vegetation communities (e.g., introduction of invasive species) • fugitive dust • spills (e.g., fuel)	Timing Windows • 1A-2A, 4A Best Construction Practices • 2B, 4B, 6B, 7B, 8B Prevention of Terrestrial Disturbance • 1D-6D Erosion and Sedimentation Control • 1E-6E, 8E-9E, 11E	• Permanent vegetation removals of natural habitats associated with the bridge works are expected to be minor. This will include 868 m^2 within FOD7 and 544 m^2 within CUW1. • Trees removed as part of construction will be replaced according to specifications within the arborist report and will be used to revegetate previously impacted areas within the study area. • Many natural areas (including the FOD7 significant woodland) are heavily degraded through the presence of aggressive invasive species such as Garlic Mustard. Though removal is proposed, restoration and impact mitigation will create opportunities l for invasive species management and re-introduction of native vegetation to these areas. • It is acknowledged that the compensation of mature tree removal with immature plantings does not fully account for the negative impact of removing mature woodland. The compensation and restoration of these areas will utilize mature species and augment existing and adjacent habitat to the greatest possible extent.
		<u>Species at Risk</u> • Barn Swallow Nests were noted along the Royal Canadian Legion building. Removal or degradation of natural habitat (including mature trees, wetland areas, and waterways) that support aerial insect populations has the potential to negatively impact this species by decreasing the availability of insect prey. • There is potential for SAR bat species within the FOD7 stand. Vegetation and tree removal to accommodate the bridge has the potential to reduce the availability of suitable cavity trees.	Timing Windows • 1A-2A, 4A Prevention of Terrestrial Disturbance • 1D 6D Prevention of Wildlife Mortality and Disturbance • 1C-6C	
		<u>Disturbance/Avoidance of Habitat</u> • increased noise during construction • increased human presence	Timing Windows • 1A-2A, 4A Prevention of Wildlife Mortality and Disturbance • 1C-5C	
		<u>Injury or Incidental Take</u> (particularly during migration to and/or emergence from hibernacula, nesting sites, or during natural travel patterns to and from habitats) • increased collision with machinery • removal of nests and eggs • smothering hibernacula or nesting site	Timing Windows • 1A, 2A, 4A Prevention of Wildlife Mortality and Disturbance • 1C-5C	

Project Activity	Natural Heritage Features	Potential Impacts	Mitigation Measures	Net Effects

Near-water construction works	Fish and fish habitat:
	• Provincially Significant Wetland (PSW)/Area of Natural and Scientific Interest (ANSI)
	• significant valleylands
	
	Potential SAR:
	• American Eel
	
	Potential SWH:
	• Turtle Over Wintering Areas
	
	Potential SCC:
	• Northern Map Turtle
	• Common Snapping Turtle
	• Deepwater Sculpin
	• Greater Redhorse
		<u>Habitat Loss and/or Alteration</u>
		• near-water works, works along the banks, have the potential to impact aquatic and semi-aquatic species and their habitat through the following:
		  • fugitive dust
		  • spills (e.g., fuel)
		  • erosion and sedimentation
			Timing Windows
			• 1A-4A
			Best Construction Practices
			• 1B-8B
			Prevention of Terrestrial Disturbance
			• 1D-6D
			Erosion and Sedimentation Control
			• 1E-11E
				• The construction of the bridge will be located within the significant valleyland but is not anticipated to include any in-water works. Any works anticipated to occur below the high-water marks will require a DFO request for review and, if necessary, authorization.
				• The bank work in support of the new bridge will be located downstream of the PSW/ANSI and proposed near-water works are not anticipated to result in negative impacts to this upstream feature. A Credit Valley Conservation permit will be required for works occurring within the 120 m AOI.
				• If mitigation measures are followed no long-term impacts are anticipated for the aquatic system.

		<u>Disturbance/Avoidance of Habitat</u> • increased noise during construction • increased human presence	Timing Windows • 1A-4A Prevention of Wildlife Mortality and Disturbance • 1C-5C	
		<u>Injury or Incidental Take</u> (particularly during migration to and/or emergence from hibernacula, nesting sites, or during natural travel patterns to and from habitats) • increased collision with machinery • removal of nests and eggs • smothering hibernacula or nesting site	Timing Windows • 1A-4A Prevention of Wildlife Mortality and Disturbance • 1C-5C	
Dewatering activities	Fish and fish habitat: • Provincially Significant Wetland (PSW)/Area of Natural and Scientific Interest (ANSI) Potential SWH: • Turtle Over Wintering Areas Potential SCC: • Northern Map Turtle • Common Snapping Turtle • Deepwater Sculpin • Greater Redhorse	<u>Habitat Loss and/or Alteration</u> • Dewatering activities adjacent to the Credit River have the potential to impact aquatic and semi-aquatic species and their habitat through the following: • Drawdown of water table	Timing Windows • 2A, 5A-6A Best Construction Practices • 9B	• Bridge construction will require temporary dewatering activities to install footings on either side of the Credit River. Quantification of how dewatering and subsequent draw-down of the local water table will impact surface features such as the Credit River and nearby PSW will need to be completed through groundwater investigations at detailed design. • Generally, dewatering influence on the water table are anticipated to be temporary. • Potential ramifications of dewatering include impacts to wildlife during sensitive breeding or hibernating periods and impacts to obligate wetland plant species due to shock or prolonged dewatering activities. • Mitigation measures focus on avoidance of draw-down during the most sensitive times of the year, including wildlife timing windows and the driest period of the summer months.
		<u>Disturbance/Avoidance of Habitat</u> • Desiccation of semi-aquatic habitats during sensitive breeding periods • Alteration or other negative impacts to vegetation assemblages due to changes in prevailing subsurface hydrology	Timing Windows • 2A, 5A-6A Best Construction Practices • 9B	
		<u>Injury or Incidental Take</u> • Interruption of sensitive breeding periods which may result in mortality to eggs or young • Alteration of wildlife behaviour which may increase chance of mortality • Shock to obligate hydrophilic plant species which may result in death	Timing Windows • 2A, 5A-6A Best Construction Practices • 9B	

9 MITIGATION MEASURES

The following subsections outline mitigation recommendations for construction and operational effects to the natural heritage features within the study area. These mitigation measures are designed to prevent or significantly reduce impacts to terrestrial habitat communities.

9.1 Timing Windows/Working in the Dry

The magnitude of effects to aquatic habitat and communities is related to the extent, timing, and duration of the project. The following mitigation measures are recommended:

- **1A**: Remove trees outside of the breeding bird window of April 10 to August 15. If trees are to be removed during the breeding bird window, then an avian biologist must conduct a nesting survey before tree removals. Nesting surveys during breeding season for mature canopy trees is not recommended due to the high likelihood of missed nests.

- **2A**: Confine the contractor to the minimum area necessary to perform the work.

- **3A**: No in-water works are anticipated. However, in the event work needs to take place in the river, no in-water work should occur between March 15 to July 15 to protect spawning fish. If in-water work is necessary, works during late summer or early fall will need to consider mitigation measures for migratory fish passage.

- **4A**: Trees anticipated to be removed or otherwise impacted will need to be assessed for bat habitat features. Candidate bat snag trees are to be protected during construction. If impacts to snag trees can not be avoided, acoustic surveys may be required at the direction of MECP to confirm the absence of SAR. It is recommended that any required snag removal occur between October 1 and March 31 of a given year.

- **5A**: Dewatering activities to be avoided during sensitive timing windows (breeding and overwintering period for amphibians, birds, fish, turtles, and snakes).

- **6A**: Dewatering activities to be avoided during the driest parts of the year to avoid placing additional stress on obligate wetland plant species.

9.2 Best Construction Practices

Implementation of best construction practices during construction will reduce the potential for spills or other materials/equipment entering the water. The following measures will be employed:

- **1B**: Control all equipment maintenance and refuelling to prevent any discharge of petroleum products. Conduct vehicular maintenance and refuelling at least 30 m from the watercourse, watercourse banks, and natural heritage features.

- **2B**: Implement surface protection measures to minimize soil compaction.

- **3B**: Store construction material, excess material, construction debris, and empty containers at least 30 m from the watercourse and banks to prevent entry.

- **4B**: Enlist an environmental monitor onsite to provide advice and ensure that activities will not have any negative effects. Information for site-specific SAR should be posted in construction trailer.

- **5B**: Implement a stormwater management plan to maintain pre-construction drainage patterns and flows during all project phases.

- **6B**: Implement an emergency and response management plan to address the potential for spills.

- **7B**: Implement *Clean Equipment Protocol for Industry* (Halloran et al. 2013) to inspect and clean equipment for the purposes of invasive species prevention.

- **8B**: Works within areas overgrown with aggressive invasive species such as Garlic Mustard and Dog-strangling Vine should incorporate integrated invasive species management to facilitate the responsible removal and disposal of plant material and affected seedbanks.

- **9B**: Reduce dewatering area, duration, and depth to the minimum required to complete proposed works.

9.3 Prevention of Wildlife Mortality and Disturbance

Preventative measures during construction will reduce the potential mortality and disturbance of any wildlife within the study area and should include the following:

- **1C**: Demarcate wildlife habitat to avoid offsite disturbance and to restrict construction activities to the work areas.

