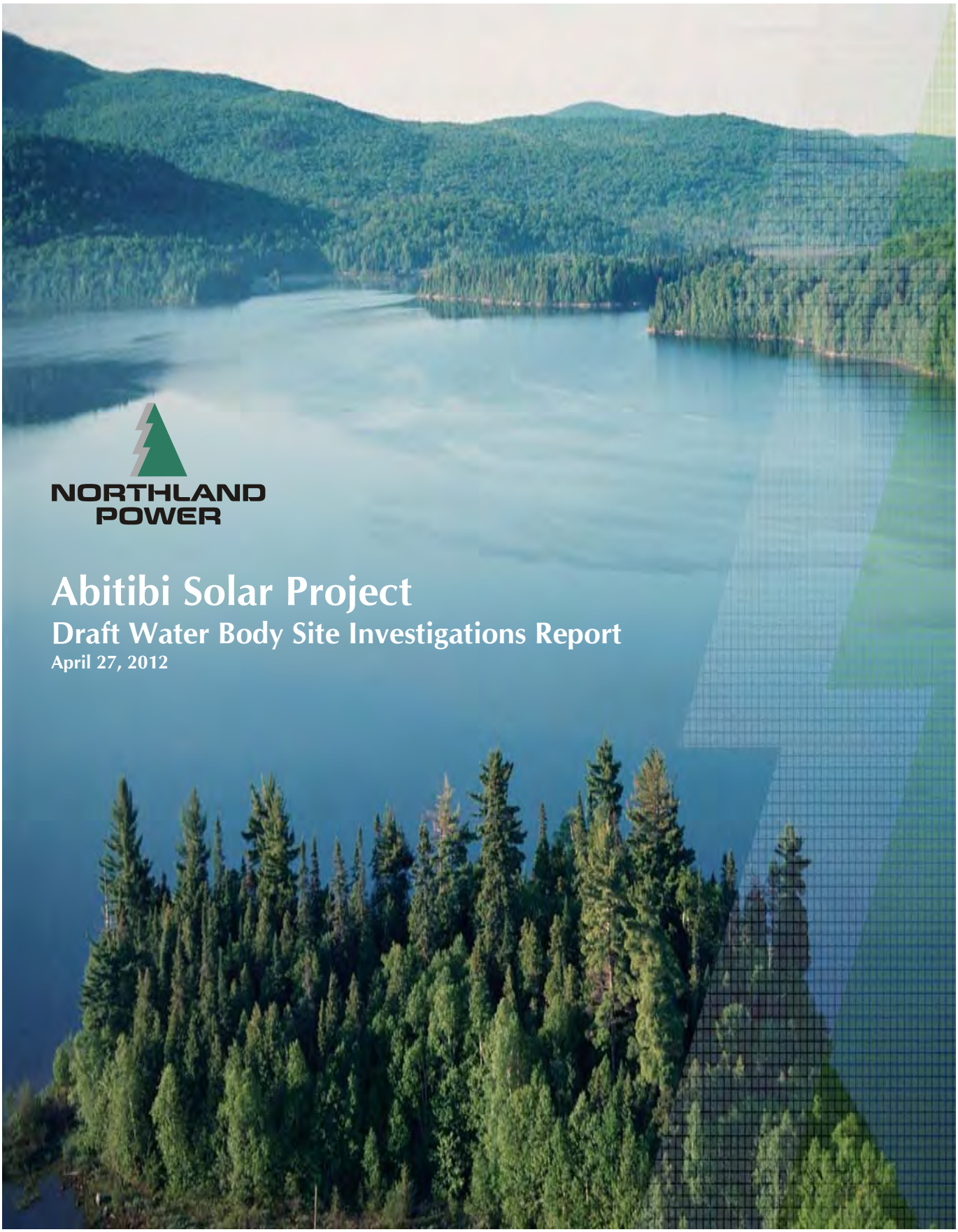

NORTHLAND POWER

Abitibi Solar Project

Draft Water Body Site Investigations Report

April 27, 2012

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

DRAFT Water Body Site Investigation Report

Abitibi Solar Project

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Rev. 0
April 27, 2012

Project Report

April 27, 2012

Northland Power Inc.
Abitibi Solar Project

DRAFT Water Body Site Investigation Report

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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 distribution line from the solar panel Project location to the connection point immediately west of the Project location. This portion of the project is referred to as the distribution 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.

