ONTARIO

MINISTRY of TRANSPORTATION
MINISTÈRE des TRANSPORTS

ENVIRONMENTAL EXISTING CONDITIONS AND IMPACT ASSESSMENT REPORT

ARGYLE STREET SOUTH BRIDGE SHORT-TERM REHABILITATION

TOWN OF CALEDONIA, HALDIMAND COUNTY

G.W.P. 3147-06-00

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MORRISON HERSHFIELD MH

DRAYCOTT ENVIRONMENTAL INC.
Environmental Consulting Specialists

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APPENDIX A Vegetation List

1.0 Introduction

This project encompasses the short-term rehabilitation of the Argyle Street South Bridge over the Grand River in the town of Caledonia, Haldimand County. Figure 1 shows the location of the bridge.

The 1927 9-span concrete bowstring arch bridge is ~200 metres long between abutments. It has 8 piers in the water with footings on the riverbed. It is the longest of similar bridges from that era in Ontario and is on the Ministry of Culture's list of heritage bridges.

This project involves the short-term rehabilitation of the bridge as well as Argyle Street South from just north of the intersection of Argyle Street South northerly to the bridge and from the bridge northerly to 70m south of the intersection of Argyle Street South and Caithness Street (old Highway 54).

The short-term rehabilitation works may include:

- Repair deck surface, waterproof and pave
- Replace or eliminate expansion joints
- Replace bearings
- Repair sidewalks, curbs and railings
- Replace arch hangers
- Repair concrete arches, railings, floor beams, deck soffit and arch tie girders (bottom chord)
- Strengthen arch tie girders and floor beams
- Construct approach slabs at each abutment
- Repair concrete abutments and piers
- Ensure proposed work conserves the original character and heritage significance of the bridge

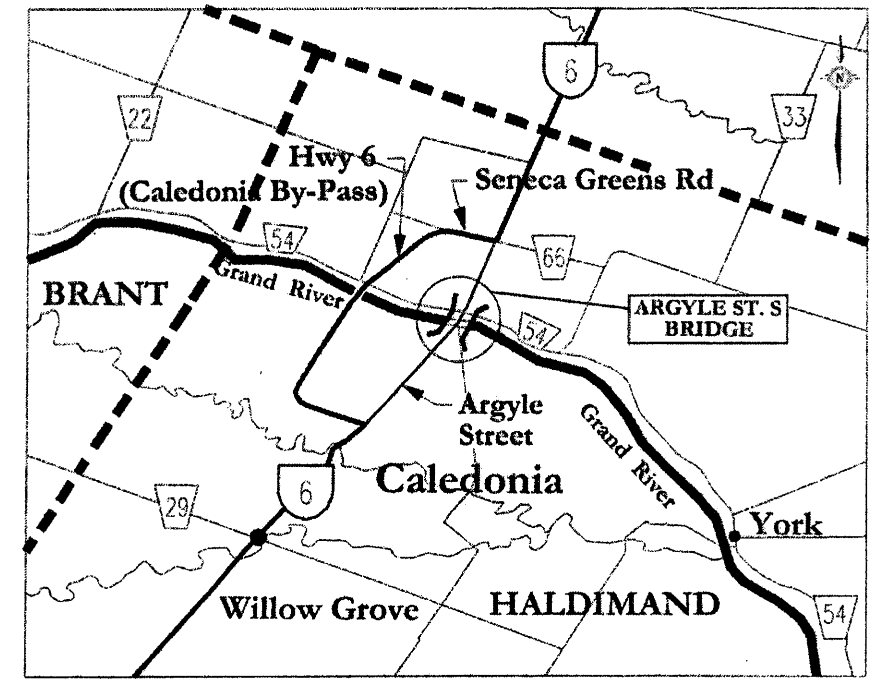


Figure 1. Key Map of Study Limits

This project has been classified under the Class Environmental Assessment for Provincial Transportation Facilities (2000) as a Group B project. As such, a key goal of this Class Environmental Assessment process is the protection of the environment through the wise management of resources.

This report has been prepared to document the existing aquatic, terrestrial and land use resources throughout the study area and to assess the impacts on these resources in relation to the proposed detail design alternatives.

2.0 Background and Approach

2.1 Objectives of an Environmental Impact Assessment (EIA)

The Class Environmental Assessment for Provincial Transportation Facilities provides the terms of reference for an EIA. The objectives of this EIA are consistent with these terms of reference and are as follows:

- Define the boundaries of the environmental features on and adjacent to the study area;
- Identify and describe the character, natural attributes and functions of the environmental features and their relationship to the proposed designs;
- Identify potential impacts of the proposed designs on environmental features and areas where the environment could be enhanced as part of the designs;

- Recommend specific measures to mitigate potential impacts on environmental features; and,
- Outline a management plan to protect and enhance or rehabilitate environmental features during and following construction.

Draycott Environmental Inc. (DEI) has conducted biological and physical inventories on the property and collected relevant secondary source information to:

1) Describe the existing conditions;
2) Delineate boundaries of Environmental Protection Areas;
3) Provide background information to evaluate potential design impacts; and
4) Recommend protection measures, including buffer areas, to protect sensitive environmental features.

DEI has assessed the potential impacts of the proposed detail design alternatives on the existing environmental features. This document provides the findings of this assessment. In the sections that follow, the methodology used, the description of the environmental features, a description of the proposed detail design alternatives, the assessment of the potential impacts on the natural environment, and the management recommendations for the protection of the environmental features are presented.

2.2 Methodology

Background information regarding the property was collected and synthesized from the following sources:

- Ontario Ministry of Natural Resources, Guelph District;
- Grand River Conservation Authority;
- Natural Heritage Information Centre;
- Natural Heritage Reference Manual for Policy 2.3 of the Provincial Policy Statement (MNR, 1999);
- Significant Wildlife Habitat Technical Guide (MNR, 2000);
- Committee on the Status of Endangered Wildlife in Canada (COSEWIC);
- Environmental Reference for Highway Design (MTO, 2002);
- Class Environmental Assessment for Provincial Transportation Facilities (MTO 2000);
- Environmental Study Report Planning and Design Section (MTO, 1993);
- Aerial photography.

