



NATURAL HERITAGE ASSESSMENT REPORT

Central Grand Marais Drain Study and Environmental Assessment Walker Road to Dougall Avenue

Prepared for:

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TABLE OF CONTENTS

1.0	Introduction	1
1.1	Study Area	1
1.2	Report Objective	2
1.3	Format	2
2.0	Land Use Settings	3
2.1	Environmental Designations	3
2.2	Land Use Designations	3
2.3	Essex Region Conservation Authority (ERCA) Regulation	3
3.0	Description of the Natural Environment	4
3.1	Physical Setting	4
3.1.1	Physiography	4
3.1.2	Soils	4
3.1.3	Topography	4
3.1.4	Hydrology	4
3.2	Biological Setting	5
3.2.1	Areas of Natural and Scientific Interest (ANSI)	5
3.2.2	Vegetation Communities and Woodlands	5
3.2.3	Wetlands	6
3.2.4	Aquatic	7
3.2.5	Flora	8
3.2.6	Fauna	11
4.0	Natural Heritage Policy Considerations	13
4.1	Provincial Policy	13
4.2	Municipal Policy	15
4.3	ERCA Policy Considerations and Regulated Lands	16
5.0	Site Suitability and Recommendations	17
5.1	Proposed Improvements	17
5.2	Natural Heritage Considerations	18
5.3	Mitigation and Opportunities	18
5.3.1	Threatened and Endangered Species	19
5.3.2	Significant Wildlife Habitat	20
5.3.3	Fish Habitat and Water Quality	20
5.3.4	Urban Forestry	21
5.3.5	Water Quality	22
5.3.6	Floodplain	22
6.0	Summary	23
7.0	References	25

List of Figures

Figure 1: Site Location

Figure 2a: Study Area - Segments 1,2 and 3

Figure 2b: Study Area - Segments 4 and 5

Figure 3: Greenway System –City of Windsor Official Plan Schedule B

Figure 4: Development Constraints – City of Windsor Official Plan Schedule C

Figure 5: Land Use – City of Windsor Official Plan Schedule D

Figure 6: ERCA Regulation Mapping

Figure 7a: Vegetation Communities - Segments 1, 2 and 3

Figure 7b: Vegetation Communities - Segments 4 and 5

Figure 8: Significant Plant Locations

Figure 9: Potential Snake Habitat

List of Tables

Table 1: Fish Species Captured within the Grand Marais Drain

List of Appendices

Appendix A: Fish Data and Habitat Assessment Field Sheets

Appendix B: Significant Species List from NHIC database

Appendix C: Floral Inventory

Appendix D: Faunal Inventory

Appendix E: Significant Wildlife Habitat Evaluation

1.0 INTRODUCTION

The Grand Marais Drain is located in the south end of Windsor, Ontario. Grand Marais Drain originates near Pillete Road and continues to flows west along Grand Marais Road and eventually empties into Turkey Creek downstream of Huron Church Road.

Over the past four years Essex Region Conservation Authority, in conjunction with the City of Windsor, has undertaken several studies and construction contracts aimed at improving and maintaining various sections of the channelized Grand Marais Drain. Between Dougall Avenue and Walker Road, the majority of the Grand Marais Drain has been improved (i.e., realigned, bank stabilization, drain invert modifications) [Figure 1]. Channel improvements for the remaining unimproved segments of the Grand Marais Drain that occur between Dougal Avenue and Walker Road in the City of Windsor are being considered.

1.1 Study Area

The study area includes five segments of the Grand Marais Drain between Dougall Avenue and Walker Road that have not yet been improved [Figure 2a and 2b]. Segment 1 extends from Dougal Avenue east to South Cameron Boulevard. Segment 2 is the portion of drain located adjacent to the Roundhouse Center, which is just south of E.C. ROW at Howard Avenue. Segment 3 consists of the E.C. ROW culverts at the Howard Avenue on-ramp to the E.C. ROW Expressway. Segment 4 extends from the E.C. ROW Expressway to 280m north of the North Service Road. Segment 5 extends from Byng Road to Turner Road. Within each of these segments the study area has been defined as the area within 15m the Grand Marais Drain [Figure 2a and 2b].

For the purposes of this report, the lands within 120m of the five segments were reviewed to consider any landscape level natural features or functions. These lands are referred to as “adjacent lands” for the remainder of the report [Figure 1]. The Grand Marais Drain is within an urban setting, and therefore the adjacent lands are primarily rear yards or maintained properties, with no natural heritage features.

1.2 Report Objective

BioLogic was retained by Landmark Engineers Inc. to examine the natural heritage components within and adjacent to the five segments of Grand Marais Drain that require improvements to identify any potential impacts to the functions, features and values of any terrestrial and/or aquatic ecosystems. This report fulfills the requirements of the natural heritage components of the *Environmental Study Report* required by Ontario Environmental Assessment Act (1990) for Municipal Class Environmental Assessments, Schedule B.

The protocol and policies employed in this evaluation are consistent with the following:

- Ontario Environmental Assessment Act (1990),
- Ontario Ministry of Municipal Affairs Provincial Policy Statement (2005),
- Natural Heritage Reference Manual for Policy 2.3 (OMNR, 2010),
- Significant Wildlife Habitat Technical Guide (OMNR, 2000),
- Draft Significant Wildlife Habitat Criteria Schedules (MNR, 2012)
- Conservation Authorities Act: Ontario Regulation 158/06, and
- City of Windsor Official Plan (Office Consolidation, 2007).

1.3 Format

Report sections contain the following components, in accordance with the standards noted above. Our description of the existing environment includes:

- **Section 2.0** Land Use Setting
- **Section 3.0** Description of the Natural Environment
- **Section 4.0** Natural Heritage Policy Considerations
- **Section 5.0** Site Suitability and Recommendations
- **Section 6.0** Summary

The outcome of this report will identify the requirements for any additional detailed studies needed, identify potential impacts to the natural heritage features and functions and detail mitigation techniques to minimize any foreseeable adverse impacts.

2.0 LAND USE SETTINGS

2.1 Environmental Designations

Schedule B, City of Windsor Official Plan, 2007

The “Natural Heritage” designation in the City of Windsor Official Plan provides protection and conservation to Windsor’s most environmentally significant and sensitive natural areas, including provincially designated Areas of Natural and Scientific Interest (ANSIs) and wetlands. There are no designated Natural Heritage features within the study area or the adjacent lands [Figure 3]. The City of Windsor identified “recreation ways” through the study area and a linkage potential in Segment 3 and 4, but neither are apart of the “Natural Heritage” designation [Figure 3].

Schedule C, City of Windsor Official Plan, 2007

The study area and the adjacent lands are within the Floodplain designation [Figure 4]. The official plan notes that boundaries associated with this designation must be confirmed with the Essex Region Conservation Authority.

2.2 Land Use Designations

Schedule D, City of Windsor Official Plan, 2007

The study area for Segments 1 to 4 and their adjacent lands are mainly designated Commercial Center, Industrial and Mixed Use with some Commercial Corridor along Dougall Avenue and Howard Avenue [Figure 5]. The Segment 5 study area and its adjacent lands is mainly designated Residential with some Commercial Corridor along Walker Road [Figure 5].

2.3 Essex Region Conservation Authority (ERCA) Regulation

The study area and portions of the adjacent lands are regulated under Ontario Regulation 158/06 for a flood hazard associated with the Grand Marais Drain [Figure 6].

3.0 DESCRIPTION OF THE NATURAL ENVIRONMENT

The following section reviews the abiotic and biotic features within the study area and adjacent lands that contribute to the overall natural heritage features and functions. This review provides relevant background information for interpreting environmental features and functions in the study area for the identification of site sensitivities and potential impacts, which are discussed in Section 4.

3.1 Physical Setting

3.1.1 Physiography

Bedrock geology consists of Limestone, Dolostone and Shale of the Dundee Formation, which is Middle Devonian in age (Morris, 1994; Dillon and Golder, 2004). The bedrock lies at a depth 20-35 m below the surface (Dillon and Golder, 2004). The study area is within the St. Clair Clay Plain (Chapman and Putnam, 1984). The geological surficial setting for the study area consists of clayey silt till (Vagners, 1972; Dillon and Golder, 2004).

3.1.2 Soils

The soil type for Segments 1,2 and 5 is a Brookston Clay Loam with Burford Loam (shallow phase) as the soil for Segments 3 and 4 (Richards et al., 1949). The Brookston soil series is a poorly drained soil that has a fairly high organic matter content in the surface soil and developed on almost flat topography (Richards et al., 1949). The shallow phase Burford Loam is a well drained soil developed on well sorted gravelly materials derived largely from dolomitic limestone and smaller proportions of shaley and siliceous materials (Richards et al., 1949).

3.1.3 Topography

The entire study area is generally flat, with a very gentle slope to the southwest towards the Detroit River (Richards et al., 1949; Dillon and Golder, 2004).

3.1.4 Hydrology

The Grand Marais Drain is located within the Turkey Creek sub-watershed. The Grand Marais Drain originates near Pillete Road and continues to flow west along Grand Marais Road until it empties into Turkey Creek downstream (west) of Huron Church Road. Turkey Creek then flows southwest to the Detroit River.

There is a surficial sand aquifer associated with the St. Clair Clay Plain, and in this area it is generally 2-4m thick (Chapman and Putnam, 1984; Dillon and Golder, 2004). The water table within the area is relatively shallow, between 2 and 5 meters from the surface (Dillon and Golder, 2004).

3.2 Biological Setting

An additional information request was submitted to MNR on March 26, 2013 to confirm and or update the natural heritage data (i.e., NHIC database, Land Inventory Ontario mapping, DFO mapping, and Official Plan mapping) within or adjacent the study area. At the writing of this report, this information has not yet been received from the MNR.

3.2.1 Areas of Natural and Scientific Interest (ANSI)

There are no ANSI's located within the study area in all five segments or the adjacent lands (NHIC database, May 10, 2013; City of Windsor, 2007).

3.2.2 Vegetation Communities and Woodlands

There are no woodlands identified within the study area in all five segments or the adjacent lands (Land Inventory Ontario mapping - LIO, 2013).

Site Investigation

Based on site investigations, there are no natural vegetation communities only cultural communities within the study area. The following communities were present [Figure 7a and 7b]:

- Cultural Thicket (CUT)
- Cultural Meadow (CUM)
- Anthropogenic Land Uses (A)

Cultural Thicket

The cultural thicket is the riparian vegetation associated with the Grand Marais Drain. The riparian vegetation consisted of a variety of trees (maple, oak, ash and) and shrubs (dogwood, buckthorn) with tree cover being less than 25% and shrub cover greater than 25%. In the adjacent lands north of Segment 1 between the commercial building and South Cameron Boulevard, there is an abandoned property that consists of a cultural thicket which is similar to the riparian vegetation composition.

Cultural Meadow

In the adjacent lands north of Segment 1 between the commercial building and South Cameron Boulevard, there is an abandoned property that consists of a cultural thicket (as mentioned above) and an open field. The open field has not been maintained regularly resulting in a diversity of species (grasses and wildflowers) and longer/tall grasses/plant stems, which is characteristic of cultural meadows.

In Segment 2, there is a large open area north of the Grand Marais Drain. There are portions of this open field that have and have not been regularly maintained. The portions of open field that has not been regularly maintained have a diversity of species (grasses and wildflowers) and longer/tall grasses/ plant stems, while the maintained areas are simply mowed grass (i.e., anthropogenic land use).

Anthropogenic Land Uses

Beyond the riparian vegetation throughout all five segments there are regularly maintained lawns, residential buildings, commercial buildings, parking lots, roadways and recreational pathways. There are a few individual trees dispersed within the maintained lawns associated with the residential properties or the public walkways.

Upstream of the study area (east of Walker Road), the Grand Marais Drain flows through residential, commercial and industrial areas the City of Windsor. Downstream of the study area (west of Dougall Avenue), the Grand Marais Drain consists of a concrete lined channel that is either manicured residential lawns or manicured lawn associated with the public walkways.

The Grand Marais Drain provides limited function as a wildlife corridor although it is connected to the Spring Garden ANSI, a large natural areas downstream of Huron Church Road approximately 3 km from the study area.

3.2.3 Wetlands

There are no provincially significant wetlands (PSWs) within the study area in all five segments or the adjacent lands (NHIC database, May 10, 2013; LIO, 2013).

Site Investigation

Based on site investigations, there are no wetland communities within the study area in all five segments.

3.2.4 Aquatic

There are no Endangered, Threatened or Special Concern aquatic species (i.e., fish or mussels) in the Grand Marais Drain within the study area (NHIC, May 2013; DFO, 2013)

Site Investigation – Fish Habitat

Fish habitat investigation were completed by BioLogic on October 3, 2012 for the segments of the Grand Marais Drain within the study area [Appendix A]. This investigation included an assessment of in-stream habitat features and over contribution of the drainage feature to fish habitat. Information collected for the assessment included channel morphological characteristics, flow characteristics, aquatic habitat features and riparian vegetation characteristics.

Segments 1, 2, 4 and 5

These segments of the Grand Marais Drain were homogeneous. The Grand Marais Drain, throughout these segments, is a straightened channel that has steep banks on both sides resulting in a trapezoid-shaped channel. The channel is relatively flat and has a very little pool-riffle habitat, with only one large pool located at the culvert for the Plaza Entrance in Segment 1, which is just upstream of the weir at Dougal Avenue. The pool had a water depth of approximately 1m with a wetted width of approximately 9m. The channel had a water depth between 0.2m and 0.6m with a wetted width between 2m to 3m. Substrate throughout consisted primarily of rip rap/cobbles and gravel with smaller amounts of muck, silt and clay. Banks are vegetated with grasses, shrubs and trees. Average bankfull/top of slope width and depth were approximately 15m and 5m, respectively. Another weir is located north of North Service Road.

Segment 3

In Segment 3 the Grand Marais Drain is still a straightened, trapezoid shaped channel however it is a concrete lined channel with concrete extending up the banks. Observations for this segment were made from the banks due restricted access (fencing all around segment), therefore no depth measurements were acquired. The channel within this segment is flat and devoid of any pool riffle habitat. On average the wetted width was 15m. The bankfull/top of slope width is approximately 20m. There is no riparian vegetation along the banks of the Grand Marais Drain within this segment.

Site Investigation – Fish Community

Based on the existing fisheries data collected by ERCA in 2001 between Howard Ave and Walker Road

and by BioLogic in 2011 downstream of the Dougall Avenue weir, it has been determined that the Grand Marais Drain does support a warmwater sportfish and baitfish community [Table 1]. All the fish species captured and listed in Table 1 are common and widespread throughout Ontario. However, the weir located at Dougall Avenue would limit fish access to the Grand Marais Drain within the study area [Appendix A]. There would be a very small fish community upstream of the Dougall Avenue weir since fish would only have access to the upstream reaches during periods of high flow.

Table 1: Fish Species Captured within the Grand Marais Drain

Fish Species Captured		ERCA Data 2001	BioLogic Data 2011
Common Name	Scientific Name	Upstream of Dougall Ave Wier	Downstream of Dougall Ave Wier
Bluegill	<i>Lepomis megalotis</i>		X
Bluntnose Minnow	<i>Pimephales notatus</i>		X
Emerald Shiner	<i>Notropis atherinoides</i>	X	
Common Carp	<i>Cyprinus carpio</i>		X
Creek Chub	<i>Semotilus atromaculatus</i>		X
Fathead Minnow	<i>Pimephales promelas</i>	X	X
Gizzard Shad	<i>Dorosoma cepedianum</i>		X
Green Sunfish	<i>Lepomis cyanellus</i>	X	
Largemouth Bass	<i>Micropterus salmoides</i>		X
Pumpkinseed	<i>Lepomis gibbosus</i>		X
Rock Bass	<i>Ambloplites rupestris</i>		X
Smallmouth Bass	<i>Micropterus dolomieu</i>		X

3.2.5 Flora

Thirty-seven (37) rare plants have been reported in the vicinity of the study area (NHIC database, April 10, 2013). The element occurrences within the 1km squares that cover the study area (i.e., all five segments) and the adjacent lands on the NHIC Biodiversity Explorer are noted in Appendix B.

Of the 37 rare plant species, 30 are provincially significant (i.e., ranked S1 to S3) while the remaining 7 plant species are species at risk and are listed provincially under the *Endangered Species Act* (ESA) and/or federally under the *Species at Risk Act* (SARA). The element occurrences for the 7 plant species at

risk within the 1km squares that cover the study area and the 120m adjacent lands on the NHIC Biodiversity Explorer are:

- Purple Twanyblade (END provincially, THR federally, S2)
- Colicroot (THR, S2)
- Dwarf Lake Iris (THR provincially, SC federally, S3)
- Willowleaf Aster (THR, S2)
- Climbing Prairie Rose (SC,S3)
- Shumard Oak (SC, S3)
- Swamp Rose-mallow (SC, S3)

Habitat Requirements

Purple Twanyblade - requires oak savannah and secondary successional, deciduous or mixed forest habitat (COSEWIC, 2010a). It favors xeric to mesic drainage conditions but can tolerate wet conditions. This orchid will grow in partial shade however it does not tolerate dense shade.

Colicroot - typically inhabits open moist prairie and old fields. However, are also known to inhabit roadsides and edges of wooded areas that have coarse textured sandy soil (SARPR, 2012).