- **2C**: Implement traffic limits if onsite vehicle use is required.

- **3C**: Install exclusionary fencing to prevent wildlife from entering the construction site. Exclusionary fencing should not prohibit access to nearby habitats. Where required, redirect wildlife to areas where they can avoid the potential for incidental take and still have access to habitats. Exclusionary fencing should be monitored daily throughout construction.

- **4C**: Inspection of construction area for wildlife each morning before the commencement of construction activities. Is to be carried out by a qualified wildlife biologist. Removal of trapped wildlife from construction areas should be completed by a qualified wildlife biologist.

- **5C**: Educate workers to be aware of potential wildlife occurrences and measures to take to minimized potential for injury or incidental take. Maintain a log to record and report incidents of injury and/or mortality.

- **6C**: A visual survey for stick nests must be completed by a qualified avian biologist prior to tree removal within CUW and FOD areas to confirm absence of Bald Eagle and/or Osprey within candidate SWH habitat.

9.4 Prevention of Terrestrial Disturbance

Preventative measures during construction will reduce the likelihood of disturbance and destruction of the terrestrial features, and should include the following:

- **1D**: Identify setbacks from natural features and trees with the installation of tree protection fencing along the disturbance limit (10 m). No construction activities are to occur outside of these fences (including overhead) nor the piling of construction materials. Suitable setbacks are to be confirmed by a certified arborist.

- **2D**: Minimize the construction disturbance area to the extent feasible.

- **3D**: Retain an arborist during detailed design to create a tree preservation plan to protect as many healthy, native trees as possible through the process.

- **4D**: Implement a dust management plan for the suppression of fugitive dust.

- **5D**: Ensure that temporarily disturbed areas are restored with native vegetation and monitored during construction and post construction based on the conservation authority and the City's specifications.

- **6D**: Develop a restoration plan at detailed design to prescribe when and how disturbed areas will be restored. Plantings should consist of native trees, shrubs, and seed mixes. Replace tree species at the ratios specified within the arborist report. The restoration plan is to explore bioengineering and slope stability enhancement along the Credit River embankment. A component of the restoration plan is to include an invasive species management strategy.

9.5 Erosion and Sedimentation Control

Effective erosion and sedimentation control will be achieved throughout the project with careful planning and design, stringent construction supervision, monitoring of the site, and maintenance of control works throughout their operational life. Erosion and sedimentation control (ESC) measures will include:

- **1E**: Develop an ESC plan to minimize the potential for erosion and construction-related sediment release into nearby natural features/water bodies and prepare ESC plan condition reports as part of the monitoring and maintenance plan.

- **2E**: Install ESC measures before ground-breaking.

- **3E**: Monitor and maintain ESC measures as per specifications.

- **4E**: Delineate storage, stockpiling, and staging areas prior to construction and inspected. Storage, stockpiling, staging, and maintenance areas are not to be located within the riparian area.

- **5F**: Install sediment control fence along the channel margins to prevent the entry of sediment into the watercourse.

- **6E**: Avoid construction during high volume rain events or significant snow melts/thaws. Construction will resume once soils have stabilized to avoid risk of erosion, soil compaction, or the potential for sediment release into nearby natural features/watercourses.

- **7E**: Direct discharge from sediment clean out to a filter bag or taken offsite for disposal.

- **8E**: Implement construction monitoring to ensure erosion and sediment measures are in place and working effectively. ESC should be checked weekly and after major rain events (>10 mm) to ensure it is installed and functioning properly. Daily monitoring will be completed by the contractor. Any deficiencies should be repaired immediately. A construction monitoring log should be maintained to ensure any deficiencies and corrective actions are documented.

- **9E**: Remove all temporary ESCs following construction once disturbed areas have stabilized.

- **10E**: Debris netting, or a suitable containment measure, should be installed where bridge decking may have potential aquatic impacts if the debris is not contained.

- **11E**: Dewatering process and impact mitigation is to be prepared in accordance with all applicable policies and guidelines and incorporated into the ESC plan.

10 RESIDUAL IMPACTS AFTER MITIGATION

The construction of the Credit River AT bridge is anticipated to result in an isolated, temporary disturbance and loss of habitat while construction is taking place; however, the long-term impacts associated with this project are expected to create no net impact once the new vegetation has reached maturity. It is acknowledging that compensation and restoration cannot be expected to fully offset the removal of mature woodland. These measures are meant to offset long-term impacts of natural woodland removal to the greatest possible extent through implementation of the Municipal Class Environmental Assessment process and final design.

Within the study area, the greatest potential impacts to the natural heritage features and functions are the removal of mature trees within the FOD7 significant woodland habitat, working within proximity to confirmed Barn Swallow habitat, as well as the proximity of planned construction and dewatering activities to the Credit River and PSW/ANSI feature. Tree removals will result in a short-term disturbance to the area; however, it has been recommended within the mitigation measures that a tree preservation plan and replanting plan be created for those disturbed areas. This should include a replacement of trees according to the arborist report as well as native seed mix. The permanent removal of habitat within the FOD7 and CUW1 are expected to be relatively small (868 m^2 and 544 m^2, respectively). Tree compensations for this area should occur within previously impacted areas within the study area. Although trees species will be removed, this is not anticipated to reduce the availability of foraging habitat, or aerial insect availability for the Barn Swallows inhabiting the study area. The bank work in support of the new bridge will be located downstream of the PSW/ANSI and is not anticipated to result in any negative impacts to this upstream feature. A CVC permit will be required for works occurring within the 120 m AOI. Currently the project is not requiring any in-water works to occur; therefore, if mitigation measures are followed, there should be no impact to the Credit River while construction works are occurring.

Persistent impacts to the watercourse include the contribution of road salt and other contaminants from the bridge to the Credit River below. To mitigate this, recommendations include integration of a stormwater management system on the bridge which does not discharge directly into the river. This will mitigate impacts from salt/sand/de-icer used on the bridge surface during winter maintenance.

11 NEXT STEPS

11.1 Permitting

At the detailed design stage, permits and approvals from various agencies will need to be obtained prior to commencing works within the study area. Specifically:

- **CVC Permit:** any works with the regulation limit (under Ontario Regulation 160/06) will require a permit through the CVC. This includes the Credit River and the PSW.

- **City of Mississauga Tree Removal Permit:** a tree removal application will need to be completed and provided to the City with an arborist report.

- **DFO Self Assessment:** the determination of risk for death of fish or HADD to fish habitat is typically done through a self assessment process. The self assessment lists a number of criteria which identify whether or not the project may result in death of fish or HADD of fish habitat (DFO 2020). If the self assessment indicates that the project cannot avoid death of fish or HADD of fish habitat, then a formal request for review must be submitted to DFO.

- **License to Collect Fish for Scientific Purposes:** Though no in-water works are anticipated to be required, in the event that in-water works are required, a License to Collect Fish for Scientific Purposes under the *Fish and Wildlife Conservation Act* will be required for the relocation of fish outside the work area.

- **Wildlife Collector's Authorization:** Though no in-water works are anticipated to be required, in the event that in-water works are required, a Wildlife Collector's Authorization under the *Fish and Wildlife Conservation Act* will be required for the relocation of wildlife (including amphibians and small mammals) outside the work area.

ESA Permit: depending on the outcome of additional surveys for SAR (see Section 9.1) an Overall Benefit Permit under Section 17(2)(c) of the ESA would be required to avoid contravention of the ESA. It identifies permits for activities which may contravene the ESA. It is recommended that MECP be consulted during detailed design, approximately 1 year prior to initiation of preparation and construction activities at the site to confirm that work to obtain the necessary permits and approvals is understood, and that changes to species listings, or applicable legislation/regulations have been addressed. The extent and nature of the proposed disturbance, as depicted on detailed design drawings, must be evaluated by MECP before a decision can be made regarding permit requirements. Additional field work or screening may be necessary to confirm the proposed works will not have an impact on SAR.

11.2 Future Works

The impact assessment detailed within this report are based on preliminary design details. Potential impacts and recommended mitigation should be revisited at the final design stage of the project to ensure that negative impacts are minimized or eliminated through implementation of appropriate mitigation or compensation measures. It is recommended that the following be completed in advance of finalizing construction documents to ensure requirements under the ESA are appropriately addressed and sufficient time is available to obtain the necessary permits. At the detailed design stage, the following additional studies are recommended: a snag survey within the FOD habitat should be completed to identify if there are any candidate snag trees which may be utilized by bats. Those trees identified as high-quality snag habitat should be protected where feasible.

- Consultation with MECP with regards to the candidate SAR bat maternity roost habitat if present. MECP will confirm if additional bat acoustic surveys should be completed to confirm the presence or absence of potential SAR bats in an individual tree or forested area identified as potential maternity roosting habitat that will be impacted or removed. If SAR bats are present, approval for SAR bat habitat removal from MECP will be required. Overall benefit permitting for SAR bats may include installation of compensation measures (i.e., bat boxes) to enhance bat roosting habitat adjacent to where habitat is removed.