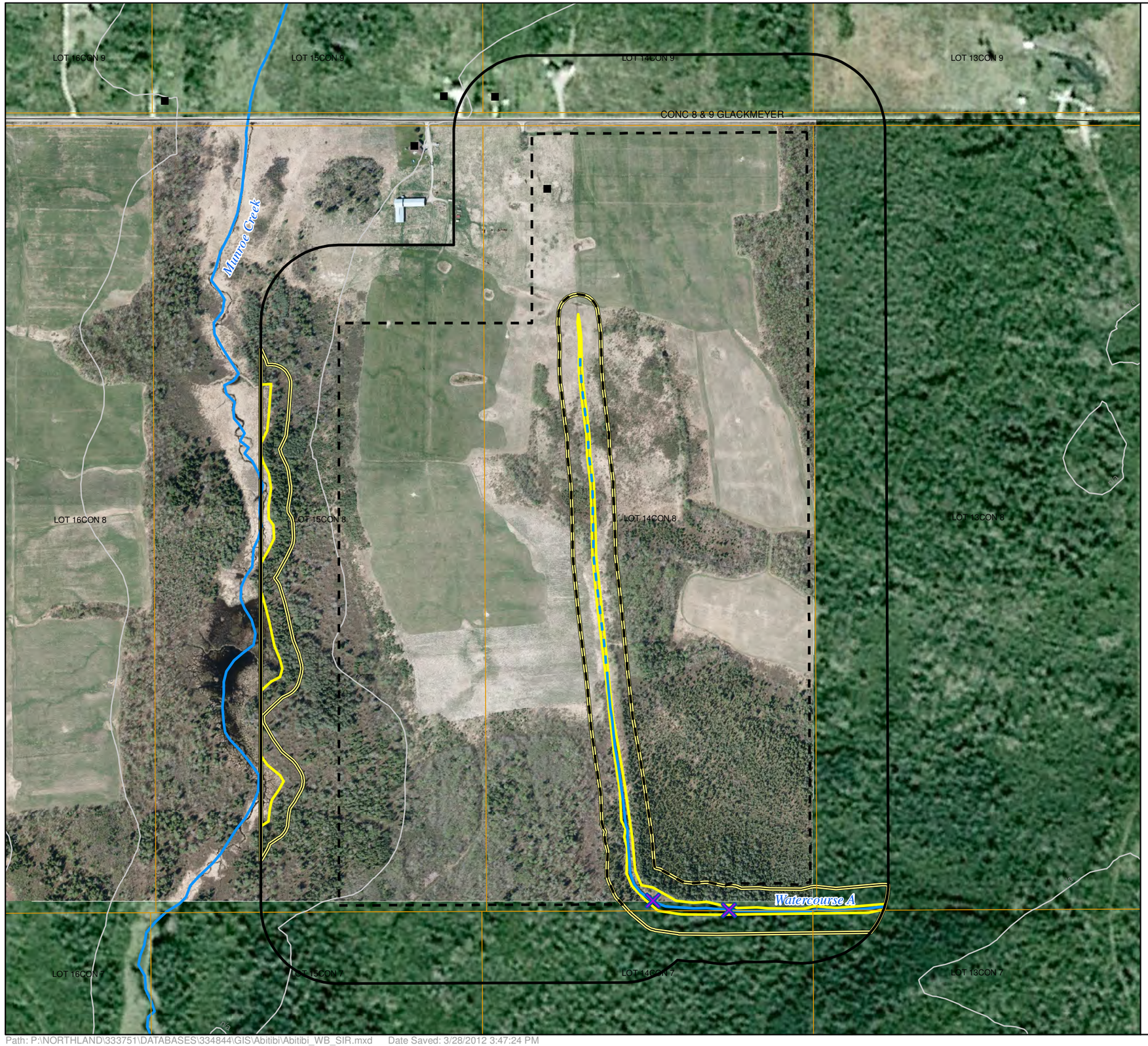
2. Information relating to each water body identified in the *Water Body Records Review Report* (Hatch Ltd., 2012) and in the site investigation, including the type of water body, plant and animal composition and the ecosystem of the land and water investigated.