Dwarf Lake Iris - inhabits shallow, calcareous and well-drained soils in areas where there are openings in the forest canopy and prefers semi-shaded areas where the water table is just below surface (COSEWIC, 2010b). Currently in Ontario, this iris is restricted to the north shore of Lake Huron (COSEWIC, 2010b). The record for the study area is known as a historic record and is most likely not present within the area anymore (COSEWIC, 2010b; Pratt, 2011).

Willowleaf Aster - typically inhabits prairies, meadows, and thickets as well as oak savannahs, but is also found in disturbed areas such as roadsides, along railways, and in abandoned fields (COSWEIC, 2003).

Climbing Prairie Rose - is an early successional species that colonizes open habitats such as early successional old fields, prairies and shrub meadows as well as abandoned agricultural fields or unoccupied urban land (COSEWIC, 2002). As succession progresses the habitats become less favourable for this species.

Shumard Oak - requires rich, moist, poorly-drained clay and clay loam soils in deciduous forests or along fence rows (COSEWIC,1999). This tree requires full sunlight for seedling establishment and is thus not found under closed canopies.

Swamp Rose-mallow - usually grows in early successional wetlands, either deep water or meadow marshes, that are or have been associated with Lake Erie, Ontario or St.Clair but it is also sometimes found in open wet woods, thickets and drainage ditches (COSEWIC, 2004).

Based on plant records for the Spring Garden Road ANSI and the Ojibway Prairie Complex ANSI, all of the plant species listed above have been found within these ANSI's (Pratt, 2011; Oldham, 1983).

Habitat requirements for all these plant species, (prairie or wet, open deciduous forest habitat) does not exist in the study area. Based on plant records and habitat requirements these plants are all known to be located locally within the Spring Garden ANSI and the Ojibway Prairie Wetland Complex which is 2.5km downstream of the study area and the adjacent lands, near Huron Church Road.

Site Investigation

Floral life science inventories were completed by Gerry Waldron and Peggy Hurst on November 14, 2012 [Appendix C]. This inventory was conducted for the study area in all five segments. The areas beyond the riparian vegetation adjacent to the Grand Marais Drain are mainly maintained yards of the adjacent residential, commercial and recreational land uses, which include lawns, public pathways and individual trees.

Site investigations did not find any species at risk (listed as special concern, threatened, or endangered under ESA and/or SARA), however three provincially significant (i.e., ranked S1 to S3) plant species were found [Appendix C]:

- Tall Boneset (S1)
- Honey Locust (S2)
- Stiff Goldenrod (S3)
- Missouri Ironweed (S3?)

The S-ranks for the Tall Boneset and the Honey Locust only apply to native species. Tall Boneset is only native to Pelee Island although it can be found along railways and roadsides elsewhere in southern

Ontario (Oldham and Brinkler, 2009). Since Honey Locust is commonly planted as an ornamental tree, cultivated stock would not be considered significant (Oldham and Brinkler, 2009). Since the Tall Boneset is not located on Pelee Island and the Honey Locust are cultivated stock, the S-ranks would not apply and they would not be considered as significant and would not need further consideration.

Both the Stiff Goldenrod (S3) and Missouri Ironweed (S3?) typically inhabit prairies, savannahs, vacant lots, abandoned fields, and areas along railroads (Voss, 1985). These plants are located in the Segment 2 north of the Grand Marais Drain in the portions of open field that has not been regularly maintained near the railway line [Figure 8].

3.2.6 Fauna

Two (2) rare faunal species have been reported in the vicinity of the study area (NHIC database, May 10, 2013) [Appendix B]. The element occurrences within the 1km squares that cover the study area on the NHIC Biodiversity Explorer are:

- Common Five-lined Skink – Carolinian population (END, S2)
- Butler’s Gartersnake (END provincially, THR federally, S2)

In addition to the above element occurrences, it is known that the Eastern Foxsnake (END, S2) exists throughout the Windsor area.

Habitat Requirements

Common Five-lined Skink - typically inhabits stabilized sand dunes, open forest areas, and wetlands where they can find shelter, most often under plant debris, tree trunks or artificial objects like construction materials, utility poles and wooden boardwalks (COSEWIC, 2007). Studies from Point Pelee National Park show that skinks have a strong association with woody debris (COSEWIC, 2007). Based on recent studies, the record for the Five-lined skink in the area is historical (last recorded in the area in 1992). Therefore, only incidental encounters of this species is anticipated.

Butler’s Gartersnake - this species is found in open areas with dense grasses near ditches, seasonally dry marshes, or other small bodies of water (COSEWIC, 2010c). This species may inhabit vacant lots in urban areas and areas partially overgrown by shrubs and trees (COSEWIC, 2010c). An essential component for the Butler’s Gartersnake is cover whether it be dense grass/herb cover with a heavy thatch layer of dead vegetation from previous years or rocks, boards, cardboard, and similar debris (i.e., junk

piles) (COSEWIC, 2010c).

Eastern Foxsnake - this species mainly uses un-forested areas such as old fields, prairies, marshes, dune shorelines during their active season however are also known to use farm hedgerows and riparian areas around drainage features and for hibernation they use a variety of both natural and anthropogenic (i.e., limestone fissures, small animal burrows, canals, wells, old building foundations) (COSEWIC, 2008).

Based on the habitat requirements for these faunal species, these species could possibly be inhabiting the study areas of all five segments. Grassed areas that are not regularly maintained may provide foraging habitat. It is anticipated only incidental encounters with Eastern Foxsnake and Butler's Gartersnake are possible within these areas.

Site Investigation

A faunal survey was completed by BioLogic on October 3, 2012 to identify any potential snake habitat within the study area [Appendix D][Figure 9]. BioLogic staff assessed the study area for natural and anthropogenic features that are required for reproductive success of snakes including hibernacula, nesting sites and thermoregulatory sites. There is limited potential habitat features available for successful survival of snakes within the study areas in all five segments.

Throughout all five segments, the steep drain slopes contained many mammal burrows which have the potential to be used as hibernaculum by local snakes however there was minimal woody and organic debris for foraging and thermoregulating . The remaining habitat within the study areas and adjacent lands is mainly heavily disturbed riparian vegetation corridor containing typical shrubby successional vegetation species. The vegetation in most places is quite thick and not likely to be preferred by snakes as they tend to prefer more open habitats.

The most suitable snake habitat was found within the study area and adjacent communities of Segment 1 and Segment 2. The open field to the north of Grand Marais Drain within the adjacent lands of Segment 1 is high-quality foraging habitat that would be preferred by Eastern Foxsnake and could also provide similar habitat for other smaller snake species, including Butler's Gartersnake (THR). The same is true for the portions of open field that has not been regularly maintained in Segment 2 [Figure 9]. There are also two rock piles in Segment 2 that have the potential to be used as hibernaculum [Figure 9].

4.0 NATURAL HERITAGE POLICY CONSIDERATIONS

This section reviews the provincial, municipal and Conservation Authority regulatory policies within the subject lands with respect to Natural Heritage considerations.

The provincial and municipal natural heritage policies provide guidelines that determine appropriate land uses on and adjacent to natural heritage features and functions. Policies that pertain to this site include:

- the Provincial Policy Statement from MAH, 2005, section 2.1
 - these have been reviewed with the Natural Heritage Reference Manual (MNR, 2010)
- the City of Windsor Official Plan, Section 5
- the ERCA Regulations.

The natural features and functions identified in Section 3, are applied to the above policies in order to determine which components of the natural heritage system will require additional consideration.

Features which warrant further evaluation for significance or require guidance with respect to construction activity are discussed in more detail in Section 5.

4.1 Provincial Policy

The Provincial Policy considerations are based on Provincial Policy Statement from MAH, 2005, section 2.1 and are reviewed using Sections 5 to 11 of the Natural Heritage Reference Manual (MNR, 2010).

Section 5 - Significant Habitat of Endangered and Threatened Species

There is potential snake habitat for Butler's Gartersnake and Eastern Foxsnake within the study area.

There is also potential for incidental encounters of the following species within the study area:

- Common Five-lined Skink – Carolinian population (END, S2)
- Butler's Gartersnake (THR, S2)
- Eastern Foxsnake (END, S2)

Mitigation measures for direct impacts of construction to potential snake habitat and incidental encounters of the at risk reptile species listed above will need to consider for this project.

Section 6 - Significant Wetlands and Significant Coastal Wetlands

There are no provincially significant wetlands within the study area or the adjacent lands.

Section 7 - Significant Woodlands

There are no woodlands located within the study area or the 120m adjacent lands. The riparian vegetation located along both banks of the Grand Marais Drain in Segments 1,2,4 and 5 would not be considered significant, however the riparian vegetation is located on City owned property and will be discussed under the Municipal Policy review.

Section 8 - Significant Valleylands

The Grand Marais Drain would not be considered a provincially significant valleyland.

Section 9 - Significant Wildlife Habitat

This evaluation is based on what was found during site investigations, the Significant Wildlife Habitat Technical Guide (MNR, 2000) and the draft Significant Wildlife Habitat Criteria Schedules (MNR, 2012). A full evaluation is located in Appendix E.

Habitats of seasonal concentrations of animals:

Candidate Significant Habitat in the form of snake hibernaculum exists. Works within the study area will need to consider impacts to this potential habitat.

Rare vegetation communities or specialized habitat for wildlife:

No rare vegetation communities were identified within the study area or the adjacent lands. No specialized habitat or their associated species were noted, at least not in numbers which would imply provincial significance.

Habitat of species of conservation concern:

Stiff Goldenrod (S3) and Missouri Ironweed (S3?) are located within open field area of Segment 2 beside the railway line. These species and their habitat will need to be considered.

Animal movement corridors:

The Grand Marais Drain does not function as a significant wildlife movement corridor in this location.

Section 10 - Significant Areas of Natural and Scientific Interest

There are no Areas of Natural and Scientific Interest located within or adjacent to the study area.

Section 11 - Fish Habitat

Grand Marais Drain does provide fish habitat to many warmwater sportfish and baitfish and outlets to Turkey Creek downstream of the study area. Works within the study area will need to consider protection of fish habitat from direct and indirect impacts of construction.

4.2 Municipal Policy

The Municipal Policy Natural Heritage considerations are based on the City of Windsor Official Plan (2007), Section 5.3 and Section 5.4 that address natural heritage.

Section 5.3 - Environmental Quality

Natural Heritage Policies

There are no lands designated Natural Heritage within the study area or the adjacent lands.

Environmental Policy Areas Policies

There are no lands designated Environmental Policy Areas within the study area or the adjacent lands.

Candidate Natural Heritage Sites Policies

There are no lands designated Candidate Natural Heritage Site within the study area or the adjacent lands.

Urban Forestry Policies

As part of these policies the City of Windsor recognizes and encourages the:

- planting of native trees associated with the Carolinian forest region on public and private property and along watercourses;
- creation, maintenance and enhancement of treed areas along infrastructure ROW and in public open spaces;
- protection of trees on public and private lands from damage associated with construction and maintenance activities;
- replacement of trees in situations where trees would be lost due to development activities;
- relocation and transplanting of trees to municipal lands in situations where trees would be lost due to development activities.

Since there are trees located within the riparian vegetation on either side of Grand Marais Drain,

appropriate measures should be employed to follow the City of Windsor's Urban Forestry Policies.

Water Quality Policies

As part of these policies the City of Windsor supports the:

- strategic placement of habitat enhancement elements in and along watercourse to provide for the spawning, feeding and nesting of aquatic related species;
- maintenance of watercourse so that they are free from litter, refuse, and other debris in order to augment the flow and flushing ability of waterways and to improve aquatic habitat;
- creation of constructed wetlands where appropriate.

Appropriate measures should be employed to follow the City of Windsor's Water Quality Policies.

Section 5.4 - Environmental Management

Floodplain Areas Policies

As part of these policies, the City of Windsor requires that the proposed development will not significantly affect the hydrology or hydraulics of the floodplain. Consideration will need to be given to the Grand Marais Drain hydrology/hydraulics.

4.3 ERCA Policy Considerations and Regulated Lands

Conservation Authority Regulation Limit

Any development proposed within the areas regulated by ERCA will require a permit.

5.0 SITE SUITABILITY AND RECOMMENDATIONS

The following section reviews the natural heritage considerations in relation to the proposed construction activities associated with the Grand Marais Drain improvements to the five segments within the study area. All work for the Grand Marais Drain improvements will be limited to the Grand Marais Drain proper and City own lands or private lands with permission for access.

5.1 Proposed Improvements

Channel improvements for the remaining unimproved segments of the Grand Marais Drain that occur between Dougal Avenue and Walker Road in the City of Windsor are being considered. Improvements include management options for accumulated sediments. The preferred design solution for drain improvements differs between the five segments. The preferred option for improvements for each segment is described below and are discussed further in Section 3 of the main EA document:

- **Segment 1 – Dougall Avenue to South Cameron Boulevard**

Slope stabilization through creation of retaining wall along the south side (only between Dougall Ave and the Plaza Entrance) and re-alignment. Flatten banks to a stable slope. Repair existing storm outlets into the drain. Replace existing weir with rock vane structures to transition slope to meet the existing slope at Dougal Avenue. Recreational pathways will be extended along the north side of West Grand Boulevard. Construction of one or several snake hibernaculum where possible and out of the way of required ongoing maintenance activities.
- **Segment 2 – Adjacent to Round House Centre (east of Howard and south of E.C. Row)**

Excavate and shape an online pond with a low flow channel through the railway culvert. Construct an access ramp for pond maintenance. Alter railway culvert to facilitate pond function. Construction of snake hibernaculum where possible and out of the way of required ongoing maintenance activities.
- **Segment 3 – E.C. Row Expressway Culverts at Howard Avenue On-ramp**

Removal and disposal of sediments from the culverts under the E.C. Row Expressway and E.C. Row On-ramp at Howard Avenue.
- **Segment 4 – E.C. Row Expressway to 280m north of North Service Road**

Slope stabilization and drain re-alignment. Removal of sheet steel pile and gabion wier upstream of North Service Road. Construct a new bridge for the recreation way over the

drain as well as reconstruct recreation way. Construction of one or more snake hibernaculum where possible and out of the way of required ongoing maintenance activities.

- **Segment 5 – Byng Road to Turner Road**

Re-construct the drain so that the drain invert is consistent with inverts upstream and downstream. Flatten banks to a stable slope. Create a berm north of the drain. Modify existing storm outlets. Remove steel sheet pile and gabion upstream of Turner Road. Construct new bridge crossing at Turner Road. Construction of one or more snake hibernaculum where possible and out of the way of required ongoing maintenance activities.

The benefits from the proposed improvements to the Grand Marais Drain include a sustainable channel alignment, uniform channel invert, increased storage capacity, increase fish passage and habitat through the removal of weirs and reduction of sedimentation through the removal of sediments and the creation of an online settling pond.

5.2 Natural Heritage Considerations

For the Grand Marais Drain improvements within the study areas in the five segments, the following natural heritage features need to be considered:

- Habitat of Threatened and Endangered Species (potential)
- Significant Wildlife Habitat: Candidate Seasonal Concentrations (hibernaculum) and Species of Conservation Concern (S-ranked plant species)
- Fish Habitat
- Urban Forestry
- Water Quality
- Floodplains

5.3 Mitigation and Opportunities

The following text will identify potential impacts, mitigation techniques or recommendations for further study and, when possible, opportunities for the enhancement of the natural heritage system.

5.3.1 Threatened and Endangered Species

There is potential for incidental encounters of the following species within the study areas of all five segments:

- Common Five-lined Skink – Carolinian population (END, S2)
- Butler’s Gartersnake (THR, S2)
- Eastern Foxsnake (END, S2)

There is also potential snake habitat (foraging and hibernaculum) for the Butler’s Gartersnake and Eastern Foxsnake within in Segments 1 and 2. A permit will be required under the *Endangered Species Act* to alter habitat and mitigate against harm to these species.

Mitigation Measures and Opportunities

Potential Species at Risk and their Habitat

- At detailed design, identified snake habitat should be assessed for usage and a snake emergence study may be needed. This more detailed study will also determine if potential habitat within the Segments 1 and 2 is habitat for Threatened or Endangered snakes or regulated habitat under the *Endangered Species Act*. Additional mitigation measures may be required to address the study findings.
- At detail design, a Snake Hibernacula Plan should be prepared. This plan will have detailed drawings for construction and location(s) of the proposed snake hibernacula. A faunal expert should be consulted through the design and approve the Snake Hibernacula Plan for the project. This plan will provide additional habitat (i.e., constructed hibernacula) and would therefore be considered a net benefit to the snake species.
- A permit will be required under the *Endangered Species Act* to alter habitat and mitigate against harm to these species.

Incidental Encounters

- A description of the Common Five-lined Skink, Butler’s Gartersnake and Eastern Foxsnake and a field identification guide should be made available to the staff and posted at the site office.
- Should a Five-lined Skink, Butler’s Gartersnake and Eastern Foxsnake be encountered during the construction of the Grand Marais Drain improvements, all construction activities should be halted. Any snake movement should be monitored and vehicular traffic should be redirected. MNR staff

should be notified immediately and the snake should be relocated to an appropriate safe habitat by a qualified ecological professional or consultant (i.e., faunal biologist or expert). Once the snake is relocated, construction activities can resume.

5.3.2 Significant Wildlife Habitat

There is potential for snake hibernaculum for common and Special Concern snakes that possibly inhabit the area.