- Consult with MECP regarding works being completed within Category 3 Barn Swallow habitat. This will be done through an information gathering form.

- Complete DFO Request for Review for each crossing where works are anticipated within the adjacent natural or riparian corridor. This process will fully assess potential direct or indirect impacts to fish and fish habitat that may result from proposed works, as well as ensuring that suitable mitigation measures are utilized to ensure no negative impacts to aquatic habitats.

- Additional screening as required based on the future changes to species' listings or habitat regulations of the ESA.

- Groundwater investigations will be required to assess the extent of groundwater drawdown and rebound from dewatering during footing installation. These investigations will further aid in targeting specific timing periods and duration for dewatering from a natural heritage perspective. Dewatering plan will need to address disposal of dewatering discharge as well to avoid impacts such as sedimentation and thermal shock.

12 CONCLUSION

HDR and the City retained Matrix to complete a NEA as part of the Lakeshore Transportation Studies. The studies include three infrastructure projects in the Lakeview, Port Credit, and Clarkson communities that build from the 2019 Lakeshore Connecting Communities Transportation Master Plan. These studies include the Lakeshore BRT Study, Lakeshore Complete Street Study, and the New Credit River AT Bridge Study. This NEA report focuses on the New Credit River AT Bridge Study to characterize the existing conditions through a background review and site investigation results, evaluate the significant heritage features and functions, determine what potential impacts the proposed design may have on significant features or functions, and recommend measures to avoid or mitigate the potential impacts.

Matrix combined information from the ecological field studies with relevant information from previous background studies and current field studies to identify significant features within the study areas. The results indicated a wide range of terrestrial and aquatic species and habitat features present or likely present within the study areas. In the analysis of significance and function, several natural heritage

features were identified, which included significant valleylands, significant woodlands, potential SWH, fish and fish habitat, and confirmed and potential SAR habitat.

The greatest potential impacts to the natural heritage features and functions are the removal of trees within the significant woodland FOD7 habitat, working within proximity to confirmed Barn Swallow habitat, as well as the proximity of construction to the Credit River and PSW/ANSI feature. Tree removals will result in short-term disturbance to the area; however, it has been recommended within the mitigation measures that a tree preservation plan and replanting plan be created for those areas disturbed. This should include a replacement of trees according to the arborist report with appropriate native species for the areas, as well as native seed mix. The permanent removal of habitat within the FOD7 and CUW1 are expected to be relatively small (868 m^2 and 544 m^2 respectively). Tree compensations for this area should occur within previously impacted area within the study area. Although trees species will be removed, this is not anticipated to reduce the availability of foraging habitat, or aerial insect availability for the Barn Swallows. The bank work in support of the new bridge will be located downstream of the PSW/ANSI and is not anticipated to result in any negative impacts to this upstream feature. A CVC permit will be required for works occurring within the 120 m AOI. Currently the project is not requiring any in-water works to occur; therefore, if mitigation measures are followed, there should be no impact to the Credit River while construction works are occurring. Appropriate approvals should be obtained during the detailed design phase of this project to ensure the natural features and functions within the study area are adequately protected.

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APPENDIX A
Desktop Species Results

TABLE A1 Lakeshore Transportation Studies - New Credit River Active Transport Bridge Species Inventory from Desktop Study

Species					Source							
Common Name	Scientific Name	National (SARA Status)	Provincial (ESA Status)	Provincial (S-rank)	NHIC 1km Map Squares - 17PJ1322, 17PJ1323, 17PJ1422, 17PJ1423	DFO Aquatic Species at Risk Mapping (2019)	Ontario Reptile and Amphibian Atlas - 17PJ12	Atlas of the Mammals of Ontario	Ontario Breeding Bird Atlas (OBBA) - 17PJ12	Ontario Butterfly Atlas - 17PJ12	Golder (2016) Natural Environment Constraints Assessment	MECP Information Request (2021)
AMPHIBIANS												
American Toad	*Bufo americanus*			S5			x					
Eastern Red-backed Salamander	*Plethodon cinereus*			S5			x					
Gray Treefrog	*Hyla versicolor*			S5			x					
Green Frog	*Rana clamitans*			S5			x					
Jefferson Salamander	*Ambystoma jeffersonianum*	END	END	S2			x					
Northern Leopard Frog	*Lithobates pipiens*			S5			x					
REPTILES												
Blanding's Turtle	*Emydoidea blandingii*	THR	THR	S3			x				x	
Dekay's Brownsnake	*Storeria dekayi*			S5			x					
Eastern Gartersnake	*Thamnophis sirtalis*			S5			x					
Eastern Milksnake	*Lampropeltis triangulum*	SC	-	S4	x		x				x	
Eastern Musk Turtle	*Sternotherus odoratus*	SC	SC	S3							x	
Eastern Ribbonsnake	*Thamnophis sauritus*	THR	SC	S4							x	
Midland Painted Turtle	*Chrysemys picta marginata*	SC	-	S4	x		x				x	
Northern Map Turtle	*Graptemys geographica*	SC	SC	S3	x		x				x	
Northern Watersnake	*Nerodia sipedon sipedon*			S5			x					
Red-eared Slider	*Trachemys scripta*			SNA			x					
Snapping Turtle	*Chelydra serpentina*	SC	SC	S3	x		x				x	
MAMMALS												
American Badger (Southwestern Ontario Population)	*Taxidea taxus jacksoni*	END	END	S1				x				
Beaver	*Castor canadensis*			S5				x				
Big Brown Bat	*Eptesicus fuscus*			S4				x				
Coyote	*Canis latrans*			S5				x				
Deer Mouse	*Peromyscus maniculatus*			S5				x				
Eastern Chipmunk	*Tamias striatus*			S5				x				
Eastern Cottontail	*Sylvilagus floridanus*			S5				x				
Eastern Gray Squirrel	*Sciurus carolinensis*			S5				x				
Eastern Small-footed *Myotis*	*Myotis leibii*	END	END	S2S3				x				x
Eastern Red Bat	*Lasiurus borealis*			S4				x				
Ermine	*Mustela erminea*			S5				x				
Hairy-tailed Mole	*Parascalops breweri*			S4				x				
Hoary Bat	*Lasiurus cinereus*			S4				x				
House Mouse	*Mus musculus*			SNA				x				
Little Brown *Myotis*	*Myotis lucifugus*	END	END	S4				x			x	x
Long-tailed weasel	*Mustela frenata*			S4				x				
Masked Shrew	*Sorex cinereus*			S5				x				
Meadow Jumping Mouse	*Zapus hudsonius*			S5				x				
Meadow Vole	*Microtus pennsylvanicus*			S5				x				
Mink	*Mustela vison*			S4				x				
Muskrat	*Ondatra zibethicus*			S5				x				
Northern *Myotis*	*Myotis septentrionalis*	END	END	S3				x			x	x
Northern Short-tailed Shrew	*Blarina brevicauda*			S5				x				
Norway Rat	*Rattus norvegicus*			SNA				x				
Porcupine	*Erethizon dorsatum*			S5				x				
Raccoon	*Procyon lotor*			S5				x				
Red Fox	*Vulpes vulpes*			S5				x				
Red Squirrel	*Tamiasciurus hudsonicus*			S5				x				
Silver-haired Bat	*Lasionycteris noctivagans*			S4				x				
Smoky Shrew	*Sorex fumeus*			S5				x				

