Grand Marais Drain Channel Improvements
Class Environmental Assessment
Dougall Avenue to West of Huron Church Road

PROJECT FILE

Job Number: 11-007
June 2012

Essex Region Conservation Authority

The City of Windsor, Ontario, Canada

Landmark Engineers Inc.

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1.0 Project Information - Project Overview, Background, Problem/Opportunity Statement, Project Status and Project File

Project Overview:

In accordance with the approved procedures contained in the Municipal Engineers Association's Municipal Class Environmental Assessment (Class EA), the Essex Region Conservation Authority (ERCA) and the City of Windsor retained Landmark Engineers Inc. to carry out an environmental assessment of the existing concrete-lined segment of the Grand Marais Drain. This Class EA was aimed at exploring the potential for establishing improved connections between the communities on either side of the Drain, and for making recreational, aesthetic, and habitat improvements within the channel corridor.

Background:

The concrete-lined segment of the Grand Marais Drain was originally constructed in the 1970s. Since that time, the standards for the design of flood-control channels such as this have changed considerably, and other less intrusive channel improvements have been carried out along the Grand Marais Drain / Turkey Creek corridor both upstream and downstream of the subject study area.

Recent studies commissioned by ERCA and the City of Windsor have documented the hydraulic capacity of the existing channel along its entire length and also the physical condition of the concrete-lined segment. As a result of these studies, a scope of needed repairs to the concrete-lined channel was identified - some of which were carried out over the summer of 2011. It was also noted that excess hydraulic capacity exists along the concrete-lined segment of the Grand Marais Drain and that opportunities exist along the Grand Marais Drain corridor to make recreational, aesthetic, and habitat improvements.

This Class EA was initiated to develop design alternatives for these improvements, taking into account the need for public consultation and the potential for environmental impacts. A project web page was developed to facilitate the review of project information by the public and various stakeholders over the course of the Class EA process. The website was updated on a regular basis as the project progresses.

Problem / Opportunity Statement:

At the outset of the Class EA process, the following Problem / Opportunity statement was developed to guide and direct the study:

"In order to maximize the potential benefits to the surrounding community, this study will identify alternative means and measures for restoring the concrete-lined segment of the Grand Marais Drain; with a focus on exploring the potential for establishing improved connections between the communities on either side of the Drain, and for making recreational, aesthetic, and habitat improvements within the channel corridor."

Project Status:

The Class EA process had been completed and the Project File has been compiled.

Project File:

Since this project is proceeding as a “Schedule B” activity under the Municipal Class Environmental Assessment, ERCA and the City of Windsor are required to maintain an official Project File that will be made available to the public for review and comment. The balance of this document represents the Project File.

2.0 Background Collection and Review

This section of the Project File summarizes the relevant background information that was obtained and reviewed as part of the Class EA process as well as secondary studies that were commissioned to support the EA process. This includes information pertaining to the existence of utilities in the vicinity of the study area we well as information from other related studies. The significance of all information collected is summarized below.

Bell Canada

The utility plan indicates that there are three locations where Bell lines cross under the drain:

Between Rankin Avenue and Massey Court – 12 duct conduit.
Between Curry Avenue and McKay Avenue – Abandoned buried cable.
Between McKay Avenue and Dominion Avenue – 2 duct conduit and buried cable.

The location of all utilities shown on the plan should be regarded as approximate locations. Physical locates would be required prior to detailed design and construction in order to confirm their actual locations.

Bicycle Use Master Plan (BUMP)

Map 5 of the BUMP plan depicts a multi-use trail along the Grand Marais Drain from Dougall Avenue to the Windsor/LaSalle city limit (see Map 5 in this section). The Preferred Solution incorporates a continuous 4.5 metre wide multi-use path from Dougall Avenue to Northway Avenue. The proposed route of the multi-use path is depicted in Section 3, Drop-In Centre No.3 – Slide 4.

Enwin Utilities

The large majority of existing power lines within the study area run parallel to the drain. However, there are five overhead crossings within the study area (Randolph Avenue, Glenwood Avenue, Dominion Boulevard, Longfellow Avenue and Academy Drive). None of the overhead lines will be affected by the proposed improvements to the Grand Marais Drain.

The underground utilities plan indicates that there is a crossing along the side of the Rankin Avenue Bridge. This utility will not be affected by the proposed design.

The location of all utilities shown on the plan should be regarded as approximate locations. Physical locates would be required prior to detailed design and construction in order to confirm their actual locations.

Heritage Sites

Built Heritage:
There are two properties identified in the Windsor Municipal Heritage Register that abut the Grand Marais drain; the Yorktown Square Sign and Glenwood United Church. Neither of these sites will be affected by the proposed improvements.

Archaeological Heritage:
The study area west of California Ave has been identified as being of high archaeological potential, according to the Windsor Archaeological Master Plan (2005), prepared by Culture Resource Management Group Limited, Fisher Archaeological Consulting, Historic Horizon Inc. and Dillon Consulting Limited for the City of Windsor, Ontario Ministry of Tourism, Culture and Recreation.

As part of this Class EA, AMICK Consultants Limited was engaged to undertake a Stage 1-2 Archaeological Assessment of lands potentially affected by the proposed improvements. Over the course of the physical assessment of the property that was completed during this study, no archaeological resources were encountered. Consequently, it is recommended that the proposed development be considered cleared of any further requirement for archaeological fieldwork. A summary of the information that was displayed at the first Drop-In Centre is provided in Section 3, Drop-In Centre No. 1 - Slides 12 and 13. A copy of the entire AMICK report can be found in Section 9 of this file.

Natural Heritage

BioLogic Inc. was retained to undertake an assessment of the Natural Heritage within the study area. The study included aquatic life as well as a terrestrial assessment to evaluate the existing flora and fauna. The following summarizes the findings of BioLogic Inc.

Aquatic:

The Grand Marais Drain, which outlets to Turkey Creek, has permanent flow and supports a number of warmwater fish species. Fish capture within the study area over the course of the repair work undertaken in 2011 did not encounter any aquatic Species at Risk known previously suspected of inhabiting the Grand Marais Drain.

Flora:

Site investigations found the following species at risk within the study area in proximity of the drain:

- Dense Blazing Star (Liatris spicata) - provincially and federally Threatened
- Butternut (Juglans cinerea) - provincially and federally Endangered

These species at risk, which are locally common, will need to be further assessed as part of the design process to ensure compliance with the federal Species at Risk Act (SARA) and provincial Endangered Species Act (ESA).

Fauna:

Since the entire channel and the banks within the study area are lined with concrete, there would be no habitat for the Species at Risk which are known to inhabit the downstream portion of the drain.

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

A copy of BioLogic's report can be found in Section 10 of this file.

Union Gas

Mapping from Union Gas was obtained and reviewed. There are two locations where a service pipe crosses the Grand Marais drain within the study area; at Dougall Avenue and California Avenue. Neither of these locations will be affected by the Preferred Solution. The location of all pipes shown on the plan should be regarded as estimated locations. Physical locates would be required prior to detailed design and construction in order to confirm the location of the gas mains.

Water Survey of Canada

Until December 2011, The Water Survey of Canada maintained a stream gauge which continuously monitored water levels within the drain starting in 1982. The Gauge was located just east of Huron Church Road. Historic water level data was obtained and analyzed to determine annual high water levels and storm frequencies. This data was used to prepare a number of slides that were presented at the first Public Drop-In Centre (Section 3, Drop-In Centre No. 1 – Slides 8 and 9).

Windsor Utilities Commission

Relevant information was extracted from the City of Windsor's sewer atlas and was used to review the local storm sewer system that is tributary to the study area. The inverts of the existing sewers were used to assess the potential hydraulic impacts of the proposed improvements and more specifically, the potential impacts of the risk of basement flooding. Local sewer elevations relative to the drain invert were presented at the third Drop-In Centre (see Section 3, Drop-In Centre No. 3 – Slide 5). The sewer atlas can be viewed on the City of Windsor's website (http://www.citywindsor.ca/visitors/Maps/Pages/MAPS-For-Residents.aspx - Scroll down to Municipal Address Atlas).

3.0 Public Drop-In Centres

Three Public Drop-In Centres were held over the course of this Class EA. This section of the Project File contains reproductions of all of the display panels that were presented at each of the three drop-in centres. A document that explains the purpose of each slide precedes the display panels.

For convenience, the display material has been separated into the following sections:

- Public Drop in Centre No. 1 (November 29th , 2011)
- Public Drop in Centre No. 2 (February 23rd, 2012)
- Public Drop in Centre No. 3 (March 20th , 2012)

The display material can also be viewed on the City of Windsor's website (www.citywindsor.ca). Simply entering 'Grand Marais Drain' in the Search Box on the top right corner of the City's Home Page will direct you to the project webpage. A screen capture of the webpage is attached at the end of this section.

GRAND MARAIS DRAIN CHANNEL IMPROVEMENTS – CLASS ENVIRONMENTAL ASSESSMENT

DOUGALL AVENUE TO WEST OF HURON CHURCH ROAD

Drop-In Centre No. 1 – Presentation Slide Summaries

Introduction

This document is intended to facilitate review of the display slides by members of the public and review agencies that were not able to attend the Public Drop-In Centre on November 29th, 2011. Brief explanations of the slides are summarized below.

Welcome, Purpose and Problem/Opportunity Statement, Project Team (Slides 1 - 3)

- The first three slides are intended to introduce the project and the project team.

Environmental Assessment Process (Slides 4 - 5)

- The Environmental Process being followed for this project consists of the steps shown in this slide. We have currently completed steps 1 through 3 and step 7. Steps 4 through 6 are currently ongoing and will be completed in conjunction with steps 8 through 10. Once the second Public Drop-In Centre is completed in February 2012, a decision will be made as to whether or not any additional public consultations are necessary based on public feedback. If another Drop-In centre is deemed necessary, steps 8 through 11 will be completed again before moving onto the final 3 steps.

Environmental Inventory and Existing Conditions (Slide 6)

- This slide outlines what will be discussed in the following slides as well as some photos of existing conditions and drain repairs that took place this past summer.

Site History (Slide 7)

- The relationship between the 1:100 year water level and adjacent homes basement levels are shown in the diagrams. The possible maximum increase in water level due to channel modifications is shown. It should be noted that the maximum increase level remains lower than the basement elevation of the adjacent homes.
- Due to the fact that the Grand Marais Drain is designed for Hurricane Hazel and not the modern 1:100 year storm standard, there is extra capacity in the drain that can be used to improve the condition of the drain.

Water Gauge – Water Survey of Canada (Slide 8)

- Includes a scaled diagram depicting the existing channel in the vicinity of the gauge.
- This slide shows the location of the monitoring gauge. The gauge continuously monitors water levels and flow within the channel.
- The water surface elevation and flow rates are given for a variety of storm frequencies and their corresponding water levels are depicted in the figure enlargement.
- The table provides a listing of the water level statistics for corresponding flow rates.

Water Gauge – Peak Water Level Events by Year (Slide 9)

- The bar and line graph shows the number of events that have occurred above a given elevation and the peak water level for each year since 1982

- The green bars show the number of events that occurred in a given year above the 1:20 year storm event.
- The yellow bars show the number of events that occurred in a given year above the 1:50 year storm event.
- The red bars show the number of events that occurred in a given year above an elevation of 178.04m which is slightly below the 1:100 year storm event.

Natural Heritage Summary (Slides 10 - 11)

- Slide 10 summarizes the findings of the biological inventory that was completed as part of the EA process.
- Slide 11 summarizes the findings of the areas archaeological assessment that was completed as part of the EA process.
- Built Heritage Sites and Archaeological Sites around the project area are shown.
- None of the Built Heritage Sites will be affected by the project.

Heritage Sites (Slide 12)

- Map highlighting any Heritage Sites in the vicinity of the drain.

Archaeological Potential (Slide 13)

- Summarizes the Archaeological Assessment that was prepared for the study area.

Existing Conditions, Design Objectives and Considerations (Slides 14 – 16)

- These slides present opportunities for linkages between the north and south neighbourhoods adjacent to the drain, park expansion opportunities, proposed pedestrian paths and trails as well as existing paths and city owned lands.

Alternative Solutions (Slides 17 – 23)

- Presented in these slides are different channel enhancement concepts being considered for implementation. Options 1 through 6 are shown with the perceived advantages and disadvantages of each.

Next Steps (Slide 24)

- This slide outlines the next steps that will be taken.

GRAND MARAIS DRAIN CHANNEL IMPROVEMENTS – CLASS ENVIRONMENTAL ASSESSMENT

DOUGALL AVENUE TO WEST OF HURON CHURCH ROAD

Drop-In Centre No. 2 – Presentation Slide Summaries

Introduction

This document is intended to facilitate review of the display slides by members of the public and review agencies that were not able to attend the Public Drop-In Centre on February 23rd, 2012. The purpose of each slide is explained.

Welcome, Purpose and Problem/Opportunity Statement (Slides 1 - 2)

- The first two slides are intended to introduce the project and welcomed visitors to the Drop-In Centre.

Environmental Assessment Process (Slide 3)

- The Environmental Process being followed for this project consists of the steps shown in this slide. We have currently completed steps 1 through 7. Steps 8 through 10 are currently ongoing. Once the third Public Drop-In Centre is completed in March 2012 (step 11), the study will progress to steps 12, 13 and 14.

Water Gauge – Water Survey of Canada (Slide 4)

- Includes a scaled diagram depicting the existing channel in the vicinity of the gauge.
- This slide shows the location of the monitoring gauge. The gauge continuously monitors water levels and flow within the channel.
- The water surface elevation and flow rates are given for a variety of storm frequencies and their corresponding water levels are depicted in the figure enlargement.
- The table provides a listing of the water level statistics for corresponding flow rates.

Reported Basement Flooding (Slide 5)

- This slide discusses the correlation of water levels in the drain during the rainfall event that caused basement flooding on November 29, 2012. The information indicates that water levels in the Drain did not cause the basement flooding during that event.

Opportunities and Constraints associated with Land Use (Slide 6)

- This slide illustrates the adjacent land uses along the Drain and discusses the opportunities and constraints they present.

Trail System and Crossings (Slide 7)

- This slide illustrates the location of existing trails and paths and of proposed trail and crossing opportunities. The proposed paths extend and link the existing paths to create a continuous trail system throughout the entire drain corridor. New pedestrian crossings are proposed along segments where there currently are large distances between crossings.

Enclosure Opportunities (Slide 8)

- The intense option shows the proposed maximum enclosure lengths and locations. The minimal option shows the proposed minimum enclosure lengths and locations to obtain the stated objectives of creating stronger linkages neighbourhoods. The final design may be a combination of both options.

Proposed Design Option 1 (Slides 9-11)

- The proposed options for each segment of the drain are illustrated in these slides. Each option is colour coded in the legend and the cross section is shown below the plan for reference.
- In areas where more table land is required to introduce pathways, options which result in some reclaiming of land adjacent to the drain are proposed.
- Other segments with no restrictions have many options that could be used.
- For each segment, options were chosen to create variation and interest along the Drain.

Proposed Design Option 2 (Slides 12 – 14)

- The proposed options for each segment of the drain are illustrated in these slides. Each option is colour coded in the legend and the cross section is shown below the plan for reference.
- In areas where more table land is required to introduce pathways, options which result in some reclaiming of land adjacent to the drain are proposed.
- Other segments with no restrictions have many options that could be used.
- For each segment, options were chosen to create variation and interest along the Drain.

Hydraulic Impact Assessment (Slides 15 – 17)

- Theses slides illustrate how the proposed improvements would affect the hydraulic grade along the channel for both Design Option 1 and 2. The dots represent the water level at each locations what would impact the local sewer that outlet to the drain.
- It can be seen from these graphs that both Design Options begin to impact the local sewers at the upstream end of the project. The impacts will need to be studied and the Preferred Solution will need to be designed to have less hydraulic impact.

Next Steps (Slide 18)

- This slide outlines the next steps that will be taken in the process of completing this Class EA.

GRAND MARAIS DRAIN CHANNEL IMPROVEMENTS – CLASS ENVIRONMENTAL ASSESSMENT

DOUGALL AVENUE TO WEST OF HURON CHURCH ROAD

Drop-In Centre No. 3 – Presentation Slide Summaries

Introduction

This document is intended to facilitate review of the display slides by members of the public and review agencies that were not able to attend the Public Drop-In Centre on March 20th, 2012. The purpose of each slide is explained.

Welcome, Purpose and Problem/Opportunity Statement (Slides 1 - 2)

- The first two slides are intended to introduce the project and welcomed visitors to the Drop-In Centre.

Environmental Assessment Process (Slide 3)

- The Environmental Process being followed for this project consists of the steps shown in this slide. We have currently completed steps 1 through 11. The study will now progress to steps 12 through 14.

Preferred Solution (Slide 4)

- The Preferred Solution for the entire study length of the drain is illustrated in this slide. Each option is colour coded in the legend and the corresponding cross section is shown below the plan for reference.
- In areas where more table land is required to introduce pathways, options which result in some reclaiming of land adjacent to the drain are proposed.
- For areas where the upper portion of the concrete is shown to be removed, prairie grasses are shown along the slopes.
- The channel enclosures that are shown correspond to the intense enclosure option presented at Drop-In Centre No.2. They reflect the maximum amount of enclosure that would be completed.
- The lengths of the enclosures could be minimized to reduce the project budget, without significantly impacting the project objectives.
-

Hydraulic Analysis (Slide 5)

- This slide illustrates how the Preferred Solution would affect the 1:100 year water level within the channel.
- The dots represent an elevation that corresponds to the local sewer being two thirds full. This level was established as the limit to which water levels in the Grand Marais Drain could be increased to without causing any added risk of flooding during the 1:100 year storm event.
- It can be seen that the new hydraulic grade line (NEW 1:100) is at or below all of the dots.

Cost Analysis – Maintenance and Repair (Slide 6)

- It is expected that the existing concrete lined channel will reach the end of its service life within the next 50 years. This slide discusses the cost to repair and rebuild what exists verses the cost of building the Proposed Solution.
- Maintenance costs for the creation of new trails, prairie landscape and mowed grass are also presented.

Cost Analysis – Projected Cost for Recommended Channel Treatments (Slide 7)

- Each of the recommended channel treatments are displayed along with the total proposed length and projected unit cost for each treatment. Sub-Totals for each option are also provided.

Cost Analysis – Summary (Slide 8)

- This slide presents the Project Budget and a breakdown of the associated costs.

Next Steps (Slide 9)

- This slide outlines the next steps that will be taken in the process of completing this Class EA.

4.0 Cost Estimate

This section of the Project File includes the cost information that was used to estimate the project budget. The estimated cost of the Preferred Design (intense enclosure option) is $22.5 million which includes allowances for construction, engineering, administration and contingencies.

The enclosure length could be reduced without significantly compromising the function of the project as envisioned. The estimated cost of this alternative (minimum enclosure option) is $18.5 million.

GRAND MARAIS DRAIN CHANNEL IMPROVEMENTS

OPTION 2 - DRAIN ENCLOSURE

ITEM	DESCRIPTION	ORDER OF MAGNITUDE ($) Lin.m	SECTION TOTAL ($)
1.0	**DEMOLITION, SITE PREPARATION & SERVICING**		
1.1	Concrete Removal	$600.00	
1.2	Excavation	$50.00	
1.3	Granular A Bedding	$535.00	
1.4	Box Culvert (3mx2.4m double culvert)	$8,750.00	
1.5	Labour	$400.00	
1.6	Equipment	$350.00	
1.7	Catchbasins (supply and install)	$60.00	
	TOTAL DEMOLITION, SITE PREPARATION & SERVICING		**$10,745.00**
2.0	**SOFTSCAPE**		
2.1	Backfilling	$250.00	
2.2	Grading	$160.00	
2.3	4" of Topsoil (supply and install)	$100.00	
2.4	Seed and Mulch	$115.00	
2.5	Shrubs and Groundcover	$150.00	
	TOTAL SOFTSCAPE		**$775.00**
3.0	**FENCING**		
3.1	Fencing (supply and install)	$75.00	
	TOTAL FENCING		**$75.00**
	TOTAL		**$11,595.00**
	TOTAL USED FOR ESTIMATE		**$12,000.00**
			(per linear metre)

GRAND MARAIS DRAIN CHANNEL IMPROVEMENTS

OPTION 3A - CHANNEL OFFSET THREE PANNEL

ITEM	DESCRIPTION	ORDER OF MAGNITUDE ($) Lin.m	SECTION TOTAL ($)
1.0	**DEMOLITION, SITE PREPARATION & SERVICING**		
1.1	Concrete Removal	$210.00	
1.2	Excavation	$45.00	
	TOTAL DEMOLITION, SITE PREPARATION & SERVICING		**$255.00**
2.0	**SOFTSCAPE**		
2.1	Fill	$760.00	
2.2	Grading	$160.00	
2.3	4" of Topsoil (supply and install)	$50.00	
2.4	Seed and Mulch	$65.00	
	TOTAL SOFTSCAPE		**$1,035.00**
3.0	**FEATURES**		
3.1	Retining Wall	$3,060.00	
3.2	Railing	$200.00	
	TOTAL FEATURES		**$3,260.00**
	TOTAL		**$4,550.00**
	TOTAL USED FOR ESTIMATE		**$4,600.00**
			(per linear metre)

GRAND MARAIS DRAIN CHANNEL IMPROVEMENTS

OPTION 3B- CHANNEL OFFSET STONE WALL

ITEM	DESCRIPTION	ORDER OF MAGNITUDE ($) Lin.m	SECTION TOTAL ($)
1.0	**DEMOLITION, SITE PREPARATION & SERVICING**		
1.1	Concrete Removal	$210.00	
1.2	Excavation	$45.00	
	TOTAL DEMOLITION, SITE PREPARATION & SERVICING		**$255.00**
2.0	**SOFTSCAPE**		
2.1	Fill	$275.00	
2.2	Grading	$50.00	
2.3	4" of Topsoil (supply and install)	$30.00	
2.4	Seed and Mulch	$35.00	
2.5	Shrubs and Groundcover	$150.00	
	TOTAL SOFTSCAPE		**$540.00**
3.0	**FEATURES**		
3.1	Retining Wall	$2,600.00	
3.2	Fencing	$75.00	
	TOTAL FEATURES		**$2,675.00**
	TOTAL		**$3,470.00**
	TOTAL USED FOR ESTIMATE		**$3,500.00**
			(per linear metre)

GRAND MARAIS DRAIN CHANNEL IMPROVEMENTS

OPTION 6A - GRASS LINED TOP PANNEL

ITEM	DESCRIPTION	ORDER OF MAGNITUDE ($) Lin.m	SECTION TOTAL ($)
1.0	**DEMOLITION, SITE PREPARATION & SERVICING**		
1.1	Concrete Removal	$85.00	
	TOTAL DEMOLITION, SITE PREPARATION & SERVICING		**$85.00**
2.0	**SOFTSCAPE**		
2.2	Grading	$65.00	
2.3	4" of Topsoil (supply and install)	$35.00	
2.4	Seed and Mulch	$45.00	
	TOTAL SOFTSCAPE		**$145.00**
3.0	**FENCING**		
3.1	Fencing (supply and install)	$75.00	
	TOTAL FENCING		**$75.00**
	TOTAL		**$305.00**
	TOTAL USED FOR ESTIMATE		**$350.00**
			(per linear metre)

GRAND MARAIS DRAIN CHANNEL IMPROVEMENTS

OPTION 6B - CHANNEL OFFSET ONE PANNEL

ITEM	DESCRIPTION	ORDER OF MAGNITUDE ($) Lin.m	SECTION TOTAL ($)
1.0	**DEMOLITION, SITE PREPARATION & SERVICING**		
1.1	Concrete Removal	$85.00	
1.2	Excavation	$25.00	
	TOTAL DEMOLITION, SITE PREPARATION & SERVICING		**$110.00**
2.0	**SOFTSCAPE**		
2.1	Fill	$80.00	
2.2	Grading	$90.00	
2.3	4" of Topsoil (supply and install)	$20.00	
2.4	Seed and Mulch	$25.00	
	TOTAL SOFTSCAPE		**$215.00**
3.0	**FEATURES**		
3.1	Retining Wall	$1,740.00	
3.2	Railing	$200.00	
	TOTAL FEATURES		**$1,940.00**
	TOTAL		**$2,265.00**
	TOTAL USED FOR ESTIMATE		**$2,300.00**
			(per linear metre)

GRAND MARAIS DRAIN CHANNEL IMPROVEMENTS

SITE ACCESSORIES

ITEM	DESCRIPTION	ORDER OF MAGNITUDE ($) Lin.m	SECTION TOTAL ($)
1.0	**SITE ACCESSORIES**		
1.1	Pedestrian Lighting (servicing, poles, luminares) 30m O.C. spacing	$130.00	
1.2	Benches at 50m O.C. spacing	$40.00	
1.3	Waste Receptacles at 100m O.C. spacing	$15.00	
1.4	Signage at 100m O.C. spacing	$20.00	
1.5	Deciduous trees (70mm caliper at 25m O.C. spacing each side of the channel	$65.00	
	TOTAL SITE ACCESSORIES		**$270.00**
	SUBTOTAL		**$270.00**
	TOTAL USED FOR ESTIMATE		**$300.00**
			(per linear metre)

GRAND MARAIS DRAIN CHANNEL IMPROVEMENTS

PEDESTRIAN PATHWAYS

ITEM	DESCRIPTION	ORDER OF MAGNITUDE ($) Lin.m	SECTION TOTAL ($)
1.0	**PATHWAYS**		
1.1	Supply and Install 4.5m wide x 150mm thick multi-use asphalt (with compacted subbase)	$300.00	
	TOTAL PATHWAYS		**300.00**
	SUBTOTAL		**$300.00**
	TOTAL USED FOR ESTIMATE		**$300.00**
			(per linear metre)

GRAND MARAIS DRAIN CHANNEL IMPROVEMENTS

END TREATMENTS

ITEM	DESCRIPTION	ORDER OF MAGNITUDE ($) EACH	SECTION TOTAL ($)
1.0	**END TREATMENTS**		
1.1	Supply and Install ent treatments for the upstream and downstream end of each new culvert and the existing Balmoral culvert. (10 total)	$20,000.00	
	TOTAL END TREATMENTS		**$200,000.00**
	SUBTOTAL		**$200,000.00**
	TOTAL USED FOR ESTIMATE		**$200,000.00**
			(lump sum)

GRAND MARAIS DRAIN CHANNEL IMPROVEMENTS

CONCRETE REPAIRS

ITEM	DESCRIPTION	ORDER OF MAGNITUDE ($) LUMP SUM	SECTION TOTAL ($)
1.0	**CONCRETE REPAIRS**		
1.1	Repair remining portion of the concrete channel to the level that was established during the summer 2011 repairs. (Dominion Boulevard to Bruce Avenue)	$530,000.00	
	TOTAL CONCRETE REPAIRS		**$530,000.00**
	SUBTOTAL		**$530,000.00**
	TOTALS USED FOR ESTIMATE	**(intense enclosure #)**	**$530,000.00**
		(minimum enclosure #)	**$630,000.00**
			(lump sum)

GRAND MARAIS DRAIN CHANNEL IMPROVEMENTS

COST ESTIMATE (INTENSE ENCLOSURE OPTION)

ITEM	DESCRIPTION	ORDER OF MAGNITUDE ($) Lin.m	QUANTITY	SECTION TOTAL ($)
1.0	**OPTION FEATURES**			
1.1	Option 2	$12,000.00	720 m	$8,640,000.00
1.2	Option 3B	$3,500.00	170 m	$595,000.00
1.3	Option 6A	$350.00	1480 m	$518,000.00
1.4	Option 6B	$2,300.00	1530 m	$3,519,000.00
1.5	Option 6A with 6B offset	$2,300.00	80 m	$184,000.00
1.6	Option 6B with 3A offset	$4,600.00	100 m	$460,000.00
	TOTAL OPTION FEATURES			**$13,916,000.00**
2.0	**OTHER ITEMS**			
2.1	Site Accessories	$300.00	5140 m	$1,542,000.00
2.2	Pathways	$300.00	3000 m	$900,000.00
2.3	End Treatments	$200,000.00	lump sum	$200,000.00
2.4	Concrete Repairs	$530,000.00	lump sum	$530,000.00
	TOTAL OTHER ITEMS			**$3,172,000.00**
	SUBTOTAL			**$17,088,000.00**
	20% CONTINGENCY			**$3,400,000.00**
	SUBTOTAL			**$20,488,000.00**
	10% ENGINEERING & ADMINISTRATION			**$1,750,000.00**
	TOTAL			**$22,238,000.00**
	TOTAL COST			**$22,500,000.00**

GRAND MARAIS DRAIN CHANNEL IMPROVEMENTS

COST ESTIMATE (MINIMUM ENCLOSURE OPTION)

ITEM	DESCRIPTION	ORDER OF MAGNITUDE ($) Lin.m	QUANTITY	SECTION TOTAL ($)
1.0	**OPTION FEATURES**			
1.1	Option 2	$12,000.00	400 m	$4,800,000.00
1.2	Option 3B	$3,500.00	170 m	$595,000.00
1.3	Option 6A	$350.00	1820 m	$637,000.00
1.4	Option 6B	$2,300.00	1810 m	$4,163,000.00
1.5	Option 6A with 6B offset	$2,300.00	100 m	$230,000.00
1.6	Option 6B with 3A offset	$4,600.00	100 m	$460,000.00
	TOTAL OPTION FEATURES			**$10,885,000.00**
2.0	**OTHER ITEMS**			
2.1	Site Accessories	$300.00	5140 m	$1,542,000.00
2.2	Pathways	$300.00	3000 m	$900,000.00
2.3	End Treatments	$200,000.00	lump sum	$200,000.00
2.4	Concrete Repairs	$630,000.00	lump sum	$630,000.00
	TOTAL OTHER ITEMS			**$3,272,000.00**
	SUBTOTAL			**$14,157,000.00**
	20% CONTINGENCY			**$2,800,000.00**
	SUBTOTAL			**$16,957,000.00**
	10% ENGINEERING & ADMINISTRATION			**$1,500,000.00**
	TOTAL			**$18,457,000.00**
	TOTAL COST			**$18,500,000.00**

5.0 Hydraulic Information

This section of the Project File includes the elevation information for the New 1:100 Hydraulic Grade Line relative to the local sewers. A HEC-RAS model was developed to simulate the performance of the proposed improvements under the 1:100 year event and generate the new 1:100 hydraulic grade line. A guideline of two-thirds full sewer was used to obtain maximum water elevations in the local sewers. The new 1:100 hydraulic grade line elevations were compared to the "maximum sewer elevations". A graphical representation of the values in the table can be seen in Section 3, Public Drop-In Centre No.3 – Slide 5.