Mitigation Measures and Opportunities

- At detailed design, identified snake habitat should be assessed for usage and a snake emergence study may be needed. This more detailed study will also determine if potential habitat within the Segments 1 and 2 is significant wildlife habitat for snakes (either for at risk or not at risk species) or regulated habitat under the *Endangered Species Act*. Additional mitigation measures may be required to address the study findings.
- At detail design, a Snake Hibernacula Plan should be prepared. This plan will have detailed drawings for construction and location(s) of the proposed snake hibernacula. A faunal expert should be consulted through the design and approve the Snake Hibernacula Plan for the project. This plan will provide additional habitat (i.e., constructed hibernacula) and would therefore be considered a net benefit to the snake species.

5.3.3 Fish Habitat and Water Quality

Grand Marais Drain does provide fish habitat to many warmwater sportfish and baitfish and outlets to Turkey Creek downstream of the study area. Works within the study area will need to consider protection of fish habitat from direct and indirect impacts of construction. The proposed design will remove the weir located at Dougal Avenue and North Service Road which will provide fish better access to the upstream reaches, thus improving fish habitat in the Grand Marais Drain, which would be considered a net benefit to aquatic species.

Mitigation Measures

- In-stream works should not take place between March 15th and June 30th to protect spring spawning of the fish species that utilize the Grand Marais Drain.
- If any in-water work is contemplated, the in-water work area should be isolated and flow should be maintained to the downstream reaches.

- At detailed design, a fish rescue and relocation plan should be designed for the in-stream isolated work areas.
- At detailed design, prepare a Sediment and Erosion Control Plan. The plan should outline appropriate control measures to avoid sedimentation and erosion impacts to the Grand Marais Drain as well as aquatic and terrestrial habitats/species downstream of Huron Church Road. The plan should consider:
 - 1) Guidelines for Erosion and Sediment Control for Urban Construction Sites (OMNR, 1987)
 - 2) applicable standards established in the Ontario Provincial Standard Specification/ Ontario Provincial Standard Drawings (OPSS/OPSD) documents
 - 3) measures to minimize the extent and period of exposed soil in disturbed areas within the work area to prevent sedimentation into the Grand Marais Drain.
- Re-fueling and maintenance of construction equipment must occur at a minimum on the tableland outside the limits of the concrete channel of Grand Marais Drain to minimize the potential for deleterious substances from entering the water. Non-mobile equipment within the construction area should have a permanent drip pan.
- An emergency spill kit should be on-site at all time in the event of a spill. All workers should be trained the proper spill procedure (i.e., containment, clean-up and reporting) which should also be completed in accordance with provincial standards.
- Any excess material needed to complete the drain improvement work or unwanted materials from improvements (i.e., old concrete, garbage, etc.) should be disposed of properly.
- A Letter of Intent (LOI) should be prepared at detailed design to fully assess impact to fish and fish habitat and identify specific mitigation measures (which may include some or all of the mitigation measures mentioned above) that are going to be employed for the project to ensure there is no violation under the federal *Fisheries Act*. Once the LOI is completed, an Authorization or a Letter of Advice can be provided by the Department of Fisheries and Oceans (DFO) or Essex Region Conservation Authority (ERCA) for the project.

5.3.4 Urban Forestry

Many trees or treed areas are concentrated along the Grand Marais Drain banks, resulting in a riparian habitat along the drain. The Urban Forestry policies in the City of Windsor Official Plan should be considered. The following mitigation measures should be considered at detailed design.

—

Mitigation Measures and Opportunities

- At detailed design, prepare a tree preservation plan. This plan should address:
 - 1) tree removal, replacement, transplantation for trees that can not be saved within the study area
 - 2) protection methods for trees that are to be saved within the study area
 - 3) enhancement/planting opportunities for new trees within the study area.
- At detailed design, a landscape plan be created and should address enhancement/planting areas and restoration of disturbed/bare soils. The plan should also specify which native trees or native seed mixes are being used for naturalizing these areas within the study area.

5.3.5 Water Quality

In addition to the mitigation measures proposed for Fish Habitat (Section 5.3.2), the following measures should also be considered to address Water Quality policies in the City of Windsor Official Plan.

Mitigation Measures and Opportunities

- At detailed design, conduct an assessment on the strategic placement of habitat enhancement elements in and along watercourse to provide for the spawning, feeding and nesting of aquatic related species.
- At detailed design, prepare a maintenance plan for the Grand Marais Drain study area. This plan will address maintenance activities that will ensure the drain is free from litter, refuse, and other debris that may augment the flow and flushing ability of the Grand Marais Drain.

5.3.6 Floodplain

The Grand Marais Drain study area is located within the Floodplain designation on the City of Windsor Official Plan Schedule C [Figure 4] and the Conservation Authority Regulation Limit that is regulated by ERCA [Figure 6].

Mitigation Measures

- At detailed design, a hydrology/hydraulics study of the Grand Marais Drain should be conducted to ensure that the proposed improvements will not significantly affect the hydrology or hydraulics of the Grand Marais Drain and its floodplain.
- A permit from the Essex Region Conservation Authority is required prior to any site alterations.

6.0 SUMMARY

Currently, the study area provides very limited fish habitat due to the weir located at Dougall Aveune that restricts access to the upstream reaches. There is also potential foraging and hibernating (hibernacula) snake habitat within the Segments 1 and 2 as well as and S-ranked plant species in Segment 2. Also, there is potential for encounters with at risk reptile species within the study area during construction.

Prior to detailed design, MNR should be contacted to confirm any additional potential species at risk located within the study areas for all five segments.. At detailed design, species at risk and their habitats that are or potentially located within the five segments will need to be reviewed/studied in more detail. If additional species are identified by MNR, additional targeted surveys may need to be completed. Based on what is found during these additional/detailed studies, *Endangered Species Act* permits will need to be obtained. A permit from ERCA prior to any site alterations will also be required.

The following additional plans/reports during the detailed design phase should also be prepared to ensure appropriate mitigation strategies and opportunities are carried out:

- Sediment and Erosion Control Plan
- A Letter of Intent for *Fisheries Act* review
- Snake Hibernacula Plan
- Fish Rescue and Relocation Plan
- Tree Preservation Plan
- Landscape Plan
- Aquatic Habitat Enhancement Assessment
- Maintenance Plan
- Hydrology/Hydrualics Study

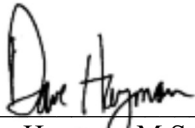
The preferred design solution provides a uniform channel invert, slope stabilization and channel re-alignment for increased capacity and longevity. The design also incorporates management of accumulated sediment through the creation of an on-line pond and sediment mitigation/removal options. The preferred solution will also increase:

- fish habitat through the removal of the Dougall Avenue weir and the North Service Road weir
 - It is important to note that any future works proposed upstream of Dougall Avenue after weir removal will require *Fisheries Act* approval. Currently, the Grand Marais Drain is regulated under numerous acts and regulations (e.g., *Drainage Act*, *Conservation Authorities Act* and the *Endangered Species Act*) that also require approvals. In our opinion, the addition of the Fisheries Act regulation will not make the approval process for future works more onerous.
- snake habitat through the creation of snake hibernaculum
- improve downstream water quality through the creation of an on-line settling pond

Overall, the preferred design would be considered a net benefit fish and wildlife habitat.

Should you wish to clarify any questions or require additional information as part of the review of this Natural Heritage Assessment, do not hesitate to contact us.

BioLogic Incorporated



Dave Hayman, M.Sc
President/Senior Scientist

[rl]

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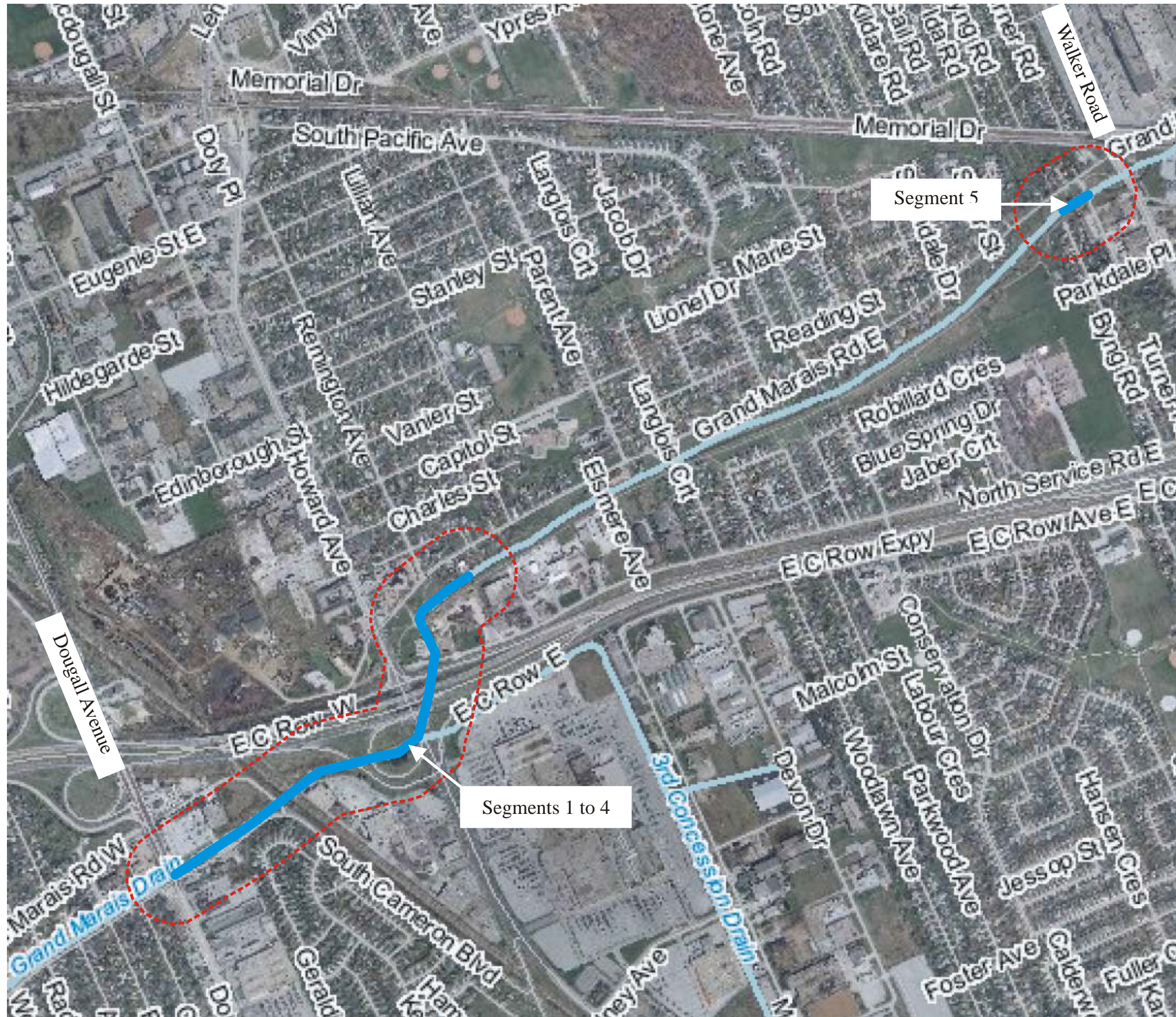
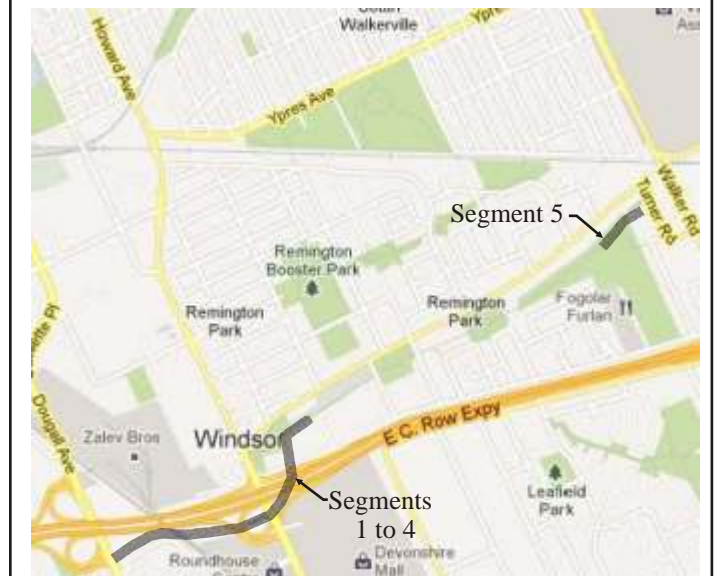


Figure 1: Site Location

(ERCA Air Photo)



Scale N.T.S.
Key Plan

Legend:

- Study Area
- - - Adjacent Lands (120m)

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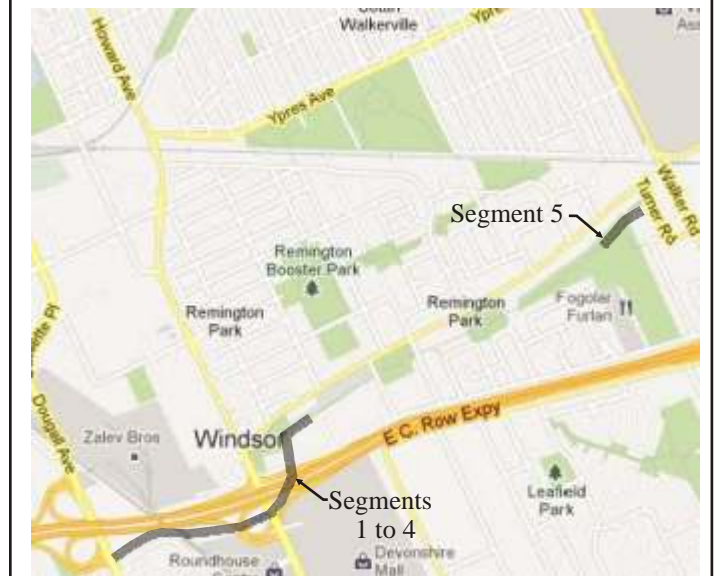
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May 2013



Figure 2a: Study Area - Segments 1, 2 and 3
(ERCA Air Photo)



Scale N.T.S.
Key Plan

Legend:

- Segment 1 Study Area
- Segment 2 Study Area
- Segment 3 Study Area
- - - Adjacent Lands (120m)

Print on 11X17, Landscape Orientation
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Scale 1:2,500
May 2013



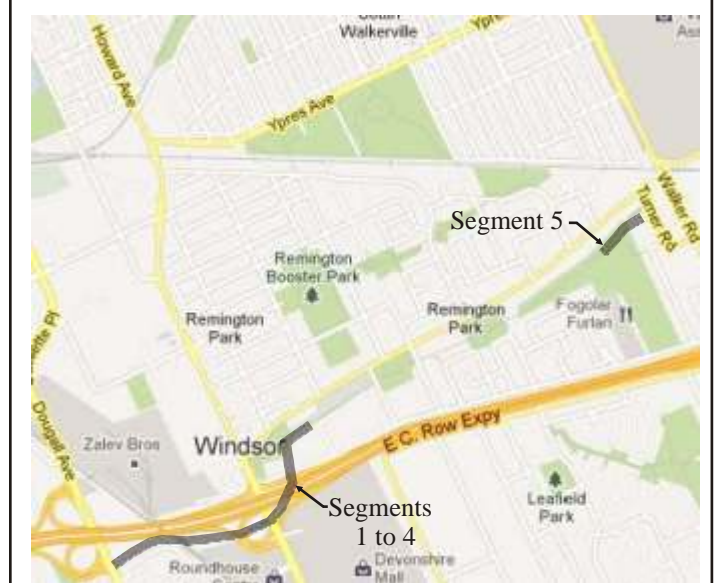
Figure 2b: Study Area - Segments 4 and 5
(ERCA Air Photo)



Segment 4



Segment 5



Scale N.T.S.
Key Plan

Legend:

- Segment 4 Study Area
- Segment 5 Study Area
- Adjacent Lands (120m)

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Figure 3: Greenway System
(Schedule B - City of Windsor Official Plan)

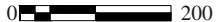


Scale N.T.S.
Key Plan

Legend:

- Study Area
- Adjacent Lands (120m)

