



**NORTHLAND
POWER**

Abitibi Solar Project

Water Body Site Investigations Report

October 18, 2012



Northland Power Inc.
on behalf of
Northland Power Solar
Abitibi L.P.
Toronto, Ontario

Water Body
Site Investigation Report

Abitibi Solar Project

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October 18, 2012

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Project Report

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**Northland Power Inc.
Abitibi Solar Project**

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1. Introduction

1.1 Project Description

Northland Power Solar Abitibi L.P. (hereinafter referred to as “Northland”) is proposing to develop a Class 3 10-megawatt (MW) ground mounted solar photovoltaic (Solar PV) facility in the District of Cochrane. This Project, known as the Abitibi Solar Project, is hereafter referred to as “Abitibi” or the “Project.”

The Project location is comprised of two primary components. The first part of the Project is the location of the solar panels, including access roads, inverters, transformers, fencing, etc, and is hereafter referred to as the “solar panel Project location” The solar panel Project location is approximately 98 hectares (ha) in size and located on Lots 14 and 15, Concession 8 of the Town of Cochrane. The solar panel Project location is situated on Glackmeyer Concession Road 9 (shown in Figure 1.1).

The second part of the Project is the approximately 20 km transmission line from the solar panel Project location to the connection point immediately west of the Project location, as well as associated transition structure and switching station. This portion of the project is referred to as the transmission line Project location, with locations shown in Figures 1.2 and 1.3.

1.2 Renewable Energy Approval Legislative Requirements

Ontario Regulation (O. Reg.) 359/09 – *Renewable Energy Approvals Under Part V.0.1 of the Act*, (herein referred to as the REA Regulation), came into force on September 24, 2009 and identifies the Renewable Energy Approval (REA) requirements for renewable energy generation facilities in Ontario. The REA Regulation has since been amended by O. Reg. 521/10, which came in effect as of January 1, 2011.

As per the REA Regulation (Part II, Section 4), ground-mounted solar facilities with a nameplate capacity greater than (>) 12 kilowatts (kW) are classified as Class 3 solar facilities and require an REA. Part IV, subsection 29 (1) of the REA Regulation requires proponents of Class 3 solar projects to conduct a water assessment consisting of a *Water Body Records Review* (Hatch Ltd., 2012) and a *Water Body Site Investigation*.

Subsection 1 (1) of the REA Regulation defines a “water body” as a lake, permanent stream, intermittent stream or 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 or driven through
- c) rock chutes and 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.

Furthermore, a *permanent stream* means “a stream that continually flows in an average year” (O. Reg. 359/09”).

An *intermittent stream* is defined as “a natural or artificial channel, other than a dam, that carries water intermittently and does not have established vegetation within the bed of the channel, except vegetation dominated by plant communities that require or prefer the continuous presence of water or continuously saturated soils for their survival” (O. Reg. 359/09).

A *seepage area* is defined as “a site of emergence of groundwater where the water table is present at the ground surface, including a spring” (O. Reg. 359/09).

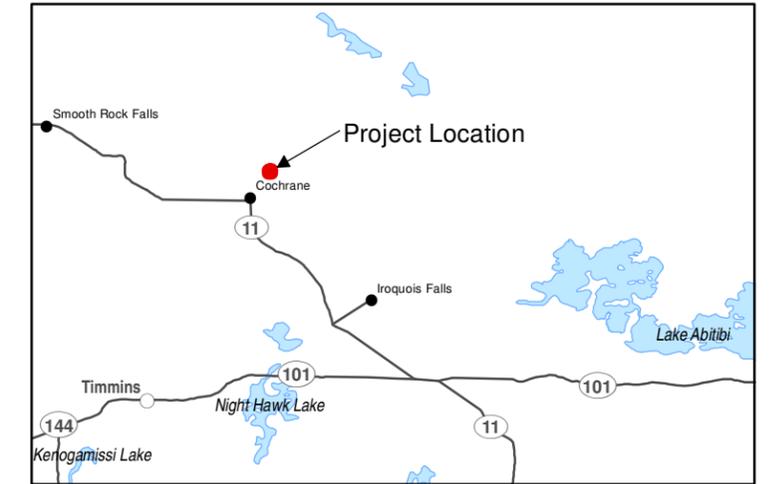
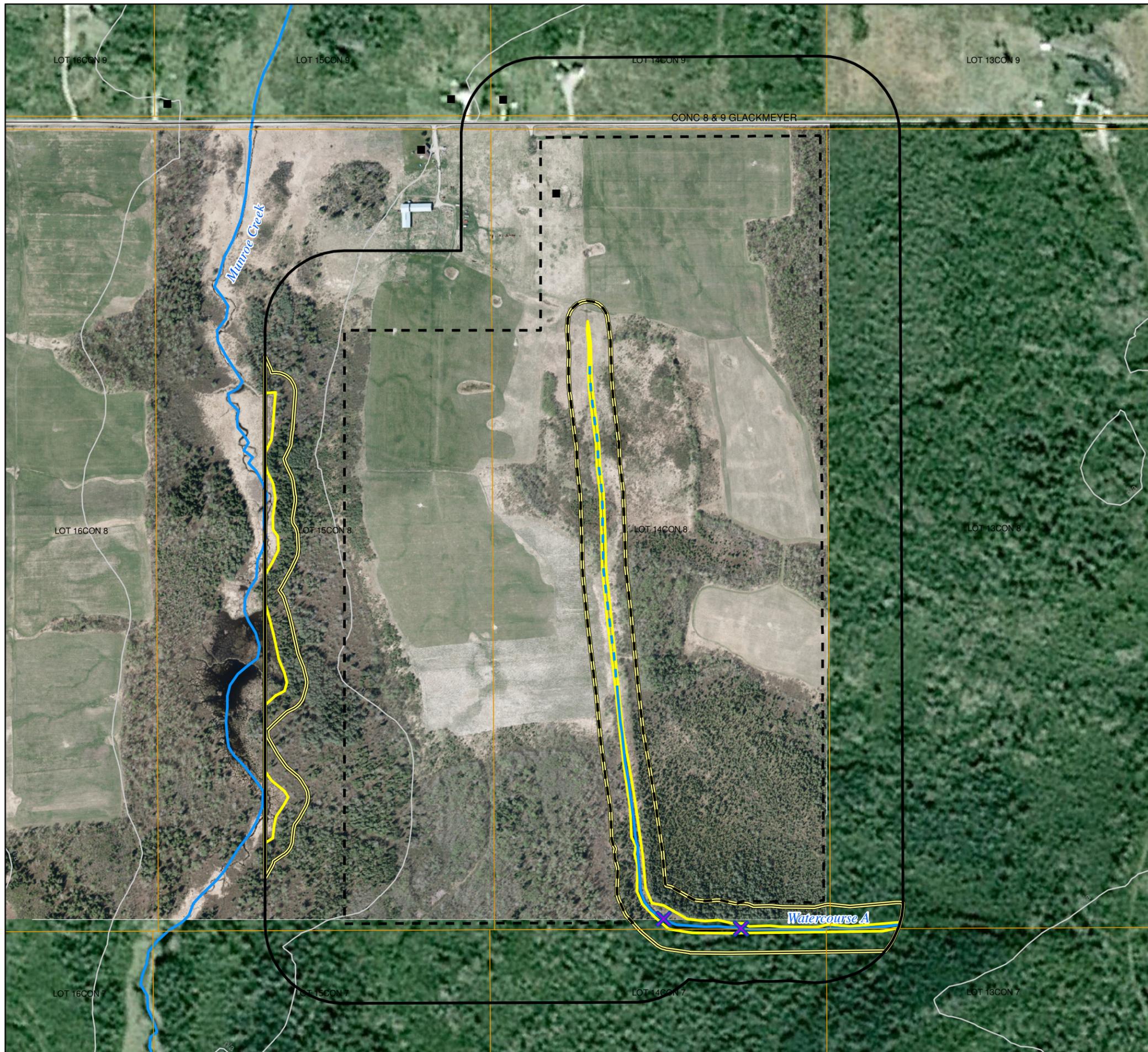
As amended by O. Reg. 521/10, Subsection 31(1) requires an investigation of the land and water within 120 m of the Project Location, either by visiting the site or by alternative investigation of the site, in order to determine the following:

- a) whether the results of the analysis summarized in the *Water Body Records Review Report* (Hatch Ltd., 2012) prepared under Subsection 30(2) are correct or require correction, and identifying any required corrections;
- b) whether any additional water bodies exist, other than those that were identified in the *Water Body Records Review Report* (Hatch Ltd., 2012) prepared under Subsection 30(2);
- c) the boundaries, located within 120 m of the Project Location, of any water body that was identified in the *Water Body Records Review Report* (Hatch Ltd., 2012) or the site investigation; and
- d) the distance from the Project Location to the boundaries determined under clause (c).

Subsection 31 (2) of the REA Regulation has specific requirements if designated lake trout lakes are present within 300 m of the Project Location. These requirements were not deemed applicable to the Project as no such lakes were found in the *Water Body Records Review Report* (Hatch Ltd., 2012).

As amended by O. Reg. 521/10, subsection 31 (4) of the REA Regulation requires the proponent to prepare a report setting out the following:

1. A summary of any corrections to the *Water Body Records Review Report* (Hatch Ltd., 2012) and the determinations made as a result of conducting the site investigation.
2. Information relating to each water body identified in the *Water Body Records Review Report* (Hatch Ltd., 2012) and in the site investigation, including the type of water body, plant and animal composition and the ecosystem of the land and water investigated.
3. A map showing,
 - i. the boundaries mentioned in clause 31 (1) (c),
 - ii. the location and type of each water body identified in relation to the Project Location, and
 - iii. all distances mentioned in clause 31 (1) (d).