Species					Source							
Common Name	Scientific Name	National (SARA Status)	Provincial (ESA Status)	Provincial (S-rank)	NHIC 1km Map Squares - 17PJ1322, 17PJ1323, 17PJ1422, 17PJ1423	DFO Aquatic Species at Risk Mapping (2019)	Ontario Reptile and Amphibian Atlas - 17PJ12	Atlas of the Mammals of Ontario	Ontario Breeding Bird Atlas (OBBA) - 17PJ12	Ontario Butterfly Atlas - 17PJ12	Golder (2016) Natural Environment Constraints Assessment	MECP Information Request (2021)
Snowshoe Hare	*Lepus americanus*			S5				x				
Southern Flying Squirrel	*Glaucomys volans*			S4				x				
Star-nosed Mole	*Condylura cristata*			S5				x				
Striped Skunk	*Mephitis mephitis*			S5				x				
Tricolored Bat	*Perimyotis subflavus*	END	END	S3?				x				
Virginia Opposum	*Didelphis virginiana*			S4				x				
White-footed Mouse	*Peromyscus leucopus*			S5				x				
White-tailed Deer	*Odocoileus virginianus*			S5				x				
Woodchuck	*Marmota monax*			S5				x				
Woodland Jumping Mouse	*Napaeozapus insignis*			S5				x				
BIRDS												
Alder Flycatcher	*Empidonax alnorum*			S5B					x			
American Black Duck	*Anas rubripes*			S4					x			
American Crow	*Corvus brachyrhynchos*			S5B					x			
American Goldfinch	*Spinus tristis*			S5B					x			
American Kestrel	*Falco sparverius*			S4					x			
American Redstart	*Setophaga ruticilla*			S5B					x			
American Robin	*Turdus migratorius*			S5B					x			
American Woodcock	*Scolopax minor*			S4B					x			
Baltimore Oriole	*Icterus galbula*			S4B					x			
Bank Swallow	*Riparia riparia*	THR	THR	S4B					x		x	
Barn Swallow	*Hirundo rustica*	THR	THR	S4B	x				x		x	
Belted Kingfisher	*Megaceryle alcyon*			S4B					x			
Black-billed Cuckoo	*Coccyzus erythropthalmus*			S5B					x			
Black-capped Chickadee	*Poecile atricapilla*			S5					x			
Blue Jay	*Cyanocitta cristata*			S5					x			
Blue-gray Gnatcatcher	*Polioptila caerulea*			S4B					x			
Blue-winged Teal	*Anas discors*			S4					x			
Bobolink	*Dolichonyx oryzivorus*	THR	THR	S4B	x				x		x	
Brown Thrasher	*Toxostoma rufum*			S4B					x			
Brown-headed Cowbird	*Molothrus ater*			S4B					x			
Canada Goose	*Branta canadensis*			S5					x			
Carolina Wren	*Thryothorus ludovicianus*			S4					x			
Cedar Waxwing	*Bombycilla cedrorum*			S5B					x			
Cerulean Warbler	*Setophaga cerulea*	END	THR	S2B							x	
Chestnut-sided Warbler	*Setophaga pensylvanica*			S5B					x			
Chimney Swift	*Chaetura pelagica*	THR	THR	S4B, S4N					x		x	
Chipping Sparrow	*Spizella passerina*			S5B					x			
Cliff Swallow	*Petrochelidon pyrrhonota*			S4B					x			
Common Grackle	*Quiscalus quiscula*			S5B					x			
Common Nighthawk	*Chordeiles minor*	THR	SC	S4B					x		x	
Common Yellowthroat	*Geothlypis trichas*			S5B					x			
Cooper's Hawk	*Accipiter cooperii*			S4					x			
Downy Woodpecker	*Picoides pubescens*			S5					x			
Eastern Kingbird	*Tyrannus tyrannus*			S4B					x			
Eastern Meadowlark	*Sturnella magna*	THR	THR	S4B	x				x		x	
Eastern Phoebe	*Sayornis phoebe*			S5B					x			
Eastern Screech-Owl	*Megascops asio*			S4					x			
Eastern Towhee	*Pipilo erythrophthalmus*			S4B					x			
Eastern Wood-pewee	*Contopus virens*	SC	SC	S4B					x		x	
European Starling	*Sturnus vulgaris*			SNA					x			
Field Sparrow	*Spizella pusilla*			S4B					x			

Species					Source							
Common Name	Scientific Name	National (SARA Status)	Provincial (ESA Status)	Provincial (S-rank)	NHIC 1km Map Squares - 17PJ1322, 17PJ1323, 17PJ1422, 17PJ1423	DFO Aquatic Species at Risk Mapping (2019)	Ontario Reptile and Amphibian Atlas - 17PJ12	Atlas of the Mammals of Ontario	Ontario Breeding Bird Atlas (OBBA) - 17PJ12	Ontario Butterfly Atlas - 17PJ12	Golder (2016) Natural Environment Constraints Assessment	MECP Information Request (2021)
Gadwall	*Anas strepera*			S4					x			
Gray Catbird	*Dumetella carolinensis*			S4B					x			
Great Crested Flycatcher	*Myiarchus crinitus*			S4B					x			
Great Horned Owl	*Bubo virginianus*			S4					x			
Green Heron	*Butorides virescens*			S4B					x			
Hairy Woodpecker	*Picoides villosus*			S5					x			
Henslow's Sparrow	Ammodramus henslowii	END	END	S1B	x						x	
Hooded Merganser	*Lophodytes cucullatus*			S5B					x			
Horned Lark	*Eremophila alpestris*			S5B					x			
House Finch	*Haemorhous mexicanus*			SNA					x			
House Sparrow	*Passer domesticus*			SNA					x			
House Wren	*Troglodytes aedon*			S5B					x			
Indigo Bunting	*Passerina cyanea*			S4B					x			
Killdeer	*Charadrius vociferus*			S5B, S5N					x			
Least Bittern	*Ixobrychus exilis*	THR	THR	S4B							x	
Least Flycatcher	*Empidonax minimus*			S4B					x			
Louisiana Waterthrush	*Parkesia motacilla*	THR	THR	S2B								x
Loggerhead Shrike	*Lanius ludovicianus*	-	END	S1B							x	
Mallard	*Anas platyrhynchos*			S5					x			
Mourning Dove	*Zenaida macroura*			S5					x			
Mourning Warbler	*Geothlypis philadelphia*			S4B					x			
Mute Swan	*Cygnus olor*			SNA					x			
Nashville Warbler	*Oreothlypis ruficapilla*			S5B					x			
Northern Bobwhite	*Colinus virginianus*	END	END	S1?B							x	
Northern Cardinal	*Cardinalis cardinalis*			S5					x			
Northern Flicker	*Colaptes auratus*			S4B					x			
Northern Harrier	*Circus hudsonius*			S4B					x			
Northern Mockingbird	*Mimus polyglottos*			S4					x			
Northern Rough-winged Swallow	*Stelgidopteryx serripennis*			S4B					x			
Northern Waterthrush	*Parkesia noveboracensis*			S5B					x			
Orchard Oriole	*Icterus spurius*			S4B					x			
Peregrine Falcon	*Falco peregrinus*	SC	SC	S3B	x				x		x	
Pileated Woodpecker	*Dryocopus pileatus*			S5					x			
Pine Warbler	*Setophaga pinus*			S5B					x			
Purple Martin	*Progne subis*			S4B					x			
Red-bellied Woodpecker	*Melanerpes carolinus*			S4					x			
Red-breast Nuthatch	*Sitta canadensis*			S5					x			
Red-eyed Vireo	*Vireo olivaceus*			S5B					x			
Red-necked Grebe	*Podiceps grisegena*			S3B, S4N					x			
Red-tailed Hawk	*Buteo jamaicensis*			S5					x			
Red-winged Blackbird	*Agelaius phoeniceus*			S4					x			
Ring-billed Gull	*Larus delawarensis*			S5B, S4N					x			
Ring-necked Pheasant	*Falcipennis canadensis*			S5					x			
Rock Dove	*Columba livia*			SNA					x			
Rose-breasted Grosbeak	*Pheucticus ludovicianus*			S4B					x			
Ruby-throated Hummingbird	*Archilochus colubris*			S5B					x			
Savannah Sparrow	*Passerculus sandwichensis*			S4B					x			
Scarlet Tanager	*Piranga olivacea*			S4B					x			
Sharp-Shinned Hawk	*Accipiter striatus*			S5					x			
Short-eared Owl	*Asio flammeus*	SC	SC	S4?B, S2S3N								x
Song Sparrow	*Melospiza melodia*			S5B					x			
Sora	*Porzana carolina*			S4B					x			

Species					Source							
Common Name	Scientific Name	National (SARA Status)	Provincial (ESA Status)	Provincial (S-rank)	NHIC 1km Map Squares - 17PJ1322, 17PJ1323, 17PJ1422, 17PJ1423	DFO Aquatic Species at Risk Mapping (2019)	Ontario Reptile and Amphibian Atlas - 17PJ12	Atlas of the Mammals of Ontario	Ontario Breeding Bird Atlas (OBBA) - 17PJ12	Ontario Butterfly Atlas - 17PJ12	Golder (2016) Natural Environment Constraints Assessment	MECP Information Request (2021)
Spotted Sandpiper	*Actitis macularia*			S5					x			
Swamp Sparrow	*Melospiza georgiana*			S5B					x			
Tree Swallow	*Tachycineta bicolor*			S4B					x			
Tufted Titmouse	*Baeolophus bicolor*			S4					x			
Turkey Vulture	*Cathartes aura*			S5B					x			
Veery	*Catharus fuscescens*			S4B					x			
Virgina Rail	*Rallus limicola*			S4B					x			
Warbling Vireo	*Vireo gilvus*			S5B					x			
White-breasted Nuthatch	*Sitta carolinensis*			S5					x			
White-throated Sparrow	*Zonotrichia albicollis*			S5B					x			
Willow Flycatcher	*Empidonax traillii*			S5B					x			
Wood Duck	*Aix sponsa*			S5					x			
Wood Thrush	*Hylocichla mustelina*	THR	SC	S4B	x				x		x	
Yellow Warbler	*Setophaga petechia*			S5B					x			
Yellow-bellied Sapsucker	*Sphyrapicus varius*			S5B					x			
Yellow-billed Cuckoo	*Coccyzus americanus*			S4B					x			
INSECTS												
Acadian Hairstreak	Satyrium acadica			S4						x		
American Lady	*Vanessa virginiensis*			S5						x		
Atlantis Fritillary	*Speyeria atlantis*			S5						x		
Azure sp.	*Celastrina sp.*			-						x		
Banded Hairstreak	*Satyrium calanus*			S5						x		
Black Swallowtail	*Papilio polyxenes*			S5						x		
Cabbage White	*Pieris rapae*			SNA						x		
Checkered White	*Pontia protodice*			SNA						x		
Clouded Sulphur	*Colias philodice*			S5						x		
Cloudless Sulphur	*Phoebis sennae*			SNA						x		
Columbine Duskywing	*Erynnis lucilius*			S4						x		
Common Buckeye	*Junonia coenia*			SNA						x		
Common Ringlet	*Coenonympha tullia*			S5						x		
Common Wood-Nymph	*Cercyonis pegala*			S5						x		
Compton Tortoiseshell	*Nymphalis l-album*			S5						x		
Crossline Skipper	*Polites origenes*			S4						x		
Dun Skipper	*Euphyes vestris*			S5						x		
Eastern Comma	*Polygonia comma*			S5						x		
Eastern Giant Swallowtail	Papilio cresphontes			S4						x		
Eastern Tailed Blue	Cupido comyntas			S5						x		
Eastern Tiger Swallowtail	*Papilio glaucus*			S5						x		
Edwards' Hairstreak	*Satyrium edwardsii*			S4						x		
European Skipper	*Thymelicus lineola*			SNA						x		
Eyed Brown	*Lethe eurydice*			S5						x		
Fiery Skipper	*Hylephila phyleus*			SNA						x		
Harvester	*Feniseca tarquinius*			S4						x		
Hickory Hairstreak	*Satyrium caryaevorus*			S4						x		
Hobomok Skipper	*Poanes hobomok*			S5						x		
Least Skipper	*Ancyloxypha numitor*			S5						x		
Little Wood-Satyr	*Megisto cymela*			S5						x		
Little Yellow	*Pyrisitia lisa*			SNA						x		
Marine Blue	*Leptotes marina*			SNA						x		
Meadow Fritillary	*Boloria bellona*			S5						x		
Monarch	*Danaus plexippus*	SC	SC	S2N, S4B						x	x	