Field Investigations

Field surveys on the subject properties were completed in 2007 by DEI.

Terrestrial Vegetation Investigations

All terrestrial vegetation community descriptions are based on 2007 field investigations by DEI.

Terrestrial Wildlife Observations

Wildlife observations were based on visual and auditory counts of species during field investigations.

Aquatic Habitat

Data on existing aquatic habitat features and fish communities in the vicinity was obtained from the Grand River Conservation Authority and the Ministry of Natural Resources, Guelph and confirmed during 2007 field investigations by DEI.

Land Use

The study area has been divided into the following land uses: Agriculture, Residential (urban & rural), Commercial, Industrial & Tourism, Community Facilities, Recreation, Natural Features, Aggregates/Mines, Municipal Services, and First Nations.

Environmental Impact Assessment

The physical and biological inventories provided the required description of the study area's resources and identified environmental functions and values that could potentially be affected, either negatively or positively, by the proposed detail design alternatives.

3.0 Existing Fisheries and Aquatic Habitat

The watercourse within the project study limits is the lower Grand River. The Grand River originates in the village of Dundalk and flows south for 290 kilometres to Lake Erie. It is a heavily managed river, with 7 major (and numerous minor) reservoirs that moderate high and low flows throughout the year. During high spring flows water is stored in reservoirs to be used to supplement low flows during the summer and early fall.

Substrate within the project limits consists of detritus and woody debris along the banks and large rubble, cobble and gravel in the fast-moving water. Substrate behind the piers was also composed of gravel, with some larger material closer to the main flow. Closer to the centre line of the pier, substrate was predominantly a sand-silt mixture.

Riparian vegetation consists of Manitoba maple trees along the banks, with some shrubs (primarily willow) underneath the bridge and around the island. Banks within the study area are stable and well vegetated with grass.

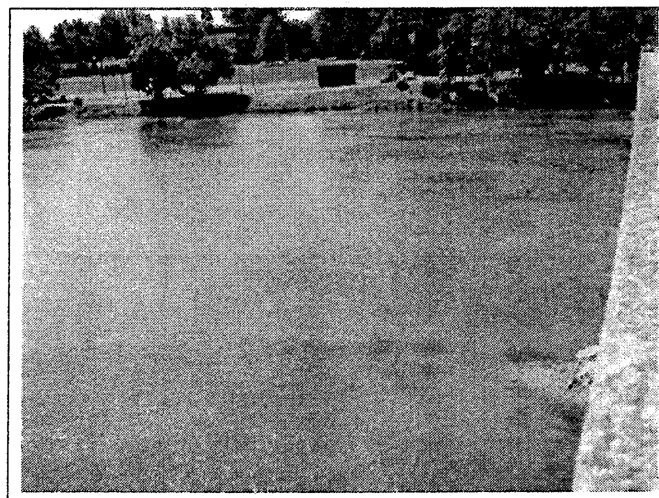
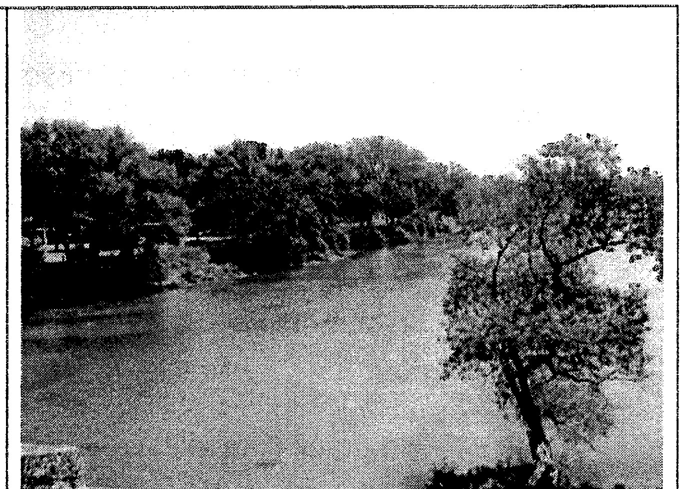
	

Figure 2. Upstream of Bridge	**Figure 3. Downstream of Bridge**

3.1 Fish Species

The Grand River supports a diverse array of fish species, as listed in Table 1.

Table 1: Fish species captured in the Grand River downstream of Caledonia Dam.

Common Name	Scientific Name	COSEWIC Status	Source of Information[a]
alewife	*Alosa pseudoharengus*		6
black crappie	*Pomoxis nigromaculatus*		1, 4, 5
black redhorse	*Moxostoma duquesnei*	Threatened	7
blackside darter	*Percina maculata*		5, 8
bluegill	*Lepomis macrochirus*		5
bluntnose minnow	*Pimephales notatus*		1, 2, 5, 6, 8
brook silverside	*Labidesthes sicculus*		1, 5
brown bullhead	*Ameiurus nebulosus*		1, 4, 5
channel catfish	*Ictalurus punctatus*		4, 6
common carp	*Cyprinus carpio*		1, 4, 5, 6, 8
common shiner	*Luxilus cornutus*		1, 2, 5, 6, 8
eastern sand darter	*Ammocrypta pellucida*	Threatened	5
emerald shiner	*Notropis atherinoides*		1, 5
fathead minnow	*Pimephales promelas*		5
freshwater drum	*Aplodinotus grunniens*		1, 6
gizzard shad	*Dorosoma cepedianum*		8
golden redhorse	*Moxostoma erythrurum*		4, 5, 6, 8
golden shiner	*Notemigonus crysoleucas*		1
greater redhorse	*Moxostoma valenciennesi*		5, 6
greenside darter	*Etheostoma bleimioides*	Special Concern	5
hornyhead chub	*Nocomis biguttatus*		1, 8