In order to ensure that the proposed improvements do not raise water levels within the Grand Marais Drain unacceptably, the assumption was made that the water level should be kept below an elevation corresponding to local sewer being full. This maximum water level was denoted as the "two-thirds full sewer elevation" at each sewer outlet location.

Hydraulic Grade Line (1:100 Year Storm)

Corss Road Name	Station	Current 1:100	New 1:100 Hydraulic Grade Line	Local Sewer Elev. North	Local Sewer Elev. South
Dougall	4105	179.9	180.35	181.337	
Church	4010	179.814	180.32		181.358
Bruce	3930	179.759	180.30		180.832
Avondale	3830	179.687	180.27		180.517
Radisson	3735	179.62	180.24		180.900
Virginia Park	3465	179.47	179.89	180.300	
Dandurand	3365	179.414	179.81		180.182
Academy	3285	179.37	179.78	180.706	
Morris	3185	179.303	179.75	180.108	
Longfellow	3100	179.245	179.72	180.462	
Dominion	2995	179.117	179.52		
McKay	2895	178.988	179.50		180.223
Curry	2795	178.869	179.46		180.183
Everts	2700	178.782	179.42	179.378	
Glenwood	2535	178.632	179.86		179.899
Massey	2445	178.641	179.66	179.907	
Rankin	2260	178.38	178.59	179.763	
Randolph	2185	178.337	178.55		179.922
St. Patricks	2105	178.291	178.51		179.533
Askin	2025	178.244	178.47		179.740
California	1918	178.199	179.49		179.823
Northway	1660	178.09	178.07		
Huron Church	1470	178.01	178.01	178.437	

6.0 Summary of Comments

This section of the Project File summarizes all of the feedback received over the course of the Class EA. The summary incorporates comments received from the public, agencies and interested stakeholders. A response or action to be taken based on each comment is provided in the spreadsheet.

Overall the comments that were received are positive (80% in favor, 12% against and 8% indifferent). A breakdown of common comments:

Naturalized areas requested	33%
Hydraulic concerns	25%
Maintenance & safety concerns	23%
Community connections requested	18%
Enclosures preferred	18%
Bike/Multi-use trails requested	15%
Fish/Animal life concerns	5%

It is important to note that although some of the respondents expressed concerns with some aspects of the project, response to the project was positive overall. See Section 8 for full copies of all feedback received.

Grand Marais Drain Channel Improvements Class EA

Agency & Public Consultation - Comment Summary

Public/ Agency/ Stakeholder*	Date/Type	Comment	Response/ Required Action
Mr. Angelo Recchia 3125 St. Patrick's Drive Windsor, Ontario N9E 3H1	6-Dec-11 Lettermail	Prefers fully covered drain tunnel (Option #5). Maintain existing depth to handle 1 in 100 year storms. Would like landscaping above tunnel with bicycle and pedestrian walkways.	Noted. Will be taken into consideration during detailed design.
Mr. Stephen Karamaotos & Ms. Nicole Noel 2889 Rockwell Blvd. Windsor, Ontario N9A 6S1	29-Nov-11 Comment Sheet	Supports improvements to drain that create greater linkages between N & S and E & W. Lots of green space would be nice. Does not want large trees to be affected.	Noted. Will be taken into consideration during detailed design.
Mr. Kendal Brockbank 3109 Randolph Avenue Windsor, Ontario N9E 3E5	2-Mar-12 E-mail	Thinks concept to replace an eye sore is wonderful. Very impressed with ideas. Thinks removal of decaying fence and some of the cement is a great beginning. Please consider natural areas to encourage the presence of aquatic life; maybe ponds and marshes and appropriate vegetation. Return it to its original Turkey Creek and Grand Marais characteristics. Would like to see some separation between walkways and homes to eliminate vandalism. Never seen the ditch filled anywhere near capacity.	Noted. Will be taken into consideration during detailed design.
	27-Mar-12 E-mail	Concerned about possible negative impact on aquatic life in the drain east of Askin should the drain be covered from California west to Huron Line. Mallard ducklings have been spotted at the foot of Randolph making their way to Turkey Creek and a closed drain could hinder their meandering downstream. Likes the pond features at tunnel openings and hopes the design will include natural features that will attract wildlife.	BioLogic Inc. was contracted to study the effects on aquatic life in the drain.
Mr. & Mrs. Antonio Di Cristofano 2323 Lambton Street Windsor, Ontario N9E 4S3	23-Feb-12 Comment Sheet	Prefers Options # 2 & 5	Noted.
Ms. Margaret Djokich & Mr. Dirk Smit 3472 Avondale Avenue Windsor, Ontario N9E 1X7	23-Feb-12 Comment Sheet	Love the proposed improvements for outdoor walking space. Please complete in their lifetime	Noted.
Ms. Josette M. Eugeni Corporation of the City of Windsor Transportation Planning Engineer Public Works - Operations 1266 McDougall Street Windsor, Ontario N8X 3M7	23-Feb-12 Comment Sheet	Strongly support establishing continuous multi-use trail along the drain and connection to the Parkway. Community connections across the drain will increase use and improve community cohesion.	Noted.
	23-Feb-12 Comment Sheet by lettermail	This division supports the continuous munti-use trail from Dougall to Huron Church Road and the opportunities for improved Community connections. Connecting active transportaito and recreational users along West Grand at Dougall will be benificial.	Noted.
Ms. Shirley Grondin 1655 Grand Marais Road West, Unit 211 Windsor, Ontario N9E 4W4	23-Feb-12 Comment Sheet	Love the idea of more trails and green space. Has some concerns regarding removal of the fence along the drain. There is often a lot of garbage along the south fence line. Students use the route between Dominion and Glenwood and often cut through the condo property. Trails with no barriers could cause problems.	Will be taken into consideration during detailed design.
	20-Mar-12 Comment Sheet	Likes the idea of removing concrete and adding wildflowers. Glad that the fence will be staying - would like a screen to keep garbage from flowing into Turkey Creek. Concerned that the walkway is too close to ground level patios behind the condo building.	Will be taken into consideration during detailed design.

Mr. David Hanna 4119 Mount Royal Drive Windsor, Ontario N9G 2C3	23-Feb-12 Comment Sheet	Likes Option 1A. Maybe some tall grasses and natural vegetation. Does not like Option 1B. Likes Option 2 and 3A. Option 3B too blocky. Would like to see the Dominion bridge raised to create more room under the bridge. Suggested a waterfall in some areas powered by solar panels.	Will be taken into consideration during detailed design.
	20-Mar-12 Comment Sheet	Provide mix of trees (colour, canopy). Depend pool area at culvert, add rocks and vegetation. Use permeable walk/trail and parking spaces, not paved. Public art or 'open' art competition.	Will be taken into consideration during detailed design.
Mr. Robert Harris 2856 California Avenue Windsor, Ontario N9E 3W9	23-Feb-12 Comment Sheet	Would like to see continuous bicycle commuter path. If not then recreational bike path. Thinks that a combination bike/pedestrian path created too much conflict. Jogging trail with soft mulch would be nice. Like the idea of natural green space. Anything that would attract wildlife would be nice.	Will be taken into consideration during detailed design.
Mr. & Mrs. G. Henderson 880 Bartlet Drive Windsor, Ontario N9G 1V4	23-Feb-12 Comment Sheet	Gord - Option 5 would be fantastic if we can find the money. Green it up and make it a natural corridor	Noted.
	20-Mar-12 Comment Sheet	Helen - Great design. Hopefully all goes forward.	Noted.
Mrs Catherine MacKendrick & Mr. Louis MacKendrick 2969 Skyline Drive Windsor, Ontario N9E 3A6	23-Feb-12 Comment Sheet	Catherine -Using grass may be difficult as 11-12 year old kids use sides of drain for fun. Prefers a mixture of 6B using concrete as fill and Option 2 for the crossings.	Noted.
	20-Mar-12 Comment Sheet	Louis -Totally positive reaction. Well bolstered by explanations that simplified the engineering. Two thumbs up.	Noted.
Mr. & Mrs. William Marentette 3205 Morris Drive Windsor, Ontario N9E 2K3	23-Feb-12 Comment Sheet	Prefers Option 6A	Noted. The preferred design incorporates this option in many locations.
	20-Mar-12 Comment Sheet	Sounds good. Leave it in your hands.	Noted.
Mr. Al McCabe 2991 St. Patrick's Drive Windsor, Ontario N9E 3G8	23-Feb-12 Comment Sheet	Would like to see wetland, marsh areas above flood level. Keep water open to facilitate wildlife, aquatic species. A small water turbine at Dougall--waterfall feature during storm runoff.	Noted. Dougall waterfall is not in our project area.
	20-Mar-12 Comment Sheet	Keep a public access to the water. Use City owned property to create waterfront marsh areas for animal habitat and children to explore. Could be different levels to accommodate flooding. Fencing does little to keep out children and inhibits maintenance.	Will be taken into consideration during detailed design.
Mr. Michael O'Donnell 2637 Norfolk Pines Cres. Windsor, Ontario N9E 4S5	23-Feb-12 Comment Sheet	Prefers Option 2 with greening over culverts and joining city property	Noted.
Mr. Patrick Redko 2770 Everts Avenue Windsor, Ontario N9E 2V1	23-Feb-12 Comment Sheet	Would like to keep slope because option using retaining wall poses hazard for falling. Prefers wild grasses/natural areas with minimal restriction of water flow. Would like 1:100 year or larger maintained.	Noted. The preferred solution will retain capacity needed for 1:100 year storm.

Ms. Judith Spring 3127 Bruce Avenue Windsor, Ontario N9E 1W3	28-Feb-12 Lettermail	Would like to see handouts with pictures of various options. Prefers open drain with sides covered with plants, trails on one or both sides and room for separate bike and hiking paths. More pedestrian bridges would be nice. Would prefer wildflower meadow on banks; native species rather than lawn. Plant low maintenance roses close to drain to prevent dumping of garbage and rename the drain "The Rose Banks".	Will be taken into consideration during detailed design.
	20-Mar-12 Comment Sheet	Prefers 6A and 6B with naturalized areas. Suggests to build any plaza areas near the commercial and away from the condos. Would like more direct crossings for wheelchairs (so they do not have to go out of their way to cross the drain)	Will be taken into consideration during detailed design.
Mr. & Mrs. Don Tourangeau 3136 Everts Avenue Windsor, Ontario N9E 2V5	23-Feb-12 Comment Sheet	Love the ideas. Worried about greenery because of maintenance. Currently find grounds near ditch poorly maintained and messy.	Will be taken into consideration during detailed design.
Mr. & Mrs. Gord Wilson 2466 Curry Avenue Windsor, Ontario N9E 2S5	23-Feb-12 Comment Sheet	Concerned about the numbers on the displays regarding the flooding that occurred on the eve of the Nov/11 open house. Numbers are likely under estimated because the numbers used on display relied on self reporting and did not include calls to insurance companies. RECOMMEND SENDING OUT A SURVEY TO ALL HOME OWNERS IN AREAS THAT FLOODED for accurate charting.	Noted.
Mr. Brett Reeves 2975 Orion Crescent Windsor, Ontario N9E 2Z3	14-Mar-12 E-mail	Currently an environmental engineering technician. Concerned that the channel improvements may not be able to handle the high water volumes than can be very sudden during spring runoff. Suggests braided multi channels for this location. Will be attending Open House #3	The preferred solution is designed to handle the 1:100 year storm.
Mr. Peter Murphy and Mrs. Betty Murphy 3002 Radisson Avenue Windsor, Ontario N9E 1Y5	20-Mar-12 Comment Sheet	Concerned with flooding and say they have seen water levels to the top of the concrete. Hope that the changes would increate real estate values of the area. Would like to know who pays for the project and if we anticipate traffic volume changes. Would have liked to see a documented video.	Noted. The preferred solution will retain capacity needed for 1:100 year storm.
Mr. Peter Antaya 3698 McKay Ave Windsor, Ontario N9E 2S2	20-Mar-12 Comment Sheet	Concerned mostly that the capacity be adequate for large storms so the water can move quickly to prevent flooding. Likes the areas of recreation areas.	Noted. The preferred solution will retain capacity needed for 1:100 year storm.
Mr. Ab Kadour 3083 Rankin Ave Windsor, Ontario N9E 3B7	20-Mar-12 Comment Sheet	Appears to be a worthwhile project that would enhance the neighbourhood. Live on Rankin for 30 years and has never seen the drain more than 1/2 full.	Noted.
Ms. Evelyn Greenwood 1655 Grand Marais Road West Unit 110 Windsor, Ontario N9E 4W4	20-Mar-12 Comment Sheet	Concerned about privacy for the condos with the walkway behind the building. Would like to deter people from cutting through their property. Notices kids cut holes in the fence to access the drain and throw junk over the bridges. (On behalf of the entire building)	Noted. Will be taken into consideration during detailed design.
Mr. Eric Henderson 3982 Howard Avenue Windsor, Ontario N9G 1P1	20-Mar-12 Comment Sheet	This will be the best thing to ever happen to South Windsor.	Noted.

Mr. Edward Denduk & Ms. Helen Beska 964 Virginia Park Court Windsor, Ontario	23-Mar-12 Comment Sheet by lettermail	Concerned that lowering the drain will cause flooding. Concerned more green space will not be kept up by the City. Covering some portions of the Drain does not deal with all of deteriorating concrete. The proposed plan is a waste of money.	Noted. The preferred solution will retain capacity needed for 1:100 year storm.
Mr. Ken Garber 2831 Alexandra Avenue Windsor, Ontario N9E 2J8	30-Mar-12 E-mail	Would like to know how the Option 2 features would affect water flow during storm events. Would they cause damming? Would like to see the area upstram of Dougall improved - clean up the waterfall. Add an additional turning lane at West Grand and Dominion.	Option 2 would not cause damming. Upstream of Dougall is not in the project area. An additional lane at Dominion would require its onw study.
Ontario Ministry of Transportation **London Office, Exeter Road Complex** 659 Exeter Road, 3rd Floor London, Ontario N6E 1L3 Attn: Mr. Joel Foster Planning and Design	21-Oct-11 E-mail	Concerned with current culverts and concrete channel lining downstream.	Noted.
Windsor Police Services Office of the Chief of Police P.O. Box 60 Windsor, Ontario N9A 6J5 Attn: Mr. Barry Horrobin Director of Planning & Physical Resources	21-Oct-11 E-mail and phone	Would like to deter vandilism and crime problem which are occuring within the drain and Balmoral culvert.	Will be taken into consideration during detailed design.
	23-Mar-12 E-mail	Supports the covered culvert design that results in a park "topping" effect over drain. This design facilitaters positive activity generation; making it a strongconcept for preventing problems of crime, disorder and nuisance in public places. It creates an environment that efffectively "self polices itself. Having the collection pond feature immediately in front of the opening sections where the trench is covered is an excellent concept. This feature will naturally discourage trespassing, which currently casues a problem for nearby residents. If the retaining wall feature is required for structural reasons; this will become a potential target for graffiti. Strong consideration should be given to the following techniques: Textured paving materials, natural vegetative coverage of retaining wall (such as ivy), decorative murals or artistic detailing, differing colours and paterns of paving materials and a placement of a planting bed at the base that can support the growth of "harsh" vegetation species such as red barberry that can grow to a height sufficient enough to discourage easy access by perpetrators.	Will be taken into consideration during detailed design.
Town of Lasalle 5950 Malden Road LaSalle, Ontario N9H 1S4 Attn: Mr. Kevin Miller Chief Administrative Officer	11/10/2011 E-mail	Interests are address sedimentation , and if work required changes to the exisiting drainage, update as part of City Initiative.	Noted.
Windsor Bicycling Committee c/o Council Services Dept. 350 City Hall Square West, Room 203 Windsor, Ontario N9A 6S1 Att: Mr. Mark Lindquist	02-Dec-12 Fax	Would like bike paths to be included in the project.	Noted. A continuous path is proposed in the Preferred solution along the entire study area.

* Note: Unauthored comments have not been included

Distribution List - Grand Marais Drain Channel Improvemnts Environmental Assessment

Company	Attention	Title	Branch	Address	City	Province	Postal Code
Provincial Departments & Agencies							
Ministry of the Environment	Mr. Bruce Curtis, MCIP, RPP	Manager, Community Planning and Development	London Regional Office	659 Exeter Road, 2nd Floor	London	Ontario	N6E 1L3
Ministry of the Environment	Mr. Mike Parker	Supervisor	MOE Sarnia District & MOE Windsor Area	1094 London Road	Sarnia	Ontario	N7S 1P1
Ministry of the Environment	Mr. Craig Newton	Environmental Assessment Evaluator	London Regional Office	733 Exeter Road, 2nd Floor	London	Ontario	N6E 1L3
Ministry of the Environment	Mr. Doug McDougall	Supervisor	Windsor Area Office	4510 Rhodes Drive, Unit 620	Windsor	Ontario	N8W 5K5
Ontario Ministry of Transportation	Mr. Garfield Dales	Planning and Design	London Office, Exeter Road Complex	659 Exeter Road, 3rd Floor	London	Ontario	N6E 1L3
Ontario Ministry of Transportation	Mr. Joel Foster	Acting Head Environmental Section	London Office, Exeter Road Complex	659 Exeter Road, 3rd Floor	London	Ontario	N6E 1L3
Ontario Ministry of Transportation	Mr. Richard vandan Boorn	Technical Services Supervisor	Chatham Area Office	870 Richmond Street West, P. O. Box 1168	Chatham	Ontario	N7M 5L8
Ontario Ministry of Natural Resources	Mr. Richard Visir			870 Richmond Street, P. O. Box 1168	Chatham	Ontario	N7M 5L8
Ontario Ministry of Natural Resources	Ms. Amanda McCloskey	District Planner	Aylmer District	615 John Street North	Aylmer	Ontario	N5H 2S8
Ontario Ministry of Culture	Manager		Culture Services Unit, Ministry of Tourism and Culture	401Bay Street, Suite 1700	Toronto	Ontario	M7A 0A7
Ministry of Tourism and Culture	Ms. Teresa B. Wagner	A/Heritage Planner	Programs and Services Branch	401 Bay Street, Suite 1700	Toronto	Ontario	M7A 0A7
Ministry of Tourism and Culture	Ms. Penny Young			penny.young@ontario.ca			
Ministry of Aboriginal Affairs	Ms. Heather Levesque	Manager, Consultation Unit	Aboriginal Relations & Ministry Partnership Division, Consultation Unit	160 Bloor Street East, 9th Floor	Toronto	Ontario	M7A 2E6
Transport Canada	Ms. Sue McDonald-Simcox	Navigable Waters Protection Officer	Marine Office	100 S. Front Street	Sarnia	Ontario	N7T 2M4
Transport Canada	Ms. Debbie Muller	Issues Management Assistant	Programs and Divesture	4900 Yonge Street, 4th Floor	Toronto	Ontario	M2N 6A5

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Company	Attention	Title	Branch	Address	City	Province	Postal Code
Ministry of Aboriginal Affairs	Mr. Dennis Sithoo	Senior Advisor to the Director	Communications Service Branch	160 Bloor Street E., 4th Floor	Toronto	Ontario	M7A 2E6
Ministry of Aboriginal Affairs	Mr. David Pickles	Team Lead	Consultation Unit	160 Bloor Street E., 9th Floor	Toronto	Ontario	M7A 2E6
Fisheries and Oceans Canada	Mr. Dan Thompson		Fish Habitat Management Program	73 Meg Drive	London	Ontario	N6E 2V2
Fisheries and Oceans Canada	Ms. Emily Morton	Fish Habitat Biologist	Ontario-Great Lakes Area Central & Arctic Region	3027 Harvester Road, Suite 304, P. O. Box 85060	Burlington	Ontario	L7R 4K3
Fisheries and Oceans Canada	Ms. Chantal Larochelle	District Manager	Fish Habitat – Management Office	3027 Harvester Road, Unit 304, P. O. Box 85060	Burlington	Ontario	L7R 4K3
Fisheries and Oceans Canada	Ms. Cindy Latendresse		Ontario Great Lakes Area, Burlington District Office	3027 Harvester Road, Suite 304, P. O. Box 85060	Burlington,	Ontario	L7R 4K3
Environment Canada – Ontario Region	Mr. Luca Cargnelli		Strategic Integration and Partnership Division, Great Lakes Area of Concern Section	867 Lakeshore Road	Burlington	Ontario	L7R 4A6
Environment Canada	Ms. Jeanette Fooks	Networks Applications Engineer	Engineering and Technology Services Water Survey Division	Jeanette.Fooks@ec.gc.ca			
Environment Canada	Mr. Tom Arsenault, C.E.T.	Data Control Lead	Water Survey Division, Metiorological Services of Canada	867 Lakeshore Road, P.O. Box #5050	Burlington	Ontario	L7R 4A6

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Company	Attention	Title	Branch	Address	City	Province	Postal Code
Aboriginal Affaris							
Aboriginal Affairs and Northern Development Canada	Manager		Ontario Region	25 St. Clair Avenue East	Toronto	Ontario	M4T 1M2
Aboriginal Affairs and Northern Development Canada	Mr. Don Boswell	Senior Claims Analyst	Specific Claims Branch	10 Wellington Street, Room 1310	Gatineau	Quebec	K1A 0H4
Aboriginal Affairs and Northern Development Canada	Mr. Franklin Roy	Director	Litigation Management and Resolution Branch	10 Wellington Street	Gatineau	Quebec	K1A 0H4
Aboriginal Affairs and Northern Development Canada	Ms. Louise Trepanier	Director, Claims East of Manitoba	Specific Claims Branch	10 Wellington Street, Room 1310	Gatineau	Quebec	K1A 0H4
Aboriginal Affairs and Northern Development Canada	Mr. Marc-Andre Millaire	Litigation Team Leader, Ontario / Nanavut Team	Litigation Management and Resolution Branch	10 Wellington Street	Gatineau	Quebec	K1A 0H4
Aboriginal Affairs and Northern Development Canada	Ms. Janet Townson	Claims Analyst	Specific Claims Branch, Ontario Team	1310-10 Wellington Street	Gatineau,	Quebec	K1A 0H4
Aboriginal Affairs and Northern Development Canada	Ms. Allison Berman	Regional Subject Expert for Ontario	Consultation and Accommodation Unit	300 Sparks Street, Room 205	Ottawa,	Ontario	K1A 0H4
Aboriginal Affairs and Northern Development Canada	Mr. Daniel Johnson	Environment Offricer	Environment and Natural Resources	25 St. Clair Avenue East, 8th Floor	Toronto	Ontario	M4T 1M2
Aboriginal Affairs and Northern Development Canada	Mr. Sean Darcy	Manager	Assessment and Historical Research	10 Wellington Street	Gatineau	Quebec	K1A 0H4
Aboriginal Affairs and Northern Development Canada	Mr. Glenn Gilbert	Manager, Environmental Unit	Lands and Trusts Services	25 St. Clair Avenue West, 8th Floor	Toronto	Ontario	M4T 1M2
Aboriginal Affairs and Northern Development Canada	Mr. Fred Hosking	Senior Claims Analyst	Specific Claims Branch, Ontario Research Team	10 Wellington Street, Room 1310	Gatineau	Quebec	K1A 0H4
Aboriginal Affairs and Northern Development Canada	Mr. Guy Morin	Policy Analysis	Treaties and Aboriginal Government	10 Wellington Street, 8th Floor	Gatineau	Quebec	K1A 0H4

Distribution List - Grand Marais Drain Channel Improvemnts Environmental Assessment

Company	Attention	Title	Branch	Address	City	Province	Postal Code
First Nations							
Walpole Island First Nation	Chief Joseph Gilbert		Bkejwanong Territory	R. R. #3	Wallaceburg	Ontario	N8A 4K9
Aamjiwnaang First Nation	Chief Chris Plain			978 Tashmoo Avenue	Sarnia	Ontario	N7T 7H5
Moravian of the Thames	Chief Gregory Peters		Delaware Nation	R. R. #3, 14760 School House Line	Thamesville	Ontario	N0P 2K0
Caldwell First Nation	Chief Louise Hillier			P. O. Box 388	Leamington	Ontario	N8H 3W3
Oneida Nation of the Thames	Chief Joel Abram			2212 Elm Avenue	Southwold	Ontario	N0L 3C0
Chippewas of Kettle & Stoney Point	Chief Elizabeth J. Cloud			6247 Indian Lane	Kettle & Stoney Point, FN	Ontario	N0N 1J1
Chippewas of the Thames	Chief Richard "Joe" Miskokomon			320 Chippewa Road, R. R. #1	Muncey	Ontario	N0L 1Y0
Munsee-Delaware Nation	Chief Patrick Waddilove			R. R. #1	Muncey	Ontario	N0L 1Y0
Six Nations of the Grand River Territory	Chief William K. Montour			P. O. Box 5000	Ohsweken	Ontario	N0A 1M0
Metis Nation of Ontario	Mr. James W. Wagner	Consultation Assessment Coordinator	Land, Resources and Consultation	75 Sherbourne St., Suite 222	Toronto	Ontario	M5A 2P9
Metis Nation of Ontario	Ms. Melanie Paradis		Director, Lands Resources and Consultations	500 Old St. Patrick Street	Ottawa	Ontario	K1N 9G4
Metis Nation of Ontario, Region 9	Mr. Peter Rivers		Provisional Council of the Metis Nation of Ontario	1039 Clover	Windsor	Ontario	N8P 1V8
Metis Nation of Ontario	Mr. Robert Leboeuf		Windsor-Essex Metis Council	4745 Huron Church Line	Windsor	Ontario	N9H 1H5

Distribution List - Grand Marais Drain Channel Improvemnts Environmental Assessment