Species					Source							
Common Name	Scientific Name	National (SARA Status)	Provincial (ESA Status)	Provincial (S-rank)	NHIC 1km Map Squares - 17PJ1322, 17PJ1323, 17PJ1422, 17PJ1423	DFO Aquatic Species at Risk Mapping (2019)	Ontario Reptile and Amphibian Atlas - 17PJ12	Atlas of the Mammals of Ontario	Ontario Breeding Bird Atlas (OBBA) - 17PJ12	Ontario Butterfly Atlas - 17PJ12	Golder (2016) Natural Environment Constraints Assessment	MECP Information Request (2021)
Mottled Duskywing	*Erynnis martialis*	END	END	S2						x	x	
Mourning Cloak	*Nymphalis antiopa*			S5						x		
Northern Broken-Dash	*Wallengrenia egeremet*			S5						x		
Northern Cloudywing	*Thorybes pylades*			S5						x		
Northern Crescent	*Phyciodes cocyta*			S5						x		
Northern Pearly-Eye	*Lethe anthedon*			S5						x		
Orange Sulphur	*Colias eurytheme*			S5						x		
Painted Lady	*Vanessa cardui*			S5						x		
Pearl Crescent	*Phyciodes tharos*			S4						x		
Peck's Skipper	*Polites peckius*			S5						x		
Question Mark	*Polygonia interrogationis*			S5						x		
Red Admiral	*Vanessa atalanta*			S5						x		
Red-spotted Purple	*Limenitis arthemis astyanazx*			S5						x		
Sachem	*Atalopedes campestris*			SNA						x		
Silver-spotted Skipper	*Epargyreus clarus*			S4						x		
Silvery Blue	*Glaucopsyche lygdamus*			S5						x		
Silvery Checkerspot	*Chlosyne nycteis*			S5						x		
Striped Hairstreak	*Satyrium liparops*			S5						x		
Transverse Lady Beetle	Coccinella transversoguttata	-	END	S1	x							
Viceroy	*Limenitis archippus*			S5						x		
White Admiral	*Limenitis arthemis arthemis*			S5						x		
Wild Indigo Duskywing	*Erynnis baptisiae*			S4						x		
FISH												
American Eel	*Anguilla rostrata*		END	S1?	x						x	
Deepwater Sculpin	*Myoxocephalus thompsonii pop. 2*	SC		S4	x							
Greater Redhorse	Moxostoma valenciennesi			S3	x							
Lake Ontario Kiyi	Coregonus kiyi orientalis	EXT	EXT	SX	x							
Lake Sturgeon (Great Lakes - Upper St. Lawrence River population)	Acipenser fulvescens pop. 3	SC	END	S2	x							
Redside Dace	*Clinostomus elongatus*	END	END	S2	x							
Shortnose Cisco	Coregonus reighardi	END	END	SH	x	x						
PLANTS												
American Chestnut	*Castanea dentata*	END	END	S1S2								x
Clinton's Clubrush	Trichophorum clintonii			S2S3	x							
Virginia Bluebells	Mertensia virginica			S3	x							
White Wood Aster	Eurybia divaricata	THR	THR	S2							x	

Species					Source							
Common Name	Scientific Name	National (SARA Status)	Provincial (ESA Status)	Provincial (S-rank)	NHIC 1km Map Squares - 17PJ1322, 17PJ1323, 17PJ1422, 17PJ1423	DFO Aquatic Species at Risk Mapping (2019)	Ontario Reptile and Amphibian Atlas - 17PJ12	Atlas of the Mammals of Ontario	Ontario Breeding Bird Atlas (OBBA) - 17PJ12	Ontario Butterfly Atlas - 17PJ12	Golder (2016) Natural Environment Constraints Assessment	MECP Information Request (2021)

Definitions, Acronyms and Symbols

Species at Risk
Species of Conservation Concern

National and Provincial At Risk Status

Species at Risk Act (SARA; 2002) and Endangered Species Act (ESA; 2007)

EXP - Extirpated
END - Endangered
THR - Threatened
SC - Special Concern
NAR - Not at Risk

Provincial S-rank

Natural Heritage Information Centre (NHIC). 2021 Provincial status of plants, wildlife and vegetation communities database. https://www.ontario.ca/page/natural-heritage-information-centre#section-3. OMNR, Peterborough.

Provincial ranks are used by the NHIC to set protection priorities for rare species and natural communities. Provincial ranks are used by the NHIC to set protection priorities for rare species and natural communities. These rankings are based on the total number of extant Ontario populations and the degree to which they are potentially or actively threatened with destruction. These ranks are not legal designations. S4 and S5 species are generally uncommon to common in the province. Species ranked S1-S3 are considered to be rare in Ontario.

S1: Critically Imperiled (i.e. fewer than 5 occurrences in the nation and/or province)
S2: Imperiled (i.e. fewer than 20 occurrences in the nation and/or province)
S3: Vulnerable (i.e. 20-80 occurrences in the nation and/or province)
S4: Apparently Secure (uncommon, but not rare in the nation and/or province)
S5: Secure (common, widespread and abundant in the nation and/or province)
SNA: Not Applicable (species is not a suitable target for conservation activities)
SHB: Breeding is not confirmed in Ontario
S#S#: Range Rank (range of uncertainty about the status of the species or community)
S#?: Rank is Uncertain
S?: Not Ranked Yet
B: Breeding migrants/vagrants
N: Non-breeding migrants/vagrants

APPENDIX B
Site Photographs

Matrix Solutions Inc.
June 4, 2021

1. The east bank of the Credit River watercourse.

Matrix Solutions Inc.
June 4, 2021

2. The east bank of the Credit River watercourse.

Matrix Solutions Inc.
June 4, 2021

3. The west bank of the Credit River watercourse looking upstream at the rail crossing.

Matrix Solutions Inc.
June 4, 2021

4. The west bank of the Credit River watercourse looking downstream at the Mississauga Canoe Club.

APPENDIX C
Flora Inventory Results

TABLE C1 Lakeshore Transportation Studies New Credit River Active Transportation Bridge Study Plant List Based on 2021 Field Survey

