AMHERST ISLAND WIND ENERGY PROJECT
WATER ASSESSMENT AND WATER BODY REPORT

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Prepared for:

Windlectric Inc.
2845 Bristol Circle,
Oakville, ON L6H 7H7

Prepared by:

Stantec Consulting Ltd.
Suite 1 - 70 Southgate Drive
Guelph ON N1G 4P5

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1.0 Introduction

1.1 PROJECT OVERVIEW

Windlectric Inc. (Windlectric) is proposing to develop, construct, and operate the 56 - 75 megawatt (MW) Amherst Island Wind Energy Project (the Project) within Loyalist Township (the Township) in the County of Lennox and Addington (the County) in eastern Ontario, in response to the Government of Ontario's initiative to promote the development of renewable electricity in the province.

The Project Study Area includes Amherst Island, an approximately 3 - 15 kilometre wide corridor stretching between the Island and the mainland where the submarine cable is proposed. The mainland portion of the Project Study Area stretches from the mainland shoreline, north of the Invista Transformer Station and is generally bounded by i) County Road 4 to the West; ii) the Canadian National Railway line to the North; and iii) approximately 500 m East of Jim Snow Drive to the East (**Figure 1** - **Appendix A**).

The basic components of the proposed Project include up to 36 Siemens wind turbines. The turbine model proposed utilizes the same 36 turbine pad locations that have been subject to the assessment required under the Renewable Energy Approval (REA). The layout includes 24 Siemens SWT-2.3-113 2300 kW and twelve (12) Siemens SWT-2.3-113 2221 kW model wind turbines. The layout includes 34 Siemens SWT-2.3-113 2300 kW and two (2) Siemens SWT-2.3-113 2221 kW model wind turbines. The final layout will result in a total installed nameplate capacity of approximately 56 - 75 MW. The number of wind turbines will be dependent upon final selection of the model of the wind turbine most appropriate to the proposed Project.

The proposed Project will also include a 34.5 kilovolt (kV) underground and/or overhead electrical power line collector system, fibre optic data lines from each turbine and/or wireless technology for the communication of data, a transmission line, truck turnaround areas, a submarine cable, an operations and maintenance building, permanent dock, a substation, a switching station, an un-serviced storage shed, one connection point to the existing electrical system, cable vault areas, meteorological tower(s) (met tower(s)), access road(s) to the met tower site(s), and turbine access roads with culvert installations, as required, at associated watercourse crossings.

Temporary components during construction may include staging areas for the turbines, access roads, met tower(s), collector lines and transmission line as well as crane paths, a temporary dock, site office(s), batch plant, central staging areas, and associated watercourse crossings. The electrical power line collector system would transport the electricity generated from each turbine to the substation, along the submarine cable to the mainland and then to a switching station located near to an existing Hydro One Networks Inc. (HONI) 115 kV transmission line.

The Proponent has elected to assess and seek approval for some alternative Project configurations. The REA application process will consider:

- two alternative mainland transmission line routes;
- two alternative switching station locations and corresponding point of common coupling with the HONI line;
- three alternative mainland temporary dock locations along the mainland;
- a submarine cable with three alternative submarine cable routes near the mainland;
- three alternative mainland submarine cable landing locations and corresponding cable vault locations;
- up to three alternative met tower locations; and,
- up to three potential locations for an operations and maintenance building.

Final selection of the sites to be used would be based on the results of consultation activities, detailed design / engineering work, and the conditions experienced during construction.

This **Water Assessment and Water Body Report** is intended to satisfy the requirements outlined within Ontario Regulation 359/09 and is to be submitted as a component of the REA application for the Project. The Project Study Area is not located within the Niagara Escarpment Plan, the Oak Ridges Moraine Conservation Plan Area or the Protected Countryside of the Greenbelt Plan.

In accordance with O. Reg. 359/09, the Project Location includes all land and buildings/structures associated with the Project and any air space in which the Project will occupy. This includes structures such as turbines, access roads and power lines as well as any temporary work areas (the 'constructible area' for the Project) which are required to be utilized during the construction of the Project.

A "Zone of Investigation" has been identified based on the requirements of Ontario Regulation 359/09 (O. Reg. 359/09) and the Ministry of Natural Resources' (MNR) Approval and Permitting Requirements Document (APRD). The zone of investigation encompasses the Project Location and an additional 120 m surrounding the Project Location. This report identifies water bodies that are within the Zone of Investigation and assesses potential negative environmental effects that may result from construction activities. Mitigation measures are also identified to alleviate potential negative environmental effects.

Once the Project layout was confirmed, a water records review and site assessment was conducted according to Section 30(1) of O. Reg. 359/09. Additionally, fish communities were sampled at selected water bodies within the 120 m Zone of Investigation and a general aquatic

habitat assessment was conducted. A combination of background data (including data from ASI Group) and results of Stantec's 2011 and 2012 surveys were used to determine the presence or absence of water bodies and fish habitat within the 120 m Zone of Investigation. Photographs of all water features were taken during field surveys and are included in **Appendix B**.

Locations where water bodies are present within 120 m of the Project Location are presented in Figure 2 and summarized in **Table 3.1**. All water bodies identified in this report are located greater than 30 m from any turbine blade tip. The designation of features as water bodies was agreed upon by field staff using field conditions at the time of the survey and the definition of water body provided in O. Reg. 359/09.

This **Water Assessment and Water Body Report** has been prepared in accordance with O. Reg. 359/09 (s. 39 and 40), the MOE document "Technical Guide to Renewable Energy Approvals" and the MNR's APRD.

1.2 REPORT REQUIREMENTS

A Water Assessment is a required component of a REA application, and includes a Records Review and Site investigation to determine the presence and boundaries of water bodies as defined in O. Reg. 359/09 within 120 m of the Project Location (assuming that no Lake Trout lakes that are at or above development capacity are identified within 300 m). If water bodies are identified within 120 m of the Project Location, a **Water Body Report** must be prepared.

A renewable energy project includes all activities associated with the construction, installation, use, operation, maintenance, changing or retiring of the renewable energy generation facility. Therefore, for the purposes of measuring the distance from the Project Location to a water body, a Project Location boundary is considered to be the outer limit where site preparation and construction activities will occur and where infrastructure will be located (e.g. temporary structures, laydown areas, storage facilities, generation equipment, access roads, transmission lines less than 50 kilometres in length, etc.).

This **Water Assessment and Water Body Report** is intended to satisfy the requirements outlined within O. Reg. 359/09 (s. 39 and 40) and is to be submitted as a component of the REA application. **Table 1.1** summarizes the documentation requirements of the **Water Report** as specified under O. Reg. 359/09.

Table 1.1: Water Assessment Report and Water Body Report Requirements: O. Reg. 359/09

Requirements (Water Assessment)	Completed	Section Reference
A person who proposes to engage in a renewable energy project shall conduct a water assessment, consisting of the following:		
1. A records review conducted in accordance with section 30.	✓	2.2, 4.0
2. A site investigation conducted in accordance with section 31, including:		
31(4)(1). A summary of any corrections to the report.	✓	3, Figure 2
31(4)(2). Information relating to each water body.	✓	4.1 to 4.6
31(4)(3). A map showing boundaries, location/type and distances.	✓	Figure 2 (Appendix A)
31(4)(4). A summary of methods used to make observations for the purposes of the site investigation.	✓	2.2, 2.3
31(4)(5). The name and qualifications of any person conducting the site investigation.	✓	2.4
31(4)(6)(i). The dates and times of the beginning and completion of the site investigation.	✓	2.3 and Appendix D
If an investigation was conducted by visiting the site:		
31(4)(6)(ii). The duration of the site investigation.		2.3 and Appendix D
31(4)(6)(iii).The weather conditions during the site investigation	✓	4 and Appendix D
31(4)(6)(iv). Field notes kept by the person conducting the site investigation.	✓	Appendix D
If an alternative investigation of the site was conducted:		
31(4)(7)(i). The dates of the generation of the data used in the site investigation.		N/A
31(4)(7)(ii). An explanation of why the person who conducted the alternative investigation determined that it was not reasonable to conduct the site investigation by visiting the site.		N/A
Requirements (Water Body)		
4. Report identifies and assesses any negative environmental effects of the project on a water body and on land within 30 metres of the water body.	✓	4.7
5. Report identifies mitigation measures in respect of any negative environmental effects.	✓	6.0
6. Report describes how the environmental effects monitoring plan addresses any negative environmental effects.	✓	7.0
7. Report describes how the construction plan report addresses any negative environmental effects.	✓	7.1

2.0 Methods

2.1 DEFINITION OF A WATER BODY

The presence or absence of water bodies within the Project's 120 m Zone of Investigation was assessed using the definition of a water body provided in O. Reg. 359/09, which is as follows:

"…a lake, a permanent stream, an intermittent stream and a seepage area but does not include, a) grassed waterways, b) temporary channels for surface drainage, such as furrows or shallow channels that can be tilled and driven through, c) rock chutes or spillways, d) roadside ditches that do not contain a permanent or intermittent stream, e) temporarily ponded areas that are normally farmed, f) dugout ponds, or g) artificial bodies of water intended for the storage, treatment or recirculation of runoff from farm animal yards, manure storage facilities and sites and outdoor confinement areas".

2.2 RECORDS REVIEW

A water records review was conducted according to Section 30(1) of O. Reg. 359/09. Data were gathered through agency requests and/or accessing online databases as follows:

- Ontario Ministry of Natural Resources
- Land Information Ontario mapping database (LIO 2012)
- Natural Heritage Information Centre online database
- Cataraqui Region Conservation Authority (CRCA)

Copies of all correspondence related to the Records Review will be provided in the Record of Consultation which will be submitted as part of the complete REA application to the MOE. Information obtained as a result of the information requests/records review are presented in Section 4 of this report.

For the purposes of this report, the Amherst Island portion of the Study Area has been divided into drainage areas (Figure 1). Watercourses and waterbodies identified by LIO mapping (MNR, 2009) are delineated in Figure 2 (**Appendix A**) where "watercourses" and "waterbodies" are water features (including lakes, rivers, streams, etc.), as mapped by the MNR. These water features may or may not meet the definition of a water body as described in Section 2.1. Potential waterbodies were also identified through a review of aerial photographs of the Zone of Investigation. Further information on these potential water bodies was obtained during the site investigations (as described in Section 2.3).

The MNR was contacted to obtain any background data regarding fish communities in the Project Location (Peterborough District MNR and the Lake Ontario Management Unit).

2.3 SITE INVESTIGATIONS

Site investigations were carried out according to Section 31 of O. Reg. 359/09. The investigations were conducted on dates provided in Table 2.1.

Table 2.1: Summary of Field Investigations; Amherst Island Wind Project

	Date	Duration
Watercourses		
2011	May 17 May 18 May 19 May 20 July 6 July 7	9:00-5:00 (8 hours) 9:00-6:30 (9.5 hours) 9:00-5:45 (8.75 hours) 9:00-11:00 (2 hours) 12:00-2:00 (2 hours) 5:00 pm-6:45 pm (1.75 hours)
2012	March 27 March 28 May 18 August 15	10:00-4:00 (6 hours) 11:00-2:30 (3.5 hours) 6:00 pm-7:00 pm (1 hour) 11:30-3:00 (3.5 hours)
Lake Ontario		
2011	July 4 to July 13 August 2 August 3 August 4 August 5 September 12 September 13	7:30-3:30 (8 hours per day) 11:00-4:30 (5.5 hours) 8:30-3:30 (7 hours) 11:00-4:00 (5 hours) 8:30-4:30 (8 hours) 11:00-5:00 (6 hours) 8:00-4:00 (8 hours)

The specific time of day at which each water body (or mapped water feature) was assessed, is provided on the field notes included in Appendix D of the Water Assessment and Water Body Report.

In addition to field data collected by Stantec, ASI Group collected bathymetry data and photographs/videos of areas along the proposed submarine cable route between Amherst Island and the mainland and at the proposed dock option locations on the mainland and the island. This information was used to supplement Stantec's habitat information.

The purpose of the site investigations was to:

- Ground truth the results of the records review to identify any required corrections;
- Determine whether any additional water bodies exist, other than those identified in the records review; and
- Identify the boundaries of any water body located within 120 m of the Project Location.

While on site, the field crews used visual inspections to verify the presence or absence of water bodies within 120 m of the Project Location. A few of the surface water features identified on MNR mapping (e.g. watercourses) did not exist in the field; therefore, these features were not classified as water bodies during Stantec's 2011 and 2012 field investigations (**Table 3.1**).

In some cases, marshes or portions of other on-line wetland features meet the definition of a water body if they are part of a permanent or intermittent channel or seepage area. All other wetland types do not contain channels and therefore do not meet the definition of a water body under O. Reg. 359/09 and are addressed in the NHA/EIS.

Once the Project Layout and locations of water bodies were confirmed, a general aquatic habitat assessment was conducted within the 120 m Zone of Investigation. Fish communities were sampled at representative locations. Fish were collected using either a Model 12 or Smith Root Model 24 backpack electrofisher or minnow traps and were sampled on May 17 to 20 and July 6 and 7, 2011 in small flowing water bodies. In cases where one water body traversed several Project components, one or two representative locations were fished to determine the general species assemblage for the watercourse. Specific locations where fishing was completed are identified in the fisheries data provided **Appendix C**.

With respect to Lake Ontario, habitat mapping was conducted by boat within the Project Location in water up to 2 m in depth. Information regarding physical characteristics of areas greater than 2 m deep was collected for Windlectric by ASI Group and provided supplementary data to the Stantec surveys. Nearshore fish sampling in Lake Ontario was conducted from July 4 to 13 and August 2 to 4, 2011. Fish communities were sampled in representative locations in the nearshore area using non-lethal fishing methods (electrofishing boat, minnow traps, fyke nets) (Figure 3).

As a result of the collection of background data and field data, an assessment was made with respect to the presence or absence of fish habitat at each surveyed reach in the Zone of Investigation. The following criteria were used for the designation of fish habitat:

Direct Fish Habitat – **Permanent** – permanently flowing watercourse with available fish community data (background and/or Stantec surveys).

Direct Fish Habitat – Seasonal – intermittent watercourse (as per drain classification or field observation) that is directly connected to a downstream watercourse that supports fish or where Stantec surveys captured fish.

Indirectly Contributes to Fish Habitat – intermittent flow (as per field observations) and although no fish were observed or captured, the channel contributes indirectly (e.g., allochthonous inputs, flow) to downstream reaches supporting fish.

Not Fish Habitat – not directly connected to a downstream water feature that supports fish or where Stantec surveys captured fish.

2.4 QUALIFICATIONS

The following Stantec personnel were responsible for the identification of water bodies and for determining any implications associated with fish and fish habitat:

- Ryan Park, B.Sc. – Fisheries Biologist
- Katie Easterling, H.B.Sc, Dip. (F&W), EPt. – Fisheries Biologist
- Marc Faiella, Dip. – Fisheries Biologist
- Nancy Harttrup, B.Sc. – Senior Fisheries Biologist

Curricula vitae are provided in **Appendix F**.

3.0 Water Bodies within the 120 m Zone of Investigation

As indicated in Section 2.2, the presence or absence of water bodies within the Zone of Investigation was assessed using the definition of a water body provided in O. Reg. 359/09. Based on the results of field investigations and the Records Review, water bodies within 120 m of the Project Location are summarized in **Table 3.1** and illustrated in **Figure 2** (**Appendix A**). A total of 22 water bodies were identified within the 120 m Zone of Investigation. Based on the site investigation, a number of corrections were required to the records obtained from available MNR mapping. At 26 locations where there was a mapped watercourse within or crossing the Zone of Investigation, the mapped features did not meet the definition of a water body. Criteria for their exclusion as water bodies are provided in Table 3.1 and these locations were not investigated further. During the field investigations, there were no additional water bodies, lakes or seepage areas identified within 120 m of the Project Location other than those described in Sections 4.1 to 4.6. Corrections to the MNR watercourse layer are illustrated in **Figure 2.** Photographs and field notes of these investigations are provided in **Appendices B**, **C and D**, respectively.

Additional field surveys included fish sampling at selected locations and an assessment of fish habitat. Water bodies within the 120 m Zone of the Investigation are listed in **Table 3.2**, which identifies Project components and areas providing fish habitat. Water bodies that provide fish habitat are illustrated in **Figure 5** (**Appendix A**).

Based on a review of the document entitled “Inland Ontario Lakes Designated for Lake Trout Management” (MNR, 2003), there are no Lake Trout (*Salvelinus namaycush*) lakes that are at or above development capacity identified within 300 m of the Project Location.

Table 3.1: Summary of mapped watercourses/waterbodies (LIO) in the Zone of Investigation and criteria for REA water bodies - Amherst Island Wind Project

Water Feature	WB Station(s)	NWB Station(s)	Tile No. in Figure 2	Water Body+			Criteria for Screening Out Mapped Watercourses (Not a Water Body)									Comments
				permanent stream	intermittent stream	seep++	No Surface Feature Present	Swale**	Grassed Waterway*	Temporary Channel for Surface Drainage*	Roadside Ditch*	Temporarily Ponded Area Normally Farmed*	Dugout Pond*	Rock Chute*	Other	
Northern Drainage																
	1		2		✓											
		3	1							✓						No defined channel; cow pasture with active grazing.
	21		3		✓											WB at Front Road.
		21	3							✓						Approx. 50m upstream of road, surficial drainage only (no channel).
		31	2				✓									No evidence of channel.
		32	2				✓									No evidence of channel.
		33	2				✓									No evidence of channel.
	55		2		✓											
		56	2							✓						
	57		3		✓											
Eastern Drainage																
	8		3		✓											
	9		3		✓											
		11	3							✓						
		28	3				✓			✓						
		30	3							✓						
	58		3		✓											
		59	3							✓						
Southern Drainage																
		10	3				✓									Diffuse surficial drainage.
		12	3							✓						Surficial drainage.
		13	3							✓						
		14	3							✓						Diffuse surficial drainage.
		16	2				✓			✓						Shallow furrows for surficial drainage.
		18	2				✓			✓						Not a WB within the Zone of Investigation;

Table 3.1: Summary of mapped watercourses/waterbodies (LIO) in the Zone of Investigation and criteria for REA water bodies - Amherst Island Wind Project

Water Feature	WB Station(s)	NWB Station(s)	Tile No. in Figure 2	Water Body+			Criteria for Screening Out Mapped Watercourses (Not a Water Body)									Comments
				permanent stream	intermittent stream	seep++	No Surface Feature Present	Swale**	Grassed Waterway*	Temporary Channel for Surface Drainage*	Roadside Ditch*	Temporarily Ponded Area Normally Farmed*	Dugout Pond*	Rock Chute*	Other	
																surficial drainage.
	19		2	✓												
		20	2								✓					Grassed ditch parallel to 2nd Concession.
	36		2		✓											
	37		2		✓											
	38		2		✓											
		39								✓						Surficial drainage through pasture, turns into a water body at confluence with Miller Drain (but outside of ZOI).
	52		2		✓											
	53		2		✓											Trapezoidal channel.
	60		2		✓											
Western Drainage																
	6		1		✓											
	25		1		✓											
		26	1				✓			✓						No defined channel.
		41	1				✓									No defined channel; pasture.
		50	1				✓									Located in pasture.
	51		1		✓											
		54	1							✓						
Mainland																
		M1 Trib	4							✓						
	M2		4		✓											
	M3		4		✓											
	M4		4		✓											
	M9		4		✓											
	M7				✓											

Table 3.1: Summary of mapped watercourses/waterbodies (LIO) in the Zone of Investigation and criteria for REA water bodies - Amherst Island Wind Project

Water Feature	WB Station(s)	NWB Station(s)	Tile No. in Figure 2	Water Body+			Criteria for Screening Out Mapped Watercourses (Not a Water Body)									Comments
				permanent stream	intermittent stream	seep++	No Surface Feature Present	Swale**	Grassed Waterway*	Temporary Channel for Surface Drainage*	Roadside Ditch*	Temporarily Ponded Area Normally Farmed*	Dugout Pond*	Rock Chute*	Other	
	M10		4		✓											Lower portion near Taylor Kidd Road is not a water body.
		M11	4							✓						
Lake Ontario																
	n/a		2 & 4	Lake												
Seeps																
None	n/a															There were no groundwater seeps identified in the Project Location.

+ if all three criteria are 'no', then the feature is not a water body
++ a site of emergence of ground water where the water table is present at the ground surface, including a spring
** low lying feature with no defined channel and not dominated by aquatic vegetation
* as per REA Definition O. Reg 359/09
WB = Water Body
NWB = Non-Water Body

Table 3.2: Summary of Water Bodies and Project Components

Water Body	Crossing Class		Within 120 m				Fish Habitat	
	Access Road[a]	Collector Line	Turbine[b]	Access Road[a]	Collector Line	Substation/Switching Station/MET Tower	Direct Permanent (P) or Seasonal (S)	Indirect
Northern Drainage								
Station 1	S06 crosses twice	1	-	Dock	-	-	S	
Station 55	-	1	-	-	-	-	S	
Station 57	-	1	-	-	-	-	S	
Station 21	-	1	-	-	-	-	S	
Eastern Drainage								
Stations 30 and 58	-	1	-	-	-	-	S	
Station 9	-	1	-	-	-	-	S	
Station 8	-	1	-	S28	-	-	S	
Southern Drainage								
Station 19	-	1	-	-	-	-	P	
Stations 52, 36, 38, 34 and 35	S20	2	S34	S16	-	-	P	
Station 37 and 60	S34	-	-	-	-	-	S	
Station 53	-	1	-	S16	-	-	S	
Western Drainage								
Station 51	-	1	-	-	-	-	S	
Stations 25 and 54	-	1	-	-	-	-		☐
Station 6	-	1	-	-	-	-	S	

Table 3.2: Summary of Water Bodies and Project Components

Water Body	Crossing Class		Within 120 m				Fish Habitat	
	Access Road[a]	Collector Line	Turbine[b]	Access Road[a]	Collector Line	Substation/Switching Station/MET Tower	Direct Permanent (P) or Seasonal (S)	Indirect
Mainland								
Option 1								
M2					1		S	
M3		1					S	
M4/M9					1		S	
Option 2								
M2						1	S	
Lake Ontario								
Mainland	Facilities Dock and Submarine Cable Landing Area						P	
Island	Facilities Dock and Submarine Cable Landing Area						P	
Offshore	Submarine Cable on Lake Bottom						P	

[a] includes crane path and underground collector line

[b] turbine plus associated laydown area

4.0 Existing Conditions and Predicted Impacts

In the following sub-sections, available background data are provided for each subwatershed, followed by site-specific information regarding physical habitat and fish communities, as determined by Stantec in 2011 and 2012. Potential impacts to fish habitat and references to standard mitigation measures are provided for each site, where fish habitat is present (Section 4.1).

Fisheries and Oceans Canada (DFO) was consulted during the preparation of this report for input with respect to possible DFO authorization requirements based on the Project Layout. Consultation with the DFO will continue as Project details are finalized, and Windlectric will comply with any DFO conditions and recommendations for the Project. Further consultation with the Cataraqui Region Conservation Authority (CRCA) and/or DFO may result in site-specific construction methods and mitigation measures for some locations. Additional information regarding the permitting process from the CRCA and DFO is provided in Section 4.7.

Electricity will be transported by the electrical power line collector system and the Project is planning to bury the collector lines, unless requested otherwise by the Township.

Weather conditions at the time of the field surveys are summarized in **Table 4.1**, with specific daily information provided on the field notes in **Appendix D**.

Table 4.1: Weather conditions during and preceding Site Investigations

Dates	Air Temperature (Range) ^{o}C	Weather Prior to Surveys
May 17 to 20, 2011	7 – 23	Excessive rain in weeks prior to surveys. Rain during surveys
July 6, 2011	28 – 29	Light precipitation
March 27-28, 2012	5 – 7	Mar 27 – no previous precipitation Mar 28 – moderate precipitation prior to survey
August 15, 2012	15 - 25	Minor precipitation prior to survey

The spring of 2011 was extremely wet, with significant rainfall during the month prior to the field survey. At Environment Canada's Kingston Climate station, a total of 78 mm of rain was recorded between May 1 and May 16. Another 7 mm was recorded from May 17 to May 20. The long-term average (1971 to 2000) total precipitation for the month of May in the Kingston area is 75 mm.

Due to the shallow limestone bedrock, water does not infiltrate the soil and percolate through to the water table, but drains mainly overland. As a result, a majority of the island was temporarily flooded or saturated due to these extremely wet conditions in May 2011. Field notes from the site investigations are included in **Appendix D**.

Water bodies within the Zone of Investigation are described according to the following subwatersheds:

- Northern Drainage, i.e. all watercourses/tributaries flowing to the north side of the island
- Southern Drainage, i.e. all watercourses/tributaries flowing to the south side of the island
- Western Drainage, i.e. all watercourses/tributaries flowing to the west end of the island
- Eastern Drainage, i.e. all watercourses/tributaries flowing to the east end of the island
- Mainland Drainage, i.e. all watercourses/tributaries flowing south to Lake Ontario

In addition to watercourses and tributaries on land, Lake Ontario is within the Project Location. The nearshore areas of Lake Ontario within the Project Location are included in this report due to the submarine cable crossing and docking facilities that are part of the project.

Information on mapped water features that were not deemed to be water bodies is provided in photographs (**Appendix B**) and field notes (**Appendix D**) and summarized in **Table 3.1**. Within each subwatershed, only those water features occurring within 120 m of the Project Location and that were deemed to be water bodies, are summarized in **Sections 4.1 to 4.6**. Turbine S34 is located 106 m from a water body; there are no water bodies within 30 m of the blade-tip of any turbine (**Figure 2**).

4.1 NORTHERN DRAINAGE

4.1.1 Station 1

Situated along Front Road, approximately 500 m west of the hamlet of Stella, this unnamed tributary flows northeast into Lake Ontario **(Figure 2)**. Upstream of Front Road, this watercourse consists of two tributaries, the first of which is a narrow, shallow, slightly braided watercourse flowing through a vegetated channel. A second tributary flows south through an incised, vegetated channel and converges with the first tributary approximately 50 m west of the road culvert. Downstream of Front Road this watercourse flows under a driveway and into a wetland. Based on field observations conducted in May, 2011, it was concluded that this watercourse provides seasonally direct fish habitat upstream of Front Road. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. Electrofishing efforts by Stantec in May 2011 yielded 20 Banded Killifish and one Pumpkinseed.

Within the Zone of Investigation, there is:

- One reach of this watercourse that is designated as a water body that provides seasonal fish habitat. It is crossed twice by the access road to S06 and by a proposed collector line. The reach and is within 120 m of the proposed submarine cable landing area and temporary dock.

Habitat characteristics at Station 1 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.1.2 Station 55

Situated along Front Road approximately 100 m east of McDonalds Lane in the hamlet of Stella, this unnamed tributary flows north into Lake Ontario **(Figure 2)**. This natural watercourse consists of a channel with a slight meander underlain by coarse substrates. Based on field observations conducted in August, 2012, it was concluded that this watercourse provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. Stantec was unable to conduct fish sampling in 2012 at the proposed collector line crossing due to insufficient water depths at the time of the survey.

Within the Zone of Investigation, there is:

- One reach of this watercourse that is designated as a water body that provides seasonal fish habitat and is crossed by a proposed collector line.

Habitat characteristics at Station 55 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.1.3 Station 57

The waterbody associated with Station 57 is situated along Front Road approximately 2 km east of the hamlet of Stella **(Figure 2)**. This watercourse flows through a densely vegetated riparian area and is underlain by cobble and sand substrates. Based on field observations conducted in August, 2012, it was concluded that this watercourse provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. Stantec was unable to conduct fish sampling in 2012 at the proposed collector line crossing due to insufficient water depths at the time of the survey.

Within the Zone of Investigation, there is:

- One reach of this watercourse that is designated as a water body that provides seasonal fish habitat and is crossed by a proposed collector line.

Habitat characteristics at Station 57 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.1.4 Station 21

Situated along Front Road, approximately 300 m west of Marshall 40 Foot Road, this unnamed tributary flows northwest to Lake Ontario **(Figure 2)**. Upstream of Front Road, this watercourse consists of a shallow, grassy channel flowing down a gradient to the road allowance. Downstream a narrow, shallow, slightly meandering watercourse flows through a small valley to Lake Ontario. Based on field observations conducted in May, 2011, it was concluded that this watercourse provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. Stantec was unable to conduct fish sampling in 2011 at the proposed collector line crossing due to insufficient water depths at the time of the survey and the downstream reach of the water body is located on private property.

Within the Zone of Investigation, there is:

- One reach designated as a water body that provides seasonal fish habitat, and is crossed by a proposed collector line.

Habitat characteristics at Station 21 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.2 EASTERN DRAINAGE

4.2.1 Stations 30 and 58

Situated along Front Road, this unnamed tributary flows northeast to Lake Ontario **(Figure 2)**. Upstream of Front Road (Station 30), the watercourse consists of shallow, surficial drainage through furrows in the pasture, while downstream a narrow channel flows through a Reed Canary Grass floodplain (Station 58). Based on field observations conducted in May, 2011 and August 2012, it was concluded that this watercourse provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. Stantec was unable to conduct fish sampling in 2011 or 2012 at the proposed collector line crossing due to insufficient water depths at the time of the survey.

Within the Zone of Investigation, there is:

- One reach designated as a water body that provides seasonal fish habitat, and is crossed by a proposed collector line.

Habitat characteristics at Station 30 and 58 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.2.2 Station 9

Situated along Lower 40 Foot Road, this unnamed tributary flows east into Lake Ontario **(Figure 2)**. Upstream, this watercourse consists of shallow drainage through a field, while the downstream reach consists of an extremely sinuous channel flowing through the adjacent field. Based on field observations in May 2011, it was concluded that this watercourse provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. Electrofishing efforts by Stantec in May 2011 yielded 16 Fathead Minnows and one Banded Killifish.

Within the Zone of Investigation, there is:

- One reach designated as a water body that provides seasonal fish habitat, and is crossed by a proposed collector line.

Habitat characteristics at Station 9 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.2.3 Station 8

Situated along Lower 40 Foot Road, this unnamed tributary flows east into Lake Ontario **(Figure 2)**. Upstream, a trenched channel conveys flow through a small wooded area to the road culvert. Downstream the reach consists of a narrow, shallow channel with a slight meander pattern flowing through the adjacent field. Based on field observations during May 2011, it was concluded that this watercourse provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. Electrofishing efforts by Stantec in May 2011 yielded eight Fathead Minnows and 19 Banded Killifish.

Within the Zone of Investigation, there is:

- One reach designated as a water body that provides seasonal fish habitat, and is crossed by a proposed collector line. The reach is also located within 120 m of the proposed access road to S28.

Habitat characteristics at Station 8 are provided in **Table 4.2** along with references to general impacts, mitigation measures and net effects.

4.3 SOUTHERN DRAINAGE

4.3.1 Station 19

The tributary associated with Station 19 **(Figure 2)** originates in a large swamp/wetland to the east and consists of a relatively wide and deep channel flowing southwest to converge just north of the Amherst Island ANSI with the Miller Municipal Drain. Based on field observations

conducted in May, 2011, this watercourse provides direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. Field investigations conducted by Stantec in 2011 yielded 76 fish of the following five species:

- Brook Stickleback
- Bluegill
- Central Mudminnow
- Fathead Minnow
- Northern Redbelly Dace

Within the Zone of Investigation, there is:

- One reach designated as a water body that provides fish habitat, and is crossed proposed collector lines at two locations.

Habitat characteristics at Station 19 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.3.2 Miller Municipal Drain (Station 52, 36, 38, 34 and 35)

The Miller Municipal Drain originates north of Second Concession Road and consists of a wide, deep, incised drain flowing south, east and then southwest. It flows through an area used for cattle grazing and converges with the large watercourse associated with Station 19 just north of the Amherst Island ANSI. According to LIO mapping, this drain has been mapped as a class “F” drain – intermittent or ephemeral for more than two months. Based on field observations conducted in May, 2011, this watercourse likely provides direct fish habitat as fish were captured in the far upper reaches (Station 52) and large carp were observed in the lower reaches (Station 34). No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community.

Field investigations conducted by Stantec in 2011 yielded 120 fish of the following seven species:

- Banded Killifish
- Brook Stickleback
- Common Carp
- Central Mudminnow
- Fathead Minnow
- Northern Redbelly Dace
- Pumpkinseed

Within the Zone of Investigation, there is:

- One reach that has been designated as water body that provides fish habitat and is crossed by a proposed collector line and is located within 120 m of the proposed access road to Turbine S16.
- One reach that has been designated as water body that provides fish habitat and is crossed by the proposed access road to Turbine S20, crossed by a proposed collector line and is located 106 m from Turbine S34.

Habitat characteristics at Miller Municipal Drain are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.3.3 Station 37 and 60

The tributary associated with Stations 37 and 60 (Figure 2) consists of a narrow, slightly incised channel flowing through a pasture and eventually converging with the Miller Municipal Drain. Based on field observations conducted in May, 2011, this watercourse likely provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. Field investigations conducted by Stantec in 2011 in the Miller Municipal Drain yielded the following species that are may also occur in the tributary associated with Station 37:

- Banded Killifish
- Brook Stickleback
- Central Mudminnow
- Fathead Minnow
- Northern Redbelly Dace
- Pumpkinseed

Within the Zone of Investigation, there is:

- One reach designated as a water body that provides seasonal fish habitat and is crossed by the proposed access road to Turbine S34.

Habitat characteristics at Station 37 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.3.4 Station 53

The watercourse associated with Station 53 is a short, narrow, incised channel flowing south to Miller Municipal Drain at 2nd Concession **(Figure 2)**. Based on field observations conducted in March 2012, it was concluded that this watercourse provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal

regime classification or the fish community. Stantec was unable to conduct fish sampling in 2012 due to insufficient water depths at the time of the survey.

Within the Zone of Investigation, there is:

- One reach designated as a water body that provides seasonal fish habitat, and is located within 120 m of a proposed collector line.

Habitat characteristics at Station 53 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.4 WESTERN DRAINAGE

4.4.1 Station 51

Situated along 2nd Concession Road, the watercourse associated with Station 51 flows south to converge with a drainage area that flows west to a large wetland along the west side of the island. The upstream reach consists of a shallow channel flowing south along the east side of a small wooded area and the downstream reach is a shallow channel flowing along a tree line between two agricultural fields. Based on field observations conducted in March 2012, it was concluded that this watercourse provides seasonally direct fish habitat, as fish were observed in the densely vegetated channel. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. Electrofishing was not conducted at this station during the March 2012 field investigation due to low water levels and thick vegetation.

Within the Zone of Investigation, there is:

- One reach of this watercourse that is designated as a water body that provides seasonal fish habitat and is crossed by a proposed collector line.

Habitat characteristics at Station 51 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.4.2 Stations 25 and 54

Immediately upstream of 2nd Concession Road, the tributary associated with Station 25 **(Figure 2)** provides shallow surficial drainage conveys water from the surrounding pasture. At the time of the May 2011 field investigation, landowner permission was not granted to further assess the upstream reach. Downstream of 2nd Concession Road, this watercourse consists of an incised channel with a mix of vegetation and exposed limestone bedrock. Approximately 50 m downstream, the watercourse loses channel definition and transitions to diffuse surficial drainage through the surrounding pasture. Based on field observations conducted in May, 2011, this watercourse likely contributes indirectly to fish habitat through flow and nutrient inputs to downstream fish habitat. No background data was available from the CRCA or the MNR

regarding watercourse thermal regime classification or the fish community. Stantec was unable to conduct fish sampling in 2011 at the proposed collector line crossing locations due to insufficient water depth at the time of the survey.

Within the Zone of Investigation, there is:

- One reach of the watercourse designated as a water body that contributes indirectly to fish habitat, and is crossed by a proposed collector line.

Habitat characteristics at Stations 25 and 54 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.4.3 Station 6

The tributary associated with Station 6 consists of a shallow, vegetated, slightly meandering channel that flows west through a pasture to Art McGinns Road **(Figure 2)**. Downstream of Art McGinns Road this watercourse flows into a large wetland complex along the Lake Ontario shoreline. Based on field observations conducted in May, 2011, it was concluded that this watercourse provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. Electrofishing efforts by Stantec in May 2011 did not yield any fish.

Within the Zone of Investigation, there is:

- One reach designated as a water body that provides seasonal fish habitat, and is crossed by a proposed collector line.

Habitat characteristics at Station 6 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.5 MAINLAND

4.5.1 M2

Located along Bath Road (Highway 33), approximately 150 m west of Jim Snow Drive, the tributary associated with Station M2 **(Figure 2)** was dry at the time of the field investigation. Upstream of Bath Road this watercourse consists of a narrow cattail lined channel, while the downstream reach flows through a large box culvert directly connected to Lake Ontario. Based on field observations conducted in July, 2011, it was concluded that this watercourse provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community. A review of historical air photos indicate the channel is man-made as indicated by the straight channel visible at the time.

Within the Zone of Investigation for Option 1, there is:

- One reach of the tributary that has been designated as a water body that provides seasonal fish habitat, and is located within the area designated as Laydown, Storage, Parking and Office area.

Within the Zone of Investigation for Option 2, there is:

- One reach of the tributary that has been designated as a water body that provides seasonal fish habitat, and is located within the 120 m of the proposed collector line.

Habitat characteristics at Station M2 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.5.2 M3

Located along Jim Snow Drive, approximately 200 m south of Taylor Kidd Boulevard, the tributary associated with Station M3 **(Figure 2)** was dry at the time of the field investigation. This watercourse consists primarily of a narrow channel flowing through a terrestrial meadow. Based on field observations conducted in July, 2011, it was concluded that this watercourse provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community.

Within the Zone of Investigation Option 2, there is:

- One reach of the tributary that has been designated as a water body that provides seasonal fish habitat, and is crossed by a proposed collector line.

Habitat characteristics at Station M3 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.5.3 M4/M9

Located along Taylor Kidd Boulevard, approximately 200 m west of Jim Snow Drive, this watercourse consists of a shallow, cattail lined channel flowing along the south side of Taylor Kidd Boulevard **(Figure 2)**. Based on field observations conducted in March, 2012, it was concluded that this watercourse provides seasonally direct fish habitat. No background data was available from the CRCA or the MNR regarding watercourse thermal regime classification or the fish community.

Within the Zone of Investigation for Option 2, there is:

- One reach of the tributary that has been designated as a water body that provides seasonal fish habitat, and is located within 120 m of a proposed collector line.

Habitat characteristics at Station M4/M9 are provided in **Table 4.2** along with references to general impacts, mitigation measures/Operational Statements and net effects.

4.6 LAKE ONTARIO

The only recent fish community data available from fish collection sites within the Study Area were provided by the MNR's Lake Ontario Management Unit (LOMU). The data were from a 2009 survey during which fish were collected at previously established sampling stations. MNR survey locations are included in the fishing stations illustrated in **Figure 3**. MNR catch data are provided in **Appendix C**.

None of the agencies contacted had any additional information with respect to specific documented areas of fish habitat in the Study Area; however the Eastern Canada Response Corporation (ECRC) provided a map indicating a Chinook Salmon spawning area in Parrots Bay, east of the Study Area (mainland).

Based on data provided by the MNR, the following fish species are known to occur in the nearshore habitats of this part of Lake Ontario: Largemouth Bass, Smallmouth Bass, Yellow Perch, Bluegill, Pumpkinseed, Common Carp and Brown Bullhead.

The MNR initially classified the nearshore areas of the Study Area as coldwater habitat. Stantec provided habitat information collected by Stantec and ASI to the MNR and based on the lack of suitable Lake Trout spawning habitat in the Study Area, the MNR subsequently concurred that the habitats within the vicinity of the dock and cable landing areas support warmwater fish species.

4.6.1 Island

The cable landing and dock facility is located on the Lake Ontario shoreline of Amherst Island. Substrate in the nearshore area at the cable landing and dock location was primarily bedrock in the nearshore area, with areas of cobble overlaid by silt and/or algae farther offshore; scattered aquatic vegetation was also present in the area **(Figure 4)**. This area corresponds to ASI substrate sampling station CR20 and ROV Transects TR1 and TR2 (photos and maps in **Appendix B**). Supporting photographs and substrate information from underwater photography and sediment sampling (ASI data) are included in **Appendix B** and illustrate the presence of algae and aquatic vegetation. ASI's substrate samples and descriptions show that in approximately 2 m of water the substrate is flat, angular sedimentary rock with approximately 65% coverage by algae.

The bottom gradient at the proposed island dock location is fairly gradual and reaches a depth of approximately 4 m at the end of the proposed dock.

Stantec's fish survey in 2011 captured Yellow Perch, Bluntnose Minnow, Spottail Shiner, Round Goby and Common Carp in the vicinity of the proposed island dock and cable landing.

The proposed dock location and cable landing area (submarine cable) are located in the nearshore area of Lake Ontario on the north shore of Amherst Island.

4.6.2 Mainland

West Dock Option

The depth profile of the West option is gradual and would require a relatively long dock structure. Estimated water depth at the end of a dock at this location would be approximately 4.5 m. Substrate at this location was primarily sand with very little vegetation **(Figure 4)**; rock piles are present in the near shore area immediately west of the proposed dock site. There is a proposed cable landing area associated with this dock location.

Photographs and data from an ASI sediment sampling statin in the area (ASI Station NS19) are included in **Appendix B** and illustrate dense growth of aquatic vegetation in the area.

Center Dock Option

The substrate at this proposed dock location is characterized by cobble and sand in the nearshore area, with scattered aquatic vegetation. Bathymetry at this proposed dock (and cable landing) location is the most gradual of the mainland options, potentially resulting in the longest dock structure. Water depth at the end of a proposed dock at this location would be close to 4 m.

Farther offshore, results of ASI's sediment sampling and ROV video show the lake bottom characteristics as algae-covered scattered boulders over sand (**Appendix B**).

East Dock Option

The lake bottom at this proposed dock location is the steepest of the three options, resulting in the shortest dock structure. Water depth would be approximately 5 m at the end of a dock at this location. Substrates were identified as sand with scattered vegetation with large rubble piles located immediately west of the proposed dock location.

Photographs from ASI's ROV support the above assessment and illustrate similarity of habitat beyond the 2 m surveyed by Stantec (**Appendix B**). This area is characterized by fine substrates and patchy aquatic vegetation.

Optional Cable Landing Area

This location is an optional cable landing area and there is no dock proposed for this site. The bottom substrate at this cable landing area is predominantly sand with a gradual slope of the lake bottom. At the time of the 2011 survey, submergent aquatic vegetation was present but was patchy and sparse. There was a row of mature trees on the shoreline in this area.

4.6.3 Offshore

Bathymetric data for the portion of Lake Ontario between Amherst Island and the mainland east indicates that the lake bottom is relatively flat at about 20 m deep for most of the cable crossing route. Maximum depth is approximately 37 m, which occurs closer to the mainland (approximately 800 m from shore).

Information provided to the Project by ASI indicated the predominant sediment types in the majority of the deep water areas between Amherst Island and the mainland (from approximately 15 m and deeper) are grey clays, grey muds, and black silty muds. In water depths less than 15 m the lakebed material generally tends to transition from muds and clays, to sands, gravels, then exposed bedrock with occasional boulders as depth decreases towards shore (mainland and the Amherst Island sides of the Study Area).

Within this deep water area, a proposed a submarine cable will be placed on the lake bottom.

Table 4.2: Summary of Water Bodies Within the 120 m Zone of Investigation

Reach ID[a]	Site Description	Proposed Works[ab]	Potential Impacts	Mitigation	Net Effects[c]
Northern Drainage					
Tributary Associated with Station 1	Intermittent flow dominated by flat morphology. Bankfull width = 3 m. Water depth = 20 cm. Substrate = silt and gravel . Fished May 2011 (Stantec). Seasonal fish habitat.	Crossed twice by access road to Turbine S06 and once by a proposed collector line. Potential submarine cable landing area and dock to be located within 120 m of water body providing fish habitat.	Construction activities associated with the installation of the turbine access roads and culverts may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction (Section 5.1 and 5.2.) Construction activities within the constructible area of the cable landing and dock may affect the reach despite being outside of the constructible area (e.g. Temporary increase in surface water turbidity due to runoff during construction. (Section 5.1.)	See Sections 6.1, 6.2, 6.3. Follow DFO Operational Statement (OS) for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E)	New access road culvert. As per preliminary agency consultation, effects of a culvert at this location can be mitigated. DFO consultation is ongoing and the Project will comply with required permits and/or conditions.
Tributary Associated with Station 55	Intermittent flow , dry at the time. of the field investigation. Bankfull width = 6 m. Water depth = n/a. Substrate = bedrock, cobble, silt and detritus . Seasonal fish habitat.	Crossed by a proposed collector line along Front Road.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1 and 6.3. Follow DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E).	None expected.
Tributary Associated with Station 57	Intermittent flow , dry at the time of the field investigation. Bankfull width = 7 m. Water depth = n/a. Substrate = cobble and sand. Seasonal fish habitat.	Crossed by a proposed collector line along Front Road.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1 and 6.3. Follow DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E).	None expected.
Tributary Associated with Station 21	Intermittent flow dominated by run and pool morphology. Bankfull width = 2 m. Water depth = 5 to 10 cm. Substrate = limestone bedrock and vegetation. Seasonal fish habitat .	Crossed by a proposed collector line along Front Road.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1 and 6.3. Follow DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E).	None expected.
Eastern Drainage					
Tributary Associated with Station 30/58	Intermittent dry at the time of the field investigation. Bankfull width = 5 m. Water depth = n/a. Substrate = limestone bedrock, silt and detritus. Seasonal fish habitat .	Crossed by a proposed collector line along Front Road.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1 and 6.3. Follow DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E).	None expected.
Tributary Associated with Station 9	Intermittent flow dominated by run and flat morphology, with occasional pools and riffles . Bankfull width = 4 m. Water depth = 30 cm. Substrate = bedrock, silt, gravel and detritus. Seasonal fish habitat .	Crossed by a proposed collector line along Lower 40 Foot Road.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1 and 6.3. Follow DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E).	None expected.

Table 4.2: Summary of Water Bodies Within the 120 m Zone of Investigation

Reach ID[a]	Site Description	Proposed Works[ab]	Potential Impacts	Mitigation	Net Effects[c]
Tributary Associated with Station 8	Intermittent flow dominated by pool and flat morphology . Bankfull width = 4 m. Water depth = 20 cm. Substrate = bedrock, silt, gravel and detritus. Seasonal fish habitat .	Crossed by a proposed collector line along Lower 40 Foot Road.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1 and 6.3. Follow DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E).	None expected.
Southern Drainage					
Tributary Associated with Station 19	Permanent Flow dominated by run and flat morphology. Bankfull width = 4 m. Water depth = 60 cm to >1.5 m. Substrate = Silt and detritus. Fish habitat.	Crossed by a proposed collector line along Stella 40 Foot Road.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1 and 6.3. DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E).	None expected.
Miller Municipal Drain (Stations 52, 36, 38, 34 and 35)	Permanent flow dominated by pool and flat morphology (downstream areas). Upstream areas (Stns 52, 36, 38) are intermittent. Bankfull width = 3 to 15 m. Water depth = 15 cm. Substrate = Silt and clay. Fish habitat.	Crossed by an access road to Turbine S20 and twice by a proposed collector line along 2nd Concession Road. Turbine S34, underground collector line and access road to S16 to be located within 120 m of water body providing fish habitat. Turbine S34 is located 106 m from a water body.	Construction activities associated with the installation of the turbine and turbine access roads may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction See Section 5.1 and 5.2). With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1, 6.2, 6.3/6.4. Follow DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E).	New access road culvert. As per preliminary agency consultation, effects of a culvert at this location can be mitigated. DFO consultation is ongoing and the Project will comply with required permits and/or conditions.
Tributary Associated with Station 37/60	Intermittent flow dominated by float morphology. Bankfull width = 4 m. Water depth = 20 cm. Substrate = Silt and clay. Seasonal fish habitat.	Crossed by an access road to Turbine S34.	Construction activities associated with the installation of the turbine access roads may affect the reach (e.g. Temporary increase in surface water turbidity due to runoff during construction (Section 5.1 and 5.2).	See Sections 6.1 and 6.2.	New access road culvert. As per preliminary agency consultation, effects of a culvert at this location can be mitigated. DFO consultation is ongoing and the Project will comply with required permits and/or conditions.
Tributary Associated with Station 53	Intermittent flow that was dry at the time of the field investigation. Bankfull width = 1.5 m. Water depth = n/a. Substrate = silt, clay and muck. Seasonal fish habitat.	Located within 120 m of a proposed collector line.	With the exception of standard construction activities, collector lines located within 120 m of a water body should not affect the reach outside the constructible area (see Section 5.1).	See Section 6.1.	None expected.
Western Drainage					
Tributary Associated with Station 51	Likely intermittent flow dominated by pool and flat morphology. Bankfull width = 2.2 m. Water depth = 15 cm. Substrate = sand, silt, clay and detritus. Likely seasonal fish habitat.	Crossed by a proposed collector line.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1 and 6.3. Follow DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E)	None expected.

Table 4.2: Summary of Water Bodies Within the 120 m Zone of Investigation

Reach ID[a]	Site Description	Proposed Works[ab]	Potential Impacts	Mitigation	Net Effects[c]
Tributary Associated with Stations 25 and 54	Intermittent flow dominated by run habitat with occasional pool morphology. Bankfull width = 5 m. Water depth = 10 cm. Substrate = Clay, gravel, silt, boulder and detritus. Contributes indirectly to fish habitat.	Crossed by a proposed collector line.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1 and 6.3. Follow DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E)	None expected.
Tributary Associated with Station 6	Intermittent flow dominated by flat morphology. Bankfull = 5 m. Water depth = 30 cm . Substrate = Silt and detritus. Seasonal fish habitat .	Crossed by a proposed collector line.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1 and 6.3. Follow DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E)	None expected.
Mainland					
Tributary Associated with Station M2	Intermittent flow that was dry at the time of the field visit. Bankfull width = 1.5 m. Water depth = dry. Substrate = Silt, muck, sand, cobble and detritus. Seasonal fish habitat.	*Option 1* Located within proposed Laydown Area *Option 2* Located within 120 m of a proposed collector line and dock location.	With the exception of standard construction activities, collector lines and docks located within 120 m of a water body should not affect the reach outside the constructible area (see Section 5.1).	See Section 6.1.	None expected.
Tributary Associated with Station M3	Intermittent flow that was dry at the time of the field visit. Bankfull width = 1 m. Water depth = dry. Substrate = soil. Seasonal fish habitat.	*Option 2* Crossed by a proposed collector line.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Sections 5.1, 5.3).	See Sections 6.1 and 6.3. Follow DFO OS for Overhead Line Construction, Directional Drilling or Punch and Bore Crossings (Appendix E)	None expected.
Tributary Associated with Station M9/M4	Likely intermittent flow, dominated by flat and pool morphology. Bankfull width = 2 m. Water depth = 15 cm. Substrate = silt, clay, marl, muck and detritus. Likely seasonal fish habitat.	*Option 2* Within 120 m of a proposed collector line.	With the exception of standard construction activities, collector line crossings of a water body should not affect the reach outside the constructible area (see Section 5.1).	See Section 6.1.	None expected.
Lake Ontario					
Amherst Island Shoreline	Littoral zone of Lake Ontario. Bedrock with scattered cobble and sparse vegetation. Habitat for warmwater fish species.	Dock and Cable Landing Final dock design - to be determined (no infilling required). Cable landing area – bury cable in trench to approx. 100 m from the average high water mark; clamshell armour to be used from end of trench to 3 m depth (under average water level conditions?)	Dock construction and operation – Section 5.4. Cable Landing – Section 5.5.	See Sections 6.4 and 6.5.	New dock structure on island shoreline; although there will be a permanent footprint of the dock footings, effects can be mitigated. DFO consultation is ongoing and the Project will comply with required permits and/or conditions..

Table 4.2: Summary of Water Bodies Within the 120 m Zone of Investigation

Reach ID[a]	Site Description	Proposed Works[ab]	Potential Impacts	Mitigation	Net Effects[c]
Mainland Shoreline	Littoral zone of Lake Ontario. Habitat for warmwater fish species at all three locations. *West Option*: Sand. *Centre Option*: Sand and cobble with scattered vegetation. *East Option*: Predominantly sand with scattered vegetation; steeper slope relative to the West and Centre options. *Optional Cable Landing*: Sand with patchy vegetation; gradual slope.	Dock and Cable Landing Final dock design - to be determined (no infilling required). Cable landing area – bury cable in trench to approx.100 m from the average high water mark; clamshell armour to be used from end of trench to 3 m depth (under average water level conditions).	Dock construction and operation – Section 5.4. Cable landing – Section 5.5.	See Sections 6.4 and 6.5 and DFO OS for Underwater Cables (Appendix E).	New dock structure on shoreline; although there will be a footprint of the dock footings, effects can be mitigated. DFO consultation is ongoing and the Project will comply with required permits and/or conditions..
Offshore	Deepwater zone of Lake Ontario.	Submarine cable on lake bottom (115 kV, 180 mm diameter [approx.] 4 km long [approx.]). Clamshell armour at MTO air bubbler.	General construct impacts, temporary disturbance to lake bed – Section 5.5. Operation – Section 5.5.	Section 6.5 and see DFO OS for Underwater Cables (Appendix E).	None Expected.

a see **Figures 2, 4 and 5** (**Appendix A**)
b the Project is planning to bury the collector lines unless requested otherwise by the Township; construction method to bury the collector line is not known at the time of report preparation (i.e. drilling vs. open cut)
c assumes all mitigation measures are implemented and successful

4.7 SUMMARY OF IN-WATER WORK IN OR NEAR FISH HABITAT

Based on the current Project layout, in-water work has the potential to affect fish or fish habitat, or areas that contribute indirectly to fish habitat, at three watercourse locations on Amherst Island, and two locations in the nearshore area of Lake Ontario (**Table 4.3**).

Based on previously submitted REA applications, it is likely that most Project-related impacts to water bodies and aquatic habitat can be mitigated. Locations where further DFO consultation will occur during the permitting process include sites where new roads and culverts are proposed, and for project components in Lake Ontario. At these locations, DFO can issue a Letter of Advice if they conclude that the works can be conducted in a manner that will not require a *Fisheries Act* authorization. Windlectric Inc. will comply with any conditions and recommendations resulting from the DFO consultation process.

Table 4.3: Water Bodies that provide fish habitat where in-water work is required

	Fish Habitat Type	
Reach ID	**Direct**	**Indirect**
Northern Drainage		
Station 1 (Access Road to Turbine S06)	X (seasonal)	
Southern Drainage		
Miller Municipal Drain - Stations 52, 38, 34 and 35 (Access Road to Turbine S20)	X	
(Station 37/60 (Access Road to Turbine S34)	X (seasonal)	
Lake Ontario		
Island – nearshore area (Dock and Cable Landing)	X	
Mainland – nearshore area (Dock and Cable Landing)	X	

The conclusions of No Net Effects (**Table 4.2**) assume that negative effects associated with turbine construction, underground (or overhead if required) collector line installation can be mitigated. If conditions of applicable Operational Statements can be met and the mitigation measures implemented no further DFO review or approvals would be required. Although specific Operational Statements are referenced in this report, consultation with the DFO may result in site-specific construction methods and mitigation measures for some locations.

The Construction Plan Report (CPR) describes activities associated with all components of project construction including the installation of culverts on access roads, construction of collector lines, transmission lines, the submarine cable and docks. The CPR identifies potential effects of construction on surface water, fish and fish habitat and mitigation measures to protect these features and consistent with those listed in this report. The CPR also provides details of monitoring plans and contingency measures.

5.0 Overview of Potential Impacts

5.1 GENERAL CONSTRUCTION-RELATED IMPACTS

Project construction activities include land clearing, soil stripping, grubbing and grading. Potential impacts to watercourses located within 120 m of the Project Location may include:

- Short-term increase in turbidity from runoff and soil erosion during construction; and
- Water quality and habitat disturbance effects to aquatic habitat (loss of shade, reduced bank stability, reduced input of leaves, twigs and insects).

5.2 CULVERTS AND ACCESS ROADS

Potential impacts related to the installation and maintenance of culvert crossings in addition to the general impacts listed above may include:

- Disturbance to aquatic biota and habitat during installation;
- Permanent enclosure of portions of a watercourse;
- Loss of bed material within the length of the culvert; and
- Changes to riparian vegetation within road allowance.

Culverts must be designed and installed such that there is no:

- Restriction of flows through the culvert resulting in upstream pooling;
- Erosion at the culvert inlets and outlets; and
- Barrier to fish passage to upstream environments.

5.3 COLLECTOR LINES

Electricity will be transported by the electrical power line collector system. It should be emphasized that the Project is planning to bury the collector lines, unless requested otherwise by the Township.

5.3.1 Overhead Collector Lines

Short-term impacts on watercourses may include loss of riparian vegetation which can result in increased turbidity during construction but also affects fish habitat by removing sources of shade, cover and food production. There are no long term impacts associated with the operation and maintenance of overhead collector lines.

5.3.2 Underground Collector Lines

Potential impacts to fish and fish habitat resulting from the installation of underground collector lines are as follows:

- Erosion and sedimentation from site disturbance and dewatering;
- Collapse of the punch or bore hold under the stream;
- Reduced shoreline cover, shade and food production areas due to disturbance of riparian vegetation;
- Disturbance of stream banks and bottom substrates, disruption of sensitive fish life stages due to machinery fording the stream; and
- Introduction of deleterious substances due machinery fording the stream (if equipment is not properly maintained).

5.4 DOCK CONSTRUCTION AND OPERATION

The construction and installation of docks can affect fish habitat by covering or changing spawning areas, removing cover features such as rocks and logs, causing erosion and sedimentation (due to shoreline erosion) introducing deleterious substances (during construction and operation) and disrupting sensitive life stages of fish. In large water bodies, docks can also alter currents in the nearshore area.

5.5 SUBMARINE CABLE CONSTRUCTION AND OPERATION

The placement of underwater cables is a common practice used to deliver utility services such as electricity across water bodies when overhead lines are not feasible (DFO Operating Statement for Underwater Cable). Placing cables on the lake bottom is more favourable than burying them, as it generates less sediment and avoids the need to use machinery in deep water areas. Excavation is often required to bury the cable near the shoreline for safety reasons.

The trench required to bury the submarine cable in the nearshore area will extend up to approximately 100 m from the average high water mark. For safety reasons, the cable should be protected to a water depth of 3 m. From the end of the trench to where water depth is 3 m, the cable will be encased in clamshell armour (metal). During construction, potential impacts to fish and fish habitat include disruption of sensitive fish spawning areas (e.g., gravel, cobble, and rock rubble), erosion and sedimentation caused by disturbance to the shoreline and bed of water bodies, removal of riparian (bank) vegetation and underwater rocks and logs that provide cover, shade and food, and disruption of sensitive fish life stages.

During the operational phase, submarine cables produce magnetic fields. The only effect of cables on the ambient electrical environment may be on the local geomagnetic field as a weak magnetic field source. While a number of species are reported to be capable of detecting changes in the Earth's magnetic field, the narrow linear feature of the field around the cable

makes it unlikely that long distance navigation, migration, or major behavioural patterns of those species would be affected.

Monitoring studies have been conducted for off-shore wind projects (marine environments in Europe and the UK; Dong Energy et al, 2006; CEMACS, 2003) to determine if there are effects on the behavior or movement of marine organisms. Since the studies found that the magnetic fields of submarine power cables are either small or zero (with the exception of monopolar D.C. cables), results of marine studies completed for offshore wind projects concluded that the electromagnetic fields of submarine cables would not have any significant effects on the marine environment.

6.0 Standard Mitigation Measures for Working around Fish Habitat

Standard mitigation measures used for works in and around water are summarized below. Specific details of the mitigation measures to be implemented would be determined through consultations with the local municipality, the CRCA and DFO once details of construction methods are finalized. The extent of mitigation would be dependent on project details such as technical requirements, construction methods and schedule.

Since specific construction details are not known at the time of report preparation, the list of mitigation measures is extensive such that all measures are included and the appropriate measures will be applied once the construction method has been finalized. For example, specific construction methods for underground collector line crossings of specific water bodies are not known at this time; therefore, mitigation measures for open cut methods and drilling under the watercourse are included. Specific timing of construction is not known at this time. Measures for the use of coffer dams (dam and pump) and fish removals are included in the event they will be required. If the watercourses are dry at the time of construction, these measures would not be applicable.

6.1 GENERAL MITIGATION MEASURES

There are many mitigation measures to protect fish and fish habitat from potential effects during the construction phase of a project. General mitigation measures for construction activities near a watercourse in the Zone of Investigation include:

- All in-water work would be completed within MNR timing windows to protect local fish populations during their spawning and egg incubation periods. A typical construction timing window for warmwater streams in the Peterborough District is July 1 to March 31.
- The MNR provided the following in-water timing window for nearshore work at the cable landing sites (Lake Ontario): July 1 to March 31 (no work between April 1 and June 30).
- All materials and equipment used for the purpose of site preparation and Project construction shall be operated and stored in a manner that prevents any deleterious substance (e.g., petroleum products, silt, etc.) from entering the water:
  - Any stockpiled materials should be stored and stabilized away from the water;
  - Refuelling and maintenance of construction equipment should occur a minimum of 100 m from a water body;
  - As appropriate, spills should be reported to the MOE Spills Action Centre;
  - Any part of equipment entering the water should be free of fluid leaks and externally cleaned/degreased to prevent any deleterious substance from entering the water; and
  - Only clean material, free of fine particulate matter should be placed in the water.
- Sediment and erosion control measures should be implemented prior to construction and maintained during the construction phase to prevent entry of sediment into the water:

- Silt fencing and/or barriers should be used along all construction areas adjacent to natural areas;
- No equipment should be permitted to enter any natural areas beyond the silt fencing during construction;
- All sediment and erosion control measures should be inspected at least weekly and during and immediately following rainfall events to ensure that they are functioning properly and are maintained and/or upgraded as required;
- Topsoil stockpiles should be sufficiently distant from watercourses to preclude sediment inputs due to erosion of stored soil materials;
- If the sediment and erosion control measures are not functioning properly, no further work should occur until the sediment and/or erosion problem is addressed;
- All disturbed areas of the construction site should be stabilized immediately and re-vegetated as soon as conditions allow; and
- Sediment and erosion control measures should be left in place until all areas of the construction site have been stabilized.

6.2 NEW CULVERT CROSSINGS

Culverts would be required at watercourses crossed by access roads. Culverts should be sized according to hydrologic requirements to be determined during the detailed design / permit application stage. Other technical requirements may influence culvert size and materials.

Where fish habitat is present, culverts must be installed such that fish passage is maintained. Where a watercourse provides indirect habitat, the culvert must continue to convey flow to downstream areas.

Specific methods for culvert installation would be dependent on culvert type, size and construction seasons. If a temporary access road is required, the DFO Operational Statement for Temporary Stream Crossings can be used if the specific conditions can be met. The Operational Statement includes details of mitigation measures.

Under flowing water conditions, water must be pumped or flumed around the work area in order to install a culvert. The following steps outline how a site can be isolated for culvert construction:

Temporary Isolation

- Coffer dams (e.g., aqua-dams, sand bags, concrete blocks, steel or wood wall, clean rip-rap, sheet pile or other appropriate designs) can be used to separate the in-water work site from flowing water.

- If rip rap or pea gravel bags are used, clean, washed material should be used to build the berm. The berm face should consist of clean, washed granular material that is adequately sized (i.e., moderate sized rip rap and not sand or gravel) to hold the berm in place during construction. Material to build the berms should not be taken from below the high water mark.

- Coffer dams should be designed to accommodate any expected high flows of the watercourse during the construction period.

- Before starting construction, fish should be salvaged from behind the coffer dam and returned to an area immediately upstream of the isolated area. Salvage operations would consist of electrofishing and/or seining.

- Accumulated sediment should be removed (ensuring that the original bed of the watercourse is not excavated) from behind the coffer dam before its removal.

- The original channel bottom gradient and substrate should be restored after coffer dam removal.

- Water from dewatered areas should be treated or diverted into a vegetated area or settling basin to remove suspended solids and prevent sediment and other deleterious substances from entering the watercourse.

- Coffer dams should be removed in a downstream to upstream sequence to allow gradual re-introduction of water to the dewatered area and prevent excessive suspension of silt or other bed material.

- Pump intakes should be sized and adequately screened to prevent debris blockage and fish mortality (refer to the DFO Freshwater Intake End-of-Pipe Fish Screen Guidelines).

- The pumping system should be sized to accommodate any expected high flows of the watercourse during the construction period. Back-up pumps should be kept on site in case of pump failure.

- The pump should be discharged to a grassed area to allow water to reenter the watercourse only after it has been filtered through vegetation to prevent silt deposition. If no suitable areas exist, a filter bag should be place on the outlet to filter the water prior to reentry into the watercourse.

- Work should not be completed during flood stage flows or during times when heavy precipitation is occurring or is expected.

6.3 COLLECTOR LINES

6.3.1 Overhead Collector/Transmission Lines

The DFO has prepared an Operational Statement for overhead line construction (Ontario Operational Statement Habitat Management Program: Overhead Line Construction – see **Appendix E**). This Operational Statement provides measures to protect fish and fish habitat when undertaking this type of construction activity. In addition to measures identified in the Operational Statement, an Emergency Spill Kit should be available on site in the event of leaks from machinery.