LEGEND

- Beaver Dam
- Intermittent Stream (Water Body)
- Permanent Stream (Water Body)
- Road
- Topographic Contour (5m interval)
- High Water Mark
- 30 m from High Water Mark
- Parcel
- Project Location
- 120 m from Project Location
- Water Body
- Wetland Area

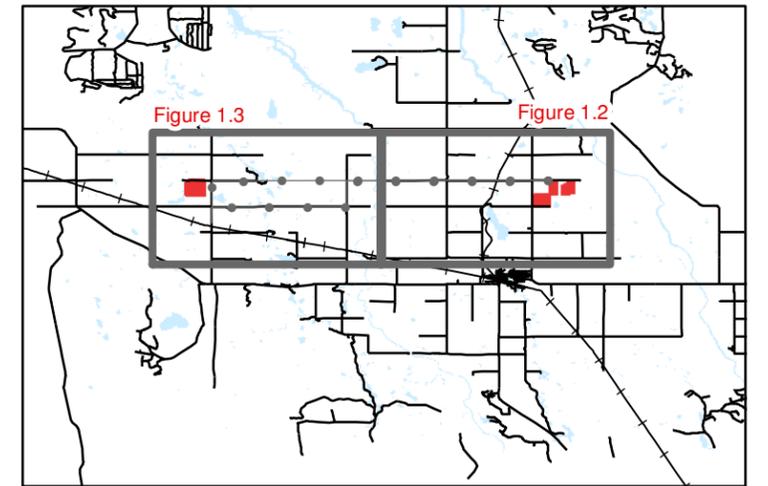
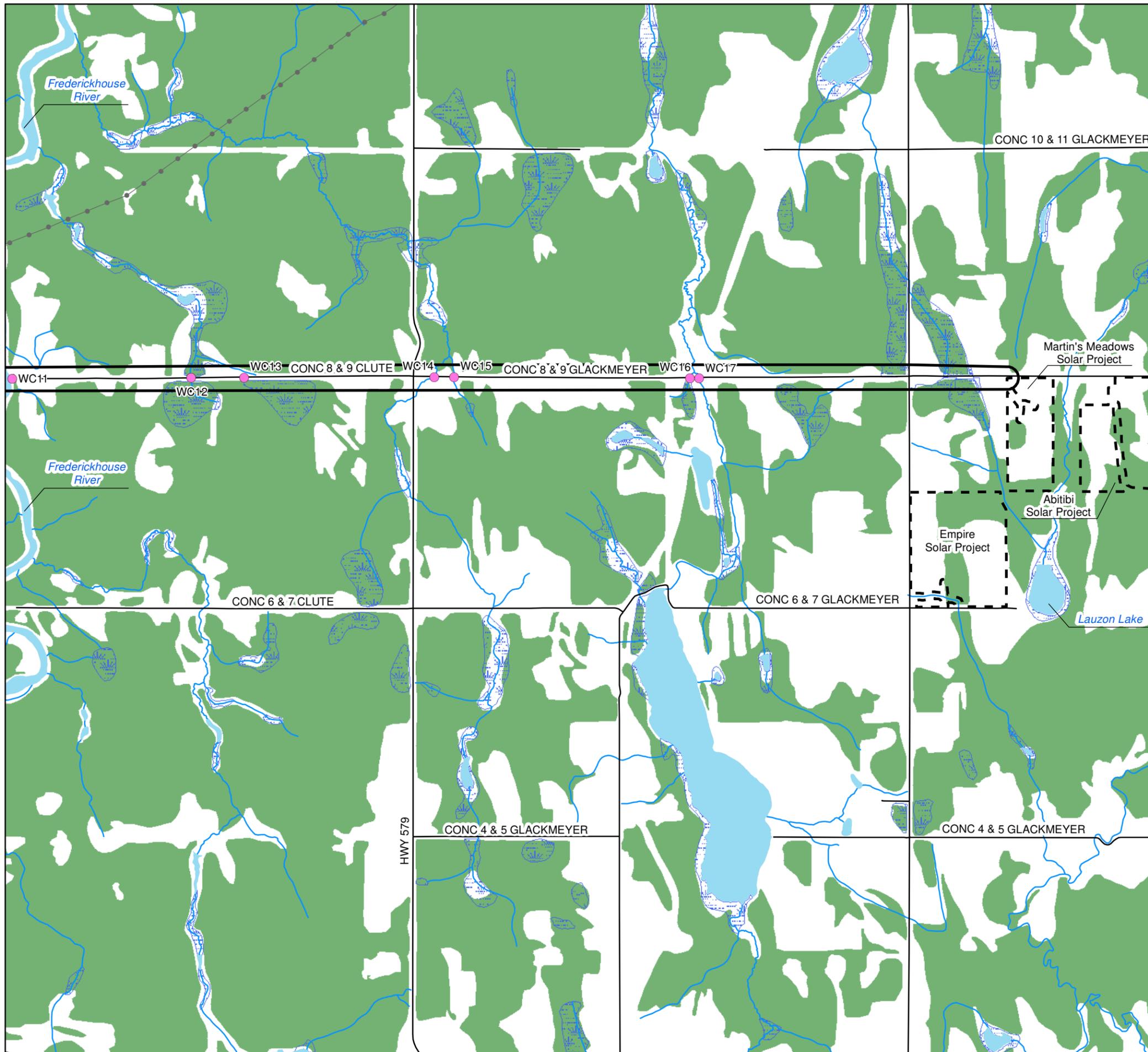
Notes:
 1. Produced by Hatch under licence from Ontario Ministry of Natural Resources, Copyright (c) Queens Printer 2011.
 2. Spatial referencing UTM NAD 83.
 3. Satellite imagery obtained from Google Earth Pro, captured 2003.
 4. Air photo obtained from Northland Power Inc, flown May 2011.



Figure 1.1
 Northland Power Inc.
Abitibi Solar Project
Water Body Site
Investigation Results



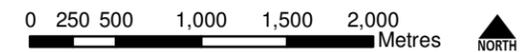
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Legend

- Connection Point
 - Switchyard
 - Transition Structure
 - Road
 - Utility Line
 - ⋮ Northland Power Project Location
 - ▭ 120 m from Distribution Line
 - Wetland Area
 - Wooded Area
- Waterbody Feature**
- Watercrossing (Hatch)
 - Watercourse (LIO Mapping)
 - Waterbody

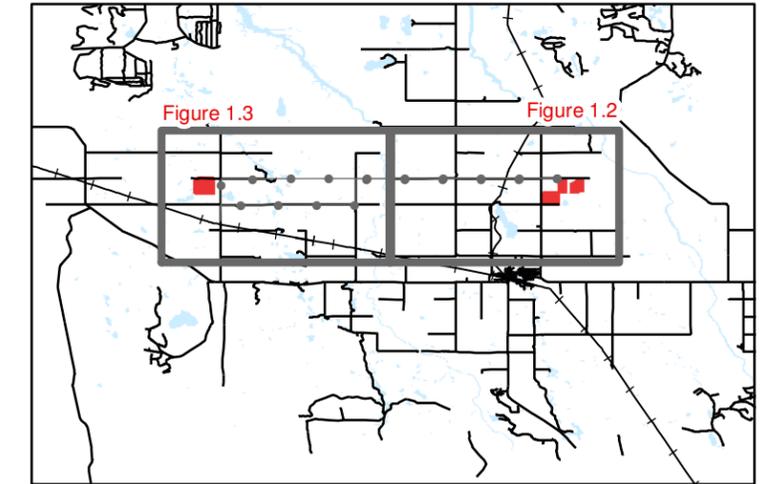
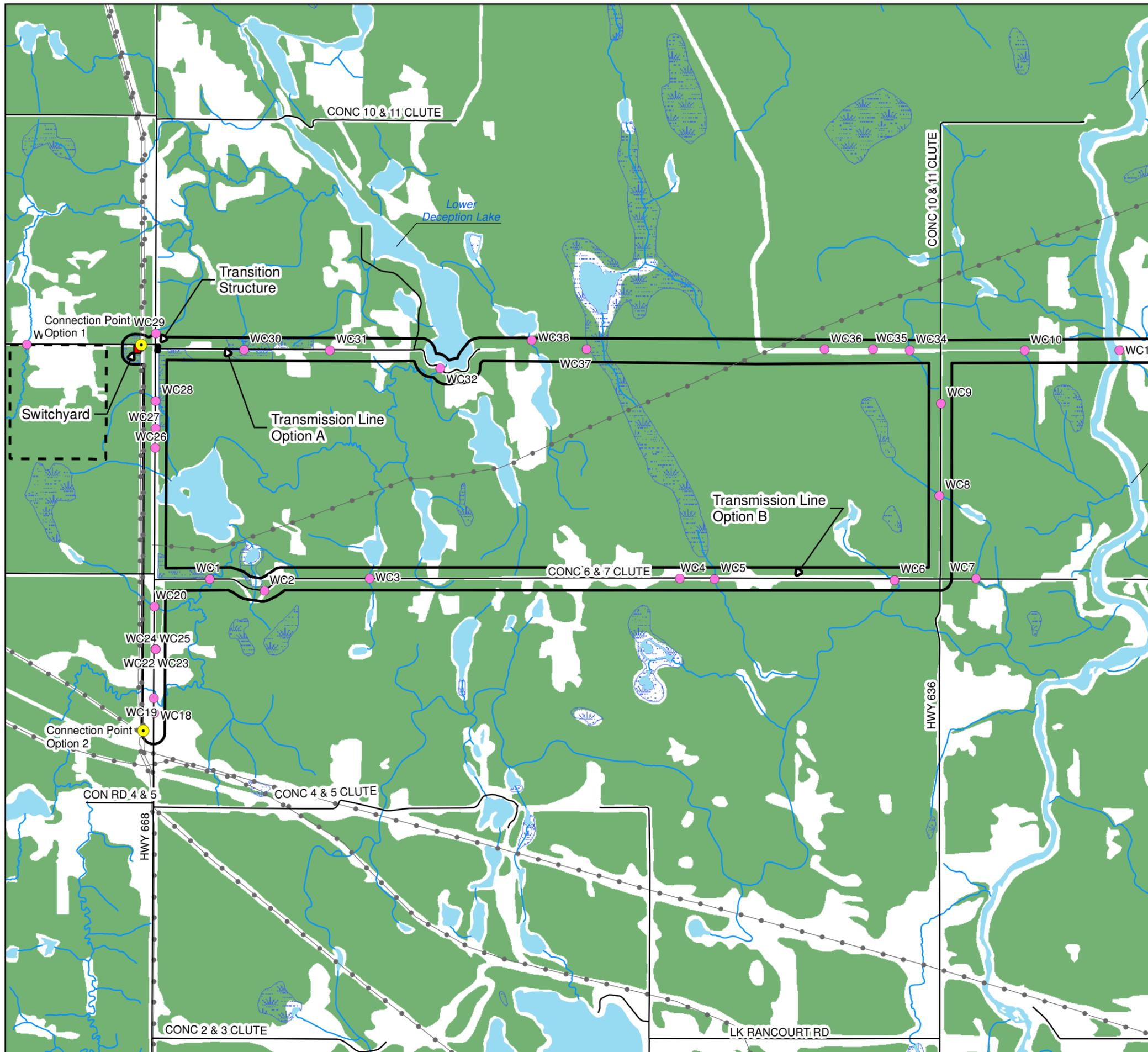
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 2. Spatial referencing UTM NAD 83.
 3. Satellite Imagery from google Earth Pro, captured 2003 through 2004.