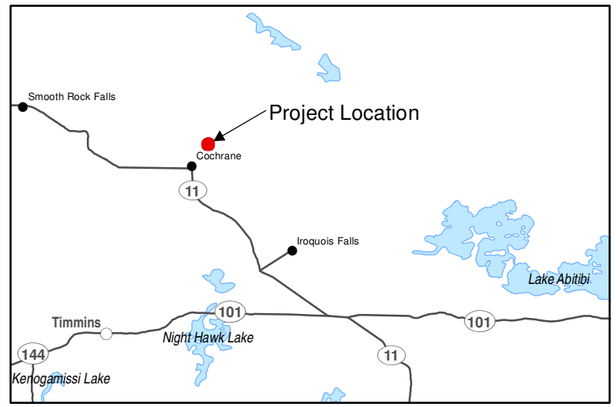
3. A map showing,

    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 Eart Pro, captured 2003.
4. Air photo obtained from Northland Power Inc, flown May 2011.

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

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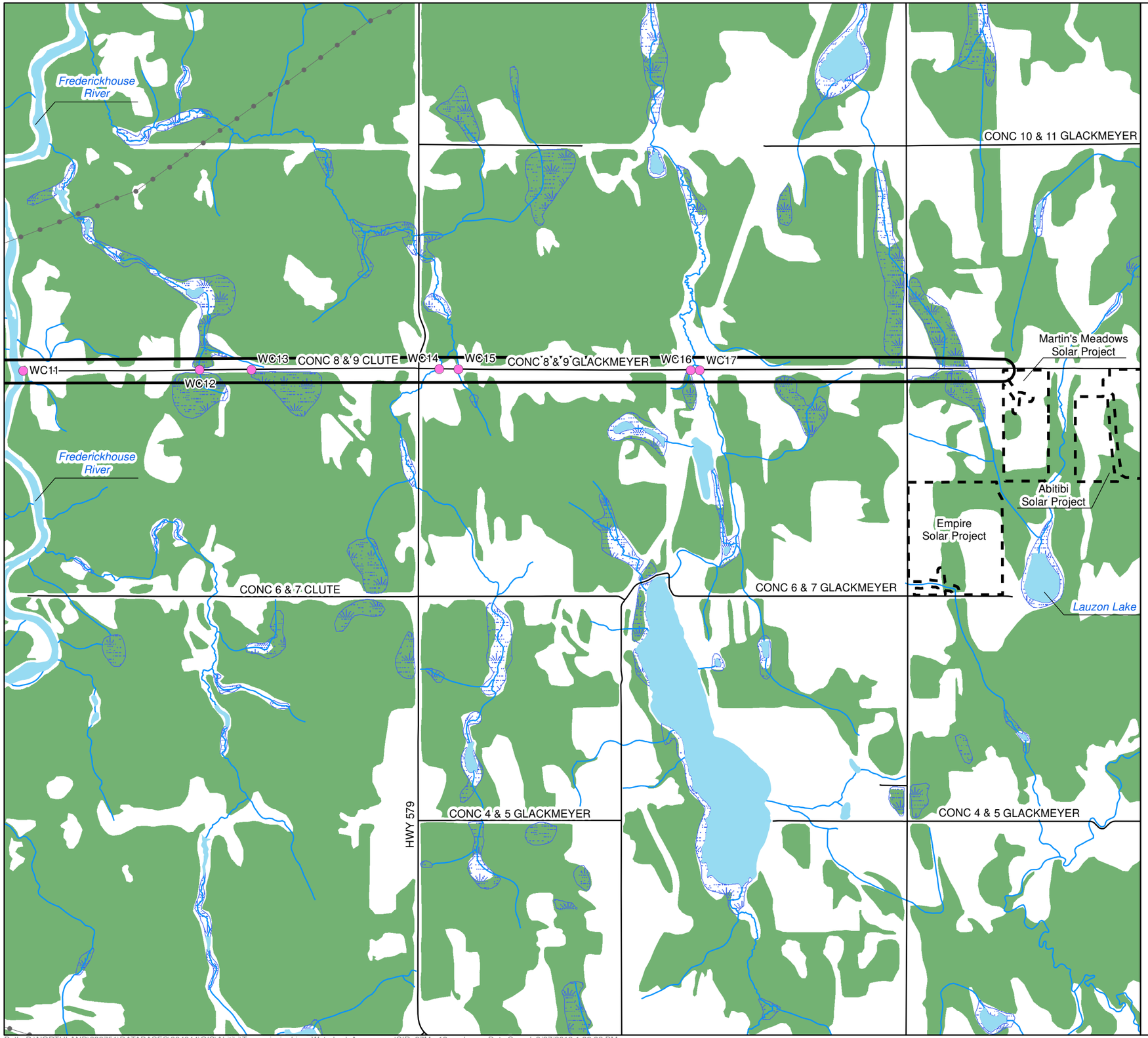