Company	Attention	Title	Branch	Address	City	Province	Postal Code
Municial Departments, Agencies & Utilities							
Hydro One Network	Planning Department			56 Embro Street, P. O. Box 130	Beachville	Ontario	N0J 1A0
Essex Power Corporation	Mr. Ray Tracey	President		360 Fairview Avenue West, Suite 218	Essex	Ontario	N8M 3G4
Hydro One Network	Mr. Jim Oriotis	Senior Real Estate Coordinator		185 Clegg Road	Markham	Ontario	L6G 1B7
Union Gas Ltd.	Mr. Lindsay Boyd			3840 Rhodes Drive, P. O. Box 700	Windsor	Ontario	N9A 6N7
Enwin Utilities	Mr. Marvio Vinhaes	Director, Engineering	Windsor Utilities Commission	4545 Rhodes Drive, P. O. Box 1625, Station A	Windsor	Ontario	N9A 5T7
Enwin Utilities	Mr. John Wladarski	I/P, Hydro Operations	Windsor Utilities Commission	4545 Rhodes Drive, P. O. Box 1625, Station A	Windsor	Ontario	N9A 5T7
Bell Canada	Mr. Sandy Pavlica	Access Project Manager		1149 Goyeau Street, 1st Floor	Windsor	Ontario	N9A 1H9
Bell Canada	Mr. Randy Matis			1149 Goyeau Street, 1st Floor	Windsor	Ontario	N9A 1H9
Bell Canada	Mr. David Cowing			1149 Goyeau Street, 1st Floor	Windsor	Ontario	N9A 1H9
Bell Alliant	Mr. Aaron Kovacs	Coordinator Access Network	Transmission Lines Sustainment	163 Queen Street, Floor 2	Chatham	Ontario	N7M 2G9
Cogeco Cable	Manager			2525 Dougall Avenue	Windsor	Ontario	N8X 5A7
Greater Essex County District School Board	Mr. Warren Kennedy	Director of Education		451 Park Street West, Box 210	Windsor	Ontario	N9A 6K1
Windsor-Essex Catholic District School Board	Mr. Paul Picard	Director of Education		1325 California Avenue	Windsor	Ontario	N9B 3Y6
Ministry of Agriculture	Mr. Dino Radocchia	Manager, Infrastructure Programs Unit	Food and Rural Affairs	1 Stone Road West, 4th NW Floor	Guelph	Ontario	N1G 4Y2
Essex Region Conservation Authority	Ms. Rebecca Belanger	Conservation Planner		360 Fairview Avenue West	Essex	Ontario	N8M 1Y6
County of Essex	Mr. Tom Bateman, P. Eng.	County Engineer	County Engineering Department	360 Fairview Avenue West	Essex	Ontario	N8M 1Y6
County of Essex	Mr. Bill King	County Planning Advisor	County Planning Department	360 Fairview Avenue West	Essex	Ontario	N8M 1Y6
Town of LaSalle	Mr. Peter Marra, P. Eng.	Manager of Water and Wastewater		1900 Normandy Road	LaSalle	Ontario	N9H 1P8
Windsor-Essex County Health Unit	Ms. Debbie Bennett	Director of Health Protection		1005 Ouellette Avenue	Windsor	Ontario	N9A 4J8

Distribution List - Grand Marais Drain Channel Improvemnts Environmental Assessment

Company	Attention	Title	Branch	Address	City	Province	Postal Code
Windsor-Essex County Health Unit	Dr. Allen Heimann	Medical Officer of Health		1005 Ouellette Avenue	Windsor	Ontario	N9A 4J8
Hydro One Networks Inc.	Mr. Charles S. Esendal, P. Eng., MBA	Sustainment Manager	Transmission Lines & Row Sustainment	483 Bay Street, TCT15, North Tower	Toronto	Ontario	M5G 2P5
Hydro One Networks Inc.	Mr. Anthony Ierullo	Senior Network Management Engineer		483 Bay Street, TCT15, North Tower	Toronto	Ontario	M5G 2P5
Citizens Environment Alliance	Manager			1950 Ottawa Street	Windsor	Ontario	N8Y 1R7
CAW Windsor Regional Environment Council	Mr. Mark Bartlett		CAW Regional Office	2345 Central Avenue, 2nd Floor	Windsor	Ontario	N8W 4J1
City of Windsor	Mr. Wes Hicks, P.Eng.	Deputy City Engineer	Engineering Department	350 City Hall Square West, 3rd Floor, P. O. Box 1607	Windsor	Ontario	N9A 6S1
City of Windsor	Mr. Tom Hunt	City Planner	Planning Department	400 City Hall Square E., Suite 404B	Windsor	Ontario	N9A 7K6
City of Windsor	Mr. Bruce Montone	Chief	Fire Department	815 Goyeau Street	Windsor	Ontario	N9A 1H7
City of Windsor	Mr. George Wilkki		Legal Department	400 City Hall Square, Suite 201	Windsor	Ontario	N9A 7K6
City of Windsor	Mr. Mark Winterton, P. Eng.	Manager of Contracts	Contracts Division	1531 Crawford Avenue	Windsor	Ontario	N8X 2A9
City of Windsor	Mr. Pete Matheson	Maintenance Manager	Maintenance Division	1531 Crawford Avenue	Windsor	Ontario	N8X 2A9
City of Windsor	Mr. Mike Clement	Manager of Parks Development	Parks and Recreation	2450 McDougall Street	Windsor	Ontario	N8X 3N6
Windsor Police Services	Mr. Barry Horrobin	Director of Planning & Physical Resources	Office of the Chief of Police	P.O. Box 60	Windsor	Ontario	N9A 6J5

Distribution List - Grand Marais Drain Channel Improvemnts Environmental Assessment

Company	Attention	Title	Branch	Address	City	Province	Postal Code
Interested Steakholders							
Windsor Bicycling Committee	Mr. Mark Lindquist			2723 Princess Avenue	Windsor	Ontario	N8T 1W3
Windsor Heritage Committee	Manager		c/o Council Services Dept.	350 City Hall Square West, Room 203	Windsor	Ontario	N9A 6S1
Windsor-Essex County Environment Committee	Ms. Averil Parent			4155 Ojibway Parkway	Windsor	Ontario	N9C 4A5
Canadian Pacific Railway	Mr. David Luklanow	Manager of Structures	CP Southern Ontario	1290 Central Parkway West, Suite 800	Mississauga	Ontario	L5C 4R3
Parkway Infrastructure Constructors	Ms. Linda Riley	Technical Services Manager		2187 Huron Church Road, Suite 340	Windsor	Ontario	N9C 2L8
Parkway Infrastructure Engineers	Mr. Vic Hebert, P. Eng.		c/o Dillon Consulting	3200 Deziel Drive, Suite 608	Windsor	Ontario	N8W 5K8
Windsor Accessibility Advisory Committee	Manager		c/o Council Services Dept.	350 City Hall Square West, Room 203	Windsor	Ontario	N9A 6S1
Ministry of Municipal Affairs & Housing	Ms. T. Ryall	Planner	Southwestern Municipal Services Office	659 Exeter Road, 2nd Floor	London	Ontario	N6E 1L3
Tourism Windsor Essex Pelee Island	Mr. John Parent	Director Research & Product Development		333 Riverside Drive West, Suite 103	Windsor	Ontario	N9A 7C5

Distribution List - Grand Marais Drain Channel Improvemnts Environmental Assessment

Name	Address	City	Province	Postal Code
Public				
Mr. Mark Abramson	2590 St. Patrick's Drive	Windsor	Ontario	N9E 3G6
Mr. & Mrs. John Barker	2001 West Grand Court	Windsor	Ontario	N9E 1G7
Mr. Jack Berry	706-3915 Southwinds Drive	Windsor	Ontario	N9G 2S8
Mr. Ray Bezaire	2289 Lamont Street	Windsor	Ontario	N9E 4X5
Mr. Randy Brunatti	11865 County Road 24	Tecumseh	Ontario	N8N 2M1
Mr. Bob Burnside	3015 Longfellow Avenue	Windsor	Ontario	N9E 2L4
Mr. Ken Chisholm	1986 West Grand Court	Windsor	Ontario	N9E 1G5
Ms. Marian Cholubko	3494 Avondale Avenue	Windsor	Ontario	N9E 1X7
Mr. & Mrs. Steve Christie	3550 Dougall Avenue	Windsor	Ontario	N9E 1T2
Mr. Robert Comber	405-1535 Grand Marais Road West	Windsor	Ontario	N9E 4W2
Mr. Paul Dawson	1915 West Grand Court	Windsor	Ontario	N9E 1G6
Mr. David Deitrich - Aecom	350 Cabana Road East, Unit 4	Windsor	Ontario	N8T 2W8
Mr. Ed Denduk	964 Virginia Park Court	Windsor	Ontario	N9E 4Y1
Mr. & Mrs. Antonio Di Cristofano	2323 Lambton Street	Windsor	Ontario	N9E 4S3
Ms. Margaret Djokich & Mrs. Dirk Smit	3472 Avondale Avenue	Windsor	Ontario	N9E 1X7
Mr. & Mrs. Jim Drummond	3503 Avondale Avenue	Windsor	Ontario	N9E 1Y1
Mr. Ed Dupuis	948 Virginia Park Court	Windsor	Ontario	N9E 4Y1
Ms. Josette M. Eugeni - The City of Windsor	1266 McDougall Street	Windsor	Ontario	N8X 3M7
Mr. Paolo Eugeni	3385 Gundy Park Court	Windsor	Ontario	N9E 4R6
Mrs. T. Fuerth	1733 Kildare Road	Windsor	Ontario	N8W 2W5
Mr. Ken Garber	2831 Alexandra Avenue	Windsor	Ontario	N9E 2J8
Mr. & Mrs. William Gibson	2963 Virginia Park Avenue	Windsor	Ontario	N9E 4X8
Ms. Shirley Grondin	1655 Grand Marais Road West	Windsor	Ontario	N9E 4W4
Mr. David Hanna	4119 Mount Royal Drive	Windsor	Ontario	N9G 2C3
Mr. & Mrs. Karl Harper	3493 Avondale Avenue	Windsor	Ontario	N9E 1X8
Mr. Robert Harris	2856 California Avenue	Windsor	Ontario	N9E 3W9
Mr. G. Henderson	880 Bartlet Drive	Windsor	Ontario	N9G 1V4
Mr. & Mrs. Sid Hurst	18 Summer Court	Windsor	Ontario	N9E 1R1
Ms. Hanna Ibrahim	130 Dufferin Avenue	London	Ontario	N6A 5R2
Mr. Adrian Jacques	3085 Radisson Avenue	Windsor	Ontario	N9E 1Y4
Mr. Stephen Karamotos	2889 Rockwell Blvd.	Windsor	Ontario	N9E 2A4
Mr. Nels Katzman	3155 Rankin Avenue	Windsor	Ontario	N9E 3B8

Distribution List - Grand Marais Drain Channel Improvemnts Environmental Assessment

Name	Address	City	Province	Postal Code
Mrs. Catherine MacKendrick	2969 Skyline Drive	Windsor	Ontario	N9E 3A6
Mr. & Mrs. John Mammarella	2600 Buttery	Windsor	Ontario	N9E 4L7
Mr. & Mrs. William Marentette	3205 Morris Drive	Windsor	Ontario	N9E 2K3
Mr. Lionel Markham	3020 Morris Drive	Windsor	Ontario	N9E 2J9
Mr. & Mrs. Paul Markou	2789 Virginia Park Avenue	Windsor	Ontario	N9E 2B6
Mr. Al McCabe	2991 St. Patrick's Drive	Windsor	Ontario	N9E 3G8
Mr. Brian McCrindle	2765 Jamaica Cres.	Windsor	Ontario	N9E 2Z1
Ms. Margaret McCrone	3219 Askin	Windsor	Ontario	N9E 3J6
Mr. Peter McBride	1096 Janisse Drive	Windsor	Ontario	N8S 2W1
Mr. Fenton McEachrane	663 Caruso Drive	Windsor	Ontario	N9G 2M7
Mr. Alain Michaud	3581 Morris Drive	Windsor	Ontario	N9E 2K5
Mr. David Munro	305-3915 Southwinds Drive	Windsor	Ontario	N9G 2S8
Ms. Pauline Murray	701-3915 Southwinds Drive	Windsor	Ontario	N9G 2S8
Ms. Nicole Noel	2889 Rockwell Blvd.	Windsor	Ontario	N9E 2A4
Mr. Michael O'Donnell	2637 Norfolk Pines Cres.	Windsor	Ontario	N9E 4S5
Mr. Edward Oleksiuk	103-1547 Grand Marais Road	Windsor	Ontario	N9E 4W3
Mrs. S. Pastorius	2984 Virginia Park Avenue	Windsor	Ontario	N9E 4X7
Mr. Dave Paddon & Mr. Spencer Paddon	3194 Rankin Avenue	Windsor	Ontario	N9E 3B9
Ms. Kathleen Paterson	2864 Glenwood Avenue	Windsor	Ontario	N9E 2X8
Mr. Hilary Payne	4640 Tournament Court	Windsor	Ontario	N9G 2P8
Mr. & Mrs. John Payne	4215 Mount Carmel Drive	Windsor	Ontario	N9G 2E1
Mr. L. Pray and Mr. J Pray	3108 Everts Avenue	Windsor	Ontario	N9E 2W5
Mr. Angelo Recchia	3125 St. Patrick's Drive	Windsor	Ontario	N9E 3H1
Mr. Patrick Redko	2770 Everts Avenue	Windsor	Ontario	N9E 2V1
Mr. Reg Serafini	3101 Everts Avenue	Windsor	Ontario	N9E 2V4
Mr. Randal Sasso	2675 Longfellow Avenue	Windsor	Ontario	N9E 2L1
Ms. Judith Spring	3127 Bruce Avenue	Windsor	Ontario	N9E 1W3
Mr. & Mrs. Lewis Stiles	996 Virginia Park Court	Windsor	Ontario	N9E 4Y1
Mr. & Mrs. Allan Taverner	2118 Longfellow Avenue	Windsor	Ontario	N9B 3J6
Mr. & Mrs. Don Tourangeau	3136 Everts Avenue	Windsor	Ontario	N9E 2V5
Mr. Herman Vandolder	3477 St. Patrick's Drive	Windsor	Ontario	N9E 3H5
Mr. Arthur Weingust	463 Sixth Street	Windsor	Ontario	N9E 4Y1
Mr. & Mrs. Gord Wilson	2466 Curry Avenue	Windsor	Ontario	N9E 2S5

Distribution List - Grand Marais Drain Channel Improvemnts Environmental Assessment

Name	Address	City	Province	Postal Code
Local Commercial Property Owners				
Mrs. Rina Cirelli - 1174461 Ontario Inc.	640 Radison Court East	Windsor	Ontario	N9E 4N5
N & D Property Management	1341 Grand Marais Road West	Windsor	Ontario	N9E 1E3
Remo Valente Real Estate (1990) Limited	2985 Dougall Avenue	Windsor	Ontario	N9E 1S1
Tim Hortons and Shoppers Drug Mart	1421 Grand Marais Road West	Windsor	Ontario	N9E 4V1

8.0 Correspondence

This section of the Project File contains all of the correspondence sent and received over the course of the study.

The correspondence is broken down into the following sections:

- Notice of Intent
- Invitation for Comment – Public Drop in Centre No. 1
- Invitation for Comment – Public Drop in Centre No. 2
- Invitation for Comment – Public Drop in Centre No. 3
- Invitation for Comment – Follow up

Landmark
Engineers Inc.

September 29, 2011 Project No.: 11-007

Address Block

Attention: Attention
Title

Re: Grand Marais Drain Channel Improvements
Dougall Avenue to west of Huron Church Road
Class Environmental Assessment - Notice of Intent

Dear Special Greeting:

In accordance with the approved procedures contained in the Municipal Engineers Association's *Municipal Class Environmental Assessment*, the Essex Region Conservation Authority (ERCA) and City of Windsor are proceeding with the **Grand Marais Drain Channel Improvements (Dougall Avenue to west of Huron Church Road) Class Environmental Assessment.**

The existing concrete-lined portion of the Grand Marais Drain (generally between Dougall Avenue and Huron Church Road) was identified in a recent study to be oversized and in need of substantial repairs. In 2010, ERCA commissioned a follow-up study aimed at identifying alternative channel designs for an improved Grand Marais Drain with an emphasis on establishing a more sustainable, ecologically desirable and aesthetically-pleasing flood control channel. The purpose of this Class EA will be to assess these alternatives in consultation with the public and to select a preferred solution.

The following Problem/Opportunity Statement has been established for the project:

> *"In order to maximize the potential benefits to the surrounding community, this study will identify alternative means and measures for restoring the concrete-lined segment of the Grand Marais Drain; with a focus on exploring the potential for establishing improved connections between the communities on either side of the Drain, and for making recreational, aesthetic, and habitat improvements within the channel corridor."*

2280 Ambassador Drive
Windsor, Ontario
Canada
N9C 4E4

Phone:
(519) 972-8052
Fax:
(519) 972-8644

www.landmarkengineers.ca

Professional Engineers
Ontario

We are presently contacting all private and public agencies that may have an interest in the project to solicit their comments and to confirm their interest in the Environmental Assessment process. In order to simplify your initial response, we have enclosed a form which we ask you to complete and forward along with any additional information you may wish to provide at this time. We also ask that you indicate your preferred mode for receiving future notifications and information.

In the interest of reducing the amount of paper used in this undertaking, we would encourage you to take advantage of the electronic methods of information transfer, such as e-mail and the project website. The site will be located at:

http://www.citywindsor.ca/003966.asp

and it will facilitate the distribution of project information. It will also assist with the collection of feedback from the public and from stakeholders.

If you have any questions or require further details, please contact the undersigned or one of the alternate contacts indicated below.

Yours truly,

Landmark Engineers Inc.

Daniel M. Krutsch, P.Eng.
Encl.

Project Contacts:

Landmark Engineers Inc.
Attn: Mr. Daniel Krutsch
2280 Ambassador Drive
Windsor, Ontario N9C 4E4
519-972-8052
dkrutsch@landmarkengineers.ca

Essex Region Conservation Authority
Attn: Mr. Jeremy Wychreschuk
360 Fairview Avenue West, Suite 311
Essex, Ontario N8M 1Y6
519-776-5209
jwychreschuk@erca.org

City of Windsor
Attn: Mr. Paul Mourad
350 City Hall Square West, 3rd Floor
Windsor, Ontario N9A 6S1
519-255-6257
pmourad@city.windsor.on.ca

GRAND MARAIS DRAIN CHANNEL IMPROVEMENTS
(Dougall Avenue to west of Huron Church Road)
CLASS ENVIRONMENTAL ASSESSMENT

With regard to the project/study noted above (as outlined in the attached letter), we have:

- ❑ no further interests or concerns.
- ❑ interests in this project. We will respond by _____.
- ❑ interests in this project. Our concerns are indicated in an accompanying letter.

Form completed by: _____
(Name)

_____
(Title)

Response from: _____
(Agency)

_____
(Address)

_____

_____

_____
(Postal Code)

Should this matter require further discussion, I wish to be contacted by:

- ❑ telephone (_____) _____
- ❑ email _____

*Please return this form by **24 October 2011** to ensure that your concerns are addressed. Your co-operation is appreciated.*

Landmark Engineers Inc.
2280 Ambassador Drive
Windsor, ON, N9C 4E4
P: (519) 972-8052
F: (519) 972-8644

Landmark

LOCATION MAP

EXISTING CHANNEL SECTION (TYPICAL)

Landmark Engineers Inc.

Essex Region Conservation Authority

Title: KEY PLAN		Date: SEPT 2011	FIGURE 1
Project: GRAND MARAIS DRAIN CHANNEL IMPROVEMENTS (DOUGALL AVENUE TO WEST OF HURON CHURCH ROAD) CLASS ENVIRONMENTAL ASSESSMENT		Scale: NTS	
		Project No.: 11-007	

Landmark
Engineers Inc.

June 6, 2012 Project No. 11-007

Company
Branch
Address
City, Province Postal Code

Attention: Attention
Title

Grand Marais Drain Channel Improvements
Class Environmental Assessment

Notice of Completion of Environmental Study

Dear Special Greeting:

In accordance with the approved procedures contained in the Municipal Class Environmental Assessment, this letter is to advise you that the Class EA for the Grand Marais Drain Channel Improvements has now been completed. Attached is a copy of the Notice of Completion.

Subject to comments received as a result of this Notice, and the receipt of necessary approvals, the City of Windsor may proceed with the design and construction of the project.

Yours truly,

Landmark Engineers Inc.

Daniel M. Krutsch, P. Eng.
Encl.

2280 Ambassador Drive
Windsor, Ontario
Canada
N9C 4E4

Phone:
(519) 972-8052
Fax:
(519) 972-8644

www.landmarkengineers.ca

Professional Engineers
Ontario

Essex Region Conservation Authority

THE CITY OF WINDSOR ONTARIO, CANADA

GRAND MARAIS DRAIN CHANNEL IMPROVEMENTS CLASS ENVIRONMENTAL ASSESSMENT

NOTICE OF COMPLETION OF ENVIRONMENTAL STUDY

The existing concrete-lined portion of the Grand Marais Drain was identified in a recent study to be oversized and in need of substantial repairs. The purpose of this Class EA is to assess alternative channel designs in consultation with the public and to select a preferred solution.

The above project is being planned under **Schedule B** of the **Municipal Class Environmental Assessment.** Subject to comments received as a result of this Notice, and the receipt of necessary approvals, the City of Windsor may proceed with the design and construction of the project.

The Environmental Study Report Project File is available for review at the following locations.

Essex Region Conservation Authority
360 Fairview Avenue West
Suite 311
Essex, ON N8M 1Y6
Mon – Fri: 8:30am to 4:30pm
Ph: (519) 776-5209

City of Windsor
City Hall, Clerk's Office
350 City Hall Square West, Suite 203
Windsor, ON N9A 6S1
Mon – Fri: 8:30am to 4:30pm
Ph: (519) 255-6100 ext. 6378

Further information may be obtained from Landmark Engineers Inc., 2280 Ambassador Drive, Windsor, ON N9C 4E4. Telephone: 519-972-8052. Attention Mr. Daniel Krutsch, P. Eng.

Interested persons should provide written comment to the Essex Region Conservation Authority or City Clerk's office within 30 calendar days from the date of this Notice.

If the concerns cannot be resolved, a person may request that the Minister of the Environment make an order for the project to comply with Part II of the Environmental Assessment Act (referred to as a Part II Order) which addresses individual environmental assessments. Part II Order requests must detail the issues of concern and the rationale behind the request. Requests must be received by the Minister at the address listed below by July 6th, 2012. A copy of the Part II Order request must also be sent to the City of Windsor at the address listed above. If no Part II Order requests are received by July 6th, 2012, the City of Windsor may proceed with the design and construction of the project.

Part II Order requests should be sent to:
Minister of the Environment
135 St. Clair Ave. W., 12th Floor
Toronto, Ontario M4V 1P5

9.0 Archaeological Assessment Report – AMICK Consultants Ltd.

The following is a copy of the Archaeological Assessment report prepared by AMICK Consultants Ltd.

1.0 PROJECT REPORT COVER PAGE

Licensee Information:

Licensee:	Marilyn E. Cornies BA CAHP
Archaeology Licence:	P038
Contact Information:	Lakelands District Office 380 Talbot Street, P.O. Box 29 Port Mc Nicoll, ON L0K 1R0 Phone: (705) 534-1546 Fax: (705) 534-7855 Email: mcornies@amick.ca www.amick.ca

Project Information:

AMICK Project Number:	11826-L
MTC Project Number:	P038-408-2011
Investigation Type:	Stage 1-2 Archaeological Assessment
Project Name:	Grand Marais Drain EA
Project Location:	Dougall Avenue to West of Huron Church Road Class Environmental Assessment (Geographic Township of Sandwich, County of Essex), City of Windsor

Approval Authority Information:

File Designation Number:	- Municipal Class EA Project No. 11-007

Reporting Information:

Site Record/Update Forms:	N/A
Date of Report Filing:	17 October 2011
Type of Report:	ORIGINAL

2.0 EXECUTIVE SUMMARY

This report describes the results of the 2011 Stage 1-2 Archaeological Assessment of Grand Marais Drain EA Dougall Avenue to West of Huron Church Road, Lots 43-46 Concession 2 and Lots 64-80 Concession 3, Class Environmental Assessment (Geographic Township of Sandwich, County of Essex), City of Windsor, conducted by AMICK Consultants Limited. This study was conducted under Archaeological Consulting License #P038 issued to Marilyn Cornies by the Minister of Tourism and Culture for the Province of Ontario. This assessment was undertaken as a component study of a Municipal Class EA. All work was conducted in conformity with the Ontario Ministry of Tourism and Culture (MTC) Standards and Guidelines for Consultant Archaeologists (MTC 2011), the Ontario Heritage Act (RSO 1990a), and the Ontario Heritage Amendment Act (SO 2005).

AMICK Consultants Limited was engaged by the proponent to undertake a Stage 1-2 Archaeological Assessment of lands potentially affected by the proposed undertaking and was granted permission to carry out archaeological work on September 26, 2011. The study area was subject to reconnaissance, photographic documentation and physical assessment on September 30, 2011, consisting of high-intensity test pit survey at an interval of ten metres between individual test pits in order to confirm disturbance. All records, documentation, field notes, photographs and artifacts (as applicable) related to the conduct and findings of these investigations are held at the Lakelands District corporate offices of AMICK Consultants Limited until such time that they can be transferred to an agency or institution approved by the Ontario Ministry of Tourism and Culture (MTC) on behalf of the government and citizens of Ontario.

As a result of the physical assessment of the property, no archaeological resources were encountered. Consequently, it is recommended that the proposed development be considered cleared of any further requirement for archaeological fieldwork. Any current or future condition of development respecting archaeological resources should be considered as addressed.

3.0 TABLE OF CONTENTS

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LIST OF MAPS

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4.0 PROJECT PERSONNEL

Consulting Archaeologist
Marilyn Cornies (MTC Professional Archaeologist Licence# P038)
Project Archaeologist
Derek Lincoln (MTC Professional Archaeologist Licence# P344)
Field Assistants
Matthew Lincoln
Report Preparation
Derek Lincoln (MTC Professional Archaeologist Licence# P344)
Phil Rice (MTC Avocational Licence# A304)
Draughting
Phil Rice (MTC Avocational Licence# A304)
Photography
Derek Lincoln (MTC Professional Archaeologist Licence# P344)

5.0 PROJECT BACKGROUND

5.1 Development Context

This report describes the results of the 2011 Stage 1-2 Archaeological Assessment of Grand Marais Drain EA Dougall Avenue to West of Huron Church Road, Lots 43-46 Concession 2 and Lots 64-80 Concession 3, Class Environmental Assessment (Geographic Township of Sandwich, County of Essex), City of Windsor, conducted by AMICK Consultants Limited. This study was conducted under Archaeological Consulting License #P038 issued to Marilyn Cornies by the Minister of Tourism and Culture for the Province of Ontario. This assessment was undertaken as a component study of a Municipal Class EA. All work was conducted in conformity with Ontario Ministry of Tourism and Culture (MTC) Standards and Guidelines for Consultant Archaeologists (MTC 2011), the Ontario Heritage Act (RSO 1990a), and the Ontario Heritage Amendment Act (SO 2005).

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5.2 Historical Context

As part of the present study, background research was conducted in order to determine the archaeological potential of the proposed project area.

"A Stage 1 background study provides the consulting archaeologist and Ministry report reviewer with information about the known and potential cultural heritage resources within a particular study area, prior to the start of the field assessment."