Although construction of overhead lines (as required) would not require any in-water works, as discussed in the Operational Statement, it is the riparian habitat that is most sensitive to disturbance from overhead line construction. Riparian vegetation occurs adjacent to the watercourse and directly contributes to fish habitat by providing shade, cover and spawning and food production areas.

According to the DFO Operational Statement, a proponent may proceed with an overhead line project without DFO review when the conditions of the Operational Statement are met (**Appendix E**).

6.3.2 Underground Collector Lines

There are several crossing techniques that may be employed for installation of a buried collector line. According to DFO the order of preference for such crossings, in order to protect fish and fish habitat is: 1) punch or bore, 2) high pressure directional drilling, 3) dry open-cut crossing and 4) isolated open-cut crossing. There are DFO Operational Statements for all of the above methods and all are included in **Appendix E**, where mitigation measures are also described.

In addition to measures identified in the Operational Statement, an Emergency Spill Kit should be available on site in the event of leaks from machinery.

6.4 DOCK CONSTRUCTION

Since specific construction details are not known at the time of report preparation, the list is extensive such that all measures are included and the appropriate measures will be applied as needed. Although the scale of the proposed docks is larger than that covered by DFO's Operational Statement for Dock and Boathouse Construction, the conditions and mitigation measures listed in the Operational Statement should be implemented to minimize impacts on the aquatic environment.

As the final construction method is not known at the time of report production, the following list of measures is provided and may or may not apply, dependent on the final dock location and design.

- Measures listed in the DFO Operational Statement for Dock Construction
- Follow MNR in-water construction timing windows
- Work from barges where possible
- Shoreline restoration plan
- Sediment and erosion control
- Protection of water quality during construction
- Fish removal plan (for drilling of piles, construction of hydraulic lifts, etc.)

6.5 SUBMARINE CABLE CONSTRUCTION

Although the scale of the submarine cable component of the project is larger than that covered by DFO's Operational Statement for Underwater Cables, the conditions and mitigation measures listed in the Operational Statement should be implemented to minimize impacts on the aquatic environment. As the final construction method is not known at the time of report production, measures for both trenching and directional drilling in the nearshore area are provided below.

6.5.1 Landing Areas

Trenching

Due to the bathymetry in the nearshore areas, trenching to bury the cable exceeds the criteria for trench length of DFO's Operational Statement for Underwater Cables. In addition to the following measures, the principles and mitigation measures of the Operational Statement will be followed:

- Clamshell armouring of cable to protect cable in shallow water and minimize trenching. Trenching to extend approximately 100 m from the Lake Ontario High Water Mark within which the cable will be buried. Metal clamshell armour will protect the cable from the end of the trench to a water depth of 3 m.
- Follow DFO Blasting Guidelines (if applicable)
- Follow MNR in-water construction timing windows
- Backfill trench using native materials
- Work from barges where possible
- Shoreline restoration plan
- Restoration of work area (removal of work platforms if required)

- Sediment control
- Protection of water quality during construction
- Fish removal plan

Directional Drilling

- Measures listed in the DFO Operational Statement for High-Pressure Directional Drilling
- Follow MNR in-water construction timing windows
- Isolation of the exit location for the protection of water quality and control of drilling fluids (sediment control silt curtain)
- Restoration of any in-water work areas
- Restoration of shoreline

  Sediment control

6.5.2 Offshore

The cable will be laid on the lake bottom from barges on the lake surface. Mitigation measures listed in DFO's Operational Statement regarding refueling and maintenance of machinery, spill kits, etc. will be implemented. The cable material is a galvanized steel type armour with cross-linkable polyethylene insulation which minimizes the electromagnetic field around the cable.

7.0 Monitoring

7.1 CONSTRUCTION

Methodologies/Sampling Protocols

As appropriate, an Environmental Monitor should be on-site during installation of Project components that could potentially affect aquatic habitats to ensure compliance with specifications, site plans and permits. In particular, the Construction Contractor would ensure that pre-construction preparation is completed (e.g. erosion and sediment control plans) prior to commencement of in-stream work (if required). The Construction Contractor would ensure that detailed pre-construction profiles of the slopes, banks, and bed are determined prior to installation of the access roads, crane paths and power lines. The Environmental Monitor should monitor weather forecasts prior to the installation of access roads, crane paths and power lines, particularly prior to work near aquatic habitats.

The Environmental Monitor will:

- Perform routine checks of all erosion and sediment control measures
- Monitor flow conveyance during in-water works where culvert replacements are required
- Visually inspect access/exit pits and directional drill line for frac-outs
- Inspect drilling equipment and material for spills or leaks

Performance Objectives/Additional Actions

The Environmental Monitor should ensure that bank, bed, and floodplain conditions are restored to pre-construction conditions, where possible, following completion of the construction activities.

Environmental monitoring following spring run-off the year after construction (first year of operations) should also occur, to review the effectiveness of the bank and slope re-vegetation (if required), to check bank and slope stability, and to ensure surface drainage has been maintained. In the event that adverse effects are noted, appropriate remedial measures should be completed as necessary (i.e. site rehabilitation and re-vegetation) and additional follow-up monitoring conducted as appropriate, under the direction of an environmental advisor.

Compensation strategies and/or permits from the DFO and/or the CRCA, as applicable, may include conditions of approval such as construction and post-construction monitoring. All such strategies and/or permits should be obtained prior to construction, and all such conditions and requirements would be implemented as appropriate.

7.2 OPERATION

The Environmental Effects Monitoring Plan for the Project is provided in the **Design and Operations Report**. Operation activities that have the potential to affect aquatic habitat includes accidental spills and/or leaks. Proper storage of materials (e.g. maintenance fluids) at off-site storage containers would greatly reduce the potential for accidental spills and/or leaks.

Appropriate remedial measures may be completed as necessary and additional follow-up monitoring conducted as appropriate in the event of an accidental spill and/or leak. The level of monitoring and reporting should be based on the severity of the spill/leak and may be discussed with the MOE (Spills Action Centre) and MNR.

If *Fisheries Act* approvals are required from DFO, some monitoring may be required, and would be stated in any DFO Authorizations. Monitoring typically includes photographic records during construction and for two years after the completion of construction to ensure survival of plantings and overall function of the installations.

8.0 Conclusions

The Amherst Island Wind Project **Water Assessment and Water Body Report** has been prepared by Stantec for Windlectric Inc. (c/of Algonquin Power Co.) in accordance with Ontario Regulation 359/09. This report is one component of the REA application for the Project.

Careful siting of the wind turbines at the Amherst Island Wind Energy Project ensures that all 36 turbines are located greater than 30 m from any lake or stream. There is a water body located 106 m from the blade tip of Turbine 34. Water bodies located within 120 m of a turbine or structure, or crossed by an access road or collector line are identified in Tables 3.2 and 4.2. All other water bodies in the Study Area are located greater than 120 m from the Project Location

Locations where water bodies are present within 120 m of the proposed Project Location are presented in **Figure 2.** Aquatic habitat characteristics at each water body summarized in **Table 4.2**.

Based on the current Project layout and proposed environmental mitigation measures, construction activities will not result in negative effects to water bodies or fish habitat at proposed collector line crossings. At culverts, docks and cable landing areas (**Table 4.3**), DFO can issue a Letter of Advice if they conclude that the works can be conducted in a manner that will not require a *Fisheries Act* authorization. Consultation with the DFO will continue as Project details are finalized, and Windlectric Inc. will comply with any DFO conditions and recommendations for the Project. .

This report has been prepared by Stantec for the sole benefit of Windlectric Inc., and may not be used by any third party without the express written consent of Windlectric Inc. The data presented in this report are in accordance with Stantec's understanding of the Project as it was presented at the time of reporting.

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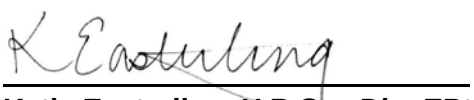

Katie Easterling, H.B.Sc., Dip, EPt
Fisheries Biologist

Nancy Harttrup, B.Sc.
Senior Fisheries Biologist

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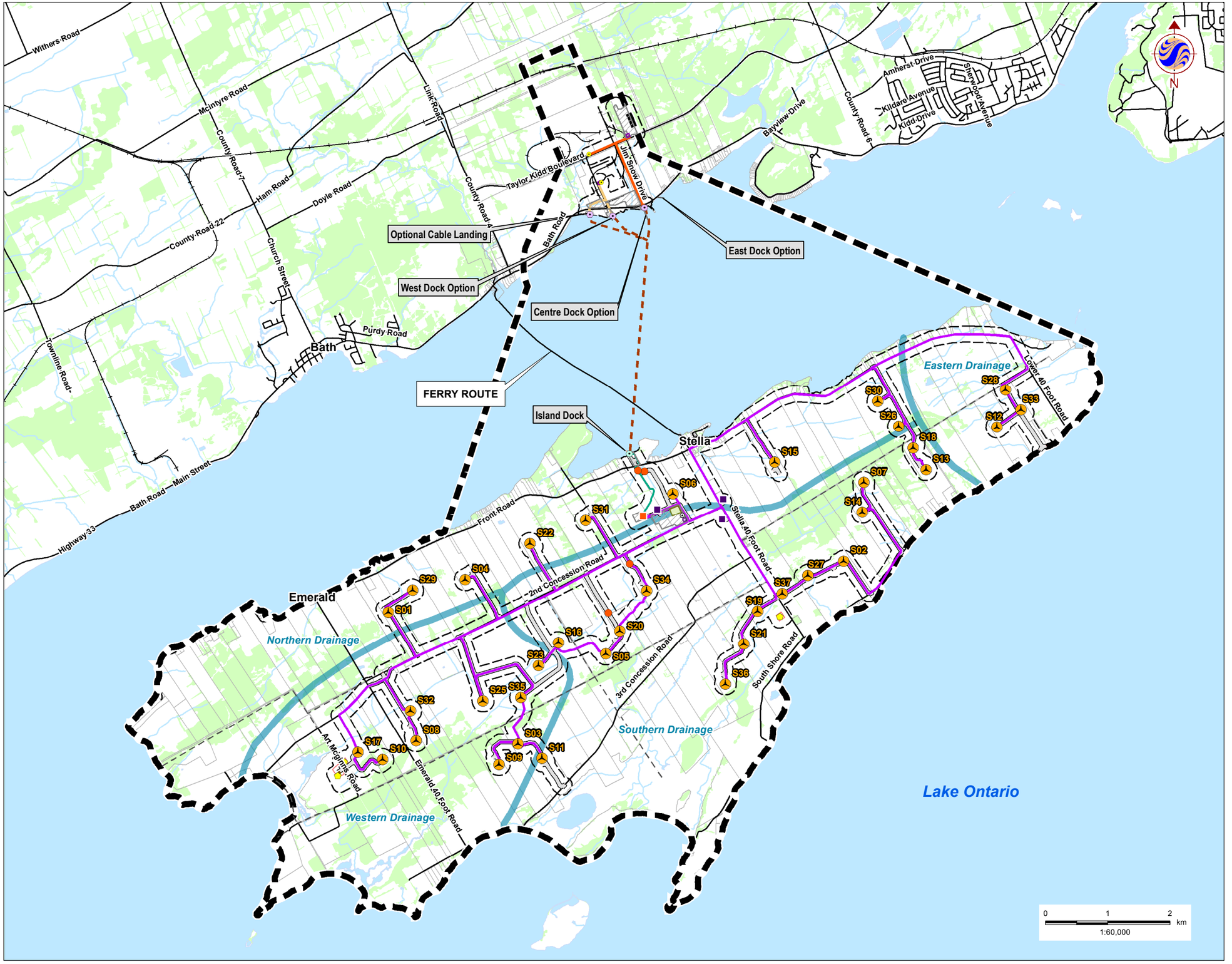
Appendix A

Figures



Legend

- Project Study Area
- 120m Zone of Investigation

Project Components

- Turbine
- Met Tower (Potential Location)
- Substation (Potential Location)
- Access Road
- Collector Lines
- Submarine Cable Path
- Operation and Maintenance Building (Potential Location)
- Potential Culvert Location
- Point of Common Coupling
- Mainland Cable Vault (Potential Location)
- Island Cable Vault
- Aboveground Storage Tanks (Potential Location)
- Constructible Area
- Mainland Dock (Potential Location)
- Island Dock
- Batch Plant (Potential Location)
- Site Office (Potential Location)
- Storage Shed

Transmission Lines

- Mainland Option1
- Mainland Option 2
- Island Transmission Line

Land Use

- Central Staging Area
- Switching Station (Potential Location)

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse
- Waterbody
- Wooded Area
- Property Boundary
- Drainage Area

Notes

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AMHERST ISLAND WIND ENERGY PROJECT

Figure No.

1

Title

Location of Study Area and Subwatersheds

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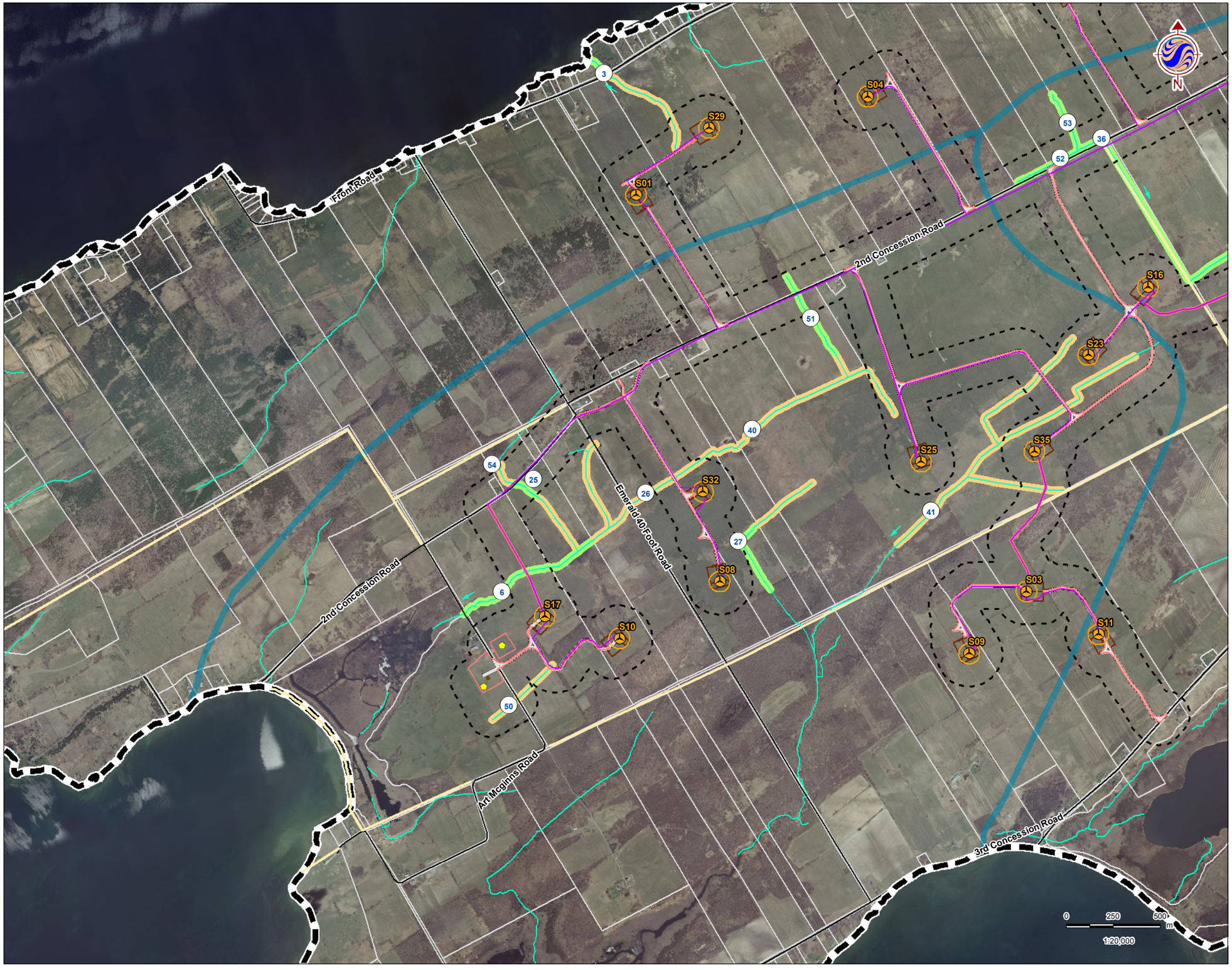

Legend

- Study Area
- 120m Zone of Investigation

Project Components

- Turbine
- Met Tower (Potential Location)
- Access Road
- Collector Lines
- Submarine Cable Path
- Laydown Area and Crane Path
- Submarine Cable Path
- Operation and Maintenance Building (Potential Location)
- Storage Shed
- Turbine Blade Tips
- Substation (Potential Location)
- Potential Culvert Location
- Point of Common Coupling
- Mainland Cable Vault (Potential Location)
- Island Cable Vault
- Aboveground Storage Tanks (Potential Location)
- Constructible Area
- Mainland Dock (Potential Location)
- Island Dock
- Batch Plant (Potential Location)
- Site Office (Potential Location)

Transmission Lines

- Mainland Option1
- Mainland Option 2
- Island Transmission Line

Land Use

- Central Staging Area
- Switching Station (Potential Location)

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse (modified by Stantec)
- Direction of Flow
- Property Line
- REA Water Body
- Not a REA Water Body
- 1 Water Assessment Station Number
- Drainage Area

Notes

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WINDLECTRIC INC.
AMHERST ISLAND WIND ENERGY PROJECT

Figure No.

2 (1 of 4)

Title

Water Body Locations and Water Assessment Survey Stations

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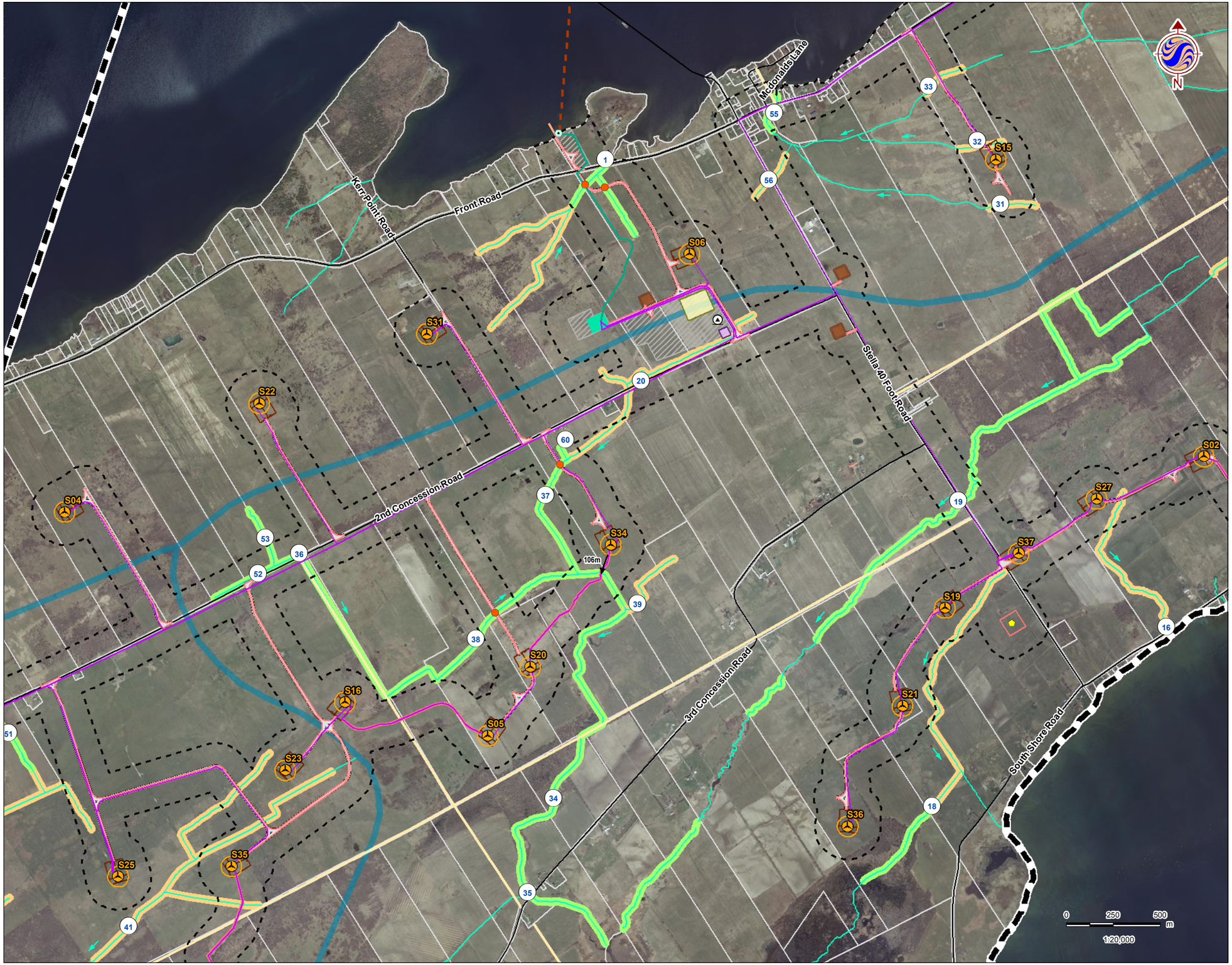

Legend

- Study Area
- 120m Zone of Investigation

Project Components

- Turbine
- Met Tower (Potential Location)
- Access Road
- Collector Lines
- Submarine Cable Path
- Laydown Area and Crane Path
- Submarine Cable Path
- Operation and Maintenance Building (Potential Location)
- Storage Shed
- Turbine Blade Tips
- Substation (Potential Location)
- Potential Culvert Location
- Point of Common Coupling
- Mainland Cable Vault (Potential Location)
- Island Cable Vault
- Aboveground Storage Tanks (Potential Location)
- Constructible Area
- Mainland Dock (Potential Location)
- Island Dock
- Batch Plant (Potential Location)
- Site Office (Potential Location)

Transmission Lines

- Mainland Option1
- Mainland Option 2
- Island Transmission Line

Land Use

- Central Staging Area
- Switching Station (Potential Location)

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse (modified by Stantec)
- Direction of Flow
- Property Line
- REA Water Body
- Not a REA Water Body
- 1 Water Assessment Station Number
- Drainage Area

Notes

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November 2013
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Client/Project

WINDLECTRIC INC.
AMHERST ISLAND WIND ENERGY PROJECT

Figure No.

2 (2 of 4)

Title

Water Body Locations and Water Assessment Survey Stations

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Revised: 2013-11-20 By: pworsell

Legend

- Study Area
- 120m Zone of Investigation

Project Components

- Turbine
- Met Tower (Potential Location)
- Access Road
- Collector Lines
- Submarine Cable Path
- Laydown Area and Crane Path
- Submarine Cable Path
- Operation and Maintenance Building (Potential Location)
- Storage Shed
- Turbine Blade Tips
- Substation (Potential Location)
- Potential Culvert Location
- Point of Common Coupling
- Mainland Cable Vault (Potential Location)
- Island Cable Vault
- Aboveground Storage Tanks (Potential Location)
- Constructible Area
- Mainland Dock (Potential Location)
- Island Dock
- Batch Plant (Potential Location)
- Site Office (Potential Location)

Transmission Lines

- Mainland Option1
- Mainland Option 2
- Island Transmission Line

Land Use

- Central Staging Area
- Switching Station (Potential Location)

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse (modified by Stantec)
- Direction of Flow
- Property Line
- REA Water Body
- Not a REA Water Body
- 1 Water Assessment Station Number
- Drainage Area

Notes

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Client/Project

WINDLECTRIC INC.
AMHERST ISLAND WIND ENERGY PROJECT

Figure No.

2 (3 of 4)

Title

Water Body Locations and Water Assessment Survey Stations

\\cd1220-f02\01609\active\60960595\drawing\MXD\Aquatics\ReportFigures\WaterBody_Report\160960595_Fig2_WaterBodyLocation_SurveyStations_20131119.mxd
Revised: 2013-11-20 By: pworsell

Legend

- Study Area
- 120m Zone of Investigation

Project Components

- Turbine
- Met Tower (Potential Location)
- Access Road
- Collector Lines
- Submarine Cable Path
- Laydown Area and Crane Path
- Submarine Cable Path
- Operation and Maintenance Building (Potential Location)
- Storage Shed
- Turbine Blade Tips
- Substation (Potential Location)
- Potential Culvert Location
- Point of Common Coupling
- Mainland Cable Vault (Potential Location)
- Island Cable Vault
- Aboveground Storage Tanks (Potential Location)
- Constructible Area
- Mainland Dock (Potential Location)
- Island Dock
- Batch Plant (Potential Location)
- Site Office (Potential Location)

Transmission Lines

- Mainland Option1
- Mainland Option 2
- Island Transmission Line

Land Use

- Central Staging Area
- Switching Station (Potential Location)

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse (modified by Stantec)
- Direction of Flow
- Property Line
- REA Water Body
- Not a REA Water Body
- 1 Water Assessment Station Number
- Drainage Area

Notes

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AMHERST ISLAND WIND ENERGY PROJECT

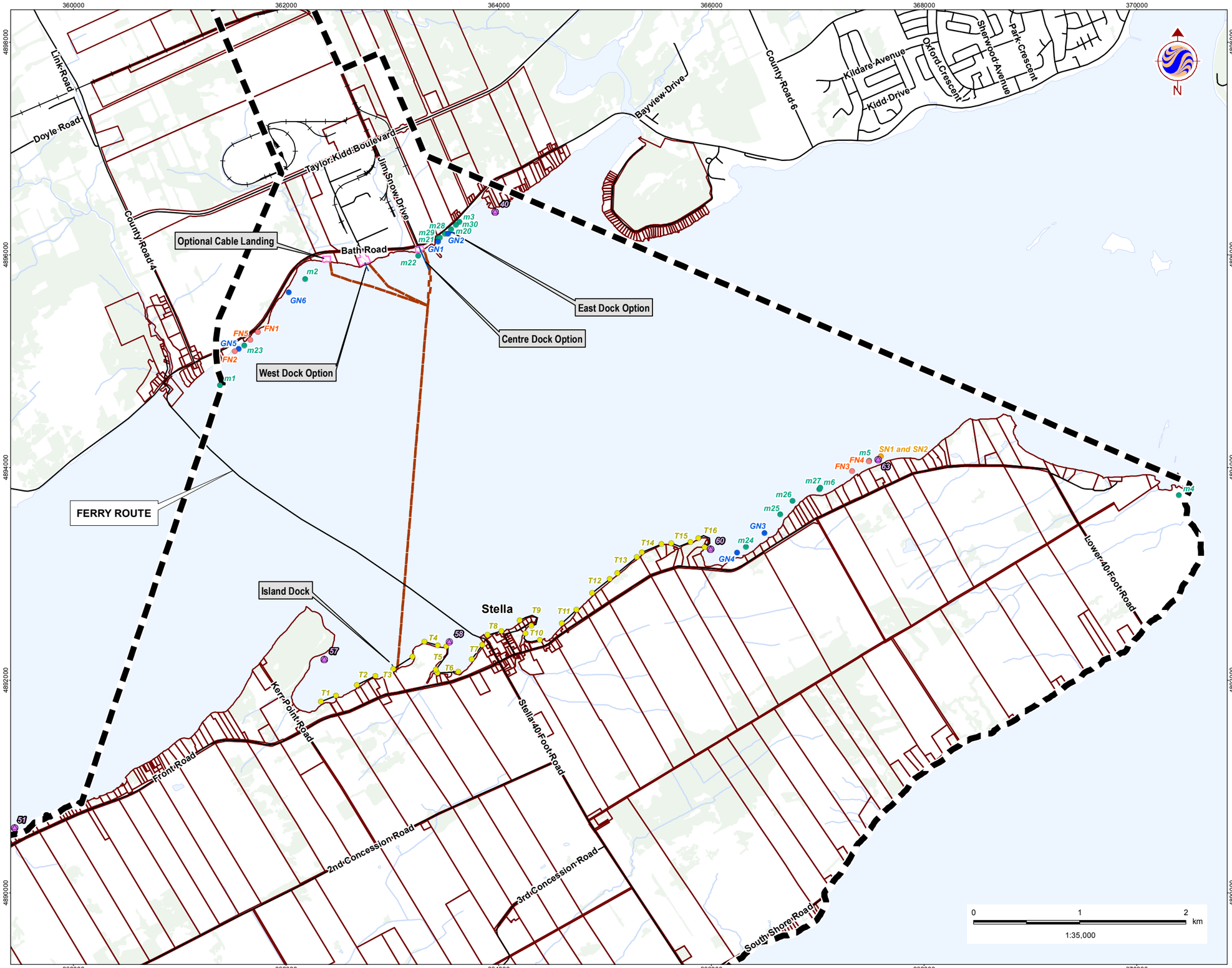
Figure No.

2 (4 of 4)

Title

Water Body Locations and Water Assessment Survey Stations

\\cd1220-f02\01609\active\60960595\drawing\MXD\Aquatics\ReportFigures\WaterBody_Report\160960595_Fig2_WaterBodyLocation_SurveyStations_20131119.mxd
Revised: 2013-11-20 By: pworsell



Legend

- Project Study Area

Project Components

- Submarine Cable Path
- Dock Footprint
- Optional Cable Landing

Existing Features

- Road
- Railway
- Watercourse
- Property Boundaries
- Waterbody
- Wooded Area

Fish Survey Methods

- Fyke Nets (FN1)
- Gill Nets (GN1)
- Minnow Traps (m1)
- Seine Net (SN1)
- Electrofishing Transect (T1)
- LOMU Fish Sampling Stations – 2009 (60)

Notes

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Figure No.

3

Title

Fish Collection Stations in Lake Ontario

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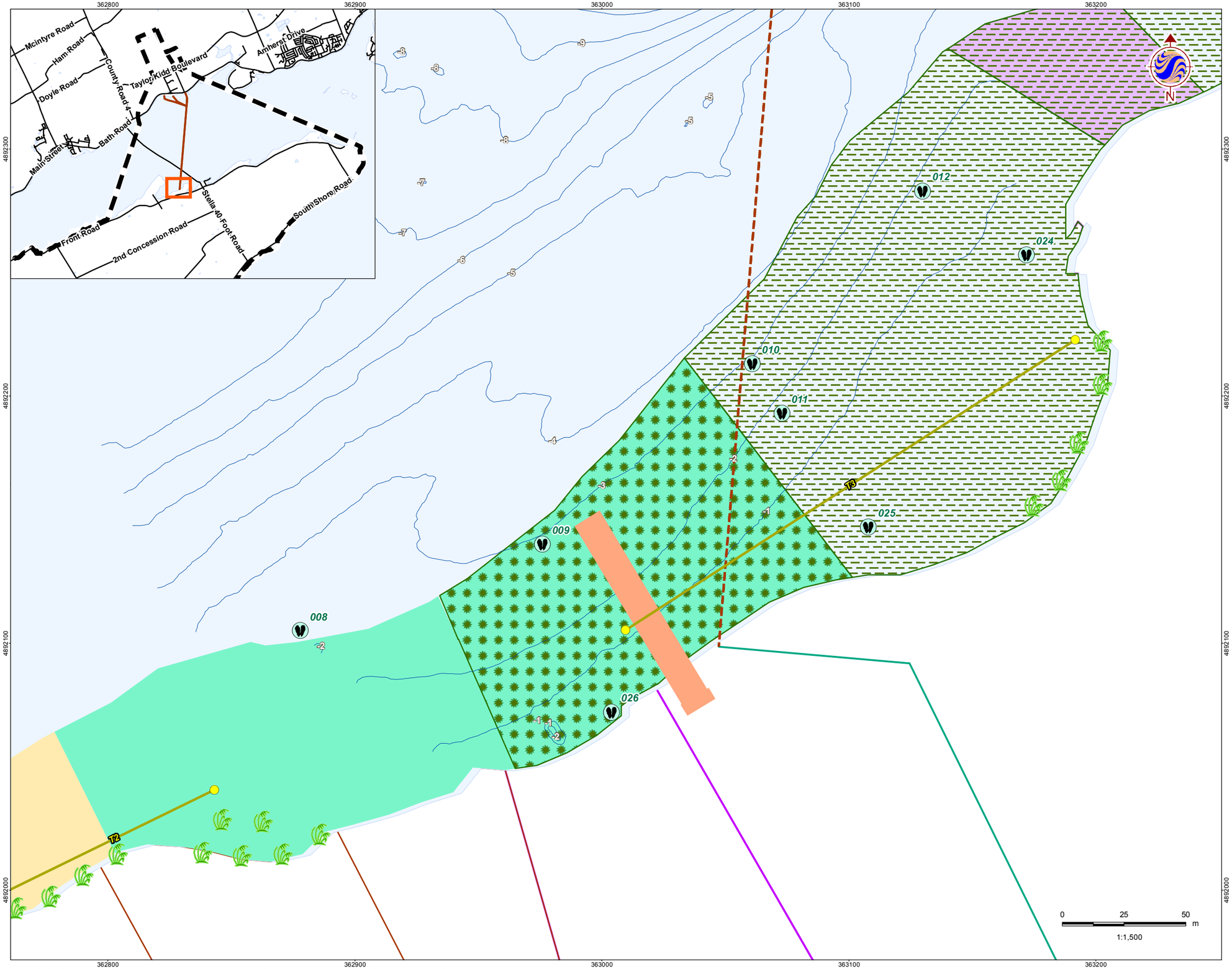
Revised: 2013-04-01 By: pworsell



Legend

- Study Area
- Transformer
- Collector Line
- Unopened Road Allowance
- Bathymetry Contour (metres ASL)
- Road
- Watercourse
- Waterbody
- Optioned Property
- Property Boundary
- Mainland Dock (Potential Location)
- Island Dock
- Optional Cable Landing
- Submarine Cable Path

Transmission Lines

- Mainland Option1
- Mainland Option 2
- Island Transmission Line

Substrate

- Bedrock
- Cobble (patchy)
- Cobble/Sand
- Cobble/Sand/Gravel
- Sand
- Sand/Gravel
- Sand/Silt/Cobble
- Sand/Milfoil

Vegetation

- Milfoil
- Overhanging Terrestrial Vegetation
- Scattered, Sparse Submergent Vegetation
- Weedbed
- Weedbed/Scattered Vegetation
- Emergent Vegetation

Other

- Logs, in Water Cover
- Rocks
- Bass Bed/Nest

Fish Survey Locations

- FN1 Fyke Nets
- GN1 Gill Nets
- m1 Minnow Traps
- SN1 Seine Net
- T1 Electrofishing Transect
- LOMU Fish Sampling Stations – 2009
- Mussel Survey - Sept 2011

Notes

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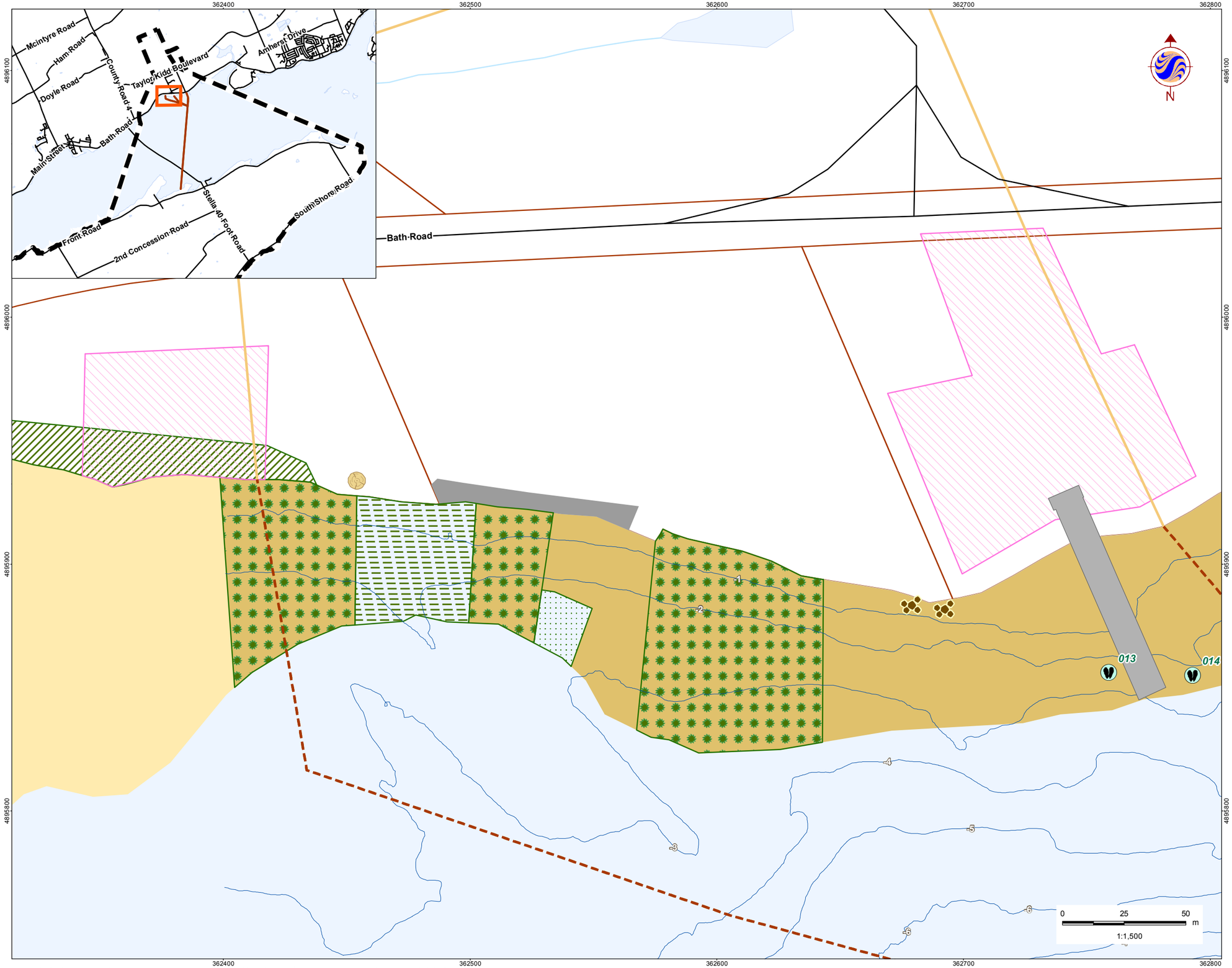
AMHERST ISLAND WIND ENERGY PROJECT

Figure No.
4 (1 of 4)

Title
Substrate and Bathymetry at Dock and Cable Landing Sites
Island Dock

W:\active\60960595\drawing\MXD\Aquatics\ReportFigures\WaterBody_Report\160960595_Fig4_Substrate_BathymetryDock_CableLanding_20130401.mxd
Revised: 2013-04-01 By: pworsell



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Revised: 2013-04-01 By: pworsell

Legend

- Study Area
- Transformer
- Collector Line
- Unopened Road Allowance
- Bathymetry Contour (metres ASL)
- Road
- Watercourse
- Waterbody
- Optioned Property
- Property Boundary
- Mainland Dock (Potential Location)
- Island Dock
- Optional Cable Landing
- Submarine Cable Path

Transmission Lines

- Mainland Option1
- Mainland Option 2
- Island Transmission Line

Substrate

- Bedrock
- Cobble (patchy)
- Cobble/Sand
- Cobble/Sand/Gravel
- Sand
- Sand/Gravel
- Sand/Silt/Cobble
- Sand/Milfoil

Vegetation

- Milfoil
- Overhanging Terrestrial Vegetation
- Scattered, Sparse Submergent Vegetation
- Weedbed
- Weedbed/Scattered Vegetation
- Emergent Vegetation

Other

- Logs, in Water Cover
- Rocks
- Bass Bed/Nest

Fish Survey Locations

- FN1 Fyke Nets
- GN1 Gill Nets
- mn1 Minnow Traps
- SN1 Seine Net
- T1 Electrofishing Transect
- 00 010 LOMU Fish Sampling Stations – 2009
- Mussel Survey - Sept 2011

Notes

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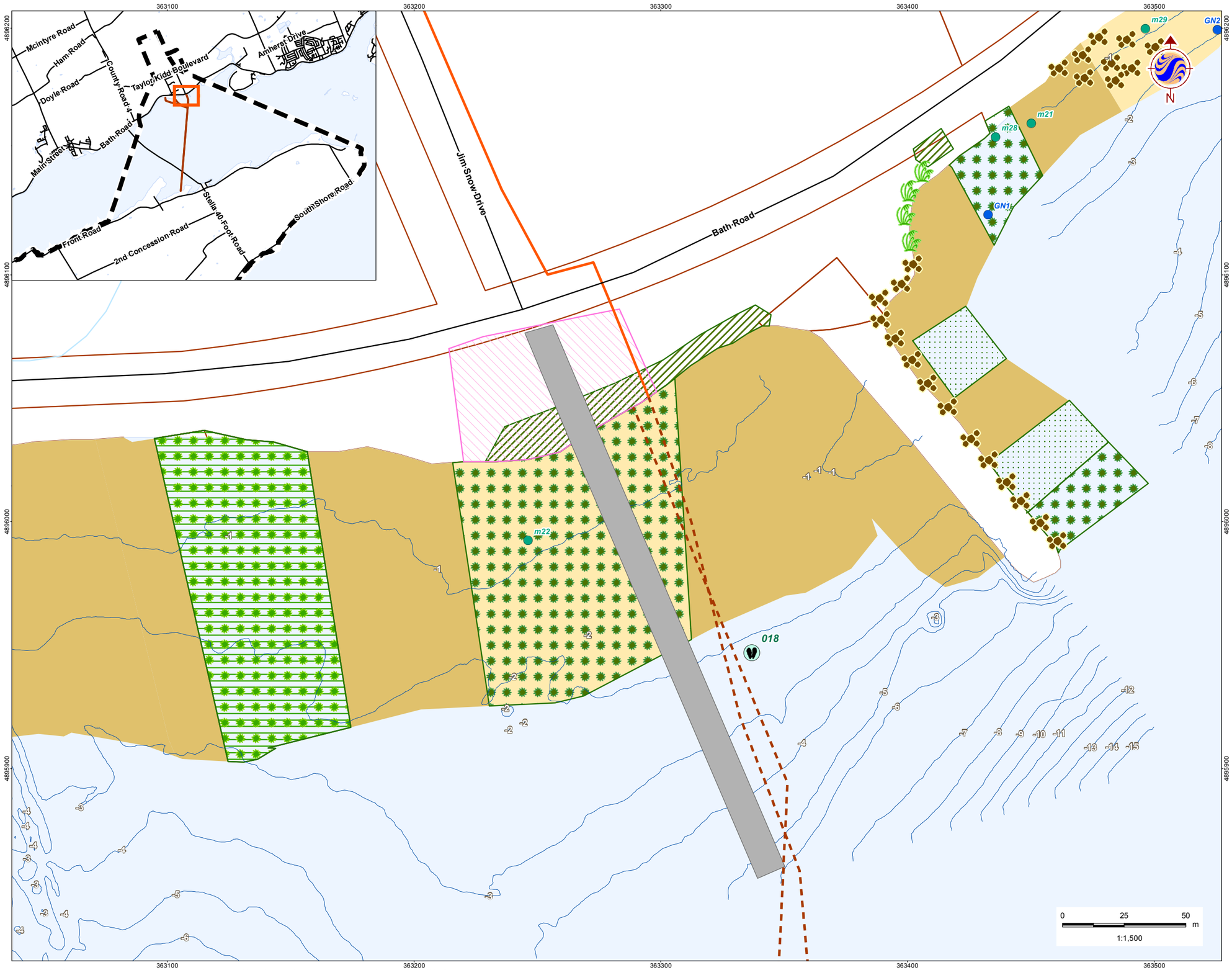
Figure No.
4 (2 of 4)

Title
Substrate and Bathymetry at Dock and Cable Landing Sites
Mainland Dock – West Option and Optional Cable Landing Area



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Revised: 2013-04-01 By: pworsell

Legend

- Study Area
- Transformer
- Collector Line
- Unopened Road Allowance
- Bathymetry Contour (metres ASL)
- Road
- Watercourse
- Waterbody
- Optioned Property
- Property Boundary
- Mainland Dock (Potential Location)
- Island Dock
- Optional Cable Landing
- Submarine Cable Path

Transmission Lines

- Mainland Option1
- Mainland Option 2
- Island Transmission Line

Substrate

- Bedrock
- Cobble (patchy)
- Cobble/Sand
- Cobble/Sand/Gravel
- Sand
- Sand/Gravel
- Sand/Silt/Cobble
- Sand/Milfoil

Vegetation

- Milfoil
- Overhanging Terrestrial Vegetation
- Scattered, Sparse Submergent Vegetation
- Weedbed
- Weedbed/Scattered Vegetation
- Emergent Vegetation

Other

- Logs, in Water Cover
- Rocks
- Bass Bed/Nest

Fish Survey Locations

- Fyke Nets (FN1)
- Gill Nets (GN1)
- Minnow Traps (m1)
- Seine Net (SN1)
- Electrofishing Transect (T1)
- LOMU Fish Sampling Stations – 2009 (010)
- Mussel Survey - Sept 2011

Notes

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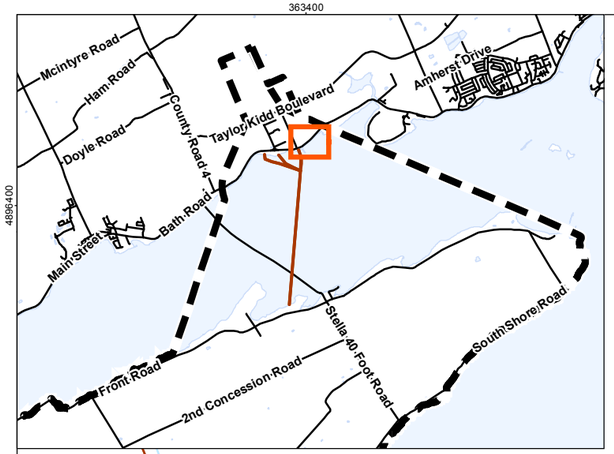
Figure No.
4 (3 of 4)

Title
Substrate and Bathymetry at Dock and Cable Landing Sites
Mainland Dock – Centre Option



363400 363500 363600 363700 363800

4896400 4896300 4896200 4896100

Bath Road

m3 m30 m20 m29 m21 m28 GN2 GN1

-1 -2 -3 -4 -5 -6 -7

0 25 50 m

1:1,500

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Revised: 2013-04-01 By: pworsell

Legend

- Study Area
- Transformer
- Collector Line
- Unopened Road Allowance
- Bathymetry Contour (metres ASL)
- Road
- Watercourse
- Waterbody
- Optioned Property
- Property Boundary
- Mainland Dock (Potential Location)
- Island Dock
- Optional Cable Landing
- Submarine Cable Path

Transmission Lines

- Mainland Option1
- Mainland Option 2
- Island Transmission Line

Substrate

- Bedrock
- Cobble (patchy)
- Cobble/Sand
- Cobble/Sand/Gravel
- Sand
- Sand/Gravel
- Sand/Silt/Cobble
- Sand/Milfoil

Vegetation

- Milfoil
- Overhanging Terrestrial Vegetation
- Scattered, Sparse Submergent Vegetation
- Weedbed
- Weedbed/Scattered Vegetation
- Emergent Vegetation

Other

- Logs, in Water Cover
- Rocks
- Bass Bed/Nest

Fish Survey Locations

- Fyke Nets (FN1, GN1)
- Gill Nets (m1)
- Minnow Traps (SN1)
- Seine Net (T1)
- Electrofishing Transect (e1)
- LOMU Fish Sampling Stations – 2009 (e10)
- Mussel Survey - Sept 2011

Notes

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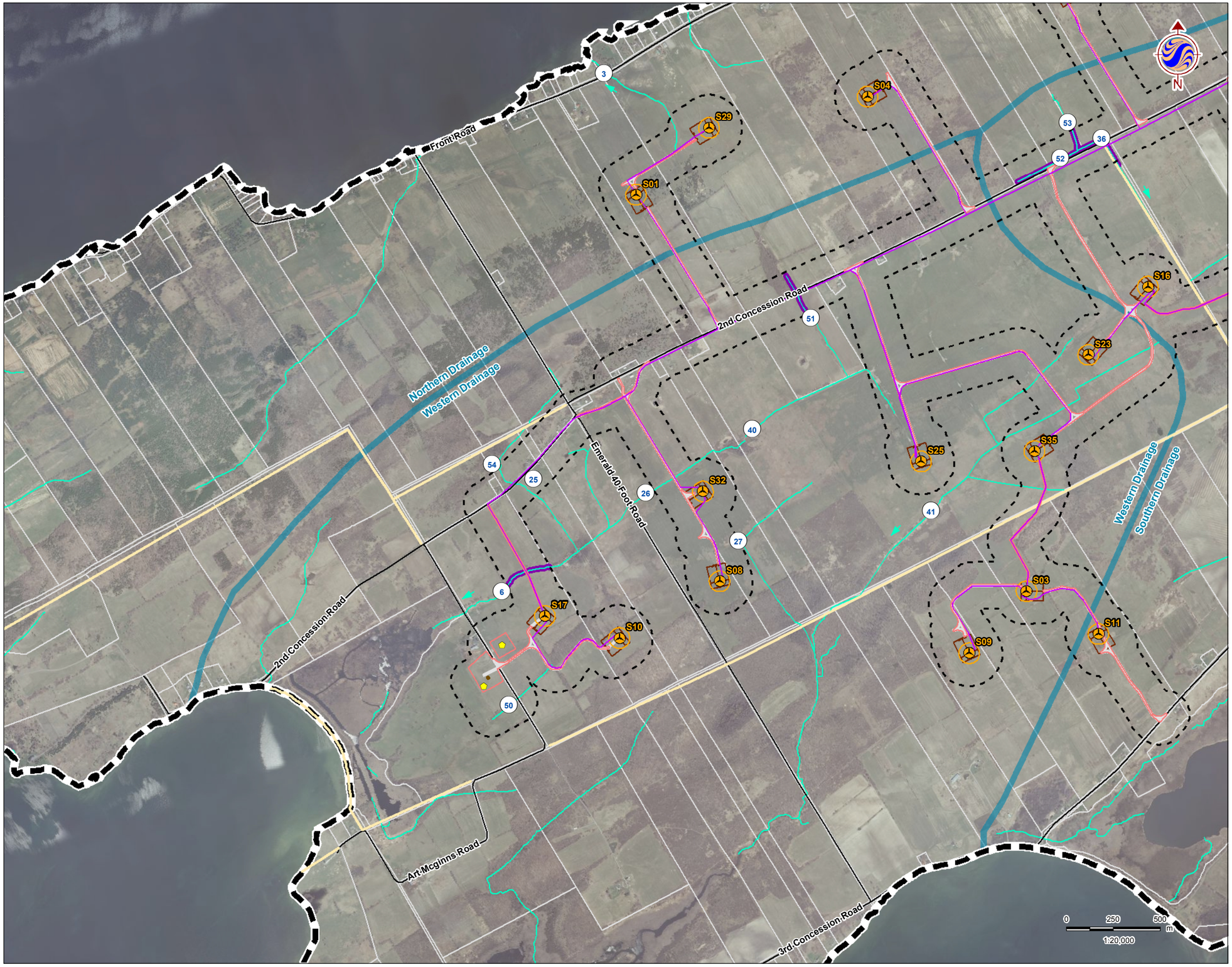
Figure No.
4 (4 of 4)

Title
Substrate and Bathymetry at Dock and Cable Landing Sites
Mainland Dock – East Option



Legend

- Study Area
- 120m Zone of Investigation

Project Components

- Turbine
- Met Tower (Potential Location)
- Access Road
- Collector Lines
- Laydown Area and Crane Path
- Submarine Cable Path
- Operation and Maintenance Building (Potential Location)
- Storage Shed
- Turbine Blade Tips
- Substation (Potential Location)
- Potential Culvert Location
- Point of Common Coupling
- Mainland Cable Vault (Potential Location)
- Island Cable Vault
- Aboveground Storage Tanks (Potential Location)
- Constructible Area
- Mainland Dock (Potential Location)
- Island Dock
- Batch Plant (Potential Location)
- Site Office (Potential Location)

Transmission Lines

- Mainland Option1
- Mainland Option 2
- Island Transmission Line

Land Use

- Central Staging Area
- Switching Station (Potential Location)

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse (modified by Stantec)
- Direction of Flow
- Property Line
- Drainage Area
- Fish Habitat
- (1) Water Assessment Station Number

Notes

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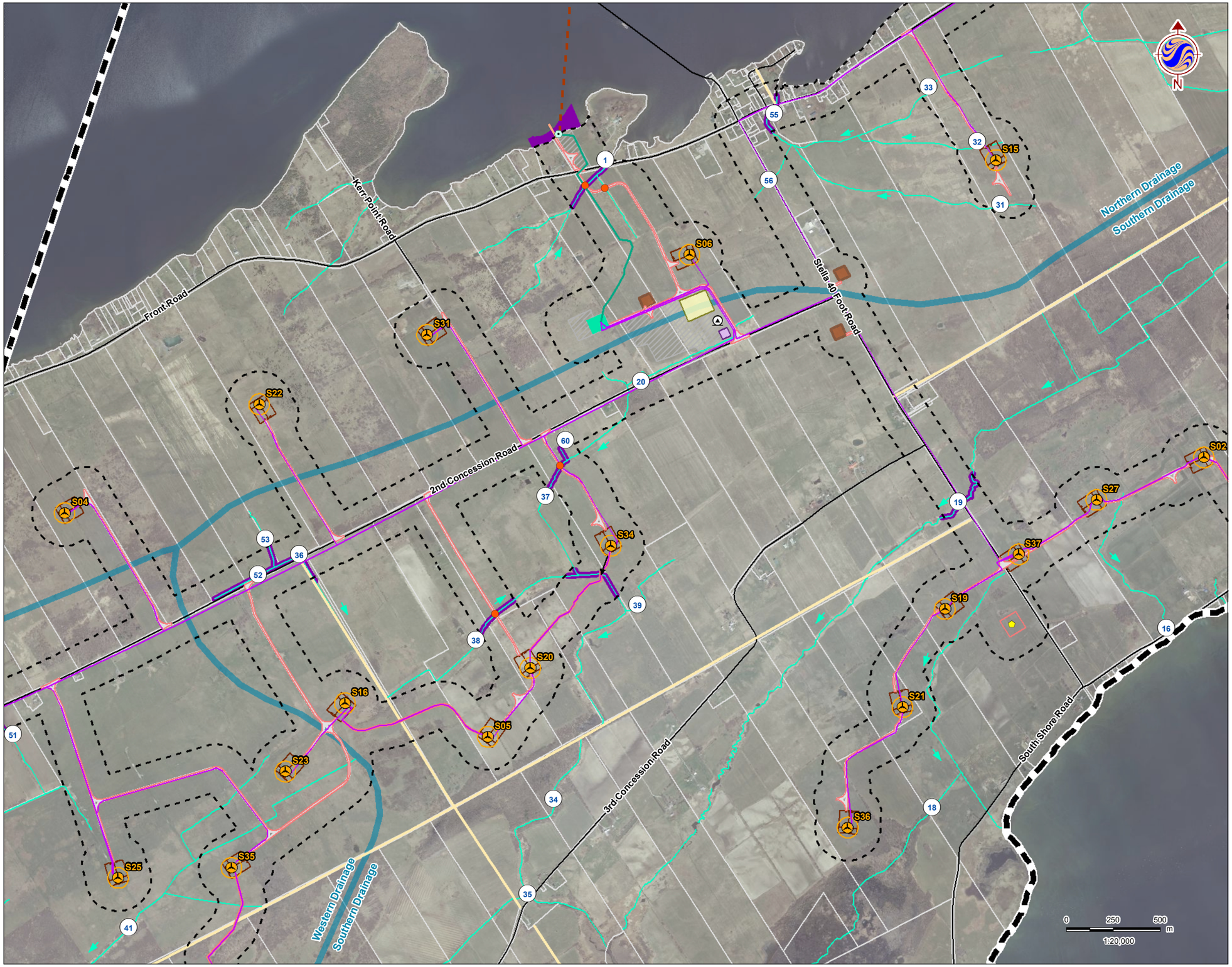
Figure No.

5 (1 of 4)

Title

Fish Habitat in the Zone of Investigation

\\cd1220-f02\01609\active\60960595\drawing\MXD\Aquatics\ReportFigures\WaterBody_Report\160960595_Fig5_FishHabitat_20131119.mxd
Revised: 2013-11-20 By: pworsell



Legend

- Study Area
- 120m Zone of Investigation

Project Components

- Turbine
- Met Tower (Potential Location)
- Access Road
- Collector Lines
- Laydown Area and Crane Path
- Submarine Cable Path
- Operation and Maintenance Building (Potential Location)
- Storage Shed
- Turbine Blade Tips
- Substation (Potential Location)
- Potential Culvert Location
- Point of Common Coupling
- Mainland Cable Vault (Potential Location)
- Island Cable Vault
- Aboveground Storage Tanks (Potential Location)
- Constructible Area
- Mainland Dock (Potential Location)
- Island Dock
- Batch Plant (Potential Location)
- Site Office (Potential Location)

Transmission Lines

- Mainland Option1
- Mainland Option 2
- Island Transmission Line

Land Use

- Central Staging Area
- Switching Station (Potential Location)

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse (modified by Stantec)
- Direction of Flow
- Property Line
- Drainage Area
- Fish Habitat
- 1 Water Assessment Station Number

Notes

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Figure No.

5 (2 of 4)

Title

Fish Habitat in the Zone of Investigation

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Revised: 2013-11-20 By: pworsell

Legend

- Study Area
- 120m Zone of Investigation

Project Components

- Turbine
- Met Tower (Potential Location)
- Access Road
- Collector Lines
- Laydown Area and Crane Path
- Submarine Cable Path
- Operation and Maintenance Building (Potential Location)
- Storage Shed
- Turbine Blade Tips
- Substation (Potential Location)
- Potential Culvert Location
- Point of Common Coupling
- Mainland Cable Vault (Potential Location)
- Island Cable Vault
- Aboveground Storage Tanks (Potential Location)
- Constructible Area
- Mainland Dock (Potential Location)
- Island Dock
- Batch Plant (Potential Location)
- Site Office (Potential Location)

Transmission Lines

- Mainland Option1
- Mainland Option 2
- Island Transmission Line

Land Use

- Central Staging Area
- Switching Station (Potential Location)

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse (modified by Stantec)
- Direction of Flow
- Property Line
- Drainage Area
- Fish Habitat
- 1 Water Assessment Station Number

Notes

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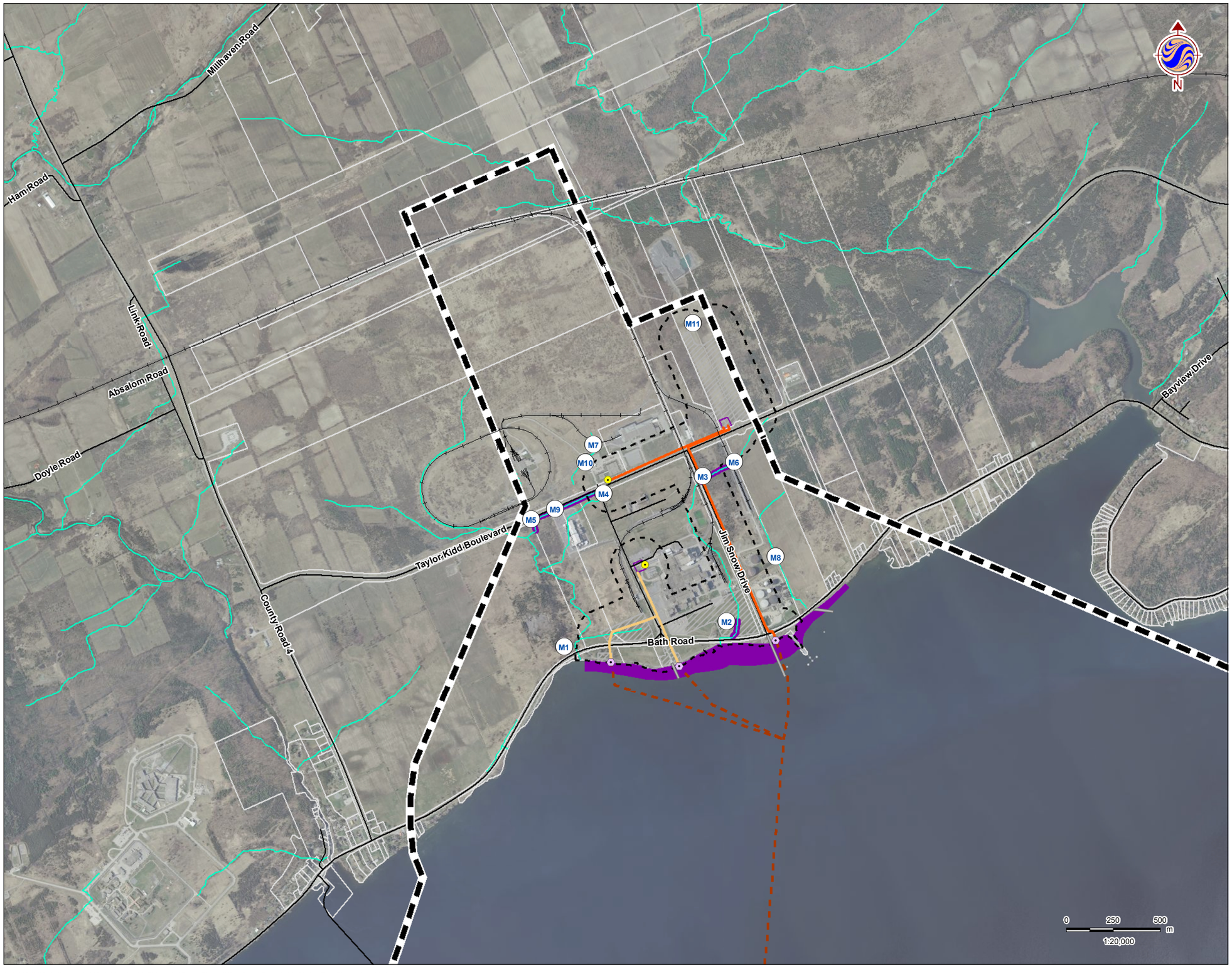
Figure No.

5 (3 of 4)

Title

Fish Habitat in the Zone of Investigation

\\cd1220-f02\01609\active\60960595\drawing\MXD\Aquatics\ReportFigures\WaterBody_Report\160960595_Fig5_FishHabitat_20131119.mxd
Revised: 2013-11-20 By: pworsell



Legend

- Study Area
- 120m Zone of Investigation

Project Components

- Turbine
- Met Tower (Potential Location)
- Access Road
- Collector Lines
- Laydown Area and Crane Path
- Submarine Cable Path
- Operation and Maintenance Building (Potential Location)
- Storage Shed
- Turbine Blade Tips
- Substation (Potential Location)
- Potential Culvert Location
- Point of Common Coupling
- Mainland Cable Vault (Potential Location)
- Island Cable Vault
- Aboveground Storage Tanks (Potential Location)
- Constructible Area
- Mainland Dock (Potential Location)
- Island Dock
- Batch Plant (Potential Location)
- Site Office (Potential Location)

Transmission Lines

- Mainland Option1
- Mainland Option 2
- Island Transmission Line

Land Use

- Central Staging Area
- Switching Station (Potential Location)

Existing Features

- Road
- Unopened Road Allowance
- Railway
- Watercourse (modified by Stantec)
- Direction of Flow
- Property Line
- Drainage Area
- Fish Habitat
- 1 Water Assessment Station Number

Notes

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AMHERST ISLAND WIND ENERGY PROJECT

Figure No.

5 (4 of 4)

Title

Fish Habitat in the Zone of Investigation

\\cd1220-f02\01609\active\60960595\drawing\MXD\Aquatics\ReportFigures\WaterBody_Report\160960595_Fig5_FishHabitat_20131119.mxd
Revised: 2013-11-20 By: pworsell

Appendix B

Photographic Record

Northern Drainage

Photo 1 Station 3 – upstream view from Front Road showing surficial drainage through pasture.

Photo 2 Station 3 – downstream view from Front Road showing channel overview.

Photo 3 Station 1 – upstream view of main channel from Front Road showing channel overview.

Photo 4 Station 1 – incised drainage channel flowing south through agricultural fields and connecting with main channel approximately 50 m upstream

Photo 5 Station 1 – channel branching to the west, consisting of diffuse surficial drainage from an on-line pond

Photo 6 Station 1 – channel branching to the southwest, consisting of diffuse surficial drainage

Photo 7 Station 1 – downstream view from Front Road towards Lake Ontario

No Photo

Photo 8 Station 31 – upstream view of mapped watercourse, no evidence of a channel or drainage

Photo 9 Station 31 – downstream view of mapped watercourse, no evidence of a channel or drainage

Photo 10 Station 32 – upstream view of mapped watercourse, no evidence of a channel or drainage

Photo 11 Station 32 – downstream view of mapped watercourse, no evidence of a channel or drainage

Photo 12 Station 33 - upstream view of mapped watercourse, no evidence of a channel or drainage

Photo 13 Station 33 - downstream view of mapped watercourse, no evidence of a channel, just some diffuse surficial drainage

Photo 14 Station 56 – upstream view from Stella 40 Foot Road showing surficial drainage through field.