Common Name	ESA	SARA	S-rank	CUW1	CUM1-1	FOD7
American Elm			S5			x
Basswood			S5			x
Black Locust			SNA		x	
Black Walnut			S4?	x		x
Bur Oak			S5			x
Crack Willow			SNA	x		
Eastern Cottonwood			S5		x	x
Eastern White Cedar			S5		x	
Green Ash			S4	x		x
Common Hackberry			S4			x
Honey Locust (Shademaster)			SNA		x	
Manitoba Maple			S5	x	x	x
Mountain Ash			S5			x
Norway Maple			SNA	x		x
Red Oak			S5			x
Siberian Elm			SNA	x	x	x
Silver Maple			S5	x		x
Sugar Maple			S5			x
Sycamore			S4			x
Tulip Tree			S4			x
Umbrella Magnolia			-			x
White Oak			S5			x
Climbing Nightshade			SNA	x	x	x
Dog-strangling Vine			SNA	x	x	x
English Hawthorn			SNA			x
European Buckthorn			SNA			x
Grey Dogwood			S5			x
Canada Moonseed			S4			x
Prickly Rose			S5			x
Red-osier Dogwood			S5			
River Grape			S5	x	x	x
Staghorn Sumac			S5		x	x
Tartarian Honeysuckle			SNA	x	x	
Virginia Creeper			S4?	x	x	x
Bird's-foot Trefoil			SNA		x	
Black Medick			SNA		x	
Bull Thistle			SNA		x	
Common Burdock			SNA	x		x
Canada Thistle			SNA		x	
Chicory			SNA		x	
Common Blue Violet			S5	x		x
Common Mullein			SNA			x
Common Plantain			SNA		x	
Creeping Red Fescue			SNA		x	
Curly Dock			SNA			x
Dandelion			SNA		x	x
Enchanter's Nightshade			S5			x
English Plantain			SNA		x	
Garlic Mustard			SNA	x	x	x
Herb Robert			S5	x	x	x
Kentucky Blue Grass			SNA		x	
Mugwort			SNA	x		x
Orchard Grass			SNA		x	
Perforated St. John's Wort			SNA		x	
Philadelphia Fleabane			S5		x	x
Poison Ivy			S5	x		
Quackgrass			SNA		x	
Reed-canary Grass			S5		x	
Smooth Brome			SNA		x	
Sow Thistle			SNA		x	x
Stickseed			S5	x	x	
Stinging Nettle			SNA	x		x
Tall/Canada Goldenrod			S5		x	x
Teasel			SNA		x	x
Timothy			SNA		x	
Tufted Vetch			SNA		x	x
White Campion			SNA	x		
White Clover			SNA		x	
White Sweet-clover			SNA		x	
White Vervain			S5			x
Wild Carrot			SNA			x
Witchgrass			S5	x		
Yarrow			SNA		x	
Yellow Avens			S5	x		x
Yellow Rocket			SNA		x	

Definitions, Acronyms and Symbols

National and Provincial At Risk Status

Species at Risk Act (SARA; 2002) and Endangered Species Act (ESA; 2007)

EXP - Extirpated; **END** - Endangered; **THR** - Threatened; **SC** - Special Concern; **NAR** - Not at Risk

Provincial S-rank

Natural Heritage Information Centre (NHIC). 2021 Provincial status of plants, wildlife and vegetation communities database. https://www.ontario.ca/page/natural-heritage-information-centre#section-3. OMNR, Peterborough.

Provincial ranks are used by the NHIC to set protection priorities for rare species and natural communities. Provincial ranks are used by the NHIC to set protection priorities for rare species and natural communities. These rankings are based on the total number of extant Ontario populations and the degree to which they are potentially or actively threatened with destruction. These ranks are not legal designations. S4 and S5 species are generally uncommon to common in the province. Species ranked S1-S3 are considered to be rare in Ontario.

S1: Critically Imperiled (i.e. fewer than 5 occurrences in the nation and/or province)

S2: Imperiled (i.e. fewer than 20 occurrences in the nation and/or province)

S3: Vulnerable (i.e. 20-80 occurrences in the nation and/or province)

S4: Apparently Secure (uncommon, but not rare in the nation and/or province)

S5: Secure (common, widespread and abundant in the nation and/or province)

SNA: Not Applicable (species is not a suitable target for conservation activities)

SHB: Breeding is not confirmed in Ontario

S#S#: Range Rank (range of uncertainty about the status of the species or community)

S#?: Rank is Uncertain

S?: Not Ranked Yet

APPENDIX D
Species at Risk and Species of Conservation Concern Habitat Assessment

TABLE D1 Species at Risk Assessment Table

Common Name	Scientific Name	ESA	SARA	Habitat Requirements	Observations and Likelihood of Occurrence Within Study Area
Flora (3)					
American Chestnut	*Castanea dentata*	END	END	This species prefers dryer upland deciduous forests with sandy, acidic to neutral soils.[1]	Unlikely- habitat is found within the study area, however, this species was not identified within the tree inventory.
Butternut	*Juglans cinerea*	END	END	This species prefers moist, well-drained soil, often found along streams. Also found on well-drained gravel sites.[1]	Unlikely- habitat is found within the study area, however, this species was not identified within the tree inventory.
White Wood Aster	*Eurybia divaricata*	THR	THR	This species grows in open, dry to moist deciduous forests dominated by Sugar Maple and American Beech trees. Often found mixed in with other asters. It does best in well-drained soils, partial to full shade, and areas with a low-level of disturbance. It is found in a small number of sites in the Niagara region.[3]	Unlikely- habitat is not found within the study area.
Insects (2)					
Mottled Duskywing	*Erynnis martialis*	END	-	Tends to live in dry habitats with sparse vegetation including open barrens, sandy patches within woodlands and alavrs.[1]	Unlikely- habitat is not found within the study area.
Transverse Lady Beetle	*Coccinella transversoguttata*	END	-	This species is a habitat generalist, and therefore has a wide range of habitats that is may utilize.[1]	Unlikely- In Ontario, all records are considered to be historical. There have been no new records of the Transverse Lady Beetle since 1990, despite greater search effort in recent years to find individuals in parts of its previous range.[3]
Birds (13)					
Bank Swallow	*Riparia riparia*	THR	THR	Nest in burrows in natural and human made settings where there are vertical faces in silt and sand deposits. Many nests are on banks of rivers and lakes, but they are also found in active sand and gravel pits or former ones where the banks remain suitable.[1]	Unlikely- habitat is not found within the study area.
Barn Swallow	*Hirundo rustica*	THR	THR	Have a preference for farmlands or rural areas but are also found in open forests or in close proximity to water for feeding. They prefer buildings or other manmade structures to construct their nests on.[1]	Confirmed - Nesting on Royal Canadian Legion Building
Bobolink	*Dolichonyx oryzivorus*	THR	THR	Bobolink historically lived in North American tallgrass prairie and other open meadows. Since the clearing of native prairies in Ontario, Bobolinks have started residing in hayfields. They live in large, open expansive grasslands with dense ground cover, hayfields, meadows, or fallow fields or marshes and often build their nests on the ground in dense grasses.[1]	Unlikely- habitat is not found within the study area.
Cerulean Warbler	*Setophaga cerulea*	THR	END	During breeding seasons this species is in mature, deciduous forests with large, tall trees and an open understory. In late summer the migrate to South America.[3]	Unlikely- habitat is not found within the study area.
Chimney Swift	*Chaetura pelagica*	THR	THR	Prior to European settlement, Chimney Swift nested on cave walls and in hollow trees and cavities in old growth forests. More recently they have been found to prefer areas near urban settlement and nest or roost in chimneys and other manmade structures with a preference for areas near water.[1]	Confirmed – Species was observed foraging over the Credit River during the 2021 field studies
Common Nighthawk	*Chordeiles minor*	SC	THR	Commonly found on open ground, clearings in dense forests or ploughed fields. They are also found on gravel beaches or barren areas with rocky soils, open woodlands, and flat gravel roofs.[1]	Unlikely- habitat is not found within the study area.
Eastern Meadowlark	*Sturnella magna*	THR	THR	Prefer open, grassy meadows, farmland, pastures, hayfield or grasslands with elevated singing perches. They are also found on cultivated land, in weedy areas, or in old orchards with nearby open grassy areas greater than 10 ha in size.[1]	Unlikely- habitat is not found within the study area.
Henslow's Sparrow	*Ammodramus henslowii*	END	END	Prefers extensive, dense, tall grasslands but has been found in abandoned farm fields, pastures and wet meadows.[3]	Unlikely- habitat is not found within the study area.
Least Bittern	*Ixobrychus exilis*	THR	THR	Can be found in a variety of wetland habitats with a strong preference for cattail marshes with a mix of open pools and channels. Nests are almost always built in dense stands of vegetation near open water.[3]	Unlikely- habitat is not found within the study area.
Louisiana Waterthrush	*Parkesia motacilla*	THR	THR	Species prefers steep, forested ravines with fast-flowing streams.[3]	Unlikely- habitat is not found within the study area
Loggerhead Shrike	*Lanius ludovicianus*	END	-	Lives in fields or alvars with short grass with a preference for pasture or other grasslands with scattered low trees and shrubs. Requires spiny, multi-branched shrubs but barbed wire fencing is also suitable for impaling prey.[3]	Unlikely- habitat is not found within the study area.
Northern Bobwhite	*Colinus virginianus*	END	END	Live in savannahs, grasslands, abandoned farm fields, bushy fencerows and similar sites. In severe winter conditions bobwhites may move to a small forest area.[3]	Unlikely- habitat is not found within the study area.
Wood Thrush	*Hylocichla mustelina*	SC	THR	Prefer mature deciduous and mixed (conifer/deciduous) forests with moist stands of trees, well developed undergrowth, and tall trees for singing perches. These birds prefer large forests but will also use smaller stands of trees. They build their nests in living saplings, trees or shrubs, usually Sugar Maple or American Beech.[1]	Unlikely- habitat is not found within the study area.
Mammals (5)					
American Badger	*Taxidea taxus jacksoni*	END	END	Badgers are found in a variety of habitats, such as tall grass prairie, sand barrens and farmland. These habitats provide badgers with small prey, including groundhogs, rabbits and small rodents.[3]	Unlikely- habitat is not found within the study area.