 LINKAGES	 WATERFRONT CORRIDORS	 RECREATIONWAYS
 NATURAL HERITAGE	 COMMUNITY AND REGIONAL PARKS	 WATERFRONT RECREATION

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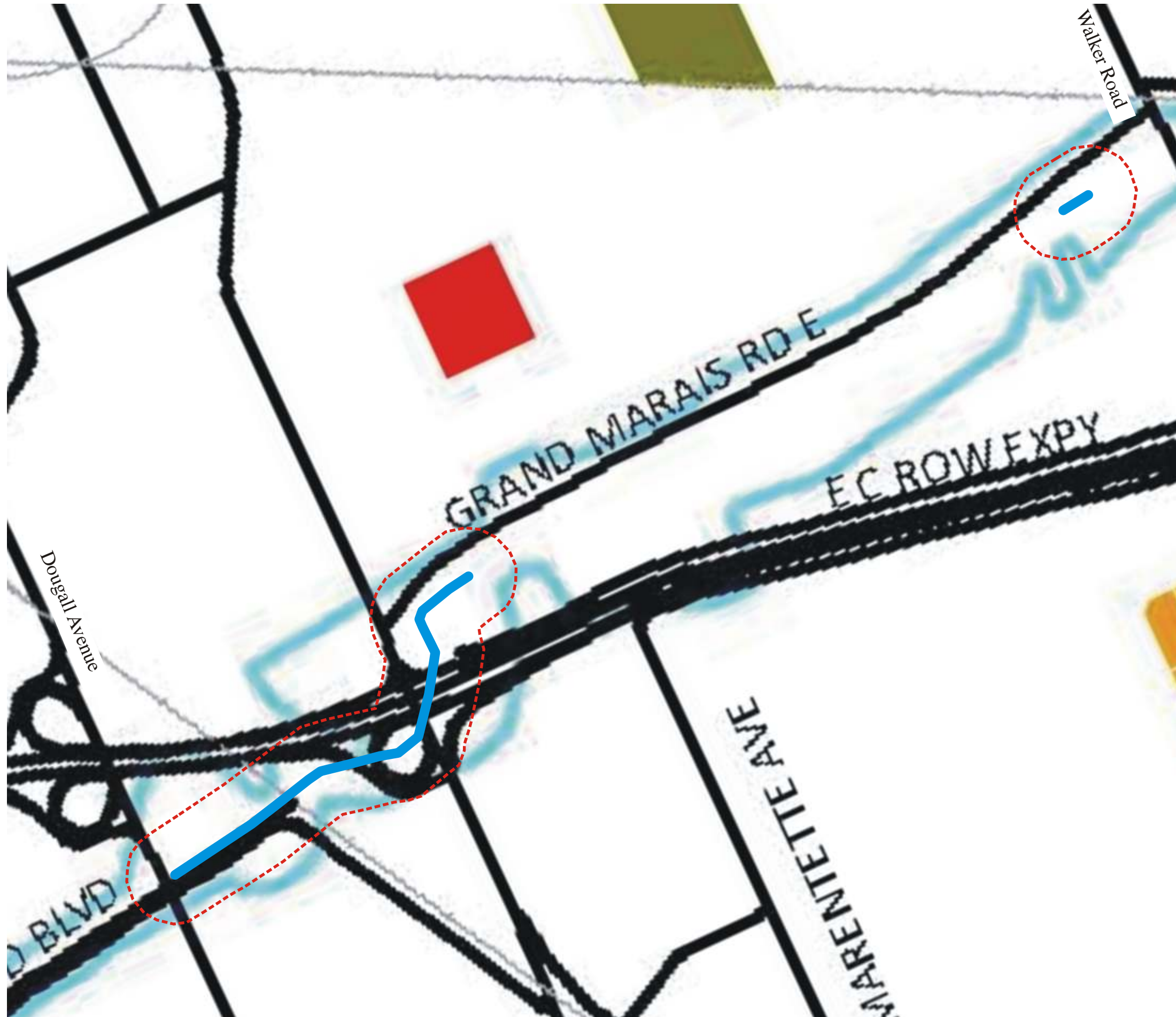


Figure 4: Development Constraints
(Schedule C - City of Windsor Official Plan)



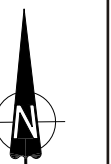
Scale N.T.S.
Key Plan

Legend:

- Study Area
- Adjacent Lands (120m)

LEGEND		
	ENVIRONMENTAL SENSITIVE AREA	
	NATURAL HERITAGE	
	ONDOWNE NATURAL HERITAGE SITES	
	RAIL TRAIL	
	POLLUTION CONTROL PLANTS	
	AIRPORT OPERATING AREA	
	AGGREGATE RESOURCE SITES	
	SHORELINE AREAS	
	FLOODPLAIN AREAS	
	20 YEAR CLIMATE CHANGE FORECAST	

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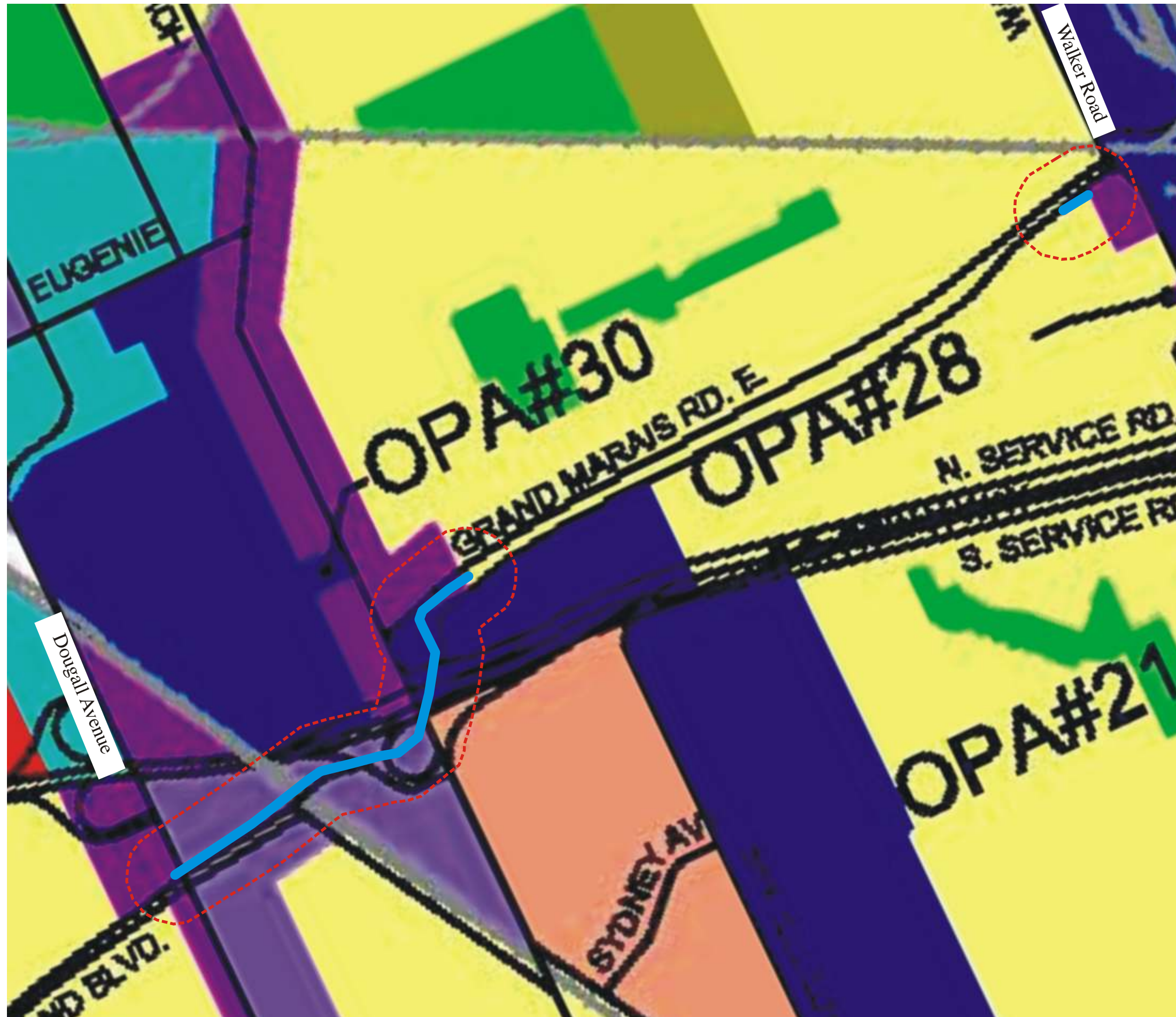


Figure 5: Land Use
(Schedule D - City of Windsor Official Plan)



Scale N.T.S.
Key Plan

Legend:

- Study Area
- Adjacent Lands (120m)

LEGEND			
OPEN SPACE	BUSINESS PARK	MAJOR INSTITUTIONAL	COMMERCIAL CENTRE
WATERFRONT RECREATION	WATERFRONT PORT	COMMERCIAL CORRIDOR	RESIDENTIAL
NATURAL HERITAGE	INDUSTRIAL	RESIDENTIAL	AIRPORT
MIXED USE	WATERFRONT RESIDENTIAL	RESIDENTIAL	MINOR INSTITUTIONAL
FUTURE URBAN AREA	FUTURE EMPLOYMENT AREA	RESIDENTIAL	
	PRIVATE RECREATION		

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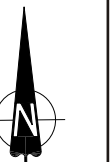
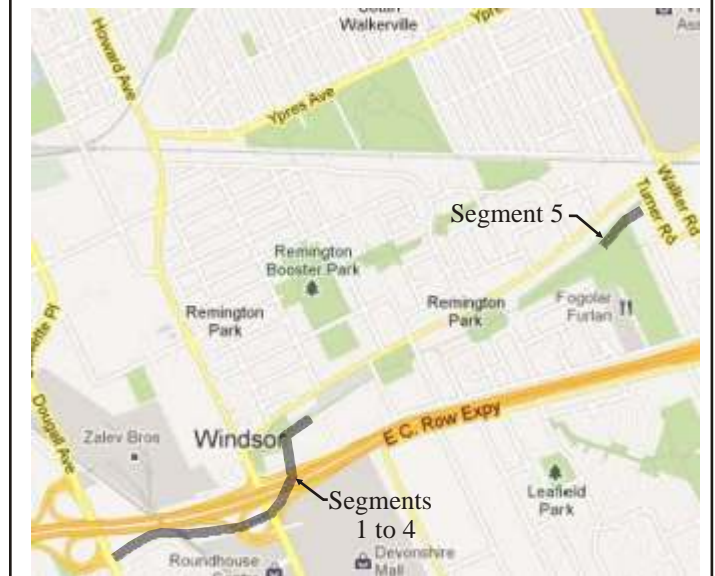
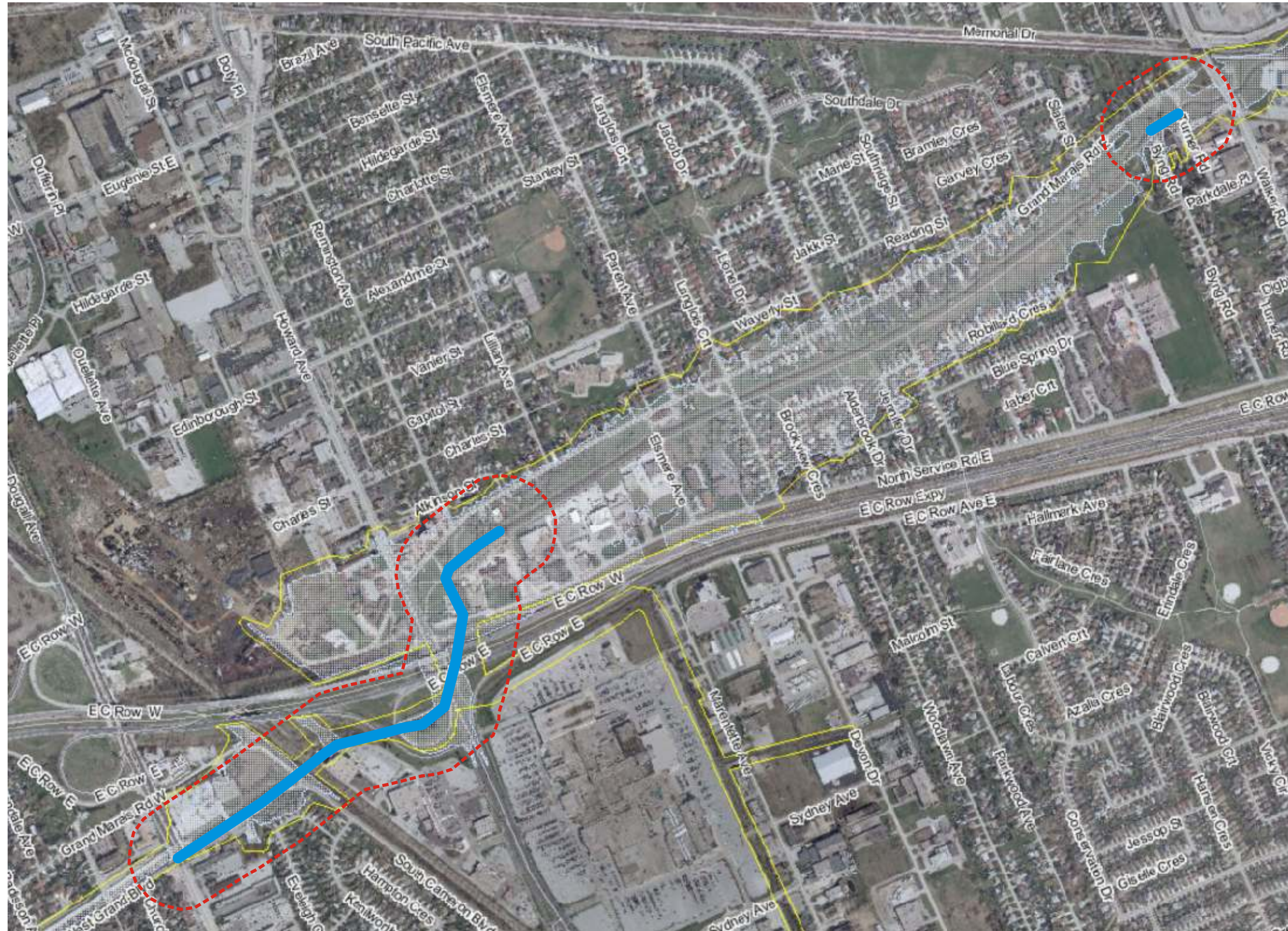


Figure 6: ERCA Regulations
(ERCA Air Photo)



Scale N.T.S.
Key Plan

Legend:

- Study Area
- - - Adjacent Lands (120m)
- Limit of Regulated Area
- Windsor Streets
- Streets
- ESA 04
- Floodline
- Woodlots 00

Print on 11X17, Landscape Orientation
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Figure 7a: Vegetation Communities
 Segments 1, 2 and 3 (ERCA Air Photo)



Scale N.T.S.
 Key Plan

Legend:

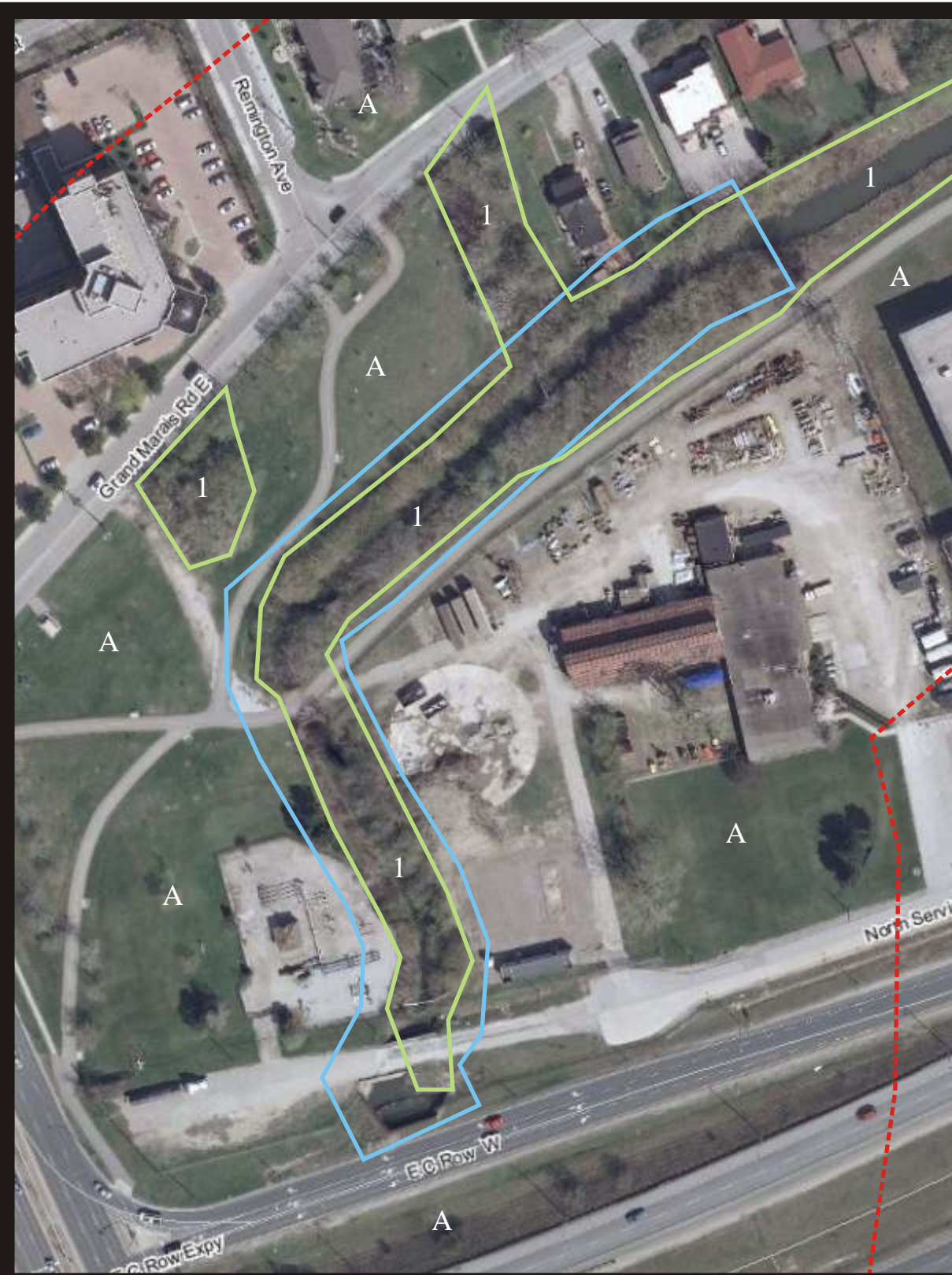
- Segment 1 Study Area
- Segment 2 Study Area
- Segment 3 Study Area
- - - Adjacent Lands (120m)