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Figure 1.2
 Northland Power Inc.
**Transmission Line Project Location
 (Eastern Half) - Waterbody
 Site Investigation Results**

Blank back



Legend

- Connection Point
 - Switchyard
 - Transition Structure
 - Road
 - Utility Line
 - ⌈ Northland Power Project Location
 - ▭ 120 m from Distribution Line
 - ▨ Wetland Area
 - ▨ Wooded Area
- Waterbody Feature**
- Watercrossing (Hatch)
 - Watercourse (LIO Mapping)
 - ▨ Waterbody

Notes:
 1. Produced by Hatch under licence from Ontario Ministry of Natural Resources, Copyright (c) Queens Printer 2011.
 2. Spatial referencing UTM NAD 83.
 3. Satellite Imagery from google Earth Pro, captured 2003 through 2004.



Figure 1.3
 Northland Power Inc.
**Transmission Line Project Location
 (Western Half) - Waterbody
 Site Investigation Results**

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4. A summary of methods used to make observations for the purposes of the site investigation.
5. The name and qualifications of any person conducting the site investigation.
6. If an investigation was conducted by visiting the site:
 - i. the dates and times of the beginning and completion of the site investigation
 - ii. the duration of the site investigation
 - iii. the weather conditions during the site investigation
 - iv. field notes kept by the person conducting the site investigation.
7. If an alternative investigation of the site was conducted:
 - i. the dates of the generation of the data used in the site investigation
 - 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.

This *Water Body Site Investigation Report* has been prepared to meet these requirements.

2. Summary of Water Body Records Review Results

Table 2.1 provides a summary of the determinations made in the *Water Body Records Review Report* (Hatch Ltd., 2012) with respect to water body features in and within a specified distance from the Project Location.

Table 2.1 Summary of Water Body Records Review Determinations

Determination to be Made	Yes/No	Description
Is the Project in a water body?	No	No water body features were identified on the Project Location.
Is the Project within 120 m of the average annual high water mark of a lake, other than a lake trout lake that is at or above development capacity?	Yes	No lakes were identified within 120 m of the solar panel Project location. The proposed transmission line will come within 120 m of the average annual high water mark of Lower Deception Lake.
Is the Project within 300 m of the average annual high water mark of a lake trout lake that is at or above development capacity?	No	No lake trout lakes were identified within 300 m of the solar panel or transmission line Project locations.
Is the Project within 120 m of the average annual high water mark of a permanent or intermittent stream?	Yes	The average annual high water mark of Munroe Creek is located within 120 m of the solar Panel Project location. A surface water drainage feature visible on aerial photography may also be a permanent or intermittent stream, and would be within 120 m of the solar Panel Project location. There are 34 watercourses located within 120 m of the transmission line Project location.

Determination to be Made	Yes/No	Description
Is the Project within 120 m of a seepage area?	No	No seepage areas were identified on or within 120 m of the Project Location.

Therefore, depending on the layout of the proposed Project, some components of the solar panel Project location could be located within 120 m of the average annual high water mark of Munroe Creek. An unnamed surface drainage feature is visible on aerial photography of the solar panel Project location, and this may also be a permanent or intermittent stream that would be located within 120 m of the solar panel Project location. The proposed transmission line may cross a total of 24 waterbodies (depending on the route selected) and may be located within 120 m of 10 additional waterbodies, including Lower Deception Lake.

3. Site Investigation Details and Methodology

A number of different site investigation events were undertaken as part of the overall water body site investigation for the proposed Project. Four site investigations were undertaken on the proposed solar panel Project, while six separate investigations were conducted along the proposed transmission line Project location. These various investigations are described in the following sections.

3.1 Solar Panel Site Investigation Details

The following table provides information on the date, times, duration, weather conditions for each of the site investigations and name(s) of the assessor(s).

Table 3.1 Dates, Times and Weather Conditions During Each Site Investigation

Site Investigation	Date (dd/mm/yy)	Start/End Time	Duration (Hr)	Temperature (°C)	Beaufort Wind Scale	Cloud Cover (%)	Assessor(s)
1	23/08/10	1600-1930	3.5	24°C	2 (6-11 km/h)	0	M. Esraelian
2	24/08/10	1330-1600	2.5	24°C	3 (12-19 km/h)	0	M. Esraelian
3	28/09/11	1430-1730	3	22°C	2 (6-11 km/h)	5	M. Esraelian J. Viscek
4	29/09/11	1300-1630	3.5 hrs	19 °C	1 (1-5 km/h)	100%	M. Esraelian J. Viscek

3.2 Name and Qualifications of Persons Conducting the Site Investigations

Site investigations 1 through 4 were completed by Martine Esraelian, B.Sc., of Hatch Ltd. Martine is a terrestrial ecologist with diverse technical and consulting experience, as well as strong field identification skills. She has conducted field inventories and assessments that have included wildlife and vegetation surveys, species at risk surveys and monitoring, Ecological Land Classification (ELC) and habitat mapping, soil surveys, land use surveys, and hydrological assessments. Martine has managed several environmental projects from initial design and planning through technical analysis, documentation, and delivery. She has completed several environmental and agricultural impact studies for major development projects which have enabled her to liaise with all levels of government, the community, and a portfolio of clients that include consulting firms, planners, and

high-profile developers. She also has considerable experience working with species at risk, including Jefferson salamander, spotted turtle, spoon-leaved moss, Massasauga and gray ratsnake, among others.

Joe Viscek of Hatch Ltd. completed site investigations 3 and 4 (along with Martine Esraelian). Joe is an Environmental Scientist who joined Hatch after completing a successful internship assignment with the company through his post-graduate studies. He is currently engaged in the Renewable Energy Approval (REA) process for a number of green-energy projects in Ontario. Joe specializes in completing environmental work for renewable energy projects through a combination of field work, data management, environmental assessment, digital mapping (GIS) and technical writing. He has experience in fisheries field surveys, species at risk assessments and water body site investigations.

3.3 Survey Methods

The entire site was searched by the observer on foot in order to document the presence/absence of waterbodies. Photographs of the site were taken, and were GPS referenced where necessary using a sub-meter accuracy, handheld GPS unit. Any observations of waterbodies were noted, including: the type of water body, in-stream habitat types, surrounding riparian areas, average annual high water mark and wildlife use. Geographic coordinates at representative areas of the average annual high water mark for waterbodies on and within 120 m of the Project site were recorded using a handheld GPS unit, for mapping purposes.

A copy of the field notes kept by the observers is provided in Appendix A.

3.4 Transmission line Project Location Site Investigations

The purpose of these site investigations was to confirm waterbodies on and within 120 m of the transmission line Project location, including documentation of water body types, habitat features. Prior to these surveys, a map of the potential waterbodies was prepared through interpretation of satellite imagery as well as background records obtained from the Ministry of Natural Resources, Cochrane District. Presence of an average annual high water mark boundaries of the waterbodies along the roadside associated with the Project location were then confirmed through visual observation. A copy of the field notes kept by the observers is provided in Appendix A.

Site Investigations 5 through 10 were completed by Martine Esraelian and Joe Viscek. Martine is trained in the use of Ecological Land Classification, and has participated in several vegetation community surveys within Northeastern Ontario. Joe Viscek is an environmental technologist with experience in terrestrial and aquatic field studies in support of renewable energy projects throughout the province.

Table 3.2 Dates, Times, Duration and Weather Conditions of Site Investigations 5 Through 10

	Site Investigation 5	Site Investigation 6	Site Investigation 7	Site Investigation 8	Site Investigation 9	Site Investigation 10
Date	29-09-2011	30-09-2011	01-10-2011	02-10-2011	10-11-2011	11-11-2011
Start Time	1300h	0900h	0900h	0900h	0800h	0800h
End Time	1700h	1900h	1900h	1930h	1630h	1600h
Duration	4hrs	10hrs	10hr	10.5hrs	8.5hrs	8hrs
Temperature	19°C	15°C	5°C	16°C	1°C	-1°C
Beaufort Wind	1	1	1	1	3	2
Cloud Cover	100%	10%	40%	10%	100%	95%

4. Results of the Site Investigations

This section documents the results of the site investigations on the solar panel and transmission line Project locations and discusses specific water features observed on and within 120 m of the Project location. Features noted in the following sections, including the proposed Project location and the average annual high water mark of watercourses on and within 120 m of the Project location, are shown in Figure 1.1 (Solar Panel Project Location) and Figures 1.2 and 1.3 (Transmission line Project Location).

4.1 Solar Panel Project location

The *Water Body Records Review Report* (Hatch Ltd., 2012) identified a portion of Munroe Creek (i.e., a permanent or intermittent water body feature) within 120 m west of the solar panel Project Location. The site investigations confirmed the presence of this water body feature and another water body feature (i.e., Watercourse A) not previously identified in the *Water Body Records Review Report* (Hatch Ltd., 2012). A description of each of these water body features is provided in the following sections.

4.1.1 Munroe Creek

The Land Information Ontario (LIO) mapping obtained for the *Water Body Records Review Report* (Hatch Ltd., 2012) indicates that Munroe Creek originates approximately 800 m southwest of the Project Location at Lauzon Lake and flows north where it eventually discharges into the Abitibi River. Munroe Creek is a permanent water body that flows through wetland communities (i.e., narrow-leaved emergent marsh, tall shrub swamp) and woodlands dominated by trembling aspen, black spruce and balsam fir. The high water mark was assessed during the site investigation and determined to be the wetland boundary. Photographs of Munroe Creek surrounded by wetland are shown in Figure 4.1 and Figure 4.2.



Figure 4.1 View of Munroe Creek from the South Side of Glackmeyer Concession Road 9



Figure 4.2 View of Munroe Creek from the North Side of Glackmeyer Concession Road 9

4.1.1.1 Watercourse A

Watercourse A is both an intermittent and permanent stream that originates in an agricultural field on the north-central portion of the property on which the Project is located (Figure 1.1). The intermittent reach of Watercourse A occurs at its point of origin and continues south for approximately 100 m (Figure 4.3). This 100 m reach has a channel-width of approximately 3 m, with 1.5 m high banks. The average annual high watermark was determined to be top of bank. Although highly variable, standing water was noted in several areas, and ranged from approximately < 1 to 10 cm in depth, with a muck bottom. No flowing water was present along this stretch of Watercourse A. The channel was found to contain water-favouring wetland meadow species such as cattails, sedges, rushes and grasses. Riparian vegetation consisted of mainly grasses and small shrubs (Figure 4.3).