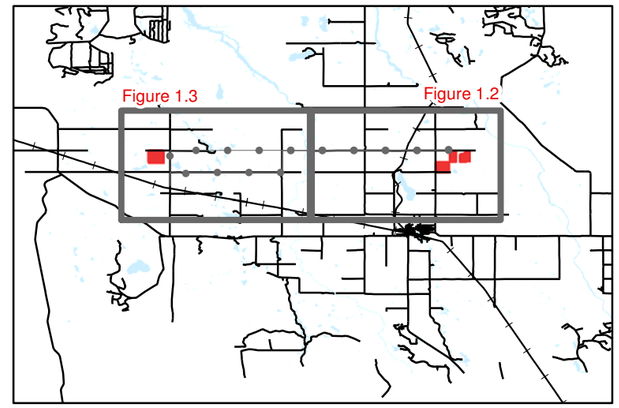

Legend

- Connection Point
- 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.

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Figure 1.2
Northland Power Inc.

Distribution Line Project Location (Eastern Half) - Waterbody Site Investigation Results

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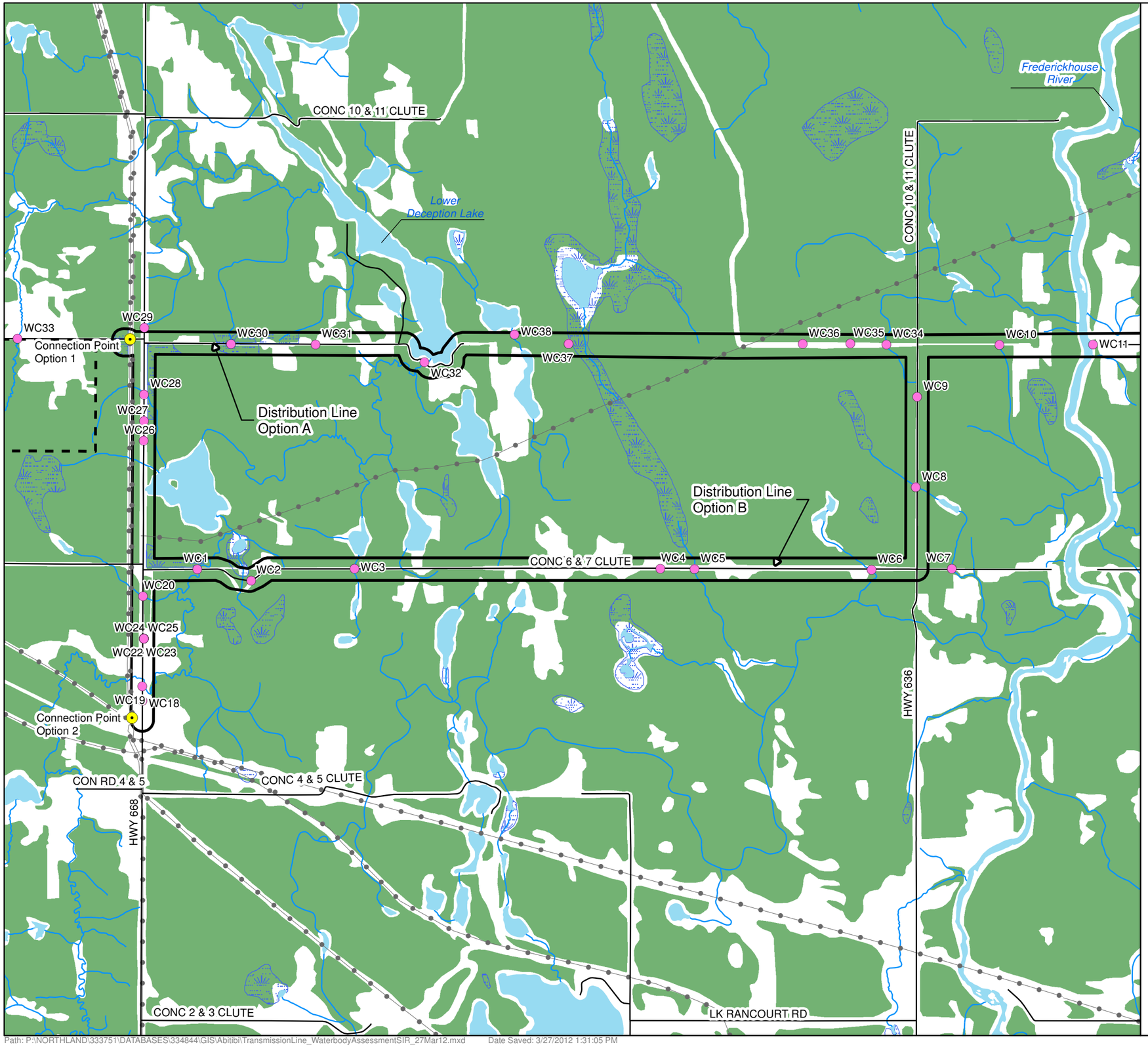

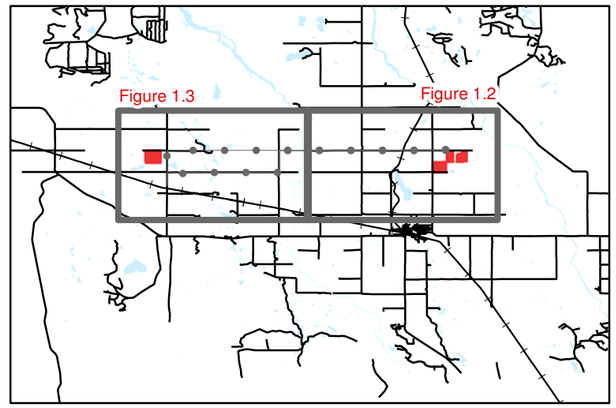

Legend

- Connection Point
- 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.

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Figure 1.3
Northland Power Inc.

Distribution 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 distribution 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 distribution 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 distribution 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 distribution 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 distribution 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 Distribution Line Project Location Site Investigations

The purpose of these site investigations was to confirm waterbodies on and within 120 m of the distribution 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 distribution 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 (Distribution 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 Distribution Line Project Location

A total of 38 waterbodies were observed along the distribution 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 distribution 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 Distribution 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 Distribution 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 distribution line will run within 120 m of the average annual high water mark of Lower Deception Lake. There are no corrections required to the *Water Body Records Review Report* (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 *Water Body Records Review Report* (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	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. 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. • The *Water Body Records Review Report* (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 distribution 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 *Water Body Records Review Report* (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 distribution 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

No.
Date. Page 37

Project: Martin's Meadow
Abitibi Site
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 & surrounding the Project site.
- There is a watercourse that traverses north-south through Lot 15, Conc. 8
- This watercourse is shown on the LIO mapping
- This watercourse is surrounded by wetland vegetation characteristic of a meadow marsh (e.g. [illegible] canary, cattail, grasses, sedges). Surrounding the meadow marsh community is a thicket swamp dominated by

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Date. Page 38

willow, speckled alder, dogwood.
- These wetland communities (meadow marsh & willow thicket swamp) are not shown on the LIO mapping.
- There is also a municipal drain that flows east along Conc 8 & 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 canola, hay, grain
- Pasture was also observed
- A large equestrian operation & small equestrian hobby farm was

No. ....