Photo 15 Station 56 – downstream view from Stella 40 Foot Road showing surficial drainage through field.

Photo 16 Station 55 – downstream view from Front Road showing channel overview.

Photo 17 Station 55 – downstream overview showing channel and foot bridge.

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APPENDIX
B
TITLE
Photolog

Photo 18 Station 55 – upstream view from Front Road showing channel overview.

Photo 19 Station 57 – facing upstream from Front Road showing channel overview

Photo 20 Station 57 – facing downstream from Front Road towards Lake Ontario

Photo 21 Station 21 – upstream view of surficial drainage through adjacent pasture

Photo 22 Station 21 – upstream of Front Road, downstream view towards road of channel

Photo 23 Station 21 – downstream view from Front Road

Eastern Drainage

Photo 1 Station 30 – upstream view from Front Road of surficial drainage through field

Photo 2 Station 30 – downstream view of braided flow through grasses situated between Front Road and driveway access road

Photo 3 Station 58 – downstream view from Front Road showing dry channel through Reed Canary Grass floodplain.

Photo 4 Station 58 – Close-up of culvert and dry channel.

Photo 5 Station 29 – upstream view from farm crossing of surficial drainage. Some erosion was noted and is a result of an under-sized culvert at the access road

Photo 6 Station 29 – downstream view from farm crossing of surficial drainage through low-lying area in field

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APPENDIX
B

TITLE
Eastern Drainage Photolog

Photo 7 Station 9 – upstream view from Lower 40 Foot Road through adjacent agricultural field

Photo 8 Station 9 – downstream view from Lower 40 Foot Road, extremely sinuous channel flowing toward Lake Ontario

Photo 9 Station 28 – upstream view from farm crossing of ponded area resulting from previous rainfall

Photo 10 Station 28 – downstream view from farm crossing of surficial drainage through field

Photo 11 Station 8 – upstream view from Lower 40 Foot Road through adjacent woodlot

Photo 12 Station 8 – downstream view from Lower 40 Foot Road through pasture

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APPENDIX
B

TITLE
Eastern Drainage Photolog

PAGE

Photo 13 Station 11 – upstream view of diffuse surficial drainage through agricultural field

Photo 14 Station 11 – downstream view of diffuse surficial drainage through agricultural field

Photo 15 Station 7 – upstream view from Lower 40 Foot Road, diffuse surficial drainage through pasture

Photo 16 Station 7 – downstream view from Lower 40 Foot Road, sinuous and eroded channel through pasture

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SITE:
Amherst Island

APPENDIX
B

TITLE
Eastern Drainage Photolog

Southern Drainage

Photo 1 Station 10 – upstream view from South Shore Road, diffuse surficial drainage through pasture

Photo 2 Station 10 – downstream view from South Shore Road, perched culvert outletting to limestome bedrock along Lake Ontario shoreline

Photo 3 Station 12 – upstream view from South Shore Road of surficial drainage through agricultural field

Photo 4 Station 12 – downstream view from South Shore Road, perched culvert outletting to limestome bedrock along Lake Ontario shoreline

Photo 5 Station 13 – upstream view from South Shore Road of surficial drainage through agricultural field

Photo 6 Station 13 – downstream view from South Shore Road, perched culvert outletting to limestome bedrock along Lake Ontario shoreline

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APPENDIX
B

TITLE
Southern Drainage Photolog

Photo 7 Station 14 – upstream view of surficial drainage through agricultural field

Photo 8 Station 14 – downstream view of surficial drainage through agricultural field

Photo 9 Station 18 – upstream view of diffuse surficial drainage through agricultural field

Photo 10 Station 18 – upstream view from farm crossing of flooded wooded area

Photo 11 Station 18 – flooded farm crossing, Brook Stickleback captured in pool at this location

Photo 12 Station 18 – downstream view from flooded farm crossing

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APPENDIX
B

TITLE
Southern Drainage Photolog

PAGE

Photo 13 Station 19 – upstream from Stella 40 Foot Road

Photo 14 Station 19 – downstream from Stella 40 Foot Road

Photo 15 Station 52 – upstream view along 2nd Concession showing channel overview.

Photo 16 Station 52 – downstream view along 2nd Concession showing channel and riparian vegetation.

Photo 17 Station 36 – upstream view from Second Concession Road

Photo 18 Station 36 - downstream view from Second Concession Road

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APPENDIX
B

TITLE
Southern Drainage Photolog

PAGE

Photo 19 Station 38 - upstream view through pasture

Photo 20 Station 38 - downstream view of confluence with larger watercourse

Photo 21 Station 34 – upstream view from inside woodlot, near proposed crossing

Photo 22 Station 34 - downstream view from inside woodlot, near proposed crossing

Photo 23 Station 35 – upstream view from Third Concession Road

Photo 24 Station 35 – downstream view from Third Concession Road

Photo 25 Station 53 – Upstream view from 2nd Concession showing channel overview.

Photo 26 Station 20 – upstream from Second Concession Road, view along north side of the road

Photo 27 Station 20 – downstream from Second Concession Road, view along south side of the road

Photo 28 Station 60 – Facing south from 2nd Concession showing riparian area associated with short channel between Station 20 and Station 37.

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Amherst Island

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Southern Drainage Photolog

PAGE

Western Drainage

Photo 1 Station 41 – upstream view from station showing ill-defined grassy swale.

Photo 2 Station 41 – downstream view from station showing ill-defined grassy swale.

Photo 3 Station 27 – upstream through agricultural field, view looking northeast at eroded bend

Photo 4 Station 27 – downstream view through agricultural field of

Photo 5 Station 51 – upstream view from 2nd Concession showing channel flowing along the east side of a wooded area.

Photo 6 Station 51 – downstream view from 2nd Concession showing channel overview along treeline.

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SITE:
Amherst Island

APPENDIX
B

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Western Drainage Photolog

PAGE

Photo 7 Station 40 – upstream view showing lack of channel through pasture.

Photo 8 Station 40 – downstream view showing lack of channel definition through pasture.

Photo 9 Station 26 – upstream from Emerald 40 Foot Road of surficial drainage through field

Photo 10 Station 26 – downstream from Emerald 40 Foot Road of surficial drainage through field and minor ponding due to previous rain

Photo 11 Station 6 – downstream view from Art McGinns Road

Photo 12 Station 7 – upstream view from Lower 40 Foot Road, diffuse surficial drainage through pasture

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Windlectric Inc.

SITE:
Amherst Island

APPENDIX
B

TITLE
Western Drainage Photolog

PAGE

Photo 13 Station 25 – upstream view from Second Concession Road

Photo 14 Station 25 – downstream view from Second Concession Road through adjacent pasture

Photo 15 Station 54 – upstream view from 2nd Concession showing surficial drainage through wooded area and pasture.

Photo 16 Station 50 – upstream view from Art McGinns Road showing lack of channel definition.

Photo 17 Station 50 – downstream view from Art McGinns Road showing surficial drainage through agricultural fields.

Mainland Drainage

Photo 1 M1 – Facing upstream from Bath Road, showing channel overview.

Photo 2 M1 – Facing downstream from Bath Road showing channel and Lake Ontario.

Photo 3 Tributary of M1 facing west from east end (from Invista access road)

Photo 4 M2 – Facing upstream showing cattail lined channel.

Photo 5 M2 – Facing downstream showing culvert and direct connection to Lake Ontario.

Photo 6 M6 – Facing upstream showing surficial drainage

Photo 7 M3 – Facing upstream from Jim Snow Drive

Photo 8 M3 – Facing downstream from Jim Snow Drive

Photo 9 M4 – Facing upstream from Taylor Kidd Boulevard showing lack of channel.

Photo 10 M4 – Facing downstream along Taylor Kidd Boulevard showing shallow channel.

Photo 11 M9 – Facing upstream along Taylor Kidd Boulevard showing cattail lined channel.

Photo 12 M9 – Facing downstream along Taylor Kidd Boulevard showing channel overview.

Photo 13 M5 – Facing downstream from Taylor Kidd Boulevard showing channel overview

Photo 14 M5 – Facing upstream from Taylor Kidd Boulevard showing channel overview.

Photo 15 M7 – Facing upstream showing channel overview.

Photo 16 M7 – Facing downstream showing channel and vegetation.

Photo 17 M10 – Facing upstream showing channel overview and possible patch of watercress.

Photo 18 M10 – facing downstream showing diffuse, surficial flow into cattail wetland.

Photo 19 M11 – Facing upstream showing lack of channel.

Photo 20 M11 – Facing north showing tractor path through low-lying wet area with no defined channel.

Photo 21 M11 – Facing downstream showing low-lying wet area with no defined channel.

Photo 22

Island Dock

Photo 1 Shoreline near the proposed island dock/cable landing location (Stantec, 2011)

Photo 2 Substrate in the nearshore area at island dock/cable landing location (Stantec, 2011).

Photo 3 Facing west along the shoreline at the proposed island dock/cable landing location (2012)

Photo 4 Facing east along the shoreline at the proposed island dock/cable landing location (2012)

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SITE:
Amherst Island

APPENDIX
B

TITLE
Island Dock and Cable Landing

PAGE
1 of 1

Underwater images of island side shoreline (ASI 2012)

TR1

TR1

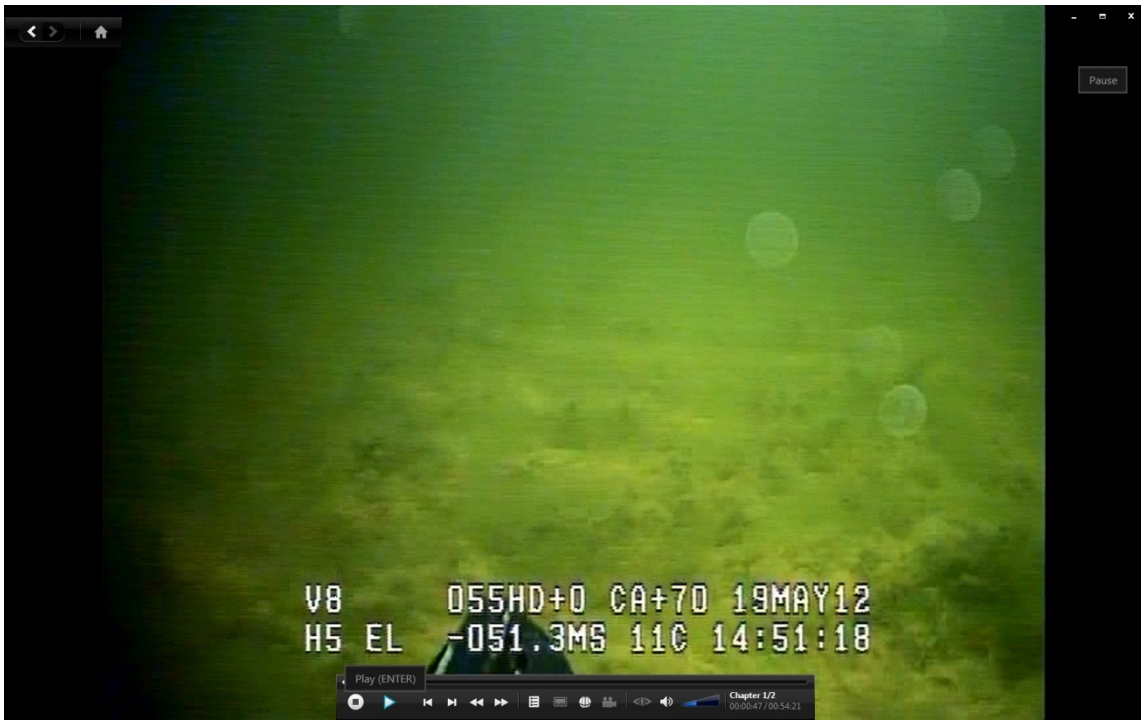
Underwater images of island side shoreline (ASI 2012)

TR1

TR1

Underwater images of island side shoreline (ASI 2012)

TR2



TR2

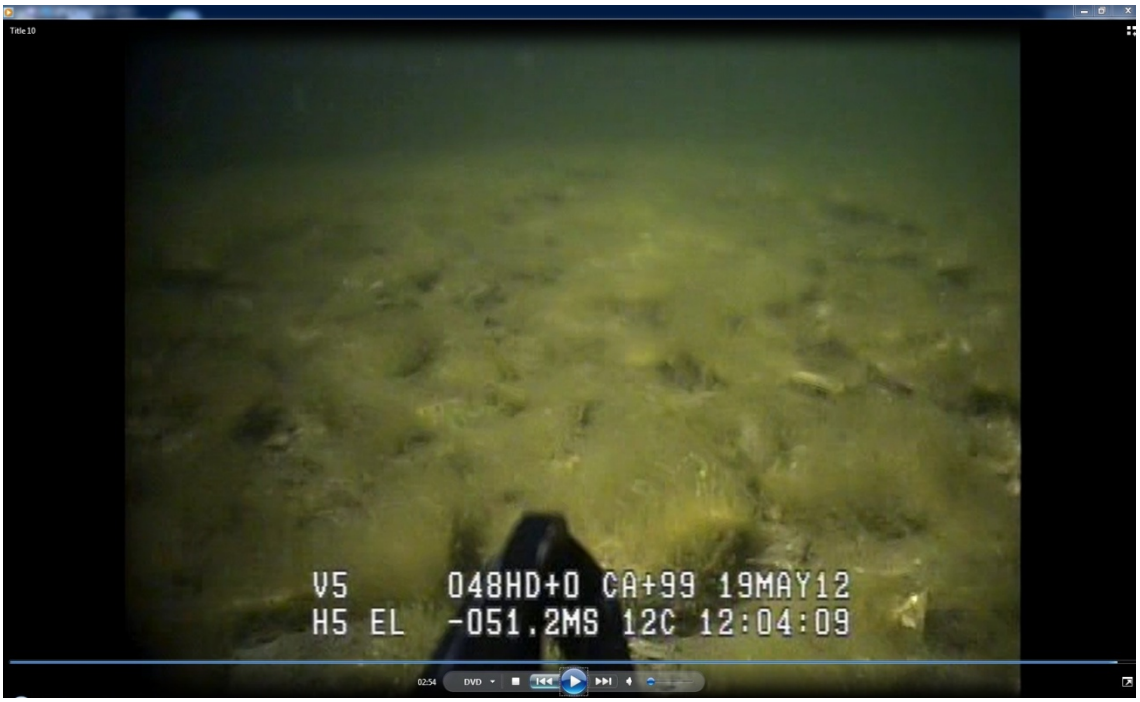
Underwater images of island side shoreline (ASI 2012)

TR2

TR2

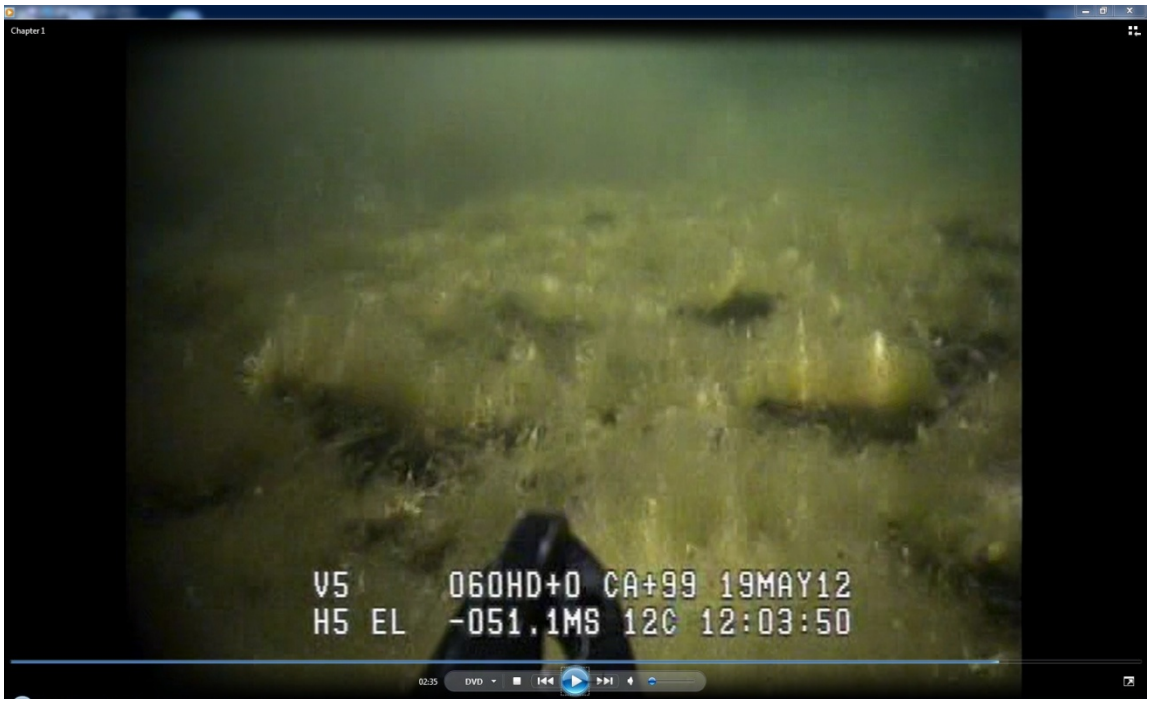
Underwater images of island side shoreline (ASI 2012)

Sediment Sampling Station CR 20

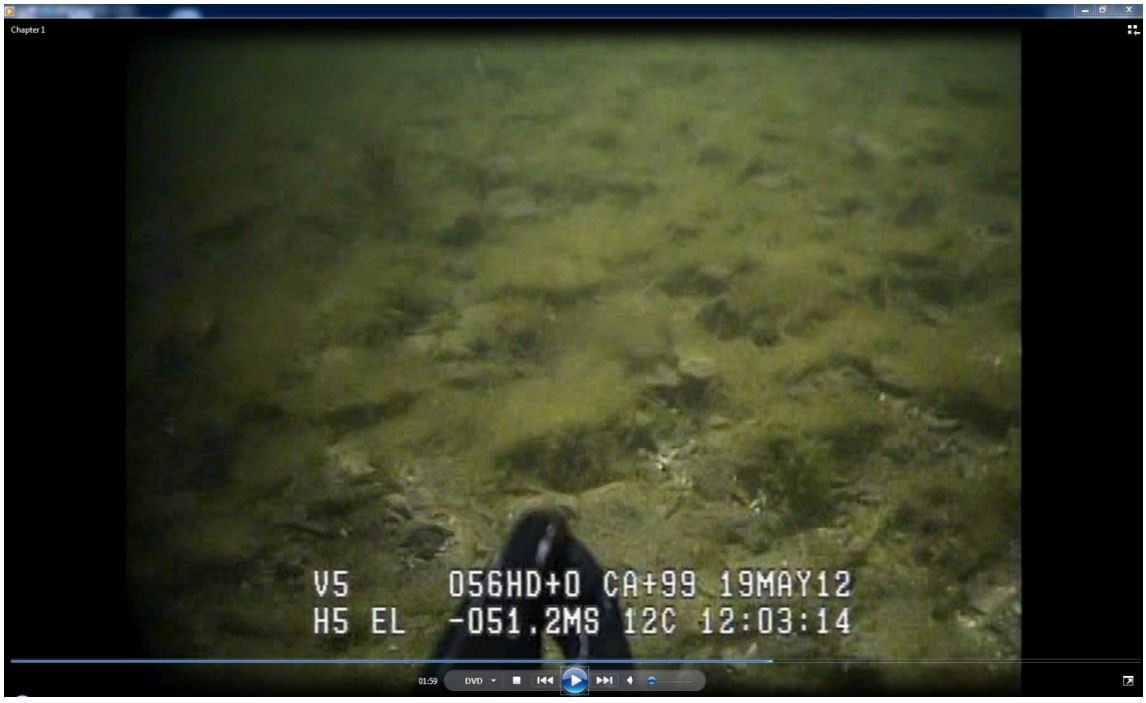


Sediment Sampling Station CR 20

Underwater images of island side shoreline (ASI 2012)

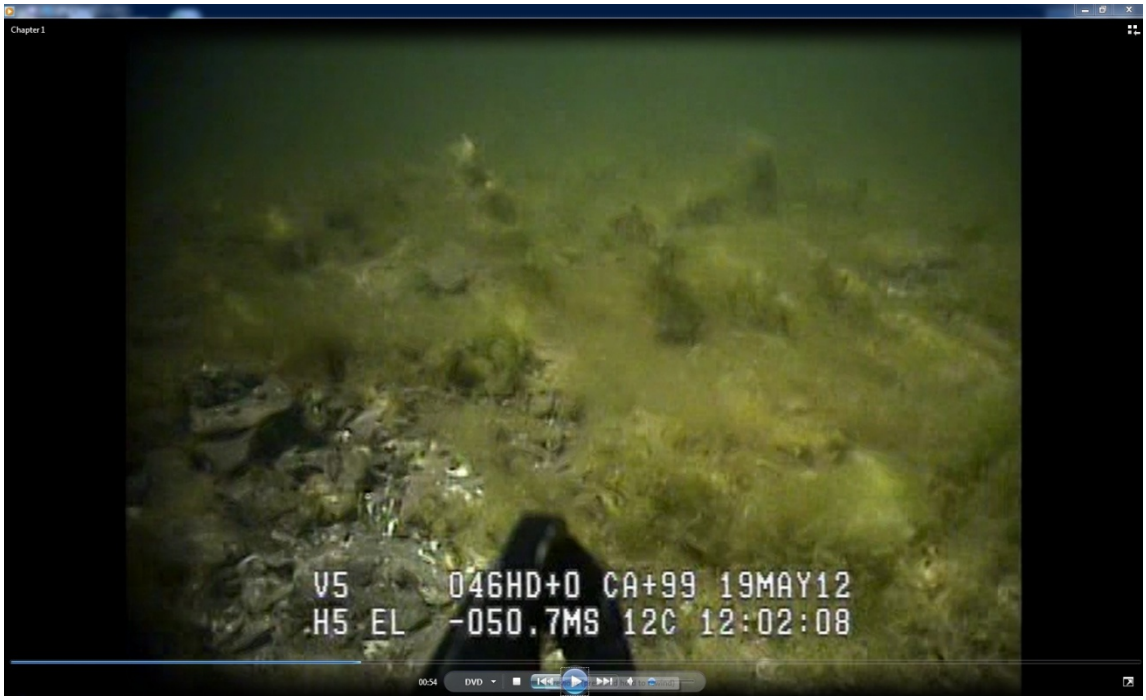


Sediment Sampling Station CR 20



Sediment Sampling Station CR 20

Underwater images of island side shoreline (ASI 2012)



Sediment Sampling Station CR 20

ASI Photo Locations

LOCATION MAP
NOT TO SCALE

E 362625
E 362875
E 363125
E 363375
N 4892375
N 4892125

TR1
VESSEL TRACK LINE END
N: 4892389
E: 363035

TR2
VESSEL TRACK LINE BEGINING
N: 4892348
E: 363162
TRAVELED SOUTH WEST

LAKE ONTARIO

APPROXIMATE EXTENTS OF ROV INSPECTION

VESSEL TRACK LINE DURING ROV INSPECTION

TR1
VESSEL TRACK LINE BEGINING
N: 4892176
E: 362808
TRAVELED NORTH EAST

TR2
VESSEL TRACK LINE END
N: 4892128
E: 362882

APPROXIMATE EXTENTS OF ROV INSPECTION

STUDY AREA

APPROXIMATE SHORELINE

STELLA, AMHERST ISLAND, ONTARIO

NOTES:

1. THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE GENERAL INSPECTION COVERAGE ON 19 MAY 2012.
2. COORDINATES SHOWN HEREON ARE EXPRESSED IN METRES AND ARE REFERENCED TO NAD83 UTM NORTH SYSTEM ZONE 18.
3. SHORELINE WAS APPROXIMATED FROM INFORMATION PROVIDED BY ALGONQUIN POWER.
4. THE ROV, IN GENERAL, FLEW A "Z" TYPE INSPECTION PATTERN WHILE RECORDING VIDEO DATA AS THE SURVEY VESSEL NAVIGATED THROUGH STUDY AREA ALONG THE COURSE INDICATED.
5. EQUIPMENT UTILIZED TO ACQUIRE DATA:

VESSEL:	ASI INSPECTOR
POSITIONING SYSTEM:	TRIMBLE SPS461 DGPS (SUB-METRE ACCURACY)
NAVIGATION SOFTWARE:	HYPACK 2011
ROV:	ASI LBV300XL

0 50 100 150 200 250

SCALE BAR (METRES)

	REV.	DESCRIPTION	DATE	APPR.

ASI Group

SURVEYED BY: D. COUSINEAU	FIELD BOOK(S):	DATE(S) OF SURVEY: 19 MAY 2012	
DRAWN BY: S. WAITE	PLOT SCALE: 1 : 125	ASI GROUP JOB NO.: GH12-006	
CHECKED BY: D. KEYES	PLOT DATE: 15 JUNE 2012	DRAWING FILE NAME: AH-BARGE LAND_SHT X.DGN	

APPROVED:
APPROVED:
APPROVED:
APPROVED:
DATE:

ALGONQUIN Power & Utilities Corp.

BATHYMETRIC SERVICES
AMHERST ISLAND WIND FARM PROJECT
NEAR MILLHAVEN, ONTARIO

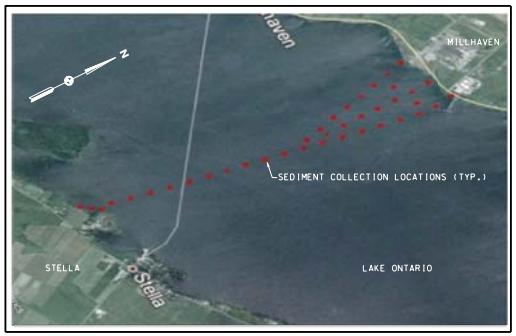
AMHERST ISLAND - PROPOSED BARGE LANDING ZONE

ROV VIDEO INSPECTION / TRUTHING PLAN VIEW

APPENDIX NUMBER: 9

SHEET 1 OF 2

ASI Photo Locations



LOCATION MAP
NOT TO SCALE

FIELD SEDIMENT COLLECTION LOCATIONS

STATION	EASTING (X)	NORTHING (Y)	APPROXIMATE DEPTH
NS3	363226.46	4894729.89	20
NS4	363191.12	4894926.74	19
NS5	363155.77	4895123.59	34
NS6	363120.43	4895320.44	37
NS7	363085.08	4895517.30	17
NS8	363049.74	4895714.15	13
NS9	363014.39	4895911.00	2
NS12	363216.25	4894519.09	17
NS13	363135.34	4894701.99	19
NS14	363054.44	4894884.90	21
NS15	362973.53	4895067.81	36
NS16	362892.63	4895250.71	40
NS17	362811.72	4895433.62	20
NS18	362730.82	4895616.52	11
NS19	362649.91	4895799.43	3.5
NS20	362918.58	4895588.52	15
NS21	363216.05	4895692.40	13
CR1	363273.00	4896031.00	1
CR2	363335.96	4895840.99	3.5
CR3	363364.75	4895643.07	25
CR4	363358.50	4895443.17	33
CR5	363352.26	4895243.26	38
CR6	363343.81	4895043.43	26
CR7	363330.64	4894843.86	23
CR8	363317.48	4894644.30	21
CR9	363304.32	4894444.73	20
CR10	363291.15	4894245.17	19
CR11	363277.99	4894045.60	19
CR12	363264.94	4893846.03	18
CR13	363252.45	4893646.42	18
CR14	363239.96	4893446.81	18
CR15	363227.47	4893247.20	17
CR16	363214.98	4893047.59	17
CR17	363200.52	4892848.10	17
CR18	363181.01	4892649.05	17
CR19	363161.50	4892450.01	15
CR20	363142.00	4892250.96	2
CR21	363079.33	4892170.66	1.5
CR22	363200.45	4892332.92	1.5

NOTES:

1. THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE GENERAL LOCATION OF FIELD SEDIMENT COLLECTIONS ON 18, 19 AND 21 MAY 2012.
2. COORDINATES SHOWN HEREON ARE EXPRESSED IN METRES AND ARE REFERENCED TO NAD83 UTM NORTH SYSTEM ZONE 18.
3. SHORELINE WAS APPROXIMATED FROM INFORMATION PROVIDED BY ALGONQUIN POWER.
4. THE ROV, IN GENERAL, FLEW A RADIAL TYPE INSPECTION PATTERN WHILE RECORDING VIDEO DATA ON MOST POINTS AS THE SURVEY VESSEL MAINTAINED POSITION ON POINTS INDICATED.
5. EQUIPMENT UTILIZED TO ACQUIRE DATA:

VESSEL: ASI INSPECTOR
POSITIONING SYSTEM: TRIMBLE SPS461 DGPS (SUB-METRE ACCURACY)
NAVIGATION SOFTWARE: HYPACK 2011
ROV: ASI LBV300XL

REV.	DESCRIPTION	DATE	APPD

ASI Group

SURVEYED BY: D. COUSINEAU	FIELD BOOK(S):	DATE(S) OF SURVEY: 18, 19 & 21 MAY 2012
DRAWN BY: S. WAITE	PLOT SCALE: 1 : 500	ASI GROUP JOB NO.: GIH12-008
CHECKED BY: D. KEYES	PLOT DATE: 15 JUNE 2012	DRAWING FILE NAME: SED_SAMP SHT_1.DGN

APPROVED: _____ DATE: _____

ALGONQUIN Power & Utilities Corp.

BATHYMETRIC SERVICES
AMHERST ISLAND WIND FARM PROJECT
NEAR MILLHAVEN, ONTARIO

PROPOSED CABLE ROUTE
SEDIMENT COLLECTION AND
ROV VIDEO INSPECTION / TRUTHING
KEY MAP

APPENDIX NUMBER: 7

SHEET 1 OF 1

Mainland Dock (3 Options)

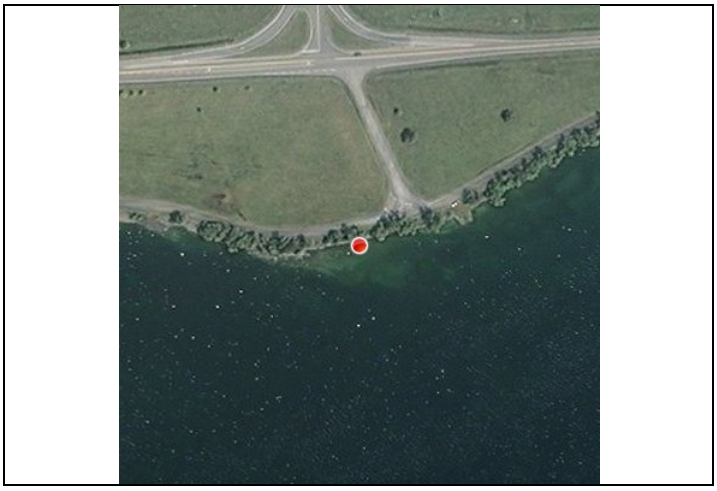


Photo 1 West Dock Option - Location of Photos 2 to 4

Photo 2 Facing east from location in Photo 1

Photo 3 Facing west from location in Photo 1

Photo 4 Shoreline at Photo 1.

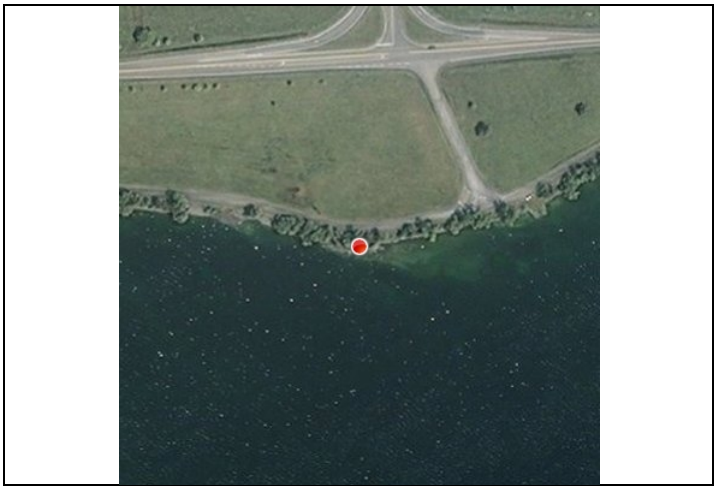


Photo 5 West Dock Option – location of Photo 6

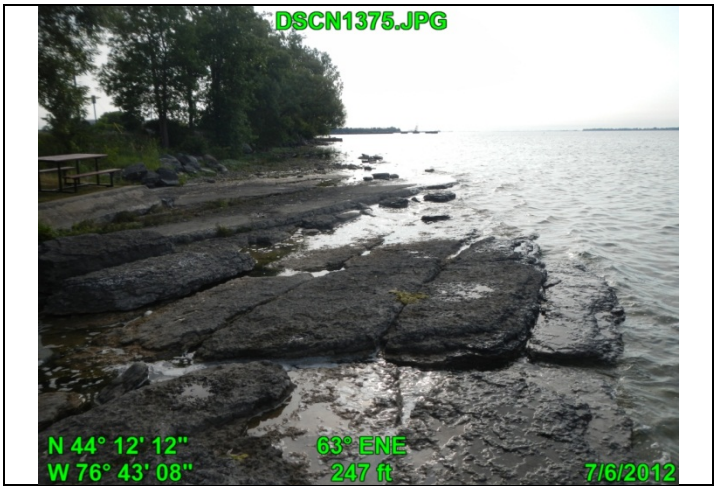


Photo 6 Facing east from location in Photo 5

Stantec

PREPARED FOR:
Windlectric Inc.

SITE:
Amherst Island

APPENDIX
B

TITLE
West Dock and Cable Landing Area

nah g:\active\60960595\reports\waterbody report\appendix b photographic record\07a_mainland dock_west.docx

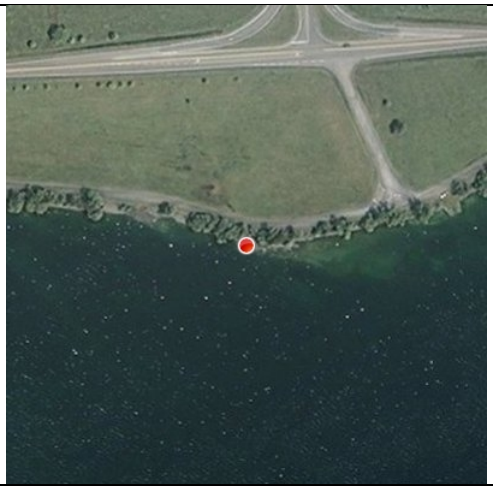


Photo 7 West Dock Option – location of Photo 8

Photo 8 Facing west from location in Photo 7

Stantec

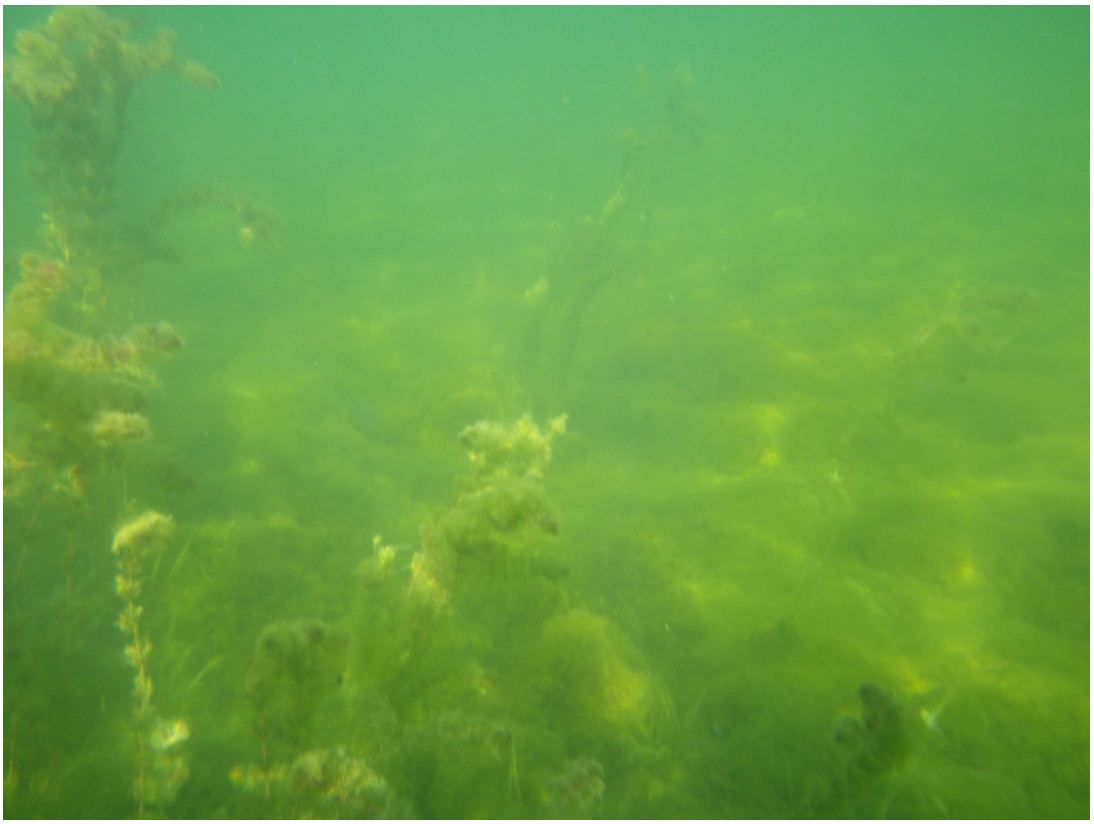
PREPARED FOR:
Windlectric Inc.

SITE:
Amherst Island

APPENDIX
B

TITLE
West Dock and Cable Landing Area

PAGE
2 of 2



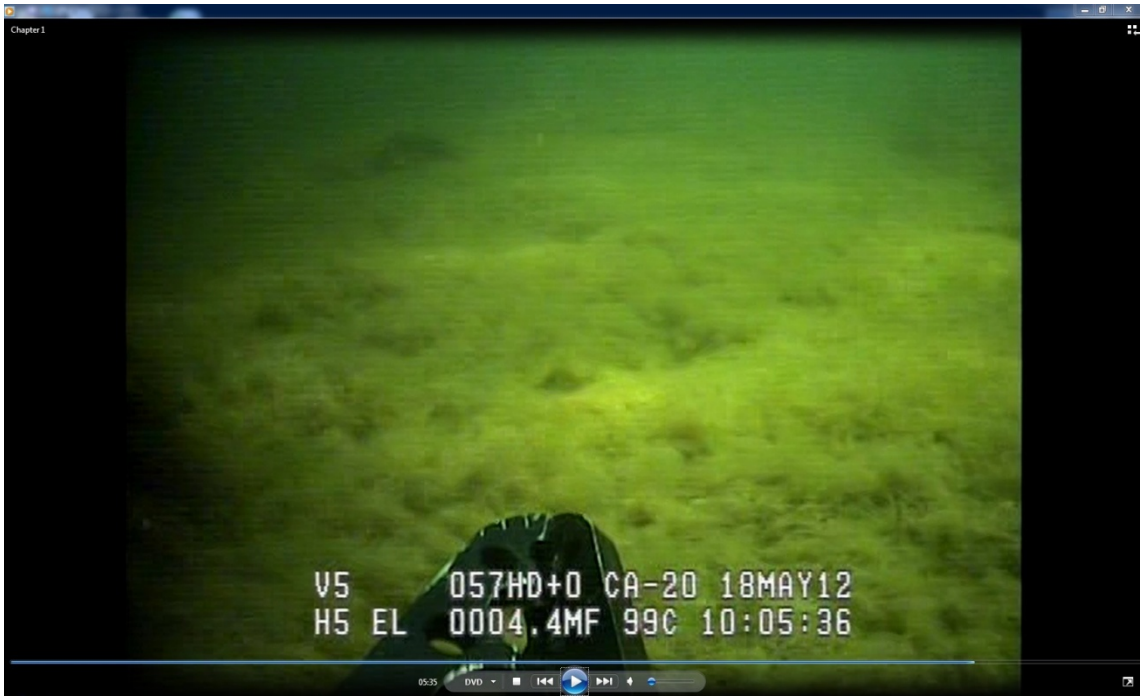
Aquatic Vegetation at West Dock Option, Stantec, 2011

Underwater images of Mainland shoreline West Option (ASI 2012)

ASI Sediment Station NS 19

ASI Sediment Station NS 19

Underwater images of Mainland shoreline West Option(ASI 2012)



ASI Sediment Station NS 19

Underwater images of east of Mainland shoreline West Option (ASI 2012)

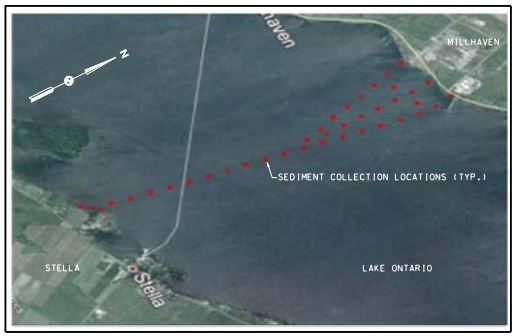
ASI Sediment Station NS 9

ASI Sediment Station NS 9

Underwater images of east of Mainland shoreline West Option (ASI 2012)

ASI Sediment Station NS 9

ASI Photo Locations



LOCATION MAP
NOT TO SCALE

NS19

NS9

MILLHAVEN, ONTARIO

LAKE ONTARIO

LAKE ONTARIO

STELLA, AMHERST ISLAND
ONTARIO

APPROXIMATE SHORELINE

SIDE SCAN SONAR (SNIPPETS) MOSAIC (TYP.)

FIELD SEDIMENT COLLECTION LOCATION (TYP.)

PROPOSED CABLE CROSSING

ACCESS ROAD

BATH ROAD (LOYALIST PARKWAY)

J.H. SNOW DRIVE

DOLPHIN

DOLPHINS

FRONT ROAD

N 4893700 N 4894700 N 4895700 N 4896700 N 4897700 N 4898700

E 362100 E 363100 E 364100

FIELD SEDIMENT COLLECTION LOCATIONS

STATION	EASTING (X)	NORTHING (Y)	APPROXIMATE DEPTH
NS3	363226.46	4894729.89	20
NS4	363191.12	4894926.74	19
NS5	363155.77	4895123.59	34
NS6	363120.43	4895320.44	37
NS7	363085.08	4895517.30	17
NS8	363049.74	4895714.15	13
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NS15	362973.53	4895067.81	36
NS16	362892.63	4895250.71	40
NS17	362811.72	4895433.62	20
NS18	362730.82	4895616.52	11
NS19	362649.91	4895799.43	3.5
NS20	362918.58	4895588.52	15
NS21	363216.05	4895692.40	13
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CR9	363304.32	4894444.73	20
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CR11	363277.99	4894045.60	19
CR12	363264.94	4893846.03	18
CR13	363252.45	4893646.42	18
CR14	363239.96	4893446.81	18
CR15	363227.47	4893247.20	17
CR16	363214.98	4893047.59	17
CR17	363200.52	4892848.10	17
CR18	363181.01	4892649.05	17
CR19	363161.50	4892450.01	15
CR20	363142.00	4892250.96	2
CR21	363079.33	4892170.66	1.5
CR22	363200.45	4892332.92	1.5

NOTES:

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2. COORDINATES SHOWN HEREON ARE EXPRESSED IN METRES AND ARE REFERENCED TO NAD83 UTM NORTH SYSTEM ZONE 18.
3. SHORELINE WAS APPROXIMATED FROM INFORMATION PROVIDED BY ALGONQUIN POWER.
4. THE ROV, IN GENERAL, FLEW A RADIAL TYPE INSPECTION PATTERN WHILE RECORDING VIDEO DATA ON MOST POINTS AS THE SURVEY VESSEL MAINTAINED POSITION ON POINTS INDICATED.
5. EQUIPMENT UTILIZED TO ACQUIRE DATA:

VESSEL: ASI INSPECTOR
POSITIONING SYSTEM: TRIMBLE SPS461 DGPS (SUB-METRE ACCURACY)
NAVIGATION SOFTWARE: HYPACK 2011
ROV: ASI LBV300XL

0 200 400 600 800 1000

SCALE BAR (METRES)

NO.	DESCRIPTION	DATE	APPD.

ASI Group

SURVEYED BY: D. COUSINEAU	FIELD BOOK(S):	DATE(S) OF SURVEY: 18, 19 & 21 MAY 2012	
DRAWN BY: S. WAITE	PLOT SCALE: 1 : 500	ASI GROUP JOB NO.: GIH12-008	
CHECKED BY: D. KEYES	PLOT DATE: 15 JUNE 2012	DRAWING FILE NAME: SED_SAMP SHT_1.DGN	

APPROVED: _____ DATE: _____

ALGONQUIN Power & Utilities Corp.

BATHYMETRIC SERVICES
AMHERST ISLAND WIND FARM PROJECT
NEAR MILLHAVEN, ONTARIO

PROPOSED CABLE ROUTE
SEDIMENT COLLECTION AND
ROV VIDEO INSPECTION / TRUTHING
KEY MAP

APPENDIX NUMBER: 7

SHEET 1 OF 1

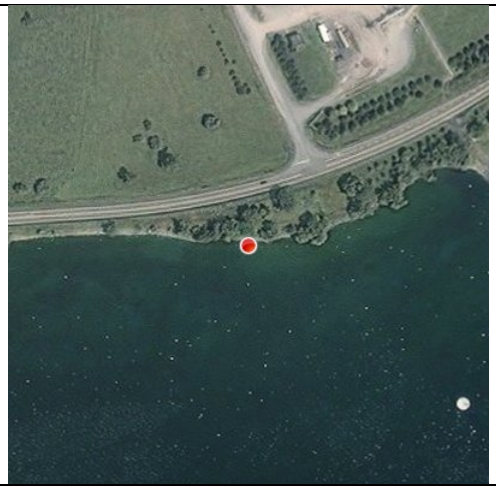


Photo 1 Centre Dock Option – location of Photo 2

Photo 2 Facing east from location in Photo 1

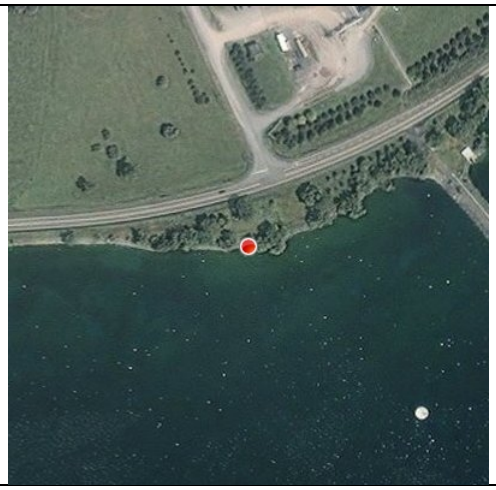


Photo 3 Centre Dock Option – location of Photo 4.

Photo 4 Facing west from location in Photo 3.

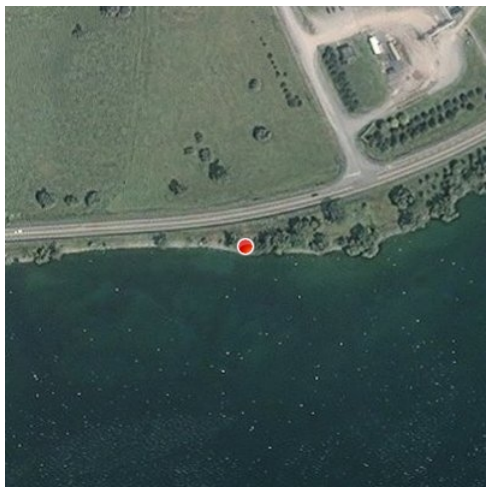


Photo 5 Centre Dock Option – location of Photo 6

Photo 6 Facing east from location in Photo 5

Stantec

PREPARED FOR:
Windlectric Inc.

SITE:
Amherst Island

APPENDIX
B

TITLE
Centre Dock and Cable Landing Area

Aquatic Vegetation at Centre Dock Option, Stantec, 2011

Underwater images of Mainland shoreline Centre Option (ASI 2012)

ASI Sediment Sampling Station CR1 (May 2012)

ASI Sediment Sampling Station CR1 (May 2012)

Underwater images of Mainland shoreline Centre Option (ASI 2012)

ASI Sediment Sampling Station CR1 (May 2012)

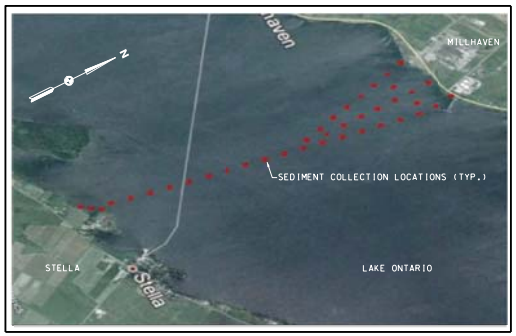
ASI Sediment Sampling Station CR1 (May 2012)

Underwater images of Mainland shoreline Centre Option (ASI 2012)

ASI Sediment Sampling Station CR02

ASI Sediment Sampling Station CR02

ASI Photo Locations



LOCATION MAP
NOT TO SCALE

CR1

CR02

SIDE SCAN SONAR (SNIPPETS) MOSAIC (TYP.)

FIELD SEDIMENT COLLECTION LOCATION (TYP.)

PROPOSED CABLE CROSSING

APPROXIMATE SHORELINE

MILLHAVEN, ONTARIO

LAKE ONTARIO

STELLA, AMHERST ISLAND ONTARIO

ACCESS ROAD

BATH ROAD (LOYALIST PARKWAY)

J.H. SNOW DRIVE

DOLPHIN

FRONT ROAD

N 4893700 N 4894700 N 4895700 N 4896700 N 4897700

E 362100 E 363100 E 364100

STATION	EASTING (X)	NORTHING (Y)	APPROXIMATE DEPTH
NS3	363226.46	4894729.89	20
NS4	363191.12	4894926.74	19
NS5	363155.77	4895123.59	34
NS6	363120.43	4895320.44	37
NS7	363085.08	4895517.30	17
NS8	363049.74	4895714.15	13
NS9	363014.39	4895911.00	2
NS12	363216.25	4894519.09	17
NS13	363135.34	4894701.99	19
NS14	363054.44	4894884.90	21
NS15	362973.53	4895067.81	36
NS16	362892.63	4895250.71	40
NS17	362811.72	4895433.62	20
NS18	362730.82	4895616.52	11
NS19	362649.91	4895799.43	3.5
NS20	362918.58	4895588.52	15
NS21	363216.05	4895692.40	13
CR1	363273.00	4896031.00	1
CR2	363335.96	4895840.99	3.5
CR3	363364.75	4895643.07	25
CR4	363358.50	4895443.17	33
CR5	363352.26	4895243.26	38
CR6	363343.81	4895043.43	26
CR7	363330.64	4894843.86	23
CR8	363317.48	4894644.30	21
CR9	363304.32	4894444.73	20
CR10	363291.15	4894245.17	19
CR11	363277.99	4894045.60	19
CR12	363264.94	4893846.03	18
CR13	363252.45	4893646.42	18
CR14	363239.96	4893446.81	18
CR15	363227.47	4893247.20	17
CR16	363214.98	4893047.59	17
CR17	363200.52	4892848.10	17
CR18	363181.01	4892649.05	17
CR19	363161.50	4892450.01	15
CR20	363142.00	4892250.96	2
CR21	363079.33	4892170.66	1.5
CR22	363200.45	4892332.92	1.5

NOTES:

1. THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE GENERAL LOCATION OF FIELD SEDIMENT COLLECTIONS ON 18, 19 AND 21 MAY 2012.
2. COORDINATES SHOWN HEREON ARE EXPRESSED IN METRES AND ARE REFERENCED TO NAD83 UTM NORTH SYSTEM ZONE 18.
3. SHORELINE WAS APPROXIMATED FROM INFORMATION PROVIDED BY ALGONQUIN POWER.
4. THE ROV, IN GENERAL, FLEW A RADIAL TYPE INSPECTION PATTERN WHILE RECORDING VIDEO DATA ON MOST POINTS AS THE SURVEY VESSEL MAINTAINED POSITION ON POINTS INDICATED.
5. EQUIPMENT UTILIZED TO ACQUIRE DATA:

VESSEL: ASI INSPECTOR
POSITIONING SYSTEM: TRIMBLE SPS461 DGPS (SUB-METRE ACCURACY)
NAVIGATION SOFTWARE: HYPACK 2011
ROV: ASI LBV300XL

0 200 400 600 800 1000
SCALE BAR (METRES)

DESCRIPTION | DATE | APPD

ASI Group

SURVEYED BY: D. COUSINEAU
FIELD BOOK(S):
DATE(S) OF SURVEY: 18, 19 & 21 MAY 2012
DRAWN BY: S. WAITE
PLOT SCALE: 1 : 500
ASI GROUP JOB NO.: GIH12-008
CHECKED BY: D. KEYES
PLOT DATE: 15 JUNE 2012
DRAWING FILE NAME: SED_SAMP SHT_1.DGN

APPROVED: APPROVED: APPROVED: DATE:

ALGONQUIN Power & Utilities Corp.

BATHYMETRIC SERVICES
AMHERST ISLAND WIND FARM PROJECT
NEAR MILLHAVEN, ONTARIO
PROPOSED CABLE ROUTE
SEDIMENT COLLECTION AND
ROV VIDEO INSPECTION / TRUTHING
KEY MAP

APPENDIX NUMBER: 7
SHEET 1 OF 1

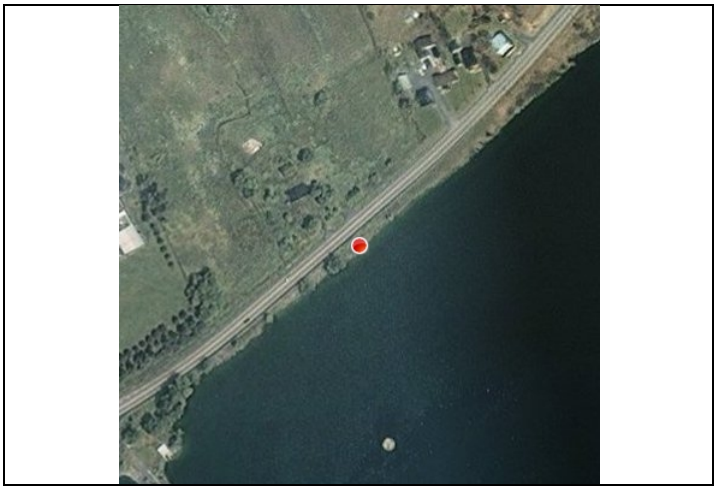


Photo 1 East Dock Option – location of Photo 2

Photo 2 Facing south from location in Photo 1

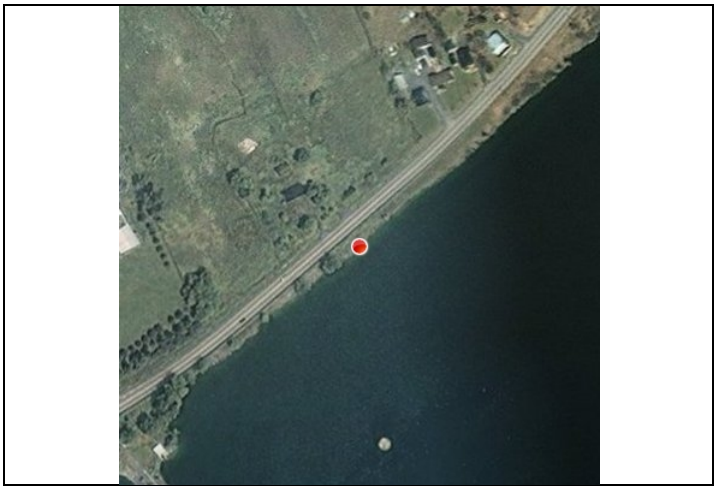


Photo 3 East Dock Option – location of Photo 4

Photo 4 Facing east from location in Photo 3.

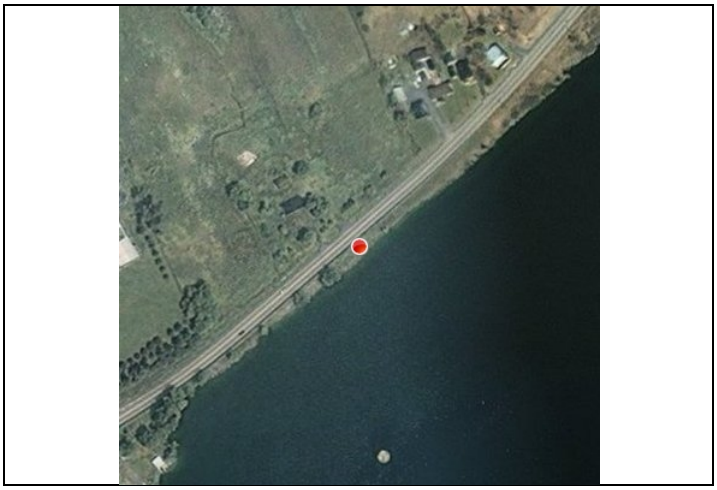


Photo 5 East Dock Option – location of Photo 6

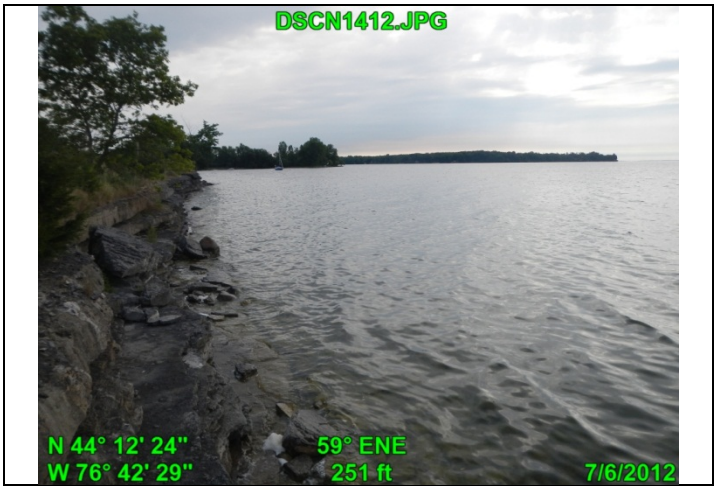


Photo 6 Facing east from location in Photo 5

Stantec

PREPARED FOR:
Windlectric Inc.

SITE:
Amherst Island

APPENDIX
B

TITLE
East Dock and Cable Landing Area

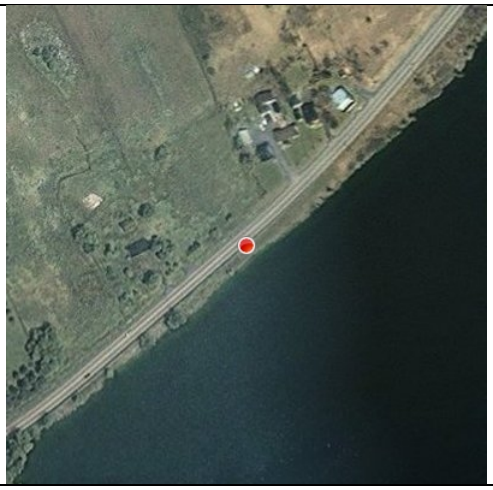


Photo 7 East Dock Option – location of Photo 8

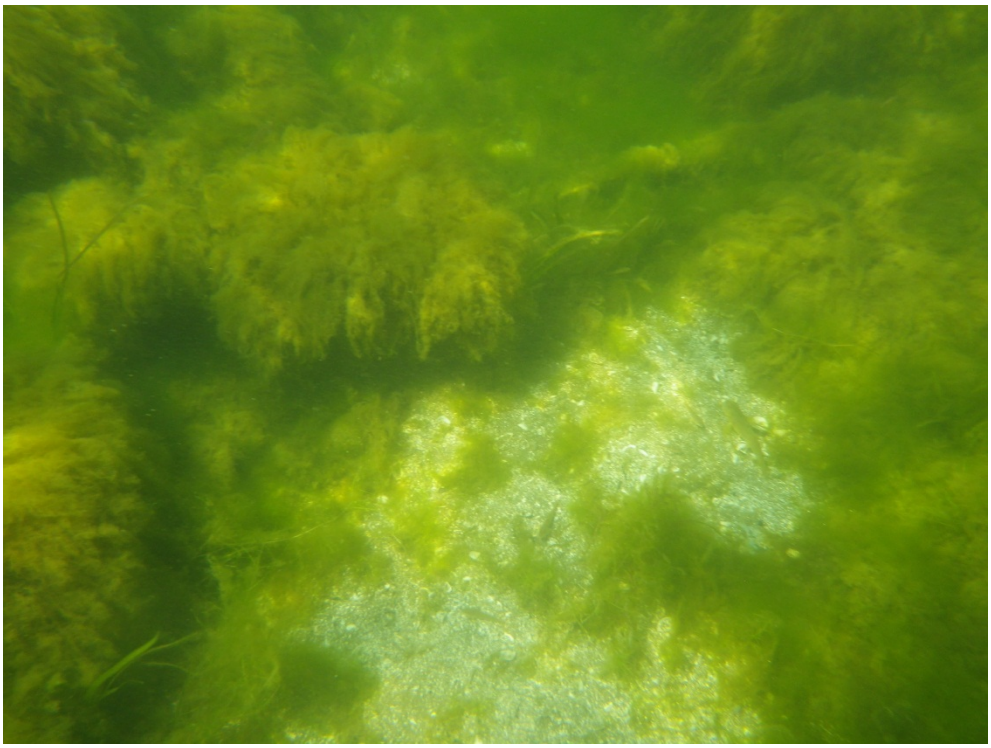
Photo 8 Facing east from location in Photo 7

PREPARED FOR:
Windlectric Inc.