Common Name	Scientific Name	ESA	SARA	Habitat Requirements	Observations and Likelihood of Occurrence Within Study Area
Eastern Small-footed Myotis	*Myotis leibii*	END	END	In the spring and summer, eastern small-footed bats will roost in a variety of habitats, including in or under rocks, in rock outcrops, in buildings, under bridges, or in caves, mines, or hollow trees. These bats often change their roosting locations every day. At night, they hunt for insects to eat, including beetles, mosquitos, moths, and flies. In the winter, these bats hibernate, most often in caves and abandoned mines.[3]	Unlikely- habitat is not found within the study area.
Little Brown Myotis	*Myotis lucifugus*	END	END	During the day they roost in trees and buildings. They often select attics, abandoned buildings, and barns for summer colonies where they can raise their young. Little Brown Myotis hibernate from October or November to March or April, most often in caves or abandoned mines that are humid and remain above freezing.[1]	Potential- the study area contains snag tree habitat adjacent to a watercourse and is considered suitable habitat for this species.
Northern Myotis	*Myotis septentrionalis*	END	END	Live in boreal forests, choosing to roost under loose bark and in the cavities of trees. Northern Myotis hibernate from October or November to March or April, most often in caves or abandoned mines.[1]	Potential- the study area contains snag tree habitat adjacent to a watercourse and is considered suitable habitat for this species.
Tricolored Bat	*Perimyotis subflavus*	END	END	During the summer, the Tri-colored Bat is found in a variety of forested habitats. It forms day roosts and maternity colonies in older forest and occasionally in barns or other structures. They forage over water and along streams in the forest. Tri-colored Bats eat flying insects and spiders gleaned from webs. They overwinter in caves where they typically roost by themselves rather than part of a group.[3]	Potential- the study area contains snag tree habitat adjacent to a watercourse and is considered suitable habitat for this species.
Herpetofauna (2)					
Blanding's Turtle	*Emydoidea blandingii*	THR	THR	Lives in shallow water, normally in large wetlands and shallow lakes with abundant aquatic macrophytes.[1]	Unlikely- habitat is not found within the study area.
Jefferson Salamander	*Ambystoma jeffersonianum*	END	END	Adults live in moist, loose soil, under logs or in leaf litter. [3]	Unlikely- habitat is not found within the study area.
Fish (4)					
American Eel	*Anguilla rostrata*	END	-	This species utilizes a wide range of habitats which include saltwater and freshwater habitats. [2]	Unlikely- habitat is not found within the study area.
Lake Sturgeon (Great Lakes population)	*Acipenser fulvescens*	END	-	Live almost exclusively in freshwater lakes and rivers with soft bottoms of mud, sand or gravel. Usually at a depth of 5 to 20 meters and spawn in shallow, fast-flowing water with gravel and boulders at the bottom.[3]	Unlikely- habitat is not found within the study area.
Redside Dace	*Clinostomus elongatus*	END	END	Prefers pools and slow-moving areas of small streams and headwaters with a gravel bottom. [1]	Unlikely- habitat is not found within the study area.
Shortnose Cisco	*Coregonus reighardi*	END	END	It is only found in the Great Lakes of North America.[3] Although the DFO SAR mapping indicate this species is a record for the Credit River within the study area, NHIC notes it as a historical record (SH rank) as this species has not been reported in Lake Ontario since 1964 despite significant sampling efforts[4].	Unlikely- habitat is not found within the study area.

1 *Endangered Species Act* (ESA)
2 *Species at Risk Act* (SARA)
3 Species at Risk in Ontario (MECP 2020)
4 Fisheries and Oceans Canada (DFO 2012)

REFERENCES

Fisheries and Oceans Canada (DFO). 2012. *Recovery Strategy for the Shortnose Cisco (Coregonus reighardo) in Canada*. Species at Risk Act Recovery Strategy Series. vi + 16 pp. Ottawa, Ontario. 2012.

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2020. *Species at Risk in Ontario List*. Last updated November 9, 2020. http://www.ontario.ca/environment-and-energy/species-risk-ontario-list

TABLE D2 Species of Conservation Concern Assessment Table

Common Name	Scientific Name	ESA	SARA	S-Rank	Habitat Requirements	Observations and Likelihood of Occurrence Within Study Area
Insects (1)						
Monarch	*Danaus plexippus*	SC	SC	S2N, S4B	Most abundant where milkweed plants and breeding habitat are widespread including the north shores of Lake Ontario and Lake Erie.[3]	Unlikely- habitat is not found within the study area.
Birds (3)						
Eastern Wood-pewee	*Contopus virens*	SC	SC	S4B	Most abundant in intermediate-age mature forest stands with little understory and vegetation. Lives in the mid-canopy layer of forest clearings and edges of deciduous and mixed forests.[3]	Potential- habitat is found within the study area.
Peregrine Falcon	*Falco peregrinus*	SC	SC	S3B	Usually nest on tall, steep cliff ledges close to large bodies of water but have adapted well to cities, nesting on ledges of tall buildings.[3]	Unlikely- habitat is not found within the study area.
Short-eared Owl	*Asio flammeus*	SC	SC	S4?B, S2S3N	Species nests in open areas such as grasslands, marshes and tundra.[3]	Unlikely- habitat is not found within the study area.
Herpetofauna (4)						
Eastern Musk Turtle	*Sternotherus odoratus*	SC	SC	S3	Found in ponds, lakes, marshes, and rivers that are slow-moving with abundant emergent vegetation and muddy bottoms. Nesting habitat must be close to the water, exposed to direct sunlight in soil, decaying vegetation, rotting wood, in muskrat lodges, open ground or in rock crevices. Mostly along the southern edge of the Canadian Shield and throughout Southwestern and Eastern Ontario.[3]	Unlikely- habitat is not found within the study area.
Eastern Ribbonsnake	*Thamnophis sauritus*	SC	THR	S4	Usually close to water especially in marshes with frogs and small fish. Hibernate in burrows or rock crevices.[3]	Unlikely- habitat is not found within the study area.
Northern Map Turtle	*Graptemys geographica*	SC	SC	S3	Found in rivers and lakeshores. Will bask on emergent rocks and fallen trees. Hibernates on the bottom of deep, slow-moving rivers. Requires high quality water that support mollusc prey.[3]	Potential- habitat is found within the study area.
Snapping Turtle	*Chelydra serpentina*	SC	SC	S3	Prefer shallow water where they can hide under mud and leaf litter. Nesting sites are usually along stream in gravelly or sandy areas but they will use man-made structures including gravelling shoulders, dams and aggregate pits.[3]	Potential- habitat is found within the study area.
Fish (2)						
Deepwater Sculpin	*Myoxocephalus thompsonii pop. 2*	-	SC	S4	This species is found in cold, highly oxygenated lakes throughout its range. It often occupies deep water habitats.[4]	Unlikely- habitat is not found within the study area.
Greater Redhorse	*Moxostoma valenciennesi*	-	-	S3	This species is typically found in clear, relatively fast-moving rivers.[5]	Potential- This species was captured within the Credit River in 2018.
Plant (2)						
Clinton's Clubrush	*Trichophorum clintonii*	-	-	S2S3	This species prefers Rocky river ledges, argillaceous soils, clearings of fir forests, and prairie and open woods.[5]	Unlikely- habitat is not found within the study area.
Virginia Bluebells	*Mertensia virginica*	-	-	S3	This species prefers floodplain woodlands, bottomland woodlands, mesic woodlands, and wooded bluffs.[5]	Unlikely- habitat is found within the study area, however, this species was not identified during the botanical inventory.

Notes:
1 *Endangered Species Act* (ESA)
2 *Species at Risk Act* (SARA)
3 Species at Risk in Ontario (MECP 2020)
4 Species at Risk Public Registry (Government of Canada 2021)
5 Nature Serve (Nature Serve 2021)

REFERENCES

Ontario Ministry of the Environment, Conservation and Parks (MECP). 2020. *Species at Risk in Ontario List*. Last updated November 9, 2020. http://www.ontario.ca/environment-and-energy/species-risk-ontario-list

Government of Canada. 2021. *Species at Risk Public Registry, Species List*. Modified September 26, 2021. https://www.canada.ca/en/environment-climate-change/services/species-risk-public-registry/species-list.html

NatureServe. 2021. *NatureServe Explorer*. Accessed August 2021. https://explorer.natureserve.org/