(OMCzCR 1993)

The evaluation of potential for heritage resources is further elaborated in Section 5.3 of the Guideline for Preparing the Cultural Heritage Resource Component of Environmental Assessments (1992) prepared by the Ontario Ministry of Culture and Communications (MCC) and the Ontario Ministry of Environment (MOE):

"Generally, lands affected by project development should be classified by the proponent as having high, medium or low potential for the discovery of heritage resources. Since heritage resources are

not uniformly distributed across the landscape, not all project areas will exhibit the same likelihood of finding heritage resources. Potential is based on the following geographical and historical factors, which may have influenced previous use and settlement of an area:

- *Distance from historic transportation routes.*
- *Distance from sources of water (rivers, lakes, streams, creeks, springs, marshes, swamps, relict creek beds).*
- *Ability of the terrain to accommodate human settlement. This includes topography, soils and access to plant, animal and mineral resources.*
- *Documentation of existing heritage resource sites in the affected area and region. Known resources in the affected area, such as architectural features, cultural landscapes or registered archaeological sites, can be evaluated for possible heritage significance by using the evaluation criteria outlined in Section 5.5 of this guideline.*
- *Historical context of the region encompassing the affected area.*
- *Description of previous land uses of the affected area, including nature and extent of previous development disturbances."*

(MCC & MOE 1992: 6)

The evaluation of potential does not indicate that sites are present within areas affected by proposed development. Evaluation of potential considers the possibility for as yet undocumented sites to be found in areas that have not been subject to systematic archaeological investigation in the past. Potential for archaeological resources is used to determine if physical assessment of a property or portions of a property is required.

> *"Archaeological resources not previously documented may also be present in the affected area. If the alternative areas being considered, or the preferred alternative selected, exhibit either high or medium potential for the discovery of archaeological remains an archaeological assessment will be required."*
>
> (MCC & MOE 1992: 6-7)

> *"The Stage 1 background study (and, where undertaken, property inspection) leads to an evaluation of the property's archaeological potential. If the evaluation indicates that there is archaeological potential anywhere on the property, the next step is a Stage 2 assessment."*
>
> (MTC 2011: 17)

In addition, the collected data is also used to determine if any archaeological resources had been formerly documented within or in close proximity to the study area and if these same resources might be subject to impacts from the proposed undertaking. This data was also collected in order to establish the significance of any resources that might be encountered during the conduct of the present study. The requisite archaeological sites data was collected from the Programs and Services Branch, Culture Programs Unit, MTC and the corporate research library of AMICK Consultants Limited.

5.2.1 General Historical Outline

Essex County was among the first areas of Ontario to be settled. The original settlers were primarily disbanded French soldiers or former fur traders. Permanent settlement began on

what was to become the Canadian side of the Detroit River in 1747, at this time these lands were largely inhabited by native peoples, both the Huron and the Ottawas had villages in the area.

Sandwich was one of the original towns in Essex County and grew up across the river from the fort on the Detroit side. Although settlement had begun earlier the town of Sandwich was established in 1796 when the British gave up Detroit in accordance with the Jay Treaty. Many of the early settlers were Loyalists who chose to remain loyal to the crown and settled therefore on the Canadian side of the river. In 1845 an act to better define counties and townships in Ontario defined the Boundaries of the Township of Sandwich. (www.windsor-essex.info)

Figure 2 illustrates the location of the study area and environs as of 1881. There are structures and historic transportation routes in the vicinity of the study area. Accordingly, it has been determined that there is potential for archaeological deposits related to early Euro-Canadian settlement within the study area.

5.2.2 Summary of Historical Context

The brief overview of documentary evidence readily available indicates that the study area is situated within an area that was close to the historic transportation routes and in an area well populated during the nineteenth century and as such has a high potential for sites relating to early Euro-Canadian settlement in the region. Background research indicates the property has high potential for significant archaeological resources of Native origins.

5.3 Archaeological Context

TABLE 1 Cultural Chronology for South-Central Ontario

Period		Group	Date Range	Traits
Palaeo-Indian		Fluted Point	9500-8500 B.C.	Big game hunters.
		Hi-Lo	8500-7500 B.C.	Small nomadic groups.
Archaic	Early		8000-6000 B.C	Hunter-gatherers.
	Middle	Laurentian	6000-200 B.C.	Territorial divisions arise.
	Late	Lamoka	2500-1700 B.C.	Ground stone tools appear.
		Broadpoint	1800-1400 B.C.	
		Crawford Knoll	1500-500 B.C.	
		Glacial Kame	c.a. 1000 B.C.	Elaborate burial practices.
Woodland	Early	Meadowood	1000-400 B.C.	Introduction of pottery.
		Red Ochre	1000-500 B.C.	
	Middle	Point Peninsula	400 B.C.-500 A.D.	Long distance trade.
		Princess Point	500-800 A.D.	Horticulture.
	Late	Pickering	800-1300 A.D.	Villages and agriculture.
		Uren	1300-1350 A.D.	Larger villages.
		Middleport	1300-1400 A.D.	
		Huron	1400-1650 A.D.	Warfare
Historic	Early	Odawa, Ojibwa	1700-1875 A.D.	Social displacement.
	Late	Euro-Canadian	1785 A.D.+	European settlement.

The Archaeological Sites Database administered by MTC indicates that there are 2 previously documented sites within the study area or within 1 kilometres of the study area. However, it must be noted that this is based on the assumption of the accuracy of information compiled from numerous researchers using different methodologies over many years. AMICK Consultants Limited assumes no responsibility for the accuracy of site descriptions, interpretations such as cultural affiliation, or location information derived from the Archaeological Sites Database administered by MTC. In addition, it must also be noted that the lack of formerly documented sites does not indicate that there are no sites present as the documentation of any archaeological site is contingent upon prior research having been conducted within the study area.

5.3.1 First Nations Occupation

A summary of registered and/or known archaeological sites within a 1-kilometre radius of the study area was gathered from the Archaeological Sites Database, administered by MTC. As a result it was determined that no (0) archaeological sites relating directly to First Nations habitation/activity had been formally documented within the immediate vicinity of the study area. However, the lack of formally documented archaeological sites does not mean that First Nations people did not use the area; it more likely reflects a lack of systematic archaeological research in the immediate vicinity.

The distance to water criteria used to establish potential for archaeological sites suggests potential for First Nations occupation and land use in the area in the past. This consideration establishes archaeological potential within the study area.

5.3.2 Euro-Canadian Settlement

A summary of registered and/or known archaeological sites within a 1-kilometre radius of the study area was gathered from the Archaeological Sites Database, administered by MTC. As a result it was determined that two (2) archaeological sites relating directly to Euro-Canadian habitation/activity had been formally documented within the immediate vicinity of the study area. The sites are briefly described below:

Table 2 Euro-Canadian Sites within 2km

Site Name	Borden #	Site Type	Cultural Affiliation
Baly	AbHs-35	Homestead	Euro-Canadian
Fields	AbHs-36	Homestead	Euro-Canadian

5.3.3 Location and Current Conditions

This report describes the results of the 2011 Stage 1-2 Archaeological Assessment of Grand Marais Drain EA Dougall Avenue to West of Huron Church Road, Lots 43-46 Concession 2 and Lots 64-80 Concession 3, Class Environmental Assessment (Geographic Township of Sandwich, County of Essex), City of Windsor, conducted by AMICK Consultants Limited.

The study area consists of a concrete drain running east to west from Dougall Ave. to parkland West of Huron Church Road, following the natural watercourse Turkey Creek. Residential zones bound the study area to the North and South. To the west the drain flows into Turkey Creek and the concrete drain channel ends, the waterway is also unpaved to the east of the project, where Turkey creek flows into the drain. A plan of the study area is included within this report as Figure 1.

5.3.4 Physiographic Region

The study area is within the St. Clair Clay Plains. The St. Clair clay plains cover 2, 270 square miles including the Counties of Essex, Kent and Lambton. The region has little relief varying between 575 and 700 feet above sea level in most areas. The counties of Lambton and Essex are till plains, which have been smoothed by deposits of lacustrine clay that has settled in depressions as a result of glacial lakes Whittlesey and Warren, which covered the whole area. A deep cover of overburden lies on the bedrock creating good conditions for vegetation (Chapman and Putnam 1984: 147-148).

5.3.5 Surface Water

Sources of potable water, access to waterborne transportation routes, and resources associated with watersheds are each considered, both individually and collectively to be the highest criteria for determination of the potential of any location to support extended human activity, land use, or occupation. Accordingly, proximity to water is regarded as the primary indicator of archaeological site potential. The Standards and Guidelines for Consultant Archaeologists stipulates that undisturbed lands within 300 metres of a water source are considered to have archaeological potential (MTC 2011: 21).

The whole project area is a concrete drain channel that follows the natural watercourse Turkey Creek.

5.3.6 Windsor Archaeology Master Plan

The City of Windsor is currently undertaking a master plan of archaeological resources as a tool to aid in the conservation of archaeological sites within the city. A planning report entitled, Archaeological Master Plan Study Report for the City of Windsor, was prepared by Culture Resource Management Group Limited, Fisher Archaeological Consulting, Historic Horizon Inc., and Dillon Consulting Limited (CRM Group 2005). This initial document offers planning guidance and explains general principles to follow in the conservation and management of archaeological resources pending the release of the final master plan. In particular, archaeological potential modeling is discussed with respect to determining areas within the City of Windsor that have archaeological potential.

The Archaeological Master Plan Study Report for the City of Windsor, uses several criteria

to propose two different models for determining archaeological potential for Precontact Native Settlement and Historic Period Settlement. The Native model is based on environmental and geomorphological criteria while the Euro-Canadian model is based on known settlement locations drawn from historic mapping and other archival sources. The two models were used in combination to create an archaeological potential map for the city of Windsor, taking into account major landscape alterations for development, which were omitted from the final archaeological potential map (CRM Group 2005).

The Native model for determining archaeological potential in the Windsor area relies on eight main criteria: Glacial Geomorphology; Quaternary Geology; Soils; Drainage; Topography; Proximity to Water; Drainage Order; and Native Trails. These criteria are discussed in detail in the Archaeological Master Plan Study Report for the City of Windsor.

The Euro-Canadian model for determining archaeological potential in the Windsor area relies on historic 18th and 19th century maps as well as the determination of archaeological site significance, following a general practice that Euro Canadian sites are archaeologically significant prior to the mid-19th century. These criteria are explained in detail in the Archaeological Master Plan Study Report for the City of Windsor.

According to the map produced for the Archaeological Master Plan Study Report for the City of Windsor the Grand Marais Drain runs through both areas of high and low potential. The archaeological potential is considered to be low for the eastern half of the study area (from the eastern limit of the study to California Ave.). The study area to the West of California Ave. is in a zone designated as having high archaeological potential (Fig. 3).

5.3.7 Summary

Background research indicates the vicinity of the study area has potential for archaeological resources of Native origins based on proximity to a source of potable water in the past. Background research also suggests potential for archaeological resources of Euro-Canadian origins.

According to the Archaeological Potential Map produced for the Archaeological Master Plan Study Report for the City of Windsor, portions of the study area are in zones of high archaeological potential (Fig. 3).

Archaeological potential does not indicate that there are necessarily sites present, but that environmental and historical factors suggest that there may be as yet undocumented archaeological sites within lands that have not been subject to systematic archaeological research in the past.

5.4 Current Property Conditions Context

Current characteristics encountered within an archaeological research study area determine if physical assessment of specific portions of the study area will be necessary and in what manner a Stage 2 Physical Assessment should be conducted, if necessary. Conventional assessment methodologies include pedestrian survey on ploughable lands and test pit methodology within areas that cannot be ploughed. For the purpose of determining where physical assessment is necessary and feasible, general categories of current landscape conditions have been established as archaeological conventions. These include:

5.4.1 Buildings and Structural Footprints

A building, in archaeological terms, is a structure that exists currently or has existed in the past in a given location. The footprint of a building is the area of the building formed by the perimeter of the foundation. Although the interior area of building foundations would often be subject to physical assessment when the foundation may represent a potentially significant historic archaeological site, the footprints of existing structures are not typically assessed. Existing structures commonly encountered during archaeological assessments are often residential-associated buildings (houses, garages, sheds), and/or component buildings of farm complexes (barns, silos, greenhouses). In many cases, even though the disturbance to the land may be relatively shallow and archaeological resources may be situated below the disturbed layer (eg. a concrete garage pad), there is no practical means of assessing the area beneath the disturbed layer. However, if there were evidence to suggest that there are likely archaeological resources situated beneath the disturbance, alternative methodologies may be recommended to study such areas.

There are nine bridges within the study area serving as crossings for roads and footpaths. The bridges exist from East to West as follows; a vehicle bridge at Dougall Ave, a vehicle bridge and Bruce Ave, a footbridge at Virginia Park Ave, a vehicle bridge at Dominion Ave, a footbridge at Curry Ave, a footbridge at Glenwood Ave, a vehicle bridge at Rankin Ave, a large bridge spanning from Askin Ave to California Ave, and a vehicle bridge on Huron Church Rd. All the Bridges are concrete structures spanning from one side of the project area to the other (North-South). The large bridge at California Ave. includes an extended area on top of it, including Balmoral Street, which runs parallel (East-West) to the drain directly above it. There are no buildings within the project area on the Balmoral Street Bridge, just grassland, either side of Balmoral Street and to its west end. A paved footpath runs down the middle of the grassy section to the west and stops at Balmoral Street. Two sidewalks run perpendicular to Balmoral Street (North-South) either side of California Ave. across the span of the bridge. This area was disturbed entirely, as it was all constructed on the bridge spanning the drain. (Fig 6) The remaining bridges had no assessable components, and were just concrete overpasses.

5.4.2 Disturbance

Areas that have been subjected to extensive and deep land alteration that has severely damaged the integrity of archaeological resources are known as land disturbances. Examples of land disturbances are areas of "past quarrying, major landscaping, recent built and industrial uses, sewage and infrastructure development, etc." (MCL 2005: 15), as well as driveways made of either gravel or concrete, in-ground pools, and wells or cisterns. Utility lines are conduits that provide services such as water, natural gas, hydro, communications, sewage, and others. Areas containing below ground utilities are considered areas of disturbance, and are excluded from Stage 2 Physical Assessment. Disturbed areas are excluded from Stage 2 Physical Assessment due to no or low archaeological potential or because they are not assessable using conventional methodology.

The project area was disturbed in its entirety. From Dougall Ave to Huron Church Rd, the project consisted of a concrete drain channel, where the watercourse itself, 3 meters either side of the water, and several meters up a steep slope to a fence line were all paved. Outside of this area, another two meters of grassland continued up steep slope until it flattened out at street level. From the top of the slope there was an area of grassland less than 1 meter wide within the project area between the top of the slope and the roadways, parking lots, and residential units. This area was disturbed, and confirmed by test-pit survey done at 10m intervals. On the South side of the drain, between Dominion Ave and Dougall Ave, the grass slope didn't even flatten out but continued right up to the roadside.

To the East of Dougall Ave, the project area extended only about 15 meters to where the natural watercourse enters the concrete drain channel. This entire area is disturbed, being graded and paved over. The paved area also slopes up from the water to the road and limit of the project area.

For approximately 150 meters, from California Ave. to Askin Ave. (inclusive) there is a large area including Balmoral Street and grass land to either side, where the drain passes along underneath. The underneath section was a concrete tunnel with no assessable portions. The above part was all disturbed as it was constructed on top of the overpass.

To the west of Huron Church Road (approximately 60 meters), the concrete banks ended. A paved path turned up the slope from the bottom of the drain channel, and the remainder of the project area (to the West) was grass slope. Roughly 90 meters West of where the grass portion started, another concrete drain came out of the side of the slope on the North side, draining into the main one. For the remainder of the project area along the North side of the drain, only a small area (less than one meter) of grassland was flat, between the top of the slope and the paved path that ran parallel with the drain along the top of the slope and marked the limit of the project area. Similar conditions hold true for the South side of the drain, save that the path is not paved but dirt. The tops of the banks on both sides of the drain were assessed by test-pit survey (including the dirt path on the South side) and were found to be disturbed. The water itself continued to flow down a concrete channel with

unpaved banks, which ended at the limit of the project area when the drain entered Turkey Creek.

5.4.3 Low-Lying and Wet Areas

Landscape features that are covered by permanently wet areas, such as marshes, swamps, or bodies of water like streams or lakes, are known as low-lying and wet areas. Low-lying and wet areas are excluded from Stage 2 Physical Assessment due to inaccessibility.

The bottom of the drain was flowing water down the concrete basin, which ran the length of the project area. The portion to the West of Huron Church Road, which had unpaved banks, had water from the drain overflowing the concrete banks and pooling at the bottom of the slopes (Plate 1).
.

5.4.4 Steep Slope

Landscape which slopes at a greater than (>) 20 degree change in elevation, is known as steep slope. Areas of steep slope are considered uninhabitable, and are excluded from Stage 2 Physical Assessment.

Most of the project area contained slopes of greater than 20 degrees. The drain ran from East to West and for the entire length of the project area the sides of the drain were steep slope. From the bottom of the drain to the limits of the project area, only the top meter was less than a 20-degree slope. On the South side of the drain, from Dougall Ave. to Dominion Ave, the entire project area was slope.

5.4.5 Wooded Areas

Areas of the property that cannot be ploughed, such as natural forest or woodlot, are known as wooded areas. These wooded areas qualify for Stage 2 Physical Assessment, and are required to be assessed using test pit survey methodology.

The banks of the drain to the West of Huron Church Road that are designated steep slope, also contained woodlot and low brush, but are not to be assessed because of the steep slope.

5.4.6 Ploughable Agricultural Lands

Areas of current or former agricultural lands, which have been ploughed in the past, are considered ploughable agricultural lands. Ploughing these lands regularly moves the soil around, which brings covered artifacts to the surface, easily identifiable during visual inspection. Furthermore, by allowing the ploughed area to weather sufficiently through rainfall washing soil off any artifacts, the visibility of artifacts at the surface of recently worked field areas increases significantly. Pedestrian survey of ploughed agricultural lands

is the preferred method of physical assessment because of the greater potential for finding evidence of archaeological resources if present.

The study area contains no ploughable lands.

5.4.7 Lawn, Pasture, Meadow

Landscape features consisting of former agricultural land covered in low growth, such as lawns, pastures, meadows, shrubbery, and immature trees. These are areas that may be considered too small to warrant ploughing, (i.e. less than one hectare in area), such as yard areas surrounding existing structures, and land-locked open areas that are technically workable by a plough but inaccessible to agricultural machinery. These areas may also include open area within urban contexts that do not allow agricultural tillage within municipal or city limits or the use of urban roadways by agricultural machinery. These areas are required to be assessed using test pit survey methodology.

The study area contains very little lawn area. A thin one-meter wide strip of lawn area exists along the top of the banks of the drain and runs most of the length of the project area (Plates 14, 18, and 22). Along the South side of the drain, between Dominion Ave. and Dougall Ave. this lawn strip does not exist, the bank meets the road directly.

6.0 FIELD METHODS

This report confirms that the entirety of the study area was subject to visual inspection, and that the fieldwork was conducted according to the archaeological fieldwork standards and guidelines, including weather and lighting conditions. The property reconnaissance and assessment were completed in ideal conditions under cloudy skies on 30 September 2011. The temperature at the time of the reconnaissance and assessment was 11°C. The locations from which photographs were taken and the directions toward which the camera was aimed for each photograph are illustrated in Figures 4-9 of this report. Upon completion of the field reconnaissance of the study area, it was determined that select areas would require Stage 2 archaeological assessment consisting of test pit survey methodology.

6.1 Photo Reconnaissance

A detailed examination and photo documentation was carried out on the study area in order to document the existing conditions of the study area to facilitate Stage 2 assessment. All areas of the study area were visually inspected and photographed. The locations from which photographs were taken and the directions toward which the camera was aimed for each photograph are illustrated in Figures 4-9 of this report.

6.2 Test Pit Survey

In accordance with the Standards and Guidelines for Consultant Archaeologists, test pit survey is required to be undertaken for those portions of the study area where deep prior disturbance had not occurred prior to assessment or which were accessible to survey. Test pit survey is only used in areas that cannot be subject to ploughing or cultivation. This report confirms that the conduct of test pit survey within the study area conformed to the following standards:

> *1. Test pit survey only on terrain where ploughing is not possible or viable, as in the following examples:*
> *a. wooded areas* [Not Applicable]
> *b. pasture with high rock content* [Not Applicable]
> *c. abandoned farmland with heavy brush and weed growth* [Not Applicable]
> *d. orchards and vineyards that cannot be strip-ploughed (planted in rows 5 m apart or less), gardens, parkland or lawns, any of which will remain in use for several years after the survey* [Not Applicable]
> *e. properties where existing landscaping or infrastructure would be damaged. The presence of such obstacles must be documented in sufficient detail to demonstrate that ploughing or cultivation is not viable.* [Not Applicable]
> *f. narrow (10 m or less) linear survey corridors (e.g., water or gas pipelines, road widening). This includes situations where there are planned impacts 10 m or less beyond the previously impacted limits on both sides of an existing linear corridor (e.g., two linear survey corridors on either side of an existing roadway). Where at the*

> *time of fieldwork the lands within the linear corridor meet the standards as stated under the above section on pedestrian survey land preparation, pedestrian survey must be carried out. Space test pits at maximum intervals of 5 m (400 test pits per hectare) in areas less than 300 m from any feature of archaeological potential.* [The narrow one-meter strips of grassland at the top of each bank were the only locations in the project area deemed to be assessable or requiring assessment. Test-pit survey began at 5m intervals and the area was found to be disturbed, assessment continued at 10m intervals to confirm continued disturbance]
> *2. Space test pits at maximum intervals of 5 m (400 test pits per hectare) in areas less than 300 m from any feature of archaeological potential.* [All test pits were spaced at an interval of 5m between individual test pits, until areas were deemed disturbed, when the interval was increased to 10m to confirm continued disturbance]
> *3. Space test pits at maximum intervals of 10 m (100 test pits per hectare) in areas more than 300 m from any feature of archaeological potential.* [Not Applicable]
> *4. Test pit to within 1 m of built structures (both intact and ruins), or until test pits show evidence of recent ground disturbance.* [Not Applicable]
> *5. Ensure that test pits are at least 30 cm in diameter.* [All test pits were at least 30 cm in diameter]
> *6. Excavate each test pit, by hand, into the first 5 cm of subsoil and examine the pit for stratigraphy, cultural features, or evidence of fill.* [All test pits were excavated by hand into the first 5 cm of subsoil and examined for stratigraphy, cultural features, or evidence of fill]
> *7. Screen soil through mesh no greater than 6 mm.* [All soil was screened through mesh no greater than 6 mm]
> *8. Collect all artifacts according to their associated test pit.* [Not Applicable]
> *9. Backfill all test pits unless instructed not to by the landowner.* [All test pits were backfilled]
>
> (MTC 2011: 31-32)

6.3 Field Work Weather Conditions

The conduct of the Stage 1-2 Archaeological Assessment of the study area was completed in accordance with the above noted standards on September 30, 2011. The temperature was around 11°C. The work was completed under cloudy skies. Weather conditions were appropriate for the conduct of archaeological fieldwork.

7.0 RECORD OF FINDS

Section 7.8.2 of the Standards and Guidelines for Consultant Archaeologists (MTC 2011: 137-138) outlines the requirements of the Record of Finds component of a Stage 2 report:

1. *For all archaeological resources and sites that are identified in Stage 2, provide the following:*
    a. *a general description of the types of artifacts and features that were identified*
    b. *a general description of the area within which artifacts and features were identified, including the spatial extent of the area and any relative variations in density*
    c. *a catalogue and description of all artifacts retained*
    d. *a description of the artifacts and features left in the field (nature of material, frequency, other notable traits).*
2. *Provide an inventory of the documentary record generated in the field (e.g. photographs, maps, field notes).*
3. *Submit information detailing exact site locations on the property separately from the project report, as specified in section 7.6. Information on exact site locations includes the following:*
    a. *table of GPS readings for locations of all archaeological sites*
    b. *maps showing detailed site location information.*

7.1 Archaeological Resources

No archaeological resources of any description were encountered anywhere within the study area.

7.2 Archaeological Fieldwork Documentation

The documentation produced during the field investigation conducted in support of this report includes: two sketch maps, one page of photo log, one page of field notes, and 60 digital photographs.

8.0 ANALYSIS AND CONCLUSIONS

AMICK Consultants Limited was engaged by the proponent to undertake a Stage 1-2 Archaeological Assessment of lands potentially affected by the proposed undertaking and was granted permission to carry out archaeological work on September 26, 2011. The study area was subject to reconnaissance, photographic documentation and physical assessment on September 30, 2011, consisting of high-intensity test pit survey at an interval of ten metres between individual test pits in order to confirm disturbance. All records, documentation, field notes, photographs and artifacts (as applicable) related to the conduct and findings of these investigations are held at the Lakelands District corporate offices of AMICK

Consultants Limited until such time that they can be transferred to an agency or institution approved by the Ontario Ministry of Tourism and Culture (MTC) on behalf of the government and citizens of Ontario.

Section 7.7.3 of the Standards and Guidelines for Consultant Archaeologists (MTC 2011: 132) outlines the requirements of the Analysis and Conclusions component of a Stage 1 Background Study.

1) *"Identify and describe areas of archaeological potential within the project area.*
2) *Identify and describe areas that have been subject to extensive and deep land alterations. Describe the nature of alterations (e.g., development or other activity) that have severely damaged the integrity of archaeological resources and have removed archaeological potential."*

8.1 Characteristics Indicating Archaeological Potential

Section 1.3.1 of the Standards and Guidelines for Consultant Archaeologists specifies the property characteristics which indicate archaeological potential (MTC 2011: 17-18). Factors which indicate archaeological potential are features of the local landscape and environment which may have attracted people to either occupy the land or to conduct activities within the study area. One or more of these characteristics found to apply to a study area would necessitate a Stage 2 Property Assessment to determine if archaeological resources are present. These characteristics are listed below together with considerations derived from the conduct of this study.

1) *Previously Identified Archaeological Sites*
   No previously documented archaeological sites related to First Nations activity and occupation have been documented in the vicinity of the study area.

   Two (2) previously documented archaeological sites related to Euro/Canadian occupation have been documented in the vicinity of the study area.

2) *Water Sources*
   Primary water sources are describes as including lakes, rivers streams and creeks. Close proximity to primary water sources (300 metres) indicates that people had access to readily available sources of potable water and routes of waterborne trade and communication should the study area have been used or occupied in the past.

   The drain follows a natural watercourse that extends beyond the limits of the project area. Turkey Creek runs the length of the study area and extends to the East and West on either side.

3) *Features Indicating Past Water Sources*

Features indicating past water resources are described as including glacial lake shorelines indicated by the presence of raised sand or gravel beach ridges, relic river or stream channels indicated by clear dip or swale in the topography, shorelines of drained lakes or marshes, and cobble beaches. Close proximity (300 metres) to features indicating past water sources indicates that people had access to readily available sources of potable water, at least on a seasonal basis, and in some cases seasonal access to routes of waterborne trade and communication should the study area have been used or occupied in the past.

The historical atlas shows that Turkey Creek runs along the study area (Fig 2).

4) *Accessible or Inaccessible Shoreline*
This form of landscape feature would include high bluffs, swamp or marsh fields by the edge of a lake, sandbars stretching into marsh, etc.

There are no shorelines within 300 metres of the study area.

5) *Elevated Topography*
Features of elevated topography, which indicate archaeological potential, include eskers, drumlins, large knolls, and plateaux.

There are no identified features of elevated topography within the study area.

6) *Pockets of Well-drained Sandy Soil*
Pockets of sandy soil are considered to be especially important near areas of heavy soil or rocky ground.

There is very little soil within the study area. Where it does exist, it is dark brown with heavy gravel inclusions.

7) *Distinctive Land Formations*
These are landscape features that might have been special or spiritual places, such as waterfalls, rock outcrops, caverns, mounds, and promontories and their bases. There may be physical indicators of their use, such as burials, structures, offerings, rock paintings or carvings.

There are no identified distinctive land formations within the study area.

8) *Resource Areas*
Resource areas that indicate archaeological potential include food or medicinal plants (e.g., migratory routes, spawning areas, and prairie), scarce raw materials (e.g., quartz, copper, ochre or outcrops of chert) and resources of importance to early Euro-Canadian industry (e.g., logging, prospecting, and mining).

There are no identified resource areas within the study area.

9) *Areas of Early Euro-Canadian Settlement*
These include places of early military or pioneer settlement (e.g., pioneer homesteads, isolated cabins, and farmstead complexes), early wharf or dock complexes, pioneer churches and early cemeteries. There may be commemorative markers of their history, such as local, provincial, or federal monuments or heritage parks.