SITE:
Amherst Island

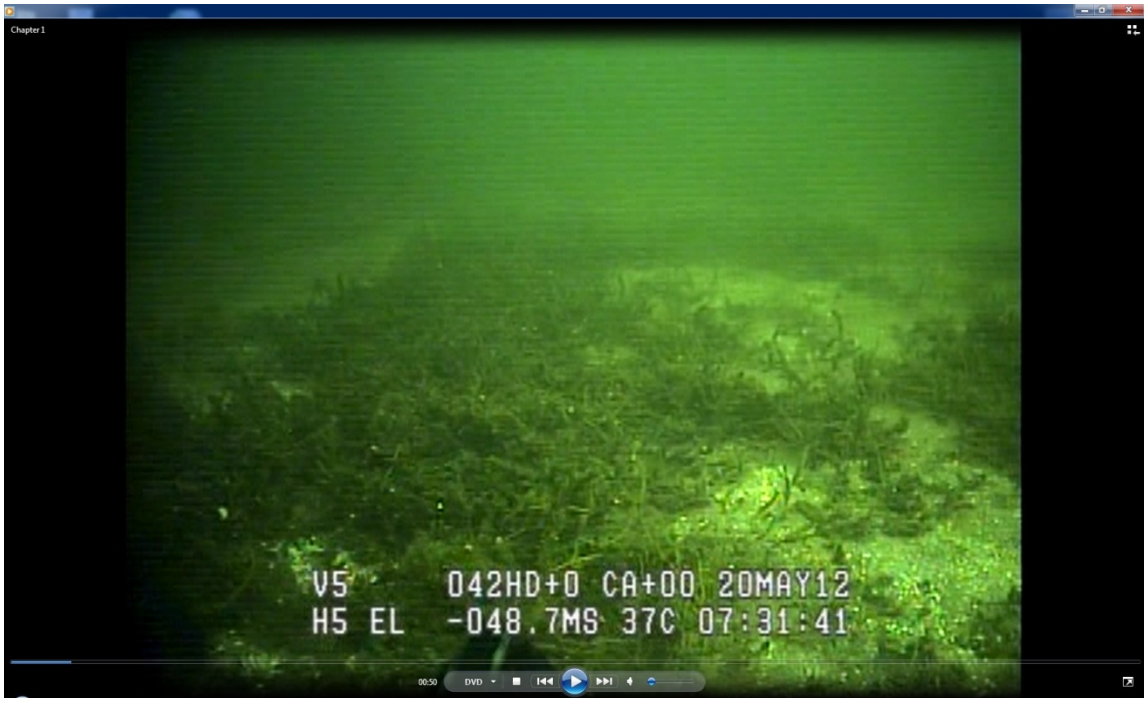
APPENDIX
B

TITLE
East Dock and Cable Landing Area



Aquatic Vegetation at Dock East Option, Stantec, 2011

Underwater images of Mainland shoreline East Option (ASI 2012)

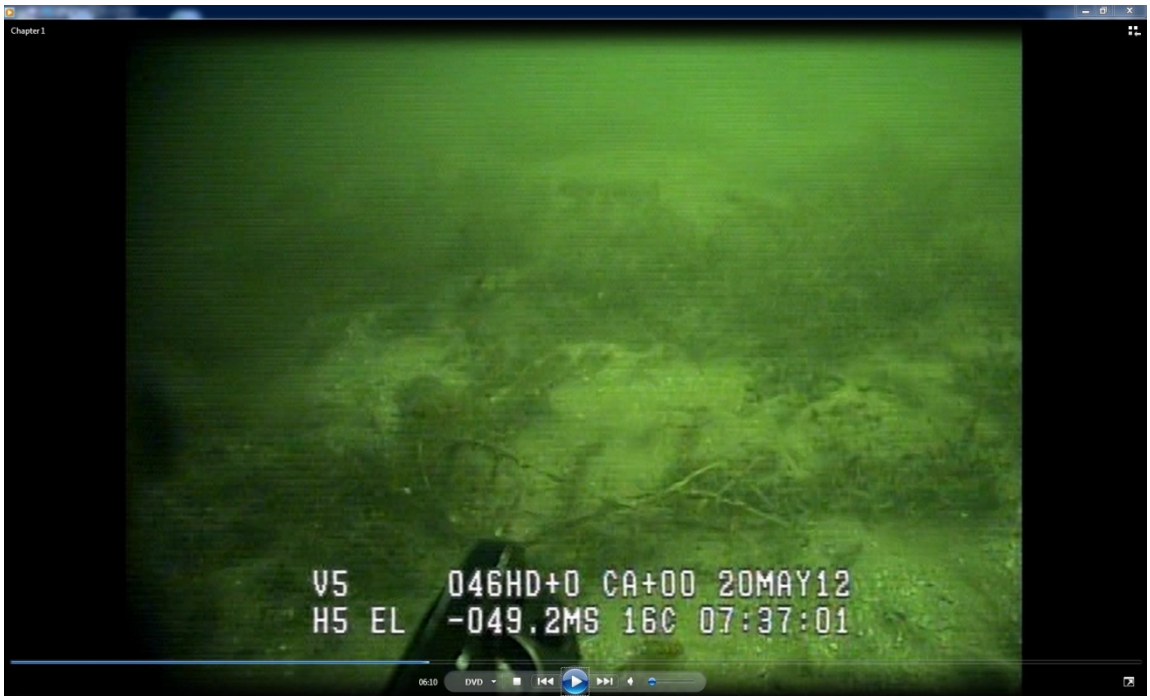


ROV RAD INSP_8 (RR8)

RR8

Underwater images of Mainland shoreline East Option (ASI 2012)

RR8



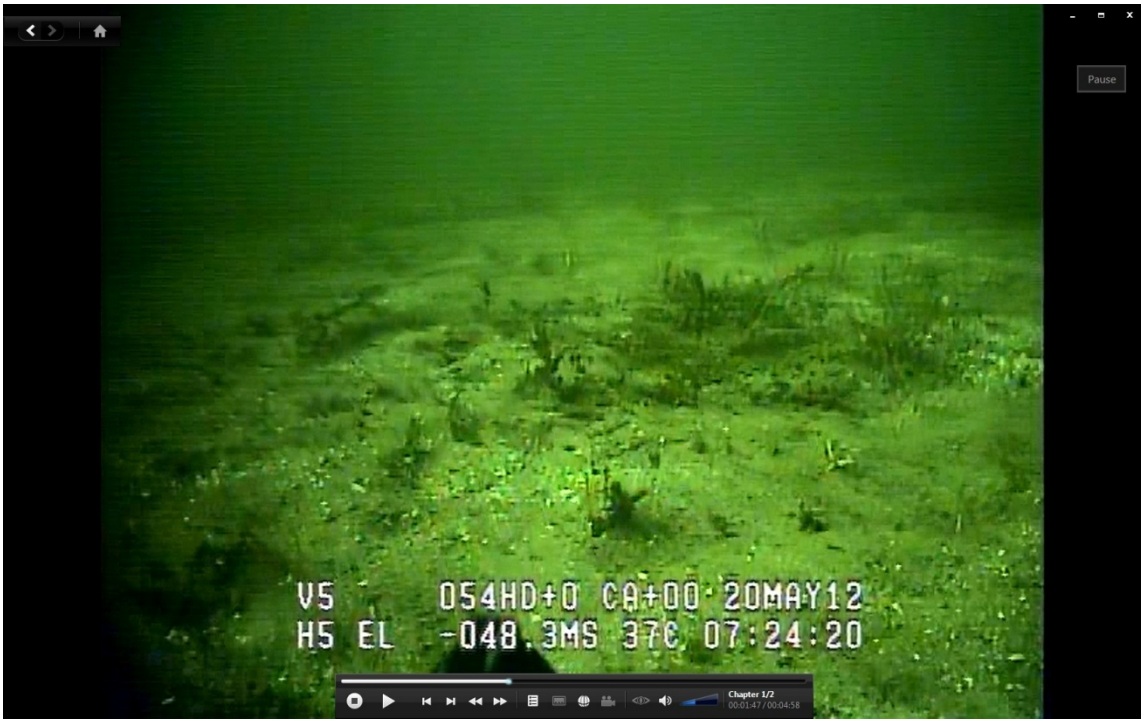
RR8

Underwater images of Mainland shoreline East Option (ASI 2012)

RR8

ROV RAD INSP_9 (RR9)

Underwater images of Mainland shoreline East Option (ASI 2012)

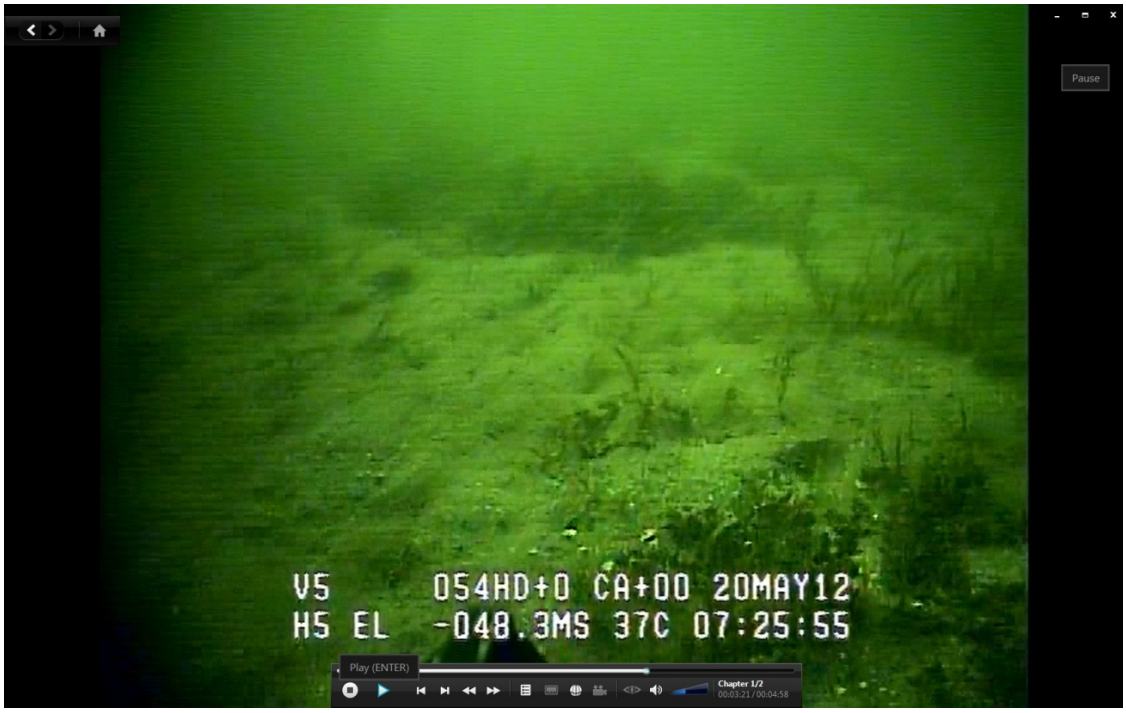


RR9

RR9

Underwater images of Mainland shoreline East Option (ASI 2012)

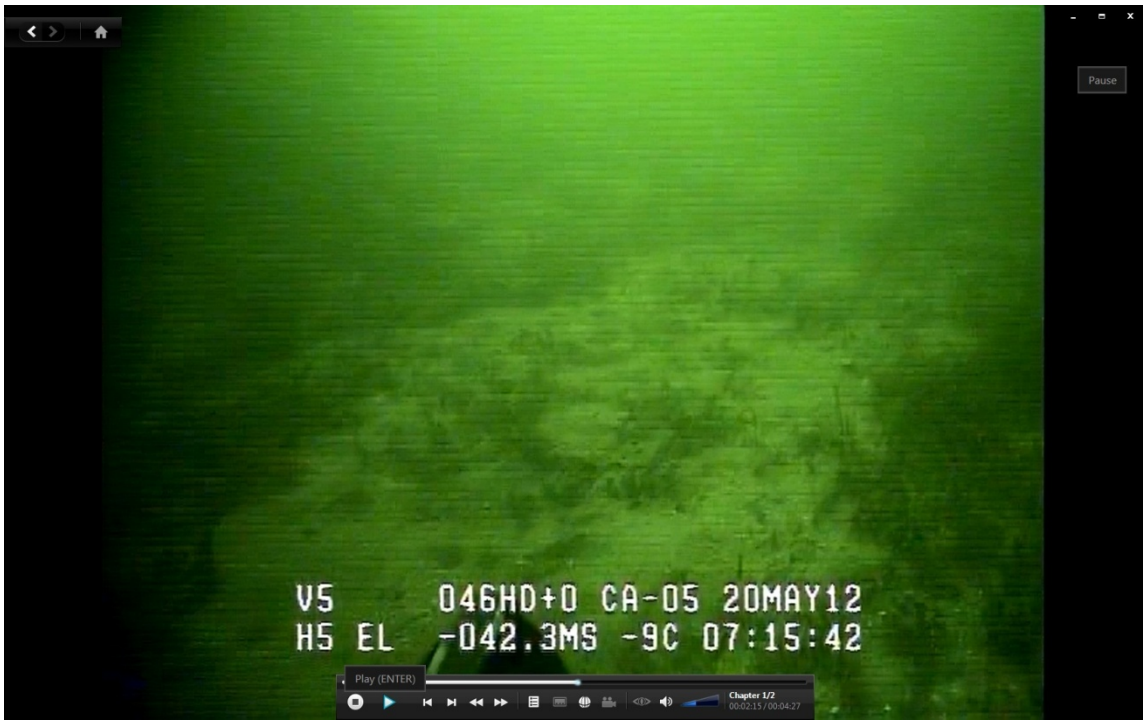
RR9



RR9

Underwater images of Mainland shoreline Easts Option (ASI 2012)

ROV RAD INSP_10 (RR10)



RR10

Underwater images of Mainland shoreline East Option (ASI 2012)

RR10

RR10

Underwater images of Mainland shoreline East Option (ASI 2012)

RR10

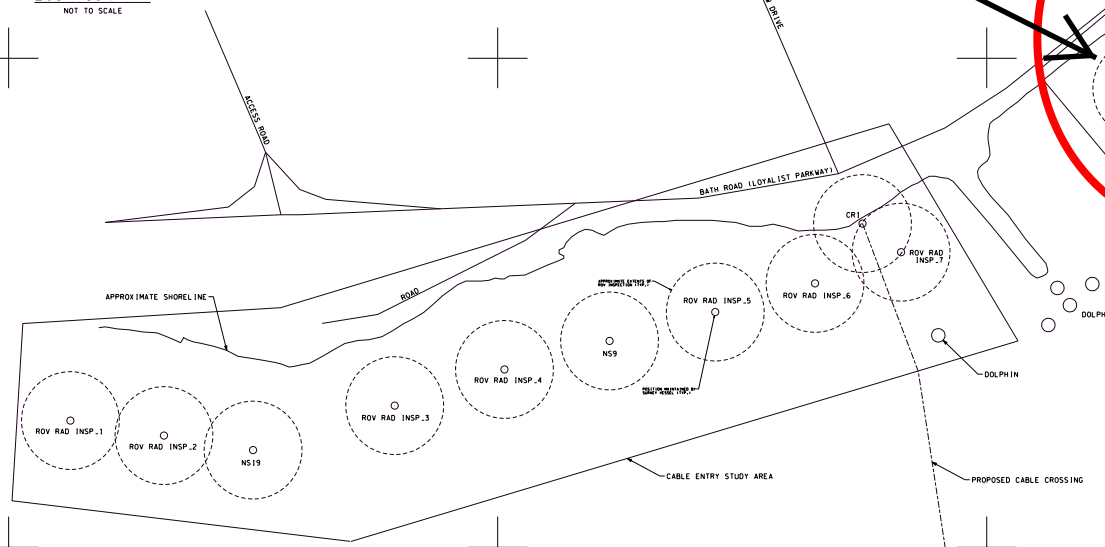
ASI Photo Locations

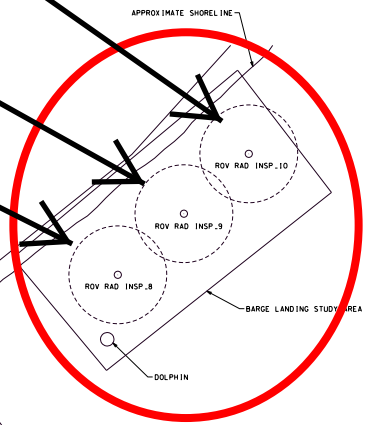
LOCATION MAP
NOT TO SCALE

RR10
RR9
RR8

MILLHAVEN, ONTARIO

E 362400 E 362900 E 363400 E 363900
N 4896200 N 4895700





N

ROV RADIAL INSPECTION LOCATIONS

DESCRIPTION	EASTING (X)	NORTHING (Y)
ROV RAD INSP_1	362463.14	4895829.59
ROV RAD INSP_2	362558.78	4895814.28
ROV RAD INSP_3	362794.70	4895844.89
ROV RAD INSP_4	362906.92	4895881.87
ROV RAD INSP_5	363122.43	4895940.53
ROV RAD INSP_6	363224.45	4895969.86
ROV RAD INSP_7	363312.44	4896001.74
ROV RAD INSP_8	363558.56	4896168.80
ROV RAD INSP_9	363626.14	4896231.28
ROV RAD INSP_10	363692.46	4896292.49

NOTES:
1. THE INFORMATION DEPICTED ON THIS MAP REPRESENTS THE GENERAL INSPECTION COVERAGE ON 20 MAY 2012.
2. COORDINATES SHOWN HEREON ARE EXPRESSED IN METRES AND ARE REFERENCED TO NAD83 UTM NORTH SYSTEM ZONE 18.
3. SHORELINE WAS APPROXIMATED FROM INFORMATION PROVIDED BY ALGONQUIN POWER.
4. THE ROV, IN GENERAL, FLEW A RADIAL TYPE INSPECTION PATTERN WHILE RECORDING VIDEO DATA AS THE SURVEY VESSEL MAINTAINED POSITION ON POINTS INDICATED.
5. VIDEO FOR ROV INSPECTION AREAS THAT BEGIN WITH CR OR NS IS AVAILABLE FROM SEDIMENT SAMPLE DATA.
5. EQUIPMENT UTILIZED TO ACQUIRE DATA:

VESSEL: ASI INSPECTOR
POSITIONING SYSTEM: TRIMBLE SPS461 DGPS (SUB-METRE ACCURACY)
NAVIGATION SOFTWARE: HYPACK 2011
ROV: ASI LBV300XL

0 100 200 300 400 500
SCALE BAR (METRES)

REV. | DESCRIPTION | DATE | APPR.

ASI Group

SURVEYED BY: D. COUSINEAU
FIELD BOOK(S):
DATE(S) OF SURVEY: 20 MAY 2012
DRAWN BY: S. WAITE
PLOT SCALE: 1 : 250
ASI GROUP JOB NO.: GH12-009
CHECKED BY: D. KETES
PLOT DATE: 18 JUNE 2012
DRAWING FILE NAME: ML-ROV INSP_SHT1.DGN

APPROVED: DATE:
APPROVED: DATE:
APPROVED: DATE:
APPROVED: DATE:

ALGONQUIN Power & Utilities Corp.

BATHYMETRIC SERVICES
AMHERST ISLAND WIND FARM PROJECT
NEAR MILLHAVEN, ONTARIO
MAINLAND - PROPOSED BARGE LANDING AND CABLE ENTRY ZONES
ROV VIDEO INSPECTION / TRUTHING PLAN VIEW

SHEET NUMBER: X
SHEET X OF X

Optional Cable Landing Area

Photo 1 Facing west along shoreline at Optional Cable Landing location

Photo 2 Facing west along shoreline at Optional Cable Landing location

PREPARED FOR:
Windlectric Inc.

SITE:
Amherst Island

APPENDIX
B

TITLE
Optional Cable Landing Area

Appendix C

Fish Collection Data

Amherst Island Boat Electrofishing Catch Results (Stantec and MNR Data)

	Stantec Results (2011)																		MNR LOMU Stations (2009)							
Station	T1	T2	T3	T4	T5	T6	T7	T8	T9	T10	T11	T12	T13	T14	T15	T16			40	48	51	57	58	60	63	
Date	12-Jul	12-Jul	12-Jul	12-Jul	12-Jul	12-Jul	12-Jul	12-Jul	12-Jul	12-Jul	12-Jul	13-Jul	13-Jul	13-Jul	13-Jul	13-Jul			11-Aug-09	7-Aug-09	7-Aug-09	11-Aug-09	11-Aug-09	11-Aug-09	12-Aug-09	
Effort (sec)	267	370	297	315	364	330	440	382	284	333	329		259	646	364	505										
																	Total									Total
Species																										
Yellow Perch	1		5	3	2	6	2	8	2	3	1				2	2	37			1	17	1				19
Bluntnose Minnow	2	2	1				1									5	11									0
Spottail Shiner	3		2														5									0
Rock Bass	8	3	1		2		2	2	1		1			2		1	23				6	32			1	39
Round Goby	16	3	2	2	2	1	3	5	6		7	8	7	5	1	2	70									0
Bluegill	4							2							1	7	14									0
Blackchin Shiner	2									1							3									0
Banded Killifish	1			2													3									0
Common Carp		1	10														11									0
Freshwater Drum				2			1						1				4		4				1			5
Brown Bullhead						2		1									3		1			11		2		14
smallmouth bass								2								1	3		3	1		4				8
White Sucker									1								1		3	3	1			4	3	14
salmonidae sp YOY														2			2									0
largemouth bass																3	3		1							1
Bowfin																	0				1		1			2
Northern Pike																	0						1			1
Silver Redhorse																	0						1			1
Channel Catfish																	0							2		2
Pumpkinseed																	0						1			1
Walleye																	0				2					2

Amherst Island Boat Electrofishing (Stantec - July 2011); Effort and Station Characteristics

Method	Station	Substrate	Vegetation	Date	Effort (sec)
Boat Electrofishing	T1	Sand and gravel	Sparse	7/12/2011	267
	T2	Sand, silt, cobble, gravel	Weedbed and emergent	7/12/2011	370
	T3	Bedrock	Sparse and weedbed	7/12/2011	297
	T4	Sand, cobble, silt and gravel	Sparse and weedbed	7/12/2011	315
	T5	Cobble, sand, silt and gravel	Emergent and weedbed	7/12/2011	364
	T6	Cobble, silt, gravel and sand	Emergent and weedbed	7/12/2011	330
	T7	Cobble, sand and gravel	Sparse	7/12/2011	440
	T8	Sand, gravel and cobble	Sparse and weedbed	7/12/2011	382
	T9	Cobble, sand, silt and gravel	Weedbed, sparse and overhanging terrestrial veg	7/12/2011	284
	T10	Sand, cobble, silt and gravel	Sparse and weedbed	7/12/2011	333
	T11	Cobble, sand and gravel	Sparse and weedbed	7/12/2011	329
	T12	Sand, gravel cobble	Weedbed	7/13/2011	-
	T13	Cobble, sand and gravel	Sparse and overhanging terrestrial veg	7/13/2011	259
	T14	Sand, gravel and cobble	Sparse and overhanging terrestrial veg	7/13/2011	646
	T15	Cobble, sand and gravel	Sparse and overhanging terrestrial veg	7/13/2011	364
	T16	Cobble	Sparse, algae and emergent	7/13/2011	505

Amherst Island Minnow Trap Catch Results (Stantec 2011)

Location	MT1			MT2		MT3			MT4			MT5			MT6		MT20	Trap 21	Trap 22	Trap 23	Trap 24	Trap 25	Trap 26	Trap 27	Trap 28	Trap 29	Trap 30	Total
	a	b	c	a	b	a	b	c	a	b	c	a	b	c	a	b												
Round Goby	12	30	12	3		12				3				2	8	14	55	62	72	15	31	28	42	36	25	60	19	**541**
Yellow Perch						4		2	2	1	3								1				1					**14**
Pumpkinseed					no fish		no fish		3		7					2												**12**
Rock Bass												2	1										1		1			**5**
Total	**12**	**30**	**12**	**3**		**16**		**2**	**5**	**4**	**10**	**2**	**1**	**2**	**8**	**16**	**55**	**62**	**73**	**15**	**31**	**28**	**44**	**36**	**26**	**60**	**19**	

Amherst Island Gillnet, Fyke Net and Seine Net Catch Results (Stantec 2011)

Method	Gill Net						Fyke Net					Seine Net		Total
Station	**G1**	**G2**	**G3**	**G4**	**G5**	**G6**	**F1**	**F2**	**F3**	**F4**	**F5**	**S1**	**S2**	
Rock Bass	No Catch	No Catch	No Catch	No Catch		No Catch	No Catch			2	2		No Catch	**4**
Round Goby									2	2		1		**5**
Freshwater Drum					1									**1**
Largemouth Bass								1						**1**
Total	**-**	**-**	**-**	**-**	**1**	**-**	**-**	**1**	**2**	**4**	**2**	**1**	**-**	**11**

Amherst Island Gillnet, Fyke Net and Seine Net - Effort and Station Characteristics (Stantec 2011)

Method	Location		Set Date/Time	Lift Date/Time	Effort	Substrate	Vegetation
Minnow Traps	Trap 1	a	July 4, 2011 16:50	July 5, 2011 08:30	15 hr 40 min	Gravel and cobble	n/a
		b					
		c					
	Trap 2	a	July 4, 2011 17:10	July 5, 2011 09:20	16 hr 10 min	Sand	n/a
		b					
	Trap 3	a	July 4, 2011 17:30	July 5, 2011 10:30	17 hr 00 min	Sand	Weedbed
		b					
		c					
	Trap 4	a	July 5, 2011 11:00	July 6, 2011 09:20	22 hr 40 min	Sand	Sparse
		b					
		c					
	Trap 5	a	July 5, 2011 12:30	July 6, 2011 09:23	20 hr 7 min	Clay	n/a
		b					
		c					
	Trap 6	a	July 5, 2011 12:49	July 6, 2011 09:40	20 hr 9 min	Sand	Sparse
		b					
	Trap 20		August 2, 2011 15:25	August 3, 2011 08:30	17 hr 5 min	Sand	Sparse
	Trap 21		August 2, 2011 15:35	August 3, 2011 08:36	17 hr 1 min	n/a	Sparse
	Trap 22		August 2, 2011 15:50	August 3, 2011 08:43	16 hr 53 min	Clay and sand	Sparse
	Trap 23		August 2, 2011 16:26	August 3, 2011 09:00	16 hr 44 min	Sand	Weedbed
	Trap 24		August 3, 2011 12:10	August 4, 2011 11:00	23 hr 50 min	Sand	n/a
	Trap 25		August 3, 2011 12:20	August 4, 2011 11:10	22 hr 50 min	Clay and sand	n/a
	Trap 26		August 3, 2011 12:25	August 4, 2011 12:15	23 hr 50 min	Clay and sand	n/a
	Trap 27		August 3, 2011 12:32	August 4, 2011 12:20	23 hr 48 min	Clay and sand	n/a
	Trap 28		August 4, 2011 14:40	August 5, 2011 09:15	18 hr 25 min	n/a	Sparse
	Trap 29		August 4, 2011 14:50	August 5, 2011 09:05	18 hr 15 min	Clay and sand	n/a
	Trap 30		August 4, 2011 15:00	August 5, 2011 09:09	14 hr 9 min	Sand	Weedbed
Gill Net	G1		Aug 2, 2011 14:10	Aug 2, 2011 17:20	3 hr 10 min	n/a	Sparse
	G2		Aug 2, 2011 14:15	Aug 2, 2011 17:10	3 hr 00 min	Clay and sand	n/a
	G3		Aug 3, 2011 11:45	Aug 3, 2011 14:10	2 hr 25 min	Sand	Sparse
	G4		Aug 3, 2011 12:00	Aug 3, 2011 14:00	2 hr 00 min	Sand	n/a
	G5		Aug 4, 2011 14:20	Aug 4, 2011 16:00	1 hr 40 min	Sand	Weedbed
	G6		Aug 4, 2011 14:30	Aug 4, 2011 16:20	1 hr 50 min	n/a	Weedbed
Fyke Net	F1		Aug 2, 2011 16:20	Aug 3, 2011 08:50	16 hr 30 min	Boulder	n/a
	F2		Aug 2, 2011 16:45	Aug 3, 2011 09:10	16 hr 25 min	Sand	Weedbed
	F3		Aug 3, 2011 12:45	Aug 4, 2011 11:30	23 hr 15 min	Sand and silt	Sparse
	F4		Aug 3, 2011 13:05	Aug 4, 2011 11:40	22 hr 25 min	Clay	n/a
	F5		Aug 4, 2011 14:15	Aug 5, 2011 08:55	18 hr 20 min	n/a	Weedbed
Seine Net	S1		Aug 3, 2011 14:45	Aug 3, 2011 14:50	5 min	Sand	Weedbed
	S2		Aug 3, 2011 14:45	Aug 3, 2011 14:50	5 min	Sand	Weedbed

Appendix D

Field Notes

Northern Drainage

Northern Drainage (1) WB

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Amherst Island | Project # 160960595
Station # 1 | Field Staff KE + BP
Photos Taken y | Date May 17 2011
GPS Coordinates | Time 10:20 Am
Descriptive Location west of Stella, along Front Rd

Water Quality
Dissolved Oxygen (mg/L) 10.48 | pH 7.82 | Conductivity (µS/cm) 247
Water Temperature (°C) 9.69 | Air Temperature (°C) 7°
Weather conditions in previous 24 hrs cool, cloudy + rain (lots of rain in the last week)

Watercourse Dimensions & Morphology
Mean Watercourse Width 2 (m) | Maximum Pool Depth 40 (cm)
Mean Bankfull Width 3 (m) | Mean Water Depth 20 (cm)
—% Riffle | —% Pool | —% Run | 100% Flat
Evidence of eroding banks, Comments on bank stability
no, grass lined, probably seasonal WB. u/s of road

Substrate – Upstream (% cover)
Bedrock | 80 Silt | Boulder | Clay | Cobble
Muck | 20 Gravel | Marl | Sand | Detritus

Substrate – Downstream (% cover)
Bedrock | Silt | Boulder | Clay | Cobble
Muck | Gravel | Marl | Sand | Detritus

In-water Cover
Cover Types Present (circle): Overhanging Vegetation | Undercut Banks | Woody Debris | Deep Pool | Boulder | Vascular Plants | Other

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream almost 0% cover, few trees along road near culv
Downstream
Adjacent Land Use
Upstream ag
Downstream 0

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream ND
Downstream
Migratory Obstructions (seasonal, permanent)
Upstream seasonal - most likely dry in summer
Downstream
Note any fish observations Banded Killifish + pumpkinseed.

Other Habitat Notes, Incidental Wildlife Observations, etc.
-shallow, flooded channel
-diffuse surficial drainage where WB splits farther west (photos 1c & 1d), not WB.

Field Notes Authored by KE | Field Notes QA/QCed by | Page 1 of 1

Stantec

Stantec Consulting Ltd - Electrofishing Record and Catch Results

Project Number 160960595 Station Number 1

Project Name Amherst Island Pass No. (if applicable) 1

Project manager Date (yyyymmdd): May 17th 2011

Descriptive Location just west of stella ON.

UTM coordinates easting northing zone

Fishing Method (circle one): (Backpack) Boat Unit Model/Make smith root

Sampling Method (circle one): even (habitat) transect spot

Effort (Electrofishing Seconds): 975. Number of Netters: 1 Number of Anodes: 1

Settings

Frequency (Hz) 75 Voltage (volts) 350 Current (Amps) Power (Watts)

Station Information

Length of Stream Surveyed (m) 40 m

Station Characteristics: Width (m): 2 Range Average:

Depth (m): Range 10 - 40cm Average: 20

Water Clarity/Colour: clear/colourless Water Velocity if Measured (m/s): slow

Temperature (°C) 9.69°C Conductivity (uS/cm) 247

pH 7.82 Dissolved Oxygen (mg/L) 10.48

Catch Data

Species	Number of Fish	Species	Number of Fish
Banded Killifish	20		
Pumpkinseed	1		

Fish Measurements on Separate Sheet? Y/N

Field Staff: KE + RP Notes By: KE

(Station Diagram on Back)

Northern Drainage

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

(3) x WB u/s WB d

Stantec

Project Amherst Island | Project # 160960595
Station # 3 | Field Staff KE + RP
Photos Taken 4 | Date May 17 2011
GPS Coordinates | Time 1:20
Descriptive Location Front Rd, 750 m east of Emerald

Water Quality
Dissolved Oxygen (mg/L) 11.18 | pH 8.1 | Conductivity (µS/cm) 200
Water Temperature (°C) 16.13 | Air Temperature (°C) 12
Weather conditions in previous 24 hrs cloudy & rain

Watercourse Dimensions & Morphology
Mean Watercourse Width 30-50 (m)cm | Maximum Pool Depth 15 (cm)
Mean Bankfull Width 3 (m) | Mean Water Depth 5 (cm)
— % Riffle | — % Pool | — % Run | 100 % Flat
Evidence of eroding banks, Comments on bank stability
cows trample through watercourse

xWB **Substrate – Upstream (% cover)**
10 Bedrock | 90 Silt | Boulder | Clay | Cobble
Muck | Gravel | Marl | Sand | Detritus

Substrate – Downstream (% cover)
WB -undercut banks
50 Bedrock | 10 Silt | Boulder | Clay | 10 Cobble
Muck | 20 Gravel | Marl | 10 Sand | Detritus

In-water Cover d/s
Cover Types Present (circle): Undercut Banks | Deep Pool | Vascular Plants | Overhanging Vegetation | Woody Debris | Boulder | Other

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 0%
Downstream 40% ash & lilac
Adjacent Land Use
Upstream cow pasture
Downstream cottages

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream none observed
Downstream
Migratory Obstructions (seasonal, permanent)
Upstream seasonal
Downstream seasonal?
Note any fish observations none
-not fished due to min. water levels.

Other Habitat Notes, Incidental Wildlife Observations, etc.
xWB u/s -cow pasture, no defined channel, seasonal - xnWB
WB d/s -defined channel, possibly seasonal flow - WB.

Field Notes Authored by KE | Field Notes QA/QCed by | Page 1 of 1

Northern 55 WB

WIND FARM WATERBODY RAPID ASSESSMENT FORM

drainage

Stantec

Station # 55
Watercourse Name
Photos 65-71
Date Aug 15 2012
Weather conditions in previous 24 hrs
GPS Coordinates (Zone) 18T E 364207 N 4892262 Datum
Descriptive Location

Project Name Amherst Island
Project # 160960595
Field Staff KJ + SJ
Time 14:45

Water Quality

Dissolved Oxygen (mg/L) ____ pH ____ Conductivity (µS/cm) ____
Water Temperature (°C) ____ Air Temperature (°C) ____
Time *in situ* measurements taken

dry

Watercourse Dimensions & Morphology

Mean Watercourse Width ____ (m) Maximum Pool Depth ____ (cm)
Mean Bankfull Width 6 (m) Mean Water Depth ____ (cm)
____ % Riffle ____ % Pool ____ % Run ____ % Flat
Evidence of eroding banks, Comments on bank stability
some concrete blocks d/s to stabilize banks

Substrate (% cover)

20 Bedrock	50 Cobble		Sand 20	Silt	Muck
Boulder	Gravel		Clay	Marl 10	Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
70% shaded by cedar, mountain ash, willow & mix
Adjacent Land Use
residential

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations

Waterbody Notes

Natural Watercourse ✓ Trapezoidal Channel ____ Grassed Swale ____ Buried Tile ____
Surficial Drainage (i.e. furrows) ____ Dugout Pond ____ Dominated by Aquatic Veg ____ Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc.
natural, slight meander underlain by coarse substrates

Field Notes Authored by ____ Field Notes QA/QCed by ____

Northern Drainage 56 NWB

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

Station # 56 | Project Name Amherst Island
Watercourse Name | Project # 160960595
Photos 72-73 | Field Staff Kat. St.
Date Aug 15 2012 | Time 14:58
Weather conditions in previous 24 hrs
GPS Coordinates (Zone) 18T E 364188 N 4891852 Datum
Descriptive Location

Water Quality
Dissolved Oxygen (mg/L) | pH dry | Conductivity (µS/cm)
Water Temperature (°C) | Air Temperature (°C)
Time *in situ* measurements taken

Watercourse Dimensions & Morphology
Mean Watercourse Width (m) | Maximum Pool Depth (cm)
Mean Bankfull Width 0 (m) | Mean Water Depth (cm)
% Riffle | % Pool | % Run | % Flat
Evidence of eroding banks, Comments on bank stability

Substrate (% cover)
Bedrock | Cobble | Sand | Silt | Muck
Boulder | Gravel | Clay | Marl | Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks | Deep Pool | Watercress | Aquatic Veg
Overhanging Vegetation | Woody Debris | Boulder | Other

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
0%
Adjacent Land Use
Ag

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Migratory Obstructions (seasonal, permanent)
Note any fish observations

Waterbody Notes
Natural Watercourse | Trapezoidal Channel | Grassed Swale | Buried Tile
Surficial Drainage (i.e. furrows) ✓ | Dugout Pond | Dominated by Aquatic Veg | Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc.
low lying area through pasture / Ag field

Field Notes Authored by | Field Notes QA/QCed by

Northern Drainage 57 WB

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

Station # 57 | Project Name Amherst Island
Watercourse Name | Project # 160960095
Photos 59-64 | Field Staff Kat. SJ
Date Aug 15. 2012 | Time 14:25
Weather conditions in previous 24 hrs
GPS Coordinates (Zone) 18T E 366012 N 4893046 Datum
Descriptive Location

Water Quality
Dissolved Oxygen (mg/L) | pH | Conductivity (µS/cm) dry
Water Temperature (°C) | Air Temperature (°C)
Time *in situ* measurements taken

Watercourse Dimensions & Morphology
Mean Watercourse Width (m) | Maximum Pool Depth (cm)
Mean Bankfull Width 7 (m) | Mean Water Depth (cm)
% Riffle | % Pool | % Run | % Flat
Evidence of eroding banks, Comments on bank stability

Substrate (% cover)
Bedrock 70 | Cobble 30 | Sand | Silt | Muck
Boulder | Gravel | Clay | Marl | Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks | Deep Pool | Watercress | Aquatic Veg | Overhanging Vegetation | Woody Debris | Boulder | Other

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
90-100% - cedar, willow, elm, buckthorn
Adjacent Land Use

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Migratory Obstructions (seasonal, permanent)
Note any fish observations

Waterbody Notes
Natural Watercourse ✓ | Trapezoidal Channel | Grassed Swale | Buried Tile
Surficial Drainage (i.e. furrows) | Dugout Pond | Dominated by Aquatic Veg | Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc.

Field Notes Authored by | Field Notes QA/QCed by

Northern Drainage (31) (32) (3

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

XWB

Stantec

Project Amherst Island
Station # 31, 32 + 33
Photos Taken ✓
GPS Coordinates
Descriptive Location south of Front Rd, east of Stella 460m to 1.3km south in field

Project # 160960595
Field Staff RE + RP
Date May 19 2011
Time 2-3:30

Water Quality
Dissolved Oxygen (mg/L) _____ pH_____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Weather conditions in previous 24 hrs _____

Watercourse Dimensions & Morphology
Mean Watercourse Width_____(m) Maximum Pool Depth_____(cm)
Mean Bankfull Width_____(m) Mean Water Depth_____(cm)
_____% Riffle _____% Pool _____% Run _____% Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate – Upstream (% cover)
_____Bedrock _____Silt _____Boulder _____Clay _____Cobble
_____Muck _____Gravel _____Marl _____Sand _____Detritus

Substrate – Downstream (% cover)
_____Bedrock _____Silt _____Boulder _____Clay _____Cobble
_____Muck _____Gravel _____Marl _____Sand _____Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks Deep Pool Vascular Plants
Overhanging Vegetation Woody Debris Boulder Other_____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream_____
Downstream_____
Adjacent Land Use
Upstream_____
Downstream_____

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream_____
Downstream_____
Migratory Obstructions (seasonal, permanent)
Upstream_____
Downstream_____
Note any fish observations _____

Other Habitat Notes, Incidental Wildlife Observations, etc. _____
-grassed, saturated field, no evidence of channel at all 3 locations

Field Notes Authored by RE Field Notes QA/QCed by _____ Page 1 of 1

Northern Drainage (21) WB XWB

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Amherst Island
Station # 21
Photos Taken Y
GPS Coordinates
Descriptive Location Front Rd, 200 m west of Marshall 40 Ft Rd.

Project # 160960595
Field Staff KE + RP
Date May 18 2011
Time 6

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Weather conditions in previous 24 hrs _____

Watercourse Dimensions & Morphology

Mean Watercourse Width 0.5-1 (m) Maximum Pool Depth _____ (cm)
Mean Bankfull Width 2 (m) Mean Water Depth 5-10 (cm)
_____% Riffle 50 % Pool 50 % Run _____% Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate – Upstream (% cover)

_____Bedrock _____Silt _____Boulder _____Clay _____Cobble
_____Muck _____Gravel _____Marl _____Sand _____Detritus

Substrate – Downstream (% cover)

_____Bedrock _____Silt _____Boulder _____Clay _____Cobble
_____Muck _____Gravel _____Marl _____Sand _____Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Vascular Plants
Overhanging Vegetation Woody Debris Boulder Other_____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream_____
Downstream_____
Adjacent Land Use
Upstream_____
Downstream_____

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream_____
Downstream_____
Migratory Obstructions (seasonal, permanent)
Upstream_____
Downstream_____
Note any fish observations _____

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

-u/s - WB approx. 50 m to top of hill, surficial drain through furrow farther u/s (seasonal)
-d/s - WB - defined channel (probably seasonal)

Field Notes Authored by KE Field Notes QA/QCed by _____ Page 1 of 1

-no access d/s so not fished, min water u/s due to

Eastern Drainage

Eastern Drainage

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

30 u/s X

Stantec

Project Amherst Island
Station # 30
Photos Taken 7
GPS Coordinates
Descriptive Location crossing @ Ritchie Farm @ Front Rd

Project # 160960595
Field Staff KE + BP
Date May 19 2011
Time 2:15 pm

Water Quality

Dissolved Oxygen (mg/L) 7.14 pH 8.01 Conductivity (µS/cm) 303
Water Temperature (°C) 26.12 Air Temperature (°C) 20°
Weather conditions in previous 24 hrs cool & rain

Watercourse Dimensions & Morphology

Mean Watercourse Width 2 (m) Maximum Pool Depth 50 (cm)
Mean Bankfull Width 3.5 (m) Mean Water Depth 15 (cm)
20 % Riffle 10 % Pool 30 % Run 30 % Flat
Evidence of eroding banks, Comments on bank stability
stable + veg

Substrate – Upstream (% cover)

70 Bedrock 30 Silt ____ Boulder ____ Clay ____ Cobble
____ Muck ____ Gravel ____ Marl ____ Sand ____ Detritus

Substrate – Downstream (% cover)

30 Bedrock 40 Silt ____ Boulder ____ Clay ____ Cobble
____ Muck ____ Gravel ____ Marl ____ Sand 30 Detritus

In-water Cover

Cover Types Present (circle): Overhanging Vegetation, Undercut Banks, Woody Debris, Deep Pool, Boulder, Vascular Plants, Other ____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 0%
Downstream 0%
Adjacent Land Use
Upstream pasture
Downstream

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream none observed
Downstream
Migratory Obstructions (seasonal, permanent)
Upstream seasonal
Downstream
Note any fish observations
none observed

Other Habitat Notes, Incidental Wildlife Observations, etc.
-u/s - shallow, surficial drainage through furrows in field, small pool @ culvert (temporary) XWB.
-d/s - no access

Field Notes Authored by KE Field Notes QA/QCed by ____ Page 1 of 1

Eastern Drainage 58

WIND FARM WATERBODY RAPID ASSESSMENT FORM

WB

Stantec

Station # 58
Watercourse Name
Photos 53-58
Date Aug 15 2012
Project Name Amherst Island
Project # 160960595
Field Staff Kat St. J.
Time 13:50
Weather conditions in previous 24 hrs
GPS Coordinates (Zone) 18T E 368531 N 4894011 Datum
Descriptive Location

Water Quality
Dissolved Oxygen (mg/L) _____ pH ~~_____~~ dry Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology
Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
Mean Bankfull Width 5 (m) Mean Water Depth _____ (cm)
_____ % Riffle _____ % Pool _____ % Run _____ % Flat
Evidence of eroding banks, Comments on bank stability

Substrate (% cover)
_____ Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck
_____ Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
15% grasses, goldenrod, forbs
Adjacent Land Use
residential / pasture

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations

Waterbody Notes
Natural Watercourse ✓ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg ✓ Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc.

Field Notes Authored by _____ Field Notes QA/QCed by _____

Eastern Drainage (9) WB

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Amherst Island | Project # 160916595
Station # 9 | Field Staff KE + RP
Photos Taken 4 | Date May 18 2011
GPS Coordinates | Time 11
Descriptive Location 3rd watercourse north along 40 ft Rd Lower

Water Quality
Dissolved Oxygen (mg/L) 9.63 | pH 7.94 | Conductivity (µS/cm) 142
Water Temperature (°C) 13.11 | Air Temperature (°C) 12°
Weather conditions in previous 24 hrs cold + rain

Watercourse Dimensions & Morphology
Mean Watercourse Width 1.5 (m) | Maximum Pool Depth 50 (cm)
Mean Bankfull Width 4 (m) | Mean Water Depth 30 (cm)
10 % Riffle | 20 % Pool | 30 % Run | 40 % Flat
Evidence of eroding banks, Comments on bank stability
eroding banks in pasture dfs.

Substrate – Upstream (% cover)

20 Bedrock	50 Silt	Boulder	Clay	Cobble
Muck	Gravel	Marl	Sand	30 Detritus

Substrate – Downstream (% cover)

50 Bedrock	15 Silt	Boulder	Clay	Cobble
Muck	35 Gravel	Marl	Sand	Detritus

In-water Cover
Cover Types Present (circle): Overhanging Vegetation | Undercut Banks | Woody Debris | Deep Pool | Boulder | Vascular Plants | Other

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream
Downstream 0%
Adjacent Land Use
Upstream
Downstream pasture

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream none observed
Downstream
Migratory Obstructions (seasonal, permanent)
Upstream seasonal likely.
Downstream potentially seasonal
Note any fish observations
Fathead Minnow + Banded Killifish

Other Habitat Notes, Incidental Wildlife Observations, etc.
WB -u/s – shallow, diffuse ~~channel~~ drainage through field
WB -d/s – extremely sinuous channel drains toward cottage ~~pool~~ @ culvert
-unknown if a barrier exists @ lake (no access)

Field Notes Authored by KE | Field Notes QA/QCed by | Page 1 of 1

Stantec

Page ___ of ___

Stantec Consulting Ltd - Electrofishing Record and Catch Results

Project Number 160960595 | Station Number 9

Project Name Amherst Island wind | Pass No. (if applicable) 1

Project manager Rob Roland | Date (yyyymmdd): 2011/05/18

Descriptive Location U/S + D/S of ~~Front Line~~ at Fillson + Jeffrey Properties Lane 40 Ft Road

UTM coordinates _____ easting _____ northing zone ____

Fishing Method (circle one): (Backpack) Boat | Unit Model/Make LR-24 Smith Root

Sampling Method (circle one): even (habitat) transect spot

Effort (Electrofishing Seconds): 152 | Number of Netters: 1 | Number of Anodes: 1

Settings

Frequency (Hz) 70 | Voltage (volts) 400 | Current (Amps) / | Power (Watts) /

Station Information

Length of Stream Surveyed (m) 60

Station Characteristics: Width (m): Range 1 - 3 Average: 1.5

Depth (m): Range 0.10 - 0.50 Average: 0.30

Water Clarity/Colour: Clear/colourless | Water Velocity if Measured (m/s): —

Temperature (°C) 13.16 | Conductivity (uS/cm) 142

pH 7.94 | Dissolved Oxygen (mg/L) 9.63

Catch Data

Species	Number of Fish	Species	Number of Fish
Fathead Minnow	16		
Banded Killifish	1		

Fish Measurements on Separate Sheet? Y(N)

Field Staff: KE + RP | Notes By: RP

(Station Diagram on Back)

Eastern Drainage (29) XVI

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Amherst Island | Project # 160960595
Station # 29 | Field Staff KE + RP
Photos Taken Y | Date May 19 2011
GPS Coordinates | Time 2
Descriptive Location Ritchie property, watercourse mid property

Water Quality
Dissolved Oxygen (mg/L) 7.24 | pH 7.86 | Conductivity (µS/cm) 184
Water Temperature (°C) 26.89 | Air Temperature (°C) 20°
Weather conditions in previous 24 hrs cool + rain

Watercourse Dimensions & Morphology
Mean Watercourse Width _____(m) | Maximum Pool Depth _____(cm)
Mean Bankfull Width _____(m) | Mean Water Depth _____(cm)
_____% Riffle | _____% Pool | _____% Run | _____% Flat
Evidence of eroding banks, Comments on bank stability

Substrate – Upstream (% cover)
_____Bedrock | _____Silt | _____Boulder | _____Clay | _____Cobble
_____Muck | _____Gravel | _____Marl | _____Sand | _____Detritus

Substrate – Downstream (% cover)
_____Bedrock | _____Silt | _____Boulder | _____Clay | _____Cobble
_____Muck | _____Gravel | _____Marl | _____Sand | _____Detritus

In-water Cover
Cover Types Present (circle): Overhanging Vegetation | Undercut Banks | Woody Debris | Deep Pool | Boulder | Vascular Plants | Other_____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream
Downstream 0%
Adjacent Land Use
Upstream
Downstream sheep pasture

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream
Downstream none observed
Migratory Obstructions (seasonal, permanent)
Upstream
Downstream seasonal
Note any fish observations none observed, too little water to fish

Other Habitat Notes, Incidental Wildlife Observations, etc.
-u/s- no defined channel, shallow surficial drainage through field, some erosion @ farm crossing possibly due to undersized + slightly sunken culvert.

Field Notes Authored by KE | Field Notes QA/QCed by | Page 1 of 1

-d/s no defined channel, surficial drainage through low wms area in pasture.

Eastern Drainage (8) WF

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Amherst Island | Project # 160960.595
Station # 8 | Field Staff KE + RP
Photos Taken 4 | Date May 18 2011
GPS Coordinates | Time 9:48
Descriptive Location 2nd watercourse north along lower 40 Ft Rd

Water Quality
Dissolved Oxygen (mg/L) 9.63 | pH 7.6 | Conductivity (µS/cm) 202
Water Temperature (°C) 12.2 | Air Temperature (°C) 12°
Weather conditions in previous 24 hrs rain

Watercourse Dimensions & Morphology
Mean Watercourse Width 2.5 (m) | Maximum Pool Depth 40 (cm)
Mean Bankfull Width 4 (m) | Mean Water Depth 20 (cm)
— % Riffle | 40 % Pool | 20 % Run | 40 % Flat
Evidence of eroding banks, Comments on bank stability
stable + veg

Substrate – Upstream (% cover)

50 Bedrock	30 Silt	Boulder	Clay	Cobble
Muck	10 Gravel	Marl	Sand	10 Detritus

Substrate – Downstream (% cover)

50 Bedrock	50 Silt	Boulder	Clay	Cobble
Muck	Gravel	Marl	Sand	Detritus

In-water Cover
Cover Types Present (circle): Overhanging Vegetation | Undercut Banks | Woody Debris | Deep Pool | Boulder | Vascular Plants | Other

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 90%, flows through small woodlot
Downstream 0%
Adjacent Land Use
Upstream fallow field + woodlot
Downstream pasture

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream none observed
Downstream
Migratory Obstructions (seasonal, permanent)
Upstream seasonal w/ isolated pools (likely)
Downstream possible barrier @ Idle
Note any fish observations
Banded Killifish + Fathead Minnow @ culvert.

Other Habitat Notes, Incidental Wildlife Observations, etc.
u/s - trenched channel through woodlot
d/s - shallow, slightly meandering channel through pasture

Field Notes Authored by KE | Field Notes QA/QCed by | Page 1 of 1

Stantec

Stantec Consulting Ltd - Electrofishing Record and Catch Results

Project Number: Amherst Island
Station Number: 8
Project Name: 160960595
Pass No. (if applicable): 1
Project manager:
Date (yyyymmdd): May 18 2011
Descriptive Location: 2nd watercourse south along lower 40 foot Road. (Jeffery + Filson property)
UTM coordinates: easting northing zone

Fishing Method (circle one): (Backpack) Boat Unit Model/Make:
Sampling Method (circle one): even (habitat) transect spot

Effort (Electrofishing Seconds): 162 Number of Netters: 1 Number of Anodes: 1

Settings
Frequency (Hz): 75 Voltage (volts): 400 Current (Amps): Power (Watts):

Station Information
Length of Stream Surveyed (m): 90 m
Station Characteristics: Width (m): Range 2-3 Average: 2.5
Depth (m): Range 10-40 Average: 20

Water Clarity/Colour: clear / colourless Water Velocity if Measured (m/s):
Temperature (°C): 12.2 Conductivity (uS/cm): 202
pH: 7.6 Dissolved Oxygen (mg/L): 9.63

Catch Data

Species	Number of Fish	Species	Number of Fish
Killifish	19		
Fathead	8		
tadpole	2		

Fish Measurements on Separate Sheet? Y (N)
Field Staff: KE + RP
Notes By:

(Station Diagram on Back)

Eastern Drainage

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT (28) XWF

Stantec

Project Amherst Island | Project # 160960595
Station # 28 | Field Staff KE + RP
Photos Taken Y | Date May 19 2011
GPS Coordinates | Time 1:30
Descriptive Location Ritchie property, watercourse farthest south

Water Quality
Dissolved Oxygen (mg/L) 8.78 | pH 7.97 | Conductivity (µS/cm) 267
Water Temperature (°C) 24.63 | Air Temperature (°C) 23
Weather conditions in previous 24 hrs rain & cool

Watercourse Dimensions & Morphology
Mean Watercourse Width 2.5 (m) | Maximum Pool Depth 40 (cm)
Mean Bankfull Width 4.5 (m) | Mean Water Depth 10 (cm)
— % Riffle | — % Pool | — % Run | 100 % Flat
Evidence of eroding banks, Comments on bank stability
erosion @ culvert

Substrate – Upstream (% cover)
Bedrock | 80 Silt | Boulder | Clay | Cobble
Muck | Gravel | Marl | Sand | 20 Detritus

Substrate – Downstream (% cover)
Bedrock | 80 Silt | Boulder | Clay | Cobble
Muck | Gravel | Marl | Sand | 20 Detritus

In-water Cover
Cover Types Present (circle): Overhanging Vegetation | Undercut Banks | Woody Debris | Deep Pool | Boulder | Vascular Plants | Other

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream
Downstream 0%
Adjacent Land Use
Upstream sheep pasture
Downstream

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream none observed
Downstream
Migratory Obstructions (seasonal, permanent)
Upstream temporarily ponded @ culvert
Downstream
Note any fish observations none observed, not enough water to fish

Other Habitat Notes, Incidental Wildlife Observations, etc.
-u/s - no defined channel, terrestrial grasses, just a temporarily ponded area @ culvert caused by farm crossing (active pasture)
-d/s - no defined channel, just sw incidental drainage in low lying area of terrestrial grasses

Field Notes Authored by KE | Field Notes QA/QCed by | Page 1 of 1

Eastern Drainage 59 NWP

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

Station # 59 | Project Name Amherst Island
Watercourse Name | Project # 160960595
Photos 50-52 | Field Staff Kdt, St J
Date Aug 15, 2012 | Time 13:15
Weather conditions in previous 24 hrs
GPS Coordinates (Zone) 18T E 369607 N 4893460 Datum
Descriptive Location

Water Quality
Dissolved Oxygen (mg/L) ____ pH ____ Conductivity (µS/cm) ____
Water Temperature (°C) ____ Air Temperature (°C) ____
Time *in situ* measurements taken ____

Watercourse Dimensions & Morphology
Mean Watercourse Width ____ (m) Maximum Pool Depth ____ (cm)
Mean Bankfull Width ____ (m) Mean Water Depth ____ (cm)
____ % Riffle ____ % Pool ____ % Run ____ % Flat
Evidence of eroding banks, Comments on bank stability

Substrate (% cover)
____ Bedrock ____ Cobble ____ Sand ____ Silt ____ Muck
____ Boulder ____ Gravel ____ Clay ____ Marl ____ Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other ____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)

Adjacent Land Use

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)

Migratory Obstructions (seasonal, permanent)

Note any fish observations

Waterbody Notes
Natural Watercourse ____ Trapezoidal Channel ____ Grassed Swale ____ Buried Tile ____
Surficial Drainage (i.e. furrows) ✓ Dugout Pond ____ Dominated by Aquatic Veg ____ Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc.
surficial drainage through pasture

Field Notes Authored by ____ Field Notes QA/QCed by ____

Eastern Drainage (7) u/s xWB d/s WB

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Amherst Island — Project # 160960595
Station # 7 — Field Staff KE + RP
Photos Taken 4 — Date May 18 2011
GPS Coordinates — Time 9:30
Descriptive Location adjacent to Kingston Naturalist property, along Lower Big Ft. Rd

Water Quality
Dissolved Oxygen (mg/L) 8.26 — pH 7.67 — Conductivity (µS/cm) 194
Water Temperature (°C) 11.5 — Air Temperature (°C) 12°
Weather conditions in previous 24 hrs rain

Watercourse Dimensions & Morphology
Mean Watercourse Width 2 (m) — Maximum Pool Depth 40 (cm)
Mean Bankfull Width 4 (m) — Mean Water Depth 20 (cm)
__% Riffle — ~ % Pool — ~ % Run — 100 % Flat
Evidence of eroding banks, Comments on bank stability
eroded banks d/s.

xWB **Substrate – Upstream (% cover)** of road

Bedrock	70 Silt	Boulder	Clay	Cobble
Muck	Gravel	Marl	Sand	30 Detritus

WB **Substrate – Downstream (% cover)** of road

Bedrock	60 Silt	10 Boulder	Clay	Cobble
Muck	Gravel	Marl	Sand	Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks, Deep Pool, Vascular Plants, Overhanging Vegetation, Woody Debris (willows), Boulder, Other

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 0%
Downstream 10% - 2 willow next to road, otherwise open
Adjacent Land Use
Upstream Ag field
Downstream pasture

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream none observed
Downstream
Migratory Obstructions (seasonal, permanent)
Upstream no defined channel
Downstream defined channel, probably seasonal
Note any fish observations
not fished, no access

Other Habitat Notes, Incidental Wildlife Observations, etc. shallow furrows.
- u/s diffuse surficial drainage, no channel - Not WB
- d/s defined channel, meanders, eroded banks.

Field Notes Authored by KE — Field Notes QA/QCed by — Page 1 of 1

Eastern Drainag

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT (11) XW

Stantec

Project Amherst Island
Station # 11
Photos Taken ✓
GPS Coordinates
Descriptive Location farther u/s from station 7 in sheep pasture, north of station 10.

Project # 160960595
Field Staff KE + RP
Date May 18 2011
Time 12:15

Water Quality
Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Weather conditions in previous 24 hrs _____

Watercourse Dimensions & Morphology
Mean Watercourse Width _____(m) Maximum Pool Depth _____(cm)
Mean Bankfull Width _____(m) Mean Water Depth _____(cm)
_____% Riffle _____% Pool _____% Run _____% Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate – Upstream (% cover)
_____Bedrock _____Silt _____Boulder _____Clay _____Cobble
_____Muck _____Gravel _____Marl _____Sand _____Detritus

Substrate – Downstream (% cover)
_____Bedrock _____Silt _____Boulder _____Clay _____Cobble
_____Muck _____Gravel _____Marl _____Sand _____Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks Deep Pool Vascular Plants
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream _____
Downstream _____
Adjacent Land Use
Upstream _____
Downstream _____

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream _____
Downstream _____
Migratory Obstructions (seasonal, permanent)
Upstream _____
Downstream _____
Note any fish observations _____

Other Habitat Notes, Incidental Wildlife Observations, etc. _____
- grassed swale through field u/s 2 on-line ponds (man-made)
- all tributaries checked on option property - all diffuse surficial drainage or grassed swale in pasture

Field Notes Authored by KE Field Notes QA/QCed by _____ Page 1 of 1

Southern Drainage

Southern Drainage (10) x W1

Stantec

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Project Amherst Island
Station # 10
Photos Taken Y
GPS Coordinates
Descriptive Location South shore Rd, 600 m west of lower 40 St Rd

Project # 1609160595
Field Staff KE + RP
Date May 18 2011
Time 11:45

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Weather conditions in previous 24 hrs _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____(m) Maximum Pool Depth _____(cm)
Mean Bankfull Width _____(m) Mean Water Depth _____(cm)
_____% Riffle _____% Pool _____% Run _____% Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate – Upstream (% cover)

_____Bedrock _____Silt _____Boulder _____Clay _____Cobble
_____Muck _____Gravel _____Marl _____Sand _____Detritus

Substrate – Downstream (% cover)

_____Bedrock _____Silt _____Boulder _____Clay _____Cobble
_____Muck _____Gravel _____Marl _____Sand _____Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Vascular Plants
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream _____
Downstream _____
Adjacent Land Use
Upstream _____
Downstream _____

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream _____
Downstream _____
Migratory Obstructions (seasonal, permanent)
Upstream _____
Downstream _____
Note any fish observations _____

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

-u/s diffuse surficial drainage through pasture
-d/s culvert outlets onto limestone bedrock along shoreline perched

Field Notes Authored by RE Field Notes QA/QCed by _____ Page 1 of 1

Southern Drainage (12 XW)

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Amherst Island
Station # 12
Photos Taken ✓
GPS Coordinates
Descriptive Location South shore Rd, 1.2 km west of Marshall 40 Ft Rd

Project # 160960595
Field Staff KE + RP
Date May 18 2011
Time 1:20

Water Quality
Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Weather conditions in previous 24 hrs _____

Watercourse Dimensions & Morphology
Mean Watercourse Width _____(m) Maximum Pool Depth _____(cm)
Mean Bankfull Width _____(m) Mean Water Depth _____(cm)
_____% Riffle _____% Pool _____% Run _____% Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate – Upstream (% cover)
_____Bedrock _____Silt _____Boulder _____Clay _____Cobble
_____Muck _____Gravel _____Marl _____Sand _____Detritus

Substrate – Downstream (% cover)
_____Bedrock _____Silt _____Boulder _____Clay _____Cobble
_____Muck _____Gravel _____Marl _____Sand _____Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks Deep Pool Vascular Plants
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream _____
Downstream _____
Adjacent Land Use
Upstream _____
Downstream _____

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream _____
Downstream _____
Migratory Obstructions (seasonal, permanent)
Upstream _____
Downstream _____
Note any fish observations _____

Other Habitat Notes, Incidental Wildlife Observations, etc. _____
-ups - shallow surficial drainage to pool & culvert
-dls - perched culvert outlets directly onto limestone bedrock shoreline

Field Notes Authored by KE Field Notes QA/QCed by _____ Page 1 of 1

Southern Arauna (13) XWB

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Amherst Island
Project # 160960595
Station # 13
Field Staff KE + RP
Photos Taken Y
Date May 18 2011
GPS Coordinates
Time 1:26
Descriptive Location South Shore Rd, 1.5 km west of Marshall 40 ft Rd.

Water Quality

Dissolved Oxygen (mg/L) _____ pH_____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Weather conditions in previous 24 hrs _____

Watercourse Dimensions & Morphology

Mean Watercourse Width_____(m) Maximum Pool Depth_____(cm)
Mean Bankfull Width_____(m) Mean Water Depth_____(cm)
_____% Riffle _____% Pool _____% Run _____% Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate – Upstream (% cover)

_____Bedrock _____Silt _____Boulder _____Clay _____Cobble
_____Muck _____Gravel _____Marl _____Sand _____Detritus

Substrate – Downstream (% cover)

_____Bedrock _____Silt _____Boulder _____Clay _____Cobble
_____Muck _____Gravel _____Marl _____Sand _____Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Vascular Plants
Overhanging Vegetation Woody Debris Boulder Other_____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream_____
Downstream_____
Adjacent Land Use
Upstream_____
Downstream_____

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream_____
Downstream_____
Migratory Obstructions (seasonal, permanent)
Upstream_____
Downstream_____
Note any fish observations _____

Other Habitat Notes, Incidental Wildlife Observations, etc. _____
-u/s - surficial drainage through field, some furrows
-d/s - perched culvert outlets onto limestone bedrock shoreline

Field Notes Authored by KE Field Notes QA/QCed by _____ Page 1 of 1

Southern Drainage (14) XWE

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Amherst Island
Station # 14
Photos Taken ✓
GPS Coordinates
Descriptive Location wetlands property, 1.2 km north in field

Project # 160960595
Field Staff KE + RP
Date May 18 2011
Time 1:50

Water Quality
Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Weather conditions in previous 24 hrs _____

Watercourse Dimensions & Morphology
Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
_____ % Riffle _____ % Pool _____ % Run _____ % Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate – Upstream (% cover)
_____ Bedrock _____ Silt _____ Boulder _____ Clay _____ Cobble
_____ Muck _____ Gravel _____ Marl _____ Sand _____ Detritus

Substrate – Downstream (% cover)
_____ Bedrock _____ Silt _____ Boulder _____ Clay _____ Cobble
_____ Muck _____ Gravel _____ Marl _____ Sand _____ Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks Deep Pool Vascular Plants
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream _____
Downstream _____
Adjacent Land Use
Upstream _____
Downstream _____

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream _____
Downstream _____
Migratory Obstructions (seasonal, permanent)
Upstream _____
Downstream _____
Note any fish observations _____

Other Habitat Notes, Incidental Wildlife Observations, etc.
u/s - diffuse surficial drainage, field saturated
d/s - surficial drainage through field

Field Notes Authored by KE Field Notes QA/QCed by _____ Page 1 of 1

southern Drainage (16) XW

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Amherst Island
Station # 16
Photos Taken Y
GPS Coordinates
Descriptive Location South Shore Rd, 500 m east of Stella 40FT Rd

Project # 160960595
Field Staff KE + RP
Date May 18 2011
Time 3

Water Quality

Dissolved Oxygen (mg/L) _____ pH_____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Weather conditions in previous 24 hrs _____

Watercourse Dimensions & Morphology

Mean Watercourse Width_____(m) Maximum Pool Depth_____(cm)
Mean Bankfull Width_____(m) Mean Water Depth_____(cm)
_____% Riffle _____% Pool _____% Run _____% Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate – Upstream (% cover)

_____Bedrock _____Silt _____Boulder _____Clay _____Cobble
_____Muck _____Gravel _____Marl _____Sand _____Detritus

Substrate – Downstream (% cover)

_____Bedrock _____Silt _____Boulder _____Clay _____Cobble
_____Muck _____Gravel _____Marl _____Sand _____Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Vascular Plants
Overhanging Vegetation Woody Debris Boulder Other_____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream_____
Downstream_____
Adjacent Land Use
Upstream_____
Downstream_____

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream_____
Downstream_____
Migratory Obstructions (seasonal, permanent)
Upstream_____
Downstream_____
Note any fish observations _____

Other Habitat Notes, Incidental Wildlife Observations, etc.