APPENDIX E
Significant Wildlife Habitat Assessment

TABLE E1 Significant Wildlife Habitat Evaluation

Significant Wildlife Habitat Feature	Candidate Significant Wildlife Habitat Description	Presence/Absence Within New Credit River Active Transportation Bridge Study Area
Season Concentrations of Animals		
Waterfowl Stopover and Staging Areas (Terrestrial)	Fields (CUM and CUT) with sheet water during spring	Not Present: This habitat is not present within the study area.
Waterfowl Stopover and Staging Areas (Aquatic)	Ponds, marshes, lakes, bays, coastal inlets, and watercourses with abundant food supply used during migration (includes MAS, SAS, SAM, SAF, and SWD communities).	Not Present: This habitat is not present within the study area.
Shorebird Migratory Stopover Area	Shorelines of lakes, rivers and wetlands that are seasonally flooded, muddy, and have an unvegetated shoreline (includes BBO, BBS, SDO, SDS, SDT, and MAM communities)	Not Present: This habitat is not present within the study area.
Raptor Wintering Area	Requires a combination of upland (CUM/CUT/CUS/CUW) and forested area (FOD/FOM/FOC) with a combined area of >20 ha. Fields must be wind swept with limited snow accumulation.	Not Present: This habitat is not present within the study Area.
Bat Hibernacula	Hibernacula can be found in caves, mine shafts, and karts (includes CCR1, CCR2, CCA1, CCA2 communities).	Not Present: This habitat is not present within the study area.
Bat Maternity Colonies	Maternity colonies are found in mature deciduous (FOD/SWD) or mixed (FOM/SWM) forest communities with >10/ha large diameter snag trees. Trees in early stage of decay (class 1 to 3) are preferred by female bats.	Potential: FOD communities are present within the study area.
Turtle Wintering Areas	Permanent waterbodies, large wetlands, and bogs or fens with soft substrate that are deep enough to not freeze over the winter. Wintering areas are in the same general area as their core habitat. Includes SW, MA, OA, SA, FEO and BOO communities.	Potential: OA community present that is large enough to likely not freeze over the winter.
Reptile Hibernaculum	Hibernation occurs in sites located below the frost line in burrows, rock crevices in any ecosite other than very wet ones. Additionally, conifer or shrub swamps (or depressions in bedrock terrain with sparse trees) may be used as reptile hibernaculum.	Not Present: This habitat is not present within the study area.
Colonially - Nesting Bird Breeding Habitat (Bank/Cliff)	Any site with undisturbed or naturally eroding exposed soil banks including watercourse banks, sandy hills, steep slopes, sand piles, cliff faces, bridge abutments, silos and barns found within CUM, CUT, CUS, BLO, BLS, BLT, CLO, CLS, and CLT communities.	Not Present: This habitat is not present within the study area.
Colonially - Nesting Bird Breeding Habitat (Tree/Shrubs)	Nest in live or dead standing trees in wetlands, lakes, islands, and peninsulas that are 11 to 15 m from the ground (including SWM, SWD, and FET communities).	Not Present: This habitat is not present within the study area.
Colonially - Nesting Bird Breeding Habitat (Ground)	Any rocky island or peninsula within a lake or large river.	Not Present: This habitat is not present within the study area.
Migratory Butterfly Stopover Area	Requires a combination of fields (CUM/CUT/CUS) and forested area (FOD/FOM/FOC/CUP) that is a minimum of 10 ha and is located within 5 km of Lake Erie or Lake Ontario.	Not Present: This habitat is not present within the study area.

Significant Wildlife Habitat Feature	Candidate Significant Wildlife Habitat Description	Presence/Absence Within New Credit River Active Transportation Bridge Study Area
Land bird Migratory Stopover Areas	All ecosites associated with these community series; FOC, FOM, FOD, SWC, SWM, SWD that are >5 ha in size and are within 5 km of Lake Erie or Lake Ontario.	Not Present: This habitat is not present within the study area.
Deer Winter Congregation Areas	Woodlots (FOC/FOM/FOD/SWC/SWM/SWD) >50 ha in size. However, deer winter congregation areas considered significant are mapped by the Ministry of Northern Development, Mining, Natural Resources and Forestry.	Not Present: No mapped Deer Winter Congregation Areas within the study area.
Rare Vegetation Communities		
Cliff and Talus Slopes	A cliff is vertical to near vertical bedrock >3 m in height. A talus slope is rock rubble at the base of a cliff made up of coarse rocky debris. Any Ecological Land Classification (ELC) ecosite within community series TAO, TAS, TAT, CLO, CLS, and CLT.	Not Present: This habitat is not present within the study area.
Sand Barren	Areas of exposed sand, generally sparsely vegetated and cause by lack of moisture, periodic fires and erosion greater than 0.5 ha in size. Usually located within other types of natural habitat such as forests or savannah.	Not Present: This habitat is not present within the study area.
Alvar	Typically, a level, mostly unfractured calcareous bedrock feature with a mosaic of rock pavements and bedrock overlain by a thin veneer of soil. Must be >0.5 ha in size.	Not Present: This habitat is not present within the study area.
Old Growth Forest	Characterized by heavy mortality or turnover of over-storey trees resulting in a mosaic of gaps that encourage development of multilayered canopy. Woodland area is >0.5 ha and contains no recognizable forestry activities.	Not Present: This habitat is not present within the study area.
Savannah	A tallgrass prairie that has a tree cover between 25% to 60%. No minimum size required.	Not Present: This habitat is not present within the study area.
Tall Grass Prairie	A tallgrass prairie that has ground cover dominated by prairie grasses and has a tree cover of <25%.	Not Present: This habitat is not present within the study area.
Other Rare Vegetation Communities	Provincially rare S1, S2, and S3 vegetation communities as listed in Appendix M of the Significant Wildlife Habitat Technical Guide (MNR 2000).	Not Present: This habitat is not present within the study area.
Specialized Habitat for Wildlife		
Waterfowl Nesting Area	Upland habitat that is adjacent, and within 120 m, to a wetland (includes ecosites MAS, SAS, SAM, SAF, MAM, SWT, and SWD). Adjacent area should be 120 m wide, so predators have difficulty finding nests.	Not Present: This habitat is not present within the study area.
Bald Eagle and Osprey Nesting/Foraging/Perching	Nesting occurs within forested areas adjacent to lakes, ponds, rivers or wetlands. This includes FOD, FOM, FOC, SWD, SWM, and SWC directly adjacent to riparian areas.	Potential: The forested communities along the Credit River are directly adjacent to riparian areas. No stick nests, bald eagles or osprey observed within the study area during surveys.
Woodland Raptor Nesting Habitat	Nesting occurs in any forested ecosite that are greater than 30 ha with greater than 4 ha of interior habitat.	Not Present: This habitat is not present within the study area.
Turtle Nesting Areas	Area of exposed mineral soil and gravel adjacent (<100 m) from water, including ecosites MAS, SAS, SAM, SAF, BOO, and FEO.	Not Present: This habitat is not present within the study area.

Significant Wildlife Habitat Feature	Candidate Significant Wildlife Habitat Description	Presence/Absence Within New Credit River Active Transportation Bridge Study Area
Seeps and Springs	Any forested area (with <25% meadow/field/pasture) within the headwaters of a watercourse. Seeps and springs are identified as areas where ground water comes to the surface.	Not Present: This habitat is not present within the study area.
Amphibian Breeding Habitat (Woodland)	Presence of a wetland, pond, or woodland pools >500 m^2 within or 120 m adjacent to a woodland (no minimum size). This includes all ecosites associated with FOD, FOM, FOC, SWC, SWM, SWD communities.	Not Present: This habitat is not present within the study area.
Amphibian Breeding Habitat (Wetland)	Wetland >500 m^2 that are typically isolated from (>120 m) from woodland ecosites. Presence of shrubs and logs increase significance. This includes SW, MA, FE, BO, OA, and SA communities.	Not Present: This habitat is not present within the study area.
Woodland Area Sensitive Bird Breeding Habitat	Habitats where interior forest breeding birds are breeding. Typically occurs in large mature trees (>60 years old) in forest stands or woodlots >30 ha. Interior habitat is at least 200 m from the forest edge.	Not Present: This habitat is not present within the study area.
Habitat for Species of Conservation Concern (SCC)		
Marsh Bird Breeding Habitat	All wetland habitat (i.e., MA, SAS, SAM SAF, SW FEO, BOO communities) with shallow water and emergent aquatic vegetation is considered significant wildlife habitat.	Not Present: This habitat is not present within the study area.
Open Country Bird Breeding Habitat	Large grassland areas (includes natural and cultural fields and meadows) that are >30 ha. (Active farmland does not qualify).	Not Present: This habitat is not present within the study area.
Shrub/Early Successional Bird Breeding Habitat	Large field areas (i.e., CUT, CUS and CUW communities) succeeding to shrub and thicket that are >10 ha in size.	Not Present: This habitat is not present within the study area.
Terrestrial Crayfish	Wet meadows and edges of shallow marshes, includes MAM, MAS, SWT, SWD, and SWM communities.	Not Present: This habitat is not present within the study area.
Rare Plant Species	All special concern and provincially rare (S1 to S3 ranked) plant species.	Confirmed: Honey Locust was also observed in CUM1-1.
Rare Wildlife Species	All special concern and provincially rare animal species.	Potential: As per the SCC screening conducted in Appendix E, there is the opportunity for: Northern Map Turtle, Snapping Turtle, Greater Redhorse and Eastern Wood-pewee.
Animal Movement Corridor		
Amphibian Movement Corridor	Movement corridors may be found in all ecosites associated with water that link significant breeding habitat.	Potential: The Credit River corridor is a north-south linkage associated with water.

REFERENCES

Ontario Ministry of Natural Resources (MNR). 2000. *Significant Wildlife Habitat Technical Guide*. Fish and Wildlife Branch, Wildlife Section, Science Development and Transfer Branch, Southcentral Sciences Section. October 2000. 2000.