Common Name	Scientific Name	COSEWIC Status	Source of Information[a]
Johnny darter	*Etheostoma nigrum*		1, 5
largemouth bass	*Micropterus salmoides*		1, 2, 4, 5, 6
logperch	*Percina caprodes*		2, 5, 6, 8
longnose dace	*Rhinichthys cataractae*		5
longnose gar	*Lepisosteus osseus*		1, 5, 6
mimic shiner	*Notropis volucellus*		2, 5, 8
mooneye	*Hiodon terigus*		6
northern hognose sucker	*Hypentelium nigricans*		5, 8
northern pike	*Esox lucius*		4, 8
pumpkinseed	*Lepomis gibbosus*		1, 4, 5
quillback	*Carpiodes cyprinus*		5
rainbow darter	*Etheostoma caendeum*		5
rainbow trout	*Oncorhynchus mykiss*		1
river chub	*Nocomis micropogon*		2, 5
river redhorse	*Moxostoma carinatum*	Special Concern	7
rock bass	*Ambloplites rupestris*		1, 2, 4, 5, 6, 8
rosyface shiner	*Notropis rubellus*		1, 2, 5
sea lamprey	*Petromyzon marinus*		3
shorthead redhorse	*Moxostoma macrolepidotum*		1, 4, 5, 8
silver redhorse	*Moxostoma anisurum*		4, 5, 6
smallmouth bass	*Micropterus dolomieu*		1, 2, 4, 5, 6, 8
spotfin shiner	*Cyprinella spiloptera*		1, 2, 5, 6
spottail shiner	*Notropis hudsonius*		5, 6
stonecat	*Noturus flavus*		2, 5, 8
striped shiner	*Luxilus chrysocephalus*		5
trout perch	*Percopsis omiscomaycus*		6
walleye	*Stizostedion vitreum vitreum*		1, 4, 5, 6
white crappie	*Pomoxis armularis*		1, 5
white sucker	*Catostomus commersoni*		1, 4, 5, 6, 8
yellow perch	*Perca flavescens*		4, 5

[a] Information sources
1 – MNR records for below Caledonia Dam in 1971
2 – MNR records for below Caledonia Dam in 1974
3 – MNR records for below Caledonia Dam in 1981
4 – GRCA (1988)
5 – Tarandus (1998)
6 – Anderson (2002)
7 – Reid (personal communication)
8 – GRCA (personal communication)

The presence of resident rainbow trout and pacific salmon means that this section of the river will be classified as a coldwater system and will likely be subject to the instream timing restrictions associated with that designation.

Four species at risk are found in the study area. Eastern sand darter and Black Redhorse are listed as "Threatened" species by COSEWIC while River Redhorse is classified as "Special Concern" by COSEWIC. Greenside Darter is classified as "Not at Risk" by COSEWIC but is offered a SARA status of "Special Concern".

Eastern sand darters are not at risk provincially but are considered "Threatened" federally by COSEWIC. They are listed under Schedule 1 of the *Species at Risk Act*

(*SARA*), and offered formal protection under the Act. The eastern sand darter frequents water with limestone bottoms, covered with a thin layer of fine sediment, riffles composed of rubble and gravel and slightly silted sand bottoms in rivers. The main preference seems to be sandy bottom areas with enough current to keep silt from depositing. Preferred spawning habitat is similar, a sand bottom, with enough current to keep it silt free. Habitat matching this description was found downstream of some of the bridge piers, along the shoreline underneath the bridge and around the island downstream of the bridge.

The black redhorse is listed as a "Threatened" species both provincially (MNR) and federally (COSEWIC), however it is on Schedule 2 of *SARA*, and is not formally protected by the Act. Black redhorse prefers fast moving riffle areas with a sand, gravel and bedrock substrate, similar to the habitat found around the bridge piers. It is not unlikely that this species could utilize the habitat around the piers, around the island and the riffle areas between the dam and the bridge. Since this fish is a strong swimmer, it is able to utilize the entire river and could be found in the vicinity of the bridge.

The river redhorse is listed as a species of "Special Concern" both provincially (MNR) and federally (COSEWIC). River redhorse have been listed under Schedule 3 of the *SARA*, and are not offered formal protection under the Act. The preferred habitat of the river redhorse is fast water, with gravel to bedrock substrate and very little silt. Changes to habitat are listed as the primary reason for the concern regarding this species.

The greenside darter is listed as a species of "Special Concern" in Ontario by the MNR. It is classified as "Not at Risk" by COSEWIC but offered a *SARA* status of "Special Concern". It is on Schedule 3 of the *SARA* and is not formally protected by the Act. Unlike the eastern sand darter, the greenside darter requires less specific habitat, preferring moderate to fast-flowing, clean water. Spawning takes place on filamentous algae covered boulders in fast flowing water. Some algae was observed coating the boulders downstream of the bridge, but it could not be determined if the algae was suitable for spawning greenside darters.

3.2 Mussel Species

Seven mussel species were observed in 2007 DEI field studies: Deertoe (*Truncilla truncate)*, flutedshell (*Lasmigona costata)*, mucket (*Actinonaias ligamentina)*, fragile papershell (*Leptodea fragilis)*, pimpleback (*Quadrula pustoluosa),* pink heelsplitter (*Potamilus alatus)* and elktoe (*Alasmidonta marginata)*. None of these species are listed as rare provincially or nationally.

Two mussel species at risk are listed by the MNR as being documented in the vicinity of the project by the MNR: kidneyshell (*Ptychobranchus fasciolaris*) and round pigtoe (*Pleurobema sintoxia*).

Kidneyshell mussels are classified as "Endangered" in Ontario and in Canada. They are listed under Schedule 1 of the *Species at Risk Act* (*SARA*), and offered formal protection under the Act. They are protected in Ontario by the *Endangered Species Act.*

Kidneyshells mainly reside in small to medium-sized rivers and streams and tend to prefer shallow areas with clear and rapidly flowing water and sand and gravel substrate. The river and streambeds upon which these types of mussels reside are most often packed with sand and gravel. The project area does have a suitable habitat for the Kidneyshell upstream of the bridge in the shallow gravel riffle area.

Round Pigtoe mussels are classified as "Endangered" in Ontario and in Canada. They are listed under Schedule 1 of the *Species at Risk Act* (*SARA*), and offered formal protection under the Act. They are protected in Ontario by the *Endangered Species Act.* Round Pigtoe mussels inhabit medium to large rivers with mud, sand or gravel substrate. The project area does have a suitable habitat for the Round Pigtoe mussel.

4.0 Existing Terrestrial Habitat

4.1 Vegetation

The vegetation community within the project limits is Deciduous Forest, along the banks of the Grand River.