-u/s shallow furrows for surficial drainage through field
-d/s = surficial drainage through lawn to perched limestone bedrock shoreline
shallow

Field Notes Authored by KE Field Notes QA/QCed by _____ Page 1 of 1

southern drainage (18) u/s WB d/s XWB

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Amherst Island | Project # 160960595
Station # 18 | Field Staff KE + RP
Photos Taken Y | Date May 18 2011
GPS Coordinates | Time 3:40
Descriptive Location south shore Rd, 1.3 km west of Stella 40 ft Rd, 200 m north into field

Water Quality
Dissolved Oxygen (mg/L) 12.0 | pH 7.92 | Conductivity (µS/cm) 159
Water Temperature (°C) 17.3 | Air Temperature (°C) 14.0
Weather conditions in previous 24 hrs rain & cool

Watercourse Dimensions & Morphology
Mean Watercourse Width 1.5 (m) | Maximum Pool Depth 50 (cm)
Mean Bankfull Width 2.5 (m) | Mean Water Depth 20 (cm)
/ % Riffle | 40 % Pool | / % Run | 60 % Flat
Evidence of eroding banks, Comments on bank stability
- stable

Substrate – Upstream (% cover)

Bedrock	50 Silt	Boulder	Clay	10 Cobble
Muck	Gravel	Marl	Sand	40 Detritus

Substrate – Downstream (% cover)

Bedrock	50 Silt	Boulder	Clay	10 Cobble
Muck	Gravel	Marl	Sand	40 Detritus

In-water Cover
Cover Types Present (circle): Overhanging Vegetation | Undercut Banks | Woody Debris | Deep Pool | Boulder | Vascular Plants | Other

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 60% maple & ash
Downstream 90% " "
Adjacent Land Use
Upstream Ag field
Downstream woodlot

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream none observed
Downstream
Migratory Obstructions (seasonal, permanent)
Upstream seasonal
Downstream
Note any fish observations
3 brook stickleback - 1 captured in pool over larger

Other Habitat Notes, Incidental Wildlife Observations, etc.
-u/s - WB in woodlot, XWB u/s through field, surficial drainage
-d/s - WB - flood, but shallow channel through woodlot

Field Notes Authored by KE | Field Notes QA/QCed by | Page 1 of 1

Stantec

Stantec Consulting Ltd - Electrofishing Record and Catch Results

18

Project Number 160960595 Station Number 18

Project Name Amherst Island Pass No. (if applicable) 1

Project manager Date (yyyymmdd): May 18 2011

Descriptive Location Farm access at dead end of south shore

UTM coordinates easting northing zone

Fishing Method (circle one): (Backpack) Boat Unit Model/Make

Sampling Method (circle one): even (habitat) transect spot

Effort (Electrofishing Seconds): 98 Number of Netters: 1 Number of Anodes: 1

Settings

Frequency (Hz) 75 Voltage (volts) 400 Current (Amps) Power (Watts)

Station Information

Length of Stream Surveyed (m) 30

Station Characteristics: Width (m): Range 1-3 Average: 1.5

Depth (m): Range 5-30 Average: 20

Water Clarity/Colour: clear / tea stained Water Velocity if Measured (m/s):

Temperature (°C) 17.3 Conductivity (uS/cm) 159

pH 7.92 Dissolved Oxygen (mg/L) 12.

Catch Data

Species	Number of Fish	Species	Number of Fish
Brook Stickle	3		

Fish Measurements on Separate Sheet? Y (N)

Field Staff: KE + RP Notes By: KE

(Station Diagram on Back)

Stantec

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

southern Drainage (19) WE

Project Amherst Island
Station # 19
Photos Taken Y
GPS Coordinates
Descriptive Location large watercourse draining swamp/wetland into ARSL, crossing @ Stella 40 ft Rd

Project # 160960595
Field Staff KE + RP
Date May 18 2011
Time 4:40

Water Quality

Dissolved Oxygen (mg/L) 9.06 pH 7.70 Conductivity (µS/cm) 83
Water Temperature (°C) 16.14 Air Temperature (°C) 20°
Weather conditions in previous 24 hrs cool & rain

Watercourse Dimensions & Morphology

Mean Watercourse Width 2.5 (m) Maximum Pool Depth 1.5+ (cm)
Mean Bankfull Width 4 (m) Mean Water Depth 40 (cm)
5 % Riffle 5 % Pool 50 % Run 50 % Flat
Evidence of eroding banks, Comments on bank stability
- veg banks, no erosion

Substrate – Upstream (% cover)

Bedrock 80 Silt Boulder Clay Cobble
Muck Gravel Marl Sand 20 Detritus

Substrate – Downstream (% cover)

Bedrock 80 Silt Boulder Clay Cobble
Muck Gravel Marl Sand 20 Detritus

In-water Cover

Cover Types Present (circle): Overhanging Vegetation, Undercut Banks, Woody Debris, Deep Pool, Boulder, Vascular Plants, Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 40% dogwood + ash
Downstream 20% dogwood
Adjacent Land Use
Upstream hay field
Downstream

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream none observed
Downstream
Migratory Obstructions (seasonal, permanent)
Upstream permanent
Downstream
Note any fish observations see fish collection sheet electrofished - 1 fathead set minnow traps overnight

Other Habitat Notes, Incidental Wildlife Observations, etc.

- wide, deep watercourse, slightly sinuous d/s
- large pool @ culvert
- SV u/s near culvert

Field Notes Authored by KE Field Notes QA/QCed by Page 1 of 1

- probably one of the few permanent watercourses on the isl

Stantec Consulting Ltd - Electrofishing Record and Catch Results

19

Project Number 160960595 Station Number 19

Project Name Amherst Island Pass No. (if applicable) 1

Project manager Date (yyyymmdd): May 18 2011

Descriptive Location large n/c on stella 401 Road

UTM coordinates easting northing zone

Fishing Method (circle one): (Backpack) Boat Unit Model/Make

Sampling Method (circle one): even (habitat) transect spot

Effort (Electrofishing Seconds): 236 Number of Netters: 1 Number of Anodes: 1

Settings

Frequency (Hz) 75 Voltage (volts) 350-550 Current (Amps) Power (Watts)

Station Information

Length of Stream Surveyed (m) 70 m

Station Characteristics: Width (m): Range 2-3.5 Average: 2.5

Depth (m): Range 50-1.5+ Average: 70 cm

Water Clarity/Colour: clear / tea stain Water Velocity if Measured (m/s):

Temperature (°C) 16.14 Conductivity (uS/cm) 83

pH Dissolved Oxygen (mg/L) 9.06

Catch Data

Species	Number of Fish	Species	Number of Fish
Fathead	1		
Minnow Trap May 19			
Fathead	⊠ ⊠ ⊠ = 30		
NRB Dace	:: = 4		
Stickleback	⊠ ⊠ ⊠ ⊠ = 38		
Bluegill	: = 2		
Mudminnow	• = 1		

Fish Measurements on Separate Sheet? Y/(N)

Field Staff: KE + RP Notes By: KE

(Station Diagram on Back)

Miller Drain REA

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Possibly Intermitten

Island Southern Drainage

Stantec

Station # 52 Project Name Amherst Is. Wind
Watercourse Name Unknown trib to Lk. On Project # 160960595
Photos 8603 - ~~8615~~ 8615 Field Staff MF
Date March 28, 2012 Time 13:30
Weather conditions in previous 24 hrs mod. precip.
GPS Coordinates (Zone) 18T E 0361201 N 4889617 Datum Nad 83
Descriptive Location in ROW on north side ditch area of 2nd Conc Rd ~ 100m east of potential access rd of turbine 504

Water Quality
Dissolved Oxygen (mg/L) 9.76 pH 8.52 Conductivity (µS/cm) 575
Water Temperature (°C) 10.14 Air Temperature (°C) ~~8~~ 5.0
Time *in situ* measurements taken 13:45 standing water @ culvert

Watercourse Dimensions & Morphology
Mean Watercourse Width 2.0 (m) Maximum Pool Depth 20 (cm)
Mean Bankfull Width 2.75 (m) Mean Water Depth 15 (cm)
____% Riffle 100 % Pool ____% Run ~~10~~ % Flat
Evidence of eroding banks, Comments on bank stability minor undercut banks. Some exposed bedrock. Flows observed further d/s towards Stn 53

Substrate (% cover)

50 Bedrock	Cobble	Sand 40	Silt	Muck
Boulder	Gravel 10	Clay	Marl	Detritus

In-water Cover
Cover Types Present (circle): (Undercut Banks) (Deep Pool) near culvert Watercress (Aquatic Veg) reed cana algae
Overhanging Vegetation Woody Debris Boulder Other ____

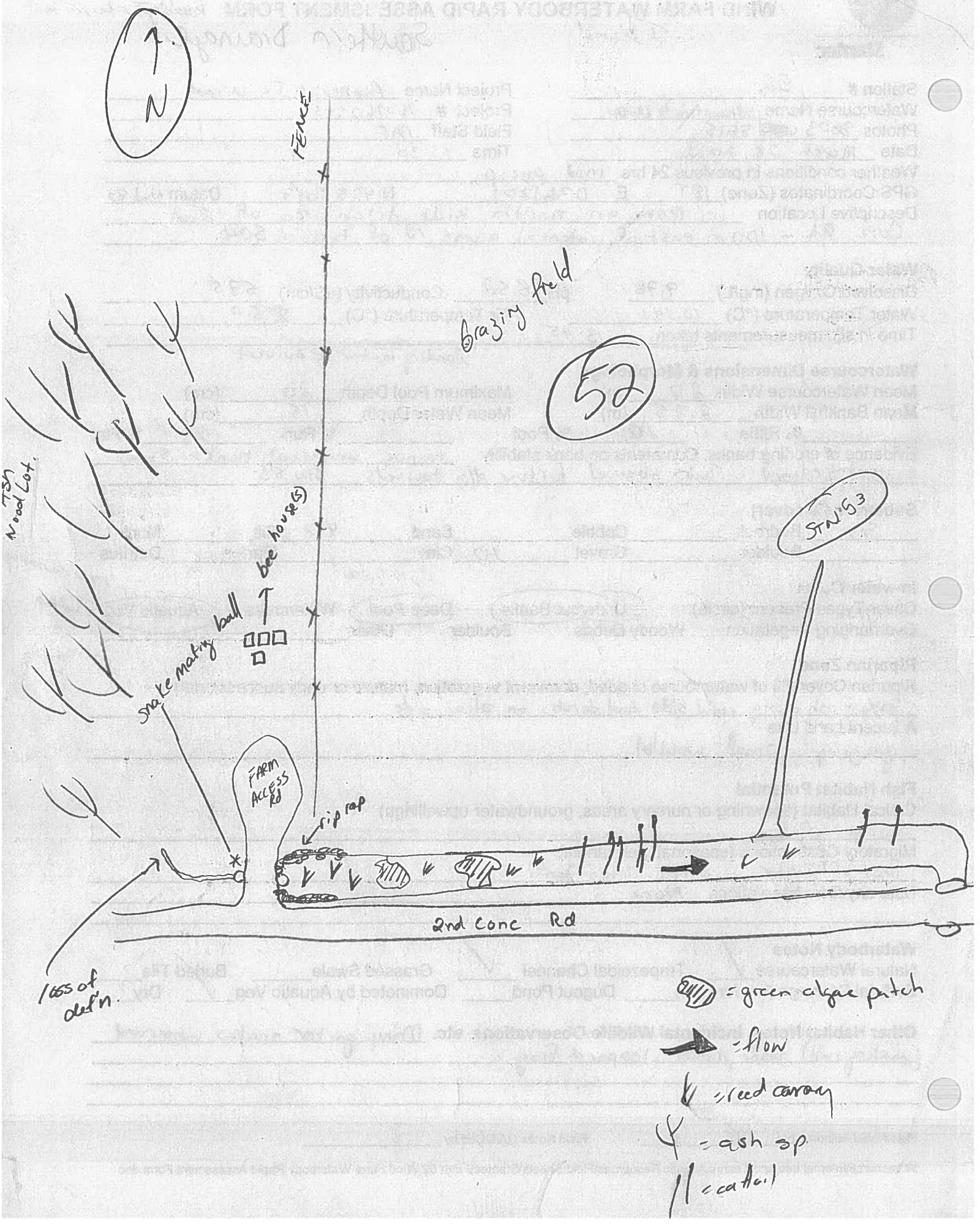
Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
20% = ash along road side and shrubs on other side
Adjacent Land Use
grazing, small woodlot

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
nursery?
Migratory Obstructions (seasonal, permanent)
lack of water possibly intermitent
Note any fish observations None

Waterbody Notes
Natural Watercourse ✓ Trapezoidal Channel ✓ Grassed Swale ____ Buried Tile ____
Surficial Drainage (i.e. furrows) ____ Dugout Pond ____ Dominated by Aquatic Veg ✓ Dry ____

Other Habitat Notes, Incidental Wildlife Observations, etc. Many garter snakes observed (mating ball) took photos., leopard frog

Field Notes Authored by MF Field Notes QA/QCed by ____


7.
N
FENCE
grazing field
52
TSN
Wood Lot.
bee house(s)
snake mating ball
STN 53
FARM ACCESS Rd
rip rap
2nd Conc Rd
165 of defn.
= green algae patch
= flow
= reed canary
= ash sp
= cattail

Southern Drain

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Miller Drain (36) WR

Stantec

Project Amherst Island
Station # 36
Photos Taken Y
GPS Coordinates Y
Descriptive Location 2nd Conc. Rd, 3 km west of Stella 40 Ft Rd.

Project # 160960595
Field Staff KE + RP
Date May 19 2011
Time 4:30

Water Quality

Dissolved Oxygen (mg/L) 6.23 pH 7.82 Conductivity (µS/cm) 199
Water Temperature (°C) 24.98 Air Temperature (°C) 20°
Weather conditions in previous 24 hrs rain + cool

Watercourse Dimensions & Morphology

Mean Watercourse Width 4 (m) Maximum Pool Depth 60 (cm)
Mean Bankfull Width 7 (m) Mean Water Depth 15 (cm)
/ % Riffle 40 % Pool / % Run 60 % Flat
Evidence of eroding banks, Comments on bank stability
vegetated incised channel

Substrate – Upstream (% cover)

Bedrock	40 Silt	Boulder	60 Clay	Cobble
Muck	Gravel	Marl	Sand	Detritus

Substrate – Downstream (% cover)

Bedrock	40 Silt	Boulder	60 Clay	Cobble
Muck	Gravel	Marl	Sand	Detritus

In-water Cover

Cover Types Present (circle): Overhanging Vegetation, Undercut Banks, Woody Debris, Deep Pool, Boulder, Vascular Plants, Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 30% riparian trees
Downstream 0%
Adjacent Land Use
Upstream Ag fields
Downstream

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream none observed
Downstream
Migratory Obstructions (seasonal, permanent)
Upstream seasonal?
Downstream
Note any fish observations
see fish collection record. - minnow traps.

Other Habitat Notes, Incidental Wildlife Observations, etc.

-u/s - no access
-d/s - incised, vegetated channel w/ some water

Field Notes Authored by KE Field Notes QA/QCed by Page 1 of 1

Stantec

Stantec Consulting Ltd - Electrofishing Record and Catch Results

Project Number: Amherst Island
Project Name: 160960595
Project manager:
Descriptive Location: Miller Drain @ 2nd Conc.
Station Number: 36
Pass No. (if applicable): n/a
Date (yyyymmdd): May 20 2011
UTM coordinates: _____ easting _____ northing zone _____

Fishing Method (circle one): Backpack Boat Unit Model/Make _____
Sampling Method (circle one): even habitat transect spot

Effort (Electrofishing Seconds): _____ Number of Netters: _____ Number of Anodes: _____

Settings

Frequency (Hz) _____ Voltage (volts) _____ Current (Amps) _____ Power (Watts) _____

Station Information

Length of Stream Surveyed (m) _____

Station Characteristics: Width (m): Range _____ Average: _____
Depth (m): Range _____ Average: _____

Water Clarity/Colour: _____ Water Velocity if Measured (m/s): _____
Temperature (°C) _____ Conductivity (uS/cm) _____
pH _____ Dissolved Oxygen (mg/L) _____

Catch Data

Species	Number of Fish	Species	Number of Fish
Minnow Trap	⊠/⊠		
Brook	⊠⊠⊠⊠⊠⊠ = 46		
Fathead	⊠⊠ = 24		
Punk	= 7		
Mudminnow	= 1		
NRB Dace	⊠⊠⊠⊠ = 41		
Banded Killish	= 1		

Fish Measurements on Separate Sheet? Y/N

Field Staff: KE + RP

Notes By: KE

(Station Diagram on Back)

Stantec

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Miller Mun. Drain (38) WB — southern Drain

Project Amherst Island — Project # 160960595
Station # 38 — Field Staff KE + RP
Photos Taken Y — Date May 19 2011
GPS Coordinates — Time 5:05
Descriptive Location confluence of Miller Mun Drain + unnamed trib

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Weather conditions in previous 24 hrs _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) — Maximum Pool Depth _____ (cm)
Mean Bankfull Width _____ (m) — Mean Water Depth _____ (cm)
_____ % Riffle _____ % Pool _____ % Run _____ % Flat
Evidence of eroding banks, Comments on bank stability _____

confirmed same as 34 + 36

Substrate – Upstream (% cover)

_____ Bedrock _____ Silt _____ Boulder _____ Clay _____ Cobble
_____ Muck _____ Gravel _____ Marl _____ Sand _____ Detritus

Substrate – Downstream (% cover)

_____ Bedrock _____ Silt _____ Boulder _____ Clay _____ Cobble
_____ Muck _____ Gravel _____ Marl _____ Sand _____ Detritus

In-water Cover

Cover Types Present (circle): Overhanging Vegetation — Undercut Banks — Woody Debris — Deep Pool — Boulder — Vascular Plants — Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 0%
Downstream
Adjacent Land Use
Upstream pasture
Downstream

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream none observed
Downstream
Migratory Obstructions (seasonal, permanent)
Upstream permanent
Downstream
Note any fish observations none observed

Other Habitat Notes, Incidental Wildlife Observations, etc.
large, wide, incised drain flowing through Ag fields + pasture.

Field Notes Authored by KE — Field Notes QA/QCed by _____ — Page 1 of 1

Stantec

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Miller Mun. Drain — Southern Drainage (34) WB

Project Amherst Island — Project # 160960595
Station # 34 — Field Staff KE + RP
Photos Taken Y — Date May 19 2011
GPS Coordinates — Time 4
Descriptive Location 3rd Conc. Rd, 3 km west + 250 m north into woodlot

Water Quality
Dissolved Oxygen (mg/L) 10.09 — pH 7.88 — Conductivity (µS/cm) 234
Water Temperature (°C) 22.21 — Air Temperature (°C) 21°
Weather conditions in previous 24 hrs rain + cool

Watercourse Dimensions & Morphology
Mean Watercourse Width 10 (m) — Maximum Pool Depth 50 (cm)
Mean Bankfull Width 15 (m) — Mean Water Depth 50 (cm)
/ % Riffle — / % Pool — / % Run — 100 % Flat
Evidence of eroding banks, Comments on bank stability
some erosion, but relatively stable + veg.

Substrate – Upstream (% cover)

Bedrock	Silt	Boulder	100 Clay	Cobble
Muck	Gravel	Marl	Sand	Detritus

Substrate – Downstream (% cover)

Bedrock	Silt	Boulder	100 Clay	Cobble
Muck	Gravel	Marl	Sand	Detritus

In-water Cover
Cover Types Present (circle): Overhanging Vegetation, Undercut Banks, Woody Debris, Deep Pool, Boulder, Vascular Plants, Other

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 10%
Downstream 40%
Adjacent Land Use
Upstream woodlot & Ag fields
Downstream woodlot + Ag fields

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream Carp spawning?
Downstream
Migratory Obstructions (seasonal, permanent)
Upstream permanent
Downstream
Note any fish observations Carp
-fished @ station 36.

Other Habitat Notes, Incidental Wildlife Observations, etc.
-large, wide, slow flowing drain w/ lots of aquatic veg.

Field Notes Authored by KE — Field Notes QA/QCed by — Page 1 of 1

Stantec

southern Drains B5 WS

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Project Amherst Island | Project # 160960595
Station # 35 | Field Staff KE + KP
Photos Taken ✓ | Date May 19 2011
GPS Coordinates | Time 4:15
Descriptive Location 3rd Conc. Rd, 3.5 km west of Stella 40 ft Rd, @ Miller Mun. Drain

Water Quality

Dissolved Oxygen (mg/L) _____ pH_____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Weather conditions in previous 24 hrs _____

Watercourse Dimensions & Morphology

Mean Watercourse Width_____(m) Maximum Pool Depth_____(cm)
Mean Bankfull Width_____(m) Mean Water Depth_____(cm)
_____% Riffle _____% Pool _____% Run _____% Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate – Upstream (% cover)

_____Bedrock _____Silt _____Boulder _____Clay _____Cobble
_____Muck _____Gravel _____Marl _____Sand _____Detritus

Substrate – Downstream (% cover)

_____Bedrock _____Silt _____Boulder _____Clay _____Cobble
_____Muck _____Gravel _____Marl _____Sand _____Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Vascular Plants
Overhanging Vegetation Woody Debris Boulder Other_____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream_____
Downstream_____
Adjacent Land Use
Upstream_____
Downstream_____

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream_____
Downstream_____
Migratory Obstructions (seasonal, permanent)
Upstream_____
Downstream_____
Note any fish observations _____

Other Habitat Notes, Incidental Wildlife Observations, etc.

-just photos to confirm similar habitat d/s of 34
-no access.

Field Notes Authored by KE | Field Notes QA/QCed by _____ | Page 1 of 1

Southern Drainage REA

WIND FARM WATERBODY RAPID ASSESSMENT FORM

DRY

Stantec

Island

Station # 53 | Project Name Amherst Is. Wind
Watercourse Name Unknown | Project # 160960595
Photos 8616 - 8618 | Field Staff MF
Date March 28, 2012 | Time 13:50
Weather conditions in previous 24 hrs mod precip.
GPS Coordinates (Zone) 18T E 0361529 N 4889783 Datum Nad 83
Descriptive Location on 2nd Conc Rd in south ROW of road ~ 500 m east of proposed accessrd to S04

Water Quality
Dissolved Oxygen (mg/L) ____ pH ____ Conductivity (µS/cm) DRY
Water Temperature (°C) ____ Air Temperature (°C) ____
Time *in situ* measurements taken ____

Watercourse Dimensions & Morphology
Mean Watercourse Width 1.0 (m) Maximum Pool Depth 0 (cm)
Mean Bankfull Width 1.5 (m) Mean Water Depth 0 (cm)
____% Riffle ____% Pool ____% Run ____% Flat
Evidence of eroding banks, Comments on bank stability Steep banks, minor slumping

Substrate (% cover)

Bedrock	Cobble	Sand 50	Silt 30	Muck
Boulder	Gravel 20	Clay	Marl	Detritus

In-water Cover
Cover Types Present (circle): ~~Undercut Banks~~ Deep Pool ~~Watercress~~ Aquatic Veg
Overhanging Vegetation Woody Debris ~~Boulder~~ Other ____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
meadow sp
Adjacent Land Use
grazing fields

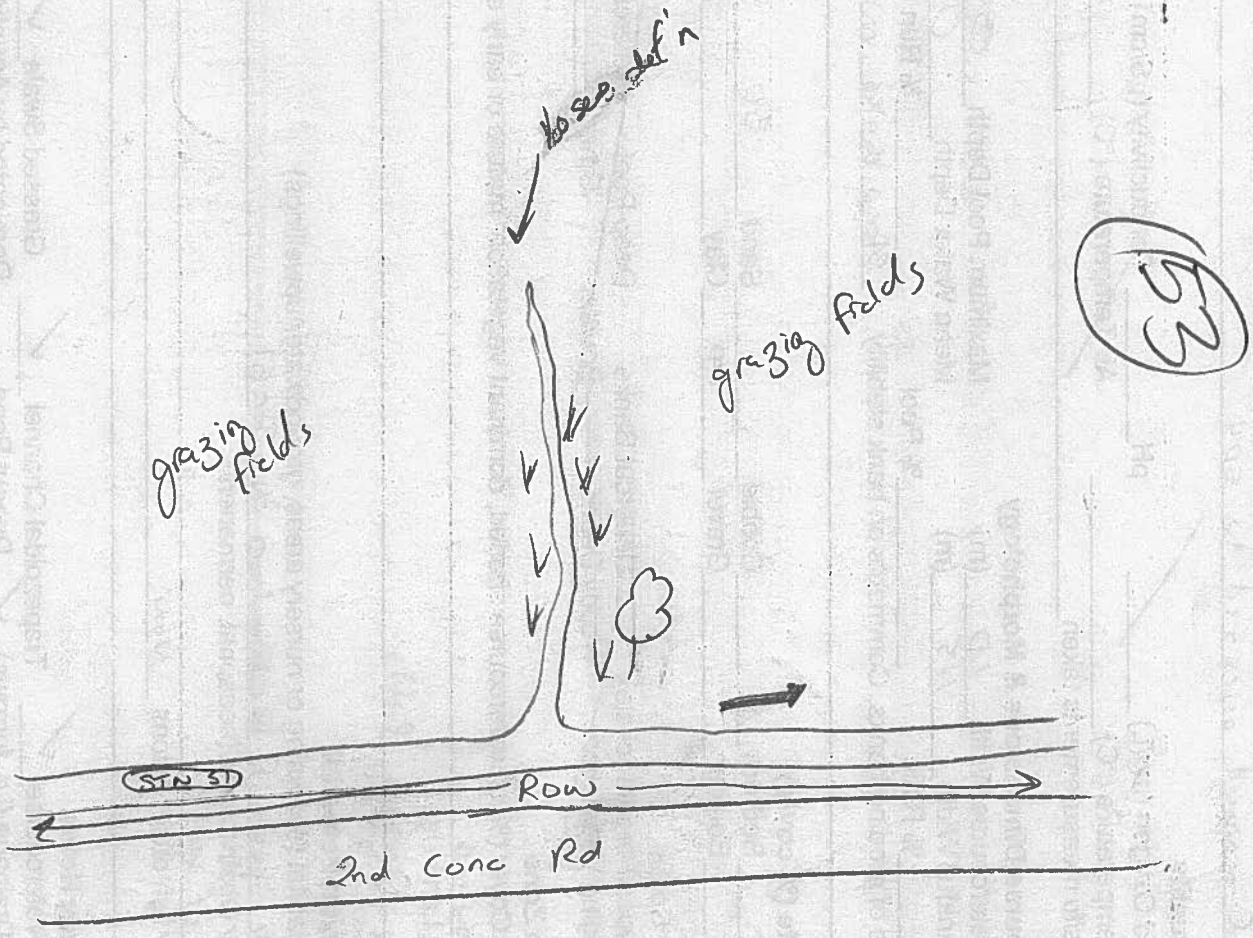
Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
possible spawning in connection to Stn 51
Migratory Obstructions (seasonal, permanent)
lack of watr.
Note any fish observations Non.

Waterbody Notes

Natural Watercourse ✓	Trapezoidal Channel ✓	Grassed Swale ✓	Buried Tile
Surficial Drainage (i.e. furrows) ✓	Dugout Pond	Dominated by Aquatic Veg	Dry

Other Habitat Notes, Incidental Wildlife Observations, etc. Nests

Field Notes Authored by MF Field Notes QA/QCed by ____


to see def'n
grazing fields
grazing fields
59
SIN 51
ROW
2nd Conc Rd

Southern Drainage

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

20

XWR

Stantec

Project Amherst Island
Station # 20
Photos Taken Y
GPS Coordinates
Descriptive Location 2nd Conc Rd, 1.2 km west of Stella 40 Ft Rd

Project # 160960595
Field Staff KE + RP
Date May 18, 2011
Time 5:45

Water Quality

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Weather conditions in previous 24 hrs _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
_____ % Riffle _____ % Pool _____ % Run _____ % Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate – Upstream (% cover)

_____ Bedrock _____ Silt _____ Boulder _____ Clay _____ Cobble
_____ Muck _____ Gravel _____ Marl _____ Sand _____ Detritus

Substrate – Downstream (% cover)

_____ Bedrock _____ Silt _____ Boulder _____ Clay _____ Cobble
_____ Muck _____ Gravel _____ Marl _____ Sand _____ Detritus

In-water Cover

Cover Types Present (circle): Overhanging Vegetation | Undercut Banks | Woody Debris | Deep Pool | Boulder | Vascular Plants | Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream _____
Downstream _____
Adjacent Land Use
Upstream _____
Downstream _____

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream _____
Downstream _____
Migratory Obstructions (seasonal, permanent)
Upstream _____
Downstream _____
Note any fish observations _____

Other Habitat Notes, Incidental Wildlife Observations, etc. _____
- grassed ditch paralleling 2nd Conc

Field Notes Authored by KE Field Notes QA/QCed by _____ Page 1 of 1

Southern Drainage (37) WB

Stantec

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Project Amherst Island | Project # 160960595
Station # 37 | Field Staff KE + RP
Photos Taken ✓ | Date May 19 2011
GPS Coordinates | Time 4:45
Descriptive Location south of 2nd Conc. Rd in pasture

Water Quality
Dissolved Oxygen (mg/L) 7.08 | pH 7.86 | Conductivity (µS/cm) 298
Water Temperature (°C) 23.88 | Air Temperature (°C) 23°
Weather conditions in previous 24 hrs rain + cool

Watercourse Dimensions & Morphology
Mean Watercourse Width 3 (m) | Maximum Pool Depth 30 (cm)
Mean Bankfull Width 4 (m) | Mean Water Depth 20 (cm)
✓ % Riffle | ✓ % Pool | ✓ % Run | 100 % Flat
Evidence of eroding banks, Comments on bank stability
veg. banks

Substrate – Upstream (% cover)

Bedrock	20 Silt	Boulder	80 Clay	Cobble
Muck	Gravel	Marl	Sand	Detritus

Substrate – Downstream (% cover)

Bedrock	20 Silt	Boulder	80 Clay	Cobble
Muck	Gravel	Marl	Sand	Detritus

In-water Cover
Cover Types Present (circle): Overhanging Vegetation | Undercut Banks | Woody Debris | Deep Pool | Boulder | Vascular Plants | Other

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 0%
Downstream
Adjacent Land Use
Upstream Pasture
Downstream

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream none observed
Downstream
Migratory Obstructions (seasonal, permanent)
Upstream seasonal
Downstream
Note any fish observations none observed
fished @ 36

Other Habitat Notes, Incidental Wildlife Observations, etc.
- slightly incised channel flowing through pasture.

Field Notes Authored by KE | Field Notes QA/QCed by | Page 1 of 1

Southern Drainage 60 WB

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

Station # 100 Project Name Amherst Island
Watercourse Name _____ Project # 160960595
Photos 43 - 45 Field Staff KAL SJ
Date AUG 15 2012 Time 11:45
Weather conditions in previous 24 hrs _____
GPS Coordinates (Zone) 18T E 360970 N 4890508 Datum _____
Descriptive Location _____

Water Quality
Dissolved Oxygen (mg/L) _____ pH dry Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology
Mean Watercourse Width _____(m) Maximum Pool Depth _____(cm)
Mean Bankfull Width _____(m) Mean Water Depth _____(cm)
_____% Riffle _____% Pool _____% Run _____% Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)
_____Bedrock _____Cobble _____Sand _____Silt _____Muck
_____Boulder _____Gravel _____Clay _____Marl _____Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
_____
Adjacent Land Use
pasture

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
_____
Migratory Obstructions (seasonal, permanent)
_____
Note any fish observations _____

Waterbody Notes
Natural Watercourse_____ Trapezoidal Channel _____ Grassed Swale_____ Buried Tile_____
Surficial Drainage (i.e. furrows)_____ Dugout Pond_____ Dominated by Aquatic Veg_____ Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

Field Notes Authored by _____ Field Notes QA/QCed by _____

southern Drainage

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

39 XWE

Stantec

Project Amherst Island
Station # 39
Photos Taken 4
GPS Coordinates
Descriptive Location short trib draining into Millers Mun. Drain in pasture

Project # 160960595
Field Staff KE + RP
Date May 19 2011
Time 5:15

Water Quality

Dissolved Oxygen (mg/L) ~~_____~~ pH ~~_____~~ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Weather conditions in previous 24 hrs _____

Watercourse Dimensions & Morphology

Mean Watercourse Width 10, 5-4 (m) pool Maximum Pool Depth 30 (cm)
Mean Bankfull Width 1-2 (m) pool Mean Water Depth 15 (cm)
C % Riffle 30 % Pool C % Run 70 % Flat
Evidence of eroding banks, Comments on bank stability
vegetated + stable

Substrate – Upstream (% cover)

_____ Bedrock 80 Silt _____ Boulder _____ Clay _____ Cobble
_____ Muck _____ Gravel _____ Marl _____ Sand 20 Detritus

Substrate – Downstream (% cover)

_____ Bedrock 80 Silt _____ Boulder _____ Clay _____ Cobble
_____ Muck _____ Gravel _____ Marl _____ Sand 20 Detritus

In-water Cover

Cover Types Present (circle): Overhanging Vegetation, Undercut Banks, Woody Debris, Deep Pool, Boulder, Vascular Plants, Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 0%
Downstream 0%
Adjacent Land Use
Upstream pasture
Downstream pasture

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream none observed
Downstream none observed
Migratory Obstructions (seasonal, permanent)
Upstream seasonal
Downstream
Note any fish observations none observed

Other Habitat Notes, Incidental Wildlife Observations, etc.

-u/s - shallow superficial drainage through pasture
- confluence of Millers Drain - temporarily ponded area w/ evidence of equipment driving through

Field Notes Authored by KE Field Notes QA/QCed by _____ Page 1 of 1

Western Drainage

Western Drainage

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

NOT A REA WC

Stantec

Project: Amherst Island Wind — Project # 160960594
Station # EZ41 — Field Staff KC, MF
Photos Taken 491, 492, 493 — Date 07/07/2011
GPS Coordinates 0360555 4887485 — Time 6:11 pm
Descriptive Location ~2km south of 2nd Conc.

Water Quality
Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Weather conditions in previous 24 hrs _____

DRY

Watercourse Dimensions & Morphology
Mean Watercourse Width _____(m) Maximum Pool Depth _____(cm)
Mean Bankfull Width _____(m) Mean Water Depth _____(cm)
_____% Riffle _____% Pool _____% Run _____% Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate – Upstream (% cover)
_____Bedrock _____Silt _____Boulder _____Clay _____Cobble
_____Muck _____Gravel _____Marl _____Sand _____Detritus

Substrate – Downstream (% cover)
_____Bedrock _____Silt _____Boulder _____Clay _____Cobble
_____Muck _____Gravel _____Marl _____Sand _____Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks Deep Pool Vascular Plants
Overhanging Vegetation Woody Debris Boulder Other_____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream _____
Downstream _____
Adjacent Land Use
Upstream Grassy Swale. Ill-defined
Downstream _____

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings) NOT REA WC
Upstream _____
Downstream _____
Migratory Obstructions (seasonal, permanent)
Upstream _____
Downstream _____
Note any fish observations _____

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

Field Notes Authored by _____ Field Notes QA/QCed by _____ Page ___of___

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Western Drainage REA

Island

WATERBO

Fish obse

Possibly intermi

Stantec

Station # 51
Watercourse Name Unknown trib to Lk ON
Photos 8590 - 8602
Date March 28, 2012
Project Name Amherst Is. Wind
Project # 160960595
Field Staff MF
Time 12:30
Weather conditions in previous 24 hrs mod. amounts of precip
GPS Coordinates (Zone) 18T E 0360299 N 4888573 Datum Nad 83
Descriptive Location ~200m south of 2nd Con Rd + ~1000m east of Emerald 40 Rd.

minor flow

Water Quality
Dissolved Oxygen (mg/L) 10.40 pH 8.85 Conductivity (µS/cm) 138
Water Temperature (°C) 12.77 Air Temperature (°C) 7
Time *in situ* measurements taken 13:01

Watercourse Dimensions & Morphology
Mean Watercourse Width 1.6 (m) Maximum Pool Depth 20 (cm)
Mean Bankfull Width 2.2 (m) Mean Water Depth 15 (cm)
____ % Riffle 50 % Pool ____ % Run 50 % Flat
Evidence of eroding banks, Comments on bank stability minor undercut @ u/s location near rd. Majority of channel is well vgt'd

Substrate (% cover)

	Bedrock		Cobble	20	Sand	25	Silt		Muck
	Boulder		Gravel	20	Clay	30	Marl	5	Detritus

In-water Cover
Cover Types Present (circle): (Undercut Banks) (Deep Pool) Watercress (Aquatic Veg) - reed canary grass
Overhanging Vegetation (Woody Debris) Boulder Other ____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
20% - mainly @ u/s section. Not much d/s. Mature hedgerow
Adjacent Land Use
grazing fields

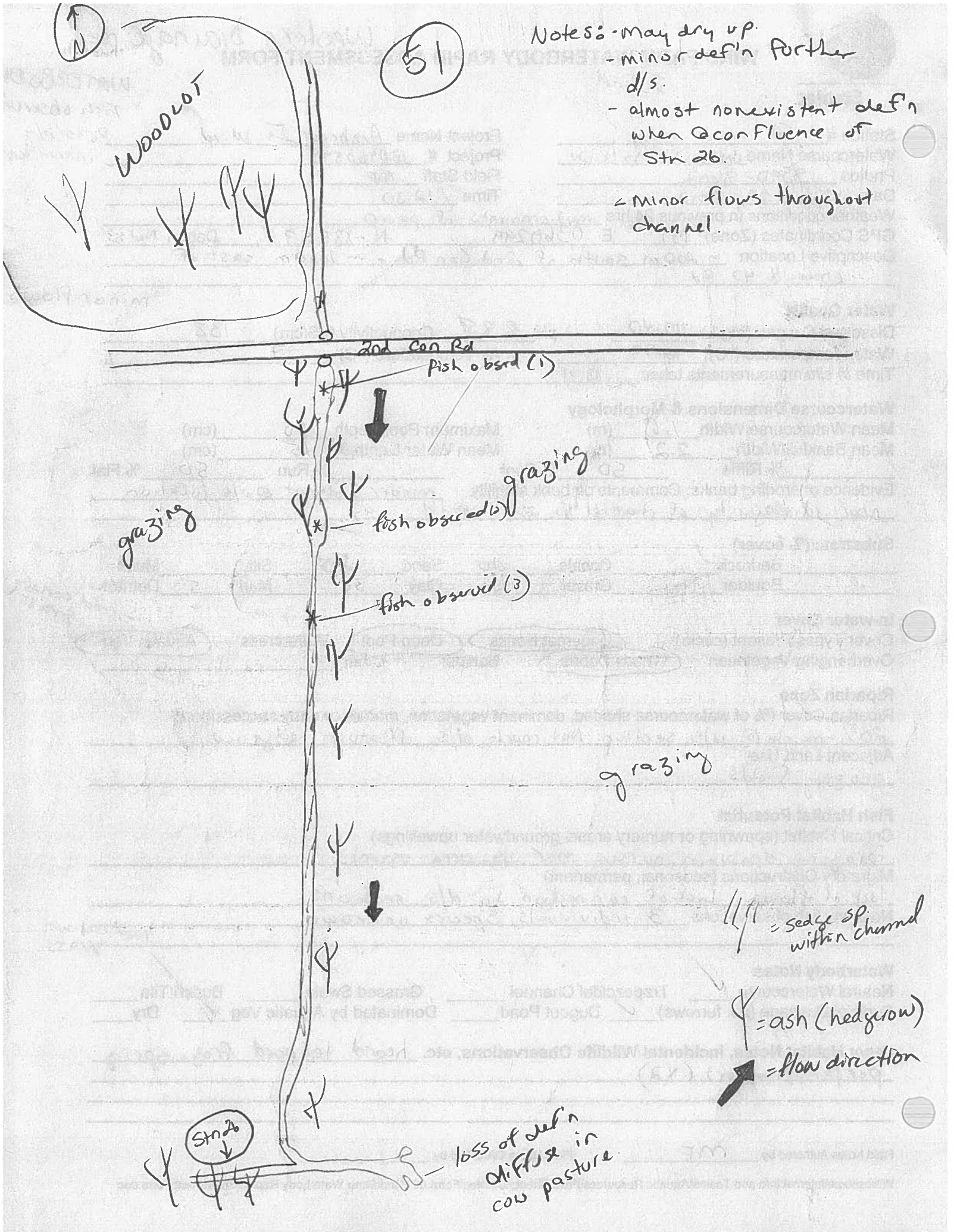
Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
foraging, spawning, nursery near u/s area mainly
Migratory Obstructions (seasonal, permanent)
lack of flows ∴ lack of connection to d/s sections
Note any fish observations 3 individuals. Species unknown

reed canary grass

Waterbody Notes
Natural Watercourse ✓ Trapezoidal Channel ____ Grassed Swale ____ Buried Tile ____
Surficial Drainage (i.e. furrows) ✓ Dugout Pond ____ Dominated by Aquatic Veg ✓ Dry ____

Other Habitat Notes, Incidental Wildlife Observations, etc. heard leopard frog, spring peeper, raptors (x2)

Field Notes Authored by MF Field Notes QA/QCed by ____


N
51
Notes: - may dry up
- minor defn further d/s.
- almost nonexistent defn when @ confluence of Stn 26.
< minor flows throughout channel.
WOODLOT
2nd Con Rd
Fish obsrd (1)
grazing
fish observed (2)
grazing
fish observed (3)
grazing
= sedge sp. within channel
= ash (hedgerow)
= flow direction
Stn 26
loss of defn diffuse in cow pasture

Western Drainage
NON-REF
WC

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project: Amherst Island
Station # ±40
Photos Taken 489, 490
GPS Coordinates 0359795 4888107
Descriptive Location ~600m south of 2nd Conc.

Project # 160960549
Field Staff KC, MF
Date 07/07/2011
Time 4:56

DRY

Water Quality
Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) 29°C
Weather conditions in previous 24 hrs _____

Watercourse Dimensions & Morphology
Mean Watercourse Width _____(m) Maximum Pool Depth _____(cm)
Mean Bankfull Width _____(m) Mean Water Depth _____(cm)
_____% Riffle _____% Pool _____% Run _____% Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate – Upstream (% cover)
_____Bedrock _____Silt _____Boulder _____Clay _____Cobble
_____Muck _____Gravel _____Marl _____Sand _____Detritus

Substrate – Downstream (% cover)
_____Bedrock _____Silt _____Boulder _____Clay _____Cobble
_____Muck _____Gravel _____Marl _____Sand _____Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks Deep Pool Vascular Plants
Overhanging Vegetation Woody Debris Boulder Other_____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream _____
Downstream _____
Adjacent Land Use
Upstream _____
Downstream _____

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream _____
Downstream _____
Migratory Obstructions (seasonal, permanent)
Upstream Grassy swale / pasture
Downstream _____
Note any fish observations _____

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

Field Notes Authored by MF Field Notes QA/QCed by _____ Page ___of___

western Drainage

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

26 XWE

Stantec

Project Amherst Island | Project # 160960595
Station # 26 | Field Staff KE + RP
Photos Taken Y | Date May 19 2011
GPS Coordinates | Time 11:25
Descriptive Location Emerald 40 ft Rd, 75 m & 500 m south of 2nd Conc

Water Quality
Dissolved Oxygen (mg/L) 7.78 | pH 7.77 | Conductivity (µS/cm) 198
Water Temperature (°C) 17.77 | Air Temperature (°C) 17°
Weather conditions in previous 24 hrs rain + cool

Watercourse Dimensions & Morphology
Mean Watercourse Width _____(m) | Maximum Pool Depth _____(cm)
Mean Bankfull Width _____(m) | Mean Water Depth _____(cm)
_____% Riffle | _____% Pool | _____% Run | _____% Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate – Upstream (% cover)
_____Bedrock | _____Silt | _____Boulder | _____Clay | _____Cobble
_____Muck | _____Gravel | _____Marl | _____Sand | _____Detritus

Substrate – Downstream (% cover)
_____Bedrock | _____Silt | _____Boulder | _____Clay | _____Cobble
_____Muck | _____Gravel | _____Marl | _____Sand | _____Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks | Deep Pool | Vascular Plants
Overhanging Vegetation | Woody Debris | Boulder | Other _____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream _____
Downstream _____
Adjacent Land Use
Upstream _____
Downstream _____

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream _____
Downstream _____
Migratory Obstructions (seasonal, permanent)
Upstream _____
Downstream _____
Note any fish observations _____

Other Habitat Notes, Incidental Wildlife Observations, etc. _____
- Flooded area near road, no defined channel through fields
- not a WB.

Field Notes Authored by KE | Field Notes QA/QCed by _____ | Page 1 of 1

Western Drainage (6) WE

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Amherst Island | Project # 160960595
Station # 6 | Field Staff KE & RP
Photos Taken Y | Date May 17
GPS Coordinates | Time 4:18
Descriptive Location Art McGinns Rd, south 2nd conc in Bull Field

Water Quality
Dissolved Oxygen (mg/L) 10.42 | pH 7.94 | Conductivity (µS/cm) 191
Water Temperature (°C) 14.7 | Air Temperature (°C)
Weather conditions in previous 24 hrs cold & rain

Watercourse Dimensions & Morphology
Mean Watercourse Width 1.5 (m) | Maximum Pool Depth 40 (cm)
Mean Bankfull Width 5 (m) | Mean Water Depth 30 (cm)
% Riffle | % Pool | % Run | 100 % Flat
Evidence of eroding banks, Comments on bank stability
stable & vegetated.

Substrate – Upstream (% cover)
Bedrock | 70 Silt | Boulder | Clay | Cobble
Muck | Gravel | Marl | Sand | 30 Detritus

Substrate – Downstream (% cover) wetland
Bedrock | Silt | Boulder | Clay | Cobble
Muck | Gravel | Marl | Sand | Detritus

In-water Cover
Cover Types Present (circle): Overhanging Vegetation | Undercut Banks | Woody Debris | Deep Pool | Boulder | Vascular Plants | Other

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 30% shaded east of road
Downstream 0%
Adjacent Land Use
Upstream pasture
Downstream wetland

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream none observed
Downstream
Migratory Obstructions (seasonal, permanent)
Upstream no fish captured, possible barrier d/s of road?
Downstream
Note any fish observations no capture

Other Habitat Notes, Incidental Wildlife Observations, etc.
- narrow channel meanders through pasture u/s of Art McGinn
- d/s flows into wetland

Field Notes Authored by KE | Field Notes QA/QCed by | Page 1 of 1

Stantec Consulting Ltd - Electrofishing Record and Catch Results

Project Number: Amherst Islands
Project Name: 160960595
Project manager:
Descriptive Location: Art McGinnis Rd

Station Number: 6
Pass No. (if applicable): 1
Date (yyyymmdd): May 17 2011

UTM coordinates: _____ easting _____ northing zone _____

Fishing Method (circle one): ~~Backpack~~ Boat Unit Model/Make _____
Sampling Method (circle one): even (habitat) transect spot

Effort (Electrofishing Seconds): 132 Number of Netters: 1 Number of Anodes: 1

Settings
Frequency (Hz) 75 Voltage (volts) 400 Current (Amps) _____ Power (Watts) _____

Station Information
Length of Stream Surveyed (m) 40
Station Characteristics: Width (m): Range 1-3 Average: 1.5
Depth (m): Range 20-60 Average: 40

Water Clarity/Colour: clear/colourless Water Velocity if Measured (m/s): ✓
Temperature (°C) 14.7 Conductivity (uS/cm) 191
pH 7.94 Dissolved Oxygen (mg/L) 10.42

Catch Data

Species	Number of Fish	Species	Number of Fish

no catch

Fish Measurements on Separate Sheet? Y/N

Field Staff: KE + RP.

Notes By: _____

(Station Diagram on Back)

western Drainage (25) WB XWB

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Amherst Island | Project # 160960595
Station # 25 | Field Staff KE + RP
Photos Taken Y | Date May 19 2011
GPS Coordinates | Time 11 am
Descriptive Location 2nd conc Rd, 400m west of Emerald 40 Pt Rd

Water Quality
Dissolved Oxygen (mg/L) 9.85 | pH 8.0 | Conductivity (µS/cm) 255
Water Temperature (°C) 17.78 | Air Temperature (°C) 17°
Weather conditions in previous 24 hrs rain & cool

Watercourse Dimensions & Morphology
Mean Watercourse Width 1.5 (m) | Maximum Pool Depth 40 (cm)
Mean Bankfull Width 5 (m) | Mean Water Depth 10 (cm)
/ % Riffle | 20 % Pool | 80 % Run | / % Flat
Evidence of eroding banks, Comments on bank stability
veg, slightly trampled due to cows.

Substrate – Upstream (% cover)
Bedrock | 10 Silt | 10 Boulder | 80 Clay | Cobble
Muck | 80 Gravel | Marl | Sand | 10 Detritus

Substrate – Downstream (% cover)
Bedrock | 10 Silt | 10 Boulder | 50 Clay | Cobble
Muck | 20 Gravel | Marl | Sand | 10 Detritus

In-water Cover
Cover Types Present (circle): Overhanging Vegetation | Undercut Banks | Woody Debris | Deep Pool | Boulder | Vascular Plants | Other

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 30% shrubs + trees
Downstream 0%
Adjacent Land Use
Upstream pasture
Downstream

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream none observed
Downstream
Migratory Obstructions (seasonal, permanent)
Upstream seasonal
Downstream
Note any fish observations none observed, too little water to fish

Other Habitat Notes, Incidental Wildlife Observations, etc.
-u/s - no access - @ road appears to be XWB, no defined channel, grassy level lying area
-d/s - 50m is a WB, defined channel + pool @ culvert
- beyond 50m XWB - cow pasture, no defined channel

Field Notes Authored by KE | Field Notes QA/QCed by | Page 1 of 1

Western Drainage 54 NWB

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

Station # 54 Project Name Amherst Island
Watercourse Name _____ Project # 160960595
Photos 46-49 Field Staff Kat. St. J.
Date Aug 15 2012 Time 12:15 pm
Weather conditions in previous 24 hrs _____
GPS Coordinates (Zone) 18T E 358520 N 4888006 Datum
Descriptive Location _____

Water Quality
Dissolved Oxygen (mg/L) _____ pH ~~_____~~ dry Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology
Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
_____ % Riffle _____ % Pool _____ % Run _____ % Flat
Evidence of eroding banks, Comments on bank stability _____

Substrate (% cover)
_____ Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck
_____ Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
_____
Adjacent Land Use
Fallow / Forest.

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
_____
Migratory Obstructions (seasonal, permanent)
_____
Note any fish observations _____
_____

Waterbody Notes
Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale ✓ Buried Tile _____
Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry ✓

Other Habitat Notes, Incidental Wildlife Observations, etc. _____
low lying area through forest, not a WB.

Field Notes Authored by _____ Field Notes QA/QCed by _____

Western Drainage (27) W

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project Amherst Island | Project # 160960595
Station # 27 | Field Staff KE + RP
Photos Taken 7 | Date May 19 2011
GPS Coordinates | Time 13:30
Descriptive Location Emerald 40 ft Rd, 750 m south of 2nd Conc, 300 m east into field.

Water Quality
Dissolved Oxygen (mg/L) 8.5 | pH 7.74 | Conductivity (µS/cm) 128
Water Temperature (°C) 19.28 | Air Temperature (°C) 20
Weather conditions in previous 24 hrs cool + rain

Watercourse Dimensions & Morphology
Mean Watercourse Width 3 (m) | Maximum Pool Depth 50 (cm)
Mean Bankfull Width 7 (m) | Mean Water Depth 30 (cm)
/ % Riffle | / % Pool | / % Run | 100 % Flat
Evidence of eroding banks, Comments on bank stability
some erosion @ 90° bend

Substrate – Upstream (% cover)

Bedrock	60 Silt	Boulder	30 Clay	Cobble
Muck	Gravel	Marl	Sand	10 Detritus

Substrate – Downstream (% cover)

Bedrock	60 Silt	Boulder	30 Clay	Cobble
Muck	Gravel	Marl	Sand	10 Detritus

In-water Cover
Cover Types Present (circle): Overhanging Vegetation | Undercut Banks | Woody Debris | Deep Pool | Boulder | Vascular Plants | Other

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 0 %
Downstream 0 %
Adjacent Land Use
Upstream pasture / hay field
Downstream pasture / hay field

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream none observed
Downstream none observed
Migratory Obstructions (seasonal, permanent)
Upstream seasonal
Downstream seasonal
Note any fish observations none observed, fished a reach d/s.

Other Habitat Notes, Incidental Wildlife Observations, etc.
- shallow channel flowing through Ag field
- lots of RCG.
- flows south into large wetland/swamp

Field Notes Authored by KE | Field Notes QA/QCed by | Page 1 of 1

Stantec

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Western Drainage NOT A REA. DRY

Island

Station # 50
Watercourse Name Unknown trib to Lk ON
Photos 8584-8589
Date March 28, 2012

Project Name Amherst Is Wind
Project # 160960595
Field Staff MF
Time 11:48

Weather conditions in previous 24 hrs Mod. amounts of precip
GPS Coordinates (Zone) 18T E 0358537 N 4886864 Datum Nad83
Descriptive Location On Art McGinnis Rd ~ 1000m south of 2nd con Rd

Water Quality

NOT TAKEN. STANDING WATER @ CULVERT ONLY

Dissolved Oxygen (mg/L) _____ pH _____ Conductivity (µS/cm) _____
Water Temperature (°C) _____ Air Temperature (°C) _____
Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology

Mean Watercourse Width _____ (m) Maximum Pool Depth _____ (cm)
Mean Bankfull Width _____ (m) Mean Water Depth _____ (cm)
_____ % Riffle _____ % Pool _____ % Run _____ % Flat
Evidence of eroding banks, Comments on bank stability NO channel def'n u/s or d/s

Substrate (% cover)

_____ Bedrock _____ Cobble _____ Sand _____ Silt _____ Muck
_____ Boulder _____ Gravel _____ Clay _____ Marl _____ Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool ~~Watercress~~ Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
2% (cattails)
Adjacent Land Use
grazing fields

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
NONE
Migratory Obstructions (seasonal, permanent)
DRY
Note any fish observations
NONE

Waterbody Notes

NO DEF'N

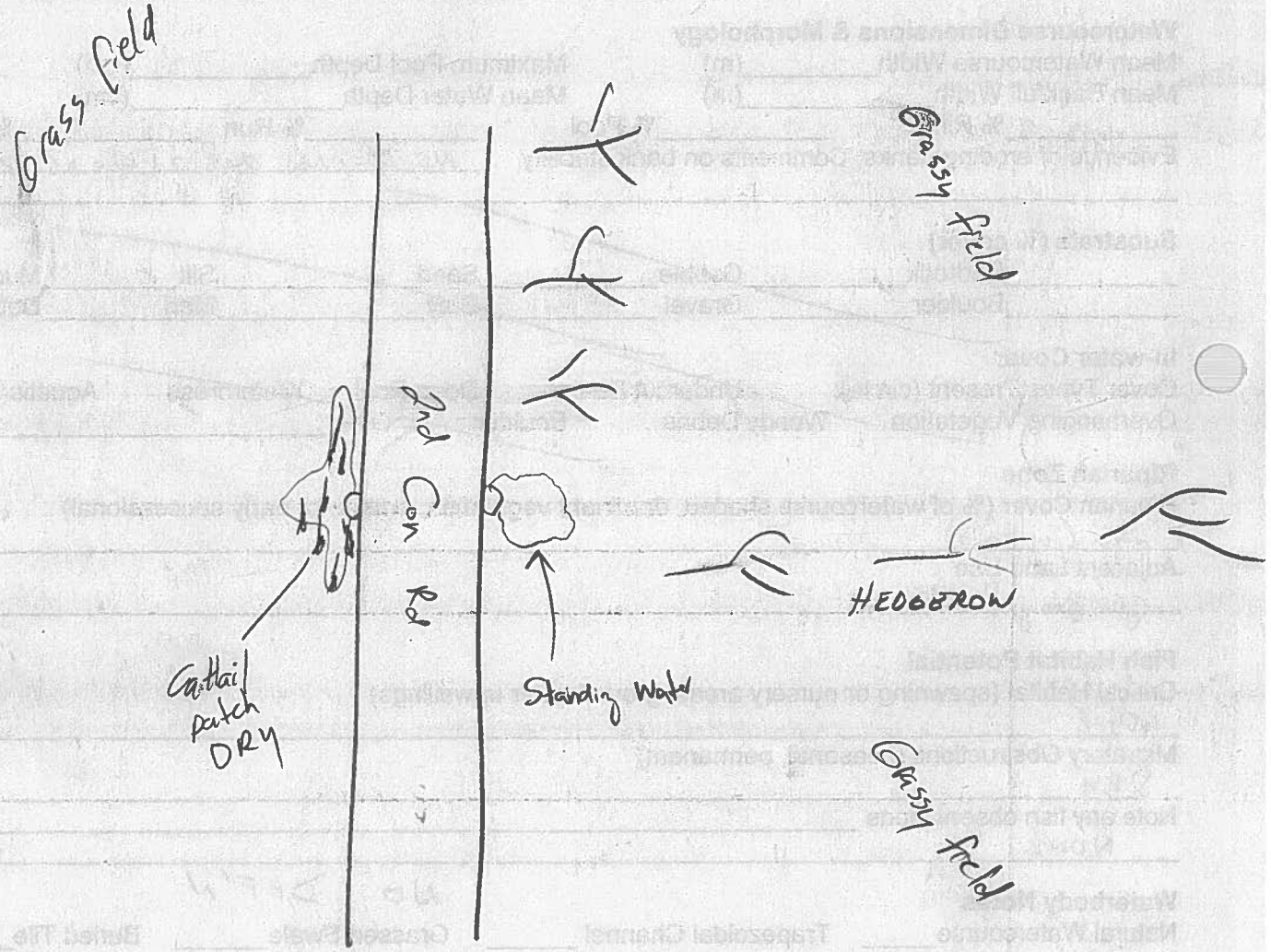
Natural Watercourse _____ Trapezoidal Channel _____ Grassed Swale _____ Buried Tile _____
Surficial Drainage (i.e. furrows) _____ Dugout Pond _____ Dominated by Aquatic Veg _____ Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. _____

Field Notes Authored by MF Field Notes QA/QCed by _____

↑ S

50


Grass Field
Grassy Field
2nd Con Rd
HEDGEROW
Cattail patch DRY
Standing Water
Grassy field

Mainland

Stantec

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Mainland

REA Waterbody

Project: Amherst Island
Station # RAM1
Photos Taken 419-425
GPS Coordinates 18T 0362197 4895780
Descriptive Location On bath Rd ~ 1Km West Jim Snow Drive.

Project # 160960595
Field Staff KC, MF
Date 07/06/2011
Time 12:33

Water Quality

Dissolved Oxygen (mg/L) ✓ pH ✓ Conductivity (µS/cm) ✓
Water Temperature (°C) ✓ Air Temperature (°C) 29°C
Weather conditions in previous 24 hrs Minor precip.

Watercourse Dimensions & Morphology

Mean Watercourse Width 2.0 (m) Maximum Pool Depth ~60 (cm)
Mean Bankfull Width ~10+ (m) (Flood) Mean Water Depth ~40 (cm)
% Riffle 100 % Pool % Run % Flat
Evidence of eroding banks, Comments on bank stability None - flood plane

Substrate – Upstream (% cover)

Bedrock	40 Silt	Boulder	Clay	30 Cobble	
30 Muck	Gravel	Marl	Sand	Detritus	

Substrate – Downstream (% cover)

Bedrock	60 Silt	Boulder	Clay	Cobble	
20 Muck	Gravel	Marl	Sand	10 Detritus	

In-water Cover

Cover Types Present (circle): Overhanging Vegetation, ~~Undercut Banks~~, Woody Debris, Deep Pool, Boulder, Vascular Plants, Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 40% algae blooms, sub-emergent aquatic veg, cattail
Downstream 40% - grasses, teasels, milkweed, wine weed, willow sp, chicken

Adjacent Land Use
Upstream Flood plain
Downstream Lake Ontario

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream spawning, nursery, foraging
Downstream Lk. Ontario

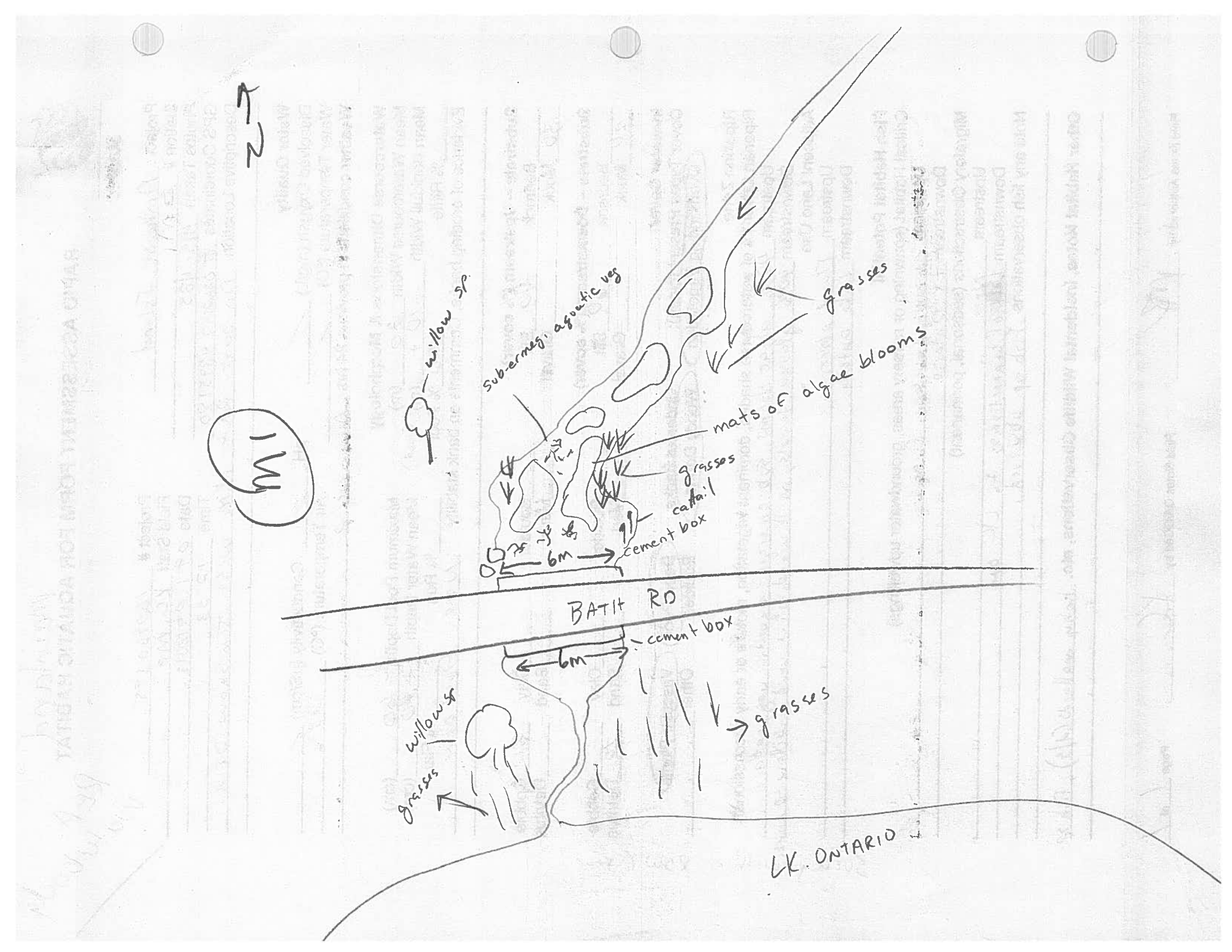
Migratory Obstructions (seasonal, permanent)
Upstream None
Downstream Lack of connectivness to Lk. ON.

Note any fish observations Fish sp. observed

Other Habitat Notes, Incidental Wildlife Observations, etc. baby mallards (d/s), fish sp.

Surveys within ROW (near)

Field Notes Authored by MF Field Notes QA/QCed by KC


N
W1
willow sp
submerged aquatic veg
grasses
mats of algae blooms
grasses
cattail
6m
cement box
BATH RD
cement box
6m
willow sp
grasses
grasses
LK. ONTARIO

Mainland

REA WATERBODY

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project: Amherst Island
Station # ~~2~~ AM 2
Photos Taken 412 - 418
GPS Coordinates 18T 0362962 4895822
Descriptive Location ~150 m west of Jim Snow Dr on Bath Rd

Project # 160960595
Field Staff KC, MF
Date 07 / 06 /2011
Time 12:07

Water Quality

Dissolved Oxygen (mg/L) / pH / Conductivity (µS/cm) /
Water Temperature (°C) / Air Temperature (°C) 28°c
Weather conditions in previous 24 hrs Minor amounts of precip.