- 1 Cultural Thicket (CUT)
- 2 Cultural Meadow (CUM)
- 3 Anthropogenic Land Uses (A)

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 May 2013



Figure 7b: Vegetation Communities
Segments 4 and 5 (ERCA Air Photo)



Segment 4



Segment 5



Scale N.T.S.
Key Plan

Legend:

- Segment 4 Study Area
- Segment 2 Study Area
- - - Adjacent Lands (120m)

- 1 Cultural Thicket (CUT)
- 2 Cultural Meadow (CUM)
- 3 Anthropogenic Land Uses (A)

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May 2013



Figure 8: Significant Flora Locations
(ERCA Air Photo)



Scale N.T.S.
Key Plan

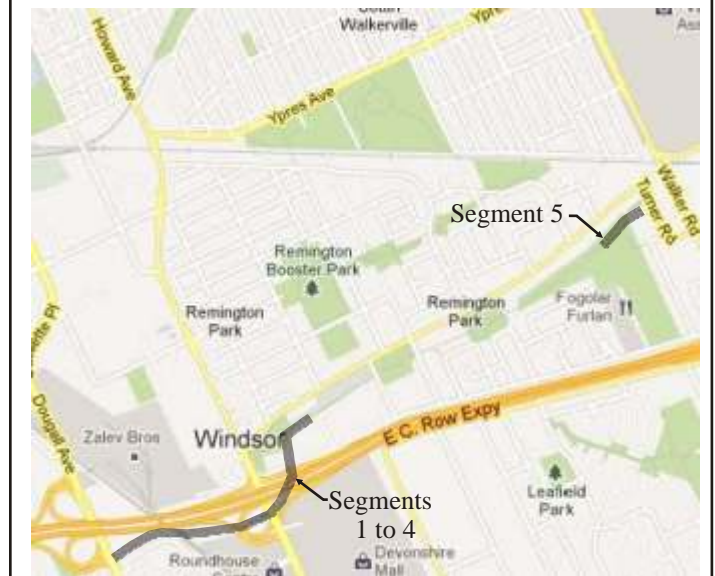
Legend:

- Segment 1 Study Area
- Segment 2 Study Area
- Segment 3 Study Area
- - - Adjacent Lands (120m)
- Significant Plant Location
 - Stiff Goldenrod (S3)
 - Missouri Ironweed (S3?)

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Scale 1:2,500
May 2013



Figure 9: Potential Snake Habitat
(ERCA Air Photo)



Scale N.T.S.
Key Plan

Legend:

- Segment 1 Study Area
- Segment 2 Study Area
- Segment 3 Study Area
- - - Adjacent Lands (120m)

- Potential Foraging Habitat
- Potential Hibernacula

- 1 Cultural Thicket (CUT)
- 2 Cultural Meadow (CUM)
- 3 Anthropogenic Land Uses (A)

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May 2013



Appendix A

Drain Classification/Fish Data

Turkey Creek

DRAFT

▲ Fish Records in Area of Interest

DFO DRAFT Drain Classifications

- Natural
- Class TBD - Channelized
- C Class - Channelized
- E Class - Channelized
- F Class - Channelized
- F Class - Tiled



The following records of fishes have been provided by the Essex Region Conservation Authority including records up to and including February 2010. These records represent only those within our database. Within the vicinity of the subject area there may be species at risk present (species listed by COSEWIC and or OMNR). Please contact Fisheries and Oceans Canada.

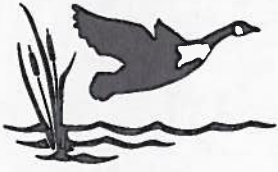


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Airphoto copyright the Corporation of the County of Essex, 2006

Source: SUPERTOM D:\PROJECTS\Fish Data Requests\Find-a-fish 2009.mxd
TD 1/14/2009

Site ID	ORIGINAL_I	SECONDARY_	SCIENTIFIC	FAMILYSCI	FAMILY	NAME	THERMAL_PR	COLLECTION	WATERBODY	LOCDESC	QUANTITY	COSEWIC	OMNR	G_RANK	S_RANK	SARA_SCH	SOURCE_ID	AUTHOR	REPORTITL	OBSERVER	METHOD	NOTES	NOTES_2
1 2210137-ER		0	Micropterus salmoides	Centrarchidae	Sunfish	largemouth bass	warm	8/24/2001		Malden Footbridge	1			GS	S5		35	ERCA		ERCA	Electrofishing		
1 2210137-ER		0	Centrarchidae	Centrarchidae	Sunfish	sunfish family		8/24/2001		Malden Footbridge	20						35	ERCA		ERCA	Electrofishing		
1 2210137-ER		0	Pimephales notatus	Cyprinidae	Carp and Minnow	bluntnose minnow	warm	8/24/2001		Malden Footbridge	10	NAR	NAR				35	ERCA		ERCA	Electrofishing		
1 2210137-ER		0	Dorosoma cepedianum	Clupeidae	Herring	gizzard shad	cool	8/24/2001		Malden Footbridge	5			GS	S4		35	ERCA		ERCA	Electrofishing		
1 2210137-ER		0	Lepomis macrochirus	Centrarchidae	Sunfish	bluegill	warm	8/24/2001		Malden Footbridge	1			GS	S5		35	ERCA		ERCA	Electrofishing		
2 2210051-ER		0	Luxilus chrysocephalus	Cyprinidae	Carp and Minnow	striped shiner	cool	5/4/2000		Brunet Park	Many	NAR	NAR	GS	S4		36	ERCA (LL)		ERCA (LL)	Electrofishing	Photo 18-19	
2 2210051-ER		0	Pimephales promelas	Cyprinidae	Carp and Minnow	fathead minnow	warm	5/4/2000		Brunet Park	Many						36	ERCA (LL)		ERCA (LL)	Electrofishing		
2 2210051-ER		0	Pimephales notatus	Cyprinidae	Carp and Minnow	bluntnose minnow	warm	5/4/2000		Brunet Park	Many	NAR	NAR				36	ERCA (LL)		ERCA (LL)	Electrofishing	Photo 14-15	
2 2210051-ER		0	Cyprinella spiloptera	Cyprinidae	Carp and Minnow	spottin shiner	warm	5/4/2000		Brunet Park	Many						36	ERCA (LL)		ERCA (LL)	Electrofishing	photo 20-21	
2 2210051-ER		0	Notropis atherinoides	Cyprinidae	Carp and Minnow	emerald shiner	cool	5/4/2000		Brunet Park	Few						36	ERCA (LL)		ERCA (LL)	Electrofishing	photo 16-17	
2 2210051-ER		0	Notemigonus crysoleucas	Cyprinidae	Carp and Minnow	golden shiner	cool	5/4/2000		Brunet Park	Many						36	ERCA (LL)		ERCA (LL)	Electrofishing	photo 23-24	
2 2210051-ER		0	Cyprinus carpio	Cyprinidae	Carp and Minnow	common carp	warm	5/4/2000		Brunet Park	Few		SE				36	ERCA (LL)		ERCA (LL)	Electrofishing		
2 2210051-ER		0	Carassius auratus	Cyprinidae	Carp and Minnow	goldfish	warm	5/4/2000		Brunet Park	Few		SE	GS			36	ERCA (LL)		ERCA (LL)	Electrofishing		
2 2210051-ER		0	Cyprinidae	Cyprinidae	Carp and Minnow	Minnow Family		5/4/2000		Brunet Park	Many						36	ERCA (LL)		ERCA (LL)	Electrofishing	unknown	
2 2210051-ER		0	Catostomus commersoni	Catostomidae	Sucker	white sucker	cool	5/4/2000		Brunet Park	Few			GS	S5		36	ERCA (LL)		ERCA (LL)	Electrofishing	photo 22	
2 2210051-ER		0	Umbra limi	Umbridae	Mudminnow	central mudminnow	cool/warm	5/4/2000		Brunet Park	Few						36	ERCA (LL)		ERCA (LL)	Electrofishing	photo 33 & 34	
2 2210051-ER		0	Lepomis gibbosus	Centrarchidae	Sunfish	pumpkinseed	warm	5/4/2000		Brunet Park	Many			GS	S5		36	ERCA (LL)		ERCA (LL)	Electrofishing	Photo 25-26	
2 2210051-ER		0	Micropterus salmoides	Centrarchidae	Sunfish	largemouth bass	warm	5/4/2000		Brunet Park	Few			GS	S5		36	ERCA (LL)		ERCA (LL)	Electrofishing		
2 2210051-ER		0	Lepomis cyanellus	Centrarchidae	Sunfish	green sunfish	warm	5/4/2000		Brunet Park	Few	NAR	NAR	GS	S4		36	ERCA (LL)		ERCA (LL)	Electrofishing		
2 2210051-ER		0	Ambloplites rupestris	Centrarchidae	Sunfish	rock bass	cool	5/4/2000		Brunet Park	Few			GS	S5		36	ERCA (LL)		ERCA (LL)	Electrofishing	Photo 27-28	
2 2210051-ER		0	Ameiurus melas	Ictaluridae	Bullhead Catfish	black bullhead	warm	5/4/2000		Brunet Park	Few			GS	S3		36	ERCA (LL)		ERCA (LL)	Electrofishing		
2 2210052-ER		0	Pimephales promelas	Cyprinidae	Carp and Minnow	fathead minnow	warm	5/4/2000		Brunet Park	Many						35	ERCA		ERCA	Electrofishing		
2 2210052-ER		0	Cyprinidae	Cyprinidae	Carp and Minnow	Minnow Family		5/4/2000		Brunet Park	Few						35	ERCA		ERCA	Electrofishing	unknown	
2 2210052-ER		0	Carassius auratus	Cyprinidae	Carp and Minnow	goldfish	warm	5/4/2000		Brunet Park	Few		SE	GS			35	ERCA		ERCA	Electrofishing		
2 2210052-ER		0	Lepomis gibbosus	Centrarchidae	Sunfish	pumpkinseed	warm	5/4/2000		Brunet Park	Few			GS	S5		35	ERCA		ERCA	Electrofishing		
3 2210132-ER		0	Pimephales promelas	Cyprinidae	Carp and Minnow	fathead minnow	warm	4/5/2001		Elsmere St. Crossing	1						35	ERCA		ERCA	Electrofishing		
3 2210132-ER		0	Lepomis cyanellus	Centrarchidae	Sunfish	green sunfish	warm	4/5/2001		Elsmere St. Crossing	5	NAR	NAR	GS	S4		35	ERCA		ERCA	Electrofishing		
3 2210132-ER		0	Notropis atherinoides	Cyprinidae	Carp and Minnow	emerald shiner	cool	4/5/2001		Elsmere St. Crossing	3						35	ERCA		ERCA	Electrofishing	deceased	
3 2210133-ER		0	Lepomis cyanellus	Centrarchidae	Sunfish	green sunfish	warm	4/17/2001		d/s Walker Road	1	NAR	NAR	GS	S4		35	ERCA		ERCA	Electrofishing		
3 2210133-ER		0	Pimephales promelas	Cyprinidae	Carp and Minnow	fathead minnow	warm	4/17/2001		d/s Walker Road	9						35	ERCA		ERCA	Electrofishing		



**Essex Region
Conservation
Authority**

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2010.05.25

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Windsor, Ontario
N8W 5K8

Attention: Nicole Caza, P. Eng., Project Manager

Re: Grand Marais Drain Improvements, Phase 2 in the City of Windsor, ON

This letter is in response to your letter dated March 22, 2010 requesting confirmation that a Fisheries Act Authorization is not required for the work in the above noted area. The project area is located south of Grand Marais Road East, from west of Central Avenue at Cassens Culvert to just east of the Lafarge Access Bridge. It is my understanding that this is a continuation of work completed in the summer of 2009 (Phase 1), which was located just downstream of the site in question.

Based on correspondence between the Ontario Ministry of Transportation (MTO) and the Essex Region Conservation Authority (ERCA) dated November 21, 2006 and November 28, 2006 for similar works along the same watercourse (Grand Marais Drain), it was confirmed that a blockage (sheet steel weir and ramp) located just upstream of Dougall Avenue is still in place and effectively cuts the passage of fish from beyond this point. It was also acknowledged that there may be fish presence at the area of proposed works. As a result, it can be confirmed that authorizations through Section 35 of the Federal Fisheries Act will not be required, but that standard protocols for the preservation of and transport of any wildlife (aquatic or terrestrial) encountered during the proposed works will need to be followed. Permits will still need to be issued by ERCA for the proposed works, and typical concerns for downstream habitat will still need to be assessed along with issues relative to channel hydraulics and corresponding flooding issues.

Should you have any questions or require further information, please do not hesitate to contact this office.

Regards,



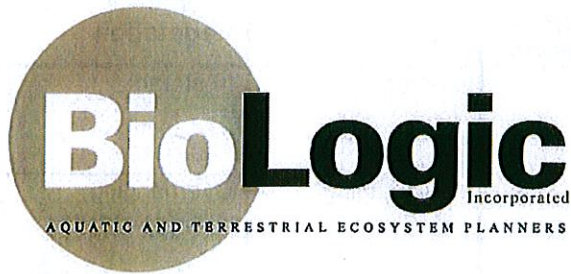
Tim Byrne
Coordinator of Flood & Erosion Control

cc/ **Jeremy Wychreschuk, ERCA**
Paul Mourad, City of Windsor

Member of



**Conservation
ONTARIO**
Natural Champions



AQUATIC HABITAT ASSESSMENT

Project Name: Grand Marais EA	
Date: October 3 2012	
Station Name: Section 1a	Collectors: D. Morse R. Leppington
Time Started: 2:30 pm	Time Finished: 3:00 pm

GENERAL INFORMATION

Weather: Overcast 18°C	Watercourse Name: Grand Marais Drain	Drainage System: Turkey Creek
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GPS Co-ordinates: b/w Dougal Ave and plaza access

LANDUSE		POLLUTION SOURCES	
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Left Bank	Right Bank	Point	Non-Point
parking lot manicured lawn Shrubs	road manicured lawn	tile drain outlets	road parking lot

FLOW REGIME	CHANNEL FORM	BANK STABILITY		GROUNDWATER EVIDENCE	
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<input checked="" type="checkbox"/> Flowing	<input checked="" type="checkbox"/> Defined	Stable	Left <input type="checkbox"/>	Right <input type="checkbox"/>	None <input checked="" type="checkbox"/>
<input type="checkbox"/> Dry	<input type="checkbox"/> Undefined	Vulnerable	<input type="checkbox"/>	<input type="checkbox"/>	Springs/Seeps <input type="checkbox"/>
<input checked="" type="checkbox"/> Permanent	<input type="checkbox"/> Natural	Unstable	<input type="checkbox"/>	<input type="checkbox"/>	Vegetation (i.e. Watercress) <input type="checkbox"/>
<input type="checkbox"/> Intermittent	<input checked="" type="checkbox"/> Channelized	Protected	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Iron Staining <input type="checkbox"/>
<input type="checkbox"/> Ephemeral	<input type="checkbox"/> Swale				Other <input type="checkbox"/>

WATERCOURSE MORPHOLOGY

	Pool	Riffle	Run	Glide	Other
% Area	40%	/	60%	/	/
Mean Wetted Width (m)	9 m	/	2 m	/	/
Mean Wetted Depth (m)	1.1 m	/	0.3 m	/	/
Mean Bankfull Width (m)	15 m	/	15 m	/	/
Mean Bankfull Depth (m)	5 m	/	5 m	/	/
Substrate (%)	GR - 50% MU - 50%	/	GR - 50% (0-10%) SA/SI/CL - 40%	/	/

Substrate Options: BR - Bedrock; BO - Boulder; CO - Cobble; GR - Gravel; SA - Sand; SI - Silt; CL - Clay; MU - Muck; D - Detritus

In-stream Cover (%)	None	Undercut Banks	Boulders	Cobbles	Organic Debris	Woody Debris	Vegetation
	80%	/	/	/	/	In-stream	In-stream
						Overhanging	Overhanging

	%	Examples	<input checked="" type="checkbox"/> None <input type="checkbox"/> Slight <input type="checkbox"/> Moderate <input type="checkbox"/> Heavy	Examples
Submergent	/	/		/
Floating				
Emergent				

% of Stream Shaded	Examples	<input type="checkbox"/> None <input type="checkbox"/> Seasonal <input type="checkbox"/> Permanent	
<input type="checkbox"/> 100 - 90% <input type="checkbox"/> 90 - 60% <input type="checkbox"/> 60 - 30% <input checked="" type="checkbox"/> 30 - 10% <input type="checkbox"/> 0%	trees - ash, manitoba maple silver maple shrubs various		Weir @ Lougal Ave

<input type="checkbox"/> Unknown <input type="checkbox"/> Nursery Habitat <input type="checkbox"/> Seasonal Refugia	<input type="checkbox"/> Spawning Habitat <input checked="" type="checkbox"/> Deep Pools <input type="checkbox"/> Other	Comments: deep pool @ upstream side of weir
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-banks lined with rip rap