Deciduous Forest Communities

Deciduous forest communities have greater than 60% tree cover, with 75% of the total tree canopy cover being deciduous species. The deciduous forest in the project area is along the river valley. The dominant trees include white ash (*Fraxinus americana*), sugar maple (*Acer saccharum*), willow sp. (*Salix sp.*). Occasional species include black walnut (*Juglans nigra*), white elm (*Ulmus Americana*) and silver maple (*Acer saccharinum*). Occasional shrub species include dotted hawthorn (*Crataegus punctata)*, Manitoba maple (*Acer negundo*), and Staghorn sumac (*Rhus typhina*).

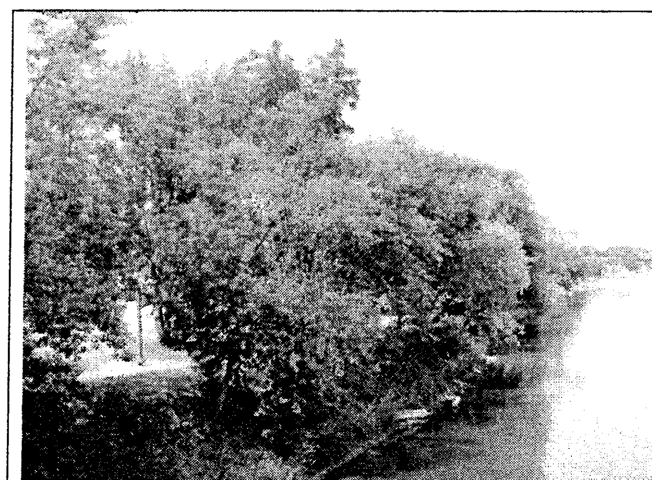


Figure 4. Deciduous Forest along river

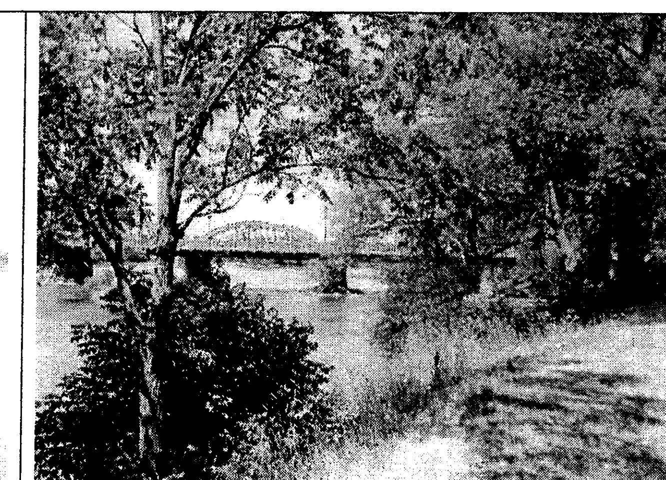


Figure 5. Deciduous Forest along river

Figure 6. Deciduous Forest Communities Within the Study Area

None of the identified vegetation is listed as threatened or rare by the Ministry of Natural Resources Natural Heritage Information Centre database.

4.2 Wildlife

Species observed in the study area, either through visual confirmation, auditory confirmation or by way of indicators (tracks, scat), include the following:

Birds

Mallard duck (*Anas platyrhynchos*), herring gull (*Larus argentatus*), great blue heron (*Ardea herodias*), American crow (*Corvus brachyrhynchos*), swallow sp. (*Hirundo sp.)* and red-winged blackbird (*Agelaius phoeniceus*) were observed in June 2007 DEI field surveys.

The NHIC lists 7 rare bird species in Haldimand County. Three of these species are classified as "endangered", two are classified as "threatened" and two are classified as "special concern" federally and provincially.

Acadian flycatchers (*Empidonax virescens)*, "Endangered" federally and provincially, are protected federally by the *Species at Risk Act, Migratory Birds Convention Act* and provincially by the *Endangered Species Act.* These birds require large areas of mature, undisturbed, closed-canopy forest. Most individuals occur in forests more than 40-ha in size. The species is also considered to be a forest interior species, meaning that they build their nests in areas that are more than 100 meters from the forest edge. No suitable habitat is found in the project area.

Hooded warblers are considered "Threatened" by COSEWIC (nationally) and MNR (provincially) and are protected federally under the *Species At Risk Act* and *Migratory Birds Convention Act* and provincially by the *Planning Act.* Hooded Warblers nest in mature hardwood forests with tall trees and a well-closed canopy. The species is considered area-sensitive, meaning that it requires large areas of forest. Suitable habitat for this species does exist within the project area however none were observed in DEI field surveys.

Henslow's sparrows are considered "Endangered" by COSEWIC (nationally) and MNR (provincially) and are protected federally by the *Species at Risk Act, Migratory Birds Convention Act* and provincially by the *Endangered Species Act.* Henslow's Sparrows require large areas of grassland habitat for breeding, rearing, and feeding. Breeding habitat is characterized by tall, dense grassland with a high percentage cover of grass and with a thick thatch layer and deep litter layer. No suitable habitat is found in the project area.

Least bitterns are considered "Threatened" by COSEWIC (nationally) and MNR (provincially) and are protected federally under the *Species At Risk Act* and *Migratory Birds Convention Act* and provincially by the *Planning Act.* Least Bitterns nest in freshwater marshes, where dense tall aquatic vegetation is interspersed with clumps of woody vegetation and open water. They are most regular in marshes that exceed 5 ha in area. In the northern part of their range, they are most strongly associated with cattails (Typha spp.), the most common tall emergent aquatic plant. The wetland areas within the project area are not large enough to support this species.

The Yellow-breasted Chat *virens* subspecies (*Icteria virens virens)* is considered "Special Concern" federally and provincially. It is protected by the federal *Migratory Birds Convention Act.* The Yellow-breasted Chat breeds in dense thickets around wood edges, riparian areas, and in overgrown clearings. No suitable habitat is found in the project area.