Permanent Settlement began in the area 1747 while the town was established in 1796

10) *Early Historical Transportation Routes*
This includes evidence of trails, passes, roads, railways, portage routes.

The historic atlas shows that the study area is located within an area that was close to historic transportation routes.

11) *Heritage Property*
Property listed on a municipal register or designated under the *Ontario Heritage Act* or is a federal, provincial or municipal historic landmark or site.

There are no listed or designated heritage buildings or properties which form a part of the study area.

12) *Documented Historical or Archaeological Sites*
This includes property that local histories or informants have identified with possible archaeological sites, historical events, activities, or occupations. These are properties which have not necessarily been formally recognized or for which there is additional evidence identifying possible archaeological resources associated with historic properties in addition to the rationale for formal recognition.

No previously documented archaeological sites related to First Nations activity and occupation have been documented in the vicinity of the study area. Two (2) previously documented archaeological sites related to Euro/Canadian occupation have been documented in the vicinity of the study area.

8.2 Characteristics Indicating Removal of Archaeological Potential

Section 1.3.2 of the Standards and Guidelines for Consultant Archaeologists specifies the property characteristics which indicate no archaeological potential or for which archaeological potential has been removed (MTC 2011: 18-19). These characteristics are listed below together with considerations derived from the conduct of this study.

The introduction of Section 1.3.2 (MTC 2011: 18) notes that *"Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to extensive and deep land alterations that have severely damaged the integrity of any archaeological resources. This is commonly referred to as 'disturbed' or 'disturbance', and may include:"*

1) *Quarrying*
   There is no evidence to suggest that quarrying operations were ever carried out within the study area.

2) *Major Landscaping Involving Grading Below Topsoil*
   Unless there is evidence to suggest the presence of buried archaeological deposits, such deeply disturbed areas are considered to have lost their archaeological potential. Properties that do not have a long history of Euro-Canadian occupation can have archaeological potential removed through extensive landscape alterations which penetrate below the topsoil layer. This is because most archaeological sites originate at grade with relatively shallow associated excavations into the soil. First Nations sites and early historic sites are vulnerable to extensive damage and complete removal due to landscape modification activities. In urban contexts where a lengthy history of occupation has occurred, properties may have deeply buried archaeological deposits covered over and sealed through redevelopment activities which do not include the deep excavation of the entire property for subsequent uses. Buildings are often erected directly over older foundations preserving archaeological deposits associated with the earlier occupation.

   Almost the entire project area has been subject to landscaping and grading. The drain follows a natural watercourse, however the banks and bottom have been paved, even the water flows down a concrete basin. The only part that has not been altered through major landscaping is the section to the West of Huron Church Road and is steep slope.

3) *Building Footprints*
   Typically, the construction of buildings involves the deep excavation of foundations, footings and cellars which often obliterate archaeological deposits situated close to the surface.

   There are a total of nine 20th century bridges in the project area, crossing the drain from North to South.

4) *Sewage and Infrastructure Development*
   Installation of sewer lines and other below ground services associated with infrastructure development often involves deep excavation, which can remove archaeological potential.

On the north side of the drain, west of Huron Church Road, another drain emerges from the side of the slope and drains into the main one.

"Activities such as agricultural cultivation, gardening, minor grading and landscaping do not necessarily affect archaeological potential."

(MTC 2011: 18)

"Archaeological potential is not removed where there is documented potential for deeply buried intact archaeological resources beneath land alterations, or where it cannot be clearly demonstrated through background research and property inspection that there has been complete and intensive disturbance of an area. Where complete disturbance cannot be demonstrated in Stage 1, it will be necessary to undertake Stage 2 assessment."

(MTC 2011: 18)

Table 3 below summarizes the evaluation criteria of the Ministry of Tourism and Culture together with the results of the Stage 1 Background Study for the proposed undertaking. Based on the criteria, the property is deemed to have archaeological potential on the basis of proximity to water, the presence of sandy soils and the location of early historic settlement roads adjacent to the study area.

Table 3 Evaluation of Archaeological Potential

FEATURE OF ARCHAEOLOGICAL POTENTIAL		YES	NO	N/A	COMMENT
1	Known archaeological sites within 300m	**Y**			If Yes, potential determined
PHYSICAL FEATURES					
2	Is there water on or near the property?	**Y**			If Yes, what kind of water?
2a	Primary water source within 300 m. (lakeshore, river, large creek, etc.)	**Y**			If Yes, potential determined
2b	Secondary water source within 300 m. (stream, spring, marsh, swamp, etc.)	**Y**			If Yes, potential determined
2c	Past water source within 300 m. (beach ridge, river bed, relic creek, etc.)	**Y**			If Yes, potential determined
2d	Accessible or Inaccessible shoreline within 300 m. (high bluffs, marsh, swamp, sand bar, etc.)		**N**		If Yes, potential determined
3	Elevated topography (knolls, drumlins, eskers, plateaus, etc.)		**N**		If Yes, and Yes for any of 4-9, potential determined
4	Pockets of sandy soil in a clay or rocky area		**N**		If Yes and Yes for any of 3, 5-9, potential determined
5	Distinctive land formations (mounds, caverns, waterfalls, peninsulas, etc.)		**N**		If Yes and Yes for any of 3-4, 6-9, potential determined
HISTORIC/PREHISTORIC USE FEATURES					
6	Associated with food or scarce resource harvest areas (traditional fishing locations, agricultural/berry extraction areas, etc.)		**N**		If Yes, and Yes for any of 3-5, 7-9, potential determined.
7	Early Euro-Canadian settlement area within 300 m.	**Y**			if Yes, and Yes for any of 3-6, 8-9, potential determined
8	Historic Transportation route within 100 m. (historic road, trail, portage, rail corridors, etc.)	**Y**			If Yes, and Yes for any 3-7 or 9, potential determined
9	Contains property designated and/or listed under the Ontario Heritage Act (municipal heritage committee, municipal register, etc.)		**N**		If Yes and, Yes to any of 3-8, potential determined
APPLICATION-SPECIFIC INFORMATION					
10	Local knowledge (local heritage organizations, First Nations, etc.)		**N**		If Yes, potential determined
11	Recent disturbance not including agricultural cultivation (post-1960-confirmed extensive and intensive including industrial sites, aggregate areas, etc.)	**Y**			If Yes, no potential or low potential in affected part (s) of the study area.

If **YES** to any of 1, 2a-c, or 10 Archaeological Potential is **confirmed**
If **YES** to 2 or more of 3-9, Archaeological Potential is **confirmed**
If **YES** to 11 or No to 1-10 Low Archaeological Potential is **confirmed** for at least a portion of the study area.

8.3 Stage 2 Analysis and Recommendations

Section 7.8.3 of the Standards and Guidelines for Consultant Archaeologists (MTC 2011: 138-139) outlines the requirements of the Analysis and Conclusions component of a Stage 2 Physical Assessment.

1. *Summarize all finding from the Stage 2 survey, or state that no archaeological sites were identified.*
2. *For each archaeological site, provide the following analysis and conclusions:*
   a. *A preliminary determination, to the degree possible, of the age and cultural affiliation of any archaeological sites identified.*
   b. *A comparison against the criteria in 2 Stage 2: Property Assessment to determine whether further assessment is required*
   c. *A preliminary determination regarding whether any archaeological sites identified in Stage 2 show evidence of a high level cultural heritage value or interest and will thus require Stage 4 mitigation.*

No archaeological sites or resources were found during the Stage 2 survey of the study area.

9.0 RECOMMENDATIONS

9.1 Stage 1 Recommendations

Under Section 7.7.4 of the Standards and Guidelines for Consultant Archaeologists (MTC 2011: 133) the recommendations to be made as a result of a Stage 1 Background Study are described.

1) Make recommendations regarding the potential for the property, as follows:
a. if some or all of the property has archaeological potential, identify areas recommended for further assessment (Stage 2) and areas not recommended for further assessment. Any exemptions from further assessment must be consistent with the archaeological fieldwork standards and guidelines.
b. if no part of the property has archaeological potential, recommend that the property does not require further archaeological assessment.
2) Recommend appropriate Stage 2 assessment strategies.

The study area has been identified as an area of archaeological potential.

1) The study area consists mainly of disturbed land, where a large concrete basin has been put in for the drain. Much of the property is steep slope and cannot assessed. There are nine 20th century bridges within the property area, which do not require Stage 2 assessment. A thin one-meter wide strip of grass exists on either side of the drain at the top of the slope at the edge of the project area. The grass areas at the top

of the slopes were determined to have potential and Stage 2 assessment was therefore conducted using test-pit methodology in accordance with the Standards and Guidelines governing the use of this method. Test pits measured a minimum of 30 centimeters in diameter and were dug at least 5 centimeters into the subsoil beneath the topsoil layer. All excavated earth was screened through 6 mm wire mesh to ensure that any artifacts contained within the soil matrix are recovered. All test pits were back filled and restored as much as was reasonably possible to the level of the surrounding grade.

9.2 Stage 2 Recommendations

Under Section 7.8.4 of the Standards and Guidelines for Consultant Archaeologists (MTC 2011: 139) the recommendations to be made as a result o f a Stage 2 Physical Assessment are described.

1) *For each archaeological site, provide a statement of the following:*
   a. *Borden number or other identifying number*
   b. *Whether or not it is of further cultural heritage value or interest*
   c. *Where it is of further cultural heritage value or interest, appropriate Stage 3 assessment strategies*
2) *Make recommendations only regarding archaeological matters. Recommendations regarding built heritage or cultural heritage landscapes should not be included.*
3) *If the Stage 2 survey did not identify any archaeological sites requiring further assessment or mitigation of impacts, recommend that no further archaeological assessment of the property be required.*

As a result of the physical assessment of the property, no archaeological resources were encountered. Consequently, it is recommended that the proposed development be considered cleared of any further requirement for archaeological fieldwork. Any current or future condition of development respecting archaeological resources should be considered as addressed.

10. ADVICE ON COMPLIANCE WITH LEGISLATION

While not part of the archaeological record, this report must include the following standard advisory statements for the benefit of the proponent and the approval authority in the land use planning and development process:

a. *This report is submitted to the Minister of Tourism and Culture as a condition of licensing in accordance with Part VI of the Ontario Heritage Act, R.S.O. 1990, c. 0.18. The report is reviewed to ensure that it complies with the standards and guidelines issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism and Culture, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.*
b. *It is an offence under Sections 48 and 69 of the Ontario Heritage Act for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeological Reports referred to in Section 65.1 of the Ontario Heritage Act.*
c. *Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed archaeologist to carry out archaeological fieldwork, in compliance with sec. 48 (1) of the Ontario Heritage Act.*
d. *The Cemeteries Act, R.S.O. 1990, c. C.4 and the Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33 (when proclaimed in force) require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services.*
e. *Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48 (1) of the Ontario Heritage Act and may not be altered, or have artifacts removed from them, except by a person holding an archaeological licence.*

11. BIBLIOGRAPHY AND SOURCES

Belden H.
1881 "Essex Supplement". Illustrated Atlas of the Dominion of Canada. H. Belden & Company, Toronto.

Chapman, L.J. & D.F. Putnam
1984 The Physiography of Southern Ontario (Third Edition). Ontario Geological Survey, Special Report #2. Ontario Ministry of Natural Resources, Toronto.

Cultural Resource Management Group Limited et al.
2005 Archaeological Master Plan Study Report for the City of Windsor. Ontario Ministry of Tourism and Culture, Windsor.

Google Inc.
2009 Google Earth (Version 6.0.3.2197) [Software]. Available from http://www.google.com/earth/index.html

Google Maps
2011 URL: http://maps.google.ca/?utm_campaign=en&utm_source=en-ha-na-ca-bk-gm&utm_medium=ha&utm_term=google%20maps Current as of 05 July 2011.

Government of Ontario
1990a Ontario Heritage Act, RSO 1990. Queen's Printer, Toronto.

1990b Planning Act, RSO 1990. Queen's Printer, Toronto.

2005 Ontario Heritage Amendment Act, SO 2005. Queen's Printer, Toronto.

Ontario Ministry of Citizenship, Culture and Recreation (OMCzCR)
1993 Archaeological Assessment Technical Guidelines, Stages 1-3 and Reporting Format. OMCzCR, Cultural Programs Branch, Archaeology and Heritage Planning, Toronto.

Ontario Ministry of Culture (MCL)
2005 Conserving a Future for Our Past: Archaeology, Land Use Planning & Development in Ontario (An Educational Primer and Comprehensive Guide for Non-Specialists). Heritage & Libraries Branch, Heritage Operations Unit, Toronto.

2006 Standards and Guidelines for Consultant Archaeologists (draft). Heritage & Libraries Branch, Heritage Operations Unit, Toronto.

2009 Standards and Guidelines for Consultant Archaeologists (draft). Programs and Services Branch, Culture Programs Unit, Toronto.

Ontario Ministry of Culture and Communications (MCC) & Ministry of Environment (MOE)
1992 Guideline for Preparing the Cultural Heritage Resource Component of Environmental Assessments. Cultural Programs Branch, Archaeology and Heritage Planning, Toronto.

Ontario Ministry of Tourism and Culture (MTC)
2009 Standards and Guidelines for Consultant Archaeologists (draft). Programs and Services Branch, Culture Programs Unit, Toronto.

Ontario Ministry of Tourism and Culture (MTC)
2011 Standards and Guidelines for Consultant Archaeologists. Programs and Services Branch, Culture Programs Unit, Toronto.

www.windsor-essex.info
2011 Early History of Essex County. URL: http://www.windsor-essex.info/wps/wcm/connect/COE/COE/ABOUT+ESSEX+COUNTY/History+of+Essex+County/Early+History+of+Essex+County+%281792+-+1924%29/, as of October 18, 2011.

12. Maps

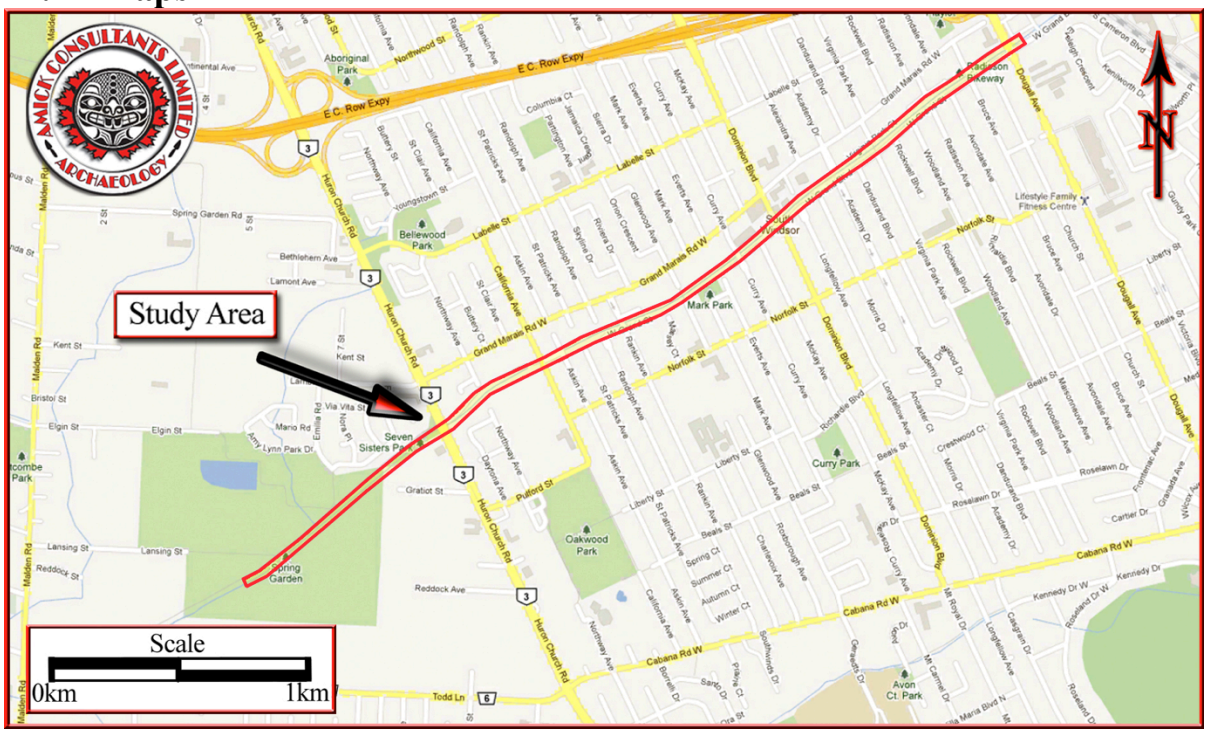

Figure 1 Location of the Study Area (Google Maps 2011)

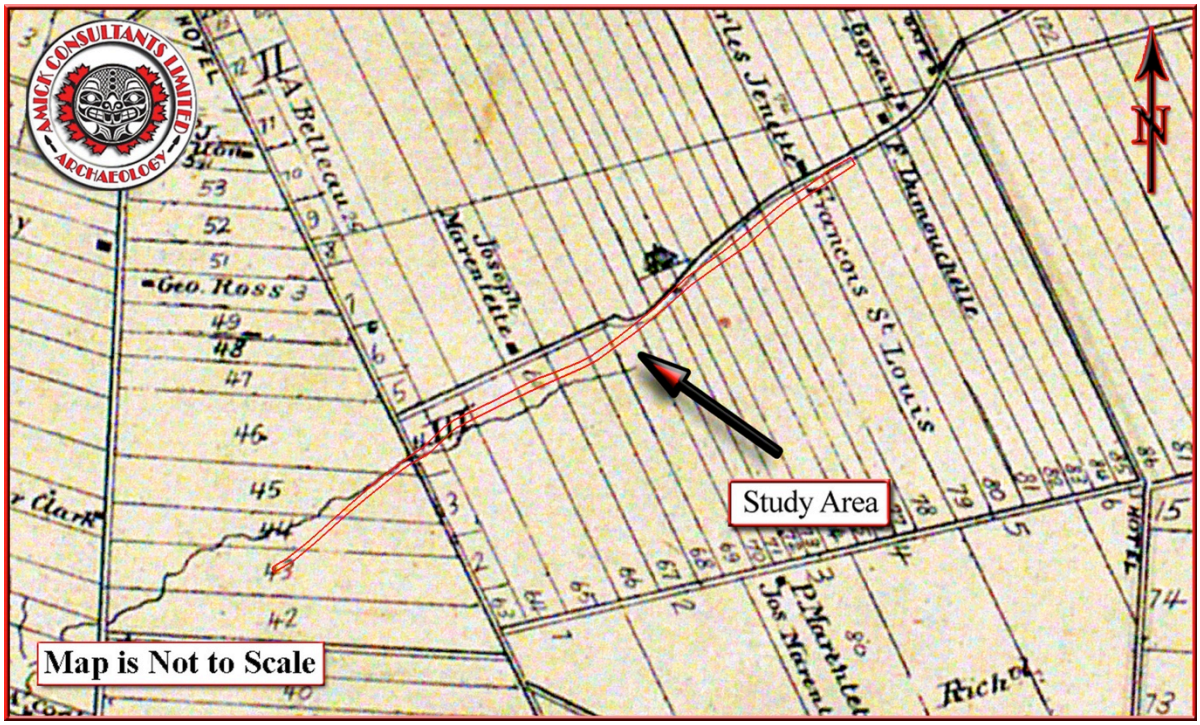

Figure 2 Segment of Historic Atlas Map for the Township of Sandwich (1881)

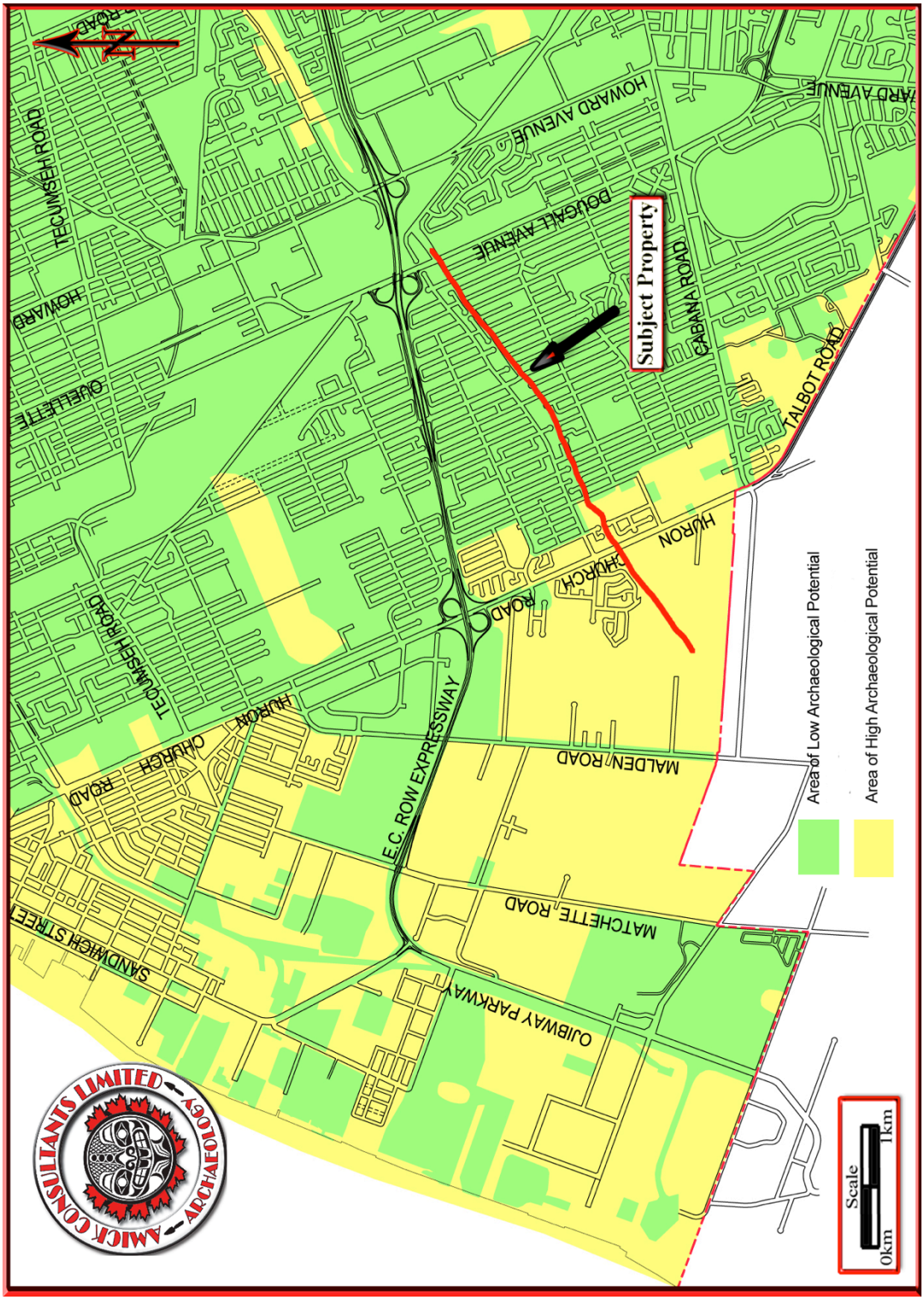

Figure 3 Segment of the Archaeological Potential Map from the Archaeological Master Plan Study Report for the City of Windsor

Figure 4 West end of Project Area with Plate Locations

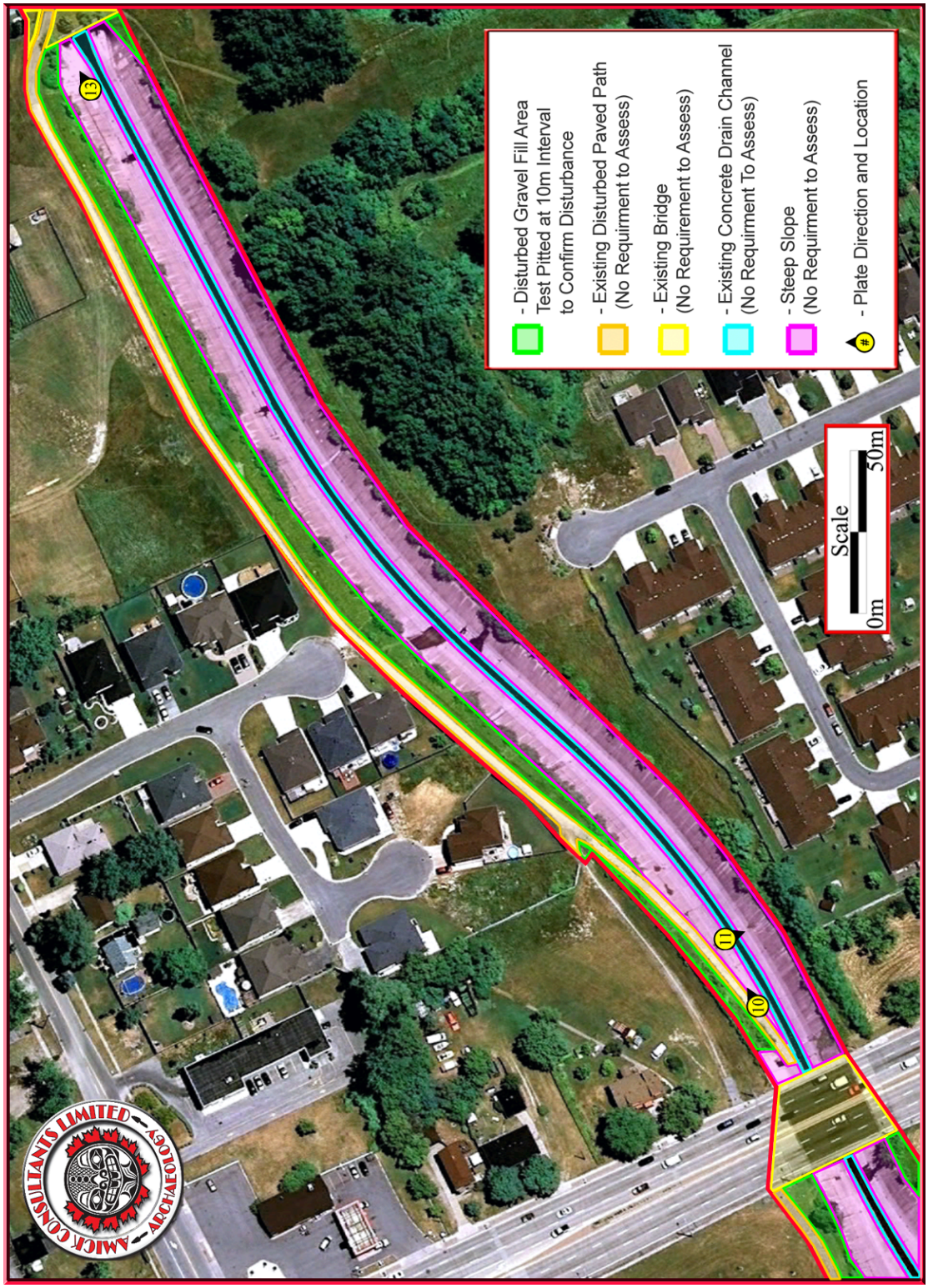

Figure 5 Segment of Study Area with Plate Locations

Figure 6 Bridge with California Ave., Balmoral Road, and Askin Ave.