DR

Watercourse Dimensions & Morphology

Mean Watercourse Width / (m) Maximum Pool Depth / (cm)
Mean Bankfull Width 1.5 (m) Mean Water Depth / (cm)
/ % Riffle / % Pool % Run / % Flat
Evidence of eroding banks, Comments on bank stability none. well vegt'd

Substrate – Upstream (% cover)

Bedrock	40 Silt	Boulder	Clay	10 Cobble	
20 Muck	Gravel	Marl	10 Sand	10 Detritus	

Substrate – Downstream (% cover)

Bedrock	Silt	Boulder	Clay	Cobble	Lake Ontario
Muck	Gravel	Marl	Sand	Detritus	

In-water Cover

Cover Types Present (circle):
(Overhanging Vegetation) Undercut Banks (Woody Debris) Deep Pool Boulder (Vascular Plants) Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream 10%, cattail, grasses
Downstream Lake Ontario

DRY

Adjacent Land Use
Upstream Energy facility, manicured grass
Downstream Lake Ontario

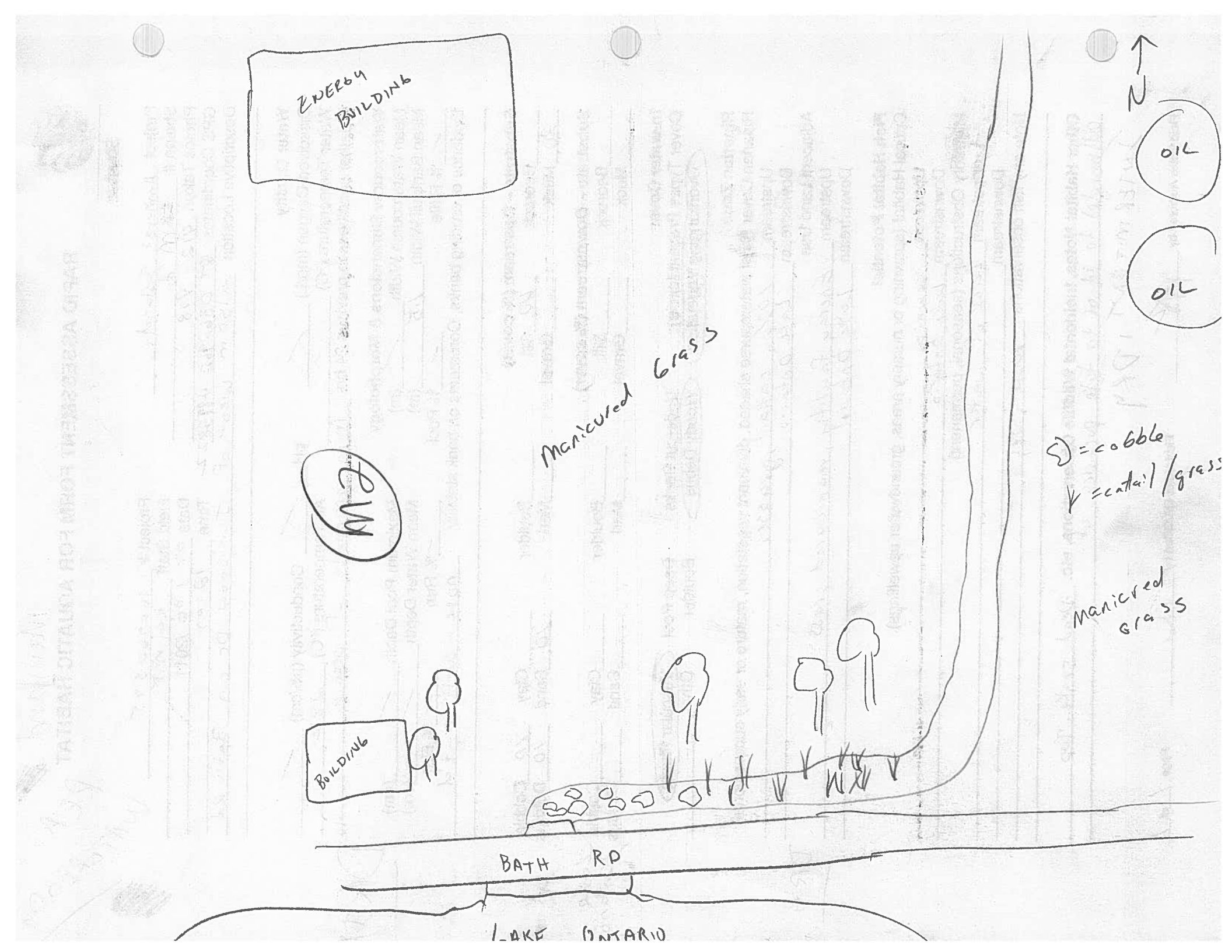
Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream spawning
Downstream Lake Ontario
Migratory Obstructions (seasonal, permanent)
Upstream Lack of water
Downstream
Note any fish observations None - Dry

Other Habitat Notes, Incidental Wildlife Observations, etc. Dead snake. Too old/mangled to id or to take pictures of.

INTERMITENT / DRY

Field Notes Authored by MF Field Notes QA/QCed by KC


ENERGY BUILDING
N
OIL
OIL
Manicured Grass
= cobble
= cattail / grass
Manicured grass
BUILDING
BATH RD
LAKE ONTARIO

Mainland

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project: Amherst Island — Project # 160960595
Station # ~~BB~~ M3 — Field Staff ICC, MF
Photos Taken 426 - 431 — Date 07 / 06 /2011
GPS Coordinates 0362869 4896681 — Time 12:56
Descriptive Location ~ 50 south of Taylor Kidd Blvd ~ 900 m north of Bath Rd. - U/S section of R2

Water Quality

Dissolved Oxygen (mg/L) ___ pH ___ Conductivity (µS/cm) ___
Water Temperature (°C) ___ Air Temperature (°C) 29°c
Weather conditions in previous 24 hrs minor precip last night.

Watercourse Dimensions & Morphology

Mean Watercourse Width ___ (m) Maximum Pool Depth ___ (cm)
Mean Bankfull Width 1.0 (m) Mean Water Depth ___ (cm)
___% Riffle ___% Pool ___% Run ___% Flat
Evidence of eroding banks, Comments on bank stability None - well veg'd

Substrate – Upstream (% cover)

100% Soil

___Bedrock ___Silt ___Boulder ___Clay ___Cobble
___Muck ___Gravel ___Marl ___Sand ___Detritus

Substrate – Downstream (% cover)

100% Soil

___Bedrock ___Silt ___Boulder ___Clay ___Cobble
___Muck ___Gravel ___Marl ___Sand ___Detritus

In-water Cover

Cover Types Present (circle): (Overhanging Vegetation) Undercut Banks Deep Pool Vascular Plants
Woody Debris Boulder Other ___

Riparian Zone

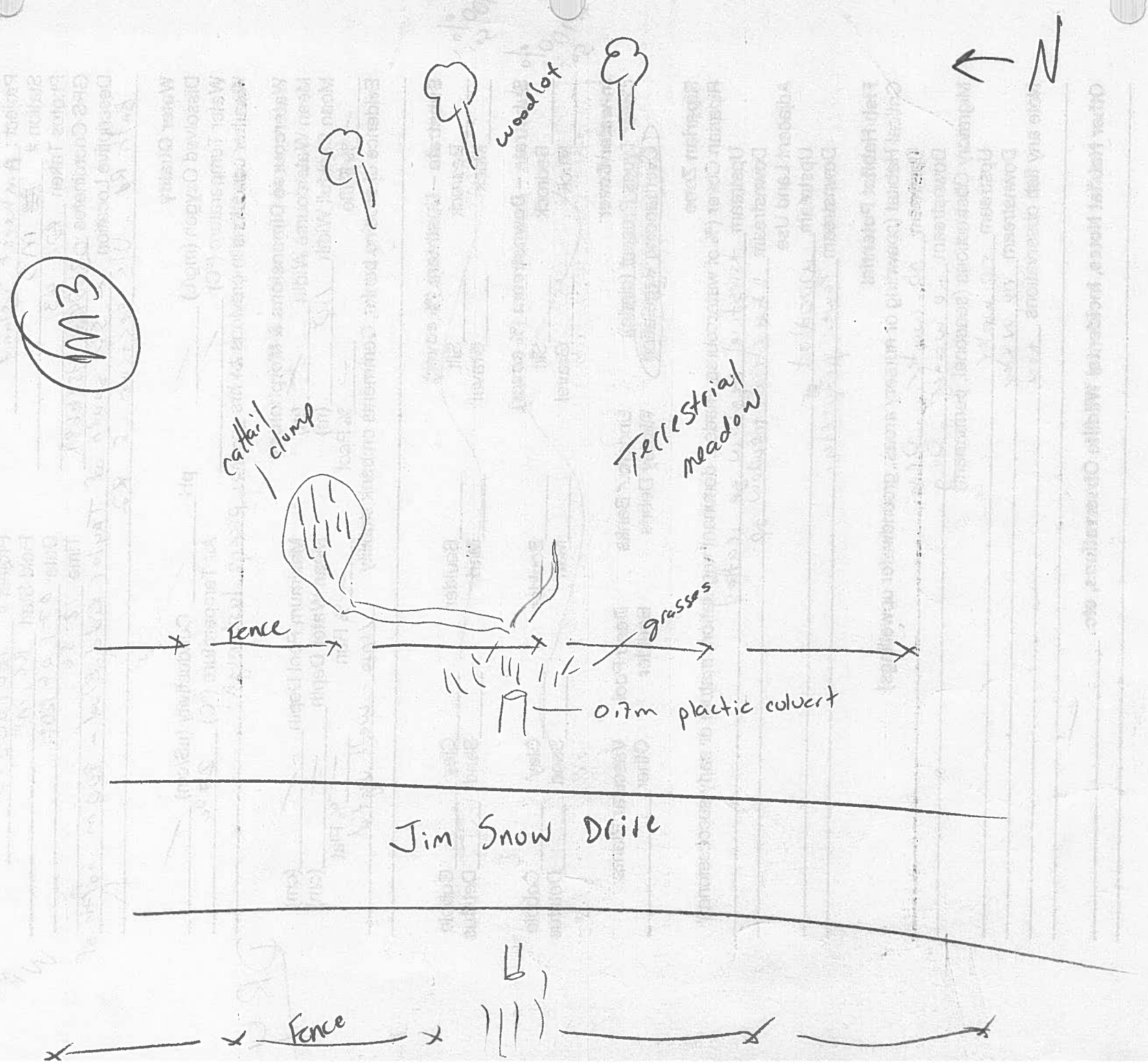
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream terrestrial meadow sp cattail
Downstream " terrestrial meadow sp.
Adjacent Land Use
Upstream woodlot
Downstream Power property.

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream no water, Dry
Downstream no water, Dry
Migratory Obstructions (seasonal, permanent)
Upstream no water
Downstream no water
Note any fish observations None.

Other Habitat Notes, Incidental Wildlife Observations, etc. ___

Field Notes Authored by MB — Field Notes QA/QCed by KC — Page 1 of 1


N
woodlot
M3
cattail clump
Terrestrial meadow
Fence
grasses
0.7m plactic culvert
Jim Snow Drive
Fence

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Mainland NOT A REA INTERM

Stantec

Main land

Station # 3 M4 | Project Name Amherst Is. Wind
Watercourse Name unknow trib of LK. ON | Project # 160960595
Photos 9570 - 9574 | Field Staff MF
Date March 27, 2012 | Time 13:19
Weather conditions in previous 24 hrs No piccip.
GPS Coordinates (Zone) 18T E 0362389 N 4896905 Datum Nad 83
Descriptive Location ~25m south of Bombardier buildings + ~30m east of Bombardier driveway with rd ROW (Taylor Kidd Blvd)

Water Quality
Dissolved Oxygen (mg/L) 10.51 pH 8.77 Conductivity (µS/cm) 941
Water Temperature (°C) 8.04 Air Temperature (°C) 5
Time *in situ* measurements taken 1610

Watercourse Dimensions & Morphology
Mean Watercourse Width 0.3 (m) Maximum Pool Depth 8 (cm)
Mean Bankfull Width 0.75 (m) Mean Water Depth 5 (cm)
% Riffle % Pool % Run 100 % Flat
Evidence of eroding banks, Comments on bank stability well vegt'd with manicured grass. Heavy green algae near hose draining water from underground

Substrate (% cover)
Bedrock Cobble Sand 30 Silt 20 Muck
Boulder Gravel 5 Clay 25 Marl 20 Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks Deep Pool Watercress (Aquatic Veg - green algae)
Overhanging Vegetation Woody Debris Boulder Other

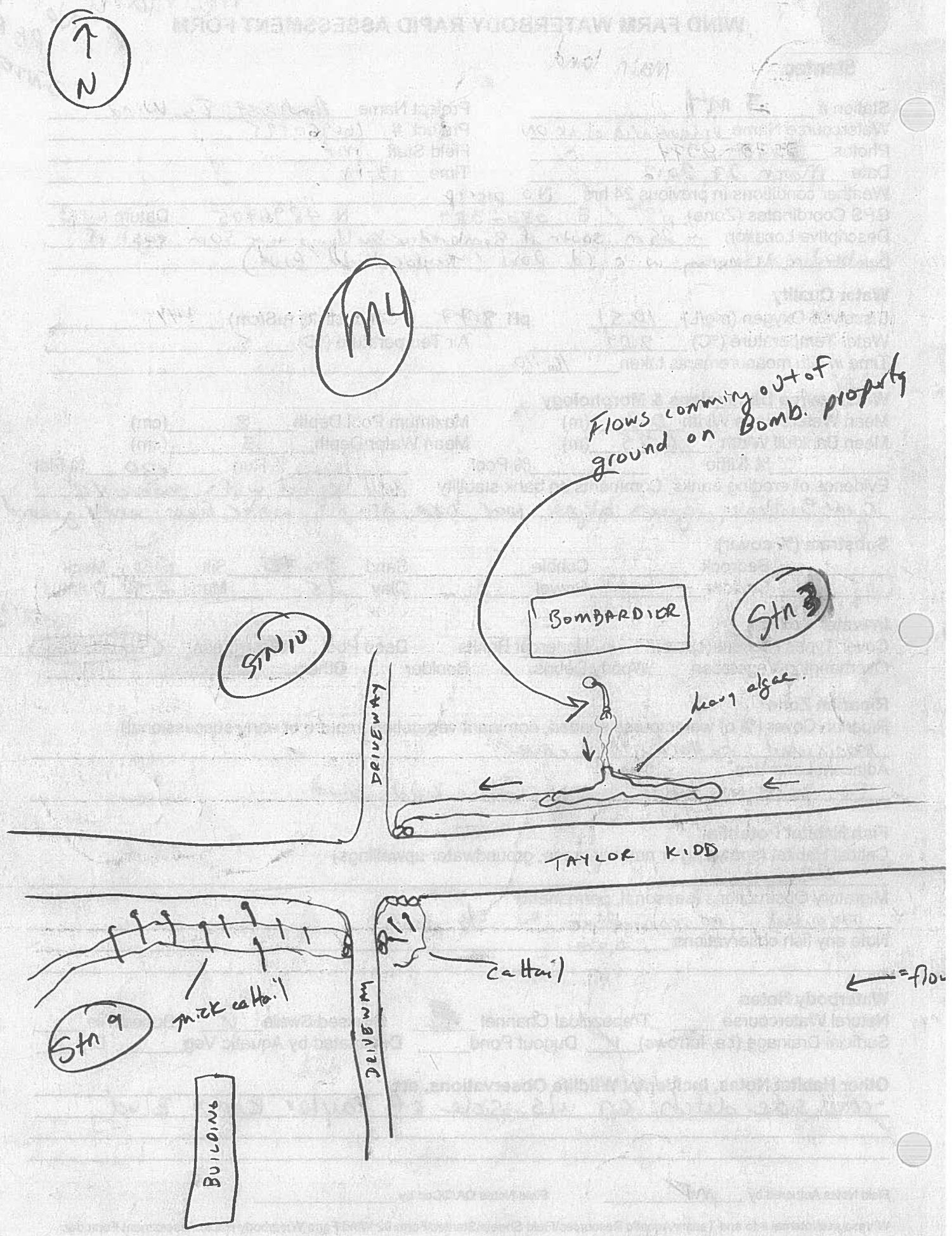
Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
manicured cattail. No cover
Adjacent Land Use
Bombardier buildings, Taylor Kidd Blvd.

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
NO
Migratory Obstructions (seasonal, permanent)
intermitent, no connection to u/s areas.
Note any fish observations None.

Waterbody Notes
Natural Watercourse Trapezoidal Channel Grassed Swale ✓ Buried Tile
Surficial Drainage (i.e. furrows) ✓ Dugout Pond Dominated by Aquatic Veg Dry

Other Habitat Notes, Incidental Wildlife Observations, etc.
-road side ditch on u/s side of Taylor Kidd Blvd.

Field Notes Authored by MF Field Notes QA/QCed by


N
M4
Flows comming out of ground on Bomb. property
BOMBARDIER
Stn 3
STN 10
DRIVEWAY
heavy algae
TAYLOR KIDD
Stn 9
thick cattail
cattail
DRIVEWAY
BUILDING
=flo

Mainland Not REA WATERBODY

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

Stantec

Project: Amherst Island
Station # ~~RA~~ M4
Photos Taken 432-438
GPS Coordinates 0362335 4896664
Descriptive Location ON Taylor Kidd Rd ~600 m west of Jim Snow Dr

Project # 160960595
Field Staff KC, MF
Date 07/06/2011
Time 13:13

Water Quality

Dissolved Oxygen (mg/L) ✓ pH ✓ Conductivity (µS/cm) ✓
Water Temperature (°C) ✓ Air Temperature (°C) 29°C
Weather conditions in previous 24 hrs minor precip. last night

Watercourse Dimensions & Morphology

Mean Watercourse Width 0.25 (m) Maximum Pool Depth ~~0.05~~ 5 (cm)
Mean Bankfull Width 1.0 (m) Mean Water Depth 3 (cm)
____% Riffle 10 % Pool 90 % Run ____% Flat
Evidence of eroding banks, Comments on bank stability manicured grass u/s, lack of banks

Substrate – Upstream (% cover)

____Bedrock 90 Silt ____Boulder ____Clay ____Cobble
____Muck ____Gravel ____Marl ____Sand 10 Detritus

Substrate – Downstream (% cover)

____Bedrock 90 Silt ____Boulder ____Clay ____Cobble
____Muck ____Gravel ____Marl ____Sand 10 Detritus

In-water Cover

Cover Types Present (circle): (Overhanging Vegetation) Undercut Banks Woody Debris Deep Pool Boulder (Vascular Plants) Other ____ @ culvert only.

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream terrestrial grass, cattail, bittersweet nightshade
Downstream cattail, queen anne's lace, cow vetch, thistle
Adjacent Land Use
Upstream Bombardier building
Downstream Industrial building

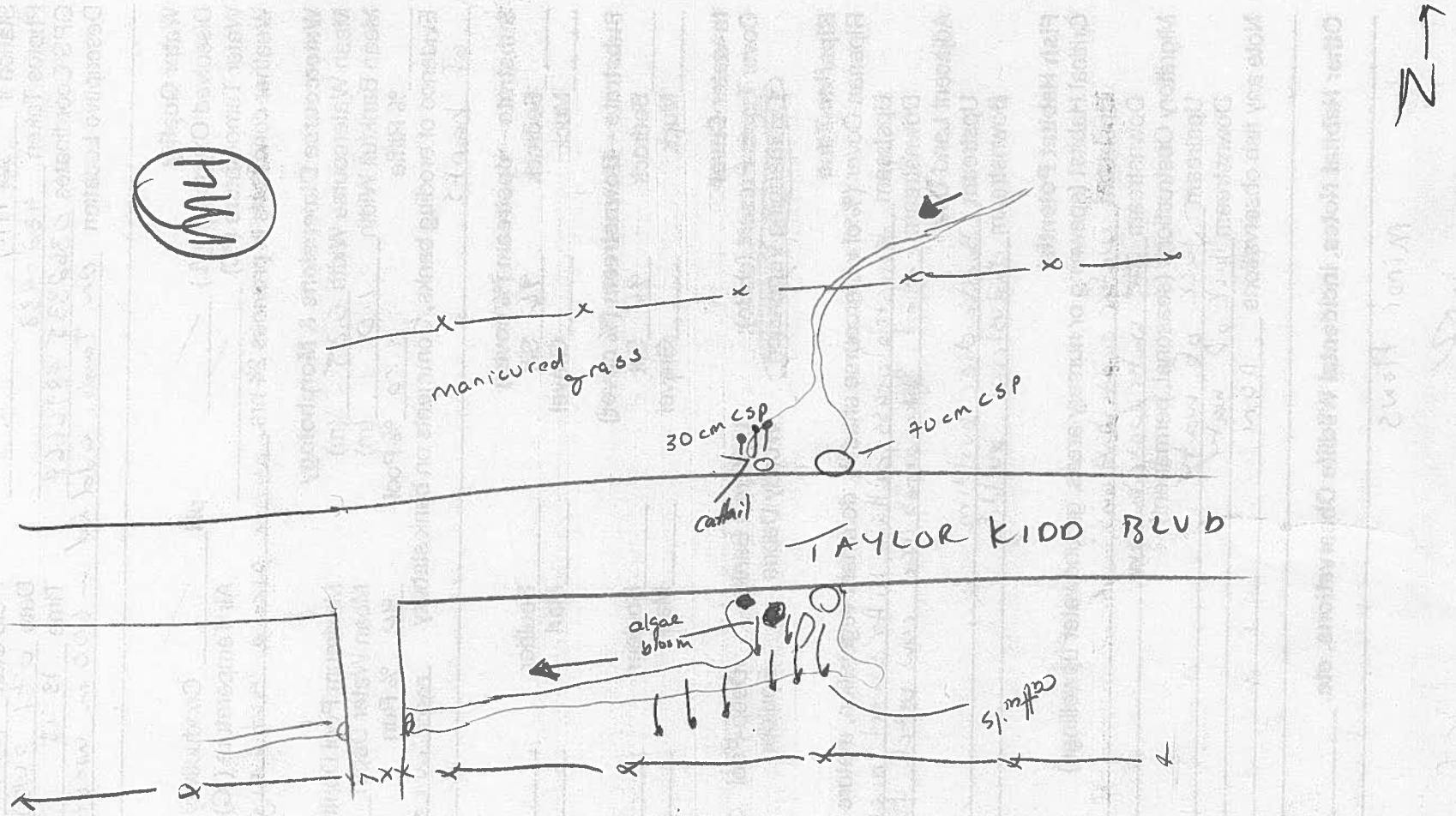
Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream water contributions
Downstream ~~lack~~ water contributions
Migratory Obstructions (seasonal, permanent)
Upstream lack of water
Downstream lack of water
Note any fish observations none.

Other Habitat Notes, Incidental Wildlife Observations, etc.

minor flows

Field Notes Authored by MR Field Notes QA/QCed by KC


N
HWY
manicured grass
30 cm CSP
70 cm CSP
cattail
TAYLOR KIDD BLVD
algae bloom
sl. muddy

Mainland

RAPID ASSESSMENT FORM FOR AQUATIC HABITAT

REA WATERB

Stantec

Project: Amherst Island
Station # ~~RS~~ MS
Photos Taken 439-446
GPS Coordinates 0361951 4896498
Descriptive Location on Taylor Kidd Blvd ~ 1.5 km west of Jim Snow Drive.

Project # 160960595
Field Staff KC, MF
Date 07 / 06 /2011
Time 13:28

Water Quality

Dissolved Oxygen (mg/L) ✓ pH ✓ Conductivity (µS/cm) ✓
Water Temperature (°C) ✓ Air Temperature (°C) 29°C
Weather conditions in previous 24 hrs minor precip last night

Watercourse Dimensions & Morphology

DR

Mean Watercourse Width ✓ (m) Maximum Pool Depth ✓ (cm)
lack of def'n Mean Bankfull Width ✓ (m) Mean Water Depth ✓ (cm)
✓ % Riffle ✓ % Pool ✓ % Run ✓ % Flat
Evidence of eroding banks, Comments on bank stability well vegt'd - lack of def'n

Substrate -- Upstream (% cover)

100% soil

Bedrock	Silt	Boulder	Clay	Cobble
Muck	Gravel	Marl	Sand	Detritus

Substrate – Downstream (% cover)

Bedrock	30 Silt	Boulder	Clay	Cobble
30 Muck	Gravel	Marl	Sand 40	Detritus

In-water Cover

Cover Types ~~Present~~ (circle): Overhanging Vegetation | Undercut Banks | Woody Debris | Deep Pool | Boulder | Vascular Plants | Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
Upstream terrestrial veg growing with mchannel
Downstream Cattail, bullrush

Adjacent Land Use
Upstream Bombardier property
Downstream woodlot, flood plane

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
Upstream none
Downstream spawning?

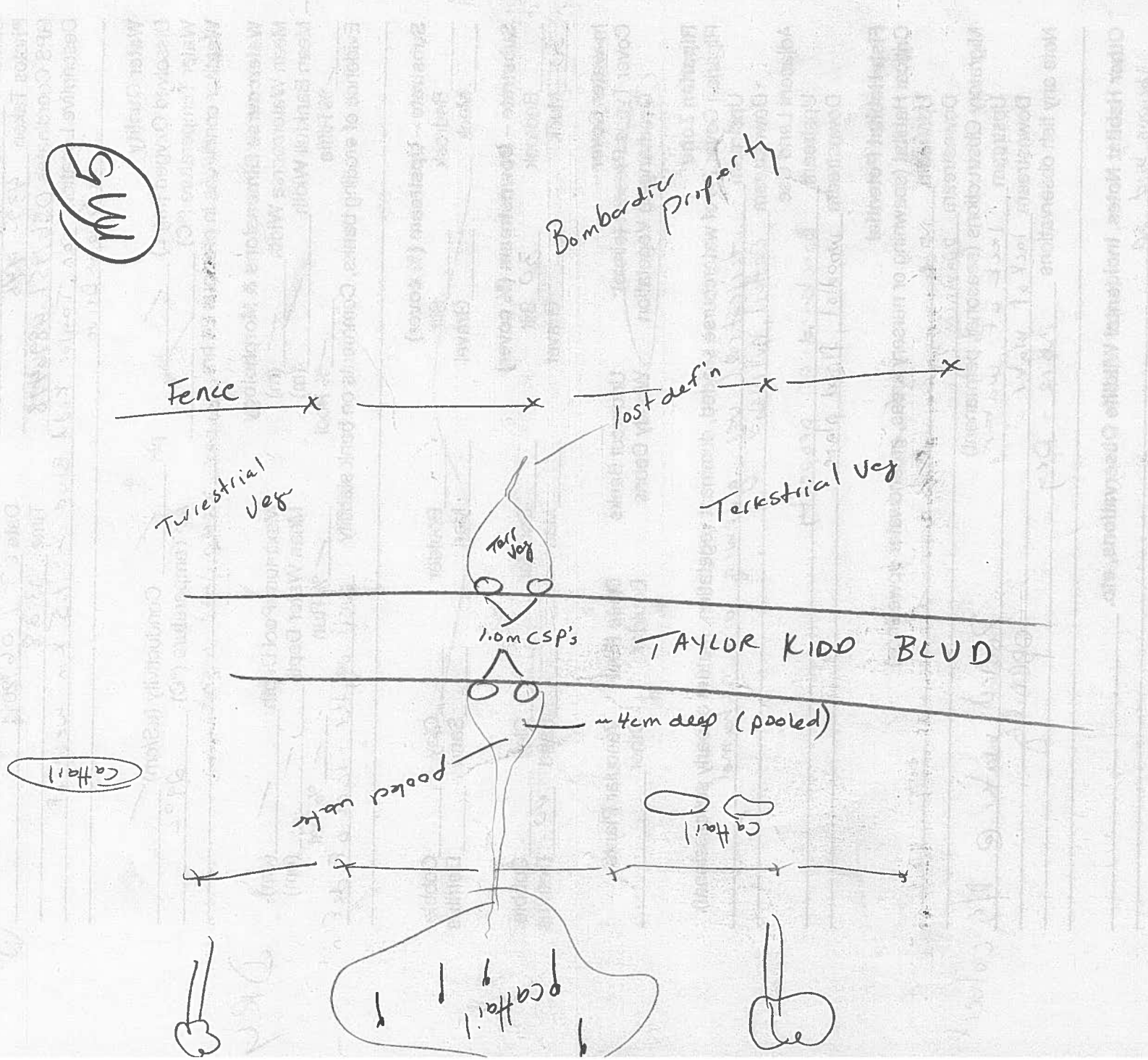
Migratory Obstructions (seasonal, permanent)
Upstream lack of water
Downstream lack of water
Note any fish observations none - Dry

Pooled water @ D/S culver opening

Other Habitat Notes, Incidental Wildlife Observations, etc.

various bird sp

Field Notes Authored by MF Field Notes QA/QCed by KC Page 1 of 1


N
Bombardier Property
Fence
lost def'n
Terrestrial Veg
Terrestrial Veg
Terr Veg
1.0m CSP's
TAYLOR KIDD BLVD
~4cm deep (pooled)
pooled water
Cattail
Cattail
Cattail
Cattail

Mainland

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

Mainland [redacted] Property

Station # 7 MP
Watercourse Name unknown trib of LYON
Photos 8510-8519 (lower) 8546-8553 (upper)
Date March 27, 2012
Project Name Amherst Is. Wind
Project # 160960595
Field Staff MF
Time 10:40am
Weather conditions in previous 24 hrs No precipitation
GPS Coordinates (Zone) 18T E 0363097 N 4897025 Datum NAD83 ← upper
Descriptive Location On Coco property in the u/s section of Str 2, east of Coco rail tracks + ~ 200m south of Taylor Kidd Blvd.

Water Quality

Dissolved Oxygen (mg/L) 10.93 pH 9.22 Conductivity (µS/cm) 423
Water Temperature (°C) 9.95 Air Temperature (°C) 5°c
Time *in situ* measurements taken 15:15

RE
WAT
BOD

Watercourse Dimensions & Morphology

Mean Watercourse Width 2.0 (m) Maximum Pool Depth 20 (cm)
Mean Bankfull Width 2.3 (m) Mean Water Depth 10 (cm)
Possible intermit
____ % Riffle 50 % Pool ____ % Run 50 % Flat
Evidence of eroding banks, Comments on bank stability well veg'td. Not much of a bank but flows evident through minor detention.

Substrate (% cover)

____ Bedrock	____ Cobble	____ Sand	40	Silt 40	Muck
____ Boulder	____ Gravel	____ Clay	10	Marl 10	Detritus

In-water Cover

Cover Types Present (circle): Undercut Banks Deep Pool Watercress (Aquatic Veg)
Overhanging Vegetation (Woody Debris) Boulder Other ____

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
60% mainly from cattail in upper and from ash stand in lower section
Adjacent Land Use
Coco paving, Taylor Kidd Blvd, grassy area

Fish Habitat Potential

Critical Habitat (spawning or nursery areas, groundwater upwellings)
indirect. Status unknown d/s of Jim Snow Drive due to no access.
Migratory Obstructions (seasonal, permanent)
intermittent nature, shallow water levels.
Note any fish observations none

Waterbody Notes

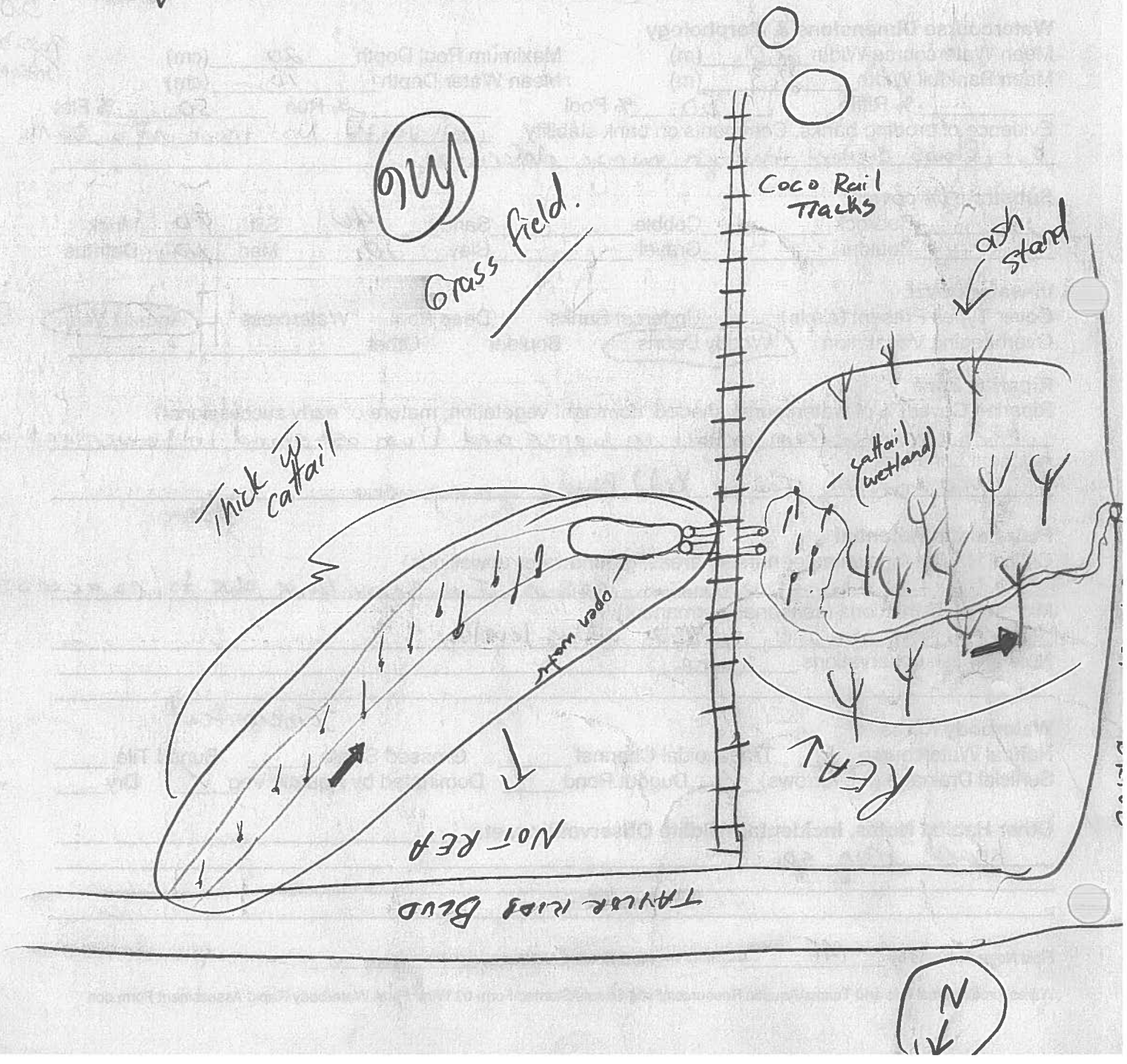
Intermittent.

Natural Watercourse ✓ Trapezoidal Channel ____ Grassed Swale ____ Buried Tile ____
Surficial Drainage (i.e. furrows) ✓ Dugout Pond ____ Dominated by Aquatic Veg ✓ Dry ____

Other Habitat Notes, Incidental Wildlife Observations, etc.

heard frog sp.

Field Notes Authored by MF Field Notes QA/QCed by ____


Coco Rail Tracks
ash stand
Grass field.
cattail (wetland)
Thick W cattail
open water
REA
Not REA
Taylor Hog Blvd
N

Mainland

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Intermitten RE

Stantec

mainland

[redacted]

Station # M8 | Project Name Amherst Wind
Watercourse Name Unknown | Project # ~~160960579~~ 160960595
Photos 9554 - 9569 | Field Staff MF
Date March 27, 2012 | Time 13:55
Weather conditions in previous 24 hrs No precip.
GPS Coordinates (Zone) 18T E 0363253 N 4896767 Datum Nad83 ← upp
Descriptive Location East of main buildings 455m W Coco Paving + ~400m north of Bath Rd.
Lower = 18T 0363451 4896218

Water Quality

Dissolved Oxygen (mg/L) 9.43 | pH 8.55 | Conductivity (µS/cm) 450 NOT TAKEN NO CONNECT D/S
Water Temperature (°C) 10.05 | Air Temperature (°C) 5°C
Time *in situ* measurements taken 14:45

Watercourse Dimensions & Morphology

Mean Watercourse Width 0.30 (m) | Maximum Pool Depth 20 (cm)
Mean Bankfull Width 0.70 (m) | Mean Water Depth 10 (cm)
% Riffle 60 ~~70~~ % Pool 10 % Run 30 % Flat
Evidence of eroding banks, Comments on bank stability Heavy erosion in mid section, exposed bedrock, slumping in mid section. Overland flows

Substrate (% cover)

40	Bedrock	5	Cobble	5	Sand	15	Silt	~~15~~	Muck
	Boulder	5	Gravel	10	Clay	20	Mari		Detritus

in-water Cover

Cover Types Present (circle): (Undercut Banks) Deep Pool Watercress (Aquatic Veg) - green algo
Overhanging Vegetation Woody Debris Boulder Other

Riparian Zone

Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
10% mainly from overhanging rip. grasses.
Adjacent Land Use
Coco Paving holding tanks, grassy meadow, Bath Rd

Fish Habitat Potential

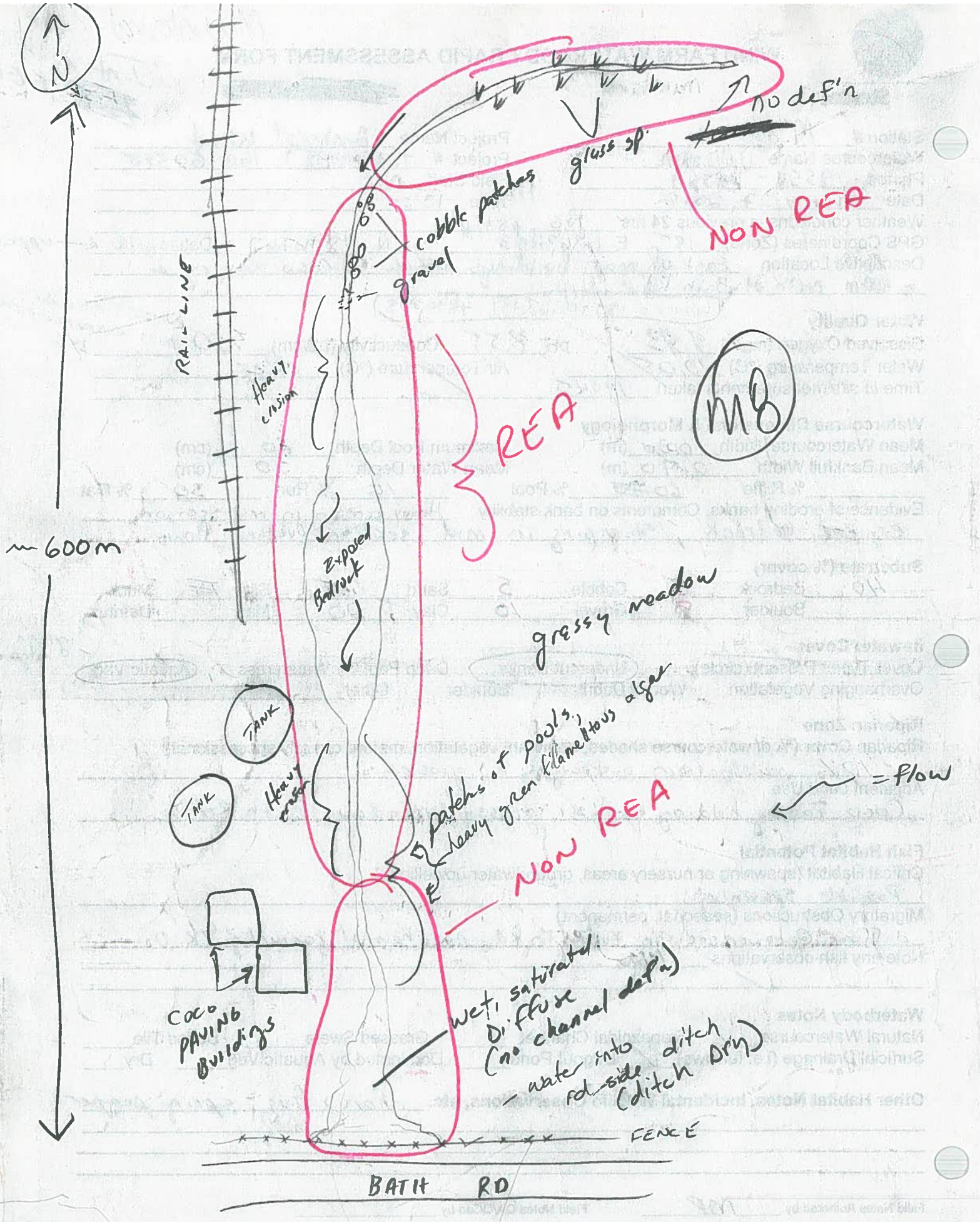
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Possible spawning
Migratory Obstructions (seasonal, permanent)
diffuse @ lower section to Bath rd, no channel connecting LK. On.
Note any fish observations None.

Waterbody Notes

Natural Watercourse ✓ | Trapezoidal Channel | Grassed Swale | Buried Tile
Surficial Drainage (i.e. furrows) ✓ | Dugout Pond | Dominated by Aquatic Veg | Dry

Other Habitat Notes, Incidental Wildlife Observations, etc. chorus frog, spring peeper

Field Notes Authored by MF | Field Notes QA/QCed by


N
~600m
RAIL LINE
no def'n
glass sp.
cobble patches
gravel
NON REA
Heavy erosion
REA
M8
Exposed Bedrock
grassy meadow
TANK
TANK
Heavy erosion
patches of pools, heavy green filamentous algae
= flow
NON REA
Coco PAVING Buildings
wet, saturated, Diffuse (no channel def'n)
water into rd side ditch (ditch dry)
FENCE
BATH RD

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Mainland REA
Possible Intermitt
Fish obser

Stantec

Main Land

Station # M9 Project Name Amherst Is. Wind
Watercourse Name unknown Trib of LK ON Project # 160960595
Photos 3573 - 3580 Field Staff MF
Date March 27, 2012 Time 15:46
Weather conditions in previous 24 hrs No precip.
GPS Coordinates (Zone) 18T E 0362087 N 4896740 Datum Nad 83
Descriptive Location on south side of Taylor Kidd Blvd. within ROW ~225m west of Bombardier driveway. Roadside ditch

Water Quality
Dissolved Oxygen (mg/L) 11.16 pH 8.95 Conductivity (µS/cm) 597
Water Temperature (°C) 11.11 Air Temperature (°C) 5
Time *in situ* measurements taken 16:00

Watercourse Dimensions & Morphology
Mean Watercourse Width 1.5 (m) Maximum Pool Depth 20 (cm)
Mean Bankfull Width 2.0 (m) Mean Water Depth 15 (cm)
____% Riffle 30 % Pool ____% Run 70 % Flat
Evidence of eroding banks, Comments on bank stability None. Well vgt'd grasses. Looks manicured regularly.

Substrate (% cover)
____ Bedrock ____ Cobble ____ Sand 10 Silt 30 Muck
____ Boulder ____ Gravel 10 Clay 30 Marl 20 Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks Deep Pool Watercress (Aquatic Veg)
Overhanging Vegetation (Woody Debris) Boulder Other ____

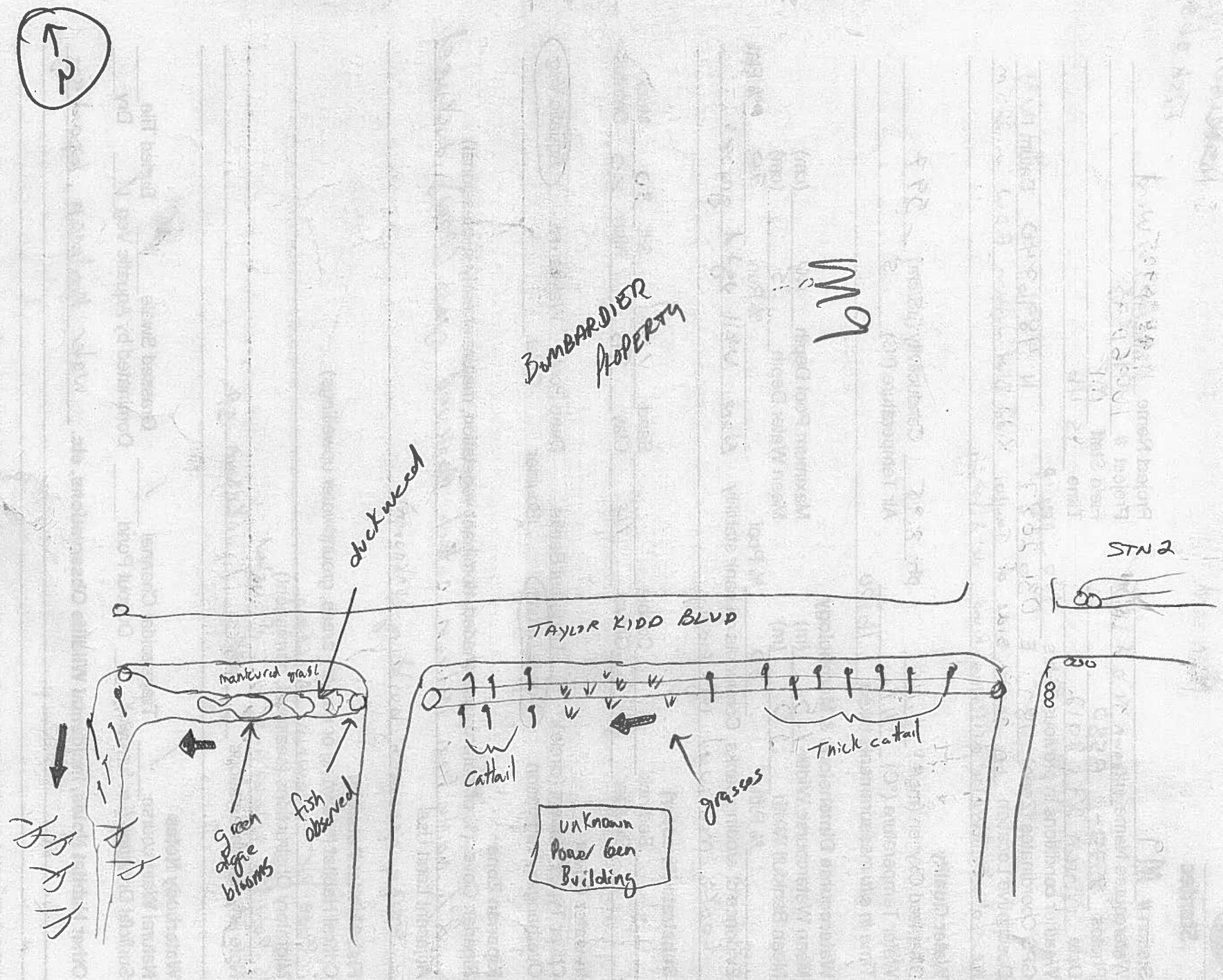
Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
2% mainly from instream cattail. Manicured grass (ROW), duckweed.
Adjacent Land Use
Energy generating building (unknown)

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
Possible spawning nursery.
Migratory Obstructions (seasonal, permanent)
Possible intermittent, lack of water
Note any fish observations ~~Minn~~ / unknown sp.

Waterbody Notes
Natural Watercourse ✓ Trapezoidal Channel ✓ Grassed Swale ✓ Buried Tile ____
Surficial Drainage (i.e. furrows) ____ Dugout Pond ____ Dominated by Aquatic Veg ✓ Dry ____

Other Habitat Notes, Incidental Wildlife Observations, etc. Water boatman, leopard frog

Field Notes Authored by MF Field Notes QA/QCed by ____


N
BOMBARDIER PROPERTY
duckweed
STN 2
TAYLOR KIDD BLVD
manicured grass
green algae blooms
fish observed
cattail
grasses
Thick cattail
Unknown Pond/Open Building

Mainland

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

Main Land

[redacted] Property

Station # M7 | Project Name Amherst Island Wind
Watercourse Name Unknown | Project # 160960595
Photos 8520 - 8530 | Field Staff MF
Date March 27, 2012 | Time 11.40
Weather conditions in previous 24 hrs No precipitation
GPS Coordinates (Zone) 18T E 0362252 N 4897060 Datum Nad 83
Descriptive Location On Bombardier property ~ 200m north of Taylor Kidd Blvd. and ~ 15m north of main building. Rd side ditch on property.

Water Quality
Dissolved Oxygen (mg/L) Too low | pH _____ | Conductivity (µS/cm) _____
Water Temperature (°C) _____ | Air Temperature (°C) _____
Time *in situ* measurements taken _____

Watercourse Dimensions & Morphology
Mean Watercourse Width 0.40 (m) | Maximum Pool Depth 5.0 (cm)
Mean Bankfull Width 1.2 (m) | Mean Water Depth 2.0 (cm)
_____ % Riffle 30 % Pool 70 % Run _____ % Flat
Evidence of eroding banks, Comments on bank stability Well grassed. Minor undercuts throughout. Overland flows only.

Substrate (% cover)

_____ Bedrock	_____ Cobble	_____ Sand	Silt 30	Muck
_____ Boulder	Gravel 70	Clay	Marl	Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks (minor) Deep Pool Watercress Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other _____

Riparian Zone Flows from drainage from area land.
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
2%, minor pockets of cattail
Adjacent Land Use
Bombardier buildings, test track, ROW power lines.

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
None
Migratory Obstructions (seasonal, permanent)
low water and possible dryness in summer
Note any fish observations None

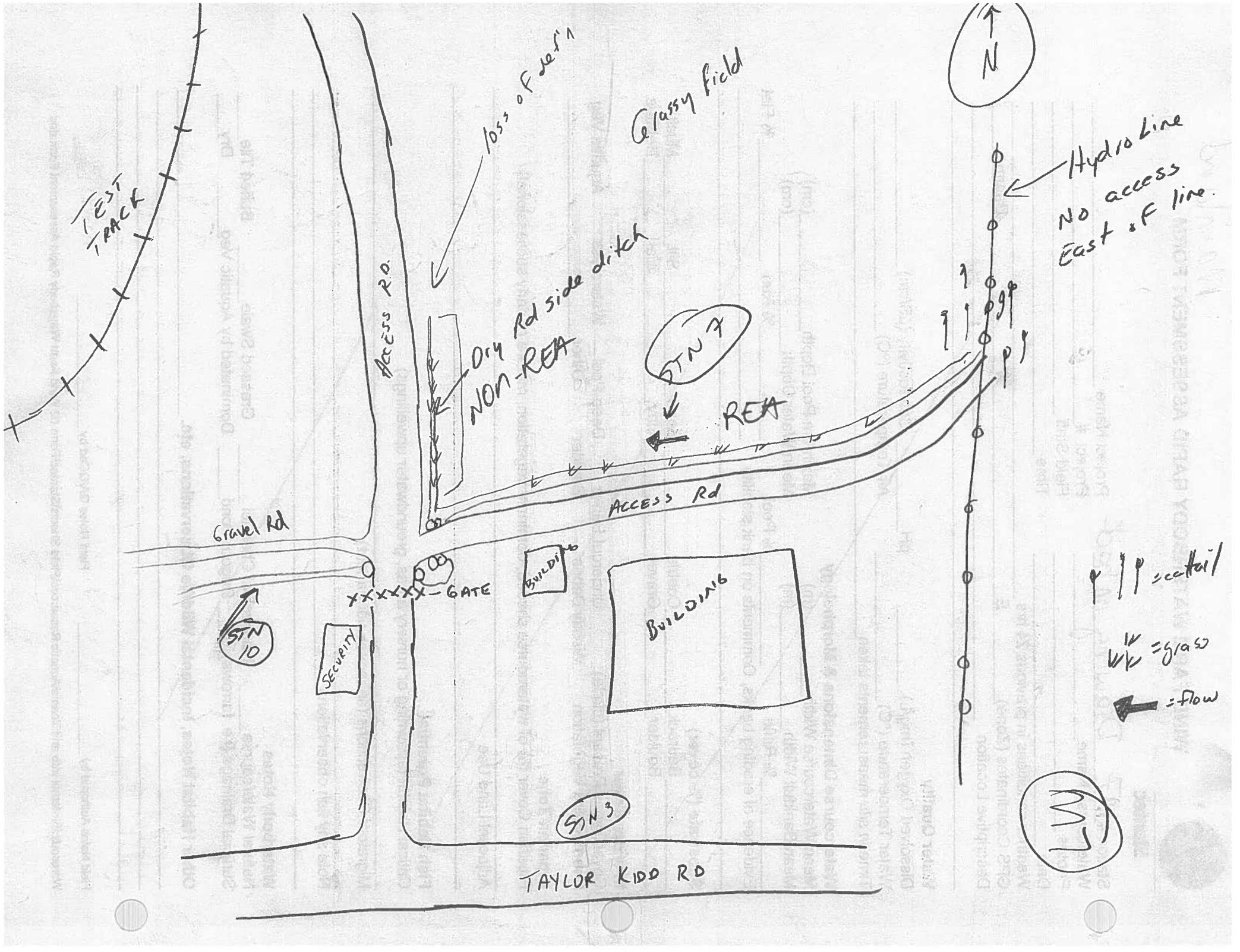
Waterbody Notes
Natural Watercourse _____ | Trapezoidal Channel ✓ | Grassed Swale ✓ | Buried Tile _____
Surficial Drainage (i.e. furrows) _____ | Dugout Pond _____ | Dominated by Aquatic Veg _____ | Dry _____

Other Habitat Notes, Incidental Wildlife Observations, etc. None

Field Notes Authored by MF | Field Notes QA/QCed by _____

See watercress note on back for Stn 10

RE WAT BOL Intell


N
TEST TRACK
Loss of Fence
Grassy field
Hydro Line
No access East of line.
Access R.D.
Dry Rd side ditch
NON-REA
STN 7
REA
ACCESS Rd
Gravel Rd
XXXXXX-GATE
BUILDING
BUILDING
STN 10
SECURITY
STN 3
TAYLOR KIDD RD
= cattail
= grass
= flow
3

Mainland

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

Main Land

Not REA overland FR ~~[illegible]~~ possible Intermittent

Station # M10
Watercourse Name unknown trib of CK ON
Photos 8532 - 8540
Date March 27, 2012
Weather conditions in previous 24 hrs No precip.
GPS Coordinates (Zone) 18T E 0362260 N 4897006 Datum Nad83
Descriptive Location on Bombardier property. D/s section connected to Sta 7. ~30m west of buildings + ~150 m north of Taylor kidd Blvd.

Project Name Amherst Is. Wind
Project # 160950595
Field Staff MF
Time 12:00

Water Quality
Dissolved Oxygen (mg/L) ____ pH ____ Conductivity (µS/cm) TOO LOW
Water Temperature (°C) ____ Air Temperature (°C) ____
Time *in situ* measurements taken ____

Watercourse Dimensions & Morphology
Mean Watercourse Width 0.75 (m) Maximum Pool Depth ~4.0 (cm)
Mean Bankfull Width ____ (m) Mean Water Depth ~2.0 (cm)
____ % Riffle 70 % Pool ____ % Run 30 % Flat
Evidence of eroding banks, Comments on bank stability heavy equipment runs through some sections

Substrate (% cover)
____ Bedrock ____ Cobble ____ Sand 50 Silt ____ Muck
____ Boulder ____ Gravel 50 Clay ____ Marl ____ Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks Deep Pool (Watercress) Aquatic Veg
Overhanging Vegetation Woody Debris Boulder Other ____

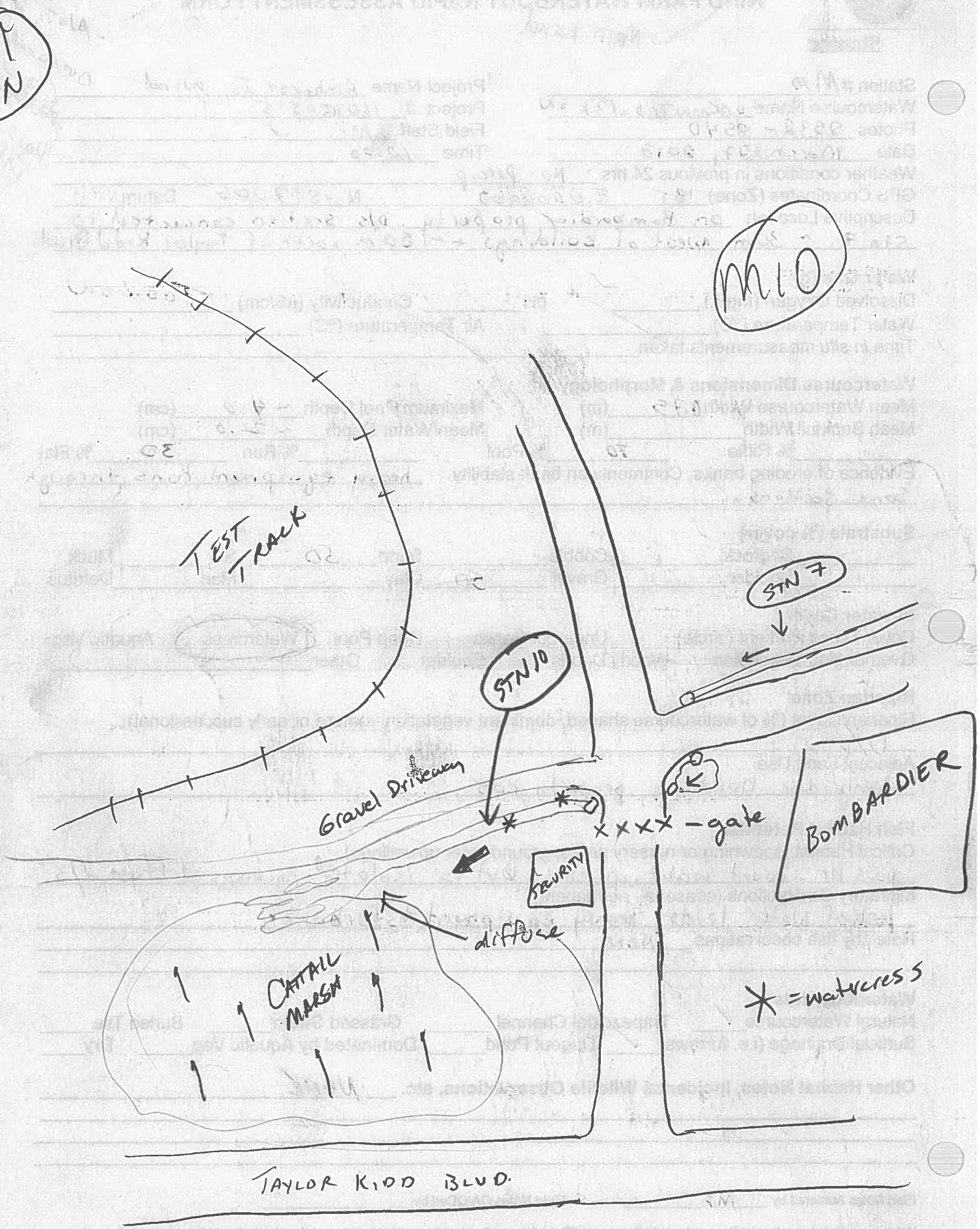
Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
0%
Adjacent Land Use
Bombardier buildings, property rds.

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
possible ground water upwelling but is isolated. Becomes diffuse d/s
Migratory Obstructions (seasonal, permanent)
lack of water levels, heavy equipment disturbance
Note any fish observations None.

Waterbody Notes
Natural Watercourse ✓ Trapezoidal Channel ____ Grassed Swale ____ Buried Tile ____
Surficial Drainage (i.e. furrows) ✓ Dugout Pond ____ Dominated by Aquatic Veg ____ Dry ____

Other Habitat Notes, Incidental Wildlife Observations, etc. NONE

Field Notes Authored by MF Field Notes QA/QCed by ____


N
MIO
TEST TRACK
STN 7
STN 10
Gravel Driveway
XXXX - gate
BOMBARDIER
SECURITY
diffuser
CATTAIL MARSH
* = waterway s
TAYLOR KIDD BLVD.

Mainland

Not a Water Bod

WIND FARM WATERBODY RAPID ASSESSMENT FORM

Stantec

Station # M11 | Project Name Amherst Island
Watercourse Name unnamed | Project # 160960595
Photos | Field Staff Josh Mansell
Date May 18, 2012 | Time 1800
Weather conditions in previous 24 hrs sunny, warm, dry, no precip.
GPS Coordinates (Zone) 18T E 362849 N 4884741 Datum
Descriptive Location located on Cavkbrook Quarry property immediately N of Jake-Kidd Blvd and E of Jim Snow Dr.

Water Quality
Dissolved Oxygen (mg/L) n/a | pH n/a | Conductivity (µS/cm) n/a.
Water Temperature (°C) 21° | Air Temperature (°C) 25°
Time *in situ* measurements taken 1800

Watercourse Dimensions & Morphology
Mean Watercourse Width ~3 (m) | Maximum Pool Depth 20 (cm)
Mean Bankfull Width n/a. (m) | Mean Water Depth (cm)
0 % Riffle | 100 % Pool | 0 % Run | 0 % Flat
Evidence of eroding banks, Comments on bank stability no defined banks

Substrate (% cover)

/ Bedrock	/ Cobble	/ Sand	/ Silt	100%	Muck
/ Boulder	/ Gravel	/ Clay	/ Marl	/	Detritus

In-water Cover
Cover Types Present (circle): Undercut Banks | Deep Pool | Watercress | (Aquatic Veg)
Overhanging Vegetation | Woody Debris | Boulder | Other

Riparian Zone
Riparian Cover (% of watercourse shaded, dominant vegetation, mature or early successional)
0%
Adjacent Land Use Agriculture, Cavkbrook access road (no culvert).

Fish Habitat Potential
Critical Habitat (spawning or nursery areas, groundwater upwellings)
none
Migratory Obstructions (seasonal, permanent)
There is no culvert @ Cavkbrook access road
Note any fish observations
None.

Waterbody Notes
Natural Watercourse | Trapezoidal Channel | Grassed Swale | Buried Tile
Surficial Drainage (i.e. furrows) X | Dugout Pond | Dominated by Aquatic Veg | Dry

Other Habitat Notes, Incidental Wildlife Observations, etc. A tractor has driven through this feature repeatedly for agricultural purposes. Water is pooling behind the Cavkbrook access road because there is no culvert.

Field Notes Authored by Josh Mansell | Field Notes QA/QCed by

Appendix E

DFO Operational Statements

DOCK AND BOATHOUSE CONSTRUCTION

Fisheries and Oceans Canada
Ontario Operational Statement

Version 3.0

Docks and boathouses are common features on the shorelines of lakes and rivers in Canada and are an important part of the recreational use of our waterways. This Operational Statement applies to docks which consist of floating platforms or those supported by pipes, poles, wooden cribs or cantilever arms. The shoreline area in front of your cottage or waterfront property is also important habitat for a variety of aquatic organisms, including fish. Fish lay their eggs, feed and hide from predators in these shoreline areas.

Building a dock or boathouse along your waterfront can impact this important habitat by covering spawning habitat, removing rocks and logs that provide shelter, causing erosion and sedimentation from bank disturbance, introducing deleterious substances if improper building materials are used and disrupting sensitive fish life stages.

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. Under the *Fisheries Act* no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO. By following the conditions and measures set out below you will be in compliance with subsection 35(1) of the *Fisheries Act*.

The purpose of this Operational Statement is to describe the conditions under which it is applicable to your project and the measures to incorporate into your project in order to avoid negative impacts to fish habitat. You may proceed with your dock or boathouse project without DFO review when you meet the following conditions:

- you are not working within the following areas/water bodies where this Operational Statement does not apply: waters within areas under Parks Canada's jurisdiction, including the Trent-Severn Waterway and the Rideau Canal system,
- it is a new, repair or rebuild of a floating, cantilever or post dock or boathouse,
- it is a new, repair or rebuild of an open-faced crib dock or boathouse built entirely on natural bedrock or sand bottom with a total combined footprint (for both existing and proposed cribs) of 15 square metres (161 ft^2) or less,
- the total surface area for the entire dock and boathouse, which occurs in a location below the ordinary high water mark (HWM) (see definition below), including both existing and proposed structures combined, does not exceed 50m^2 (538 ft^2), unless the structure is built entirely over natural bedrock or sand bottom (not supporting aquatic vegetation),
- it is not made of concrete or steel sheeting or any other skirting that isolates the inside of the crib from the rest of the water,
- it does not require any dredging, blasting or infilling in the water body,
- the combined width for all existing and proposed shoreline improvements on land and in water (docks, boathouses and beaches) is less than 25% of the property's riparian area width (shoreline frontage width), and
- you incorporate the *Measures to Protect Fish and Fish Habitat when Building your Dock and Boathouse* listed below in this Operational Statement.

If you cannot meet all of the conditions listed above and cannot incorporate all of the measures listed below then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact your Conservation Authority, or the DFO office in your area (see Ontario DFO office list), if you wish to obtain an opinion on the possible options you should consider to avoid contravention of the *Fisheries Act*.

You are required to respect all municipal, provincial or federal legislation that applies to the work being carried out in relation to this Operational Statement. The activities undertaken in this Operational Statement must also comply with the *Species at Risk Act* (**www.sararegistry.gc.ca**). If you have questions regarding this Operational Statement, please contact one of the agencies listed above.

We ask that you notify DFO, preferably 10 working days before starting your work by filling out and sending the Ontario Operational Statement notification form (**www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/prov-terr/index_e.htm**) to the DFO office in your area. This information is requested in order to evaluate the effectiveness of the work carried out in relation to this Operational Statement.

Measures to Protect Fish and Fish Habitat when Building your Dock and Boathouse

1. Use existing trails, roads, or cut lines wherever possible to avoid disturbance to the riparian vegetation (i.e., vegetation that occurs adjacent to the watercourse).
2. While this Operational Statement does not cover the clearing of riparian vegetation, the removal of select plants may be necessary to access the construction site. This removal should be kept to a minimum.
3. The construction of boathouses above the HWM is strongly encouraged in order to minimize impacts to fish habitat.
4. Floating, cantilever and post docks, and marine railways on posts for boathouse access, can be installed at any time.
5. Time the installation of crib docks to prevent disruption of sensitive fish life stages by adhering to appropriate

fisheries timing windows (see the *Ontario In-Water Construction Timing Windows*).