The Short-eared Owl (*Asio flammeus*) is classified as "Special Concern" federally and provincially, but is on the *Species at Risk Act's* Schedule 3, so it is not offered protection by the legislation. It is protected in Ontario under the *Fish and Wildlife Conservation Act.* The owl prefers extensive stretches of relatively open habitat such as grasslands, marshes and tundra where it hunts for small mammals. No suitable habitat is found in the project area.

Barn owls, "Endangered" federally and provincially, are protected federally by the *Species at Risk Act,* and provincially by the *Fish and Wildlife Conservation Act* and the *Planning Act.* Barn Owls prefer low-elevation, open country, where small rodents are more abundant. In Canada, they are often associated with agricultural lands, especially pasture. Nests are located in buildings, hollow trees and cavities in cliffs. No suitable habitat is found in the project area.

Reptiles and Amphibians

The NHIC lists 3 reptiles and 2 amphibians as being rare species in Haldimand County. Four species are classified as "threatened" federally and provincially: Eastern Ratsnake (*Elaphe obsoleta*), Blanding's Turtle (*Emydoidea blandingii*), Fowler's Toad (*Bufo fowleri*) and Jefferson Salamander (*Ambystoma jeffersonianum*). Milksnakes (*Lampropeltis triangulum*) are classified as "Special Concern" federally and provincially.

The Eastern Ratsnake (aka Gray Ratsnake) is considered "Threatened" by COSEWIC and by the MNR and is protected by Ontario's *Fish and Wildlife Conservation Act*. This species has not been assigned a *Species at Risk Act* status yet, so it is not offered protection by the Act. They prefer edge habitats, particularly old fields next to deciduous forest, where they may live at densities of about four snakes per hectare. From about October to April, snakes overwinter in communal hibernacula. Hibernacula are underground in warmer, south-facing slopes and may contain many snakes belonging to several species. Suitable habitat for this species does exist within the project area however none were observed in DEI field surveys.

Blanding's turtles are considered "Threatened" by COSEWIC and MNR and are protected by both the federal *Species at Risk Act* the provincial *Fish and Wildlife Conservation Act.* Blanding's Turtles are often observed using clear, eutrophic habitats, including lakes, rivers, streams, marshes, or ponds. Adults are generally found in open or partially vegetated sites, whereas juveniles are more reclusive by nature and prefer areas that contain thick aquatic vegetation including sphagnum, water lilies and algae. The Blanding's Turtle nests in a variety of loose substrates including sand, organic soil, gravel and cobblestone. Overwintering occurs in permanent pools that average about one metre in depth, or in slow flowing streams. No suitable habitat exists in the study area.

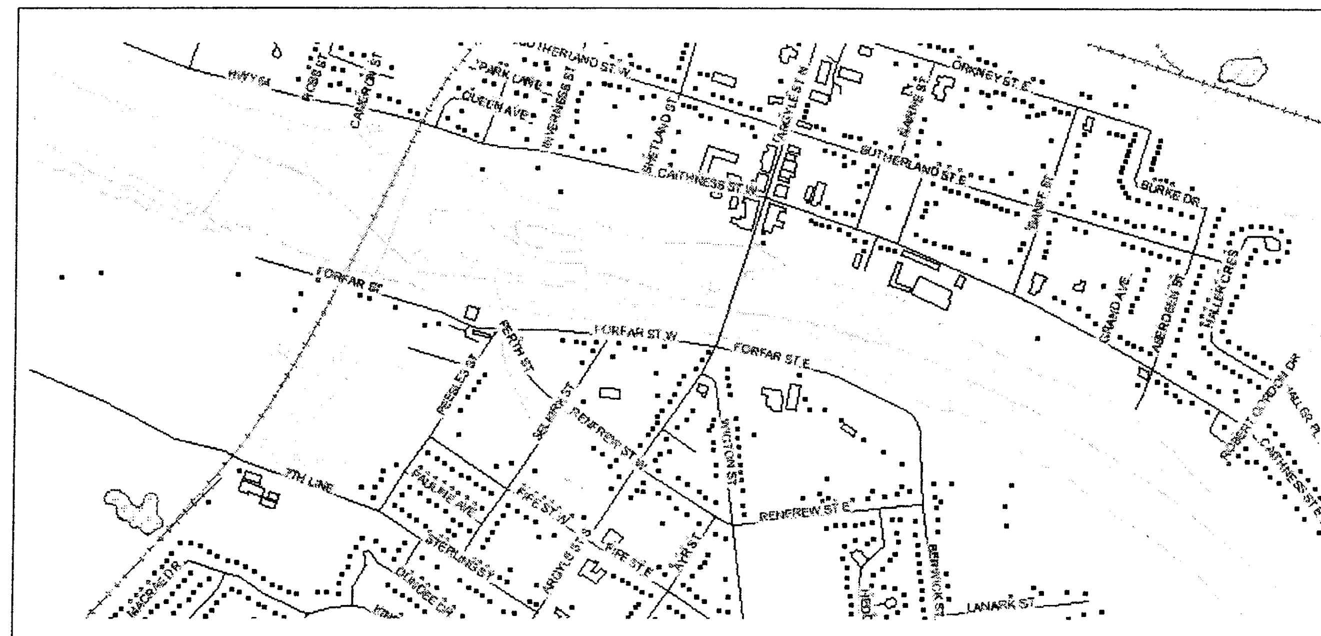
Milksnakes are considered species of "Special Concern" in Ontario and in Canada. They are protected federally under the *Species at Risk Act* and provincially under the province's *Fish and Wildlife Conservation Act.* Milksnakes are found in a wide variety of habitats, from prairies, pastures, and hayfields, to rocky hillsides and a wide variety of forest types. The most important features of good Milksnake habitat are proximity to water, and suitable locations for basking and egg-laying. They hibernate in mammal burrows, hollow logs, gravel or dirt banks, old wells or old building foundations that have enough moisture to prevent them drying out over the winter. Eggs are laid in a variety of locations, including compost or manure piles, stumps, under boards, or in loose soil. Suitable habitat for this species is found in the study area.

Fowler's toads are considered "Threatened" by COSEWIC and by the MNR and are protected by the *Species at Risk Act* and the *Fish and Wildlife Conservation Act.* Fowler's toads live on sandy beaches and breeds in marshy shallows of lakes or permanent ponds. Suitable habitat is found in the study area.