Figure 7 Segment of Study Area with Plate Locations

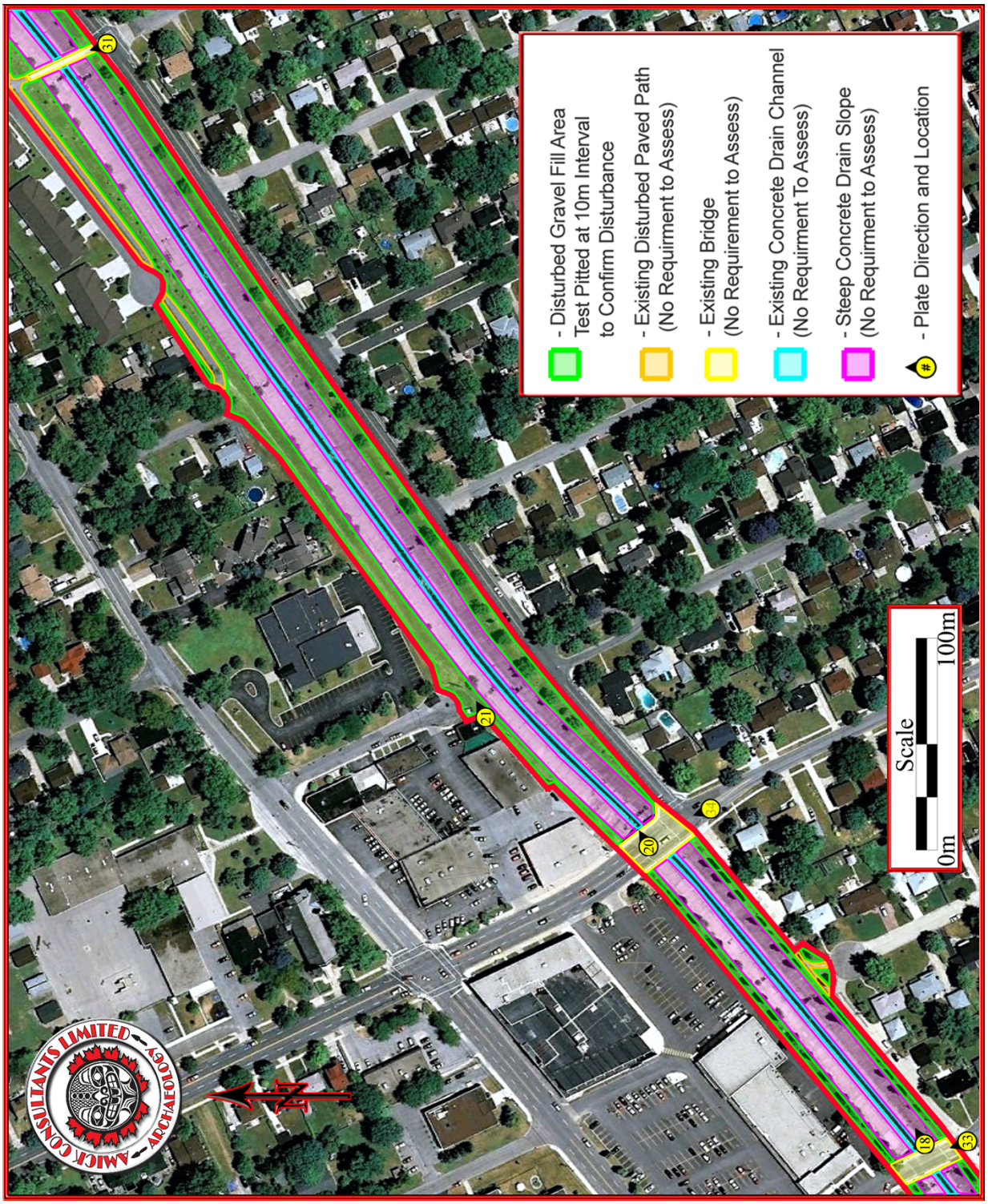

Figure 8 Segment of Study Area with Plate Locations

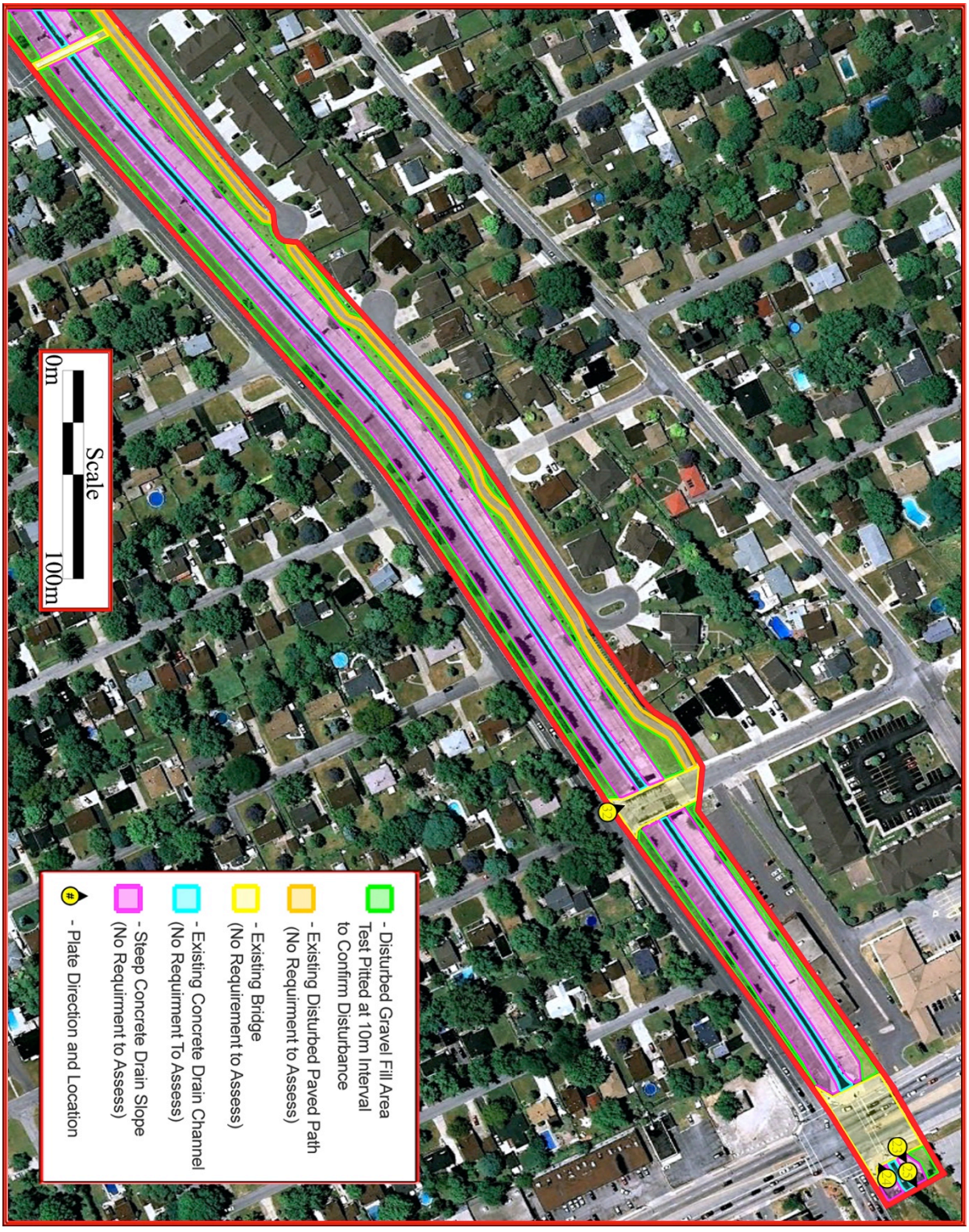

Figure 9 Segment of Study Area with Plate Locations

10.0 Natural Heritage Assessment Report - BioLogic Inc.

The following is a copy of the Natural Heritage Assessment Report prepared by BioLogic Inc.

BioLogic Incorporated

AQUATIC AND TERRESTRIAL ECOSYSTEM PLANNERS

NATURAL HERITAGE ASSESSMENT REPORT

Grand Marais Drain
Class Environmental Assessment

Prepared for:

Landmark Engineers Inc.

May 10, 2012

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1.0 INTRODUCTION

The Grand Marais Drain flows from east to west through the City of Windsor. Between Dougall Avenue at the east end and Huron Church Road at the west end, the Grand Marais Drain is concrete lined along the low flow channel and up the banks [Figure 1]. West of Huron Church Road there is concrete along the low flow channel and the banks are vegetated. Further west of this section the drain is naturalized. The section between Dougall Avenue and Huron Church Road is being considered for channel improvements to enhance the connection between the natural environment on either side of the drain and also for improvements to the natural habitat, and recreational/aesthetic appeal of this section of the system within the City of Windsor [Appendix A].

1.1 Study Area

The study area consists of the current Grand Marais Drain proper which includes a concrete low flow channel and concrete banks, as well as 3m to 4m north and south of the limit of concrete, depending on the limit of City owned property [Figure 2]. The study area extends from Dougall Avenue to Huron Church Road [Figure 1]. For the purposes of this report, the lands within 120m of the study area were reviewed to consider any landscape level natural features or functions. The 120m on either side of the study area is referred to as "adjacent Lands" for the remainder of the report [Figure 2]. This section of the Grand Marais Drain is within an urban setting, and therefore the adjacent lands are primarily rear yards, with no natural heritage features.

1.2 Report Objective

BioLogic was retained by Landmark Engineers Inc. to examine the natural heritage components on and adjacent to the proposed Grand Marais Drain improvements project 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 C.

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, 2009)
- 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 lands within the study area or the adjacent lands that are designated Natural Heritage [Figure 3]. Within the adjacent lands, there is a linkage potential at the east end and recreational parks at the west end, but neither are a "Natural Heritage" designation [Figure 3].

Schedule C, City of Windsor Official Plan, 2007

Portions of 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

Land use within the study area is mainly designated Residential with some Commercial Corridor and Commercial Centre along Dougall Avenue, Mixed Use along Dominion Boulevard and Open Space, Industrial and Commercial Corridor along Huron Church Road [Figure 5]. Adjacent lands are designated similar to the study area with majority designated Residential.

2.3 Essex Region Conservation Authority (ERCA) Regulation

The study area is 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.

The study area consists the concrete lined channel plus the concrete banks of Grand Marais Drain and 3m to 4m north and south of the limit of concrete. The study area is mostly concrete with manicured residential yards and public walkways with a few trees beyond the limit of concrete.

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 (URS, 2008; Dillon and Golder, 2004). The bedrock lies at a depth 20-35 m below the surface (Dillon, 2004).

The study area is within the St. Clair Clay Plain (Chapman and Putnam, 1984). The geological surficial setting for the study area east of Huron Church Road consists of clayey silt till and west of Huron Church Road consists of medium lacustrine sand (Vagners, 1972; Dillon and Golder, 2004). Clayey deposits are typically 20 to 30m thick while the lacustrine deposits are typically 1 to 6m thick and overlay clayey deposits (URS, 2008).

3.1.2 Soils

The predominant soil type in the study area is Brookston Clay Loam with Berrien Sand around Huron Church Road (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). Berrien Sand is imperfectly drained sand that is typically stone free and developed on undulating topography (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 study area is located within the Turkey Creek subwatershed. The Grand Marais Drain originates near Pillete Road (5 km east of study area) and continues to flow west along Grand Marais Road until it empties into Turkey Creek downstream (west) of the study area. Turkey Creek then flows southwest to the Detroit River.

There is a surficial sand aquifer associated with the St. Clair Clay Plan, 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 metres from the surface (Dillon and Golder, 2004).

3.2 Biological Setting

3.2.1 Areas of Natural and Scientific Interest (ANSI)

There are no ANSI's located within the study area however there has been an ANSI reported in the vicinity (NHIC database, March 15, 2012; City of Windsor, 2007). The Spring Garden Road ANSI is located approximately 400m downstream of the study area on both sides of the Grand Marais Drain [Figure 7].

The Spring Garden Road ANSI (117ha) is part of a larger ANSI Complex, the Ojibway Prairie Complex ANSI (350ha). The Spring Garden Road ANSI consists of tallgrass prairie and oak savannah communities, which are rare in Ontario (S-rank S1), as well a wetland in the form of an old lagoon and old field communities (LGL, 2008a; LGL 2008b). The Spring Garden Road ANSI and the remaining lands of the Ojibway Prairie Complex are home to numerous species that are listed provincially or federally as Endangered, Threatened, Special Concern and species that are provincially significant (S1 to S3 rank) (Pratt, 2011; LGL, 2008a; LGL, 2008b; Oldham, 1983).

3.2.2 Vegetation Communities and Woodlands

Just east of Huron Church Road there is a small portion of a hedgerow identified within the south side of the study area (Land Inventory Ontario mapping) [Figure 8]. The majority of the hedgerow is within the adjacent 120 metres. Larger treed areas are identified west of the study area and are associated with the Spring Garden ANSI.

Based on site investigations, there are no natural vegetation communities within the study area. The majority of the study area consists of a concrete lined channel (~ 23m wide). Within the study area, the 3-4 m of land outside the concrete channel, is either manicured residential lawns or manicure lawn associated with the public walkways along the Grand Marais Drain [Figure 9]. There are a few individual trees dispersed along the Grand Marais Drain that are associated with the residential lawns or the public walkways.

Upstream of the study area (east of Dougall Avenue) and within the study area, the Grand Marais Drain flows through residential, commercial and industrial areas the City of Windsor. Downstream of the study area (west of Huron Church Road) the banks of the Grand Marais Drain are vegetated and are adjacent to the Spring Garden ANSI and other natural areas further downstream. The Grand Marais Drain would only function as a corridor downstream of Huron Church Road because it connects the Spring Garden ANSI to other natural areas/features further downstream.

3.2.3 Wetlands

There are no provincially significant wetlands (PSWs) within the study area or the adjacent lands (NHIC database, March 15, 2012).

Based on the MNR wetland evaluation and mapping and discussions with MNR (*pers. comm*, November 2011), the provincially significant Ojibway Prairie Wetland Complex (ER 28) is approximately 400m west of Huron Church Road, beyond the study area and the adjacent lands [Figure 10].

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 identified in the NHIC database search (March 15, 2012) or on thhe DFO Species at Risk mapping for the Essex Region (DFO, 2011). No aquatic Species at Risk were identified by MNR staff for the study area (*pers. comm*, November 2011).

Site Investigation – Fish Habitat

Fish habitat investigation were completed by BioLogic on March 28, 2011 for the study area as part of the Grand Marais Drain repair project (BioLogic,2011). 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.

The Grand Marais Drain from the weir, which is just upstream of Dougall Ave., to approximately 60m downstream of Huron Church Road is a concrete lined channel with concrete extending up the banks resulting in a trapezoid shape channel [Appendix B]. The Grand Marais Drain has permanent flow and eventually outlets into Turkey Creek. The channel within the study area is flat and devoid of any pool riffle habitat. Gravel and small amounts of detritus overlay the concrete bottom in some areas. On average the water depth was 0.3m and the wetted width was 2.6m. The top of bank width and depth were 30m and 6m, respectively. There is no riparian vegetation along the banks of the Grand Marais Drain within the study area.

Site Investigation – Fish Community

Based on the existing fisheries data (ERCA, 2001 and LGL, 2008b) and the recent fisheries data collected by BioLogic in 2011 for the Grand Marais Drain, it has been determined that the Grand Marais Drain within the study area supports a warmwater sportfish and baitfish community [Table 1]. All the fish species captured and listed in Table 1 are common and widespread throughout Ontario.

Table 1: Fish Species Captured within the Grand Marais Drain

Fish Species Captured		Historic Data		Recent Data
Common Name	**Scientific Name**	**ERCA 2001**	**LGL 2008**	**BioLogic 2011**
Bluegill	*Lepomis megalotis*		X	X
Bluntnose Minnow	*Pimephales notatus*		X	X
Emerald Shiner	*Notropis atherinoides*	X		
Common Carp	*Cyprinus carpio*		X	X
Creek Chub	*Semotilus atromaculatus*			X
Fathead Minnow	*Pimephales promelas*	X	X	X
Gizzard Shad	*Dorosoma cepedianum*			X
Goldfish	*Carassius auratus*		X	
Green Sunfish	*Lepomis cyanellus*	X		
Hornyhead Chub	*Nocomis biguttatus*		X	
Largemouth Bass	*Micropterus salmoides*		X	X
Pumpkinseed	*Lepomis gibbosus*		X	X
Rock Bass	*Ambloplites rupestris*			X
Smallmouth Bass	*Micropterus dolomieu*		X	X

3.2.5 Flora

Seventy-four (74) rare plants have been reported in the vicinity of the study area (NHIC database, March 15, 2012). The element occurrences within the 1km squares that cover the study area on the NHIC Biodiversity Explorer are noted in Appendix C.

Of the 74 rare plant species, 64 are provincially significant (i.e., ranked S1 to S3) while the remaining 10 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 10 plant species at risk within the 1km squares that cover the study area and the 120m adjacent lands on the NHIC Biodiversity Explorer are:

- American Chestnut (END, S2)
- Purple Twanyblade (END provincially, THR federally, S2)

- Colicroot (THR, S2)
- Dwarf Lake Iris (THR provincially, SC federally, S3)
- Dense Blazing Star (THR, S2)
- Willowleaf Aster (THR, S2)
- Climbing Prairie Rose (SC,S3)
- Riddell's Goldenrod (SC, S3)
- Shumard Oak (SC, S3)
- Swamp Rose-mallow (SC, S3)

The MNR (*pers. comm*, December 2011) did not note any additional element occurrences, however they did note that there were known occurrences for the following within the vicinity of the study area or the 120m adjacent lands:

- Colicroot (THR, S2)
- Dense Blazing Star (THR, S2)
- Willowleaf Aster (THR, S2)

Habitat Requirements

American Chestnut - typically inhabits upland deciduous forest that have acid to neutral, sandy soils (COSEWIC, 2004a).

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, 2012a).

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).

Dense Blazing Star - inhabits moist prairies, savannahs, dune swales and abandoned fields in coarse sand or sandy loam soils (COSEWIC, 2010c). It does not tolerate shade and is usually found in areas that have been disturbed by fire, flooding, drought or grazing.

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.

Riddell's Goldenrod - inhabits wet prairie-like sites, prairie-like flood plains and also roadside ditches (SARPR, 2012b).

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, 2004b).

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. The habitat that these plants require is located within the Spring Garden ANSI and the Ojibway Prairie Wetland Complex which is outside the study area and the adjacent lands [Figure 6 and Figure 10].

Site Investigation

Floral life science inventories were completed by Gerry Waldron, Peggy Hurst and Scott Hughes, on November 8, 9, and 10, 2011 [Appendix D]. This inventory was conducted for the current study area and for lands west of Huron Church Road (approximately 700m). Lands beyond the current study area to the west consisted of a concrete lined low flow channel with riparian vegetation extending up the banks. Within the study area, at the limit of concrete there is a fence that separates the concrete channel and the adjacent residential, commercial and recreational pathways land uses on the tableland which do include manicured lawns, public pathways and individual trees.

Site investigations found three (3) species at risk (listed as special concern, threatened, or endangered under ESA and/or SARA) [Appendix C]. Only one of those species was found within the current study area:

- Butternut (END, S3?)

Two Butternut were located on south edge of the study area approximately 200m east of Huron Church Road [Figure 11]. The health of the two Butternut within the study area have not been assessed as part of this report. However, if the proposed construction works for the Grand Marais Drain improvements are within 25m of these Butternut, a Species At Risk permit may be required.

All three (3) of the plant species at risk found during site investigations were found west of Huron Church Road outside the study area [Figure 11]:

- Dense Blazing Star (THR, S2)
- Butternut (END, S3?)
- Climbing Prairie Rose (SC,S3)

Currently, these species are located outside the study area and will not be impacted by the proposed design. However, if at detailed design it is determined that the design for the Grand Marais Drain improvements will extend west of Huron Church Road, these species at risk, which are locally common, will need to be further assessed to ensure compliance with the federal *Species at Risk Act* (SARA) and provincial *Endangered Species Act* (ESA).

Site investigations also found an additional five (5) provincially significant (i.e., ranked S1 to S3) plant species [Appendix C]. All of these species were located west of Huron Church Road outside the study

area and will not be impacted by the proposed design.

3.2.6 Fauna

Two (2) rare faunal species have been reported in the vicinity of the study area (NHIC database, March 15, 2012) [Appendix C]. 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 (THR, S2)

In addition to the above element occurrences, MNR (*pers. comm*, November 2011) has known occurrences for:

- Eastern Foxsnake (END, S2)

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).

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, 2010). This species may inhibit vacant lots in urban areas and areas partially overgrown by shrubs and trees (COSEWIC, 2010). 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, 2010).

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 are most likely inhabiting the Spring Garden ANSI and possibly the vegetated banks of the drain, which are both located on the west side of Huron Church Road. Within the study area, the 3m to 4m wide strip of manicured lawn north and south of the drain on the tableland may provide limited snake habitat (foraging habitat) and it is anticipated only incidental encounters with Eastern Foxsnake and Buttler's Gartersnake are possible within the study area.

In previous studies done for the Windsor-Essex Parkway portion of the Detroit River Crossing project (LGL, 2008a; LGL, 2008b), Barn Swallow (THR provincially, not listed federally, S4B) were found utilizing the Huron Church Road bridge, which is located outside the study area but within the adjacent lands

Site Investigation

A faunal survey was completed by BioLogic on March 27, 2012 to identify any potential snake habitat within the study area [Figure 12]. 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. Within the study area there are limited potential habitat features available for successful survival of snakes.

Large amounts of garbage (mostly cardboard) were noted on the north side of the drain behind the commercial buildings on either side of Curry Avenue. This debris provides foraging and thermoregulating habitat but is not considered significant as it is likely collected or blown away from time to time throughout the year.

Other potential habitat features for snakes include:

- anthropogenic brush and organic waste piles
- buried debris and rubble
- areas where the concrete channel has been undermined, allowing access for hibernating [Figure 12].

Along the length of the channel there are minor scattered brush/organic waste piles and mammal burrows. The area east of Dougall Avenue where the concrete channel ends, within the 120m adjacent lands and not in the study area, has a large amount of buried debris and rubble which snakes would find suitable for thermoregulating and hibernating. Overall there were very few suitable areas of channel

undermining since a considerable amount of the slope is slumping and eroding over the edge of the concrete. However the area to the west of California Avenue, at the west end of the study area, presents the most suitable area for hibernating, nesting and thermoregulation. Within this concentrated area, the south bank of the drain has the most potential to be snake habitat.

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

Two (2) Butternut (END) were found within the study area. 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 the Butternut trees, potential snake habitat and incidental encounters of the at risk reptile species listed above will need to consider for this project.

Barn Swallow (THR provincially, not listed federally, S4B) were found utilizing the Huron Church Road bridge which is located within the 120m adjacent lands. Works within the study area close to Huron Church Road will need to consider indirect impacts to the Barn Swallow from construction.

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. There is a portion of a hedgerow located within the study area. This hedgerow 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, 2009).

Habitats of seasonal concentrations of animals:

Potential snake hibernacula were found within the study area. 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 species requiring specialized habitat were noted, at least not in numbers which would imply provincial significance.

Habitat of species of conservation concern:

No species of conservation concern were identified within the study area.

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 the study area or the 120m adjacent lands.

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 [Figure 3].

Environmental Policy Areas Policies

There are no lands designated Environmental Policy Areas within the study area or the adjacent lands [Figure 4].

Candidate Natural Heritage Sites Policies

There are no lands designated Candidate Natural Heritage Site within the study area or the adjacent lands [Figure 4].

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 3m to 4m strip of 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. 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

The section of Grand Marais Drain between Dougall Avenue and Huron Church Road will be improved to enhance the connections between the communities on either side of the Drain, and for making recreational, aesthetic, and habitat improvements within the channel corridor [Appendix A]. The preferred design solution for drain improvements uses a combination of design options that alternate on either side of the channel [Appendix A]. Four options have been combined to create the preferred solution and are described below:

- **Option 2** – Enclose the Drain entirely to enhance access to adjacent City owned lands and create a large park area. Recreational pathways will be constructed on the tableland with opportunities for pathway crossing.
- **Option 3B** – The low flow channel will be preserved and a natural stone retaining wall system with plantings will be constructed along the sloped banks of the channel. On the tablelands recreational pathways will be constructed.
- **Option 6A** – Upper portions of the concrete channel will be removed and replaced with a grassed or vegetated slope. The lower portions of the concrete lined channel and low flow channel will be preserved. On the tablelands recreational pathways will be constructed.
- **Option 6B** – Upper portions of the concrete channel will be replaced with a retaining wall system (with or without living wall vegetation) to gain tableland to provide continuous path connections. The lower portions of the concrete lined channel and low flow channel will be preserved. Recreational pathways will be constructed on the newly gained tableland.

For sections where Option 6A is proposed, approximately every 200m Option 6B will be constructed and for sections were Option 6B is proposed, approximately every 200m Option 3A will be constructed. Option 3A is the same as Option 6B but extends further out into the channel. By constructing these options approximately every 200m, it creates visual interest and allows for seating areas along the drain.

5.2 Natural Heritage Considerations

For the Grand Marais Drain Improvements, the following natural heritage features need to be considered:

- Habitat of Threatened and Endangered Species
- Wildlife Habitat (Seasonal Concentrations-reptile hibernacula)
- 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

Two (2) Butternut (END) were found within the study area and there is 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)

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

Barn Swallow (THR provincially, not listed federally, S4B) were found utilizing the Huron Church Road bridge which is located within the 120m adjacent lands.

Mitigation Measures:

Butternut

- At detail design, the Butternut trees should be assessed by a certified Butternut Health Assessor (BHA) to determine whether or not these trees are retainable.

- If Butternut are deemed not retainable by the BHA no further action is required they can be removed if necessary to complete the improvement works along the Grand Marais Drain.
- If Butternut are deemed retainable by the BHA a 25m setback for protection is required. If any grade changes are proposed within 25m of the retainable Butternut, a Species at Risk permit under the *Endangered Species Act* will need to be obtained. Works for drain improvements can not occur within 25m of the Butternut until the Species at Risk permit is approved and issued by MNR.
- Tree protection fencing should be installed along the boundary specified within the Species at Risk permit to prevent any damage to the root zone of the Butternut trees.

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 hibernacula within the study area is significant wildlife habitat for snakes that are not at risk. Additional mitigation measures may be required to address the study findings. However, the proposed design will provide additional habitat for all wildlife, including species at risk and would therefore be considered a net benefit to the species.
- At detailed design, additional floral studies should be conducted for the study area to confirm no additional plant species at risk are present within the study area

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.

Barn Swallow

- If Grand Marais Drain improvements are contemplated within 200m of the Huron Church Road bridge, construction should not occur between May 1st and July 31st to avoid the Barn Swallow breeding season and to be in compliance with the *Migratory Birds Convention Act* and/or

Regulations under that Act.

5.3.2 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. However, the proposed design will provide shading of the drain where it is proposed to enclose the drain. These areas will create cool water refuge areas for fish, which would be considered a net benefit to the 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) for the project.

5.3.3 Urban Forestry

There are trees and treed areas (i.e., the hedgerow) that are within the study area and 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 tress 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.

5.3.4 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.

5.3.5 Floodplain

The Grand Marais Drain Improvements 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

The section of Grand Marais Drain between Dougall Avenue and Huron Church Road will be improved to enhance the connections between the communities on either side of the Drain, and for making recreational, aesthetic, and habitat improvements within the channel corridor [Appendix A]. The preferred design solution incorporates more green space by removing sections of concrete and by enclosing portions of the Drain. The preferred solution will also increase connections between communities and to the City through the creation of recreational pathways.

There are two Butternut (END) and potential snake habitat within the study area. As well there might be potential encounters with at risk reptile species within the study area during construction. At detailed design, species at risk found within the study area and potential species at risk habitat will need to be reviewed in more detail. Based on what is found during these detailed studies, species at risk permits may need to be obtained. A permit from ERCA prior to any site alterations will also be required.

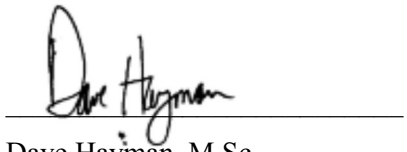
The following additional plans/reports during the detailed design phase should also be prepared to ensure appropriate mitigation strategies and opportunities are carried out:

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

Currently, the study area provides very limited fish and wildlife habitat due to the concrete lined banks and very little vegetation along the Grand Marais Drain. The preferred design solution for the drain improvements [Appendix A] removes portions of the concrete banks and naturalizes those areas creating more green space and additional habitat for wildlife, including species at risk. Locations where the preferred design encloses the Grand Marais Drain channel, even more tableland/green space is created and would provide cool water refuge areas for fish species along a drain. 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]

7.0 REFERENCES

BioLogic Incorporated, 2011. Letter of Intent for Grand Marais Drain, Huron Church Road to Dougall Avenue, Windsor Ontario. Prepared for: Essex Region Conservation Authority. June 23, 2011.