6. Construct cribs in an open-faced manner and fill with large rocks that provide crevices for fish and other small organisms. Leave enough space between cribs (two metres) and locate them at least two metres from the HWM to allow near shore water to circulate.

7. Do not take materials (e.g., rock, logs) to build the dock from the shoreline, from below the HWM or from any water body.

8. If rocks, stumps or logs need to be moved on the lake or river bottom or shoreline to build the dock, they should be relocated to an area of similar depth and not removed altogether from the bottom or shoreline.

9. Install effective sediment and erosion control measures before starting work to prevent the entry of sediment into the watercourse. Inspect them regularly during the course of construction and make all necessary repairs if any damage occurs.

- **9.1.** Avoid doing work during wet and rainy periods.

10. Use untreated materials (e.g. cedar, tamarack, hemlock, rocks, plastic, etc.) as supports for dock structures that will be submerged in water. Treated lumber may contain compounds that can be released into the water and become toxic to the aquatic environment.

- **10.1.** Use only treated lumber that is environmentally-friendly (see definition below) for dock structures that are above water.
- **10.2.** Cut, seal and stain all lumber away from the water using only environmentally-friendly stains (see definition below). All sealed and stained lumber should be completely dry before being used near water.
- **10.3.** Ensure plastic barrel floats are free of chemicals inside and outside of the barrel before they are placed in water.

11. Wherever possible, construct the dock either from a barge or float on the water or through the ice instead of using machinery from the bank of the water body.

12. Operate machinery on land (from outside of the water) and in a manner that minimizes disturbance to the banks of the water body.

- **12.1.** Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.
- **12.2.** Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent any deleterious substance from entering the water.
- **12.3.** Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.
- **12.4.** Restore banks to original condition if any disturbance occurs.

13. If a concrete abutment is needed to secure your dock to land install it entirely on land, above the HWM. The concrete is to be pre-cast and cured away from the water before use to prevent seepage of potentially toxic substances into the water body.

14. Prevent deleterious substances such as uncured concrete, grout, paint, sediment and preservatives from entering the water body or storm drains.

15. Vegetate any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses and cover such areas with mulch to prevent erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.

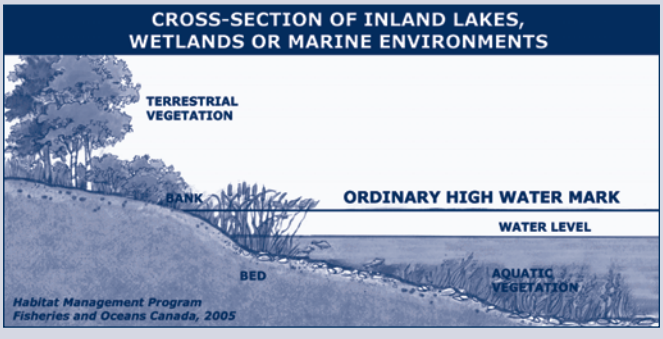
- **15.1.** Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

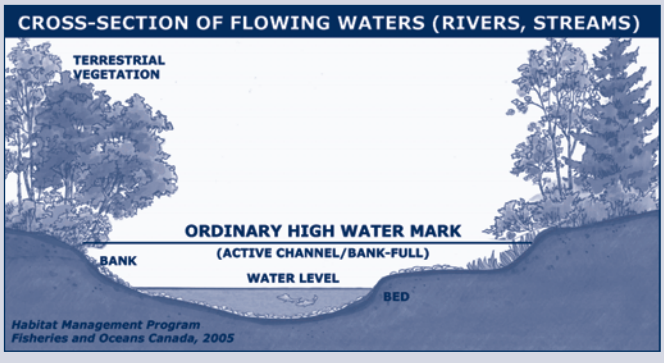
If you would like more detailed information on fish-friendly dock construction and maintenance practices to help you plan your project, please refer to the following document: *The Dock Primer - A Cottager's Guide to Waterfront-Friendly Docks* **www.dfo-mpo.gc.ca/regions/central/pub/index_e.htm** (Ontario Edition).

Definitions:

Ordinary high water mark (HWM) – The usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land. In flowing waters (rivers, streams) this refers to the "active channel/bank-full level" which is often the 1:2 year flood flow return level. In inland lakes, wetlands or marine environments it refers to those parts of the water body bed and banks that are frequently flooded by water so as to leave a mark on the land and where the natural vegetation changes from predominately aquatic vegetation to terrestrial vegetation (excepting water tolerant species). For reservoirs this refers to normal high operating levels (Full Supply Level).

For the Great Lakes this refers to the 80th percentile elevation above chart datum as described in DFO's *Fish Habitat and Determining the High Water Mark on Lakes*.





Environmentally-friendly lumber and stains – Chemical wood preservatives used in Canada are regulated by the Pest Management Regulatory Agency, Health Canada. Approved preservatives used most commonly in lumber are Alkaline Copper Quaternary (ACQ) and Copper Azole (CA). Creosote treated wood should not be used in or near water. Ask your local building supply outlet for further information on available products.

FISHERIES AND OCEANS CANADA OFFICES IN ONTARIO

Southern Ontario District

Burlington
Fisheries and Oceans Canada
3027 Harvester Road, Suite 304
P.O. Box 85060
Burlington, ON L7R 4K3
Telephone: (905) 639-0188
Fax: (905) 639-3549
Email: ReferralsBurlington@DFO-MPO.GC.CA

London
Fisheries and Oceans Canada
73 Meg Drive
London, ON N6E 2V2
Telephone: (519) 668-2722
Fax: (519) 668-1772
Email: ReferralsLondon@DFO-MPO.GC.CA

Eastern Ontario District

Peterborough
Fisheries and Oceans Canada
501 Towerhill Road, Unit 102
Peterborough, ON K9H 7S3
Telephone: (705) 750-0269
Fax: (705) 750-4016
Email: ReferralsPeterborough@DFO-MPO.GC.CA

Prescott
Fisheries and Oceans Canada
401 King Street West
Prescott, ON K0E 1T0
Telephone: (613) 925-2865
Fax: (613) 925-2245
Email: ReferralsPrescott@DFO-MPO.GC.CA

Northern Ontario District

Parry Sound
Fisheries and Oceans Canada
28 Waubeek Street
Parry Sound, ON P2A 1B9
Telephone: (705) 746-2196
Fax: (705) 746-4820
Email: ReferralsParrySound@DFO-MPO.GC.CA

Sudbury and Sault Ste. Marie
Fisheries and Oceans Canada
1500 Paris Street, Unit 11
Sudbury, ON P3E 3B8
Telephone: (705) 522-2816
Fax: (705) 522-6421
Email: ReferralsSudbury@DFO-MPO.GC.CA

Thunder Bay and Kenora
Fisheries and Oceans Canada
Thunder Bay Office
100 Main Street, Suite 425
Thunder Bay, ON P7B 6R9
Telephone: (807) 346-8118
Fax: (807) 346-8545
Email: ReferralsThunderBay@DFO-MPO.GC.CA

Aussi disponible en français

http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/index_f.asp

DFO/2007-1329

ISOLATED OR DRY OPEN-CUT STREAM CROSSINGS

Fisheries and Oceans Canada
Ontario Operational Statement

Version 1.0

For the purpose of this Operational Statement, the term "Isolated Crossing" means a temporary stream crossing technique that allows work (e.g., trenched pipeline or cable installation) to be carried out "in-the-dry" while diverting the natural flow around the site during construction. These types of open trenched crossings are isolated using flume or dam and pump techniques (see *Pipeline Associated Watercrossings*, 2005 at **http://www.capp.ca/default.asp?V_DOC_ID=763&PubID=96717**). The term "Dry Open-cut Stream Crossing" means a temporary stream crossing work (e.g., trenched pipeline or cable installation) that is carried out during a period when the entire stream width is seasonally dry or is frozen to the bottom.

The risks to fish and fish habitat associated with isolated open cut stream crossings include the potential for direct damage to substrates, release of excessive sediments, loss of riparian habitat, stranding of fish in dewatered areas, impingement/entrainment of fish at pump intakes, and disruption of essential fish movement patterns. Similarly, dry open-cut stream crossings pose a risk to fish and fish habitat due to potential harmful alteration of substrates, loss of riparian habitat, and release of excessive sediment once stream flows resume.

The order of preference for carrying out a cable or pipeline stream crossing, in order to protect fish and fish habitat, is: a) punch or bore crossing (see *Punch & Bore Crossings* Operational Statement); b) high-pressure directional drill crossing (see *High-Pressure Directional Drilling* Operational Statement); c) dry open-cut crossing; and d) isolated open-cut crossing. This order must be balanced with practical considerations at the site.

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. Under the *Fisheries Act* no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO. By following the conditions and measures set out below you will be in compliance with subsection 35(1) of the *Fisheries Act*.

The purpose of this Operational Statement is to describe the conditions under which it is applicable to your project and the measures to incorporate into your project in order to avoid negative impacts to fish habitat. You may proceed with your isolated or dry open-cut stream crossing project without a DFO review when you meet the following conditions:

- if working within the Thames River, Sydenham River, Ausable River, Grand River, or Maitland River, you have contacted your Conservation Authority or local DFO Office (see Ontario DFO office list) to ensure that your project will not impact Schedule I mussel species at risk under the federal *Species at Risk Act* (SARA), before proceeding,
- for dry, open-cut crossings the watercourse is dry or frozen completely to the bottom at the site,
- for isolated crossings, the channel width of the watercourse at the crossing site is less than 5 meters from ordinary high water mark to ordinary high water mark (HWM) (see definition below),
- the isolated crossing does not involve the construction or use of an off-stream diversion channel, or the use of earthen dams,
- the isolated crossing ensures that all natural upstream flows are conveyed downstream during construction, with no change in quality or quantity,
- the site does not occur at a stream location involving known fish spawning habitat, particularly if it is dependent on groundwater upwelling,
- the use of explosives is not required to complete the crossing, and
- you incorporate the *Measures to Protect Fish and Fish Habitat when Carrying Out an Isolated or Dry Open-cut Stream Crossing* listed below.

If you cannot meet all of the conditions listed above and cannot incorporate all of the measures listed below then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact your Conservation Authority, or the DFO office in your area (see Ontario DFO office list) or Parks Canada if the project is located within its jurisdiction, including the Trent-Severn Waterway and the Rideau Canal, if you wish to obtain an opinion on the possible options you should consider to avoid contravention of the *Fisheries Act*.

You are required to respect all municipal, provincial and federal legislation that applies to the work being carried out in relation to this Operational Statement. The activities undertaken in this Operational Statement must also comply with SARA (**www.sararegistry.gc.ca**). If you have questions regarding this Operational Statement, please contact one of the agencies listed above.

We ask that you notify DFO, preferably 10 working days before starting your work, by filling out and sending the Ontario Operational Statement notification form (**www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/prov-terr/index_e.htm**) to the DFO office in your area. This information is requested in order to evaluate the effectiveness of the work carried out in relation to this Operational Statement.

Measures to Protect Fish and Fish Habitat when Carrying Out an Isolated or Dry Open-Cut Stream Crossing

1. Use existing trails, roads or cut lines wherever possible, as access routes to avoid disturbance to the riparian vegetation.

2. Locate crossings at straight sections of the stream, perpendicular to the banks, whenever possible. Avoid crossing on meander bends, braided streams, alluvial fans, active floodplains or any other area that is inherently unstable and may result in the erosion and scouring of the stream bed.

3. Complete the crossing in a manner that minimizes the duration of instream work.

4. Construction should be avoided during unusually wet, rainy or winter thaw conditions.

5. While this Operational Statement does not cover the clearing of riparian vegetation, the removal of select plants may be necessary to access the construction site. This removal should be kept to a minimum and within the utility right-of-way.

6. Machinery fording a flowing watercourse to bring equipment required for construction to the opposite side is limited to a one-time event (over and back) and is to occur only if an existing crossing at another location is not available or practical to use. Operational Statements are also available for *Ice Bridges and Snow Fills*, *Clear-Span Bridges*, and *Temporary Stream Crossing*.

    6.1. If minor rutting is likely to occur, stream bank and bed protection methods (e.g., swamp mats, pads) should be used provided they do not constrict flows or block fish passage.
    6.2. Grading of the stream banks for the approaches should not occur.
    6.3. If the stream bed and banks are steep and highly erodible (e.g., dominated by organic materials and silts) and erosion and degradation is likely to occur as a result of equipment fording, then a temporary crossing structure or other practice should be used to protect these areas.
    6.4. Time the one-time fording to prevent disruption to sensitive fish life stages by adhering to appropriate fisheries timing windows (see the *Ontario In-Water Construction Timing Windows*).
    6.5. Fording should occur under low flow conditions and not when flows are elevated due to local rain events or seasonal flooding.

7. Operate machinery in a manner that minimizes disturbance to the watercourse bed and banks.

    7.1. Protect entrances at machinery access points (e.g., using swamp mats) and establish single site entry and exit.
    7.2. Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.
    7.3. Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent deleterious substances from entering the water.
    7.4. Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.

8. Install effective sediment and erosion control measures before starting work to prevent entry of sediment into the watercourse. Inspect them regularly during the course of construction and make all necessary repairs if any damage occurs.

9. Stabilize any waste materials removed from the work site, above the HWM, to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with grass or shrubs.

10. Vegetate any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses and cover such areas with mulch to prevent soil erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.

    10.1. Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

Measures to Protect Fish and Fish Habitat when Carrying Out an Isolated Crossing

Temporary isolation is used to allow work “in-the-dry” while maintaining the natural downstream flow by installing dams up and downstream of the site and conveying all of the natural upstream flow into a flume, or pumping it around the isolated area. In addition to measures 1 to 10, the following measures should be carried out when conducting an isolated stream crossing:

11. Time isolated crossings to protect sensitive fish life stages by adhering to fisheries timing windows (see Measure 6.4).

12. Use dams made of non-earthen material, such as water-inflated portable dams, pea gravel bags, concrete blocks, steel or wood wall, clean rock, sheet pile or other appropriate designs, to separate the dewatered work site from flowing water.

    12.1. If granular material is used to build dams, use clean or washed material that is adequately sized (i.e., moderately sized rock and not sand or gravel) to withstand anticipated flows during the construction. If necessary, line the outside face of dams with heavy poly-plastic to make them impermeable to water. Material to build these dams should not be taken from below the HWM of any water body.
    12.2. Design dams to accommodate any expected high flows of the watercourse during the construction period.

13. Before dewatering, rescue any fish from within the isolated area and return them safely immediately downstream of the worksite.

13.1. You will require a permit from DFO to relocate any aquatic species that are listed as either endangered or threatened under SARA. Please contact your Conservation Authority or the DFO office in your area to determine if an aquatic species at risk is in the vicinity of your project and, if appropriate, use the DFO website at **www.dfo-mpo.gc.ca/species-especes /permits/sarapermits_e.asp** to apply for a permit.

14. Pump sediment laden dewatering discharge into a vegetated area or settling basin, and prevent sediment and other deleterious substances from entering any water body.

15. Remove accumulated sediment and excess spoil from the isolated area before removing dams.

16. Stabilize the **streambed** and restore the original channel shape, bottom gradient and substrate to pre-construction condition before removing dams.

17. Ensure **banks** are stabilized, restored to original shape, adequately protected from erosion and re-vegetated, preferably with native species.

18. If rock is used to stabilize banks, it should be clean, free of fine materials, and of sufficient size to resist displacement during peak flood events. The rock should be placed at the original stream bank grade to ensure there is no infilling or narrowing of the watercourse.

19. Gradually remove the downstream dam first, to equalize water levels inside and outside of the isolated area and to allow suspended sediments to settle.

20. During the final removal of dams, restore the original channel shape, bottom gradient and substrate at these locations.

21. Pumped Diversion
Pumped diversions are used to divert water around the isolated area to maintain natural downstream flows and prevent upstream ponding.

21.1. Ensure intakes are operated in a manner that prevents streambed disturbance and fish mortality. Guidelines to determine the appropriate mesh size for intake screens may be obtained from DFO (e.g., *Freshwater Intake End-of-Pipe Fish Screen Guideline* (1995), available at **www.dfo-mpo.gc.ca/Library/223669.pdf**).

21.2. Ensure the pumping system is sized to accommodate any expected high flows of the watercourse during the construction period. Pumps should be monitored at all times, and back-up pumps should be readily available on-site in case of pump failure.

21.3. Protect pump discharge area(s) to prevent erosion and the release of suspended sediments downstream, and remove this material when the works have been completed.

Measures to Protect Fish and Fish Habitat when Carrying Out a Dry Open-Cut Stream Crossing

In addition to measures 1 to 10, the following measures should be carried out when conducting a dry open-cut stream crossing:

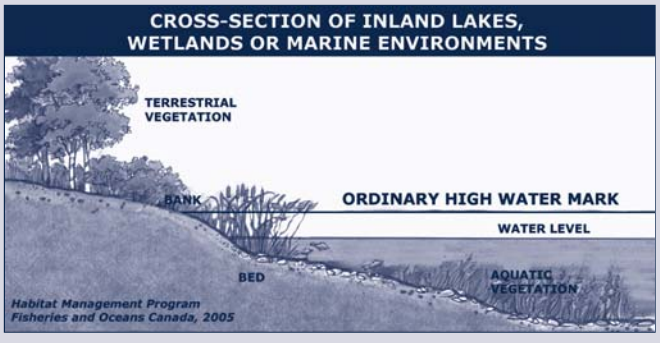
22. Stabilize the **streambed** and restore the original channel shape, bottom gradient and substrate to pre-construction condition.

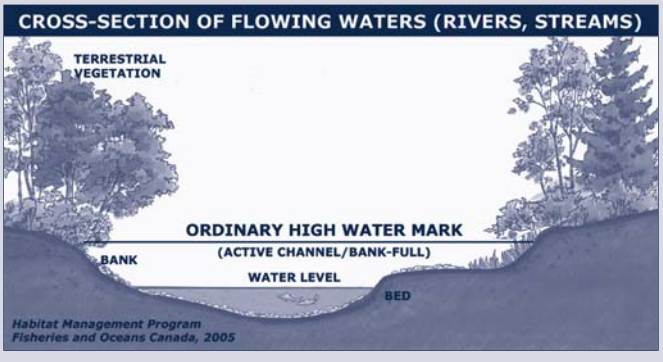
23. Ensure **banks** are stabilized, restored to original shape, adequately protected from erosion and re-vegetated, preferably with native species.

Definition:

Ordinary high water mark (HWM) - The usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land. In flowing waters (rivers, streams) this refers to the "active channel/bank-full level" which is often the 1:2 year flood flow return level. In inland lakes, wetlands or marine environments it refers to those parts of the water body bed and banks that are frequently flooded by water so as to leave a mark on the land and where the natural vegetation changes from predominately aquatic vegetation to terrestrial vegetation (excepting water tolerant species). For reservoirs this refers to normal high operating levels (Full Supply Level).

For the Great Lakes this refers to the 80th percentile elevation above chart datum as described in DFO's Fish Habitat and Determining the High Water Mark on Lakes.





FISHERIES AND OCEANS CANADA OFFICES IN ONTARIO

Southern Ontario District

Burlington
Fisheries and Oceans Canada
3027 Harvester Road, Suite 304
P.O. Box 85060
Burlington, ON L7R 4K3
Telephone: (905) 639-0188
Fax: (905) 639-3549
Email: ReferralsBurlington@DFO-MPO.GC.CA

London
Fisheries and Oceans Canada
73 Meg Drive
London, ON N6E 2V2
Telephone: (519) 668-2722
Fax: (519) 668-1772
Email: ReferralsLondon@DFO-MPO.GC.CA

Eastern Ontario District

Peterborough
Fisheries and Oceans Canada
501 Towerhill Road, Unit 102
Peterborough, ON K9H 7S3
Telephone: (705) 750-0269
Fax: (705) 750-4016
Email: ReferralsPeterborough@DFO-MPO.GC.CA

Prescott
Fisheries and Oceans Canada
401 King Street West
Prescott, ON K0E 1T0
Telephone: (613) 925-2865
Fax: (613) 925-2245
Email: ReferralsPrescott@DFO-MPO.GC.CA

Northern Ontario District

Parry Sound
Fisheries and Oceans Canada
28 Waubeek Street
Parry Sound, ON P2A 1B9
Telephone: (705) 746-2196
Fax: (705) 746-4820
Email: ReferralsParrySound@DFO-MPO.GC.CA

Sudbury and Sault Ste. Marie
Fisheries and Oceans Canada
1500 Paris Street, Unit 11
Sudbury, ON P3E 3B8
Telephone: (705) 522-2816
Fax: (705) 522-6421
Email: ReferralsSudbury@DFO-MPO.GC.CA

Thunder Bay and Kenora
Fisheries and Oceans Canada
Thunder Bay Office
100 Main Street, Suite 425
Thunder Bay, ON P7B 6R9
Telephone: (807) 346-8118
Fax: (807) 346-8545
Email: ReferralsThunderBay@DFO-MPO.GC.CA

Aussi disponible en français

http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/index_f.asp

DFO/2007-1329

HIGH-PRESSURE DIRECTIONAL DRILLING

Fisheries and Oceans Canada
Ontario Operational Statement

Version 3.0

For the purpose of this Operational Statement, the term High-Pressure Directional Drilling (HPDD) means trenchless methods of crossing a watercourse using pressurized mud systems. HPDD is used to install cables and pipelines for gas, telecommunications, fibre optics, power, sewer, oil and water lines underneath watercourses and roads. This method is preferable to open-cut and isolated crossings since the cable or pipeline is drilled underneath the watercourse with very little disturbance to the bed or banks. HPDD involves drilling a pilot bore hole underneath the watercourse towards a surface target, back-reaming the bore hole to the drill rig while pulling the pipe along through the hole. This process typically uses the freshwater gel mud system composed of a mixture of clean, freshwater as the base, bentonite (clay-based drilling lubricant) as the viscosifier and synthetic polymers.

The general order of preference for carrying out a cable or pipeline stream crossing in order to protect fish and fish habitat is: a) a punch or bore crossing (see *Punch & Bore Crossings* Operational Statement), b) HPDD crossing, c) dry open-cut crossing, and d) isolated open-cut crossing (see *Isolated or Dry Open-cut Stream Crossings* Operational Statement). This order must be balanced with practical considerations at the site.

One of the risks associated with HPDD is the escape of drilling mud into the environment as a result of a spill, tunnel collapse or the rupture of mud to the surface, commonly known as "frac-out". A frac-out is caused when excessive drilling pressure results in drilling mud propagating toward the surface. The risk of a frac-out can be reduced through proper geotechnical assessment practices and drill planning and execution. The extent of a frac-out can be limited by careful monitoring and having appropriate equipment and response plans ready in the event that one occurs. HPDD can also result in excessive disturbance of riparian vegetation and sedimentation and erosion due to operation of equipment on the shoreline or fording to access the opposite bank.

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. Under the *Fisheries Act* no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO. By following the conditions and measures set out below you will be in compliance with subsection 35(1) of the *Fisheries Act.*

The purpose of this Operational Statement is to describe the conditions under which it is applicable to your project and the measures to incorporate into your project in order to avoid negative impacts to fish habitat. You may proceed with your high-pressure directional drill project without a DFO review when you meet the following conditions:

- the crossing technique will not damage the stream bed and thereby negatively impact fish or fish habitat,
- the crossing is not a wet open-cut crossing,
- you have an emergency frac-out response plan and a contingency crossing plan in place that outline the protocol to monitor, contain and clean-up a potential frac-out and an alternative method for carrying out the crossing, and
- you incorporate the *Measures to Protect Fish and Fish Habitat when High-Pressure Directional Drilling* listed below in this Operational Statement.

If you cannot meet all of the conditions listed above and cannot incorporate all of the measures listed below then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact your Conservation Authority, or the DFO office in your area (see Ontario DFO office list) or Parks Canada if the project is located within its jurisdiction, including the Trent-Severn Waterway and the Rideau Canal, if you wish to obtain an opinion on the possible options you should consider to avoid contravention of the *Fisheries Act*.

You are required to respect all municipal, provincial or federal legislation that applies to the work being carried out in relation to this Operational Statement. The activities undertaken in this Operational Statement must also comply with the *Species at Risk Act* (**www.sararegistry.gc.ca**). If you have questions regarding this Operational Statement, please contact one of the agencies listed above.

We ask that you notify DFO, preferably 10 working days before starting your work by filling out and sending the Ontario Operational Statement notification form (**www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/prov-terr/index_e.htm**) to the DFO office in your area. This information is requested in order to evaluate the effectiveness of the work carried out in relation to this Operational Statement.

Measures to Protect Fish and Fish Habitat when High-Pressure Directional Drilling

1. Use existing trails, roads or cut lines wherever possible, as access routes to avoid disturbance to the riparian vegetation.

2. Design the drill path to an appropriate depth below the watercourse to minimize the risk of frac-out and to a depth

to prevent the line from becoming exposed due to natural scouring of the stream bed. The drill entry and exit points are far enough from the banks of the watercourse to have minimal impact on these areas.

3. While this Operational Statement does not cover the clearing of riparian vegetation, the removal of select plants may be necessary to access the construction site. This removal should be kept to a minimum and within the road or utility right-of-way.

4. Machinery fording the watercourse to bring equipment required for construction to the opposite side is limited to a one-time event (over and back) and should occur only if an existing crossing at another location is not available or practical to use. A *Temporary Stream Crossing* Operational Statement is also available.

- **4.1.** If minor rutting is likely to occur, stream bank and bed protection methods (e.g., swamp mats, pads) should be used provided they do not constrict flows or block fish passage.
- **4.2.** Grading of the stream banks for the approaches should not occur.
- **4.3.** If the stream bed and banks are steep and highly erodible (e.g., dominated by organic materials and silts) and erosion and degradation are likely to occur as a result of equipment fording, then a temporary crossing structure or other practice should be used to protect these areas.
- **4.4.** Time the one-time fording to prevent disruption to sensitive fish life stages by adhering to appropriate fisheries timing windows (see the *Ontario In-Water Construction Timing Windows*).
- **4.5.** Fording should occur under low flow conditions and not when flows are elevated due to local rain events or seasonal flooding.

5. Operate machinery on land above the ordinary high water mark (see definition below) and in a manner that minimizes disturbance to the banks of the watercourse.

- **5.1.** Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.
- **5.2.** Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent any deleterious substance from entering the water.
- **5.3.** Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.
- **5.4.** Restore banks to original condition if any disturbance occurs.

6. Construct a dugout/settling basin at the drilling exit site to contain drilling mud to prevent sediment and other deleterious substances from entering the watercourse. If this cannot be achieved, use silt fences or other effective sediment and erosion control measures to prevent drilling mud from entering the watercourse. Inspect these measures regularly during the course of construction and make all necessary repairs if any damage occurs.

- **6.1.** Dispose of excess drilling mud, cuttings and other waste materials at an adequately sized disposal facility located away from the water to prevent it from entering the watercourse.

7. Monitor the watercourse to observe signs of surface migration (frac-out) of drilling mud during all phases of construction.

Emergency Frac-out Response and Contingency Planning

8. Keep all material and equipment needed to contain and clean up drilling mud releases on site and readily accessible in the event of a frac-out.

9. Implement the frac-out response plan that includes measures to stop work, contain the drilling mud and prevent its further migration into the watercourse and notify all applicable authorities, including the closest DFO office in the area (see Ontario DFO office list). Prioritize clean up activities relative to the risk of potential harm and dispose of the drilling mud in a manner that prevents re-entry into the watercourse.

10. Ensure clean up measures do not result in greater damage to the banks and watercourse than from leaving the drilling mud in place.

11. Implement the contingency crossing plan including measures to either re-drill at a more appropriate location or to isolate the watercourse to complete the crossing at the current location. See *Isolated or Dry Open-cut Stream Crossings* Operational Statement for carrying out an isolated trenched crossing.

12. Stabilize any waste materials removed from the work site to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with preferably native grass or shrubs.

13. Vegetate any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses and cover such areas with mulch to prevent erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.

- **13.1.** Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

Definition:

Ordinary high water mark – The usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land. In flowing waters (rivers, streams) this refers to the “active channel/bank-full level” which is often the 1:2 year flood flow return level. In inland lakes, wetlands or marine environments it refers to those parts of the water body bed and banks that are frequently flooded by water so as to leave a mark on the land and where the natural vegetation changes from predominately aquatic vegetation to terrestrial

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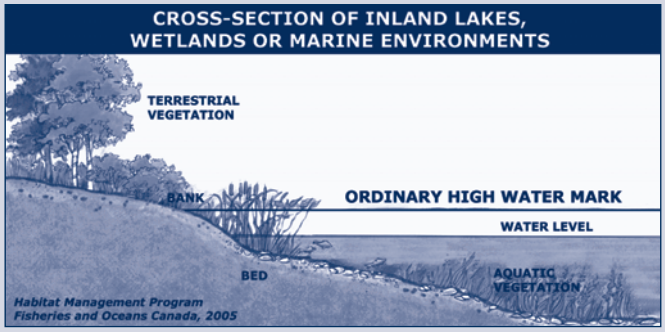

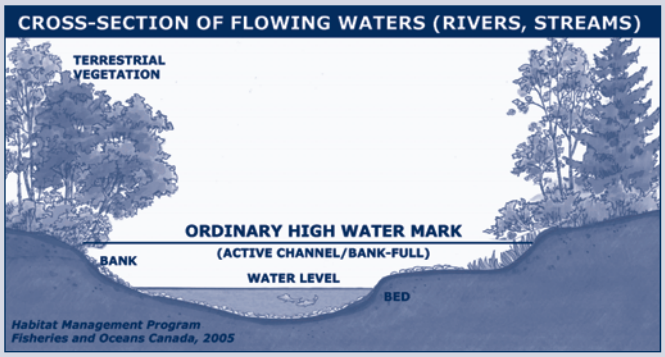

FISHERIES AND OCEANS CANADA OFFICES IN ONTARIO

Southern Ontario District

Burlington
Fisheries and Oceans Canada
3027 Harvester Road, Suite 304
P.O. Box 85060
Burlington, ON L7R 4K3
Telephone: (905) 639-0188
Fax: (905) 639-3549
Email: ReferralsBurlington@DFO-MPO.GC.CA

London
Fisheries and Oceans Canada
73 Meg Drive
London, ON N6E 2V2
Telephone: (519) 668-2722
Fax: (519) 668-1772
Email: ReferralsLondon@DFO-MPO.GC.CA

Eastern Ontario District

Peterborough
Fisheries and Oceans Canada
501 Towerhill Road, Unit 102
Peterborough, ON K9H 7S3
Telephone: (705) 750-0269
Fax: (705) 750-4016
Email: ReferralsPeterborough@DFO-MPO.GC.CA

Prescott
Fisheries and Oceans Canada
401 King Street West
Prescott, ON K0E 1T0
Telephone: (613) 925-2865
Fax: (613) 925-2245
Email: ReferralsPrescott@DFO-MPO.GC.CA

Northern Ontario District

Parry Sound
Fisheries and Oceans Canada
28 Waubeek Street
Parry Sound, ON P2A 1B9
Telephone: (705) 746-2196
Fax: (705) 746-4820
Email: ReferralsParrySound@DFO-MPO.GC.CA

Sudbury and Sault Ste. Marie
Fisheries and Oceans Canada
1500 Paris Street, Unit 11
Sudbury, ON P3E 3B8
Telephone: (705) 522-2816
Fax: (705) 522-6421
Email: ReferralsSudbury@DFO-MPO.GC.CA

Thunder Bay and Kenora
Fisheries and Oceans Canada
Thunder Bay Office
100 Main Street, Suite 425
Thunder Bay, ON P7B 6R9
Telephone: (807) 346-8118
Fax: (807) 346-8545
Email: ReferralsThunderBay@DFO-MPO.GC.CA

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http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/index_f.asp

DFO/2007-1329

Fisheries and Oceans Canada | Pêches et Océans Canada

NOTIFICATION FORM

Fisheries and Oceans Canada
Ontario Operational Statement

Version 3.1

PROPONENT INFORMATION

NAME:	STREET ADDRESS:	
CITY/TOWN:	PROVINCE/TERRITORY:	POSTAL CODE:
TEL. NO. (RESIDENCE):	TEL. NO. (WORK):	
FAX NO:	EMAIL ADDRESS:	

CONTRACTOR INFORMATION (provide this information if a Contractor is working on behalf of the Proponent)

NAME:	STREET ADDRESS:	
CITY/TOWN:	PROVINCE/TERRITORY:	POSTAL CODE:
TEL. NO. (RESIDENCE):	TEL. NO. (WORK):	
FAX NO:	EMAIL ADDRESS:	

PROJECT INFORMATION

Select Operational Statements that are being used (check all applicable boxes):

- ❒ Beach Creation for Residential Use
- ❒ Beaver Dam Removal
- ❒ Bridge Maintenance
- ❒ Clear-Span Bridges
- ❒ Culvert Maintenance
- ❒ Dock and Boathouse Construction
- ❒ High-Pressure Directional Drilling
- ❒ Ice Bridges and Snow Fills
- ❒ Isolated Pond Construction
- ❒ Isolated or Dry Open-cut Stream Crossings
- ❒ Maintenance of Riparian Vegetation in Existing Rights-of-Way
- ❒ Mineral Exploration Activities
- ❒ Moorings
- ❒ Overhead Line Construction
- ❒ Public Beach Maintenance
- ❒ Punch & Bore Crossings
- ❒ Routine Maintenance Dredging
- ❒ Submerged Log Salvage
- ❒ Temporary Stream Crossing
- ❒ Underwater Cables

Select the type of water body or watercourse at or near your project:

- ❒ River, Stream, Creek
- ❒ Lake (8 hectares or greater)
- ❒ Marine (Ocean or Sea)
- ❒ Pond or wetland (pond is less than 8 hectares)
- ❒ Estuary

PROJECT LOCATION (S) (fill out this section if the project location is different from Proponent Information; append multiple project locations on an additional sheet if necessary)

Name of water body or watercourse	Coordinates of the Project (UTM co-ordinate or Degrees, Minutes, Seconds), if available Easting: Northing: Latitude: Longitude:
Legal Description (Plan, Block, Lot, Concession, Township)	Directions to Access the Project Site (i.e., Route or highway number, etc.)
Proposed Start Date (YYYY/MM/DD):	Proposed Completion Date (YYYY/MM/DD):

We ask that you notify DFO, preferably 10 working days before starting your work, by filling out and sending in, by mail or by fax, this notification form to the DFO office in your area. This information is requested in order to evaluate the effectiveness of the work carried out in relation to the Operational Statement.

I, _____ (print name) certify that the information given on this form is, to the best of my knowledge, correct and complete.

Signature _____ Date _____

Note: If you cannot meet all of the conditions and cannot incorporate all of the measures in the Operational Statement then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact your Conservation Authority, or the DFO office in your area (see Ontario DFO office list), or Parks Canada if the project is located within its jurisdiction, including the Trent-Severn Waterway and the Rideau Canal, if you wish to obtain more information on the possible options you should consider to avoid contravention of the *Fisheries Act*. For activities carried out under the *Crown Forest Sustainability Act*, the requirements of the applicable Operational Statements are addressed through an existing agreement and the Ontario Ministry of Natural Resources is the first point of contact.

Information about the above-noted proposed work or undertaking is collected by DFO under the authority of the *Fisheries Act* for the purpose of administering the fish habitat protection provisions of the *Fisheries Act*. Personal information will be protected under the provisions of the *Privacy Act* and will be stored in the Personal Information Bank DFO-SCI-605. Under the *Privacy Act*, individuals have a right to, and on request shall be given access to, any personal information about them contained in a personal information bank. Instructions for obtaining personal information are contained in the Government of Canada's Info Source publications available at **www.infosource.gc.ca** or in Government of Canada offices. Information other than "personal" information may be accessible or protected as required by the provisions of the *Access to Information Act*.

Canada

FISHERIES AND OCEANS CANADA OFFICES IN ONTARIO

Southern Ontario District

Burlington
Fisheries and Oceans Canada
3027 Harvester Road, Suite 304
P.O. Box 85060
Burlington, ON L7R 4K3
Telephone: (905) 639-0188
Fax: (905) 639-3549
Email: ReferralsBurlington@DFO-MPO.GC.CA

London
Fisheries and Oceans Canada
73 Meg Drive
London, ON N6E 2V2
Telephone: (519) 668-2722
Fax: (519) 668-1772
Email: ReferralsLondon@DFO-MPO.GC.CA

Eastern Ontario District

Peterborough
Fisheries and Oceans Canada
501 Towerhill Road, Unit 102
Peterborough, ON K9H 7S3
Telephone: (705) 750-0269
Fax: (705) 750-4016
Email: ReferralsPeterborough@DFO-MPO.GC.CA

Prescott
Fisheries and Oceans Canada
401 King Street West
Prescott, ON K0E 1T0
Telephone: (613) 925-2865
Fax: (613) 925-2245
Email: ReferralsPrescott@DFO-MPO.GC.CA

Northern Ontario District

Parry Sound
Fisheries and Oceans Canada
28 Waubeek Street
Parry Sound, ON P2A 1B9
Telephone: (705) 746-2196
Fax: (705) 746-4820
Email: ReferralsParrySound@DFO-MPO.GC.CA

Sudbury and Sault Ste. Marie
Fisheries and Oceans Canada
1500 Paris Street, Unit 11
Sudbury, ON P3E 3B8
Telephone: (705) 522-2816
Fax: (705) 522-6421
Email: ReferralsSudbury@DFO-MPO.GC.CA

Thunder Bay and Kenora
Fisheries and Oceans Canada
Thunder Bay Office
100 Main Street, Suite 425
Thunder Bay, ON P7B 6R9
Telephone: (807) 346-8118
Fax: (807) 346-8545
Email: ReferralsThunderBay@DFO-MPO.GC.CA

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DFO/2007-1329

OVERHEAD LINE CONSTRUCTION

Fisheries and Oceans Canada
Ontario Operational Statement

Version 3.0

Overhead lines are constructed for electrical or telecommunication transmission across many watercourses that range in size from small streams and ponds to large rivers, lakes and reservoirs. This Operational Statement applies to selective removal of vegetation along the right-of-way to provide for installation and safe operation of overhead lines, and passage of equipment and materials across the water body.

Although fish habitat occurs throughout a water system, it is the riparian habitat that is most sensitive to overhead line construction. Riparian vegetation occurs adjacent to the watercourse and directly contributes to fish habitat by providing shade, cover, and spawning and food production areas. It is important to design and build your overhead line project to meet your needs while also protecting riparian areas. Potential impacts to fish and fish habitat include excessive loss of riparian vegetation, erosion and sedimentation resulting from bank disturbance and loss of plant root systems, rutting and compaction of stream substrate at crossing sites, and disruption of sensitive fish life stages.

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. Under the *Fisheries Act* no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO. By following the conditions and measures set out below you will be in compliance with subsection 35(1) of the *Fisheries Act*.

The purpose of this Operational Statement is to describe the conditions under which it is applicable to your project and the measures to incorporate into your project in order to avoid negative impacts to fish habitat. You may proceed with your overhead line project without a DFO review when you meet the following conditions:

- it does not require the construction or placement of any temporary or permanent structures (e.g. islands, poles, crib works, etc.) below the ordinary high water mark (HWM) (see definition below), and
- you incorporate the *Measures to Protect Fish and Fish Habitat when Constructing Overhead Lines* listed below in this Operational Statement.

If you cannot meet all of the conditions listed above and cannot incorporate all of the measures listed below then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact your Conservation Authority, or the DFO office in your area (see Ontario DFO office list) or Parks Canada if the project is located within its jurisdiction, including the Trent-Severn Waterway and the Rideau Canal, if you wish to obtain an opinion on the possible options you should consider to avoid contravention of the *Fisheries Act.*

You are required to respect all municipal, provincial or federal legislation that applies to the work being carried out in relation to this Operational Statement. The activities undertaken in this Operational Statement must also comply with the *Species at Risk Act* (**www.sararegistry.gc.ca**). If you have questions regarding this Operational Statement, please contact one of the agencies listed above.

We ask that you notify DFO, preferably 10 working days before starting your work by filling out and sending the Ontario Operational Statement notification form (**www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/prov-terr/index_e.htm**) to the DFO office in your area. This information is requested in order to evaluate the effectiveness of the work carried out in relation to this Operational Statement.

Measures to Protect Fish and Fish Habitat when Constructing Overhead Lines

1. Installing overhead lines under frozen conditions is preferable in all situations. On wet terrains (e.g., bogs), lines should be installed under frozen conditions, where possible, or using aerial methods (i.e., helicopter).

2. Design and construct approaches so that they are perpendicular to the watercourse wherever possible to minimize loss or disturbance to riparian vegetation.

3. Avoid building structures on meander bends, braided streams, alluvial fans, active floodplains or any other area that is inherently unstable and may result in erosion and scouring of the stream bed or overhead line structures.

3.1. Wherever possible, locate all temporary or permanent structures, such as poles, sufficiently above the HWM to prevent erosion.

4. While this Operational Statement does not cover the clearing of riparian vegetation, the removal of select plants may be necessary to accommodate the overhead line. This removal

should be kept to a minimum and within the road or utility right-of-way.

5. Machinery fording the watercourse to bring equipment required for construction to the opposite side is limited to a one-time event (over and back) and should occur only if an existing crossing at another location is not available or practical to use. A *Temporary Stream Crossing* Operational Statement is also available.

- **5.1.** If minor rutting is likely to occur, stream bank and bed protection methods (e.g., swamp mats, pads) should be used provided they do not constrict flows or block fish passage.
- **5.2.** Grading of the stream banks for the approaches should not occur.
- **5.3.** If the stream bed and banks are steep and highly erodible (e.g., dominated by organic materials and silts) and erosion and degradation is likely to occur as a result of equipment fording, then a temporary crossing structure or other practice should be used to protect these areas.
- **5.4.** Time the one-time fording to prevent disruption to sensitive fish life stages by adhering to appropriate fisheries timing windows (see the *Ontario In-Water Construction Timing Windows*).
- **5.5.** Fording should occur under low flow conditions and not when flows are elevated due to local rain events or seasonal flooding.

6. Operate machinery on land and in a manner that minimizes disturbance to the banks of the watercourse.

- **6.1.** Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.
- **6.2.** Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent any deleterious substance from entering the water.
- **6.3.** Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.
- **6.4.** Restore banks to original condition if any disturbance occurs.

7. Install effective sediment and erosion control measures before starting work to prevent entry of sediment into the watercourse. Inspect them regularly during the course of construction and make all necessary repairs if any damage occurs.

- **7.1.** Avoid work during wet, rainy conditions or use alternative techniques such as aerial methods (i.e., helicopter) to install overhead lines.

8. Stabilize any waste materials removed from the work site to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with grass or shrubs.

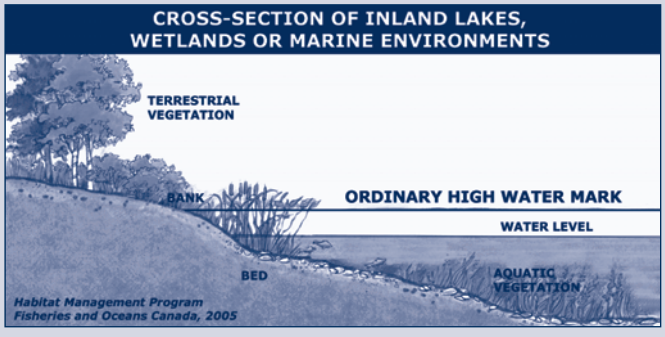
9. Vegetate any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses and cover such areas with mulch to prevent erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.

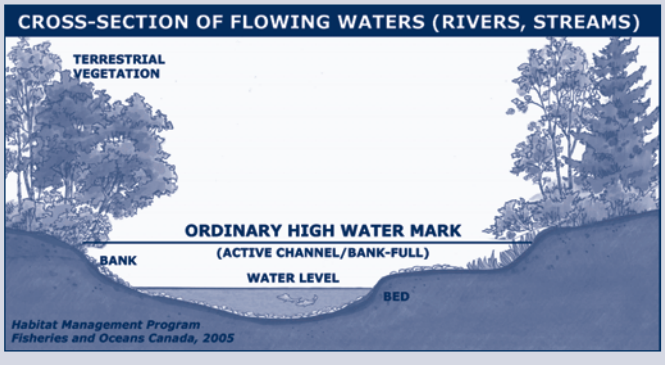
- **9.1.** Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

Definition:

Ordinary high water mark (HWM) – The usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land. In flowing waters (rivers, streams) this refers to the "active channel/bank-full level" which is often the 1:2 year flood flow return level. In inland lakes, wetlands or marine environments it refers to those parts of the water body bed and banks that are frequently flooded by water so as to leave a mark on the land and where the natural vegetation changes from predominately aquatic vegetation to terrestrial vegetation (excepting water tolerant species). For reservoirs this refers to normal high operating levels (Full Supply Level).

For the Great Lakes this refers to the 80th percentile elevation above chart datum as described in DFO's *Fish Habitat and Determining the High Water Mark on Lakes*.





FISHERIES AND OCEANS CANADA OFFICES IN ONTARIO

Southern Ontario District

Burlington
Fisheries and Oceans Canada
3027 Harvester Road, Suite 304
P.O. Box 85060
Burlington, ON L7R 4K3
Telephone: (905) 639-0188
Fax: (905) 639-3549
Email: ReferralsBurlington@DFO-MPO.GC.CA

London
Fisheries and Oceans Canada
73 Meg Drive
London, ON N6E 2V2
Telephone: (519) 668-2722
Fax: (519) 668-1772
Email: ReferralsLondon@DFO-MPO.GC.CA

Eastern Ontario District

Peterborough
Fisheries and Oceans Canada
501 Towerhill Road, Unit 102
Peterborough, ON K9H 7S3
Telephone: (705) 750-0269
Fax: (705) 750-4016
Email: ReferralsPeterborough@DFO-MPO.GC.CA

Prescott
Fisheries and Oceans Canada
401 King Street West
Prescott, ON K0E 1T0
Telephone: (613) 925-2865
Fax: (613) 925-2245
Email: ReferralsPrescott@DFO-MPO.GC.CA

Northern Ontario District

Parry Sound
Fisheries and Oceans Canada
28 Waubeek Street
Parry Sound, ON P2A 1B9
Telephone: (705) 746-2196
Fax: (705) 746-4820
Email: ReferralsParrySound@DFO-MPO.GC.CA

Sudbury and Sault Ste. Marie
Fisheries and Oceans Canada
1500 Paris Street, Unit 11
Sudbury, ON P3E 3B8
Telephone: (705) 522-2816
Fax: (705) 522-6421
Email: ReferralsSudbury@DFO-MPO.GC.CA

Thunder Bay and Kenora
Fisheries and Oceans Canada
Thunder Bay Office
100 Main Street, Suite 425
Thunder Bay, ON P7B 6R9
Telephone: (807) 346-8118
Fax: (807) 346-8545
Email: ReferralsThunderBay@DFO-MPO.GC.CA

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DFO/2007-1329

PUNCH & BORE CROSSINGS

Fisheries and Oceans Canada
Ontario Operational Statement

Version 3.0

For the purpose of this Operational Statement, the term punch and bore refers to a trenchless crossing method which involves the excavation of a vertical bell hole or shallow depression on either side of the watercourse. Horizontal punching or boring between the two points, at an appropriate depth below the watercourse, completes the creation of a passage-way for the crossing. Punch and bore crossings allow cables and pipelines to be installed under watercourses without imparting any disturbance to the bed and banks. Punch and bore crossings differ from high-pressure directional drilled crossings, in that no pressurized mud systems are required, thereby avoiding the risk of sediment release due to frac-out.

Punch and bore crossings can negatively impact fish and fish habitat due to erosion and sedimentation from site disturbance and dewatering of bell holes or the collapse of the punch or bore hole under the stream. Disturbing riparian vegetation can reduce important shoreline cover, shade and food production areas. Machinery fording the stream can disturb bottom and bank substrates, disrupt sensitive fish life stages, and introduce deleterious substances if equipment is not properly maintained. Impacts can be reduced if an emergency response plan and clean-up materials are in place.

The general order of preference for carrying out a cable or pipeline stream crossing in order to protect fish and fish habitat is: a) a punch or bore crossing, b) high-pressure directional drill crossing (see *High-Pressure Directional Drilling* Operational Statement), c) dry open-cut crossing, and d) isolated open-cut crossing (see *Isolated or Dry Open-cut Stream Crossings* Operational Statement). This order must be balanced with practical considerations at the site.

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. Under the *Fisheries Act* no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO. By following the conditions and measures set out below you will be in compliance with subsection 35(1) of the *Fisheries Act*.

The purpose of this Operational Statement is to describe the conditions under which it is applicable to your project and the measures to be incorporated into your project in order to avoid negative impacts to fish habitat. You may proceed with your punch or bore crossing project without a DFO review when you meet the following conditions:

- the crossing is not a wet open-cut crossing,
- the crossing technique will not damage the stream bed or bank and thereby negatively impact fish or fish habitat,
- the site does not occur at a stream location involving known fish spawning habitat, particularly if it is dependent on groundwater upwelling, and
- you incorporate the *Measures to Protect Fish and Fish Habitat when Conducting Punch and Bore Crossings*, listed below.

If you cannot meet all of the conditions listed above and cannot incorporate all of the measures listed below then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact your Conservation Authority, or the DFO office in your area (see Ontario DFO office list) or Parks Canada if the project is located within its jurisdiction, including the Trent-Severn Waterway and the Rideau Canal, if you wish to obtain an opinion on the possible options you should consider to avoid contravention of the *Fisheries Act.*

You are required to respect all municipal, provincial or federal legislation that applies to the work being carried out in relation to this Operational Statement. The activities undertaken in this Operational Statement must also comply with the *Species at Risk Act* (**www.sararegistry.gc.ca**). If you have questions regarding this Operational Statement, please contact one of the agencies listed above.

We ask that you notify DFO, preferably 10 working days before starting your work by filling out and sending the Ontario Operational Statement notification form (**www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/prov-terr/index_e.htm**) to the DFO office in your area. This information is requested in order to evaluate the effectiveness of the work carried out in relation to this Operational Statement.

Measures to Protect Fish and Fish Habitat when Conducting Punch and Bore Crossings

1. A punch or bore crossing can be conducted at any time of the year provided there is not a high risk of failure and it does not require in-water activities such as machinery fording.

2. Design the punch or bore path for an appropriate depth below the watercourse to prevent the pipeline or cable from becoming exposed due to natural scouring of the stream bed.

3. While this Operational Statement does not cover the clearing of riparian vegetation, the removal of select plants may be necessary to access the construction site and to excavate the bell holes. This removal is to be kept to a minimum and within the utility right-of-way.

4. Install effective sediment and erosion control measures before starting work to prevent entry of sediment into the water body. Inspect them regularly during the course of construction and make all necessary repairs if any damage occurs.

5. Machinery fording the watercourse to bring equipment required for construction to the opposite side is limited to a one-time event (over and back) and should occur only if an existing crossing at another location is not available or practical to use. A *Temporary Stream Crossing* Operational Statement is also available.

- **5.1.** If minor rutting is likely to occur, stream bank and bed protection methods (e.g., swamp mats, pads) should be used provided they do not constrict flows or block fish passage.
- **5.2.** Grading of the stream banks for the approaches should not occur.
- **5.3.** If the stream bed and banks are steep and highly erodible (e.g., dominated by organic materials and silts) and erosion and degradation are likely to occur as a result of equipment fording, then a temporary crossing structure or other practice should be used to protect these areas.
- **5.4.** Time the one-time fording to prevent disruption to sensitive fish life stages by adhering to appropriate fisheries timing windows (see the *Ontario In-Water Construction Timing Windows*).
- **5.5.** Fording should occur under low flow conditions and not when flows are elevated due to local rain events or seasonal flooding.

6. Operate machinery on land above the ordinary high water mark (HWM) (see definition below) and in a manner that minimizes disturbance to the banks of the watercourse.

- **6.1.** Machinery is to arrive on-site in a clean condition and is to be maintained free of fluid leaks.
- **6.2.** Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent any deleterious substance from entering the water.
- **6.3.** Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.

7. Excavate bell holes beyond the HWM, far enough away from any watercourse to allow containment of any sediment or deleterious substances above the HWM.

- **7.1.** When dewatering bell holes, remove suspended solids by diverting water into a vegetated area or settling basin, and prevent sediment and other deleterious substances from entering the watercourse.
- **7.2.** Stabilize any waste materials removed from the work site (including bell holes) to prevent them from entering the watercourse. This could include covering spoil piles with biodegradable mats or tarps or planting them with grass or shrubs.
- **7.3.** After suitably backfilling and packing the bell holes, vegetate any disturbed areas (see Measure 11).

8. Monitor the watercourse to observe signs of malfunction during all phases of the work.

9. For the duration of the work, keep on-site and readily accessible, all material and equipment needed to contain and clean-up releases of sediment-laden water and other deleterious substances.

10. Develop a response plan that is to be implemented immediately in the event of a sediment release or spill of a deleterious substance. This plan is to include measures to: a) stop work, contain sediment-laden water and other deleterious substances and prevent their further migration into the watercourse; b) notify all applicable authorities in the area, including the closest DFO office; c) promptly clean-up and appropriately dispose of the sediment-laden water and deleterious substances; and d) ensure clean-up measures are suitably applied so as not to result in further alteration of the bed and/or banks of the watercourse.

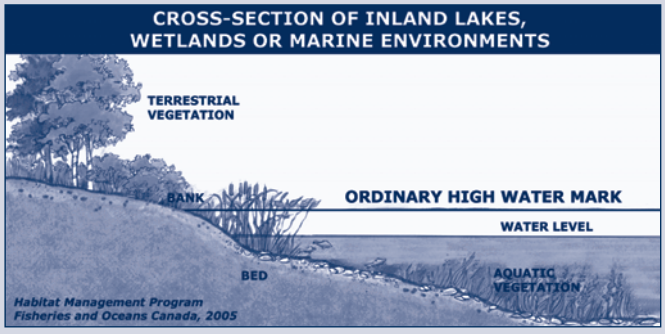
11. Vegetate any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses and cover such areas with mulch to prevent erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.

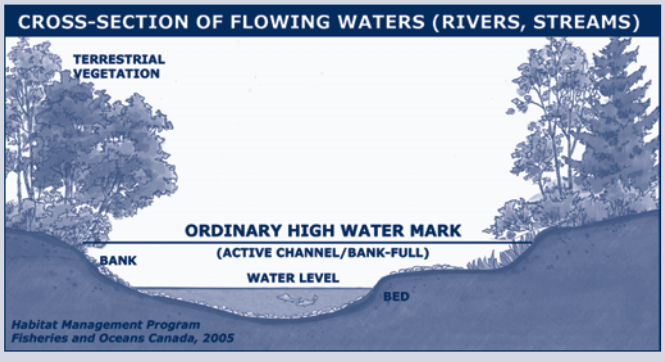
- **11.1.** Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

Definition:

Ordinary high water mark (HWM) – The usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land. In flowing waters (rivers, streams) this refers to the "active channel/bank-full level" which is often the 1:2 year flood flow return level. In inland lakes, wetlands or marine environments it refers to those parts of the water body bed and banks that are frequently flooded by water so as to leave a mark on the land and where the natural vegetation changes from predominately aquatic vegetation to terrestrial vegetation (excepting water tolerant species). For reservoirs this refers to normal high operating levels (Full Supply Level).

For the Great Lakes this refers to the 80th percentile elevation above chart datum as described in DFO's *Fish Habitat and Determining the High Water Mark on Lakes*.





FISHERIES AND OCEANS CANADA OFFICES IN ONTARIO

Southern Ontario District

Burlington
Fisheries and Oceans Canada
3027 Harvester Road, Suite 304
P.O. Box 85060
Burlington, ON L7R 4K3
Telephone: (905) 639-0188
Fax: (905) 639-3549
Email: ReferralsBurlington@DFO-MPO.GC.CA

London
Fisheries and Oceans Canada
73 Meg Drive
London, ON N6E 2V2
Telephone: (519) 668-2722
Fax: (519) 668-1772
Email: ReferralsLondon@DFO-MPO.GC.CA

Eastern Ontario District

Peterborough
Fisheries and Oceans Canada
501 Towerhill Road, Unit 102
Peterborough, ON K9H 7S3
Telephone: (705) 750-0269
Fax: (705) 750-4016
Email: ReferralsPeterborough@DFO-MPO.GC.CA

Prescott
Fisheries and Oceans Canada
401 King Street West
Prescott, ON K0E 1T0
Telephone: (613) 925-2865
Fax: (613) 925-2245
Email: ReferralsPrescott@DFO-MPO.GC.CA

Northern Ontario District

Parry Sound
Fisheries and Oceans Canada
28 Waubeek Street
Parry Sound, ON P2A 1B9
Telephone: (705) 746-2196
Fax: (705) 746-4820
Email: ReferralsParrySound@DFO-MPO.GC.CA

Sudbury and Sault Ste. Marie
Fisheries and Oceans Canada
1500 Paris Street, Unit 11
Sudbury, ON P3E 3B8
Telephone: (705) 522-2816
Fax: (705) 522-6421
Email: ReferralsSudbury@DFO-MPO.GC.CA

Thunder Bay and Kenora
Fisheries and Oceans Canada
Thunder Bay Office
100 Main Street, Suite 425
Thunder Bay, ON P7B 6R9
Telephone: (807) 346-8118
Fax: (807) 346-8545
Email: ReferralsThunderBay@DFO-MPO.GC.CA

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DFO/2007-1329

UNDERWATER CABLES

Fisheries and Oceans Canada
Ontario Operational Statement

Version 3.0

The placement of cables on the beds of freshwater lakes and rivers is a common practice used to deliver utility services (i.e., electricity and telephone) across water bodies when overhead lines are not feasible. The placement of underwater cables is more favourable than using unconfined open trench methods, which bury the cables within the substrate of the lake or river. Placing cables on the beds of freshwater lakes or rivers typically generates less sediment and avoids the need to use machinery in the water. In some instances, however, excavation may be required as cables may need to be buried near the shoreline for operational safety reasons.

Potential impacts to fish and fish habitat include disruption of sensitive fish spawning areas (e.g., gravel, cobble, and rock rubble), erosion and sedimentation caused by disturbance to the shoreline and bed of water bodies, removal of riparian (bank) vegetation and underwater rocks and logs that provide cover, shade and food, and disruption of sensitive fish life stages.

Fisheries and Oceans Canada (DFO) is responsible for protecting fish and fish habitat across Canada. Under the *Fisheries Act* no one may carry out a work or undertaking that will cause the harmful alteration, disruption or destruction (HADD) of fish habitat unless it has been authorized by DFO. By following the conditions and measures set out below you will be in compliance with subsection 35(1) of the *Fisheries Act*.

The purpose of this Operational Statement is to describe the conditions under which it is applicable to your project and the measures to incorporate into your project in order to avoid negative impacts to fish habitat. You may proceed with your underwater cable project without a DFO review when you meet the following conditions:

- if working within the Thames River, Sydenham River, Ausable River, Grand River, or Maitland River, you have contacted your Conservation Authority or local DFO Office (see Ontario DFO office list) to ensure that your project will not impact Schedule 1 mussel species at risk under the federal *Species at Risk Act*, before proceeding,
- unconfined open trench methods, including ploughing and water-jetting, to bury cable are not used,
- underwater cables are not installed on or within known fish spawning habitat,
- cable trenching is limited to near shore areas and is to be no greater in width than that required to accommodate the cable,
- any near shore excavation to bury the cable extends a maximum total of 10 metres measured horizontally from the ordinary high water mark (HWM) (see definition below), but in no case will involve more than 10% of a stream channel width (in total),
- explosives are not used to trench the cable, and
- you incorporate the *Measures to Protect Fish and Fish Habitat when Placing Underwater Cables* listed below in this Operational Statement.

If you cannot meet all of the conditions listed above and cannot incorporate all of the measures listed below then your project may result in a violation of subsection 35(1) of the *Fisheries Act* and you could be subject to enforcement action. In this case, you should contact your Conservation Authority, or the DFO office in your area (see Ontario DFO office list) or Parks Canada if the project is located within its jurisdiction, including the Trent-Severn Waterway and the Rideau Canal, if you wish to obtain an opinion on the possible options you should consider to avoid contravention of the *Fisheries Act*.

You are required to respect all municipal, provincial or federal legislation that applies to the work being carried out in relation to this Operational Statement. The activities undertaken in this Operational Statement must also comply with the *Species at Risk Act* (**www.sararegistry.gc.ca**). If you have questions regarding this Operational Statement, please contact one of the agencies listed above.

We ask that you notify DFO, preferably 10 working days before starting your work by filling out and sending the Ontario Operational Statement notification form (**www.dfo-mpo.gc.ca/regions/central/habitat/os-eo/prov-terr/index_e.htm**) to the DFO office in your area. This information is requested in order to evaluate the effectiveness of the work carried out in relation to this Operational Statement.

Measures to Protect Fish and Fish Habitat when Placing Underwater Cables

1. Use existing trails, roads, or cut lines wherever possible to avoid disturbance to the riparian vegetation.

2. While this Operational Statement does not cover the extensive clearing of riparian vegetation, the removal of select plants may be necessary to accommodate the cable. This removal should be kept to a minimum.

3. Where cables are buried within 10 metres of the HWM, time the installation to prevent disruption to sensitive fish life stages by adhering to appropriate fisheries timing windows (see the *Ontario In-Water Construction Timing Windows*).

4. Isolate any in-water trench work to contain suspended sediment and prevent it from entering the surrounding waters.

5. Install effective sediment and erosion control measures on land before starting trench work to prevent entry of sediment into the water body. Inspect them regularly during the course of construction and make all necessary repairs if any damage occurs.

6. Operate machinery on land or on water (i.e., from a barge or vessel) in a manner that minimizes disturbance to the banks or bed of the water body.

- **6.1.** Machinery is to arrive on site in a clean condition and is to be maintained free of fluid leaks.
- **6.2.** Wash, refuel and service machinery and store fuel and other materials for the machinery away from the water to prevent any deleterious substance from entering the water.
- **6.3.** Keep an emergency spill kit on site in case of fluid leaks or spills from machinery.
- **6.4.** Restore banks to original condition if any disturbance occurs.

7. Relocate any fish trapped within an isolated area to the main water body before starting any trenching.

8. During dry land trenching, stockpile the material that is moved from the bank of the water body (below the HWM) and return it to its original location once the cable is installed.

9. If any material (e.g., rock, cobble, woody material) is moved to place the cable on the bottom, it should be relocated to a similar depth within the water body in close proximity to its original location.

10. Restore the original contour, gradient and bottom of the water body, bank and shore. Allow sediment to fully settle inside any isolated area before removing sediment and erosion control measures.

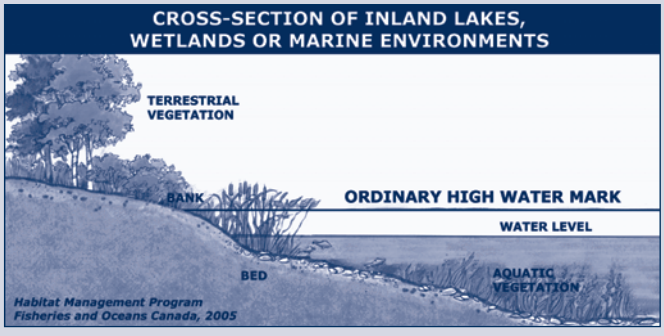
11. Vegetate any disturbed areas by planting and seeding preferably with native trees, shrubs or grasses and cover such areas with mulch to prevent erosion and to help seeds germinate. If there is insufficient time remaining in the growing season, the site should be stabilized (e.g., cover exposed areas with erosion control blankets to keep the soil in place and prevent erosion) and vegetated the following spring.

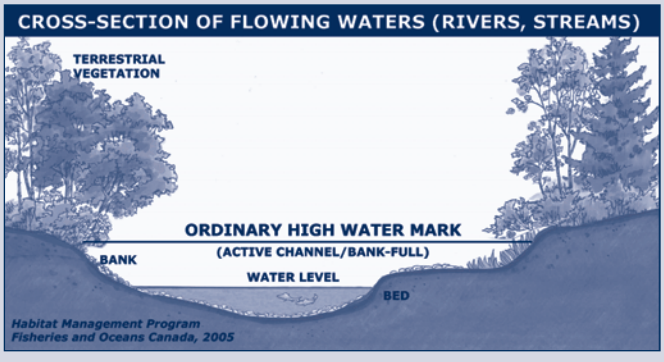
- **11.1.** Maintain effective sediment and erosion control measures until re-vegetation of disturbed areas is achieved.

Definition:

Ordinary high water mark (HWM) – The usual or average level to which a body of water rises at its highest point and remains for sufficient time so as to change the characteristics of the land. In flowing waters (rivers, streams) this refers to the "active channel/bank-full level" which is often the 1:2 year flood flow return level. In inland lakes, wetlands or marine environments it refers to those parts of the water body bed and banks that are frequently flooded by water so as to leave a mark on the land and where the natural vegetation changes from predominately aquatic vegetation to terrestrial vegetation (excepting water tolerant species). For reservoirs this refers to normal high operating levels (Full Supply Level).

For the Great Lakes this refers to the 80th percentile elevation above chart datum as described in DFO's *Fish Habitat and Determining the High Water Mark on Lakes*.