Date. ....

observed on the properties north of the Project site

The areas that are not in agricultural production (within 1 km) include scrublands & young immature woodlands.

- The Project site was formerly used as a livestock operation 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.

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Project: Martin's Meadows
Date: Aug 23, 2010
Time: 1600 - 1930 (3.5)
% C.C: 0%
Temp: 24°C
Wind: 2

black bear in NE woodlot

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Date. Page 50

drainage feature along the
western boundary. Galvanized culvert
observed
- drain not connected to the
municipal drain
— willows along drainage feature
- small-fruited bulrush
- broad leaved cattail
- alder (R)
- red-osier dogwood (R)
- ~~cwa~~
- drainage feature ends at the
woodlot - where it reaches woodlot
channel is not defined.

woodlot
- alder (D) mosses
- willow
jewelweed
aster sp.
balsam poplar
trembling aspen

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Date. Page 51

Small woodlot

willows — raspberry sp
trembling aspen
alder.

Abitibi Site

North East Woodlot

wet/moist woodland - 30% canopy cover / groundcover understory vegetation dense

alder, willow (edge)
Balsam Poplar (D) along edge
Trembling aspen (D) within woodland
red raspberry sp
spruce sapling
red-osier dogwood (edge
fragrant bedstraw.
ferns
horsetail sp.
alder (understory D)
balsam fir (immature) (K)
gooseberry
Strawberry sp.
grasses
highbush cranberry?

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Date. Page 52

agrimony
Sensitive fern
aster sp
rose sp
- vernal pooling with water along edge (GPS point taken)
- sedges, fireweed
- alder

- balsam poplar / trembling aspen vary in dominance within woodland

- patch of willow / alder that extend from the woodland east - west onto agricultural field (GPS point taken)

- tamarack, white spruce saplings near east?

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South-central (Atchafalaya side)
alder, willow, trembling aspen
white birch (AC)
small-fruited bulrush
spotted joe pye weed

southern portion of Atchafalaya has more coniferous trees
tamarack
spruce
black bear in woodland

No.....

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

Date: Aug 24, 2010 %cc: 90%
No. Temp: 24°C
Time: 1400 - 1900 (30) Wind: 3
Date Page 57
Project Site between Martins

Meadow & Alder

- Rolling topography - water drains west
Southeast towards centre
wetland
- Tamarack (D) mixed with alder &
willow and some spruce
Balsam poplar > 10cm
also observed throughout

Southern portion
some tamarack
Balsam poplar (D)
trembling aspen
alder
willow
very buck
SP
- trembling aspen
- balsam P.
willow
alder

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Date Page 58

wetland area
- whorled milkweed ?
meadow rue
alder (A)
Tamarack (A)
willow (A)
cattail sp.

No. Date. Page.

No. Date. Page.

Sept 30, 2011 Northland 304

start time 9am, 15°C, wind, clear (Cochrane site)

Transmission Line Assessments

→ From car (conc. 6+7 from East - West)

Assessing Water Crossing / roadside 305

wetlands + Vegetation communities

(see Vireck, Martine Esmaelian "Hatch 306

GPS

B1 - non water body

- Farmers ditch / swale, ~1 m wide 307

- grassy

299 Photo 1458 W Ag

1459 S W Fields

308

GPS PHOTOS

308 1460 S Ag Fields

301 1461 W approaching woodland to west 309

302 1462 N woodland

10

303 1463 S Ag

1464 W woodland 311

1465 NW thicket

1466 N thicket 312

1467 SW Ag to woodland

1468 W

1469 N Thicket

1470 NW

1471 SW

1472 S

1473 SW

1474 NW

1475 S

1476 SW

1477 W

1478 N

1479 SW

1480 NW house

1481 SW woodland to Ag

1482 NW Thicket

1483 N

1486 NE

1487 NW Next to Lake

1488 W

1489 SW

1490 S

1491 NW

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	

No.....
Date.....Page.....