Jefferson salamander is considered "Threatened" by COSEWIC and by the MNR and is protected by the *Species at Risk Act* and the *Fish and Wildlife Conservation Act.* The habitat requirements of Jefferson salamander are vernal, fishless breeding ponds adjacent to mature forest. In the adult stage, Jefferson salamanders are terrestrial, migrating to small ponds to breed and then returning to the forest. Suitable habitat for this species does exist within the project area however none were observed in DEI field surveys.

5.0 Environmentally Sensitive Areas

The project study area does not contain any environmentally sensitive areas. Several small wetlands have been mapped by the GRCA based on the interpretation of orthophotographic images. MNR mapping also indicates several small wooded areas in the vicinity of the project.



LEGEND GRCA-mapped wetlands MNR-mapped woodlands

Figure 7. Environmentally Sensitive Areas

Permitted Uses

Policy 2.1 of the Provincial Policy Statements issued under Section 3 of the *Planning Act* states that, "Development and site alteration shall not be permitted in…significant wetlands in Ecoregions 5E, 6E and 7E1…[or] significant areas of natural and scientific interest unless it has been demonstrated that there will be no *negative impacts* on the natural features or their *ecological functions*."

The wetlands near the project area are not significant and are spatially separated from the project area. No negative impacts are anticipated.

6.0 Existing and Proposed Land Use

Existing Land Use

The land surrounding the project area was classified as "Residential", "Community Facility" and "Commercial". Argyle Street and the adjacent roads are lined with residential and commercial buildings. The nearby community facilities include schools, city parks and cemeteries. See Figure 14. Approximately 2km west of the existing Argyle Street South bridge is a Six Nations reserve. See Figure 15.