City of Windsor, 2007. The City of Windsor Official Plan. Volume 1: The Primary Plan. Office Consolidation: September 1, 2007.

Chapman, L.J. and D. F. Putnam, 1984. The Physiography of Southern Ontario, 3rd Edition. Ontario Geological Survey, Special Volume. Ontario Ministry of Natural Resources. 270pp.

COSEWIC 2004a. COSEWIC assessment and status report on the American chestnut *Castanea dentata* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 19 pp. (www.sararegistry.gc.ca/status/status_e.cfm)

COSEWIC 2004b. COSEWIC assessment and update status report on the swamp rose-mallow *Hibiscus moscheutos* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vii + 43 pp. (www.sararegistry.gc.ca/status/status_e.cfm).

COSEWIC 2010a. COSEWIC assessment and status report on the Purple Twanyblade *Liparis liliifolia* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xii + 25 pp. (www.sararegistry.gc.ca/status/status_e.cfm)

COSEWIC 2010b. COSEWIC assessment and status report on the Dwarf Lake Iris *Iris lacustris* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. xi + 29 pp. (www.sararegistry.gc.ca/status/status_e.cfm)

COSEWIC. 2010c. COSEWIC assessment and status report on the Dense Blazing Star *Liatris spicata* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. ix + 23 pp.

COSEWIC 2003. COSEWIC assessment and status report on the willowleaf aster *Symphyotrichum praealtum* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 16 pp.

COSEWIC 2002. COSEWIC assessment and update status on report on the climbing prairie rose *Rosa setigera* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 15 pp.

COSEWIC. 1999. COSEWIC assessment and update status report on the shumard oak *Quercus shumardii* in Canada. Committee on the Status of Endangered Wildlife in Canada. Ottawa. vi + 11 pp. (www.sararegistry.gc.ca/status/status_e.cfm)

Dillon Consulting Limited and Golder Associates Limited, 2004. Essex-Chatham Kent Groundwater Study.

Lands Information Ontario Website. http://www.mnr.gov.on.ca/en/Business/LIO/index.html

LGL Limited, 2008a. Natural Heritage Impact Assessment – Recommended Plan. Prepared for the Canada-United States-Ontario-Michigan Border Partnership. December 2008.

LGL Limited, 2008b. Draft Practical Alternatives Evaluation Working Paper – Natural Heritage. Prepared for the Canada-United States-Ontario-Michigan Border Partnership. April 2008.

Ontario Ministry of the Environment. 1996. The Canadian Environmental Assessment Act.

Ontario Ministry of Municipal Affairs. 2005. Provincial Policy Statement. Ontario Ministry of Municipal Affairs, Toronto, Ontario. 37 pp.

Ontario Ministry of Natural Resources, 2012. Natural Heritage Information Centre Datbase: Biodiversity Explorer. http://www.mnr.gov.on.ca/MNR/nhic/nhic.cfm.. Accessed March 15, 2012.

Ontario Ministry of Natural Resources. 2010. Natural Heritage Reference Manual for Natural Heritage Policies the Provincial Policy Statement, 2005. April 2010 Toronto, Ontario.

Ontario Ministry of Natural Resources. 2009. Significant Wildlife Habitat Criteria Schedules Draft.

Ontario Ministry of Natural Resources. 2000. Significant Wildlife Habitat Technical Guide. October 2000. Ontario, Canada. 151 pp.

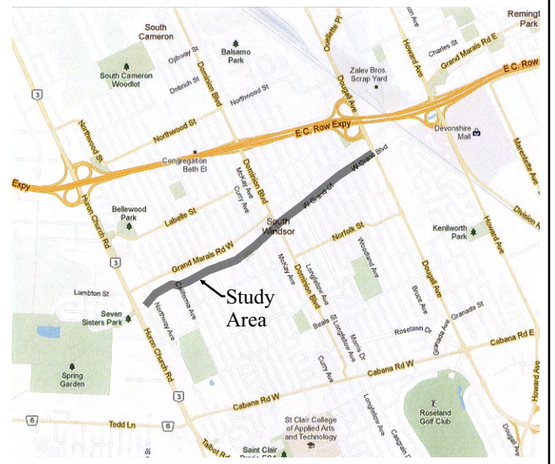
Pratt, Paul D. 2011. Provincially Rare Vascular Plants and Wildlife of the Ojibway Prairie Complex (Version JUNE11). Ojibway Nature Centre Home Page. Department of Parks, Windsor, Ontario. http://www.ojibway.ca/raresp.htm

Species at Risk Public Registry (SARPR), 2012a. Species Profile - Colicroot. On-line. Available at: http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=214.

Species at Risk Public Registry (SARPR), 2012b. Species Profile - Riddell's Goldenrod. On-line. Available at: http://www.sararegistry.gc.ca/species/speciesDetails_e.cfm?sid=640.

URS, 2008. Environmental Assessment Report (W.O.04-33-022) – Detroit River International Crossing Study, City of Windsor, County of Essex, Town of LaSalle, Town of Tecumseh. December 2008.

Figure 1: Site Location
(ERCA Air Photo)



Scale N.T.S.
Key Plan

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

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April 2012

BioLogic
AQUATIC AND TERRESTRIAL ECOSYSTEM PLANNERS

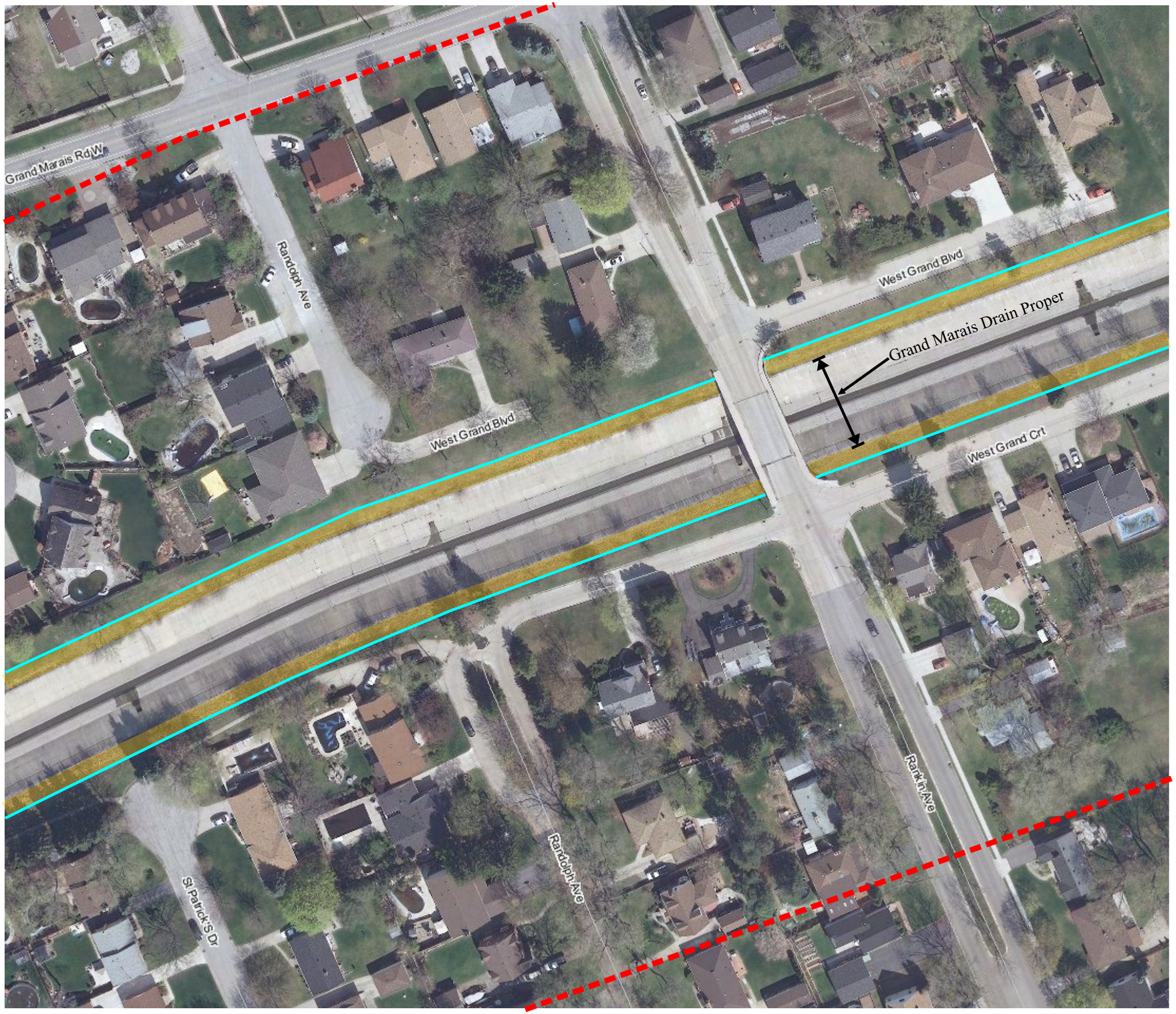
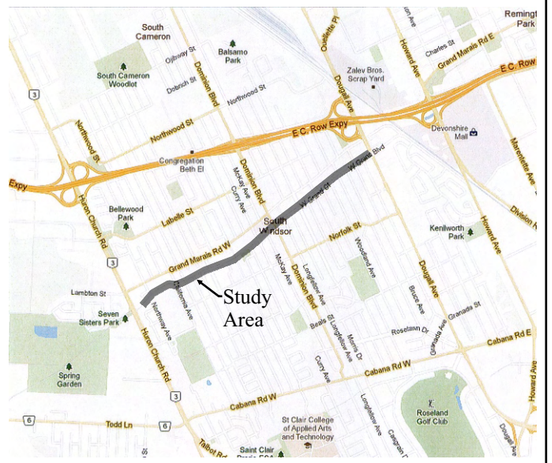


Figure 2: Study Area
(ERCA Air Photo)



Scale N.T.S.
Key Plan

Legend:

- Grand Marais Drain Proper
- 4m North and South of Drain Proper
- Study Area
- Adjacent Land (120m from Study Area)

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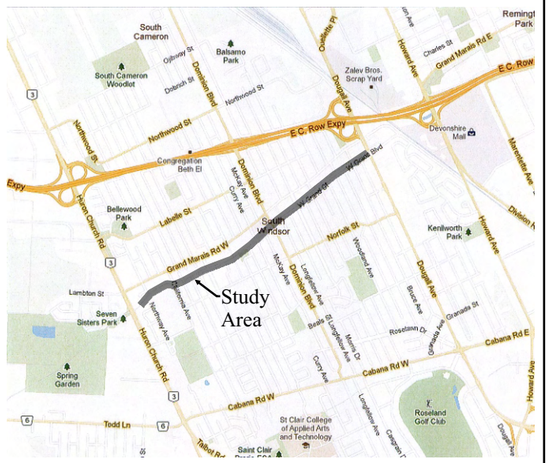
March 2012

BioLogic
AQUATIC AND TERRESTRIAL ECOSYSTEM PLANNERS

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



Scale N.T.S.
Key Plan

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

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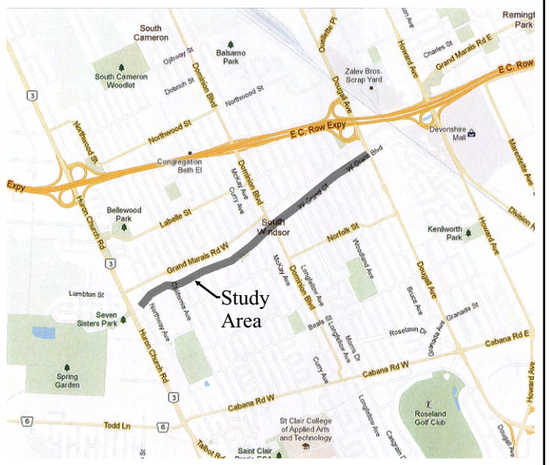
April 2012

BioLogic
AQUATIC AND TERRESTRIAL ECOSYSTEM PLANNERS

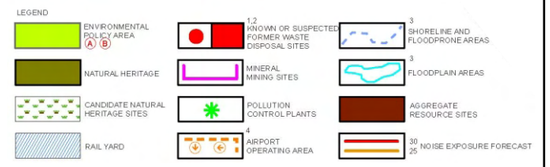
Figure 4: Development Constraint Areas (Schedule C - City of Windsor Official Plan)



Scale N.T.S.
Key Plan

Legend:

- Study Area
- Adjacent Lands (120m)



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April 2012

BioLogic
AQUATIC AND TERRESTRIAL ECOSYSTEM PLANNERS

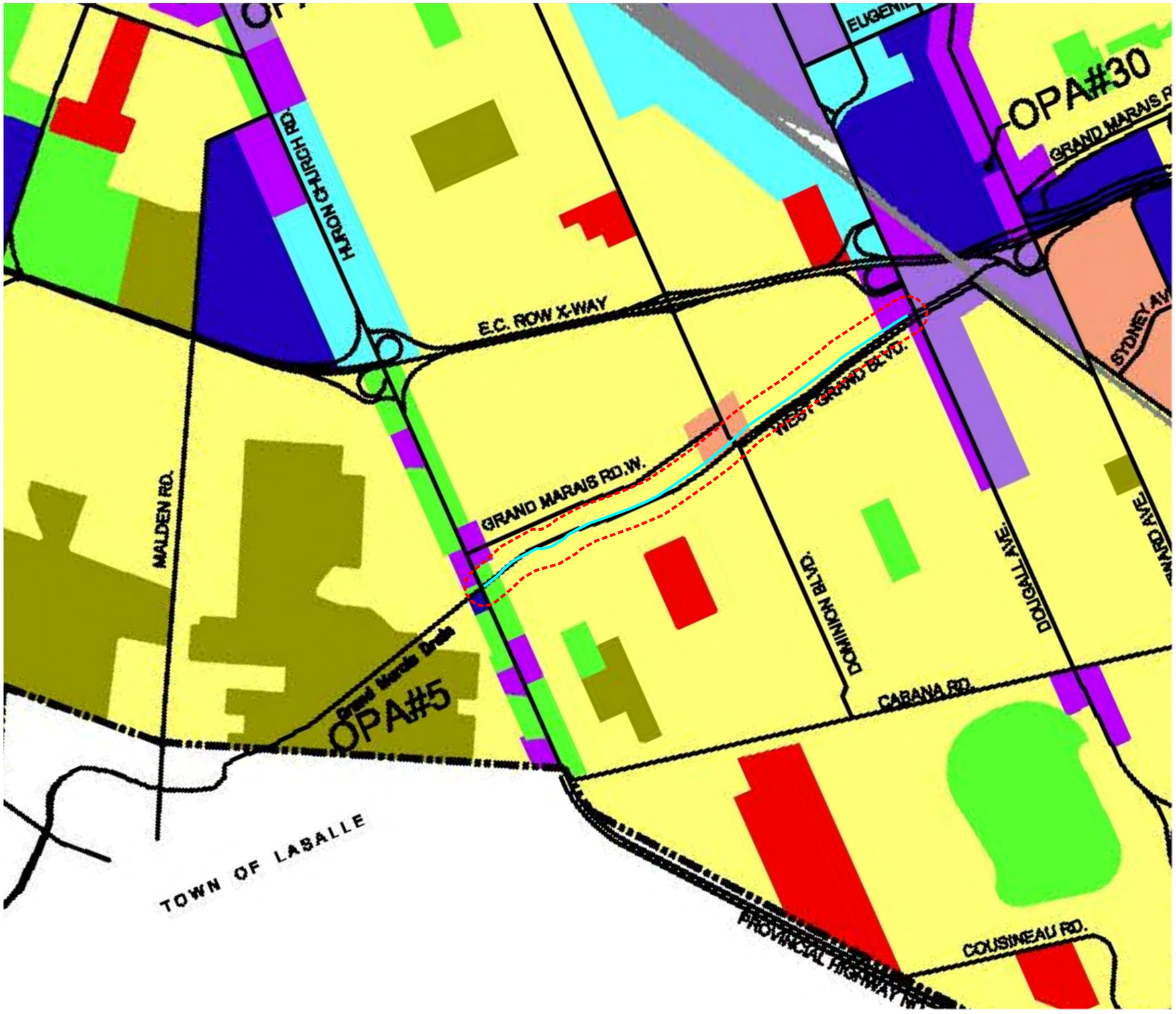
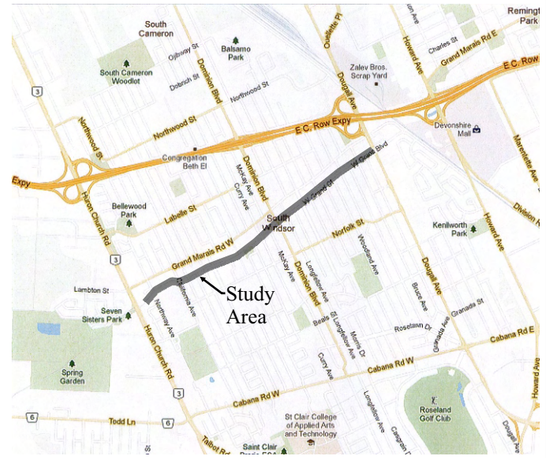


Figure 5: Land Use

(Schedule D - City of Windsor Official Plan)



Scale N.T.S.
Key Plan

Legend:

Study Area

Adjacent Lands (120m)

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

Print on 11X17, Landscape Orientation

0 400

Scale 1:20,000

April 2012

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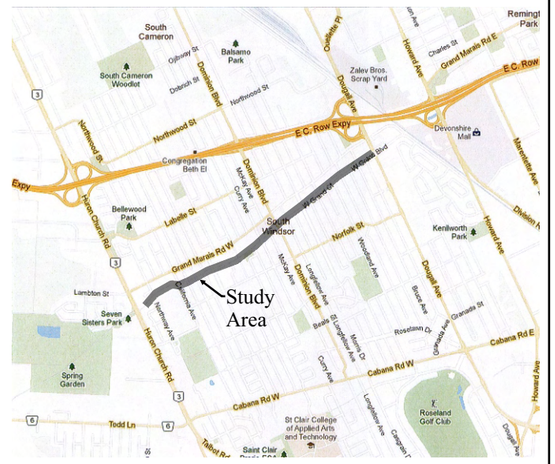
Figure 6: ERCA Regulation Mapping



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

0 200

Scale 1:10,000
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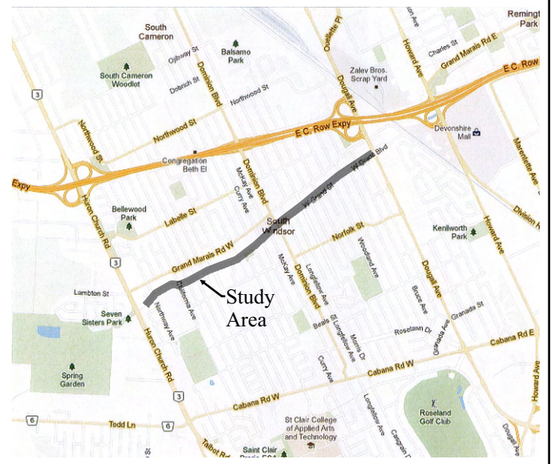
Figure 7: ANSI Location
(Land Information Ontario)



Scale N.T.S.
Key Plan

Legend:

- Study Area
- Adjacent Lands (120m)
- Rivers
- Life Science ANSI
- Earth Science ANSI

Print on 11X17, Landscape Orientation
0 200
Scale 1:10,000
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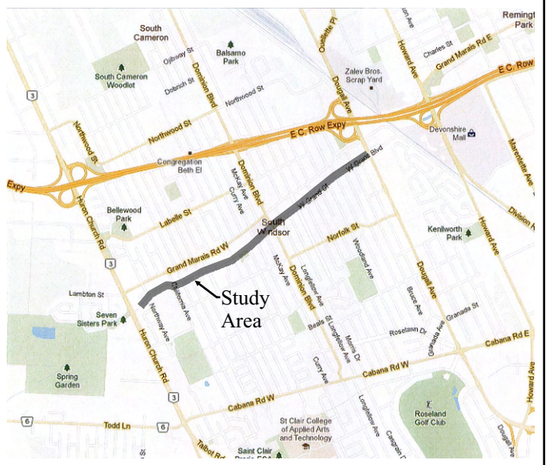
Figure 8: LIO Woodlands
(Land Information Ontario)



Scale N.T.S.
Key Plan

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

Wooded Areas by Type
- Treed
- Plantation
- Hedgerov

Print on 11X17, Landscape Orientation
0 200
Scale 1:10,000
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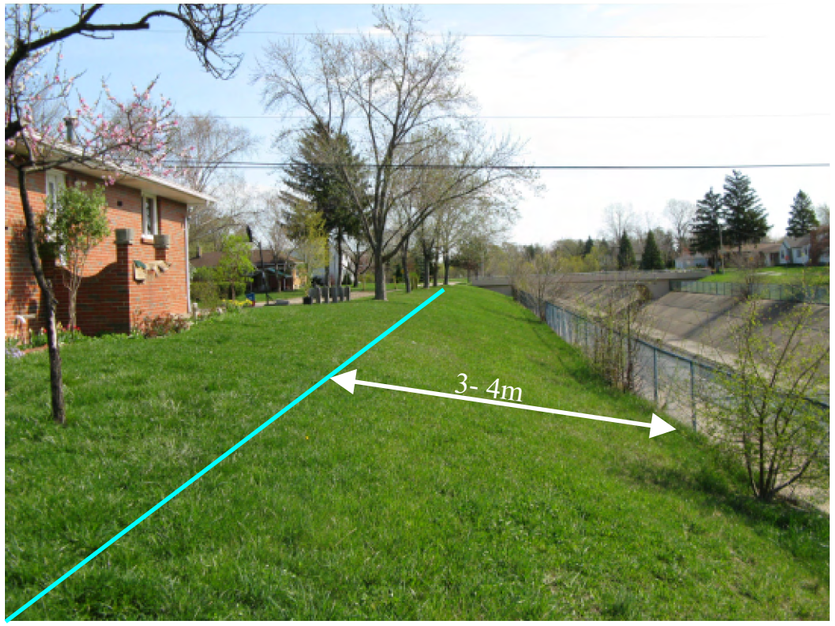
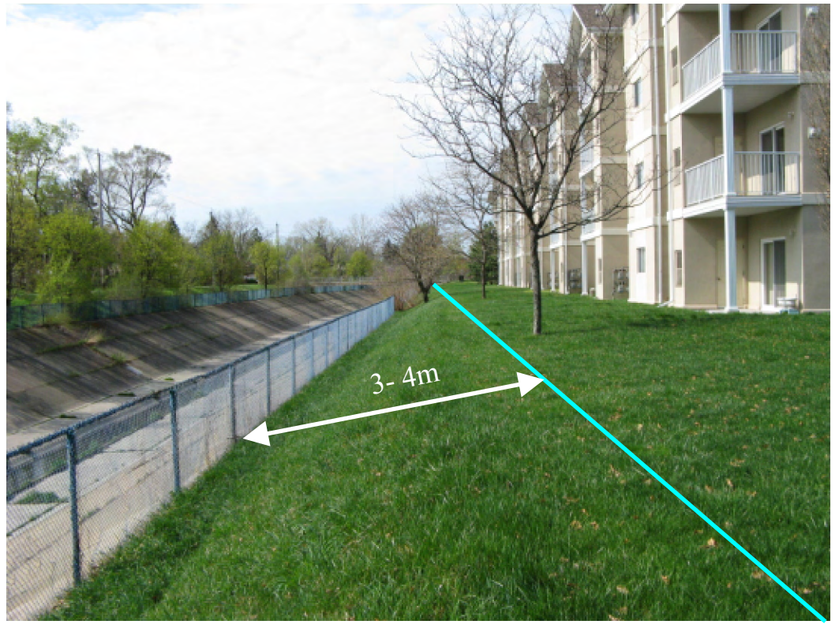
AQUATIC AND TERRESTRIAL ECOSYSTEM PLANNERS





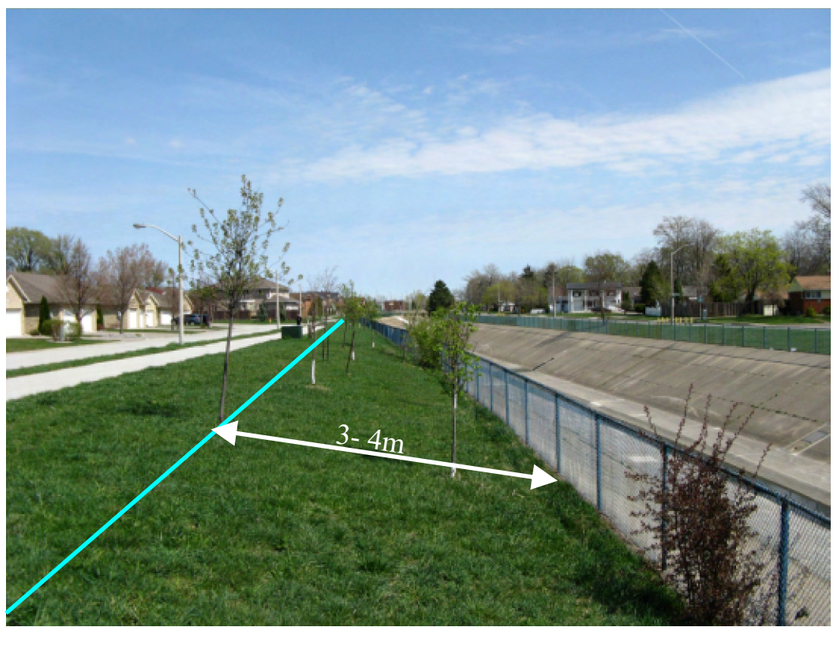
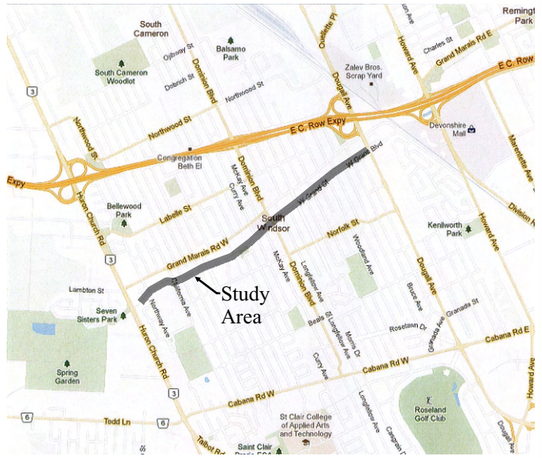


Figure 9:Photographs of Study Area



Scale N.T.S.
Key Plan

Legend:
Study Area

Print on 11X17, Landscape Orientation

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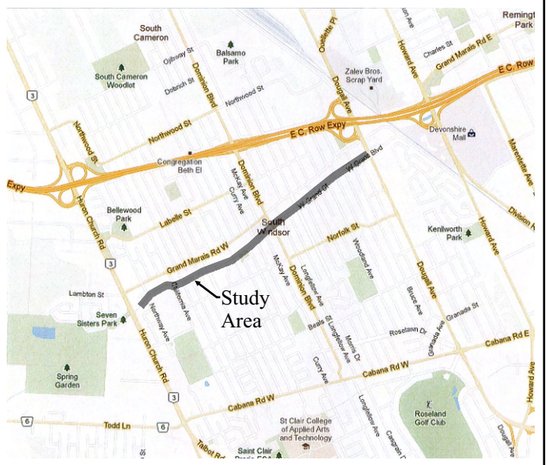
Figure 10: Wetland Location



Scale N.T.S.
Key Plan

Legend:

- Study Area
- Adjacent Lands (120m)