	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/ waterways	
	1586	N		
	1587	SW		
	1588	NW	culvert	
	1589	SW		
347	1590	SE	1592	N
	1591	S	1593	NW

No.....
Date.....Page.....

369	1648	NE		
	1649	S		
	1650	SE		
End	Time	7pm		

No.....
Date.....Page.....

Oct 1, 2014 Northland
(Cochrane sites)
5°C, Wind 1, cloud 40%.
Cont'd Roadside Trans. Line Assess.
(Joe Vistesk, Martine Espaelier + Matt)
- starting from West (con. 6 + 7 corner), 9am

GPS
370

Photo
1653 NW
1654 NE
1655 SE
1656 E
371 1657 E
372 1658 S
1659 NE
1660 SE
373 1661 NE
1662 SE
374 1663 NE 1664 SE
1665 E
375 1666 NE 1667 SE
1668 E
376/377 1669 NE 1670 N
Water course 1671 S. 1672 W 1673 W
crossing ~ 7-8m wide >1m deep
(Bridge a.h.w.m top of bank

No.
Date. Page.

395 1722 NE 1723 SE

396/B20 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 - clearing, ATV trail to N
1729 N
1730 SE 1731 NE

398 1732 E

399/B19 1733 N - roadside wetland
- no water present
1734 SE 1735 NE

400 1736 N 1737 NE, 1738 SE
↳ driveway N side ↳ open Field

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

No.
Date. Page.

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, house/barn
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
↳ Barn
1777 S

No.....
Date.....Page.....

1834 SE - the watercourse continues to S
- 3-4m wide channel, ~30cm - 0.5m 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
waters course/wetland culvert ~0.6m diam.
- long grasses 1855/57 N

No.....
Date.....Page.....

- 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 - house
1868 NE
439 1869 NE, 1870 SE, 1871 S (field)
440 1872 N (field), 1873 E, 1874 SE
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 meets ditch
~ 2m wide 3961 N
~ 0.5 m diam. culvert 3962 NE
water depth 10 - 20cm
3963 N
3964 SW
3965 W - discipates in ditch
after culvert
469 - 3966 S - trail ~ 5-6m wide
470 - + trailers to NE 3967
3968 E (road ends to east)
3969 SE (Large field)
471 - trailers 3970 NW
- road ends 3971 E
- Field 3972 S
End Time 7 PM

No.
Date. Sun Oct. 2 2011 Northland Page.
Cochrane Site

Cont'd Trans Line Assessment
(Joe Visceck, Martine Esvaelian [illegible])

Start Time 9:00am
Sunny 16°C, Wind 1, Cloud 10%

- Conc. 8-9, east side of [illegible]

GPS	Photo
472	1891 W (river)
	1892 N [illegible]
473	1894 W
474	1895 W, 1896 SW, 1897 S
	1898 NW, 1899 N
	1900 W
475	1901 E [illegible]
	1903 NE
476	1904 NE, 1905 SE
477/478	1906 W, 1907 SW, 1908 NW
479 ditch	1909 SW, 1910 W

No water within
- ~2m wide, [illegible]

No.....
Date..... Page.....

	little standing water, variable			
month	day	to < 10cm by culvert		
	- cattails	1983 N		
	1984 NE	1985 NW		
	- thicket 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	- Cattail, end in bush to N			
	2001 N, 2002 NE, 2003 SE			
504	- 2004 NW			
505	- 2005 NE	2006 SE		
	2007 N (ATV trail)			
506	2008 NE	2009 SE (house, barn)		
	2010 S (field)	2011 SW (house, barn)		
507	2012 N, 2013 NE, 2014 SE, 2015 S			
	(road)	↓ (house/barn)		
508	2016 N	2017 NE	2018 S (house)	
509	2019 N, 2020 NE, 2021 SE, 2022 S			
	2023 SW (house/barn)			

No.....
Date..... Page.....