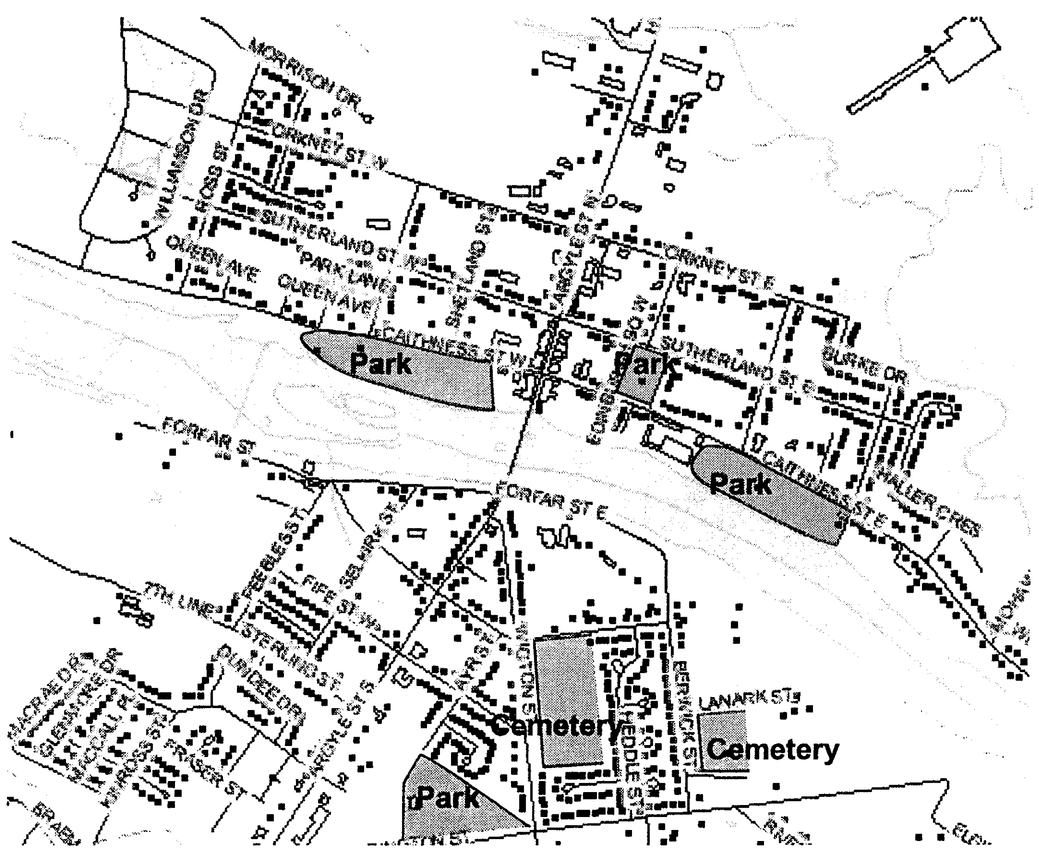


Figure 8. Existing Land Uses

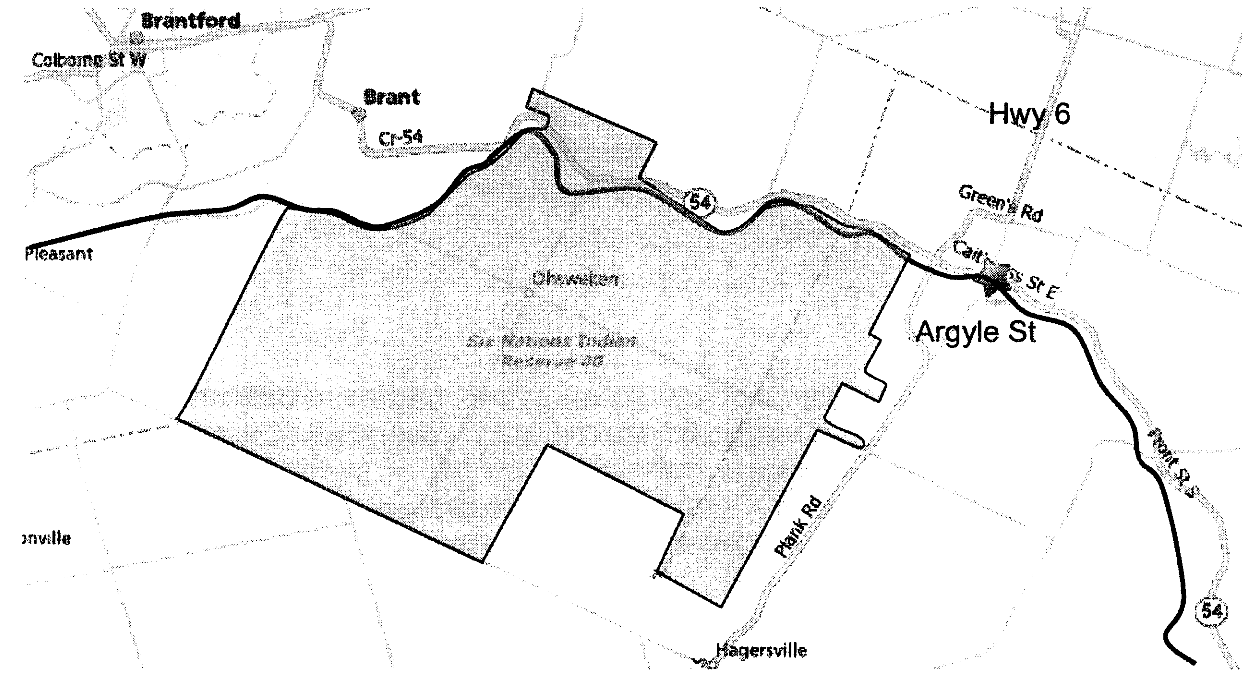


Figure 9. Six Nations Reserve

Proposed Future Land Use

No changes to existing land uses are expected as a result of the short-term bridge improvements.

7.0 Design Impacts and Mitigation

7.1 Aquatic Habitat

The short-term rehabilitation of Argyle Street South bridge will not require in-water works. This will reduce the impact on the existing fish habitat in the Grand River.

Potential impacts on aquatic habitat areas in the Grand River could include:

- Temporary disruption of fish habitat during the rehabilitation of the bridge piers;
- Erosion and/or sedimentation occurrences;
- Alteration and/or loss of shoreline cover;
- Disruption and possible curtailment of metabolism, respiration, feeding, reproduction, larval development, and migratory behaviour in some native fish;

Recommended mitigation measures to protect aquatic habitat include:

- Silt fence barrier along the perimeter of the designated work area to limit construction impacts on the river;
- No heavy equipment to enter the stream channel during construction;

- No fuel to be stored within the project area and all equipment to be refuelled and maintained at a single, designated fuelling/maintenance area well isolated from the river;
- Any effluent generated from the rehabilitation of the concrete deck or other structural components (i.e. saw cutting effluent) is contained and disposed of off-site;
- Install a containment system underneath the deck in areas where there is a potential for debris to fall into the water through the deck or off the sides of the bridge.
- Utilized suspended bridge platform to avoid in-water work.

Any "harmful alteration, disruption or destruction of fish habitat" requires a permit from the Department of Fisheries and Oceans Canada under the *Fisheries Act.* Should it be determined that the project will require a permit, compensation will be developed in consultation with the Department of Fisheries and Oceans Canada under the new MTO/DFO fisheries protocol.

7.2 Terrestrial Habitat

Short-term rehabilitation of the existing Argyle Street South Bridge may disturb any bird nests on the structure. Other potential impacts to the terrestrial habitat in the project area include loss of vegetation for food/nesting sites, loss of debris for reptile cover, compaction of soil for reptile nests.

Several mitigating measures will be used to protect the marsh areas west of the existing bridge. Minimizing the stormwater drainage entering the wetlands will ensure these areas and the species they support are protected.

Recommended mitigation measures to protect terrestrial habitat include:

- Appropriate lengths of silt fencing along the perimeter of minimized, designated work areas to limit construction impacts;
- Utilize best management practices;
- Prior to construction the contractor shall inspect the construction area for nests and eggs and advise the Contract Administrator of any locations of nests and eggs immediately;
- The contractor shall, prior to the removal of any nests, notify the Contract Administrator who shall contact the Environmental Office and the environmental consultant responsible for birds;
- Following the removal of a nest, the structure will be netted to prevent the recurrence of nesting activity;
- The contractor shall monitor the area daily for the recurrence of nesting activity upon removal of nests and notify the Contract Administrator immediately if a nest reappears;

- The contractor shall not destroy nests and eggs of protected migratory birds during migratory bird nesting season (April 1 to July 15 for Bird Conservation Area 13- Lower Great Lakes/St. Lawrence Plain).

7.3 Environmentally Sensitive Areas

The proposed Argyle Street South Bridge short-term improvements will not impact the Environmentally Sensitive Areas adjacent to the project area.

7.4 Land Use

The proposed short-term improvements to the Argyle Street South Bridge are compatible with the local existing and planned future land uses within the study area. No particular mitigation is warranted with regards to the local land uses.

7.5 Sediment and Erosion

The removal of ground cover and grubbing operations are minimal for this project, however, the potential for erosion and sedimentation of the local watercourse is a concern.

Recommended mitigation measures to minimize impacts caused by sediment and erosion:

- Conscientious design, installation and maintenance of sediment traps, silt fencing, check dams;
- Timely revegetation of exposed soils, both for temporary work areas and final grades (existing vegetation on embankments shall be maintained as long as possible);
- Machinery will not be permitted in watercourse;
- The contractor will be required to specify construction access routes and fuelling areas to avoid watercourse and groundwater contamination and siltation;
- The contractor will be reminded of the requirement to report contaminant spills as per the *Environmental Protection Act.* All toxic chemicals and contaminants must be disposed of off-site in approved disposal sites under appropriate MOE regulations.

7.6 Land Use- Navigational/Recreational Use

Grand River is considered a navigable waterway by Transport Canada. The proposed improvements to the Argyle Street South Bridge may interfere with the navigational and recreational uses of the river.

Recommended mitigation measures to minimize impacts to this land use include:

- No person shall permit any tools, equipment, vehicles, temporary structures or parts thereof used or maintained for the purpose of building or placement for work to remain in such water after completion of the project.
- Warning signs shall be placed 50m upstream and downstream of the site advising boaters of construction ahead until completion of the project.
- Warning signs must be maintained between May and October of any year.
- All vessels shall be permitted safe passage through the construction site, and assisted as necessary.
- Silt curtains or dewatering berms, installed during the navigation season, are to be marked with yellow buoys and/ or yellow lights.
- The platform is to utilize flashing lights to warn boaters;
- Signs will be posted on the bridge to warn boaters;
- Large shore-mounted, bilingual signs will advise of navigation changes at bridge;
- The existing navigable clearance at the Argyle Street South Bridge will be maintained.