<input checked="" type="checkbox"/> None <input type="checkbox"/> Fish Sampling	<input type="checkbox"/> Water Quality Sampling <input type="checkbox"/> Benthic Sampling	<input type="checkbox"/> Flow Monitoring <input type="checkbox"/> Mussel Sampling
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AQUATIC HABITAT ASSESSMENT



Project Name: <i>Grand Marais EA</i>	
Date: <i>October 3 2012</i>	
Station Name: <i>Section 1b</i>	Collectors: <i>D. Morse R. Leppington</i>
Time Started: <i>2:30 pm</i>	Time Finished: <i>3:00 pm</i>

GENERAL INFORMATION

Weather: <i>overcast 18°C</i>	Watercourse Name: <i>Grand Marais Drain</i>	Drainage System: <i>Turkey Creek</i>
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GPS Co-ordinates: *b/w plaza access road and CN railway*

LANDUSE		POLLUTION SOURCES			
Left Bank	Right Bank	Point		Non-Point	
<i>Commercial building parking lot manicured lawn</i>	<i>road manicured lawn</i>	<i>tile drain outlet</i>		<i>road parking lot</i>	
FLOW REGIME	CHANNEL FORM	BANK STABILITY		GROUNDWATER EVIDENCE	
<input checked="" type="checkbox"/> Flowing <input type="checkbox"/> Dry <hr style="border-top: 1px dashed black;"/> <input checked="" type="checkbox"/> Permanent <input type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral	<input checked="" type="checkbox"/> Defined <input type="checkbox"/> Undefined <hr style="border-top: 1px dashed black;"/> <input type="checkbox"/> Natural <input checked="" type="checkbox"/> Channelized <input type="checkbox"/> Swale	Stable <input type="checkbox"/> Vulnerable <input type="checkbox"/> Unstable <input type="checkbox"/> Protected <input checked="" type="checkbox"/>	Left <input type="checkbox"/> Right <input type="checkbox"/> Left <input type="checkbox"/> Right <input checked="" type="checkbox"/>	None <input checked="" type="checkbox"/> Springs/Seeps <input type="checkbox"/> Vegetation (i.e. Watercress) <input type="checkbox"/> Iron Staining <input type="checkbox"/> Other <input type="checkbox"/>	

WATERCOURSE MORPHOLOGY

	Pool	Riffle	Run	Glide	Other
% Area	<i>10%</i>	/	<i>90%</i>	/	/
Mean Wetted Width (m)	<i>6m</i>	/	<i>2m</i>	/	/
Mean Wetted Depth (m)	<i>1m</i>	/	<i>0.3m</i>	/	/
Mean Bankfull Width (m)	<i>15m</i>	/	<i>15m</i>	/	/
Mean Bankfull Depth (m)	<i>5m</i>	/	<i>5m</i>	/	/
Substrate (%)	<i>ER - 50% MU - 50%</i>	/	<i>CO - 40% ER - 20% SA/SI/CL - 40%</i>	/	/

Substrate Options: BR – Bedrock; BO – Boulder; CO – Cobble; GR – Gravel; SA – Sand; SI – Silt; CL – Clay; MU – Muck; D - Detritus

In-stream Cover (%)	None	Undercut Banks	Boulders	Cobbles	Organic Debris	Woody Debris	Vegetation
	5	/	/	20	/	In-stream 10	In-stream /
						Overhanging 5	Overhanging 60

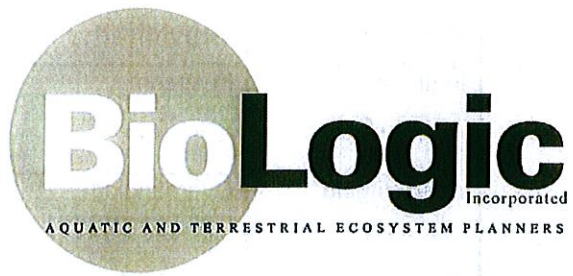
	%	Examples	<input checked="" type="checkbox"/> None	Examples /
Submergent	/	/	<input type="checkbox"/> Slight	
Floating	/	/	<input type="checkbox"/> Moderate	
Emergent	/	/	<input type="checkbox"/> Heavy	

% of Stream Shaded	Examples	<input checked="" type="checkbox"/> None	Seasonal	Permanent
<input type="checkbox"/> 100 - 90%	trees - Manitoba Maple - Elm / Ash / Silver Maple - buckthorn	Seasonal	/	/
<input checked="" type="checkbox"/> 90 - 60%		Permanent		
<input type="checkbox"/> 60 - 30%		Seasonal		
<input type="checkbox"/> 30 - 10%		Permanent		
<input type="checkbox"/> 0%		Seasonal		

<input type="checkbox"/> Unknown	<input type="checkbox"/> Spawning Habitat	Comments: pool located @ plaza access road culvert
<input type="checkbox"/> Nursery Habitat	<input checked="" type="checkbox"/> Deep Pools	
<input type="checkbox"/> Seasonal Refugia	<input type="checkbox"/> Other	

banks lined with rip rap.

<input checked="" type="checkbox"/> None	<input type="checkbox"/> Water Quality Sampling	<input type="checkbox"/> Flow Monitoring
<input type="checkbox"/> Fish Sampling	<input type="checkbox"/> Benthic Sampling	<input type="checkbox"/> Mussel Sampling



AQUATIC HABITAT ASSESSMENT

Project Name: Grand Marais EA	
Date: October 3 2012	
Station Name: Section 2	Collectors: D. Morse R. Leppington
Time Started: 3:00 pm	Time Finished: 3:30 pm

GENERAL INFORMATION

Weather: overcast 18°C	Watercourse Name: Grand Marais Drain	Drainage System: Turkey Creek
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GPS Co-ordinates: CN rail line to EC ROW E exit ramp (Roundhouse Centre)

LANDUSE		POLLUTION SOURCES			
Left Bank	Right Bank	Point		Non-Point	
road maintained lawn scrub/shrub	parking lot plaza building scrub/shrubs			roadway parking lot railway	
FLOW REGIME	CHANNEL FORM	BANK STABILITY		GROUNDWATER EVIDENCE	
<input checked="" type="checkbox"/> Flowing <input type="checkbox"/> Dry <hr/> <input checked="" type="checkbox"/> Permanent <input type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral	<input checked="" type="checkbox"/> Defined <input type="checkbox"/> Undefined <hr/> <input type="checkbox"/> Natural <input checked="" type="checkbox"/> Channelized <input type="checkbox"/> Swale	Stable <input checked="" type="checkbox"/> Left <input checked="" type="checkbox"/> Right Vulnerable <input type="checkbox"/> Unstable <input type="checkbox"/> Protected <input checked="" type="checkbox"/>	<input checked="" type="checkbox"/> None <input type="checkbox"/> Springs/Seeps <input type="checkbox"/> Vegetation (i.e. Watercress) <input type="checkbox"/> <input type="checkbox"/> Iron Staining <input type="checkbox"/> <input type="checkbox"/> Other		

WATERCOURSE MORPHOLOGY

	Pool	Riffle	Run	Glide	Other
% Area		10	90		
Mean Wetted Width (m)		2.5m	3m		
Mean Wetted Depth (m)		0.2m	0.4m		
Mean Bankfull Width (m)		15m	15m		
Mean Bankfull Depth (m)		5m	5m		
Substrate (%)		CO-100%	CO/GR 80% concrete - 20% SA/SI/CL - 20%		

Substrate Options: BR - Bedrock; BO - Boulder; CO - Cobble; GR - Gravel; SA - Sand; SI - Silt; CL - Clay; MU - Muck; D - Detritus

In-stream Cover (%)	None	Undercut Banks	Boulders	Cobbles	Organic Debris	Woody Debris	Vegetation
	25	/	/	/	/	In-stream	In-stream
						Overhanging	Overhanging
						/	75

	%	Examples	<input checked="" type="checkbox"/> None	Examples /
Submergent	/	/	<input type="checkbox"/> Slight	
Floating	/	/	<input type="checkbox"/> Moderate	
Emergent	/	/	<input type="checkbox"/> Heavy	

% of Stream Shaded	Examples	<input checked="" type="checkbox"/> None		
<input type="checkbox"/> 100 - 90%	trees - Ash/buckthorn/sumac maple	Seasonal	Permanent	
<input checked="" type="checkbox"/> 90 - 60%		/	/	
<input type="checkbox"/> 60 - 30%				
<input type="checkbox"/> 30 - 10%				
<input type="checkbox"/> 0%				

<input type="checkbox"/> Unknown	<input type="checkbox"/> Spawning Habitat	Comments: no critical habitat
<input type="checkbox"/> Nursery Habitat	<input type="checkbox"/> Deep Pools	
<input type="checkbox"/> Seasonal Refugia	<input type="checkbox"/> Other	

- culverts concrete lined bottoms
- dense riparian veg → heavily shaded

<input checked="" type="checkbox"/> None	<input type="checkbox"/> Water Quality Sampling	<input type="checkbox"/> Flow Monitoring
<input type="checkbox"/> Fish Sampling	<input type="checkbox"/> Benthic Sampling	<input type="checkbox"/> Mussel Sampling



AQUATIC HABITAT ASSESSMENT

Project Name: Grand Marais EA	
Date: October 3 2012	
Station Name: Section 3	Collectors: D. Morse R. Leppington
Time Started: 3 ³⁰ pm	Time Finished: 4 ⁰⁰ pm

GENERAL INFORMATION

Weather: overcast 18°C	Watercourse Name: Grand Marais Drain	Drainage System: Turkey Creek
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GPS Co-ordinates: inside EC ROW E on Ramp beside Howard Ave.

LANDUSE		POLLUTION SOURCES	
Left Bank	Right Bank	Point	Non-Point
manicured lawn roadway	manicured lawn roadway	/	roadway

FLOW REGIME	CHANNEL FORM	BANK STABILITY		GROUNDWATER EVIDENCE	
<input checked="" type="checkbox"/> Flowing <input type="checkbox"/> Dry	<input checked="" type="checkbox"/> Defined <input type="checkbox"/> Undefined	Stable	Left	Right	None <input type="checkbox"/>
<input checked="" type="checkbox"/> Permanent <input type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral	<input type="checkbox"/> Natural <input checked="" type="checkbox"/> Channelized <input type="checkbox"/> Swale	Vulnerable	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Springs/Seeps <input type="checkbox"/>
		Unstable	<input type="checkbox"/>	<input type="checkbox"/>	Vegetation (i.e. Watercress) <input type="checkbox"/>
		Protected	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	Iron Staining <input type="checkbox"/>
					Other <input type="checkbox"/>

WATERCOURSE MORPHOLOGY

	Pool	Riffle	Run	Glide	Other
% Area	100%	/	/	/	/
Mean Wetted Width (m)	15m	/	/	/	/
Mean Wetted Depth (m)	? → could not access due to fence	/	/	/	/
Mean Bankfull Width (m)	20m	/	/	/	/
Mean Bankfull Depth (m)	~6m	/	/	/	/
Substrate (%)	Concrete 100%	- entire channel concrete lined			

Substrate Options: BR – Bedrock; BO – Boulder; CO – Cobble; GR – Gravel; SA – Sand; SI – Silt; CL – Clay; MU – Muck; D - Detritus

In-stream Cover (%)	None	Undercut Banks	Boulders	Cobbles	Organic Debris	Woody Debris	Vegetation
	95	/	/	/	/	In-stream	In-stream
						Overhanging	Overhanging
						/	5

	%	Examples	<input checked="" type="checkbox"/> None	Examples
Submergent	/	/	<input type="checkbox"/> Slight	/
Floating	/	/	<input type="checkbox"/> Moderate	
Emergent	/	/	<input type="checkbox"/> Heavy	

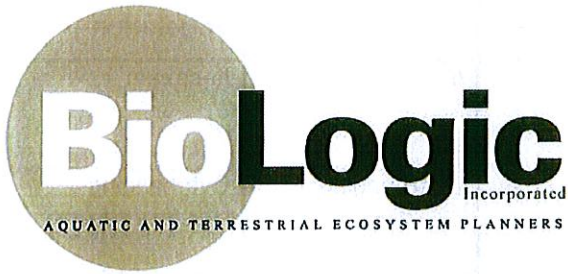
% of Stream Shaded	Examples	<input checked="" type="checkbox"/> None	Seasonal	Permanent
<input type="checkbox"/> 100 - 90%	/	/	/	/
<input type="checkbox"/> 90 - 60%				
<input type="checkbox"/> 60 - 30%				
<input type="checkbox"/> 30 - 10%				
<input checked="" type="checkbox"/> 0%				

<input type="checkbox"/> Unknown	<input type="checkbox"/> Spawning Habitat	Comments: no critical habitat
<input type="checkbox"/> Nursery Habitat	<input type="checkbox"/> Deep Pools	
<input type="checkbox"/> Seasonal Refugia	<input type="checkbox"/> Other	

- entire section concrete lined right up to bank full
 - fenced → could not access water depth.
 - mowed lawn right up to fence.
 - few trees along fence line but do not extend far enough to stream edge to provide shade

<input checked="" type="checkbox"/> None	<input type="checkbox"/> Water Quality Sampling	<input type="checkbox"/> Flow Monitoring
<input type="checkbox"/> Fish Sampling	<input type="checkbox"/> Benthic Sampling	<input type="checkbox"/> Mussel Sampling

AQUATIC HABITAT ASSESSMENT



Project Name: <i>Grand Marais EA</i>	
Date: <i>October 3 2012</i>	
Station Name: <i>Section 4</i>	Collectors: <i>D. Morse R. Leppington</i>
Time Started: <i>4:00 pm</i>	Time Finished: <i>4:30 pm</i>

GENERAL INFORMATION

Weather: <i>Overcast 18°C</i>	Watercourse Name: <i>Grand Marais Drain</i>	Drainage System: <i>Turkey Creek</i>
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GPS Co-ordinates: *from North Service Rd w/s ~250m*

LANDUSE		POLLUTION SOURCES			
Left Bank	Right Bank	Point		Non-Point	
<i>Commercial lot maintained lawn walkway</i>	<i>commercial lot maintained lawn walkway</i>	<i>tile drains</i>		<i>parking lot roads</i>	
FLOW REGIME	CHANNEL FORM	BANK STABILITY		GROUNDWATER EVIDENCE	
<input checked="" type="checkbox"/> Flowing <input type="checkbox"/> Dry <hr/> <input checked="" type="checkbox"/> Permanent <input type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral	<input checked="" type="checkbox"/> Defined <input type="checkbox"/> Undefined <hr/> <input type="checkbox"/> Natural <input checked="" type="checkbox"/> Channelized <input type="checkbox"/> Swale	Stable <input checked="" type="checkbox"/> <input type="checkbox"/> Vulnerable <input type="checkbox"/> <input type="checkbox"/> Unstable <input type="checkbox"/> <input type="checkbox"/> Protected <input type="checkbox"/> <input type="checkbox"/>	Left Right	None <input checked="" type="checkbox"/> Springs/Seeps <input type="checkbox"/> Vegetation (i.e. Watercress) <input type="checkbox"/> Iron Staining <input type="checkbox"/> Other <input type="checkbox"/>	

WATERCOURSE MORPHOLOGY

	Pool	Riffle	Run	Glide	Other
% Area	<i>5%</i>		<i>95%</i>		
Mean Wetted Width (m)	<i>9m</i>		<i>3m</i>		
Mean Wetted Depth (m)	<i>1m</i>		<i>0.4m</i>		
Mean Bankfull Width (m)	<i>14m</i>		<i>14m</i>		
Mean Bankfull Depth (m)	<i>4m</i>		<i>4m</i>		
Substrate (%)	<i>GR - 50% SA/SI/CL - 50%</i>		<i>CO/GR - 50% SA/SI/CL - 50%</i>		

Substrate Options: BR – Bedrock; BO – Boulder; CO – Cobble; GR – Gravel; SA – Sand; SI – Silt; CL – Clay; MU – Muck; D - Detritus

In-stream Cover (%)	None	Undercut Banks	Boulders	Cobbles	Organic Debris	Woody Debris	Vegetation
	10%	/	/	5%	/	In-stream	In-stream
						Overhanging	Overhanging
						5%	80%

	%	Examples	<input checked="" type="checkbox"/> None	Examples
Submergent	/	/	<input type="checkbox"/> Slight	/
Floating	/	/	<input type="checkbox"/> Moderate	
Emergent	/	/	<input type="checkbox"/> Heavy	

% of Stream Shaded	Examples	<input type="checkbox"/> None	
		Seasonal	Permanent
<input type="checkbox"/> 100 - 90%	trees Ash/Manitoba Maple buckthorn/Elm		Weir b/w Culvert & North Service Rd
<input checked="" type="checkbox"/> 90 - 60%			
<input type="checkbox"/> 60 - 30%			
<input type="checkbox"/> 30 - 10%			
<input type="checkbox"/> 0%			

<input type="checkbox"/> Unknown	<input type="checkbox"/> Spawning Habitat	Comments: pool area u/s of weir
<input type="checkbox"/> Nursery Habitat	<input checked="" type="checkbox"/> Deep Pools	
<input type="checkbox"/> Seasonal Refugia	<input type="checkbox"/> Other	

recreation pathway crosses drain @ bend.