Figure 4.3 View of the Initial, Intermittent Stream Portion of Watercourse A, Facing South

As Watercourse A extends in a southern direction near the central portion of the Project Location, it enters a thicket area of dense in-stream and riparian vegetation for approximately 200 m (Figure 1.1). In this area, the watercourse continues to exist as an intermittent stream, with a channel width of approximately 4 to 6 m and gradually sloping, 2 m high banks. The average annual high water mark was determined to be approximately 10 to 12 m across from bank to bank. Standing water was highly absent, but was present in several areas at depths ranging from approximately < 1 cm to 10 cm, with leafy/muck bottom. No flowing water was present along this stretch of the channel. In-stream vegetation ranged from water-favouring species such as cattails and sedges, and small trees/thick shrubs and bushes, such as alders, willows and dogwoods (Figure 4.4).



Figure 4.4 View of Intermittent Stream Portion of Watercourse A as it Passes through Dense Thicket, Facing South

After passing through dense thicket, Watercourse A continues to exist as an intermittent stream, and extends southward next to an agricultural field that is situated to the west (Figure 1.1). During this stretch, the channel width increases to approximately 7 to 10 m width, with relatively large, steep banks approximately 2 to 2.5 m high. The average annual high water mark was assessed to be just below the top of the 7 to 10 m wide banks. No standing water was present along this 200 m stretch of Watercourse A during the time of the site investigations. Riparian and in-stream vegetation primarily consisted of grasses and shrubs (Figure 4.5).

The large banks along the channel taper off slightly as it extends south, and level off at the site of an old water crossing situated approximately 100 m north of the south-western woodland on the Project Location (Figure 1.1). The water crossing did not appear to be maintained, and was likely used for agricultural purposes in the past. No culvert was found at this site, however, the presence of cobble stones was noted. Watercourse A transitions from an intermittent stream to a permanent stream as it extends south into the thicket and woodland to the south (Figure 4.6). In this location, channel width is approximately 2 m wide and 1 m high. The average annual high water mark was found to be the top of the bank. Standing water was present at depths of 10 to 30 cm with muck bottom. No visible flow was present. In-stream vegetation consisted of grasses, and riparian vegetation consisted of grasses and shrubs.



Figure 4.5 View of Intermittent Portion of Watercourse A
Adjacent to Agricultural Field, Facing South



Figure 4.6 View of Watercourse A as it Transitions from an Intermittent
Stream to a Permanent Stream, Facing South

Watercourse A extends south into dense thicket and woodland as a permanent stream for approximately 300 m (Figure 1.1). The channel width and average annual high water mark increases to approximately 4 m, up to a maximum of 6 m, along this stretch – with about 0.5 m high banks. Water depths along this portion of the permanent stream ranged from approximately 0.5 to 1 m, with muck bottom. No visible flow was observed. Riparian vegetation included grasses, shrubs and trees (Figure 4.7). This section of Watercourse A was assessed as potential fish/turtle habitat.



Figure 4.7 View of Watercourse A as it Extends South Through the Woodland

The presence of beavers in the area was noted, as evidenced by the large amount of felled trees and gnawed stumps; as well as a beaver lodge and two separate dams located along the permanent stream section of Watercourse A. The first beaver dam was encountered just after the stream makes an almost ninety degree bend west (Figure 1.1). The permanent stream continues to extend westward through the woodland after this first beaver dam, with the same overall characteristics. The second beaver dam was encountered approximately 100 m west of the first beaver dam (Figure 4.1). This dam, for the most part, fully halts a large proportion of the permanent stream. The watercourse channel drops off considerably after this dam, and continues westward in a narrower channel with steeper banks (i.e., 1.5 m wide and 1.5 m high) (Figure 4.8). The average annual high water mark was deemed to be the top of the bank, approximately 4 m wide all the way across. Water depths were reduced to approximately 10 cm along this shallow section of the permanent stream, with muck bottom. No visible flow was present within the channel during the time of the site investigation. Riparian vegetation remains consistent with the woodland species present. Several large burrows of approximately 30 to 50 cm in diameter were noted along the steep banks of this portion of Watercourse A. Watercourse A continues to extend westwards off of the Project Location and past 120 m in this shallow, creek-like fashion.



Figure 4.8 View of Watercourse A Facing West as it Drops Off Following the Second Beaver Dam

4.1.2 Lakes

The *Water Body Records Review Report* (Hatch Ltd., 2012) did not identify any lakes on or within 120 m of the solar panel Project Location. The site investigations further confirmed these findings.

4.1.3 Seepage Areas

A seepage area is defined as “a site of emergence of groundwater where the water table is present at the ground surface, including a spring” (O. Reg. 359/09). The information sources reviewed in the *Water Body Records Review Report* (Hatch Ltd., 2012) did not identify any seepage areas on or within 120 m of the Project Location. This was confirmed during the site investigations, where no evidence of seepage areas on or within 120 m of the solar panel Project Location were found.

4.1.4 Other Water Features

A network of small, manmade drainage troughs were identified around much of the perimeter of the agricultural fields on the Project Location. These drainage troughs are linear and consistent, indicating that they were likely excavated mechanically. They are approximately 50 cm wide and 30 cm deep. Predominantly, these drainage features do not contain standing water, but several small sections containing < 10 cm of water were noted. No water-favouring or dependant vegetation was noted within these drainage features.

These manmade drainage troughs were not found to be water body features. As per the REA Regulation, temporary channels for surface drainage, such as furrows, or shallow channels that can be tilled or driven through, are not considered intermittent streams or waterbodies (Section 1.2).

4.2 Transmission line Project Location

A total of 38 waterbodies were observed along the transmission line route options, as shown in Figures 1.2 and 1.3, and summarized in Table 4.1, which presents the watercourse identifier (as labelled on Figures 1.2 and 1.3), summary of watercourse observations (watercourse type, average width and depth, substrate, bank vegetation and other observations). There were 36 unnamed watercourses, the Frederickhouse River and Deception Creek. In addition, the proposed transmission line will pass within 120 m of Lower Deception Lake.

There were also several watercourses shown on LIO mapping that were not found during the Site Investigations. For the purposes of this report, it is assumed that the LIO mapping is correct, and that the watercourses are present.

Since the Project Transmission line will cross or run within 120 m of the watercourses noted in Table 4.1, as well as one lake (Lower Deception Lake), an EIS will be required.

Table 4.1 Summary of Water Body Observations along Transmission line Routes

Watercourse Identifier	Water Body Type	Average Width	Average Depth	Substrate Type	Riparian Vegetation	Additional Notes
WC1	Permanent stream	5 m	1 m	N/A	Grasses, shrubs, thicket	Small bridge crossing
WC2	Permanent stream	2.5 m	1 m	N/A	Cattails, grasses, shrubs	Watercourse drains into large marsh to north; culvert under road
WC3	Intermittent stream	2 m	No open water present	N/A	Cattails, grasses	Intermittent stream coming from marsh to north; culvert under road (0.75 m diameter)
WC4	Intermittent stream	2 m	No open water present	N/A	Cattails, grasses	Intermittent stream with wetland; culvert under road (0.75 m diameter)
WC5	Intermittent stream	1.5 m	0.10 to 0.20 m	Sandy, muck	Grasses and thicket	Two culverts side by side under road (0.75 m diameter)
WC6	Permanent stream	2 m	0.30 m	Muck	Grasses, shrubs, thicket	Beaver dam on north side by road; water pools up behind dam (approximately 5 m wide); culvert under road (1.5 m diameter), channel extends with 15 to 20 m wide floodplain to south
WC7	Intermittent stream	2 m	0.20 m	Muck	Grasses	No water present in channel on north side; small wetland/ponded water to south; culvert under road (0.5 m diameter)
WC8	Intermittent stream	1 m	0.10 to 0.20	Muck	Grasses	Standing water near road; channel leads to large wetland/marsh to southeast; two culverts under road about 5 m apart (0.5 m diameter)
WC9	Intermittent stream	2.5 m	0.30 m	Muck	Grasses, trees, thicket	Watercourse enters ditch west of road; no flow; no culvert under road; water dries up in ditch after about 15 m
WC10	Intermittent stream	2 m	0.10 to 0.20 m	Muck	Grasses	Watercourse meets ditch to north; water dissipates in ditch to the west after passing through culvert under road (0.5 m diameter)
Frederick House River	Permanent stream	100 m	1 to 2 m	Cobble, boulder	Grasses, trees, thicket	Large river flowing north to south; existing transmission line crossing
WC11	Permanent stream	3 m	0.5 to 0.75 m	Pebble/cobble, sand	Grasses, thicket	Watercourse from north connects to wetland south of road via culvert (0.75 m diameter); moose tracks visible along banks
WC12	Intermittent stream	1 m	No open water present	Muck	Cattails, thicket	Wetland north of road connects to south with intermittent channel; culvert under road (0.75 m diameter)
WC13	Permanent stream	3 m	0.10 to 0.30 m	Muck, some cobble	Grasses, shrubs, thicket	Water gently flowing north; culvert under road (1.5 m diameter)

Watercourse Identifier	Water Body Type	Average Width	Average Depth	Substrate Type	Riparian Vegetation	Additional Notes
WC14	Intermittent stream	0.75 m	0.05 to 0.10 m	Muck	Grasses, shrubs, thicket	Water gently flowing north; culvert under road (1 m diameter); some water ponded on north side of road (about 0.5 to 1 m deep)
WC15	Intermittent stream	1.5 m	0.20 to 0.30 m	Muck, sand	Grasses, shrubs, thicket	Wetland to south with grassy emergent vegetation and some standing water; water very gently flowing north; large culvert under road (3 m diameter)
WC16	Permanent stream	3 m	0.30 to 0.75 m	Cobble, sand	Grasses	Associated wetlands to south and north; culvert under road
WC17	Intermittent stream	2 m	0 to 0.05 m	Muck, grass	Cattails, grasses	Culvert under road (0.75 m diameter)
Deception Creek	Permanent stream	3 to 5 m	0.5 to 1.5 m	N/A	Grasses, thicket, some trees	Large creek; water flows west under road bridge
WC18	Intermittent stream	2 m	0.10 to 0.20 m	Muck	Grasses	Culvert under road (0.75 m diameter)
WC19	Intermittent stream	1 m	0 to 0.10 m	Muck, grass	Grasses, thicket, trees	Intermittent ditch west of road; no culvert present
WC20	Intermittent stream	2 m	0 to 0.05 m	Muck, grass	Cattails, Grasses, shrubs, thicket	Channel extends from east to wetland-like ditches adjacent to road; culvert under road (0.30 m diameter)
WC21	Intermittent stream	1 m	0 to 0.05 m	Muck, grass	Grasses, thicket	Ditch-like channel extends west; no culvert present
WC22	Intermittent stream	1 m	No open water present	N/A	Grasses, cattails	Small, dry, ditch-like channels extending out on both sides of the road; no culvert present
WC23	Intermittent stream	1 m	0.10 m	Muck, sand	Trees, thicket, grasses, cattails	Water flows gently in valley-like depression to the east; culvert under road (0.75 m diameter)
WC24	Intermittent stream	1 m	0.05 m	Muck	Trees, thicket, grasses	Water flows gently in valley-like depression to the east; culvert under road (0.5 m diameter)
WC25	Intermittent stream	1 m	0 to 0.05 m	Muck, grass	Grasses, cattails, trees	Small channel with very shallow water flowing east; culvert under road (0.5 m diameter)
WC26	Intermittent stream	1.5 m	0.10 to 0.30 m	Muck	Grasses, thicket	Water flows gently east; culvert under road (0.75 m diameter)
WC27	Permanent stream	2.5 m	0.10 to 0.20 m	Muck	Short grasses, some thicket	Water flowing gently east; culvert under road (0.5 m diameter)
WC28	Permanent stream	3 m	0.20 to 0.30 m	Muck	Grasses, thicket, trees	Channel on north side of road only, with pooled water to south; water flows gently north; culvert under road (0.75 m diameter)
WC29	Intermittent stream	1 to 2 m	0 to 0.10 m	Muck, grass	Cattails, grasses, some thicket	Water flows gently north; culvert under road (0.5 m diameter)