7.7 Monitoring

Environmental Monitoring should be structured and scheduled to ensure compliance with any terms and conditions of legislative approvals, such as the *Fisheries Act*, and will most likely include the following parameters:

- Inspection of mitigation measures and designs to confirm that they were constructed according to the approved designs and contract constraints and provisions. Where measures or designs were not in compliance with the contract specifications, deficiencies will be noted and recommendations for remediation will be provided.
- Inspection of the project area to identify areas where environmental impacts are evident and remedial measures are required. These impacts may or may not have been anticipated prior to construction and mitigation may or may not have been prescribed during construction. Where environmental impacts are identified, the extent of the impacts and possible cumulative impacts will be noted and recommendations for remediation will be provided.
- Review as-built drawings and correspondence during construction to verify changes in environmental mitigation designs were approved and constructed in compliance with the approved changes.
- Inspection of mitigation measures to assess the effectiveness of the measures and to identify deficiencies in the operation or expected results of the measures. Where deficiencies are identified, recommendations for remedial measures or modifications to the measures for future use will be provided.
- Inspection of all construction requirements that formed a term or condition of a project approval to document compliance or non-compliance with the approval(s).

- Incidental inspection of landscape plantings to identify failures. Failures should be reported to the Region for subsequent discussion during on-site meetings between the Region and the Contractor relating to landscaping warranties.

If monitoring is required by a *Fisheries Act* Authorization, it is anticipated that monitoring will continue for a period of 2 years and be conducted during three seasons, Spring, Summer and Fall. Interim monitoring reports will be prepared on an annual basis and at the conclusion of the monitoring; a final monitoring report will be prepared and submitted to DFO.

8.0 Permits and Approvals

Fisheries Act

An approval under the federal *Fisheries Act,* which prohibits the harmful alteration, disruption or destruction of fish habitat, will not be required.

Species at Risk Act

Least bitterns, Loggerhead shrikes, Henslow's sparrows, Blanding's turtles, Stinkpot turtles, Eastern hognose snakes, Milk snakes, Eastern Sand Darter, Kidneyshell mussel and Round Pigtoe mussel are all protected under the federal *Species at Risk Act.* This act makes it an offence to possess, collect, buy, sell or trade, kill, harm, harass, capture or take, damage or destroy the residence of an individual of a listed species. The Argyle Street South Bridge project will not impact these restrictions.

Fish and Wildlife Conservation Act

Red-shouldered hawks, Blanding's turtles, Stinkpot turtles, Eastern hognose snakes and Milk snakes are protected under the federal *Fish and Wildlife Conservation Act.* Under this act, it is prohibited to kill, harass, or capture this species or destroy, take or possess their nest or eggs. The Argyle Street South Bridge project will not impact these restrictions.

Migratory Birds Convention Act

The removal or destruction of any nest of a migratory bird protected under the *Migratory Birds Convention Act* may require approval from Environment Canada – Canadian Wildlife Service. Vegetation removals should be assessed for nesting habitat prior to removal and, in the instance that a nest is encountered, consultations with Environment Canada should be undertaken to determine the need for a permit or approval.

Endangered Species Act

Loggerhead shrikes and Henslow's sparrows are protected under the provincial *Endangered Species Act,* which specifically prohibits willful harm to endangered species that are listed in regulations under the Act and the willful destruction of, or interference with, their habitats. The Argyle Street South Bridge project will not impact these restrictions.

Navigable Waters Protection Act

All bridgework is reviewable by Transport Canada to determine impacts to the navigability of any navigable watercourse. The Grand River is navigable and as such, this project is subject to their approval screening process.

9.0 Conclusions

The proposed short-term improvements to the Argyle Street South Bridge can be completed without significant adverse impacts to the existing natural habitat. Compliance with appropriate mitigation measures will ensure that the natural habitat requiring protection will not be adversely impacted. Monitoring should be carried out to ensure compliance with environmental mitigation measures.

The aquatic habitat for the fish and mussel species of the Grand River will be considered during the construction of the new Argyle Street South Bridge and mitigation measures have been put in place to minimize these impacts.

Terrestrial habitats within the project area will not be significantly disturbed by the proposed short-term improvements. However, the bridge construction must be sensitive to avian habitat and all vegetation should be assessed for nesting habitat prior to removal.

10.0 References

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APPENDIX A

VEGETATION LIST

Vegetation List- Argyle Street South Bridge

big leaf aster (*Aster macrophyllus*)
birds foot trefoil (*Lotus corniculatus*)
Broad-leaved Arrowhead (*Sagittaria latifolia*)
Canada thistle (*Cirsium arvense*)
Common cinquefoil (*Potentilla canadensis*)
common dandelion (*Taraxacum officinale)*
common mallow (*Malva neglecta*)
Common morning glory *(Ipomoea purpurea)*
Common Teasel *(Dipsacus fullonum)*
creeping bellflower (*Campanula rapunculoides*)
dames rocket (*Hesperis matronalis*)
field bindweed (*Convolvulus arvensis*)
Floating-leaved pondweed (*Potamogeton natans*)
Forget me not (*Myosotis scorpioides*)
fox grape (*Vitis labrusca*)
fragrant bedstraw (*Galium triflorum*)
goldenrod sp. (*Solidago sp.)*
grass sp. (*Poaceae sp.)*
hawthorn sp. *(Crataegus sp.)*
Manitoba maple (*Acer negundo*)
queen anne's lace (*Daucus carota*)
red raspberry (*Rubus idaeus*)
silver maple (*Acer saccharinum*)
Staghorn sumac (*Rhus typhina*).
sugar maple (*Acer saccharum)*
white ash (*Fraxinus americana*)
white elm (*Ulmus americana)*
white willow (*Salix alba)*
Wild onion (*Allium stellatum*)