<input checked="" type="checkbox"/> None	<input type="checkbox"/> Water Quality Sampling	<input type="checkbox"/> Flow Monitoring
<input type="checkbox"/> Fish Sampling	<input type="checkbox"/> Benthic Sampling	<input type="checkbox"/> Mussel Sampling

AQUATIC HABITAT ASSESSMENT



Project Name: <i>Grand Marais EA</i>	
Date: <i>October 3 2012</i>	
Station Name: <i>Section 5</i>	Collectors: <i>D. Morse R. Leppington</i>
Time Started: <i>4:30 pm</i>	Time Finished: <i>5:00 pm</i>

GENERAL INFORMATION

Weather: <i>overcast 18°C</i>	Watercourse Name: <i>Grand Marais Drain</i>	Drainage System: <i>Turkey Creek</i>
-------------------------------	---	--------------------------------------

GPS Co-ordinates: *Byng Rd to Turner Rd*

LANDUSE		POLLUTION SOURCES			
Left Bank	Right Bank	Point		Non-Point	
<i>maintained lawn</i>	<i>maintained lawn recreation pathway residential area</i>	<i>tile drains</i>		<i>roads.</i>	
FLOW REGIME	CHANNEL FORM	BANK STABILITY		GROUNDWATER EVIDENCE	
<input checked="" type="checkbox"/> Flowing <input type="checkbox"/> Dry <hr style="border-top: 1px dashed black;"/> <input checked="" type="checkbox"/> Permanent <input type="checkbox"/> Intermittent <input type="checkbox"/> Ephemeral	<input checked="" type="checkbox"/> Defined <input type="checkbox"/> Undefined <hr style="border-top: 1px dashed black;"/> <input type="checkbox"/> Natural <input checked="" type="checkbox"/> Channelized <input type="checkbox"/> Swale	Stable <input checked="" type="checkbox"/> Vulnerable <input type="checkbox"/> Unstable <input type="checkbox"/> Protected <input type="checkbox"/>	Left <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	Right <input checked="" type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/> <input type="checkbox"/>	None <input checked="" type="checkbox"/> Springs/Seeps <input type="checkbox"/> Vegetation (i.e. Watercress) <input type="checkbox"/> Iron Staining <input type="checkbox"/> Other <input type="checkbox"/>

WATERCOURSE MORPHOLOGY

	Pool	Riffle	Run	Glide	Other
% Area			<i>100%</i>		
Mean Wetted Width (m)			<i>3m</i>		
Mean Wetted Depth (m)			<i>0.4m</i>		
Mean Bankfull Width (m)			<i>20m</i>		
Mean Bankfull Depth (m)			<i>4m</i>		
Substrate (%)			<i>CO/GR - 40% SA/SI/CL</i>		

Substrate Options: BR – Bedrock; BO – Boulder; CO – Cobble; GR – Gravel; SA – Sand; SI – Silt; CL – Clay; MU – Muck; D – Detritus

In-stream Cover (%)	None	Undercut Banks	Boulders	Cobbles	Organic Debris	Woody Debris	Vegetation
	40%	/	/	20%	/	In-stream /	In-stream /
						Overhanging /	Overhanging 40

	%	Examples	<input checked="" type="checkbox"/> None	Examples /
Submergent	/	/	<input type="checkbox"/> Slight	
Floating	/	/	<input type="checkbox"/> Moderate	
Emergent	/	/	<input type="checkbox"/> Heavy	

% of Stream Shaded	Examples	<input checked="" type="checkbox"/> None	Seasonal	Permanent
<input type="checkbox"/> 100 - 90%	trees			
<input type="checkbox"/> 90 - 60%				
<input checked="" type="checkbox"/> 60 - 30%				
<input type="checkbox"/> 30 - 10%				
<input type="checkbox"/> 0%				

<input type="checkbox"/> Unknown	<input type="checkbox"/> Spawning Habitat	Comments: no critical habitat
<input type="checkbox"/> Nursery Habitat	<input type="checkbox"/> Deep Pools	
<input type="checkbox"/> Seasonal Refugia	<input type="checkbox"/> Other	

- Some rip rap along banks
- ups of Turner Rd bridge rip rap lined banks.

<input checked="" type="checkbox"/> None	<input type="checkbox"/> Water Quality Sampling	<input type="checkbox"/> Flow Monitoring
<input type="checkbox"/> Fish Sampling	<input type="checkbox"/> Benthic Sampling	<input type="checkbox"/> Mussel Sampling

Appendix B

Summary of Provincially Significant Species Located within 1km of the Grand Marais Drain Study and EA Study Area

English Name	Scientific Name	S-rank	Provincial ESA Status	Federal SARA Status
Reptiles and Turtles				
Butler's Gartersnake	<i>Thamnophis butleri</i>	S2	END	THR
Common Five-lined Skink (Carolinian population)	<i>Plestiodon fasciatus</i> pop. 1	S2	END	END
Eastern Foxsnake	<i>Pantherophis gloydi</i>	S2	END	END
Plants				
Bushy Seedbox	<i>Ludwigia alternifolia</i>	S1		
American Lotus	<i>Nelumbo lutea</i>	S2		
Climbing Prairie Rose	<i>Rosa setigera</i>	S3	SC	SC
Colicroot	<i>Aletris farinosa</i>	S2	THR	THR
Commons's Panic Grass	<i>Dichanthelium ovale</i> ssp. <i>pseudopubescens</i>	S1		
Crowned Beggarticks	<i>Bidens trichosperma</i>	S2		
Culver's Root	<i>Veronicastrum virginicum</i>	S2		
Cup Plant	<i>Silphium perfoliatum</i>	S2		
Dwarf Lake Iris	<i>Iris lacustris</i>	S3	SC	THR
Giant Ironweed	<i>Vernonia gigantea</i>	S1?		
Gray-headed Prairie Coneflower	<i>Ratibida pinnata</i>	S3		
Great Plains Ladies'-tresses	<i>Spiranthes magnicamporum</i>	S3?		
Green Cornet Milkweed	<i>Asclepias viridiflora</i>	S2		
Hazel Dodder	<i>Cuscuta coryli</i>	SH		
Heavy Sedge	<i>Carex gravida</i>	S1		
Hoary Tick-trefoil	<i>Desmodium canescens</i>	S2		
Large Yellow Pond-lily	<i>Nuphar advena</i>	S3		
Many-fruit Primrose-willow	<i>Ludwigia polycarpa</i>	S2S3		
Pignut Hickory	<i>Carya glabra</i>	S3		
Prairie Milkweed	<i>Asclepias sullivantii</i>	S3		
Prairie Rosinweed	<i>Silphium terebinthinaceum</i>	S1		
Purple Twayblade	<i>Liparis liliifolia</i>	S2	THR	END
Rigid Sedge	<i>Carex tetanica</i>	S3		
Shellbark Hickory	<i>Carya laciniosa</i>	S3		
Short-fruited Rush	<i>Juncus brachycarpus</i>	S1		
Shumard Oak	<i>Quercus shumardii</i>	S3	SC	SC
Stiff Cowbane	<i>Oxypolis rigidior</i>	S2		
Stiff Goldenrod	<i>Solidago rigida</i> ssp. <i>rigida</i>	S3		
Swamp Rose-mallow	<i>Hibiscus moscheutos</i>	S3	SC	SC
Tall Nutrush	<i>Scleria triglomerata</i>	S1		
Tall Tickweed	<i>Coreopsis tripteris</i>	S2		
Two-flowered Rush	<i>Juncus biflorus</i>	S1		
White Blue-eyed-grass	<i>Sisyrinchium albidum</i>	S1		
Willowleaf Aster	<i>Symphyotrichum praealtum</i>	S2	THR	THR
Winged Loosestrife	<i>Lythrum alatum</i>	S3		
Wingstem	<i>Verbesina alternifolia</i>	S3		
Yellow False-indigo	<i>Baptisia tinctoria</i>	S2		

Appendix C

Study Site: Biologic – Grand Marais Drain East

Surveyors: G. Waldron & P. Hurst

Field Date: Nov. 14, 2012

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	COSSARO
<i>Acer x freemanii</i>	Freeman's Maple	GNA	SNR		
<i>Acer negundo</i>	Manitoba Maple	G5	S5		
ACER PLATANOIDES	Norway Maple	GNR	SNA		
<i>Acer saccharinum</i>	Silver Maple	G5	S5		
<i>Achillea millefolium</i>	Yarrow	G5	S5		
AESCULUS HIPPOCASTANUM	Horse-chestnut	GNR	SNA		
AGROSTIS GIGANTEA	Redtop	G4G5	SNA		
<i>Agrostis stolonifera</i>	Creeping Bent	G5	S5		
AILANTHUS ALTISSIMA	Tree-of-heaven	GNR	SNA		
ALLIARIA PETIOLATA	Garlic Mustard	GNR	SNA		
<i>Ambrosia artemisiifolia</i>	Common Ragweed	G5	S5		
<i>Ambrosia trifida</i>	Giant Ragweed	G3	S5		
ARCTIUM MINUS	Common Burdock	GNR	SNA		
<i>Asclepias syriaca</i>	Common Milkweed	G5	S5		
<i>Aster lanceolatus</i>	Eastern Lined Aster	G5	S5		
<i>Aster lateriflorus</i>	Calico Aster	G5	S5		
<i>Aster novae-angliae</i>	New England Aster	G5	S5		
<i>Aster pilosus</i>	Hairy Aster	G5	S5		
BROMUS INERMIS	Smooth Brome	GNR	SNA		
<i>Carex blanda</i>	Woodland Sedge	G5?	S5		
<i>Centaurea sp.</i>	Knapweed				
CHENOPODIUM ALBUM	Lamb's Quarters	G5	SNA		
CICHORIUM INTYBUS	Chicory	GNR	SNA		
CIRSIUM ARVENSE	Canada Thistle	GNR	SNA		
CIRSIUM VULGARE	Bull Thistle	GNR	SNA		
CONVOLVULUS ARVENSIS	Field Bindweed	GNR	SNA		
<i>Cornus amomum</i>	Silky Dogwood	G5	S5		
<i>Cornus drummondii</i>	Rough-leaved Dogwood	G5	S4		
<i>Cornus foemina</i>	Gray Dogwood	G5	S5		
<i>Crataegus crus-galli</i>	Cockspur Thorn	G5	S5		
<i>Crataegus mollis</i>	Downy Hawthorn	G5	S5		

<i>Crataegus punctata</i>	Dotted Hawthorn	G5	S5		
DACTYLIS GLOMERATA	Orchard Grass	GNR	SNA		
DAUCUS CAROTA	Wild Carrot	GNR	SNA		
DIPSACUS FULLONUM	Fuller's Teasel	GNR	SNA		
ECHIUM VULGARE	Viper's Bugloss	GNR	SNA		
ELAEAGNUS UMBELLATA	Autumn Olive	GNR	SNA		
<i>Elymus virginicus</i>	Virginia Wild Rye	G5	S5		
<i>Erigeron annuus</i>	Annual Fleabane	G5	S5		
<i>Erigeron philadelphicus</i>	Marsh Fleabane	G5	S5		
EUONYMUS ALATA	Winged Wahoo	GNR	SNA		
EUONYMUS EUROPAEA	Spindle Tree	GNR	SNA		
Eupatorium altissimum	Tall Boneset	G5	S1*		
<i>Euthamia graminifolia</i>	Grass-leaved Goldenrod	G5	S5		
FESTUCA ARUNDINACEA	Tall Fescue	GNA	SNA		
<i>Fragaria virginiana</i>	Wild Strawberry	G5	SU		
<i>Fraxinus pennsylvanica</i>	Red Ash	G5	S5		
<i>Geum aleppicum</i>	Yellow Avens	G5	S5		
<i>Geum canadense</i>	White Avens	G5	S5		
GLECHOMA HEDERACEA	Ground Ivy	GNR	SNA		
Gleditsia triacanthos	Honey Locust	G5	S2		
<i>Hackelia virginiana</i>	Beggar's Lice	G5	S5		
<i>Helianthus giganteus</i>	Tall Sunflower	G5	S5		
HELIANTHUS TUBEROSUS	Jerusalem Artichoke	G5	S5		
HEMEROCALLIS FULVA	Orange Day-lily	GNR	SNA		
HESPERIS MATRONALIS	Dame's Rocket	G4G5	SNA		
HUMULUS LUPULUS	Common Hop	G5	S4		
<i>Juglans nigra</i>	Black Walnut	G5	S4		
<i>Juniperus virginiana</i>	Red Cedar	G5	S5		
LEONURUS CARDIACA	Motherwort	GNR	SNA		
LIGUSTRUM VULGARE	Common Privet	GNR	SNA		
LINARIA VULGARIS	Butter-and-eggs	GNR	SNA		
LONICERA TATARICA	Tartarian Honeysuckle	GNR	SNA		
<i>Lycopus americanus</i>	Common Water Horehound	G5	S5		
MALUS BACCATA	Siberian Crab	GNR	SNA		
MALUS PUMILA	Apple	G5	SNA		
MALVA NEGLECTA	Common Mallow	GNR	SNA		

MORUS ALBA	White Mulberry	GNR	SNA		
NEPETA CATARIA	Catnip	GNR	SNA		
Oenothera biennis	Common Evening-primrose	G5	S5		
Panicum virgatum	Switch Grass	G5	S4		
Parthenocissus inserta	Thicket Creeper	G5	S5		
PASTINACA SATIVA	Wild Parsnip	GNR	SNA		
Phalaris arundinacea	Reed Canary Grass	G5	S5		
Phragmites australis	Reed Grass	G5	S5		
PLANTAGO LANCEOLATA	English Plantain;Ribgrass	G5	SNA		
Plantago rugelii	Rugel's Plantain	G5	SNA		
Poa compressa	Canada Bluegrass	GNR	SNA		
Poa pratensis	Kentucky Bluegrass	G5	S5		
POLYGONUM CONVOLVULUS	Wild Buckwheat	GNR	SNA		
POLYGONUM CUSPIDATUM	Japanese Knotweed	GNR	SNA		
Populus deltoides	Cottonwood	G5	S5		
POTENTILLA RECTA	Rough-fruited Cinquefoil	G5	S5		
Potentilla simplex	Old-field Cinquefoil	G5	S5		
PRUNUS AVIUM	Sweet Cherry	GNR	SNA		
Prunus serotina	Wild Black Cherry	G5	S5		
Prunus virginiana	Choke Cherry	G5	S5		
PYRUS COMMUNIS	Pear	G5	SNA		
Quercus macrocarpa	Burr Oak	G5	S5		
QUERCUS ROBUR	English Oak	GNR	SNA		
RHAMNUS CATHARTICA	Common Buckthorn	GNR	SNA		
Rhus glabra	Smooth Sumac	G5	S5		
Rhus radicans	Poison Ivy	G5	S5		
Ribes americanum	Wild Black Currant	G5	S5		
Rosa blanda	Wild Rose	G5	S5		
ROSA CANINA	Dog Rose	GNR	SNA		
Rosa carolina	Pasture Rose	G4G5	S4		
ROSA MULTIFLORA	Multiflora Rose	GNR	SNA		
Rubus occidentalis	Black Raspberry	G5	S5		
RUMEX CRISPUS	Curly Dock	GNR	SNA		
SALIX ALBA	White Willow	G5	SNA		
Salix exigua	Sandbar Willow	G5	S5		
Sambucus canadensis	Elderberry	G5	S5		

Sanicula trifoliata	Large-fruited Snakeroot	G4	S4		
SETARIA PUMILA	Yellow Foxtail	GNR	SNA		
SOLANUM CAROLINENSE	Horse Nettle	G5	SNA		
SOLANUM DULCAMARA	Bittersweet Nightshade	GNR	SNA		
Solidago altissima	Tall Goldenrod	G5	S5		
Solidago canadensis	Canada Goldenrod	G5	S5		
Solidago rigida	Stiff Goldenrod	G5	S3		
SONCHUS ARVENSIS	Perennial Sow Thistle	GNR	SNA		
TARAXACUM OFFICINALE	Common Dandelion	G5	SNA		
Tilia americana	Basswood	G5	S5		
TRAGOPOGON PRATENSIS	Common Goat's Beard	GNR	SNA		
TRIFOLIUM PRATENSE	Red Clover	GNR	SNA		
TRIFOLIUM REPENS	White Clover	GNR	SNA		
Ulmus americana	White Elm	G5?	S5		
ULMUS PUMILA	Siberian Elm	GNR	SNA		
URTICA DIOICA SSP. DIOICA	European Stinging Nettle	G5	SNA		
VERBASCUM BLATTARIA	Moth Mullein	GNR	SNA		
VERBASCUM THAPSUS	Common Mullein	GNR	SNA		
Verbena urticifolia	White Vervain	G5	S5		
Vernonia missurica	Missouri Ironweed	G4G5	S3?		
Vitis riparia	Riverbank Grape	G5	S5		