Watercourse Identifier	Water Body Type	Average Width	Average Depth	Substrate Type	Riparian Vegetation	Additional Notes
WC30	Permanent stream	5 to 6 m	0.5 to 1 m	Muck, sand, pebbles	Grasses, thicket	Large creek with bridge crossing; drains north into small lake
WC31	Permanent stream	2 to 3 m	0.5 m	Muck	Grasses	Water flows north; large culvert under road (2.5 m diameter)
WC32	Intermittent stream	1.5 m	0.20 to 0.30 m	Muck	Grasses, cattails, thicket	Water gently flows north; wetland/swamp with grasses and small trees to south; two culverts under road, about 6 m apart (0.5 m diameter)
WC33	Intermittent stream	0.5 to 1 m	0 to 0.05 m	Muck	Thicket, trees	Very gentle flow north; little to no standing water (intermittent channel); culvert under road (0.5 m diameter)
WC34	Intermittent stream	1.5 m	0.20 m	Muck	Thicket, grasses	Channel visible on north side of road; water pooled in ditches to north and south of road; no visible flow or culvert
WC35	Permanent stream	2 m	0.30 m	Muck	Cattails, grasses, thicket	Irregular channel passing through large wetland complex (swamp/marsh mix); wetland area extends north; water flows north towards lake
WC36	Permanent stream	4 m	0.30 to 0.40 m	Muck	Grasses, thicket	Watercourse drains north into Deception Lake; wetland-like area (approximately 12 m wide) makes up floodplain zone

5. Summary of Results

Subsection 31(1) of the REA Regulation requires that the *Water Body Site Investigation Report* include a summary of any corrections to the *Water Body Records Review Report* (Hatch Ltd., 2012), as well as the determinations made as a result of conducting the site investigations. The following table (Table 5.1) identifies the corrections required (if any) to the water body features identified in the *Water Body Records Review Report* (Hatch Ltd., 2012), and any new determinations made as a result of the site investigations.

Table 5.1 Corrections Required to the Abitibi Solar Project Water Body Records Review Report

Determination to be Made	Corrections Required? (Yes/No)	Description
Is the Project Location in a water body?	No	No part of the project will be located within a water body.
Is the Project Location within 120 m of the average annual high water mark of a lake, other than a lake trout lake that is at or above development capacity?	No	The site investigation confirmed that there are no lakes on or within 120 m of the solar panel Project Location. The site investigation confirmed that the proposed transmission line will run within 120 m of the average annual high water mark of Lower Deception Lake. There are no corrections required to the <i>Water Body Records Review Report</i> (Hatch Ltd., 2012) with respect to lakes.
Is the Project Location within 300 m of the average annual high water mark of a lake trout lake that is at or above development capacity?	No	No lake trout lakes are situated on or within 300 m of the Project Location. There are no corrections required to the <i>Water Body Records Review Report</i> (Hatch Ltd., 2012) with respect to lake trout lakes.
Is the Project Location within 120 m of the average annual high water mark of a permanent or intermittent stream?	Yes	<p>The records review identified a portion of Munroe Creek within 120 m west of the Project Location. This water body feature was confirmed during the site investigations. Therefore, there are no corrections required with respect to this water body feature.</p> <p>However, the site investigations did confirm the presence of a permanent/intermittent stream running through the central portion of the solar panel Project location. Therefore, the following corrections are required.</p> <ul style="list-style-type: none"> • The <i>Water Body Records Review Report</i> (Hatch Ltd., 2012) did not identify Watercourse A (i.e., a permanent/intermittent stream) which extends the length of the central portion of the Project Location, and continuing east along the southern boundary and beyond the 120 m setback. • In addition, the proposed transmission line Project location will cross or run within 120 m of approximately 38 waterbodies, which is different than noted in the Records Review.

Determination to be Made	Corrections Required? (Yes/No)	Description
Is the Project Location within 120 m of a seepage area?	No	The site investigation confirmed that there are no seepage areas on or within 120 m of the Project Location. There are no corrections required to the <i>Water Body Records Review Report</i> (Hatch Ltd., 2012) with respect to seepage areas.

6. Conclusions and Next Steps

As shown in Figure 1.1 and summarized in Table 5.1, the solar panel Project Location is located between 30 and 120 m from the average annual high water mark of Watercourse A and Munroe Creek. The proposed access road and connection line to adjoining solar facility will cross Munroe Creek. In addition, the proposed transmission line Project location will cross or run within 120 m of approximately 38 waterbodies, depending on the final route selected. As a result, a *Water Body Environmental Impact Study* is required and will be prepared to address potential negative environmental effects to the identified water body features associated with the proposed development. Recommendations on mitigation measures will be provided to ensure the long-term ecological health and integrity of these water body features.

7. References

Government of Ontario. 2009. Ontario Regulation 359/09 made under the Environmental Protection Act, Renewable Energy Approvals under Part V.0.1 of the Act. September 8, 2009 version. Printed in *The Ontario Gazette*: October 10, 2009. Available on-line at: http://www.e-laws.gov.on.ca/html/source/regs/english/2009/elaws_src_regs_r09359_e.htm. Accessed September 15, 2010.

Government of Ontario. 2010. Ontario Regulation 521/10 made under the Environmental Protection Act, Renewable Energy Approvals under Part V.0.1 of the Act. December 15, 2010 version. Printed in *The Ontario Gazette*: January 8, 2011. Available on-line at: http://www.e-laws.gov.on.ca/html/source/regs/english/2010/elaws_src_regs_r10521_e.htm. Accessed January, 2011.

Hatch Ltd. 2012. Abitibi Solar Project – Water Body Records Review Report. Prepared for Northland Power Inc.

Appendix A

Site Investigation

Field Notes

Project: Martins Meadow

Abitibi Sinc

Date: Aug 22 2010

Time: 1300-1900

% C.C.: 100%

Wind: 1-2

Land Use Only

- The agricultural fields on the project site are used for the production of hay. There are woodlands on it surrounding the project site.
- There is a watercourse that traverses north-south through Lot 15, conc. 8.
- This watercourse is shown on the L10 mapping.
- This watercourse is surrounded by wetland vegetation characteristic of a meadow marsh (e.g. broad leaved cattail, grasses, sedges). Surrounding the meadow marsh community is a thicket swamp dominated by

- Willow sp. & red-osier dogwood.
- These wetland communities (meadow marsh & willow thicket swamp) are not shown on the L10 mapping.
- There is also a municipal drain that flows east along the S & 9 road, north of the project site.
- This municipal drain is approximately 5' wide & at least 5' deep in some areas.
- Water was present within the drain during the site visit.
- Evidence of erosion was observed particularly along the road where gravel/pavement appear to be eroding.
- The surrounding land use is agricultural, primarily cash crops such as carrots, hay, grain.
- Pasture was also observed.
- A large equipment operation & small aqueduct hole, farm was

document on the properties north
of the Project site.
The area has not been
agricultural production (within 100m)
include scrublands & young
immature woodlands.
- The Project site was formerly used
as a livestock spread or with
>100 cattle. It is now used
for the production of hay. The
barn is currently being used
as a shop for rebuilding engines
& farm equipment.

No.
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Project
Date
Time
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Wind
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- being

No.

Date. Page 49

Project: Martin's Meadows

Date: Aug 23, 2010

Time: 1600-1930 (3.5)

% a.c.: 0%

Temp: 24°C

Wind: 2

black bear in NE woodlot

No.

Date. Page 50

drainage feature along the western boundary. Galvanize culvert buried

- drain not connected to the municipal drain

— willow along drainage feature

- small-fruited h. o. sp.

- broad leaved cattail

- alder (R)

- Mt. ash dogwood (R)

- tree

- drainage feature ends at woodlot - where it reaches woodlot channel is not defined.

alder (D)

mosses

woodlot

willow

yellowweed

water sp.

balsam poplar

franklinia cyprip

No.....

Date.....

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No.....

Date.....

Page.....

South-central (Alibi site)

alder, willow, trembling aspen

white birch (R)

small-fruited birch

spotted Joe pyweed

Southern portion of Alibi site

had more coniferous trees

Yamaguchi

Spruce

black bear in woodland

Date: Aug 24, 2010 %CC: 90%

No. 1400-1900 (30) Temp: 24°C

Date: Wind: 3 Page: 57

Project - Site between Martine
Meadow & Abitibi

- Rollin drainage - water drains west
Southward towards southern
woodlot
- Tamarack (D) mixed with alder &
willow and some spruce.
- Balsam poplar & trembling aspen
also observed throughout

- Southern pines
- some tamarack
- Balsam poplar (D)
- trembling aspen
- alder
- willow
- white birch
- SP
- trembling aspen
- Balsam poplar
- willow
- alder

No.

Date: Page: 58

- Wetland area
- shorted milkweed ?
- meadow rice
- alder (A)
- Tamarack (A)
- willow (A)
- alder sp.

N
D

No.

No.