- Wetlands
- Rivers and Streams 20K
- Lakes and Ponds 20K

Print on 11X17, Landscape Orientation
0 200
Scale 1:10,000
April 2012

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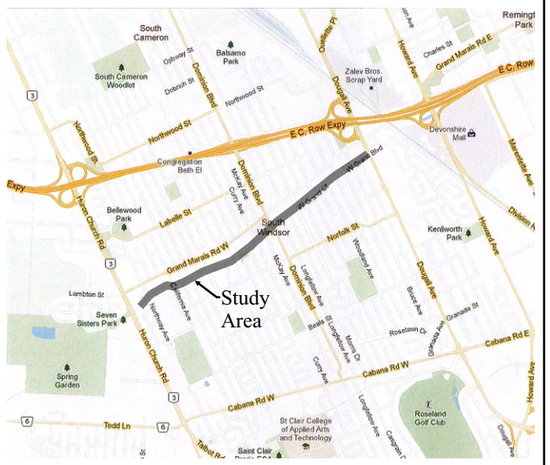
Figure 11: Species at Risk Locations
(ERCA Air Photo)



Scale N.T.S.
Key Plan

Legend:

- Study Area
- Adjacent Lands (120m)
- Butternut (individuals)
- Dense Blazing Star (individual)
- Dense Blazing Star (cluster)

Print on 11X17, Landscape Orientation
0 300
Scale 1:15,000
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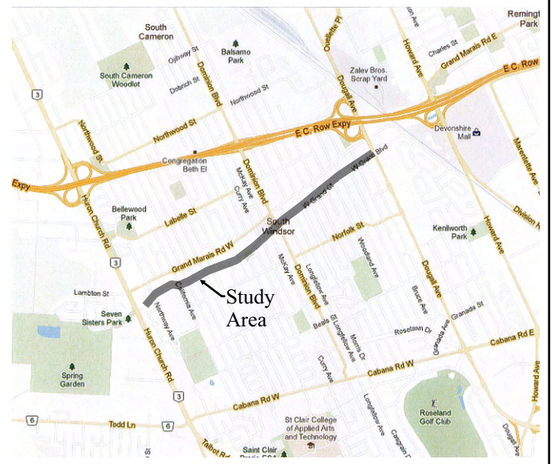
Figure 12: Potential Snake Habitat
(ERCA Air Photo)



Scale N.T.S.
Key Plan

Legend:

- Study Area
- Adjacent Lands (120m)
- High Importance - naturally occurring potential hibernaculum and ovipositing sites
- Medium Importance - anthropogenic potential hibernating and ovipositing sites
- Low Importance - themoregulatory sites, potential anthropogenic hibernating sites with small entrances

Print on 11X17, Landscape Orientation
0 200
Scale 1:10,000
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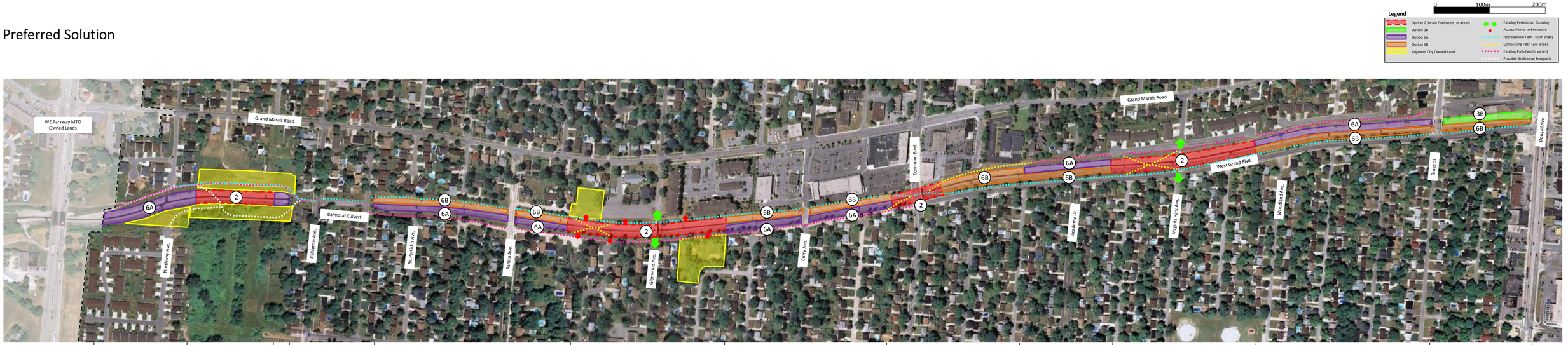
Appendix A

GRAND MARAIS DRAIN CHANNEL IMPROVEMENTS - CLASS ENVIRONMENTAL ASSESSMENT

DOUGALL AVENUE TO WEST OF HURON CHURCH ROAD

Preferred Solution



- Green the upper portion of the channel to reduce concrete maintenance
- Maintain the low flow channel

Option 6A

Option 6A

- Enclose drain to enhance access to adjacent City owned land
- Create a large park area
- Provide crossing opportunity

Option 2

- 6A
- Existing Balmoral Culvert
- Add trail connection/sidewalk

- Gain table land to provide continuous path connection along North side
- Green the upper portion of the channel to reduce concrete maintenance
- Maintain the low flow channel

Option 6A

Option 6B

- Enclose drain to gain access to adjacent City owned land
- Highly accessible and visible area
- Provides a destination along the drain

Option 2

- Gain table land to provide continuous path connection along North side
- Provide access to commercial properties
- Green the upper slope on both sides to reduce concrete maintenance
- Maintain the low flow channel

Option 6A
(Option 6B every 200m)

Option 6B
(Option 3A every 200m)

- Enclose section to create a crossing under Dominion

Option 2
Underpass at Dominion Blvd.

- Green the upper portion of the channel to reduce concrete maintenance
- Maintain the low flow channel
- Gain table land for path along both sides

Option 6B

- Gain table land for path along South side
- Green the upper portion of the slope
- Maintain the low flow channel
- Variation in encroachment along the drain to create visual interest

Option 6A
(Option 6B every 200m)

Option 6B
(Option 3A every 200m)

- Enclose drain to create green space along this section of the drain
- Provide more crossing opportunities through this reach of the drain

Option 2

- Gain table land for path along South side
- Green the upper portion of the slope
- Maintain the low flow channel
- Variation in encroachment along the drain to create visual interest

Option 6A
(Option 6B every 200m)

Option 6B
(Option 3A every 200m)

- Gain table land for path along South side
- Green the sides of the channel along North side to reduce concrete maintenance
- Maintain the low flow channel
- Limit access along North side commercial property

Option 3B

Option 6B
(Option 3A every 200m)

Photo of the Existing Drain

Conceptual Rendering - Option 2A - Channel Enclosure

Conceptual Rendering - Option 3B - Channel Offset Stone Wall

Conceptual Rendering - Option 6A - Green Upper Slope (both sides)

Conceptual Rendering - Option 6B - Channel Offset One Pannel with
Option 3A @ 200m - Channel Offset Three Pannels

Appendix B

AQUATIC HABITAT ASSESSMENT

BioLogic Incorporated
AQUATIC AND TERRESTRIAL ECOSYSTEM PLANNERS

Project Name: ERCA - Turkey Creek	
Date: March 29, 2011	
Station Name: Huron Church to Dougall Ave.	**Collectors:** R. Leppington, Will Hupe
Time Started: 4:55	**Time Finished:** 5:55

GENERAL INFORMATION

Weather: Sunny, 12°C, Still	**Watercourse Name:** Grand Marais Drain	**Drainage System:** Turkey Creek

GPS Co-ordinates: see map.

LANDUSE		POLLUTION SOURCES	
Left Bank	**Right Bank**	**Point**	**Non-Point**
Residential	Commercial, Vacant		

FLOW REGIME	CHANNEL FORM	BANK STABILITY			GROUNDWATER EVIDENCE	
			Left	**Right**		
[X] Flowing	[X] Defined	**Stable**	[X]	[X]	None	[X]
[ ] Dry	[ ] Undefined	**Vulnerable**	[ ]	[ ]	Springs/Seeps	[ ]
[X] Permanent	[ ] Natural	**Unstable**	[ ]	[ ]	Vegetation (i.e. Watercress)	[ ]
[ ] Intermittent	[X] Channelized	**Protected**	[ ]	[ ]	Iron Staining	[ ]
[ ] Ephemeral	[ ] Swale				Other	[ ]

WATERCOURSE MORPHOLOGY

	Pool	Riffle	Run	Glide	Other
% Area					100%
Mean Wetted Width (m)					2.6m
Mean Wetted Depth (m)					0.3m
Mean Bankfull Width (m)					30m
Mean Bankfull Depth (m)					6m
Substrate (%)					D - 5% GR - 70% Cobble - 25%

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

19m Bankfull width @ Corey St.

@ Dougall 1.7m WW 0.2m W.D.
upstream of weir 1.4m W.D
weir 3m WW BFD - 3.7m

INSTREAM HABITAT

	None	Undercut Banks	Boulders	Cobbles	Organic Debris	Woody Debris	Vegetation
In-stream Cover (%)	100	—	—	—	—	In-stream —	In-stream —
						Overhanging —	Overhanging —

INSTREAM VEGETATION DETAILS

	%	Examples
Submergent	0	—
Floating	0	—
Emergent	0	—

ALGAE

- [x] None
- [ ] Slight
- [ ] Moderate
- [ ] Heavy

Examples:

RIPIARIAN VEGETATION

% of Stream Shaded

- [ ] 100 – 90%
- [ ] 90 – 60%
- [ ] 60 – 30%
- [ ] 30 – 10%
- [x] 0%

Examples:
none
entire channel lined on banks upto bankfull width

MIGRATORY OBSTRUCTIONS

- [ ] None

Seasonal	Permanent
	weir @ Dougall Ave

POTENTIAL CRITICAL HABITAT

- [ ] Unknown
- [ ] Nursery Habitat
- [ ] Seasonal Refugia
- [ ] Spawning Habitat
- [ ] Deep Pools
- [ ] Other

Comments:
not critical habitat!

GENERAL SITE COMMENTS

entire channel is concrete lined
↳ low-flow & bankfull

See attached photos

OTHER MONITORING CONDUCTED

- [x] None
- [ ] Water Quality Sampling
- [ ] Flow Monitoring
- [ ] Fish Sampling
- [ ] Benthic Sampling
- [ ] Mussel Sampling

Grand Marais Drain Field Investigation Photographs– March 29, 2011

Typical Cross-Section of the Grand Marais Drain

Typical Cross-Section of the Grand Marais Drain

Grand Marais Drain Field Investigation Photographs– March 29, 2011

Looking Downstream at Dougall Avenue Bridge

Grand Marais Drain Field Investigation Photographs– March 29, 2011

Looking Upstream of Dougall Avenue

Appendix C

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

English Name	Scientific Name	S-rank	Provincial ESA Status	Federal SARA Status
Reptiles and Turtles				
Common Five-lined Skink (Carolinian population)	Plestiodon fasciatus pop. 1	S2	END	END
Butler's Gartersnake	Thamnophis butleri	S2	THR	END
Butterflies and Odantes				
Sleepy Duskywing	Erynnis brizo	S1		
Plants				
American Chestnut	Castanea dentata	S2	END	END
Arrowfeather Three-awned Grass	Aristida purpurascens	S1		
Biennial Gaura	Oenothera gaura	S3		
Black Gum	Nyssa sylvatica	S3		
Blunt-leaved Spurge	Euphorbia obtusata	S1		
Bushy Seedbox	Ludwigia alternifolia	S1		
Buttonbush Dodder	Cuscuta cephalanthi	S2		
Climbing Prairie Rose	Rosa setigera	S3	SC	SC
Clinton's Clubrush	Trichophorum clintonii	S2S3		
Colicroot	Aletris farinosa	S2	THR	THR
Commons's Panic Grass	Dichanthelium ovale ssp. pseudopubescens	S1		
Crowned Beggarticks	Bidens trichosperma	S2		
Culver's Root	Veronicastrum virginicum	S2		
Cup Plant	Silphium perfoliatum	S2		
Dense Blazing Star	Liatris spicata	S2	THR	THR
Dwarf Lake Iris	Iris lacustris	S3	THR	SC
Fall Crab Grass	Digitaria cognata	S1		
False St. John's-wort	Hypericum gentianoides	S1		
Fern-leaved Yellow False Foxglove	Aureolaria pedicularia	S2?		
Few-flowererd Nutrush	Scleria pauciflora	S1		
Field Sedge	Carex conoidea	S3		
Fox Grape	Vitis labrusca	S1		
Giant Ironweed	Vernonia gigantea	S1?		
Grass-leaved Rush	Juncus marginatus	S3		
Gray-headed Prairie Coneflower	Ratibida pinnata	S3		
Great Plains Ladies'-tresses	Spiranthes magnicamporum	S3?		
Green Cornet Milkweed	Asclepias viridiflora	S2		
Greene's Rush	Juncus greenei	S3		
Hairy Pinweed	Lechea mucronata	S3		
Heavy Sedge	Carex gravida	S1		
Hoary Puccoon	Lithospermum canescens	S3		
Hoary Tick-trefoil	Desmodium canescens	S2		
Illinois Carrion Flower	Smilax illinoensis	S2?		
Large Purple Agalinis	Agalinis purpurea	S1		
Large Yellow Pond-lily	Nuphar advena	S3		
Leggett's Pinweed	Lechea pulchella	S1		
Lowland Brittle Fern	Cystopteris protrusa	S2		
Many-fruit Primrose-willow	Ludwigia polycarpa	S2S3		
Mat Panic Grass	Dichanthelium meridionale	S1		
Mead's Sedge	Carex meadii	S2		
Ohio Spiderwort	Tradescantia ohiensis	S2		
Pignut Hickory	Carya glabra	S3		
Prairie Milkweed	Asclepias sullivantii	S3		
Prairie Rosinweed	Silphium terebinthinaceum	S1		
Prairie Straw Sedge	Carex suberecta	S2		
Pumpkin Ash	Fraxinus profunda	S2?		
Purple Twayblade	Liparis liliifolia	S2	END	THR
Riddell's Goldenrod	Solidago riddellii	S3	SC	SC
Rigid Sedge	Carex tetanica	S3		
Sharp-fruited Rush	Juncus acuminatus	S3		
Shellbark Hickory	Carya laciniosa	S3		
Short-fruited Rush	Juncus brachycarpus	S1		
Shumard Oak	Quercus shumardii	S3	SC	SC
Skunk Meadow-rue	Thalictrum revolutum	S2		
Slender Knotweed	Polygonum tenue	S2		
Slim-spiked Three-awned Grass	Aristida longespica var. longespica	S2		
Stiff Cowbane	Oxypolis rigidior	S2		
Stiff Goldenrod	Solidago rigida ssp. rigida	S3		
Sundial Lupine	Lupinus perennis	S3		
Swamp Rose-mallow	Hibiscus moscheutos	S3	SC	SC
Tall Blazing Star	Liatris aspera	S2		
Tall Nutrush	Scleria triglomerata	S1		
Tall Tickweed	Coreopsis tripteris	S2		
Two-flowered Dwarf Dandelion	Krigia biflora	S2		
Two-flowered Rush	Juncus biflorus	S1		
Viscid Bushy Goldenrod	Euthamia caroliniana	S1		
White Blue-eyed-grass	Sisyrinchium albidum	S1		
White-haired Panic Grass	Dichanthelium ovale ssp. praecocius	S3		
Willowleaf Aster	Symphyotrichum praealtum	S2	THR	THR
Winged Loosestrife	Lythrum alatum	S3		
Wingstem	Verbesina alternifolia	S3		
Yellow False Foxglove	Aureolaria flava	S2?		
Yellow False-indigo	Baptisia tinctoria	S2		
Yellow Stargrass	Hypoxis hirsuta	S3		

Appendix D

Study Site: Grand Marais Compilation Species List
Surveyors: G. Waldron, P. Hurst, S. Hughes
Field Dates: Nov. 8, 10 & 11, 2011

SCIENTIFIC NAME	COMMON NAME	GRANK	SRANK	COSEWIC	COSSARO
ABUTILON THEOPHRASTI	Velvetleaf	GNR	SNA		
Acer negundo	Manitoba Maple	G5	S5		
ACER PLATANOIDES	Norway Maple	GNR	SNA		
Acer rubrum	Red Maple	G5	S5		
Acer saccharinum	Silver Maple	G5	S5		
Achillea millefolium	Yarrow	G5	S5		
Agrimonia parviflora	Swamp Agrimony	G5	S4		
AGROSTIS GIGANTEA	Redtop	G4G5	SNA		
Agrostis stolonifera	Creeping Bent	G5	S5		
AILANTHUS ALTISSIMA	Tree-of-heaven	GNR	SNA		
ALLIARIA PETIOLATA	Garlic Mustard	GNR	SNA		
AMARANTHUS RETROFLEXUS	Redroot Pigweed	GNR	SNA		
Ambrosia artemisiifolia	Common Ragweed	G5	S5		
Ambrosia trifida	Giant Ragweed	G3	S5		
Amorpha fruticosa	False Indigo	G5	SNA		
Andropogon gerardii	Turkeyfoot Grass	G5	S4		
Apocynum cannabinum	Hemp Dogbane	G5	S5		
ARCTIUM MINUS	Common Burdock	GNR	SNA		
Asclepias incarnata	Swamp Milkweed	G5	S5		
Asclepias syriaca	Common Milkweed	G5	S5		
Asclepias tuberosa	Butterfly-weed	G5	S4		
ASPARAGUS OFFICINALIS	Asparagus	G5	SNA		
Aster ericoides	Heath Aster	G5	S5		
Aster laevis	Smooth Aster	G5	S5		
Aster lanceolatus	Eastern Lined Aster	G5	S5		
Aster novae-angliae	New England Aster	G5	S5		
Aster pilosus	Hairy Aster	G5	S5		
Aster umbellatus	Flat-topped White Aster	G5	S5		
Atriplex patula	Spearscale	G5	S5		
BARBAREA VULGARIS	Yellow Rocket	GNR	SNA		
BETULA PENDULA	European White Birch	GNR	SNA		

Bidens frondosa	Common Beggar-ticks	G5	S5		
Bidens vulgata	Tall Beggar-ticks	G5	S5		
BROMUS INERMIS	Smooth Brome	GNR	SNA		
Campanula rotundifolia	Harebell	G5	S5		
Carex spp.	Sedge				
Carex blanda	Woodland Sedge	G5?	S5		
CATALPA BIGNONIOIDES	Southern Catalpa	G3G4	SNA		
Celastrus scandens	American Bittersweet	G5	S5		
Celtis occidentalis	Hackberry	G5	S4		
CERASTIUM FONTANUM	Mouse-ear Chickweed	GNR	SNA		
CHAMAESYCE MACULATA	Nodding Spurge	G5?	SNA		
CHAMAESYCE SERPYLLIFOLIA	Thyme-leaved Spurge	G5	SNA		
CHENOPODIUM ALBUM	Lamb's Quarters	G5	SNA		
CICHORIUM INTYBUS	Chicory	GNR	SNA		
CIRSIUM ARVENSE	Canada Thistle	GNR	SNA		
Cirsium discolor	Pasture Thistle	G5	S3		
CIRSIUM VULGARE	Bull Thistle	GNR	SNA		
Clematis virginiana	Virgin's Bower	G5	S5		
CONVOLVULUS ARVENSIS	Field Bindweed	GNR	SNA		
Conyza canadensis	Horseweed	G5	S5		
Coreopsis tripteris	Tall Coreopsis	G5	S2		
Cornus amomum	Silky Dogwood	G5	S5		
Cornus drummondii	Rough-leaved Dogwood	G5	S4		
Cornus foemina	Gray Dogwood	G5	S5		
CORONILLA VARIA	Crown Vetch	GNR	SNA		
COTONEASTER DAMMERI	Bearberry Cotoneaster	GNR	SNA		
Crataegus sp.	Hawthorn				
DACTYLIS GLOMERATA	Orchard Grass	GNR	SNA		
DAUCUS CAROTA	Wild Carrot	GNR	SNA		
Desmodium canadense	Showy Tick-trefoil	G5	S2		
DIANTHUS ARMERIA	Deptford Pink	GNR	SNA		
DIGITARIA ISCHAEMUM	Smooth Crab Grass	GNR	SNA		
DIPLOTAXIS MURALIS	Wall Rocket	GNR	SNA		
DIPSACUS FULLONUM	Fuller's Teasel	GNR	SNA		
ECHINOCHLOA CRUSGALLI	Barnyard Grass	GNR	SNA		
ELAEAGNUS ANGUSTIFOLIA	Russian Olive	GNR	SNA		

ELAEAGNUS UMBELLATA	Autumn Olive	GNR	SNA		
ELEUSINE INDICA	Goose Grass	GNR	SNA		
ELYMUS REPENS	Quack Grass	GNR	SNA		
Elymus virginicus	Virginia Wild Rye	G5	S5		
Epilobium coloratum	Cinnamon Willow-herb	G5	S5		
Equisetum arvense	Common Horsetail	G5	S5		
Equisetum hyemale	Scouring Rush	G5	S5		
Eragrostis pectinacea	Love Grass	G5	S5		
EUONYMUS ALATA	Winged Wahoo	GNR	SNA		
EUONYMUS EUROPAEA	Spindle Tree	GNR	SNA		
Eupatorium altissimum	Tall Boneset	G5	S1		
Euthamia graminifolia	Grass-leaved Goldenrod	G5	S5		
FESTUCA ARUNDINACEA	Tall Fescue	GNA	SNA		
FRAXINUS EXCELSIOR	European Ash	GNR	SNA		
Fraxinus pennsylvanica	Red Ash	G5	S5		
GALINSOGA QUADRIRADIATA	Quickweed	GNR	SNA		
GERANIUM PUSILLUM	Small Geranium	GNR	SNA		
Geum aleppicum	Yellow Avens	G5	S5		
GLECHOMA HEDERACEA	Ground Ivy	GNR	SNA		
Hackelia virginiana	Beggar's Lice	G5	S5		
Helianthus giganteus	Tall Sunflower	G5	S5		
HYPERICUM PERFORATUM	Common St. John's-wort	GNR	SNA		
Impatiens capensis	Spotted Touch-me-not	G5	S5		
IRIS PSEUDACORUS	Yellow Flag	GNR	SNA		
Juglans cinerea	Butternut	G4	S3?	END	END
Juglans nigra	Black Walnut	G5	S4		
JUNCUS GERARDII	Black-grass Rush	G5	SNA		
Juncus nodosus	Joint Rush	G5	S5		
Juncus tenuis	Path Rush	G5	S5		
Juniperus virginiana	Red Cedar	G5	S5		
LACTUCA SERRIOLA	Prickly Lettuce	GNR	SNA		
LATHYRUS LATIFOLIUS	Everlasting Pea	GNR	SNA		
Lemna minor	Small Duckweed	G5	S5		
Lespedeza capitata	Round-headed Bush-clover	G5	S4		
Liatris spicata	Spiked Blazing Star	G5	S3	THR	THR
LIGUSTRUM VULGARE	Common Privet	GNR	SNA		

LINARIA VULGARIS	Butter-and-eggs	GNR	SNA		
LONICERA MAACKII	Amur Honeysuckle	GNR	SNA		
LONICERA TATARICA	Tartarian Honeysuckle	GNR	SNA		
LOTUS CORNICULATA	Birdfoot Trefoil	GNR	SNA		
Lycopus americanus	Common Water Horehound	G5	S5		
Lycopus uniflorus	Northern Bugle Weed	G5	S5		
MALUS BACCATA	Siberian Crab	GNR	SNA		
MALUS HUPAHENSIS	Tea Crabapple	GNR	SNA		
MALUS PUMILA	Apple	G5	SNA		
MEDICAGO SATIVA	Alfalfa	GNR	SNA		
MELILOTUS ALBA	White Sweet Clover	G5	SNA		
MELILOTUS OFFICINALIS	Yellow Sweet Clover	GNR	SNA		
Mentha arvensis	Wild Mint	G5	S5		
Monarda fistulosa	Wild Bergamot	G5	S5		
MORUS ALBA	White Mulberry	GNR	SNA		
Muhlenbergia sp.	Muhly Grass				
NEPETA CATARIA	Catnip	GNR	SNA		
Oenothera biennis	Common Evening-primrose	G5	S5		
Panicum dechotomiflorum	Spreading Panic Grass	G5	SNA		
Panicum virgatum	Switch Grass	G5	S4		
PASTINACA SATIVA	Wild Parsnip	GNR	SNA		
PENNISETUM GLAUCUM	Millet	GNR	SNA		
Phalaris arundinacea	Reed Canary Grass	G5	S5		
PHLEUM PRATENSE	Timothy Grass	GNR	SNA		
Phragmites australis	Reed Grass	G5	S5		
Phytolacca americana	Pokeweed	G5	S4		
PLANTAGO LANCEOLATA	English Plantain;Ribgrass	G5	SNA		
PLANTAGO MAJOR	Common Plantain	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 PERSICARIA	Lady's Thumb	G3G5	SNA		
Polygonum punctatum	Water Smartweed	G5	S5		
Populus deltoides	Cottonwood	G5	S5		
Portulaca oleracea	Purslane	GU	SNA		

Potentilla anserina	Silverweed	G5	S5		
POTENTILLA RECTA	Rough-fruited Cinquefoil	G5	S5		
Potentilla simplex	Old-field Cinquefoil	G5	S5		
Prunus americana	American Wild Plum	G5	S4		
PRUNUS AVIUM	Sweet Cherry	GNR	SNA		
Prunus serotina	Wild Black Cherry	G5	S5		
Prunus virginiana	Choke Cherry	G5	S5		
Pycnanthemum virginianum	Common Mountain Mint	G5	S4		
QUERCUS ROBUR	English Oak	GNR	SNA		
Quercus velutina	Black Oak	G5	S4		
Ranunculus hispidus	Hairy Buttercup	G5	S5		
Ratibida pinnata	Yellow Coneflower	G5	S3		
RHAMNUS CATHARTICA	Common Buckthorn	GNR	SNA		
Rhus typhina	Staghorn Sumac	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		
Rosa setigera	Prairie Rose	G5	S3	SC	SC
Rubus allegheniensis	Common Blackberry	G5	S5		
Rubus flagellaris	Northern Dewberry	G5	S4		
Rubus occidentalis	Black Raspberry	G5	S5		
RUMEX CRISPUS	Curly Dock	GNR	SNA		
SALIX ALBA	White Willow	G5	SNA		
Salix eriocephala	Missouri Willow	G5	S5		
Salix exigua	Sandbar Willow	G5	S5		
Salix humilis	Prairie Willow	G5	S5		
Schizachyrium scoparium	Little Bluestem Grass	G5	S4		
Schoenoplectus pugens	Three-square	G5	S5		
Scirpus fluviatilis	River Bulrush	G5	S4S5		
Scirpus validus	Softstem Bulrush	G?	S5		
SETARIA PUMILA	Yellow Foxtail	GNR	SNA		
SOLANUM DULCAMARA	Bittersweet Nightshade	GNR	SNA		
Solanum ptycanthum	Eastern Black Nightshade	G5	S5		
Solidago altissima	Tall Goldenrod	G5	S5		
Solidago canadensis	Canada Goldenrod	G5	S5		

Solidago gigantea	Late Goldenrod	G5	S5		
Solidago rugosa	Rough Goldenrod	G5	S5		
SOLIDAGO SEMPERVIRENS	Seaside Goldenrod	G5	SNA		
SONCHUS ARVENSIS	Perennial Sow Thistle	GNR	SNA		
SONCHUS ASPER	Prickly Sow Thistle	GNR	SNA		
Sorghastrum nutans	Indian Grass	G5	S4		
Spartina pectinata	Cordgrass	G5	S4		
STELLARIA MEDIA	Common Chickweed	GNR	SNA		
TARAXACUM OFFICINALE	Common Dandelion	G5	SNA		
Thalictrum dasycarpum	Purple Meadow-rue	G5	S4		
TRAGOPOGON DUBIUS	Goat's Beard	GNR	SNA		
TRIFOLIUM PRATENSE	Red Clover	GNR	SNA		
TRIFOLIUM REPENS	White Clover	GNR	SNA		
Typha angustifolia	Narrow-leaved Cat-tail	G5	SNA		
Typha x glauca	Hybrid Cat-tail	GNA	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		
Verbena urticifolia	White Vervain	G5	S5		
VIBURNUM OPULUS	European Highbush Cranberry	G5	SNA		
VICIA CRACCA	Bird Vetch	GNR	SNA		
Vitis riparia	Riverbank Grape	G5	S5		
Xanthium strumarium	Common Cocklebur	G5	S5		