FISHERIES AND OCEANS CANADA OFFICES IN ONTARIO

Southern Ontario District

Burlington
Fisheries and Oceans Canada
3027 Harvester Road, Suite 304
P.O. Box 85060
Burlington, ON L7R 4K3
Telephone: (905) 639-0188
Fax: (905) 639-3549
Email: ReferralsBurlington@DFO-MPO.GC.CA

London
Fisheries and Oceans Canada
73 Meg Drive
London, ON N6E 2V2
Telephone: (519) 668-2722
Fax: (519) 668-1772
Email: ReferralsLondon@DFO-MPO.GC.CA

Eastern Ontario District

Peterborough
Fisheries and Oceans Canada
501 Towerhill Road, Unit 102
Peterborough, ON K9H 7S3
Telephone: (705) 750-0269
Fax: (705) 750-4016
Email: ReferralsPeterborough@DFO-MPO.GC.CA

Prescott
Fisheries and Oceans Canada
401 King Street West
Prescott, ON K0E 1T0
Telephone: (613) 925-2865
Fax: (613) 925-2245
Email: ReferralsPrescott@DFO-MPO.GC.CA

Northern Ontario District

Parry Sound
Fisheries and Oceans Canada
28 Waubeek Street
Parry Sound, ON P2A 1B9
Telephone: (705) 746-2196
Fax: (705) 746-4820
Email: ReferralsParrySound@DFO-MPO.GC.CA

Sudbury and Sault Ste. Marie
Fisheries and Oceans Canada
1500 Paris Street, Unit 11
Sudbury, ON P3E 3B8
Telephone: (705) 522-2816
Fax: (705) 522-6421
Email: ReferralsSudbury@DFO-MPO.GC.CA

Thunder Bay and Kenora
Fisheries and Oceans Canada
Thunder Bay Office
100 Main Street, Suite 425
Thunder Bay, ON P7B 6R9
Telephone: (807) 346-8118
Fax: (807) 346-8545
Email: ReferralsThunderBay@DFO-MPO.GC.CA

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http://www.dfo-mpo.gc.ca/oceans-habitat/habitat/modernizing-moderniser/epmp-pmpe/index_f.asp

DFO/2007-1329

Appendix F

Curricula Vitae

Nancy A. Harttrup B.Sc.

Fisheries Biologist / Project Manager

Nancy is a Fisheries Biologist and Project Manager with extensive experience collecting and analyzing data related to aquatic systems. Project experience includes aquatic impact assessments related to urban development, highway and pipeline construction, and aggregate extraction. Nancy has also managed environmental effects monitoring (EEM) programs for the mining and pulp and paper industries and has been involved in watershed studies, literature searches and analysis of benthic invertebrate and water quality data relative to environmental quality.

EDUCATION

B.Sc. (Honours), Co-op Biology, University of Waterloo, Waterloo, Ontario, 1986

PROJECT EXPERIENCE

Environmental Impact Assessments

Assessment of the Benthic Invertebrate Community in the Saugeen River adjacent to the Hanover Landfill Site, Town of Hanover

Assessment of Wetland Pond Health and Downstream Water Quality at Chinguacousy Landfill

Fish and Fish Habitat Surveys along Highway 66 and 624 near Larder Lake; Rehabilitation of Highway 66 and 624, Ontario (Task Manager, Fisheries Assessment Specialist)

As a part of a Detail Design study for the Rehabilitation of Highways 66 and 624 (District of Timiskaming) Nancy managed the field surveys and reporting for this project. Limited background data were available for the study area. Field data collection and reporting followed the 2006 MTO/DFO/OMNR Protocol and reporting included impact assessments for the numerous watercourses in the study area. Impact assessments were based the proposed work required at each culvert (eg. rehabilitation, replacement) which subsequently lead to the completion of appropriate forms and submissions to DFO.

Fish and Fish Habitat Survey of the Mattawishkwia River; Highway 11 Replacement of the Mattawishkwia River Bridge at Hearst, Ontario (Task Manager, Fisheries Assessment Specialist)

As a part of a Preliminary Design study for the replacement of the Mattawishkwia River bridge, Nancy managed field surveys and prepared an Impact Assessment Report for the project. The study involved the collection of background data, detailed habitat mapping and the collection of fish community data following the 2006 Protocol. Reporting included a preliminary assessment of aquatic habitat impacts based on the Preferred Plan, and mitigation measures to protect fish habitat in the river during construction.

Fish and Fish Habitat Survey of watercourses near Highway 11; Highway 11 Access Review at High Falls Road/Holiday Park Drive near Bracebridge, Ontario (Task Manager, Fisheries Assessment Specialist)

As a part of a Preliminary Design study for interchange improvements on Highway 11 at Bracebridge, Nancy is conducted field surveys and an existing conditions report for watercourses in the Study Area. The study involved the collection of background data, detailed habitat mapping and the collection of fish community data at locations potentially affected by the Preferred Plan. Data collection and reporting followed the requirements of the 2006 MTO/DFO/OMNR Fisheries Protocol Reporting included a preliminary assessment of aquatic habitat impacts, and a summary of recommended mitigation measures based on the Preferred Plan for highway access and service roads.

Fish and Fish Habitat Survey of watercourses near Highway 11; Access Review on Highway 11 from Powassan to Callander, Ontario (Task Manager, Fisheries Assessment Specialist)

As a part of a Preliminary Design study for access and interchange improvements along Highway 11 between Powassan and Callander, Nancy conducted field surveys and prepared an existing conditions report for watercourses that cross or are adjacent to the Highway 11 Study Area. The study involved the collection of background data, detailed habitat mapping and the collection of fish community data following the 2006 MTO/DFO/OMNR Fisheries Protocol. Reporting included a preliminary assessment of aquatic habitat impacts, and a summary of recommended mitigation measures based on the Preferred Plan for access improvements.

** denotes projects completed with other firms*

Nancy A. Harttrup B.Sc.

Fisheries Biologist / Project Manager

Galt Country Club - Letter of Intent for DFO Authorization, Cambridge, Ontario (Task Manager/Biologist)
The re-design of a golf course fairway at the Galt Country Club resulted in changes to fish habitat in a golf course pond located in the floodplain and connected to the Grand River. Information regarding available data on fish species in the Grand River and detailed plans regarding changes to the pond were prepared as a Letter of Intent (LOI) and submitted to DFO for authorization of the project. The LOI included details of the existing and proposed pond areas and depths, illustrating that the new pond would actually provide more potential fish habitat than before. Additional habitat enhancements were added to the plan to provide underwater structure to fish that utilized the new pond.

Fish and Fish Habitat Survey of four watercourses near Highway 11 near Allensville, Ontario - Evaluation of Highway 11 Access and Interchange Improvements, Huntsville, Ontario (Task Manager/Fisheries Assessment Specialist)
As a part of a Preliminary Design study for access and interchange improvements along Highway 11 south of Huntsville, Nancy conducted field surveys and prepared an existing conditions report for four watercourses that cross or are adjacent to the Highway 11 Study Area. The study involved the collection of background data, detailed habitat mapping and the collection of fish community data. Reporting included a preliminary assessment of aquatic habitat impacts, and a summary of recommended mitigation measures based on the Preferred Plan for access improvements.

Fish and Fish Habitat Survey of four watercourses crossing Highway 401 near Cambridge, Ontario, Evaluation of Highway 401 and 8 Access and Interchange Improvements, Kitchener and Cambridge, Ontario (Task Manager, Field Crew Leader)
As a part of a Preliminary Design study for interchange improvements along Highway 401 between the Grand River and Speed River, Nancy conducted field surveys and an existing conditions report for these watercourses and two other small watercourses that cross the Highway 401 in the Cambridge area. The final Preferred Plan only had changes proposed for the Highway 8 and 401 interchange, potentially affecting aquatic resources in the Grand River. The study involved the collection of background data, detailed habitat mapping and the collection of fish community data, however the Grand River site was not sampled as part of this project. Reporting included a preliminary assessment of aquatic habitat impacts, and a summary of recommended mitigation measures based on the Preferred Plan for highway widening.

Fish and Fish Habitat Surveys watercourses near Highway 26 at Camperdown, Camperdown, Ontario (Task Manager, Fisheries Assessment Specialist)
As a part of a Preliminary Design study for intersection improvements along Highway 26 near Camperdown, Nancy conducted field surveys and prepared an existing conditions report for three watercourses that cross Highway 26 in the vicinity of Grey Road 40 and Camperdown Road. The study involved the collection of background data, detailed habitat mapping and the collection of fish community data. Reporting included a preliminary assessment of aquatic habitat impacts, and a summary of recommended mitigation measures based on the Preferred Plan for intersection improvements.

Fish and Fish Habitat Surveys watercourses along Highway 40 near Chatham, Chatham, Ontario (Task Manager, Fisheries Assessment Specialist)
As a part of a Detail Design study for rehabilitation of Highway 40 south of Chatham, Nancy conducted field surveys and prepared an Impact Assessment Report for watercourses that cross Highway 40 between Highway 401 and the Thames River. The study involved the collection of background data, detailed habitat mapping and the collection of fish community data. Reporting included an assessment of aquatic habitat impacts, and mitigation measures to protect fish habitat in the watercourses during construction.

Summary of Habitat Survey and Bathymetry Mapping of Brant Mill Pond (Aquatic Biologist)

Wilmot Centre Trout Spawning Surveys, Hunsburger Creek near Wilmot Centre (2005 to 2008) - Wilmot Centre Well Field, Wilmot Centre, Ontario (Project Manager)

Benthic Invertebrate Community Survey in the Maitland River at Wingham, Wescast Industries Inc. (1998-present) (Project Manager)

Assessment of Impacts of Seepage from Caledon Landfill on Fisheries of the Credit River, Region of Peel (Aquatic Biologist)

** denotes projects completed with other firms*

Nancy A. Harttrup B.Sc.

Fisheries Biologist / Project Manager

Fish Community Assessment and Habitat Inventory of Strasburg Creek near Doon Village Road, Kitchener, Ontario (Project Manager)
An aquatic habitat survey was conducted in Strasburg creek, mapping physical features such as substrates, stream morphology, and instream and riparian cover. The data were required as part of the natural environment inventory for the future alignment of Doon Mills Road. Subsequent to the initial survey, fish community data were also collected in the area. During the construction phase, Nancy also participated in the fish transfer of fish from the creek to the temporary diversion channel, prior to creek realignment.

Natural Sciences & Heritage Resources
Letter of Intent for DFO Authorization, Galt Country Club, Cambridge, Ontario

Letter of Intent for DFO, Ninth Line Tributary, TACC Construction Ltd., Markham, Ontario

Long-term Monitoring and Reporting of Brown Trout Spawning Activity, Populations and Surface Water Quality in a Coldwater Stream Adjacent to an Active Gravel Pit (1993 to2003) - Dufferin Aggregates (Project Manager)

Aquatic Habitat Survey of South Wabi Creek Near Halebury, Ontario, Adjacent to Proposed Ministry of Transportation Gravel Pit (Project Manager/Aquatic Biologist)

Fish habitat study for Kempenfelt Bay, Lake Simcoe, City of Barrie (Project Manager/Aquatic Biologist)

Aquatic Resources Survey in Two Small Lakes in Georgian Bay Islands National Park (Project Manager/Aquatic Biologist)

Aquatic Habitat Mapping in Fathom Five National Marine Park (Project Manager/Aquatic Biologist)

Numerous Aquatic Habitat Impact Assessments Related to Residential Development, Pipeline Construction, Road Construction and Alterations (Aquatic Biologist)

Aquatic Ecology
Oxbow Lake Investigation at the New Hamburg Wastewater Treatment Plant, New Hamburg, Ontario (Aquatic Biologist)
Collection and review of background fisheries data for tributary of the Nith River originating in an abandoned oxbow of the Nith River. Bi-weekly collection of surface water samples along the oxbow feature to determine if the existing oxbow provides additional treatment or can be modified to augment treatment. Region of Waterloo

Mill Creek Surface Water Monitoring Program, Guelph, Ontario (Project Manager, Fisheries Biologist)
To assess potential impacts on Mill Creek (a tributary to the Grand River), a long-term Surface Water Monitoring Program (SWMP) was initiated to monitor water quality, brown trout (Salmo trutta) populations, water levels and stream temperatures over time. During the 10-years involved in this project, Nancy's duties included project management, the coordination of annual spawning surveys, population surveys as well as water quality sampling. Annual reports included the compilation of annual fisheries data and the integration of fisheries data with groundwater and surface water data into a comprehensive monitoring report.

Brant Mill Pond Fisheries Impact Assessment, Brant County, Ontario (Task Manager/Biologist)
A bridge replacement was required on a road crossing the outlet of Brand Mill Pond. The mill pond dam was structurally tied to the bridge, therefore a method was needed to reduce water pressure on the dam prior to bridge removal and replacement. Various construction scenarios were considered, including draining or partially draining the mill pond. A bathymetric survey of a mill pond was conducted to provide an indicator of the amount of available fish habitat in the pond (by depth) and the dominant substrate types in the pond. A document summarizing fish habitat conditions in the pond and possible impacts to fish habitat based on the selected construction method was submitted to GRCA for review.

Wilmot Centre Trout Spawning Surveys, Waterloo (Wilmot Centre), Ontario (Project Manager)
Annual brook trout spawning surveys have been completed in a small coldwater creek in Wilmot Centre in the vicinity of groundwater wells that provide drinking water to the supply Regional Municipality of Waterloo. The program is part of the Wilmot Centre monitoring program and looks at annual brook trout spawning activity in the creek as an indicator of the quantity and quality of suitable habitat. Brook trout depend on areas of groundwater upwelling for spawning purposes therefore the health of the fishery is related to groundwater levels in the area.

** denotes projects completed with other firms*

Nancy A. Harttrup B.Sc.

Fisheries Biologist / Project Manager

Benthic Invertebrate Community Survey in the Maitland River at Wingham, Wingham, Ontario (Project Manager)
Since 1998, Nancy has been the Project Manager for an ongoing benthic invertebrate survey in the Maitland River in Wingham, Ontario. The monitoring is an annual program that involves the collection of benthic invertebrate samples from the river as an indicator of the quality of aquatic habitat in the river adjacent to a closed landfill site. Since 1999, Nancy has been responsible for Project Management of the survey, the coordination of data collection, data analysis and reporting.

Receiver Biomonitoring in Canagagigue Creek, Elmira, Ontario (Project Manager)
Since 1998, Nancy has been the Project Manager for an ongoing Biomonitoring Program in Canagagigue Creek in Elmira, ON. The monitoring is now a biannual program that sees the collection of benthic invertebrate, sediment and fish community data in the creek. The program is a condition of the C of A for discharge of treated groundwater to the creek. Since 1999, Nancy has been responsible for Project Management of the survey, the coordination of data collection, data analysis and reporting.

Letter of Intent for DFO Authorization, Strasburg Creek at Strasburg Road Extension, Kitchener, Ontario (Task Manager/Biologist)
The extension of Strasburg Road in the City of Kitchener required a new crossing of Strasburg Creek, which provides coldwater fish habitat. Detailed mapping of the creek was prepared and areas both upstream and downstream of the proposed crossing location were surveyed, documenting any locations that were blockages to fish migration or areas of high quality habitat. Additional data collected were a fish community inventory, summer water temperatures (hourly data by instream loggers) and a fall spawning survey. All fisheries and fish habitat data were summarized and used in the Letter of Intent (LOI) submitted to DFO for authorization of the project. The LOI included mitigation and compensation measures for the loss of fish habitat that resulted from the installation of the 40m long culvert.

Letter of Intent for DFO Authorization, Tributary of Baden Creek, Baden, Ontario (Task Manager/Biologist)
A stormwater management pond outfall in a new subdivision in the town of Baden resulted in the loss of fish habitat in a small tributary of Baden Creek. Mapping of the location was prepared and a general survey of watercourse conditions was conducted for approximately 1km downstream. Together with available background data on the main channel of Baden Creek, fish habitat data were summarized and used in the Letter of Intent (LOI) submitted to DFO for authorization of the project. The LOI included mitigation and compensation measures for the loss of fish habitat that resulted from the SWM outfall.

Wastewater

Wastewater Treatment Plant Biomonitoring, Woodstock, Ontario (Senior Biologist / Project Manager)
Benthic macro-invertebrate sampling and a multi week in-situ water quality monitoring program. The program was designed to identify the potential impacts of the municipal wastewater treatment plant discharge on the biota and water quality of the Thames River.

Middle-Grand River Assimilative Capacity Assessment, Kitchener, Ontario (Aquatic Biologist)
Collection, review and summary of background data with respect to downstream users; assessment of effluent and outflow structure changes to aquatic habitat. Peer review of Grand River Surface Water Quality Monitoring Report. Region of Waterloo

Cycle 1 Environmental Effects Monitoring: project management, field studies and data analysis, Domtar Packaging, Norampac Inc., Red Rock, Ontario (Aquatic Biologist / Project Manager)

Cycle 1 Environmental Effects Monitoring: Project Management, Field Studies and Data Analysis, Domtar Packaging, Trenton, Ontario (Aquatic Biologist)

Cycle 1, 2 and 3 Environmental Effects Monitoring: Project Management, Field Studies and Data Analysis, Domtar Fine Papers, Cornwall, Ontario (Aquatic Biologist)

Cycle 2 and 3 Environmental Effects Monitoring: Project Management and Data Analysis, Provincial Papers Inc., Cascades Fine Papers Group, Thunder Bay, Ontario (Project Manager)

** denotes projects completed with other firms*

Katie Easterling Hon. B.Sc., Dipl., CEPIT

Biologist

Katie Easterling is an Aquatic Ecologist with over 6 years of field experience in both the aquatic and terrestrial disciplines. Katie's experience includes fish habitat assessments, fish community sampling, fish salvages, REA water and water body assessments, trout spawning surveys, walleye spawning surveys, bass spawning surveys and baseline aquatic surveys for various pipeline, rail line, transportation, renewable energy and municipal projects. She also has experience conducting preliminary or baseline terrestrial habitat assessments and Species at Risk surveys. Katie's reporting skills include aquatic existing conditions reports, aquatic impact assessment reports, REA water assessment and water body reports, terrestrial existing conditions reports, Environmental Screening/Review Reports, Natural Heritage Evaluations (NHE) and Environmental Impact Statements (EIS). Katie has also consulted with First Nations, municipal, provincial and federal government agencies.

Katie is proficient in a variety of fish sampling techniques, including Fall Walleye Index Netting (FWIN), Near Shore Community Index Netting (NSCIN), fyke netting, seine netting, gill netting and boat and backpack electrofishing. She holds a certificate in radio telemetry and is certified in Ecological Land Classification (ELC). Her educational background focused on terrestrial, wildlife and aquatic biology, and includes a degree in Zoology and a Fish and Wildlife diploma. Prior to joining Stantec, Katie worked as an Ecological Research Assistant with Parks Canada, a Conservation Interpreter with the Long Point Region Conservation Authority and has worked as a Research Assistant and a Biologist.

EDUCATION

Hon. B.Sc., University of Toronto / Major Zoology, Minor Biology, Toronto, Ontario, 2003

Diploma, Sir Sandford Fleming College / Fish and Wildlife Technician, Lindsay, Ontario, 2007

Stantec Consulting Ltd. / Class II Electrofishing Crew Leader Certification Course, Guelph, Ontario, 2012

Certificate, ROM / Fish Identification Course, Toronto, Ontario, 2011

Ministry of Natural Resources / MTO/DFO/MNR Fisheries Protocol Training Session for Fisheries Specialists, Toronto, Ontario, 2011

MNR / Renewable Energy Natural Heritage Assessment Training, Toronto, Ontario, 2011

Chrisolas Management Services / Certified Traffic Control Technician, Kitchener, Ontario, 2010

Birchdale Ecological, Ltd., Bats R Us Canada Div. / Bat Acoustic Analysis Course, Calgary, Alberta, 2008

Ministry of Natural Resources / Wetland Classification Certificate, Elgin, Ontario, 2006

Ministry of Natural Resources / Ecological Land Classification Certification, Elgin, Ontario, 2006

Sir Sandford Fleming College / Radio Telemetry Certificate, Lindsay, Ontario, 2006

Sir Sandford Fleming College / Pleasure Craft Operators Course, Linsday, Ontario, 2006

CN Rail / Contractor Orientation Online Course, Kitchener, Ontario, 2012

REGISTRATIONS

Canadian Environmental Practitioner-In-Training, Canadian Environmental Certification Approvals Board

MEMBERSHIPS

Member, American Fisheries Society

** denotes projects completed with other firms*

Katie Easterling Hon. B.Sc., Dipl., CEPIT

Biologist

PROJECT EXPERIENCE

Municipal

Habitat Assessment, Regional Municipalities of Durham and York, Ontario (Terrestrial Project Biologist)
Multiple sites around the regions were assessed for wildlife usage, fisheries and ideal browse, nesting and cover habitat Recommendations for a preferred site were given based on a combination of these factors and how the potential loss of habitat through development would affect the local wildlife

Fish Sampling, Regional Municipality of Durham, Ontario (Aquatic Ecologist)
Various stations along Tooley Creek in Durham Region were electrofished to obtain composite samples of whole fish that were identified, weighed, measured and bagged for a metals analysis as part of a human health risk report for the proposed Durham-York Residual Waste Study

Baseline Aquatic Survey, Regional Municipality of York, Ontario (Aquatic Ecologist)
A baseline terrestrial and aquatic survey was conducted as a project component of an Environmental Assessment for the Fairy Lake Garden Pond Maintenance Project in the Town of Newmarket. Tasks included a visual assessment of water depth, aquatic vegetation, available cover, substrate and the presence of barriers to fish movement upstream or downstream of Garden Pond, which were used to assess the feature's function as fish habitat, both within the pond and the pond's function within the Fairy Lake/East Holland River watershed

Aquatic Habitat Surveys, Town of Ajax, Ontario (Aquatic Ecologist)
The Town of Ajax is committed to improving water quality along its Lake Ontario waterfront and in Duffins Creek and Duffins Marsh. As part of this, preliminary fieldwork was conducted to assess the existing conditions at each of the stormwater outfalls, including terrestrial and aquatic habitat. The assessment consisted of a visual assessment of water depth, aquatic and terrestrial vegetation, available cover, substrate and the presence of barriers to fish movement upstream or downstream

Trout Spawning Surveys for Municipal Road Expansion, Ontario (Aquatic Ecologist)
Conducted multiple trout spawning surveys along two coldwater creeks in the eastern region of the GTA for two municipal road expansion projects. Fieldwork involved surveying the creeks 50 m upstream and 100 m downstream to determine if Rainbow Trout were staging or spawning in the creek and within the vicinity of the bridge

Arkell Well Field Adaptive Management Plan, City of Guelph, Ontario (Aquatic Ecologist)
As part of a yearly monitoring program, fish habitat was assessed using the OSAP protocol at four monitoring stations outside the city of Guelph

Natural Sciences & Heritage Resources

Forest and Wetland Classification, Parks Canada*, Ontario (Ecological Research Assistant)
Performed rapid assessments of 400 m forest plots and 100 m wetland plots to evaluate and classify sites along the Trent-Severn Waterway from Rice Lake to Canal Lake. Classification was based on biological features such as flora and fauna present and physiological features such as soil and drainage. Data collected was used to create a mapping inventory of the Trent-Severn system for Parks Canada and the Ministry of Natural Resources

Soil Sampling Survey, Brampton Brick, Brampton, Ontario (Terrestrial Project Biologist)
Collected soil samples to assess the impact of emissions on the surrounding terrestrial environment as part of the phytotoxicology assessment of the Brampton Brick facility

Ecological Receptors of Concern Surveys, Various Clients, Ontario (Terrestrial Project Biologist)
Conducted biological surveys of flora and fauna on potentially contaminated sites to assess the current site conditions

Category B Class EA, Ontario Realty Corporation, Various Locations, Ontario (Terrestrial Project Biologist)
Conducted the background research and evaluation of existing natural heritage baseline conditions for multiple ORC properties situated across Ontario

** denotes projects completed with other firms*

Katie Easterling Hon. B.Sc., Dipl., CEPIT

Biologist

Preliminary Aquatic and Terrestrial Assessment, Canada Post, Various Locations, Ontario (Terrestrial Project Biologist)

Preliminary aquatic and terrestrial assessments of various sites in Southern Ontario were conducted to establish the existing baseline conditions. Surveys involved recording bird species observed, vegetation cover species found on the site and assessing potential impacts on nearby Valued Ecosystem Components (VECs) and any aquatic systems

Fish Community Survey*, Ontario (Fisheries Field Biologist)

FWIN, NSCIN, gill netting and Seine netting techniques were used to perform a fish surveys on a lake and rivers in the Kawartha Lakes system. Processing of the sampled fish included weighing, measuring, sexing, determining gonadal condition, removing aging structures and aging

Benthic Invertebrate and Water Quality Sampling, Fox Meadows Estates, Ontario (Aquatic Ecologist)

Benthic invertebrate sampling was conducted following the OBBN protocol and water quality samples were collected and submitted for testing. Results from the sampling effort were summarized and compared to previous years in an effort to gage and mitigate potential impacts from a residential development expansion

Box Grove, DFO Authorization for Works Affecting Fish and Fish Habitat No. BU-04-3082, Ontario (Aquatic Ecologist)

This survey was conducted to satisfy conditions included in the Department of Fisheries and Oceans (DFO) Authorization for Works Affecting Fish and Fish Habitat (DFO Authorization No. BU-04-3082). Condition 4.2 of the Authorization is to enhance fish passage through the creation of a low flow channel following the removal of a 30 m long culvert. The culvert removal and new channel construction were completed in spring 2010. This survey was conducted as part of the post construction monitoring program required by the DFO Authorization

Piles Development (Keswick) Corporation, DFO Authorization PE 07-0957, Ontario (Aquatic Ecologist)

An evaluation of fish habitat, fish passage and the fish community was conducted within the channel realignment to confirm the compensation measures and structures are functioning as designed and are providing fish habitat. Fish community sampling was conducted using a backpack electrofisher

Lake Gibson Angler Survey, Ontario Power Generation, Thorold, Ontario (Aquatic Ecologist)

Lake Gibson is a hydro-electric reservoir owned and operated by Ontario Power Generation (OPG). As detailed in the OPG Risk Management Plan, OPG is required to monitor the persistence of sediment contamination and its expression in the environment within Lake Gibson. The program was designed to identify, quantify and compare the levels of contamination over time and the impact on sediments, water, benthic invertebrates, and fish in the system. Katie was involved as a field biologist interviewing anglers at Lake Gibson to assess the effectiveness of OPG's communication with the public regarding the contamination of Lake Gibson sediment and fishes

Phase 3 Environmental Effects Monitoring (EEM): Periodic Monitoring, Kirkland Lake, Ontario (Aquatic Ecologist)

The EEM program began in 2010 (continuing through 2012) and involved the collection of water, sediment, fish and benthos to assess possible environmental effects caused by the mine and followed federal Metal Mining Effluent Regulation (MMER) guidelines. Fyke nets and a boat electrofisher were used to capture target small-bodied species. Fish dissection, gender determination, weighing of livers and gonads, and collection of eggs were performed

Oil and Gas Pipelines

Nesting Bird Surveys, TransCanada Pipelines Limited*, Ontario (Terrestrial Project Biologist)

Nesting bird surveys were performed at various remote locations throughout Northern Ontario, which included finding and identifying any active and inactive nests within and surrounding the proposed work area along a pipeline right-of-way

** denotes projects completed with other firms*

Katie Easterling Hon. B.Sc., Dipl., CEPIT

Biologist

Terrestrial Assessment, Enbridge Pipelines Inc., Ontario (Terrestrial Project Biologist)
Preliminary aquatic and terrestrial assessments of various dig sites along a pipeline in Southern Ontario were conducted to establish the existing baseline conditions. Surveys involved recording bird species observed, vegetation cover species found at the dig site and assessing any aquatic habitat found on-site

Herptile Rescue, Enbridge Pipelines Inc., Ontario (Terrestrial Project Biologist)
As part of a large pipeline maintenance project situated within a beaver pond located near the Ganaoque River, a herptile rescue was performed to remove any snakes, turtles and frogs from the trench-box once in-filling was started. All species found within or immediately adjacent to the trench-box were removed and relocated within the beaver pond but outside of the work zone

Species at Risk Survey, TransCanada Pipelines Limited, Ontario (Terrestrial Project Biologist)
Species at Risk surveys were conducted at four work areas along a pipeline right-of-way between Belleville and Brockville, Ontario. Surveys included looking for and assessing possible habitat conditions for Butternut, Henslow's Sparrow, Grey Fox, Blanding's Turtle, Eastern Milksnake and Eastern Ratsnake

Ecological Land Classification, TransCanada Pipelines Limited, Ontario (Terrestrial Project Biologist)
Ecological Land Classification (ELC) surveys were conducted along the proposed pipeline expansion route, which documented the vegetation communities present

Baseline Aquatic Habitat Survey, TransCanada Pipelines Limited, Ontario (Aquatic Ecologist)
As part of an Environmental Assessment for the proposed Thorold Sales Meter Station to connect the TransCanada Mainline to the Enbridge Gas Distribution pipeline, baseline aquatic conditions were assessed as part of the report

Fish Salvage and Construction Monitoring, Enbridge Pipelines, Ontario (Aquatic Ecologist)
In-water construction work was monitored and fish salvages were conducted at various watercourses across Ontario as part of a pipeline maintenance or repair project. The fish collected were identified, measured and released downstream of the in-water work area

Baseline Aquatic Survey, Enbridge Gas Distribution Inc., Ontario (Aquatic Ecologist)
As part of the Pipeline to Serve York Energy Centre LP Environmental Assessment, aquatic baseline conditions at all watercourse crossings were summarized as part of the preliminary assessment of reasonable routing opportunities for the proposed pipeline

Detailed Fish Habitat Assessment and Reporting, TransCanada Pipelines Limited, Ontario (Aquatic Ecologist)
As part of a pipeline expansion project, a detailed fish habitat survey was conducted following MTO protocols at ten watercourse crossings. Methodology included detailed habitat mapping 50 m upstream and 100 m downstream. Fish habitat conditions were summarized and watercourse sensitivity determined according to the DFO matrix in the Fish and Fish Habitat Assessment Report as part of a CEAA Environmental Assessment

Detailed Fish Habitat Assessment and Reporting, NOVA Chemicals (Canada) Ltd., Ontario (Aquatic Ecologist)
Fish habitat was assessed at nine proposed crossings for a pipeline route and existing conditions were summarized as part of an EA

Railroads

Nesting Bird Surveys, Canadian National Railway, Ontario (Terrestrial Project Biologist)
Nesting bird surveys were performed along various stretches of the client's right-of-way to find and identify any active or inactive nests within the proposed work area

Fish Habitat Surveys and Reporting, Canadian Pacific Railway, Ontario (Aquatic Ecologist)
As part of a CEAA Environmental Screening Report, a fish habitat and aquatic baseline survey was conducted along a proposed rail siding within a wetland. The assessment consisted of a visual assessment of water depth, aquatic vegetation, available cover, substrate and the presence of barriers to fish movement within the area of the proposed siding

** denotes projects completed with other firms*

Katie Easterling Hon. B.Sc., Dipl., CEPIT

Biologist

Detailed Fish Community and Habitat Surveys and Reporting, Canadian National Railway, Ontario (Aquatic Ecologist)

As part of a railway expansion project, detailed fish community and habitat surveys were conducted following MTO protocols at over 20 watercourse crossings. Methodology included detailed habitat mapping 50 m upstream and 100 m downstream, electrofishing to determine fish community present in the stream and water chemistry sampling. Fish community and habitat conditions were summarized and watercourse sensitivity determined according to the DFO matrix in the Fish and Fish Habitat Assessment Report as part of a CEAA Environmental Screening

Fish Salvage and Construction Monitoring, Canadian National Railway, Ontario (Aquatic Ecologist)

As part of a railway expansion project, in-water construction work was monitored and multiple fish salvages were performed at various bridge and culvert construction locations

Post-Construction Fish Community and Fish Habitat Assessment, Canadian National Railway, Ontario (Aquatic Ecologist)

As part of a railway expansion project, detailed post-construction fish community and habitat surveys were conducted following MTO protocols at approximately 20 watercourse crossings. Methodology included detailed habitat mapping 50 m upstream and 100 m downstream, electrofishing to determine fish community present in the stream and water chemistry sampling. The sites were assessed to confirm that potentially adverse effects on fish and fish habitat were effectively managed through mitigation measured proposed in the Environmental Screening Reports and approved in the Letters of Advice issued by DFO

Renewable Energy

Winter Bird Surveys, Ontario (Terrestrial Project Biologist)

As a requirement of O.Reg.116, avian monitoring surveys were conducted to characterize the bird community of two sites in Southern Ontario during the over-wintering period

Post-Construction Bird and Bat Mortality Monitoring, Ontario (Terrestrial Project Biologist)

Conducted post-construction bird and bat mortality monitoring, scavenger impact trials and searcher efficiency trials at the Ripley and Enbridge Ontario Wind Farms near Kincardine, Ontario as a requirement under O.Reg. 116

Pre-Construction Bat Monitoring Surveys, Ontario (Terrestrial Project Biologist)

Under O.Reg. 116 AnaBat detectors were installed on MET towers and design/constructed/installed multiple ground AnaBat detector units at various wind farms in Southern Ontario. Monitored pre-construction bat activity and identified species using spectrogram analysis to report on the activity level surrounding the proposed wind farms

Fish Habitat Assessment, Ontario (Aquatic Ecologist)

As part of a wind farm Environmental Assessment under O.Reg. 116, a fish habitat assessment was conducted to determine the baseline conditions and watercourse sensitivity according to the DFO matrix at each of the proposed watercourse crossings

Amherst Island REA Water Body Assessment, Ontario (Aquatic Ecologist)

Conducted the REA water assessment and prepared the water body report for a renewable energy project on Amherst Island, which involved identifying and delineating water bodies and conducting fish community and fish habitat assessment at 39 locations across the Island

Napier Wind Project REA Water Body Assessment, Ontario (Aquatic Ecologist)

Conducted the REA water assessment and prepared the water body report for a renewable energy project, which involved fish habitat assessments at three locations across the Study Area

Adelaide REA Water Body Assessment, Ontario (Aquatic Ecologist)

Conducted the REA water assessment and prepared the water body report for a renewable energy project near Strathroy, which involved identifying and delineating water bodies and conducting fish community and fish habitat assessment at 41 locations

** denotes projects completed with other firms*

Katie Easterling Hon. B.Sc., Dipl., CEPIT

Biologist

Cedar Point REA Water Body Assessment, Ontario (Aquatic Ecologist)
Conducted the REA water assessment and prepared the water body report for a renewable energy project near Forest, which involved identifying and delineating water bodies and conducting fish community and fish habitat assessment at over 100 locations

Hydroelectric Facilities, Lock 24 and 25 Dams on the Trent-Severn Waterway, Ontario (Aquatic Ecologist)
Conducted Walleye spawning surveys, benthic invertebrate sampling, small-bodied fish community sampling and Centrarchid spawning surveys at Locks 24 and 25 to establish baseline conditions within the proposed work area

Niagara Region Wind Corporation, Ontario (Aquatic Ecologist)
Conducted the REA water assessment for a renewable energy project near Welland, Ontario, which involved identifying and delineating water bodies at over 30 locations

Bow Lake Wind Project, Ontario (Aquatic Ecologist)
Conducted the REA water assessment for a renewable energy project near Sault Ste. Marie, Ontario, which involved identifying and delineating water bodies at over 20 locations

Roads and Highways

Hwy 6 Fish Salvage, MTO Southwest Region, Ontario (Aquatic Ecologist)
Conducted a fish salvage as part of an MTO highway widening project located along Hwy 6 near Varney, Ontario. Fish collected were identified, measured and released downstream of the in-water work area

Detail Design, Highway 3, 6 and 24 Fish Community and Fish Habitat Assessment at Various Locations, MTO Southwest Region, Ontario (Aquatic Ecologist)
Conducted a detailed spring, summer and fall fish community and fish habitat assessment of 20 watercourse crossings for the rehabilitation/resurfacing of Highways 3, 6 and 24 surrounding the communities of Simcoe, Delhi and Port Dover (namely, GWP 3115-09-00, GWP 3048-03-00 and GWP 362 98 00). Reporting tasks included the Aquatic Existing Conditions Report and Impact Assessment Report for each highway

Route Planning, Hwy 17 Sudbury to Markstay (GWP 5031-09-00), MTO Northeast Region, Ontario (Aquatic Ecologist)
Prepared the Aquatic Existing Conditions Report as part of the preliminary route planning study for Highway 17 between Sudbury and Markstay

Route Planning, Highway 144 Bypass around Chelmsford (GWP 5023-03-00), MTO Northeast Region, Ontario (Aquatic Ecologist)
Conducted fish habitat and fish community assessments at 63 locations in the area surrounding Hwy 144 near Chelmsford, Ontario. This involved using a backpack electrofisher or minnow traps (where applicable) to determine fish species and habitat present in order to assess the community structure and supplement watercourse sensitivity information provided by the MNR. Reporting tasks included the Aquatic Existing Conditions Report

Detail Design, Highway 7 Structural Culvert Replacement/Rehabilitation at Various Locations, MTO Eastern Region, Ontario (Aquatic Ecologist)
Conducted fish habitat and fish community assessments at 2 locations in the area surrounding Hwy 7 outside Lindsay Ontario (namely, WP 4007-08-01/02 Mariposa Creek Structural Culvert Rehabilitation, Site 32-124BC and Mariposa Brook Structural Culvert Replacement, Site 32-161C). This involved using a backpack electrofisher or minnow traps (where applicable) to determine fish species and habitat present in order to assess the community structure and supplement watercourse sensitivity information provided by the MNR. Reporting tasks included the Aquatic Existing Conditions Report

Detail Design, Highway 35 Structural Culvert Replacement/Rehabilitation at Various Sites, MTO Eastern Region, Ontario (Aquatic Ecologist)
Conducted fish habitat and fish community assessments at 3 locations in the area surrounding Hwy 35 outside Lindsay, Ontario (namely, WP 4166-09-01 Corben Creek Structural Culvert Replacement, Site 32-165C, WP 4165-09-01 Martin Creek Structural Culvert Rehabilitation, Site 32-063BC and WP 4075-09-01 South McLaren Creek Structural Culvert Rehabilitation, Site 32-072BC). This involved using a backpack electrofisher or minnow traps (where applicable) to determine fish species and habitat present in order to assess the community structure and supplement watercourse sensitivity information provided by the MNR. Reporting tasks included the Aquatic Existing Conditions Report

** denotes projects completed with other firms*

Katie Easterling Hon. B.Sc., Dipl., CEPIT

Biologist

Detail Design, Highway 35, WP 102-99-01 Trent Canal Bridge Rehabilitation, Site 32-065 (Rosedale), MTO Eastern Region, Ontario (Aquatic Ecologist)

Prepared the Aquatic Existing Conditions Report as part of the Detailed Design process for the Highway 35 site at the Trent Severn Waterway Bridge Rehabilitation

Detail Design, Highway 6 & 10, GWP 3098-09-00 Rehabilitation, MTO Southwest Region, Ontario (Aquatic Ecologist)

Conducted fish habitat and fish community assessments at 11 locations in the along Highway 6/10 between Chatsworth and Owen Sound, Ontario. This involved using a backpack electrofisher or minnow traps (where applicable) to determine fish species and habitat present in order to assess the community structure and supplement watercourse sensitivity information provided by the MNR. Reporting tasks included the Aquatic Existing Conditions Report

** denotes projects completed with other firms*

Ryan D. Park B.Sc.

Aquatic Ecologist

Ryan has ten years of environmental consulting experience as an aquatic ecologist. He has worked for a variety of industry sectors including mining, aggregates, pulp and paper, hydro-electric, energy and development. Ryan has also worked with all levels of government (municipal, provincial and federal). His specific areas of expertise include Environmental Impact Studies (EIS), Environmental Effects Monitoring (EEM), fish and fish habitat, as well as during- and post-construction monitoring and *Fisheries Act* authorizations. He has designed and completed many monitoring programs across Canada. Several of the programs occurred in remote areas with sampling sites accessible only by helicopter. Ryan is an experienced field crew leader and has developed and completed several multi-year surface water, aquatic macro-invertebrate and fisheries monitoring programs. Ryan has completed the Royal Ontario Museum's *Identification of Ontario Fishes* workshop, and has gained several years of experience with the capture, handling and identification of freshwater fish. Ryan is knowledgeable in the *Fisheries Act* authorization process.

EDUCATION

B.Sc. (Honors), University of Guelph / Ecology, Guelph, Ontario, 2001

Class 1 Electrofishing Certificate / Ministry of Natural Resources, Waterloo, Ontario, 2010

Ontario Freshwater Mussel Identification Workshop / Fisheries and Oceans Canada – Canada Centre for Inland Waters, Burlington, Ontario, 2007

Certificate, MTO, DFO, OMNR / Fisheries Specialist Protocol Training Course, Downsview, Ontario, 2006

Certificate, Ontario Fish Identification Workshop, Toronto, Ontario, 2003

PROJECT EXPERIENCE

Aggregate Services

Proposed Acton Quarry Extension, Dufferin Aggregates, Acton, Ontario (Aquatic Ecologist)

Beginning in 2003, Ryan participated in design and delivery of a multi-year natural environment existing conditions program and report. The natural environment existing conditions report was included as a part of the ARA application for the proposed Acton Quarry expansion. The program included establishing appropriate sampling stations for baseline monitoring of fish, benthos, water, thermal conditions and discharge.

Proposed Flamborough Quarry, Hamilton, Ontario (Aquatic Ecologist)

From 2004 to 2007 Ryan assisted with a multi-year existing condition program for the proposed Flambourgh quarry. The program involved water quality monitoring, benthic macro-invertebrate collections, fisheries surveys, fish habitat assessments and surface water monitoring. Ryan was pivotal in the selection and establishment of appropriate benthic macro invertebrate, water quality and surface water monitoring stations. He also onducted onsite monitoring during MOE pump tests to ensure sediment and erosion controls were properly secured to monitor for potential surface water drawdown impacts.

Proposed Burlington Quarry Expansion, Nelson Aggregates, Burlington, Ontario (Aquatic Ecologist)

From 2003 to 2006 Ryan participated in design and delivery of a multi-year natural environment existing conditions program and report. The report was included as a part of the ARA application for the proposed Burlington Quarry expansion. The program involved establishing appropriate sampling stations for baseline monitoring of fish, benthos, water, thermal conditions and discharge.

Natural Sciences & Heritage Resources

Mike's Auto Environmental Impact Study, Hamilton, Ontario (Project Manager)

Coordinated and conducted environmental impact study, with oversight of permits and approvals relating to natural channel design, construction, and enhancements, as well as landscape planting plans for an existing auto recycling facility. Work is being done in support of onsite facility expansion.

** denotes projects completed with other firms*

Ryan D. Park B.Sc.

Aquatic Ecologist

Mine and Mill Installations Inc. Environmental Impact Study, Hydrogeological Study and Stormwater Management Plan, Hamilton, Ontario (Project Manager)
Development and completion of Environmental Impact Study and management of hydrogeological monitoring and stormwater management plans, in support of a land use zoning change application.

Fisheries Management

Sewer Forcemain Crossing of the Credit River, Glen Williams, Ontario (Aquatic Ecologist)
Ryan was successful in obtaining DFO authorization for a secondary crossing method of a forcemain sewer line under the Credit River. The project involved information collection/collation and reporting for environmental approvals.

Canagagigue Creek Biomonitoring, Elmira, Ontario (Fisheries Biologist/Field Crew Leader)
From 2002 until present Ryan has conducted and overseen the completion of several of the bi-annual sampling events in Canagagigue Creek as part of a surface water bio-monitoring program. The program involves fish community surveys, spawning surveys and benthic macro-invertebrate sampling. Ryan has been responsible for all aspects of the field program including the identification of fish species captured during the sampling events.

Wateree River Fisheries Study, Lugoff, South Carolina (Fisheries Biologist/Field Crew Leader)
Ryan oversaw and performed a 6 week fisheries study on the Wateree River in South Carolina as part of a hydro electric facility re-licensing. The fisheries study was designed to identify the densities, diversity and distribution of fish species with an emphasis on anadromous American shad and striped bass. The data collected during the program was used to determine appropriate sampling techniques and efforts needed to complete future monitoring programs related to the operation of the hydro-electric facility. Ryan was responsible for all aspects of the field program, data collection, fish identification, analysis, reporting and quality control.

Mining

Environmental Effects Monitoring (EEM) Program: Focused Monitoring Phase, Hudson Bay Mining and Smelting, 2009, Flin Flon, Manitoba (Aquatic Ecologist / Field Crew Leader)
Ryan assisted with the development of the study designs for four focused monitoring programs. These programs differed from the initial and periodic monitoring programs in their expanded scope and intent. The programs were designed to identify the geographic extent and magnitude of effects on the receiving environment. Sampling occurred within 11 different water bodies and included the collection of water, sediment, fish, benthos and live macro-invertebrates for metal analysis.

Kirkland Lake Gold Environmental Effects Monitoring (EEM), 2009, Kirkland Lake, Ontario (Data Management)
Ryan provided Quality Assurance and Quality Control for the data collected during the Kirkland Lake Gold EEM program. Additionally Ryan completed the electronic submission of data to the Environment Canada National Environmental Effects Monitoring Database.

Les Mines Selbaie Post-remediation Biological Monitoring, BHP Billiton, 2007, Quebec (Aquatic Ecologist)
The 2007 monitoring program at the closed Les Mines Selbaie was designed monitor the changes in magnitude and extent of contamination in two watersheds. Ryan completed benthological and fisheries community surveys and collected water and sediment samples for metals analysis. The Les Mines Selbaie was located in the remote James Bay Lowlands of northern Quebec. Due to limited access and difficult terrain, sampling was completed exclusively by helicopter and small watercraft access.

** denotes projects completed with other firms*

Ryan D. Park B.Sc.

Aquatic Ecologist

Environmental Effects Monitoring (EEM) Program: Periodic Monitoring Phase, Hudson Bay Mining and Smelting, 2007, Flin Flon, Manitoba (Aquatic Ecologist)

With his involvement in the initial monitoring phase, Ryan played a key role in the development of the study designs for the four periodic monitoring programs. The four programs were designed to monitor and confirm potential environmental effects associated with five mining related discharges. The programs included the collection of water, sediment, fish and benthos at various exposure and reference sites. Ryan played an integral role in report production for the four EEM programs. Ryan was the lead for data management and electronic submissions of data from the four programs to the Environment Canada National Environmental Effect Monitoring Database.

Les Mines Selbaie Post-remediation Biological Monitoring, BHP Billiton, 2004, Quebec (Aquatic Ecologist)

The 2004 monitoring program was designed to determine the magnitude and extent of contamination in two watersheds. Ryan completed benthological and fisheries community surveys and sample water and sediment for metals contamination. The site was located in the remote James Bay Lowlands of northern Quebec. Due to limited access and difficult terrain, sampling was completed exclusively by helicopter and small water craft access.

Environmental Effects Monitoring (EEM) Program: Initial Phase, Hudson Bay Mining and Smelting, 2004, Flin Flon, Ontario (Field Crew Leader)

Ryan assisted with the study design and was the field crew leader for the first Environmental Effects Monitoring (EEM) Program for Hudson Bay Mining and Smelting. The project included five separate studies to monitor potential environmental effects associated with six mining related discharges. These studies involved the collection of water, sediment, fish and benthos to assess possible environmental effects. The programs were designed to follow federal Metal Mining Effluent Regulation (MMER) guidelines. Ryan played an integral role in the completion of the field programs with efficiency and accuracy, while maintaining high levels of quality control. In addition to the field program Ryan was the lead for the data management and electronic submission of data from the five programs to the Environment Canada National Environmental Effect Monitoring Database.

Transportation Planning

Bridge Street Bridge Restoration, Waterloo, Ontario (Aquatic Ecologist)

Ryan was participated with the Species at Risk relocation program that was required to permit the construction of a temporary crossing of the Grand River. The program involved the systematic screening, collection, labeling and relocating of fresh water mussels at risk (Wavy-rayed Lampmussel and Rainbow Mussel).

Road Crossings of 14 Mile Creek, Environmental Impact Statement, Oakville, Ontario (Aquatic Ecologist)

Preparation of an EIS and fish habitat impact assessment for internal subdivision road crossing of 14 Mile Creek. Involved in the preparation and completion of the during and post construction monitoring programs to ensure compliance with the Fisheries Act and protection of a Species at Risk (Redside Dace).

Natural Sciences Reports Related to Highway Improvement Works, Various Sites, Ontario (Aquatic Ecologist)

Collected fisheries and aquatic habitat data for the following MTO studies:
Future Highway 11/17 (North Bay)
Highway 11/17 (Thunder Bay)
Highway 17 (Sudbury)
Highway 21 (Bayfield)
Highway 21 (Grand Bend)
Highway 24 Interchange Improvements (Cambridge)
Highway 26 (Meaford)
Highway 26 (Woodford)
Highway 401 (Woodstock)

Wastewater

Middle - Grand River WWTP Assimilative Capacity Study, Kitchener, Ontario (Aquatic Ecologist / Crew Leader)

Ryan planned and implemented a field program to map aquatic vegetation and provide estimates of macrophyte biomass, used in the GRCA's GRSM Model in support of the ACS for the Kitchener plant. Ryan also conducted routine surface water sampling on the Grand River as part of this project.

** denotes projects completed with other firms*

Ryan D. Park B.Sc.

Aquatic Ecologist

Wastewater Treatment Plant Monitoring, Woodstock, Ontario (Aquatic Ecologist/Field Crew Leader)
Ryan was the field crew leader for this monitoring program which included benthic macro-invertebrate sampling and a multi week in-situ water quality monitoring program. He was the primary field technician on the project with the responsibility of selecting sampling locations as well as the installation and maintenance of water quality meters. The program was designed to identify the potential impacts of the municipal wastewater treatment plant discharge on the biota and water quality in the Thames River.

Proposed Sewage Treatment Expansion, Port Rowan, Ontario (Lead Field Technician)
Ryan was the primary field technician for this project, which included benthic macro-invertebrate sampling, in situ water quality measurement, fish community surveys, fish habitat assessments and the collection of water for analytical testing. The program was designed to identify the potential impacts a proposed sewage lagoon expansion.

Water Resources Management

Lake Gibson Angler Survey, Ontario Power Generation, Thorold, Ontario (Aquatic Ecologist / Project Manager)
Ryan planned and implemented the 2011 Lake Gibson Angler Survey. The survey was conducted for Ontario Power Generation (OPG) to assess the effectiveness of OPG's communication with the public regarding the contamination of Lake Gibson sediment and fishes.

Lake Gibson Contaminant Monitoring Study, Ontario Power Generation, Thorold, Ontario (Aquatic Ecologist / Project Manager)
Lake Gibson is a hydro-electric reservoir owned and operated by Ontario Power Generation (OPG). As detailed in the OPG Risk Management Plan, OPG is required to monitor the persistence of sediment contamination and its expression in the environment within Lake Gibson. The program was designed to identify, quantify and compare the levels of contamination over time and the impact on sediments, water, benthic invertebrates, and fish in the system. Ryan was involved in all aspects of the project including project management, reporting, analysis and field components.

Manheim Weir Sediment Inspection, Region of Waterloo, Kitchener, Ontario (Aquatic Ecologist / Crew Leader)
The Manheim Weir is a low head water intake structure on the Grand River for which excessive sedimentation behind the structure may pose a potential hazard. Stantec was contracted by the Region of Waterloo to investigate the size and scale of sedimentation and the risk it may or not have on the weir/intake structure. Ryan designed, supervised and completed the field investigation which included a comprehensive sediment depth survey with the collection of sediment at select locations for analysis.

Hidden Valley Intake Protection Zone Study, Kitchener, Ontario (Field Crew Leader)
Ryan was the field crew leader for the Hidden Valley Intake Protection Zone Study. The purpose of the project was to establish an Intake protection zone for the Hidden Valley water intake on the Grand River via a dye injection program. His responsibilities on the project included the mobilization of field equipment, calibration and maintenance of field meters, the collection of field data and the transferring of the data from the meters to a data base.

Yellow Falls Hydroelectric Project, Smooth Rock Falls, Ontario (Aquatic Ecologist / Field Crew Leader)
The Yellow Falls Hydroelectric Project was an intensive multi-season field inventory program used to develop and existing conditions report as part of a larger environmental assessment for a proposed hydroelectric facility. The program involved many extensive aquatic surveys including: non-lethal fish tissue mercury sampling, habitat mapping, habitat utilization, spawning surveys, fish community surveys and aquatic macroinvertebrate sampling. As a field crew leader Ryan was responsible for the safety and day-to-day operation of the field program. Ryan interpreted the collected data and prepared sections of the existing conditions report that was submitted as part of the larger Environmental Assessment for the proposed hydroelectric facility.

** denotes projects completed with other firms*

Marc A. Faiella Tech. Dipl., CEPIT

Environmental Technician

Marc Faiella's experience has included industry and development sector projects. He has conducted field investigations, liaised with representatives of government agencies, regulators and worked with First Nations, synthesized data and produced reports. Marc's specific areas of expertise include Environmental Effects Monitoring (EEM), Environmental Impact Studies (EIS) and Fish Habitat Assessments. He has assessed potential impacts to aquatic habitats at a number of mining and development-related sites, such as metal mines, quarries, pulp and paper mills, subdivisions, city drainage systems and wind energy projects. Marc's technical experience has focused mainly on aquatic habitats. He has conducted fisheries inventories and Species at Risk project surveys based on provincial protocols, trout spawning surveys, collected benthic invertebrate samples, and collected water, sediment and non-lethal and lethal fish tissue samples for mercury. Marc has gained practical experience with all construction phases of DFO applied work sites. In addition, Marc has on-site experience at remote northern sites where access is gained via helicopter, ATV, boat and hiking.

EDUCATION

Tech. Dipl., Sir Sanford Fleming College / Ecosystem Management, Lindsay, Ontario, 2005

Training Certificate, Royal Ontario Museum Fish Identification Workshop, Royal Ontario Museum, Ontario, 2006

Certificate, MTO/DFO/OMNR Protocol, Toronto, Ontario, 2006

Certificate, St. John Ambulance / First Aid and CPR, Guelph, Ontario, 2010

P.A.L. and Firearms, Brampton, Ontario, 2005

Sir Sanford Fleming College / Short Wave Radio, Lindsay, Ontario, 2004

Sir Sanford Fleming College / Chainsaw Operator, Lindsay, Ontario, 2004

Certificate, Pleasure Craft Operator, Toronto, Ontario, 2005

Training Certificate, Class 1 Electrofishing Certificate, MNR, Ministry of Natural Resources, Ontario, 2012

Fisheries and Oceans Canada / Ontario Freshwater Mussel Identification Workshop, Burlington, Ontario, 2011

MEMBERSHIPS

Canadian Environmental Practitioner In Training (CEPIT), Canadian Environmental Certification Approvals Board

PROJECT EXPERIENCE

Environmental Assessments

Communal Irrigation Study, Township of Melancthon, Ontario (Crew Lead)

Obtained appropriate licences to conduct presence / absence and fish utility surveys within the Pine and Noisy River watersheds. Served as crew lead, overseeing fish surveys that were conducted in 2008 and preparations for proposed surveys in the spring / summer of 2009. Responsible for assembling report figures, maps and analysis of collected fisheries data, in tandem with Stantec's in-house GIS / graphics department.

Bruce to Milton Transmission Reinforcement Project, Multiple Sites, Ontario (Crew Lead)

Key member of the study team for the proposed hydro corridor expansion from Bruce Nuclear to a Milton, Ontario. Liaised with several Ministry of Natural Resources offices to coordinate issuance of permits and processing of historical fisheries data requests. Worked directly with the project manager to complete a work plan to safely and efficiently complete spring and summer fisheries surveys along the approximate 180 km corridor. Led a 2-person crew to conduct stream cross section surveys used to determine appropriate sizing of culverts. Coordinated production of detailed mapping and figures upon completion of the surveys, in tandem with Stantec's in-house GIS / graphics department, and was key in production of the independent Class EA report.

Marc A. Faiella Tech. Dipl., CEPIT

Environmental Technician

Port Alma Wind Power Project, Port Alma, Ontario (Field Crew / Data Analyst)
Exclusively responsible for conducting background topography research. Performed tree measurements for entire survey area, identified and mapped tree species locations using aerial photo base. Constructed tests for future heights (software) and produced reports detailing results. These results had significant bearing on wind turbine selection and placement.

Brampton MESP, Phase I, Springdale Environmental Site Assessment, Brampton, Ontario (Habitat Assessor)
Responsible for obtaining background information and conducted field work to assess study area. Compiled field notes and detailed data using an air photo base. Prepared final technical memorandum for submission.

Environmental Site Management

Randall Drain Branch A Restoration, Environment Inspection and Post-construction Monitoring, Waterloo, Ontario (Environmental Inspector)
Responsible for overseeing that approved plans to remediate a damaged watercourse on the City of Waterloo's airport property, as outlined by The Department of Fisheries and Oceans, Grand River Conservation Authority and Stantec Consulting Ltd., were carried out accordingly. Works included properly diverting flow downstream, efficiently dewatering the damaged area and relocating any stranded aquatic species downstream. Worked closely with the construction crew to ensure all remediation phases met Fisheries Act requirements. Prepared final report.

Mining

Vale Technology Development - Hydrology and Aquatic Assessment, Sudbury, Ontario (Aquatic Technician)
Marc was part of a two person crew that conducted a fishery presence/absence survey in a number of lakes associated with mining practices. Fish were identified, measured and tissue samples were collected for laboratory analysis.

Environmental Effects Monitoring (EEM) Program: Periodic Monitoring Phase, Hudson Bay Mining and Smelting, 2007, Flin Flon, Manitoba (Aquatic Technician)
Participated in metal mine EEM Periodic Monitoring phase, involving fisheries and benthic invertebrate surveys. Collected benthic and water samples in the field as well as fish, using various collection techniques. Completed habitat assessments, plume measurements and fish necropsies. Upon completion of field work, performed data analysis and reporting for the EEM report.

Environmental Effects Monitoring (EEM) Program: Focused Monitoring Phase, Hudson Bay Mining and Smelting, 2009, Flin Flon, Manitoba (Aquatic Technician)
Participated in metal mine EEM Focused Monitoring phase, involving fisheries and benthic invertebrate surveys. Collected benthic and water samples in the field as well as fish, using various collection techniques. Completed habitat assessments, plume measurements and fish necropsies. Upon completion of field work, performed data analysis and reporting for the final EEM report.

Environmental Effects Monitoring (EEM) Program: Periodic Monitoring Phase, Hudson Bay Mining and Smelting, 2007, Snow Lake, Manitoba (Aquatic Technician)
One of a 2-person crew stationed in Snow Lake for metal mine EEM Periodic Monitoring phase, involving fisheries and benthic invertebrate surveys. Collected benthic and water samples in the field as well as fish, using various collection techniques. Completed habitat assessments, plume measurements and fish necropsies. Upon completion of field work, performed data analysis and reporting for the EEM report.

Environmental Effects Monitoring (EEM) Program: Focused Monitoring Phase, Hudson Bay Mining and Smelting, 2009, Snow Lake, Manitoba (Aquatic Technician)
One of a 2-person crew stationed in Snow Lake for metal mine EEM Focused Monitoring phase, involving fisheries and benthic invertebrate surveys. Collected benthic and water samples in the field as well as fish, using multiple collection techniques. Completed habitat assessments, plume measurements and fish necropsies. Upon completion of field work, performed data analysis and reporting for the final EEM report.

Natural Sciences & Heritage Resources

Hydro One Series Capacitor Station (Project Manager)
Responsible for a fisheries sampling survey to determine the presence or absence of fish species near a proposed capacitor station. Secured a Fish Collection Licence from OMNR, compiled maps to assist in field investigations, assembled field staff, initiated survey and prepared report for internal and external circulation.

** denotes projects completed with other firms*

Marc A. Faiella Tech. Dipl., CEPIT

Environmental Technician

Melancthon Wind Energy Project Tree Surveys, Melancthon, Ontario (Aquatic Technician)
Measured tree heights and the species identified with use of a laser-sighted measuring device. Performed a desktop exercise, whereby heights were projected over a 20 year period. These projections were then synthesized on aerial photos, showing potential hazards to turbines, thus assisting with selection of wind turbine placement and selection of site-appropriate turbine models.

Oil & Gas

Enbridge Pipeline Crossing, Sarnia, Ontario (Aquatic Construction Monitor)
Marc was responsible for monitoring the St. Clair River for "frak-outs" that may occur during the horizontal drilling and pipe line installation under the St. Clair River. Marc was also responsible for collecting water samples for laboratory analysis and recording current river conditions using a YSI water quality meter.

Power

Biological Monitoring for the Shekak-Nagagami Generating Station, Hearst, Ontario (Field Crew Lead)
Responsible for compiling appropriate field gear to complete the Year-13 monitoring study along the Shekak and Nagagami Rivers in the vicinity of a hydroelectric dam. Participated in surveys, which included: fish inventories through electrofishing, fish tissue collection via gillnets, benthic sampling and water quality and sediment quality collection through several collection techniques. Performed data analysis and completion of the report. Worked closely with Brookfield Power, the MNR and Hearst employees to obtain necessary information and data to complete the project.

Hydro One Series Capacitor Station, Huntsville, Ontario (Project Management / Crew Leader)
Undertook a fisheries sampling survey to determine the presence or absence of fish species near a proposed capacitor station. Duties included securing fisheries permits from related agencies, compilation of maps to assist with surveys, assembly of staff, planned and implemented the field program and prepare report for internal and external circulation.

Yellow Falls Hydroelectric Project, Smooth Rock Falls, Ontario (Aquatic Technician)
Crew member responsible for extensive fish, benthic, water and habitat surveys along the Matagami River. Fish surveys included setting and retrieving gillnets, electrofishing, identification of fish species, retrieving age indicators from fish, characteristic measurements and collecting non-lethal samples for mercury analysis. Collected benthic invertebrates using various sampling techniques for later sorting and identification. Collected water samples and substrate samples using various sampling techniques and equipment for lab testing. Worked closely with a First Nations crew member for the duration of the project and, upon completion of the field surveys, performed data analysis and report writing.

Roads and Highways

Highway 11 Access Improvements. Preliminary Design. MTO Northeastern Region, Huntsville, Ontario (Fisheries Specialist)
Marc conducted an inventory of aquatic resources adjacent to the existing highway. The fish and fish habitat investigations were completed on three watercourses in the Study Area, and were conducted in accordance with the 2006 MTO/DFO/OMNR Protocol

Highway 11 Access Improvements. Preliminary Design. MTO Northeastern Region, Huntsville, Ontario (Fisheries Specialist)
Marc conducted an inventory of aquatic resources adjacent to the existing highway. The fish and fish habitat investigations were completed on three watercourses in the Study Area, and were conducted in accordance with the 2006 MTO/DFO/OMNR Protocol

Highway 8 and Highway 401 Interchange Improvements. Preliminary Design. MTO Southwestern Region, Kitchener, Ontario (Fisheries Specialist)
Marc conducted an inventory of aquatic resources within the study area. The fish and fish habitat investigations were completed following the 2006 MTO/DFO/OMNR Protocol. An exception to this occurred at the Grand River, where fish inventories were not conducted in order to avoid disturbances to mussel Species at Risk that are known to occur in the area

Highway 3 Rehabilitation, Renton to Jarvis. Detail Design. MTO West Region, Ontario (Fisheries Specialist)
Marc participated in detailed Natural Heritage features assessments and a Fish Habitat Existing Conditions Report in accordance with the 2006 MTO/DFO/OMNR Protocol. Three major water crossings (Nanticoke Creek and two crossings of Black Creek) were assessed in addition to other smaller crossings

** denotes projects completed with other firms*

Marc A. Faiella Tech. Dipl., CEPIT

Environmental Technician

Wind Power

White Pines Wind Energy, Prince Edward County, Ontario (Field Crew Lead)

Marc conducted aquatic habitat assessments and a fisheries presence/absence surveys to determine aquatic features under REA (Renewable Energy Act). He also assisted in producing a photo log and figures that assisted in the application process for construction work permits.

Fairview Wind Energy, Staynor, Ontario (Field Crew Lead)

Marc conducted aquatic habitat assessment surveys to assess their designation under the REA (Renewable Energy Act). In addition, Marc conducted electrofishing surveys to assess the presence or absence of fish species and was also part responsible for producing a photo log and figures to assist in the application process for associated construction work permits.

Port Dover Wind Energy, Port Dover, Ontario (Aquatic Technician)

Marc conducted field surveys to assess aquatic features and to determine its designation under the REA (Renewable Energy Act). Marc was also part responsible for producing reports, photo logs and figures to aid in the application process to gain associated construction work permits.

Amherst Island Wind Energy, Amherst, Ontario (Field Crew Lead)

Responsible for collecting fisheries habitat characteristics along the proposed shoreline of Lake Ontario to aid in obtaining associated construction work permits. Marc was also responsible for conducting a presence/absence survey using several capture methods such as, gill nets, boat electrofishing, Fyke nets and minnow traps.

** denotes projects completed with other firms*