Date

Page

Date

Page

Sept. 30, 2011	Northland	304	1467 SW	Ag to woodland
start time 09:15, 15°C, wind 11, cloud 10%	(Cochrane site)		1468 W	
Transmission Line	Assessments		1469 N	Thicket
→ From car (conc. 6+7 from East-West)				
Assessing Water Crossing / Roadside		305	1470 NW	
wetlands + Vegetation Communities			1471 SW	
(Joe Vircek, Martin Esraelian - Match)		306	1472 S	
GPS			1473 SW	
B1	- non water body		1474 NW	
	- Farmers ditch / swale, ~ 1/2 mile	307	1475 S	
	- grassy		1476 SW	
299	Photo	1458 W	1477 W	
		1459 SW	1478 N	
			1479 SW	
GPS	PHOTOS	308	1480 NW	house
300	1460 S	Ag Fields	1481 SW	woodland to Ag
301	1461 W	approaching road to west	1482 NW	Thicket
			1483 N	
302	1462 N	woodland	1486 NE	
			1487 NW	Next to Lake
303	1463 S	Ag	1488 W	
	1464 W	woodland	1489 SW	
	1465 NW	thicket	1490 S	
	1466 N	thicket	1491 NW	

No.
 Date. Page.

No.
 Date. Page.

329 1543 SW
 1544 W
 330 1545 NE
 1546 SE
 331 1547 S
 1548 W
 1549 NW
 332 1550 W
 333 1551 NW
 334 1552 S
 335 1553 S
 1554 SW
 1555 NW
 1556 N
 336 1557 S
 1558 W
 1559 NW
 1560 N
 337 1561 NW
 338 1562 W
 339 1563 SW
 1564 NW
 340 1565/66 S
 1567 W

1568 NW
 1569 N
 341 1570 SW
 1571 NW
 342 1572 NW
 1573 S
 343 1574 SW house
 1575 W
 1576 N
 344 1577 NW
 1578 W
 1579 SW
 1580 SE
 345 1581 S
 1582 SW
 1583 W
 1584 N
 346 1585 N wetland/
 1586 N watercourse
 1587 SW
 1588 NW culvert
 1589 SW
 347 1590 SE 1592 N
 1591 S 1593 NW

369 1648 NE
 1649 S
 1650 SE

End Time 7pm

Oct 1, 2011 Northland
 (Cochran sites)

5°C, Wind, Cloud 40%.

Cont'd Roadside Trans. Line Access:
 (Joe Visek, Martine Esraelian - Hatch)
 -starting from West (con. 6+7 corner), 9am

GPS
 370

Photo

1653 NW

1654 NE

1655 SE

1656 E

1657 E

1658 S

1659 NE

1660 SE

1661 NE

1662 SE

1663 NE 1664 SE

1665 E

1666 NE 1667 SE

1668 E

376 1669 NE 1670 N

Watercourse

1671 S. 1672 W 1673 W

Crossing

~ 7-8m wide, > 1m deep

(Bridge)

a.h.w. on top of bank

395 1722 NE 1723 SE
 396/820 1724 N
 - Wetland / creek coming from
 marsh to N
 ~ 0.75 m diam culvert under Road
 → 1725 N 1726 S
 1727 E 1728 NE
 - no open water in creek (wetland)
 397 - cleaning, ATV trail to N
 1729 N
 1730 SE 1731 NE
 398 732 E
 399/814 1733 N - roadside wetland
 - no water present
 1734 SE 1735 NE
 400 1736 N 1737 NE, 1738 SE
 ↘ driveway N side ↘ open fields
 401 1739 N - trailers, small lake to N
 1740 S, 1741 SW → open field
 402 1742 NW
 - depression (wetland), no water present
 1743 E
 403 1744 N 1745 - E
 ↘ driveway on
 S side

404 1746 N - trail to N
 1747 NE
 1748 SE - 2 trailers about 50m
 from road to S
 1749 S
 405 1750 NE 1751 SE
 406 1752 N - cattails, small wetland
 no water present
 407 1753 N 1754 E, 1755 S
 408 1757 N, 1758 N
 - Large Valley to N (steep embankment)
 1756 E
 409 1759 SE 1760 NE
 410 1761 NE 1762 SE - house
 to S
 411 1763 SE 1764 E
 ↘ ag field, lower than
 1765 N - berries
 412 1766 NW (house), 1767 ag field,
 1768 E, 1769 SE, 1770 S
 (house)
 413 1771 NE 1772 SE 1773 SE
 414 1774 N, 1775 NE, 1776 SE
 1777 S → Barn

1834 SE - the water course
continues to S
- 3-4m wide channel, ~30cm deep
~15-20m wetland floodplain
to S

429 - small roadside wetland
- cattails, no standing water
1835 N, 1836 E, 1837 S

430 1838 NE 1839 E 1840 SE

431 - corner Conc. 6+7 / Conc. 10+11
1841 NE, 1842 E, 1843 SE, 1844 S

432 - 1845 NE, 1846 E, 1847 SE

433 - 1848 S, 1849 E, 1850 NE

1851 S - (Trail) - Raptor stick nest 20m S of road

434 - culvert ~.5m wide 1852 N

- cattails in ditch

1853 E

435 1854 NE

water course/wetland 2 culvert ~0.5m diam.

- long grasses 1855/57 N

- no water on N side, small wetland/
ponded water to S, ~20cm deep
↳ 1856 S
1858 E

436 1859 SE 1860 NE, 1861 E

437 1862 N, 1863 S, 1864 E

small roadside wetland - wet, but no standing water

438 1865 SW (shack house 20m from road)

1866 S - ag field

1867 SE - honor

1868 NE

439 1869 NE, 1870 SE, 1871 S (field)

440 1872 N, 1873 E, 1874 SE (field)

441 1875 E

442 1876 N, 1877 NE, 1878 E, 1879 SE

443 1880 NE (shack)

1881 E (near slope, by river)

1882 SE (roadway going S)

No.

Date Page

463 3950 N, 3951 SE, 3952 E
 464 3953 NE, 3954 SE
 465 3955 N, 3956 E, 3957 SE
 467 3958 NE, 3959 SE, 3960 E
 468 watercourse meet ditch
 ~ 2m wide 3961 N
 ~ 0.5 m diam. culvert 3962 NE
 water depth 10-20cm
 3963 N
 3964 SW
 3965 W - disjoints in ditch
 after culvert
 469 - 3966 S - trail ~ 56m wide
 470 - + railway to NE 3967
 3968 E (road ends to east)
 3969 SE (Lange field)
 471 - turnkey 3970 NW
 - road ends 3971 E
 - Field 3972 S

End Time 2 PM

No.

Date

Page

Sun Oct. 2 2011 Northland
 Cochrane Sta.

Cont'd Trans Line Assessment
 (Joe Viscek, Martine Estevan-Holt)

Start Time 9:00am

Sunny 16°C, Wind 1, Cloud 10%

- conc. 8-9, east side of ditch

GRS

Photo

472 1891 W (river)

1892 N 1893 S

473 1894 W

474 1895 W, 1896 SW, 1897 S

1898 S, NW, 1899 N

1900 W

475 1901 E, NW, SE

1902 NE

476

1904 NE, 1905 SE

1906 W, 1907 SW, 1908 NW

479

ditch

1909 SW, 1910 W

No water within

~ 2m wide, cattails

little standing water, variable
 mostly dry to < 10cm by culvert
 - cattails 1983 N
 1984 NE 1985 NW
 - thickets to S 1986 S
 1987 NW 1988 SW, 1989 E

500 1990 NE 1991 SE
 501 1992 N 1993 NE, 1994 SE
 1995 E

502 1996 N, 1997 NW, 1998 NE, 1999 SE
 2000 SW

503 - cattails end in ditch to N
 2001 N, 2002 NE, 2003 SE

504 - 2004 NW

505 - 2005 NE 2006 SE
 2007 N (ATU track)

506 2008 NE 2009 SE (house, barn)
 2010 S (house) 2011 SW (house, barn)

507 2012 N, 2013 NE, 2014 SE, 2015 S
 (house/barn)

508 2016 N 2017 NE 2018 S (house)

509 2019 N, 2020 NE, 2021 SE, 2022 S
 2023 SW (house/barn)

510 2024/25 N, 2026 NE
 2027 SE, 2028/29 E
 - Hwy 579 intersection to E

511 - at Hwy 579 intersection
 2030 NW 2031 N, 2032 NE
 2033 E, 2034 SE, 2035 S, 2036 SW
 2037 N, 2038 S

512 2039 N 2040 S, 2041 NE, 2042 SE

513 2043 N, 2044 NE, 2045 SE

514 2046 N, 2047 NE, 2048 SE, 2049 S
 2050 SW

515 - Watercourse 2051 S
 ~3-4 m wide, a.b. from top of bank
 ~10-30 cm deep
 - large culvert ~1 km diam.
 2052 SE 2053 N, 2054 NE
 - water gently flowing N
 - 2055 NE
 muck substrate visible
 2056 S - ponded water 10 m
 2057 SW east of culvert
 2058 E

No.....

Date..... Page.....

- 530 2120 N, 2126 NE (barn to NE)
2127 SE (house), 2128 S
- 531 2129 NW (house) 2130 SW (house)
2131 N, 2132 NE, 2133 SE
- 532 2134 NW, 2135 NE, 2136 SE
- 533 2137 NE, 2138 E, 2139 SE, 2140 S
- 534 2141 N - ditch crossing w/ culvert
- 535 - Watercourse crossing
2142 S, 2143 SW, 2144 S
~ 20-30 cm deep
Wetland to scrub, grassy emergents
- much sand substrate
2145 N ~ 1.5 m wide channel
a.b.w.m ~ 2 m across
2146 E - culvert ~ 2.5 m diam.
- very gently flowing N
into wetland 2147/48 N, 2149 NE
- 536 - Watercourse crossing
2150 S ~ 4-5 m wide
associated wetland
2151 SW 2152 SW
2153 S 2154 S
~ 30 cm - 0.75 m in depth
- cobble with sand substrate

No.....

Date..... Page.....

- 2155 N 2156 NW, 2157 W
- connects to wetland in N
- 2158 SW - culvert, ~ 5 m diam
(large)
- 537 - at Railway Crossing
2159 NE, 2160 SE (house)
2161 NW, 2162 SW (wetland complex)
- 538 - 2163 N, 2164 NE, 2165 SE
(houses to NE)
- 539 - 2166 NE, 2167 SE, 2168 S
- 540 - 2169 NE, 2170 E, 2171 SE
- 541 - 2172 SE, 2173 NE, 2174 N
2175 S
- 542 - Wetland to S 2176 S
possible dugout pond/marsh
~ 20-30 m diameter, ~ 15 m from road
2177 N, 2178 NE, 2179 SE
2180 SW (house)
- 543 2181 NW, 2182 NE, 2183 SE
2186 SW
- 544 2187 NE, 2188 E, 2189 SE
intersection at Genies (North) Rd.