* NOTE: S1 Ranking only applies to the Tall Boneset population on Pelee Island

Appendix D



GENERAL SITE INFORMATION FIELD SHEET

Project: Grand Marais EA - upstream

Date: Oct 3 2012

Collector(s): P. Mikoda

MNR EOs: provided not provided yet None

Time started: 14:30 Time finished: 19:15 Combined collectors' hours: 4.75 hr

WEATHER CONDITIONS				WIND SCALE				
Temp.	Wind:	2	Cloud Cover (%)	Precipitation	0	Calm		
14°	Direction:	S→N	100%	Today: ∅	1	Smoke Drifts		
				Yesterday: ∅	2	Wind Felt on Face		
DATA FOCUS					3	Leaves in constant motion		
<input type="checkbox"/>	Birds	<input type="checkbox"/>	ELC's	<input type="checkbox"/>	4	Wind raises dust and paper		
<input type="checkbox"/>	Mammals	<input type="checkbox"/>	Plant Inventory	<input type="checkbox"/>	5	Small trees sway		
<input type="checkbox"/>	Amphibians	<input type="checkbox"/>	Wetland	<input type="checkbox"/>	6	Large branches sway		
<input checked="" type="checkbox"/>	Reptiles	<input type="checkbox"/>	Butternut	<input type="checkbox"/>	7	Lots of resistance when walking into		
<input type="checkbox"/>	Invertebrates	<input type="checkbox"/>	other SAR		8	Limbs breaking off trees		
FEATURES (with GPS co-ordinates where applicable)						Mapped	Follow-up Req'd	
Man-made Structures:						Yes	No	Who
<input type="checkbox"/>	Barns/Footings/Wells/other(list)							
<input checked="" type="checkbox"/>	Rock Piles <u>Segment 2 - 2 piles North side of drain</u>					✓		✓
<input type="checkbox"/>	Garbage							
Natural Vegetation:								
<input type="checkbox"/>	Fallen Logs outside woods (#'s)							
<input type="checkbox"/>	Brush Piles							
<input type="checkbox"/>	Snags (raptor perch)							
<input type="checkbox"/>	Tree Cavities (nesting)							
<input type="checkbox"/>	Sentinel Trees							
<input type="checkbox"/>	Mast Trees (6E)	<input type="checkbox"/>	Berry Shrubs (6E)					
Wildlife Features:								
<input type="checkbox"/>	Waterfowl nesting (large #'s, # of species)							
<input type="checkbox"/>	Exposed Banks (nesting swallows)							
<input type="checkbox"/>	Stick Nests							
<input checked="" type="checkbox"/>	Animal Burrows (>10cm) <u>throughout all segments</u>					✓		
<input type="checkbox"/>	Herony							
<input type="checkbox"/>	Crayfish mounds							
<input type="checkbox"/>	Sand/gravel on site							
<input type="checkbox"/>	Marsh/open country/shrub							
<input type="checkbox"/>	Winter Deer yards							
<input type="checkbox"/>	Corridor from pond to woods (ampibian movement)							
<input type="checkbox"/>	Bat corridor (shorelines, escarpments)							
<input type="checkbox"/>	Bat hibernacula (caves, mines, crevices, etc.)							
Aquatic Features:								
<input type="checkbox"/>	Perm. pond in woodland	<input type="checkbox"/>	emergents/submergents/logs	<input type="checkbox"/>	temp.			
<input type="checkbox"/>	Perm. pond in open	<input type="checkbox"/>	emergents/submergents/logs	<input type="checkbox"/>	temp.			
<input type="checkbox"/>	Water in woodland	<input type="checkbox"/>	pools	<input type="checkbox"/>	flowing	<input type="checkbox"/>	dry	
<input checked="" type="checkbox"/>	Waterways	<input type="checkbox"/>	flowing	<input type="checkbox"/>	dry	<input type="checkbox"/>	pools	
<input type="checkbox"/>	natural stream	<input type="checkbox"/>		<input type="checkbox"/>				
<input type="checkbox"/>	swale	<input type="checkbox"/>		<input type="checkbox"/>				
<input type="checkbox"/>	open drain	<input checked="" type="checkbox"/>		<input type="checkbox"/>				
<input type="checkbox"/>	Seeps/Springs	<input type="checkbox"/>		<input type="checkbox"/>				
Rare Species/Features:								
<input type="checkbox"/>	SAR							
<input type="checkbox"/>	S1-S3 species							
Additional Notes: <u>foraging habitat → segment #1 - abandoned property N of drain; segment #2 - north of drain east of rail line.</u>						✓		
Wildlife Observations: <u>no snakes/skins observed</u>								



Snake Habitat Survey

Site: GRAND MARAIS Date: OCT. 3/12 Time: 14:30 - 19:15
 Temp: 14 °C Wind: S→N Clouds: 100% Surveyor: P. MIKOPA
 Target Species: BAPD, BUON

GPS Point	Location		Comment	Potential Usage		
	Northing	Easting		Nest	Hibern	Them
541	333970	4682170	burrow + wahoo		✓	
542	333987	4682179	burrow		✓	
543	333987	4682188	burrow		✓	
544	333985	4682169	burrow		✓	
545	33962	4682156	burrow + tile drain		✓	
546	333954	4682148	tile		✓	
547	334008	4682196	org. debris (anth.)	✓		
548	334023	4682204	fishing bank		✓	
549	334029	4682216	burrow + 4 pics		✓	
550	334032	4682233	burrow - board + rabbit house	✓	✓	✓
551	334041	4682220	rose bush			✓
552	334054	4682228	DHB ??			✓
553	334052	4682222	rose			✓
554	334067	4682232	barrow		✓	
555	334094	4682255	burrow		✓	
556	334098	4682262	burrow		✓	
557	334112	4682280	debris pile - no eggs	✓		
558	334112	4682275	burrow x 2		✓	
559	334134	4682278	concrete + openings		✓	
560	334144	4682293	calvert		✓	
561	334163	4682279	- burrow		✓	
562	334150	4682272	- storm sewer		✓	
563	334124	4682255	burrows for 2			

Rstn
6-12

Habitat
pics
↗



Snake Habitat Survey

Site: GRAND MARAIS

Date: OCT. 3/12

Mulch
around
spcs - nest

GPS Point	Location		Comment <i>ephemeral</i>	Potential Usage		
	Northing	Easting		Nest	Hibern	Them
468	334129	4682268	org. debris - no eggs	X		
469	334119	4682258	burrow		X	
566	334120	4682251	burrow x2		X	
567	334081	4682297	vines + debris			X
568	334028	4682194	burrow x2		X	
569	334496	4682426	undermined cement		X	
570	334418	4682385	" "		X	
571	334411	4682387	- burrow in wall		X	
572			- wall undermined		X	
573	334497	4682432	" "		X	
574	334183	4682383	- debris pile + habitation	X		X
575	334252	4682364	- burrow		X	
576	334212	4682351	- rock pile			
577/8	334200	4682333	- burrows x 13 + 14		X	

Section 1



This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.



- Legend**
- Peele Island Roads
 - Municipalities
 - Municipal Boundary
 - Streets
 - ESA 04
 - PSW
 - Recreation
 - Golf Course
 - Park
 - Lake Erie Islands



Scale: 1:1,484

Section 2



This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.



- Legend**
- ✓ Peele Island Roads
 - Municipalities
 - Municipal Boundary
 - ✓ Streets
 - ESA 04
 - PSW
 - Recreation
 - Golf Course
 - Park
 - Lake Erie Islands



Scale: 1:1,484

Section 3



This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.



- Legend**
- Peele Island Roads
 - Municipalities
 - Municipal Boundary
 - Streets
 - ESA 04
 - PSW
 - Recreation
 - Golf Course
 - Park
 - Lake Erie Islands



Scale: 1:1,484



Section 4



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Legend

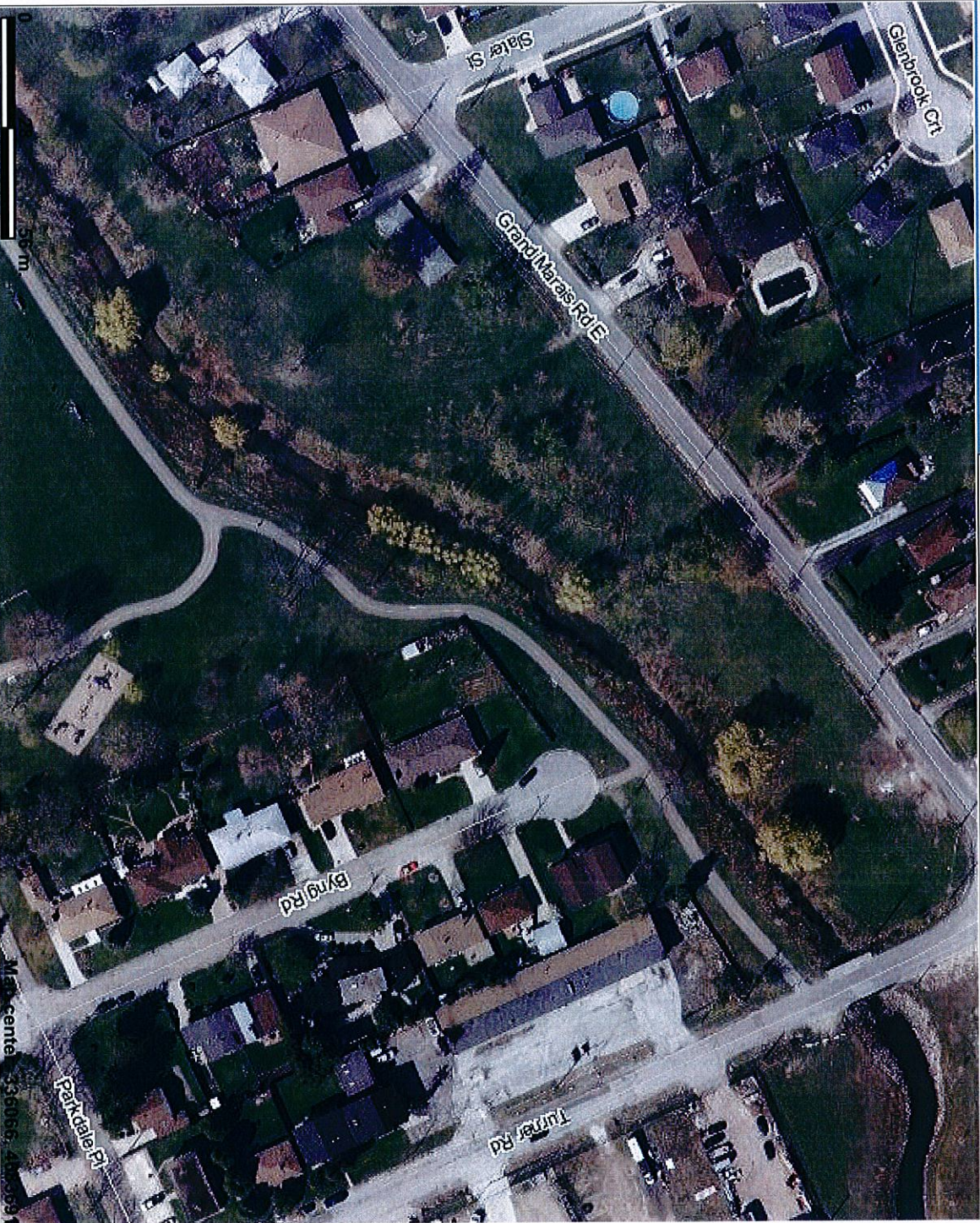
- Peele Island Roads
- Municipalities
- Municipal Boundary
- Streets
- ESA 04
- PSW
- Lake Erie Islands



Scale: 1:1,484



Section 5



This map is a user generated static output from an Internet mapping site and is for general reference only. Data layers that appear on this map may or may not be accurate, current, or otherwise reliable. THIS MAP IS NOT TO BE USED FOR NAVIGATION.



- Legend**
- Peele Island Roads
 - Municipalities
 - Municipal Boundary
 - Streets
 - ESA 04
 - PSW
 - Lake Erie Islands



Scale: 1:1,559

Appendix E

**Grand Marais Drain
Identification of Significant Wildlife Habitat - Ecoregion 7E**

Seasonal Concentration Areas of Animals

Wildlife Habitat	Wildlife Species Present	ELC Codes	Habitat Criteria	Defining Criteria	SWH Criteria Met
Waterfowl Stopover and Staging Areas (Terrestrial)	no bird studies completed	CUM - open field areas CUT - Riparian Corridor	no evidence of annual spring flooding in open fields open fields are within residential and commercial areas of the City	habitat criteria not met no studies needed	No
Waterfowl Stopover and Staging Areas (Aquatic)	no bird studies completed	none present	none present	no habitat present no studies needed	No
Shorebird Migratory Stopover Area	no bird studies completed	none present	none present	n/a	No
Raptor Wintering Area	no bird studies completed	CUM - open field areas CUT - Riparian Corridor	no forest communities present only riparian vegetation, open field areas and maintained lawn present Grand Marais Drain present however located within residential and commercial areas of the City	habitat criteria not met no studies needed	No
Bat Hibernacula	none observed	none present	none present	no habitat present no studies needed	No
Bat Maternity Colonies	none observed	none present	none present	no habitat present no studies needed	No
Bat Migratory Stopover Area	none observed	n/a	n/a	n/a	No
Turtle Wintering Areas	none observed	Grand Marais Drain	only riparian vegetation, open field areas and maintained lawn present Grand Marais Drain present and has a few deeper pools present but they lack mud substrates and overall the drain does not have strong current	habitat criteria not met no studies needed	No
Snake Hibernaculum	none observed	CUM - open field areas CUT - Riparian Corridor	throughout all five segments steep slopes with animal burrows gabion rock piles in Segment 2	no snake emergence surveys completed to confirm congregations	Yes Candidate SWH
Colonially-Nesting Bird Breeding Habitat (Bank and Cliff)	no bird studies completed	CUM - open field areas CUT - Riparian Corridor	no exposed soil banks, eroding banks, sandy hills, sand piles, cliff faces banks of the Grand Marais drain are steep slopes however they are heavily vegetated and majority is lined with gabion stone	habitat criteria not met no studies needed	No
Colonially-Nesting Bird Breeding Habitat (Trees/Shrubs)	no bird studies completed	none present	none present	no habitat present no studies needed	No
Colonially-Nesting Bird Breeding Habitat (Ground)	no bird studies completed	CUM - open field areas CUT - Riparian Corridor Grand Marais Drain	Grand Marais Drain and the cultural comminutes area located within residential and commercial area in the City of Windsor not farmland	habitat criteria not met no studies needed	No
Migratory Butterfly Stopover Areas	no butterfly studies completed	CUM - open field areas CUT - Riparian Corridor	no forest communities present and not located within 5km of Lake Ontario or Lake Erie only riparian vegetation, open field areas and maintained lawn present located within residential and commercial areas of the City of Windsor	habitat criteria not met no studies needed	No
Land Bird Migratory Stopover Areas	no bird studies completed	none present	none present	no habitat present no studies needed	No
Deer Winter Congregation Areas	none observed	none present	none present	no habitat present no studies needed	No

Rare Vegetation Communities

Wildlife Habitat	ELC Codes	Habitat Description	Defining Criteria	SWH Criteria Met
Cliffs and Talus Slopes	none present	none present	none present	No
Sand Barren	none present	none present	none present	No
Alvar	none present	none present	none present	No
Old Growth Forest	none present	none present	none present	No
Savannah	none present	none present	none present	No
Tallgrass Prairie	none present	none present	none present	No
Other Rare Vegetation Communities	none present	none present	none present, all vegetation communities present are common and secure in Ontario	No

Specialized Habitat for Wildlife

Wildlife Habitat	Wildlife Species Present	ELC Codes	Habitat Criteria	Defining Criteria	SWH Criteria Met
Waterfowl Nesting Area	no bird studies completed	none present	none present	no habitat present, no studies needed	No
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat	no bird studies completed	none present	none present	no habitat present, no studies needed	No
Woodland Raptor Nesting Habitat	no bird studies completed	none present	none present	no habitat present, no studies needed	No
Turtle Nesting Areas	no turtle studies completed	none present	none present	no habitat present, no studies needed	No
Springs and Seeps	none observed	none present	none present	no habitat present, no studies needed	No
Amphibian Breeding Habitat (Woodland)	no amphibian studies completed	none present	none present	no habitat present, no studies needed	No
Amphibian Breeding Habitat (Wetlands)	no amphibian studies completed	none present	none present	no habitat present, no studies needed	No

Habitat for Species of Conservation Concern (not END or THR species)

Wildlife Habitat	Wildlife Species Present	ELC Codes	Habitat Criteria	Defining Criteria	SWH Criteria Met
Marsh Bird Breeding Habitat	no bird studies completed	none present	none present	no habitat present, no studies needed	No
Woodland Area-Sensitive Bird Breeding Habitat	no bird studies completed	none present	none present	no habitat present, no studies needed	No
Open Country Bird Breeding Habitat	no bird studies completed	CUM - open field areas	community present however are not greater than 30 ha	habitat criteria not met, no studies needed	No
Shrub/Early Successional Bird Breeding Habitat	no bird studies completed	CUT - Riparian Corridor	thicket community not adjacent to large fields	habitat criteria not met, no studies needed	No
Terrestrial Crayfish	none observed	none present	none present	no habitat present, no studies needed	No
Wildlife Habitat	Wildlife Species Present	Element Occurrences (identified from NHIC and/or MNR)	Habitat Criteria/Defining Criteria		SWH Criteria Met
Special Concern and Rare Wildlife Species	Honey Locust (S2) Stiff Goldenrod (S3) Missouri Ironweed (S3?)	see list in Appendix C	Honey Locust - a planted cultivar that is not considered significant Stiff Golden Rod and Missouri Ironweed - in cultural meadow within Segment 2 near the railway		Yes Candidate SWH

Animal Movement Corridors

Wildlife Habitat	Wildlife Species Present	ELC Codes	Habitat Criteria	Defining Criteria	SWH Criteria Met
Amphibian Movement Corridors	n/a	n/a	No Amphibian Breeding Habitat -Wetland present	no habitat present	No