Northland - Cochrane Solar Sites
Transmission Line Corridor Assessment

Thurs., Nov. 10 / 2011

Joe Viscek (Hatch)
 with Martine Esraelian

Temp: 4°C, light snow
 Wind: 3
 Cloud Cover: 100%

8:00 am Start time

Hwy 668, West of river, close
 just past railway tracks, heading North

GPS

Photo

Substation 2365 NW, 2366 N, 2367 NE
 (substation to west, near railway tracks)

POI 001 Watercourse Crossing
 0.75m^{diam} culvert, ~4m wide
 < 5cm to no standing water
 - cattails

Photos

2368 S (culvert)
 2369 NE, 2370 W, 2371 SW
 2372 N

POI-002 - Watercourse crossing - bridge
 (Watercourse) (Deception Creek)
 1 ~ 3-6m wide, ~0.5-1.5m^{deep}
 - high banks ~ 2-6+ meters
 - grassy riparian veg., flows W
 2373 N, 2374 SE, 2375 N,
 2376 N, 2377 S, 2378 NW
 2379 NW

POI 003 - Watercourse Crossing
 (Watercourse) - culvert ~ 0.5m diam
 2 ~ 2m wide, 4m ash.w.m
 ~ 10cm - 20cm deep
 grassy veg.

2380 SE, 2381 E, 2382 N,
 2383 S, 2384 W,

POI 004 - ditch to West
 (Watercourse) - paved with by road, ~ < 10cm deep
 x 1) 2385 N, 2386 E, 2387 SE, 2388 S W
 2389 W, 2390 W

POI 005 2391 E, 2392 N, 2393 NE
 (watercourse
 x 2) 2394 S, 2395 E, 2396 N,
 2397 W, 2398 N
 culvert ~ 30 cm diam.
 wetland / watercourse crossing
 ~ 2 m wide, mostly no
 standing water, some pooled
 areas < 5 cm. Cattails + grasses

POI 006 ditch extending W, no
 (Watercourse
 x 3) culvert, some pooled,
 standing water < 5 cm deep
 2399 S, 2400 NE, 2401 N,
 2402 SW, 2403 W, 2404 NW
 - grassy veg., ~ 1 m wide

POI 007 before lake (Kennedy Lake)
 (x 4) grassy, dry swale to West
 2405 N, 2406 SE, 2407 SW,
 2408 W, 2409 NW, 2410 N

POI 008 Kennedy Lake
 2411 - 2417 (East)

POI 009 Creek on both sides
 of road, no culvert
 or standing water,
 cattails near road
 2418 NE, 2419 E, 2420 SE, 2421 NW,
 2422 S, 2423 N

POI 010 Water Crossing
 (Watercourse
 3) ~ 0.75 m diam. culvert
 channel ~ 1 m with
 ~ 8 m a.h.w. mark
 - grassy w/ cattails
 - ~ 10 cm depth, visible
 to E flowing E into
 Kennedy Lake

2424 NE, 2425 NE, 2426 E,
 2427 W, 2428 NW, 2429 N

POI 011 Water Crossing
 ~ 0.5 m diam. culvert
 < 5 cm depth, flowing East
 ~ 1 m wide
 wetland-like on W side
 w/ grasses

2430 E, 2431 NE,
2432 NW, 2433 N

POI 012 Small watercourse crossing
(x7) culvert ~0.5 m diam
2nd culvert ~ 10cm diam,
~1 m wide channel
< 5 cm depth, flowing E
2434 E, 2435 E, 2436 N, 2437 W
2438 NW

POI 013 watercourse crossing
(Watercourse)
4 - culvert ~0.75 m diam
~1-2 m wide channel
depth 10-30 cm variable
flowing E gently
- grassy riparian veg.
2439 N, 2440 NE, 2441 E,
2442 W, 2443 NW, 2444 N

POI 014 Near HWY 668 / Conc. 8 and 9
intersection
2445 N, 2446 NE, 2447 SE,
2448 SW, 2449 NW

POI 015 2450 E N
At HWY 668 / Conc. 8 and 9
intersection

POI 016 2451 N, 2452 W
Conc. 8 and 9 backing W

POI 017 watercourse crossing
(Watercourse)
5 0.5 m culvert
~3 m wide
1.5 m high banks
~10-20 cm deep
grass + some small tree
riparian veg.

2453 NE, 2454 NE, 2455 E,
2456 S, 2457 E, 2458 NW
2459 NW
- gently flowing East

POI 018 2460 S, 2461 E, 2462 N

POI 019 2463 E, 2464 NE, 2465 NW,
2466 W

POI 020 Watercourse Crossing
(Watercourse 6) ~0.75 diam. culvert
channel on N side only,
pooled water on S side
~ 3-4 m wide
trees + grass rip. veg.
~ 20-30 cm depth
very gentle flow N
muck veg. debris bottom
2467 SE, 2468 S, 2469 E,
2470 N, 2471 W, 2472 E

POI 021 Watercourse Crossing
(X8) Culvert ~0.5 m diam.
~ 1-2 m wide
cattails + grasses
< 10 cm deep to dry
2473 SE, 2474 SE, 2475 NW
2476 W, 2477 NE, 2478 E
2479 NW, 2480 N
- flowing gently N

POI 022 2481 E, 2482 SE,
2483 S, 2484 W, 2485 NW

POI 023 Lake in view
2486 E, 2487 SE,
2488 SW, 2489 W, 2490 N
2491 / 2492 E
(Lower Deception Lake to E)

POI 024 2493 SE, 2494 E
2495 NW, 2496 N, 2497 N,
2498 SE, 2499 S
- beginning to sand Lake

POI 025 2500 E, 2501 E, 2502 S
2503 SE (just before bridge)

POI 026 Water Crossing
- Bridge
Stream ~ 5-6 m wide, 0.5-1 m deep
draining N into Lake
2504 S, 2505 W, 2506 W,
2507 S, 2508 NE, 2509 NE
2510 W, 2511 W,
2512 NE, 2513 W, 2514 E

POI 027 2515 E, 2516 E,
2517 NE, 2518 NE,
2519 NW, 2520 W
- Rounding Lake to SW
2521 NW

POI 028 2522 E

POI 029 2523 E, 2524 N,
2525 W
heading E past Lake

POI 030 Road ends to E
2526 E, 2527 S, 2528 SW
Snowmobile/ATV trails continue to
East/North 2529 E / 2530 N

POI 031 Watercourse Crossing
near Long Lake site
(Conc. 8+9)
~ 2.5 m diam Culvert
2-3 m wide stream
Flowing North
~ 0.5 m deep

- grassy riparian veg
2531 S, 2532 S, 2533 N,
2534 N, 2535 W, 2536 S

POI 032 Long Lake Site
Photos for Computer
Rendering

2537 E, 2538 SE, 2539 S
2540 S, 2541 SW, 2542 W
2543 SE, 2544 S,
2545 SE, 2546 SE,
2547 W

Video taken at HWY 668 +
Conc 8+9 Culvert

Finalized at 4:00 pm
- proceeded to MNR office to
obtain FRI maps.

Northland - Cochrane 4 solar Sites
Transmission Corridor Assess.

Joe Viscok (Hatch)
 with Martine Esraelian

Fri, Nov. 11 / 2011

Temp: -1°C

Wind: 2

Cloud Cover: 95%

Light snow, on and off

8:00 am start time
 From Corner Conc. 10 + 11
 and Conc. 8 + 9 Clute
 (West of river)

GPS

Photo

POI 033 2549 SE, 2550 E,
 2551 NE, 2552 W
 (intersection of
 10/11 + 8/9)

POI 034 2553 SW, 2554 NW

POI 035 2555 SW, 2556 NW

POI 036 Water Crossing
 (17) 2 x 0.5 m diam. culverts (6 m apart)
 - wetland w/ ponded water
 to south
 - depth ~ 20-30 cm

(cattails - swampy w/ grasses + small trees
 - gently flowing north
 - channel width to north ~ 1.5 km
 as water enters wetland area

2557 N, 2558 NW, 2559 SW,
 2560 SW, 2561 SW, 2562 S,
 2563 W

POI 037 2564 SW, 2565 NW

POI 038 2566 SW, 2567 NW, 2568 N

POI 039 2570 SW, 2571 NW

POI 040 2572 SW, 2573 NW

Culvert 0.5 m diam
 < 5 cm water, gently flow N
 more wetland like than
 watercourse, < 1 m wide

2574 NW, 2575 N, 2576 W,
2577 SW

- probably an "intermittent stream"
- thicket riparian veg.

POI 041 2578 SW, 2579 W, 2580 NW

POI 042 Pieces of bone / carcass found
by road, possibly moose
2581 SW, 2582 NW

- detour road to North 2583 N

POI 043 2584 SW, 2585 NW, 2586 W

POI 044 2587 SW, 2588 NW, 2589 W

POI 045 2590 SW, 2591 W, 2592 NW

POI 046 2593 SW, 2594 NW

POI 047 Watercourse on N side of road
(X9) pooled water in ditches

to N and S, no culvert visible

~ 1.5m wide channel extends N

~ 20 cm deep

rip veg.: grasses thicket,

- no visible flow

2595 NW, 2596 N, 2597 SE,
2598 NE, 2599 W

POI 048 2600 SW, 2601 NW

POI 049 2602 SW, 2603 NW

POI 050 2604 S - possible wetland
to south

(cat tails visible)

2605 W, 2606 SW, 2607 NW

POI 051 Under Powerlines

2608 SW, 2609 W, 2610 NE

2611 NE, 2612 E, 2613 SW

POI 052 Road turns North,

Trans. Line Corridor continues
down bush trail

2614 W, 2615 NW, 2616 W

2617 - Animal skull

+ mandible found

near trail (maybe Fox)

2618

Bush trail - heading W

- POI 053 2619 W
 POI 054 2620 W
 POI 055 2621 W
 POI 056 2622 W - wetland area
 POI 057 2624 SW, 2626 E
 POI 057 2627 W
 POI 058 2628 / 2629 W
 Small wetland
 POI 059 2630 W, 2631 E
 POI 060 2632 W, 2633 E
 POI 061 2634 / 35 S, 2636 W, 2637 E
 POI 062 2638 W, 2639 NE, 2640 SE
 POI 063 2641 W, 2642 N, 2643 E, 2644 S
 Swampy-like patches along +
 adjacent to trail
 POI 064 2645 W, 2646 E
 POI 065 2647 W, 2648 S, 2649 E
 trail detour* to south
 POI 066 2652 W, 2653 N, 2654 E
 Trail detour* to N
 Wetland-like along trail
 for 25m W
 POI 067 2655 W, 2656 W, 2657 NW,
 2658 SW, 2659 E

- POI 068 2662 E, 2663 W
 wetland - patchy areas
 along path heading W
 POI 069 2664 W, 2665 E
 2666 - hoof track
 POI 070 - wetland along trail
 2667 W, 2668 W, 2669 E
 2670 E, 2671 W → shows wet
 areas along trail
 POI 071 - 2672 W, 2673 E
 POI 072 - Large Wetland Complex
 - swamp/marsh mix
 - cattails, grasses, thicket
 2674 W, 2675 E, 2676 W,
 2677 N - wetland extends N
 2678 W, 2679, 2680 S, 2681 W
 - flows North
 2682 E, 2683 W
 75m east of POI 073 → trail continues, wetland-like
 POI 073 → 2684 W, 2685 E, 2686 W
 POI 073 2687 E, 2688 W
 - trail continues to be wetland-
 like
 POI 074 - 2689 W, 2690 E
 Left site @ 4:30 pm

POI 075 2691 W, 2692 E

- very large poplars

POI 076 2693 E, 2694 W

POI 077 2695 N, 2696 W, 2697

- North/South trail detour

↳ no trail continues west

POI 078 - North detour on
trail taken to hook at
dead end.

2698 S, 2699 W

POI 079 - Watercourse

- drains into deception
Lake

~4 m wide, 30-40 cm deep

2700 W, 2701 N, 2702 N,

2703 SW, 2704 N

- wetland ~ 12 m across

Transmission Line Assessment

Location: Cochrane, ON

HWY 668 North, ~~to east~~
Conc. 8+9 Curve

Date: Nov. 10, 2011

Time: 0800 - 1600 (8.0 hrs)

% CC: 100

Temp: 9.2°C

Wind: 19 km/h SW

Precip. < 1 mm rain; < 1 mm snow
light snow

- Muddy pole on east side HWY 668

Water Feature

① Deception Creek

- Water present
- Flow - East

② Water Feature

- present - yes (east + west); Flow - East
- water present: depth ~ 3-4"
- water feature ^{on east} does not have a defined bank (at least for the portion observed from the road)
- flows through a "meadow marsh" ^{+ tall shrubs} + wetland
 - sedges, cattail, speckled alder, grasses.
- (some, both sides of road)
- water flows east under road through a galvanized culvert ~ 6-7" wide.
- photos: 4348-4351 (west side, facing ^{SW})
- duckweed, horned sp. on ^{1m} side ^{east}
- photos: 4352-4353 (east side, facing ^{east})
- "municipal drain" on both sides of road are ~ 5m lower elevation from road + composed of cattail, sedges, grasses;
- the low-lying areas connect with ~~the~~ water feature ② + water feature ①
- low-lying area ^{includes} ~~includes~~ area in a defined bank (ie municipal drain) + areas that are low-lying ~~to~~ ^{with slight} no bank or ~~slope~~ slope. This area is intermittent.
- Changes in slope ^{+ topography}

"Rite in the Rain"

- ? suggest that water does not run off & flow one-way (i.e. ~~likely~~ drain into both) culverts throughout mean that there is no break between ① + ②

⑪

Drainage Feature
- west of Hwy 668 @ cross from Huron Menonite Church / Conc. 6 + 7 Cuts.

- Photos

- 4354 - West

4355 - North

4356 - South

4357 - 4358 - vegetation - horsetails, (x) cattail, sedges in water

~ 3" standing water present

- drainage feature connected to roadside "ditch"

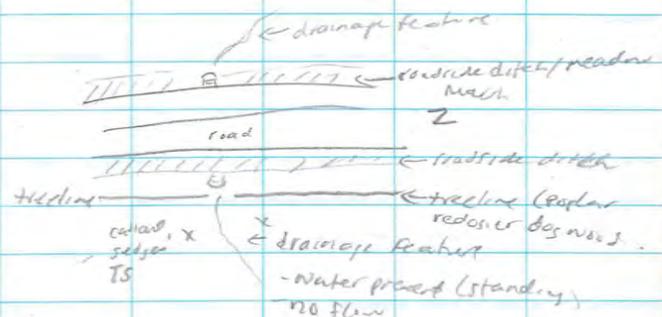
- no flow present

- slightly sloped bank - grasses / sedges

⑫

Drainage Feature / Wetland
culvert under road - east & west

- west side - ~~no~~ defined bank, low-lying area / meadow-march - grasses, sedges, cattail



- East side

- drainage swale east into "meadow-march"

- some pooled water present

- no defined bank, TS swale into marsh (open muskeg)

⑬

Drainage feature -

- west side only

4359

photo 4360 - W

4361 - N

4362 - S

ditch w water present
possibly flows North?

- drainage swale through 'open muskeg' sedges, grasses, cut through woodland - poplar, spruce

- width - 1-m' channel w

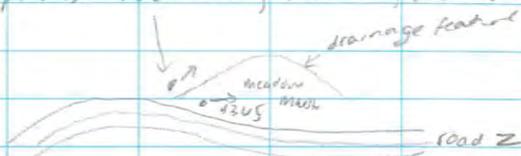
- Bank - slight slope - Top ~ 3-m

"kitten the rain"

(X4) drainage feature - not a waterbody

- naturally follows topography

photos: 4362-NW; 4363 NW; 4364 NW; 4365-W



- some standing water present c1cm

X4:1 - photo 4366-S
4367-N

X5 Kennedy Lake - east
Photos 4368-4374-S

X5 - west side 4375

- drainage swale cuts west through woodland

- grass, reeds, cattail

- no defined channel

X5-1 east side
- drainage swale - no defined channel

photo 4376

(3) water feature - Culvert (large) under road

present - yes

photo 4378 - west side

- flow - east (water ^{currently flowing})

3-1 - west side (photo 4379)

East side - <1 m channel
defined bank

photo 4378

- bank depth - ~4.6"

- flows through trees/shrub + open
mudflats

- trees - poplar (D) ^{bulbous tree}
spruce, fir

West side - open mudflats?
- irregular shaped w no "real"
defined bank

- grasses, sedges (D)

4380 - east - immature poplar, red spruce dominant

east/west side of road
culvert - ~~photo~~

X6 - east side

East ^{side} photo 4381

water present, flow east through
poplar/fir ^{salix} + open marshes
- channel width < 1m; shallow bank

X6-1 north side - 4382

- open marshes,
- grasses, sedges,
- no defined bank, no water

X6-3 - west side - open marshes? 4383

X6-4 - east side - open marshes 4384

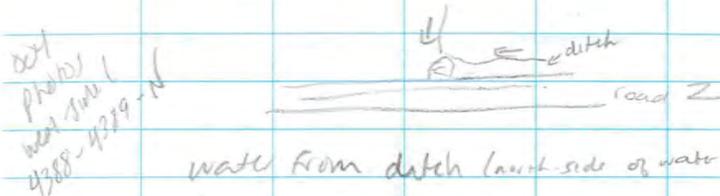
X7 - west side (culvert) 4385, 4387
flow east drainage channel, ^{some} water

X7-1 - east side culvert (near pole) 4386

- no defined channel
- grasses/sedges sward through
poplar + open meadow/marsh
- cattle X

(4) Water Feature (Fower Creek?)

(4) west side 4390-4395



water from ditch (west side of water feature)
flows south into water feature; water
feature flows east

- water present - ~4" deep?
- channel width 1.5-2m
- shrubs, sedges + grasses along bank
organic substrate

4-1 - east side 4396-4400

water present

ditch to the north flows south into
water feature; water feature flows east

- channel width - ~2.3m
- depth - ~20cm (8")
- organic substrate; some gravel
- grass-tedge around bank +
tall shrub (alder)

GP1-005

conc. 8 + 5 chks

photo 4401 (west side) - transmission line
photo 4402 (north)
photo 4403 (east side) - transmission line

⑤ Water Feature (east side) 4404 ↓

4405 - East

4406 - SE

4407 - S

4408 - NE

4409 - NE

Electric fence
east side (N-S)

- culvert -
width - ~ 6 m wide

sloped bank - Top - 7m

- "cut" grass along bank

- Alder & poplar surrounding

- grasses / sedges ^{marsh} pockets

- depth - < 20cm (nearby @ bank full)

⑤-1 west side - 4410

- drainage small, no defined bank

- sedges, sedges

east/west
- ditches are steep

conc. 8 + 9 Clute heady east

⑥ Water Feature (culvert under road)

⑥ north side 4411 - N, 4412 west

water present

- Alder / grasses / sedges ^N along bank; ^S siltation

- Black spruce surrounding

- channel width - 5-6 m

- depth - ~ 30cm (almost @ bank full)

muck substrate

⑥-1 south side - 4414

- pooled water! (doesn't go anywhere)

- ^{might} be water feature ⑥-2
north side of rd. culvert -

⑧ drainage Feature

Flow - North (flow present / water present)

4415
- N -
cattail, sedges, grasses

alder, poplar

⑧-1 south side (culvert) drainage

ditch - water flows east & west

through from ditch ^{through} ^{through} flows north

4416
- N -
sedges, cattail

water present

"Rite in the Rain"

photo 4417 - 4418 towards Lower Deception Lake

photo 4419 - 4422 - Lower Deception Lake

(10) Water feature

- bridge crossing - 6m wide?

north side 4425^N 4426^W 4427^E

South side 4428^S 4429^W 4430^E

White
Small stream

rock, cobble substrate; downed logs

TS riparian - alder, red-osier dogwood

- depth ~ 1m

- water present

POI 027

(1)
- Trembling Aspen, Balsam Fir, White Birch,
Hickory-Box
Cedar along shoreline, Jack pine?

(35) Water feature (Long Lake)

Flow - north

photo 4433 - 4435 - north

photo 4436 - 4437 - south

(Y1) TS

- Alder 80 75
Red-osier dogwood 40 05
568
705

Cattail / red-osier dogwood within ditch

(Y2) Photos 4442 - 4447

4442 - N

4443 - NE

4444 - E

4445 - SE

4446 - Facing west

4447 - Facing west

4448 - 4449 - Willow sp

(X9) Water Feature

photo 4456 - E } adjacent
4457 - N } woodland
4458 - N }
4459 - E } water feature
4460 - W }

(South of Road (ditch)
photo 4461 - 4464 - W)

- only on north side of road
- width - ~ 2m
depth 20-30 cm @ bank full
organic substrate
Riparian - sedge

Black spruce, Tamarack
speckled alder

- connected to drainage ditch along
the road. Drainage ditch is the
same width/depth + comp.
- No flow obs

Roadside ditch on the south side of
road has standing water / no flow
~ 2m wide
~ 10cm depth of water / no flow
- There is no culvert connecting the
ditch to the water feature.

(43) west of X9
presence of water begins + continues
east. This is true for both
ditches (north + south of Rd)

(44) south side of road
photo - 4465 - S
4466 - W
- grasses (+)
willow speckled alder present
patch of cattail observed further
south

(45) Photos
4468 - NW
4469 - W
4470 - N

(16) Water Feature / Wetland
- water present (permanent)