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.h.w.m to top of banks
	~10-30 cm deep
	- large culvert ~1.5 m diam.
	2052 SE 2053 N, 2054 NE
	- water gently flowing W
	- 2055 NE
	muck substrate visible
	2056 S - ponded water 10 m
	2057 SW end of culvert
	2058 E

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

530	2128 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 south, grassy emergents
	- mucky substrate
	2145 N ~ 1.5 m wide channel
	a.h.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 to N
	2158 SW - culvert, ~ 5m 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
	intersecting at Genier (North) Rd.

No.....
Date..... Page.....

Northland - Cochrane Solar Sites
Transmission Line Corridor Assessment

Thurs, Nov. 10 / 2011

Joe Visceck (Hatch)
with Martine Esraelian

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

8:00 am Start time
Hwy 668, West of river, 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, ~4 m wide
< 5cm to no standing water
- cattails

No.....
Date..... Page.....

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

POI 002 (Watercourse 1) - Watercourse Crossing - bridge (Deception Creek)
~ 3-6m wide, ~0.9-1.5m 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 2) - Watercourse Crossing
- culvert ~ 0.5m diam
~ 2m wide, 4m a.h.w.m
~ 10cm - 20cm deep
grassy veg.
2380 SE, 2381 E, 2382 N,
2383 S 2384 W,

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

No.....
Date..... Page.....

POI 005 (watercourse x2) — 2391 E, 2392 N, 2393 NE, 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 (Waterourse x3) — ditch extending W, no 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 (x4) — before lake (Kennedy Lake)
grassy, dry swale to West
2405 N, 2406 SE, 2407 SW, 2408 W, 2409 NW, 2410 N

POI 008 — Kennedy Lake
2411 - 2417 (East)

No.....
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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 (Waterourse 3) — Water Crossing
~0.75 m diam. culvert
channel ~1 m with ~7-8 m a.h.w. mark
- grassy w/ cattails
- ~10 cm depth, widths 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

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2430 E, 2431 NE,
2432 NW, 2433 N

POI 012 (x7) small watercourse crossing
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) 4 watercourse crossing
- culvert ~0.75m diam
~1-2m wide channel
depth 10-30cm 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

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POI 015 2450 E
At Hwy 668 / Conc. 8+9 intersection

POI 016 2451 N, 2452 W
Conc. 8+9, looking W

POI 017 (Watercourse) 5 watercourse crossing
0.5 m culvert
~3 m wide
1.5 m high banks
~10-20cm 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

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POI 020 Watercourse Crossing
(Watercourse 6) ~0.75 diam. culvert
channel on N side only,
pooled water on S side
~ 3-4 m wide
tree + 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 ~0.5m 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

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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 W
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 round 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

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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

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- 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 of HWY 668 +
Conc 8+9 Clute

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

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Northland - Cochrane 4 solar Sites
Transmission Corridor Assess.

Joe Visek (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)	

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POI 034	2553 SW, 2554 NW	
POI 035	2555 SW, 2556 NW	
POI 036 (17)	Water Crossing 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 m 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 0.5m diam <5 cm water, gentle flow N more wetland like than watercourse, <1 m wide	

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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 (X9) Watercourse on N side of road
cooled 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

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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
(cattails visible)
2605 W, 2606 SW, 2607 NW

POI 051 Under Power lines
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

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Bush Trail - heading W

POI 053 2619 W

POI 054 2620 W

POI 055 2621 W

POI 056 2622 W - wetland area

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

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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

6674 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 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

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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, East
Conc. 8+9 Clute

Date: Nov. 10, 2011
Time: 0800 - 1600 (8.0 hrs)
%CC: 100
Temp: 0-2°C
Wind: 19 km/h SW
Precip. <1mm rain (Light snow); <1mm snow

- Hydro pole on east side Hwy 668

Water Feature

① Deception Creek:
- Water present
- Flow - East

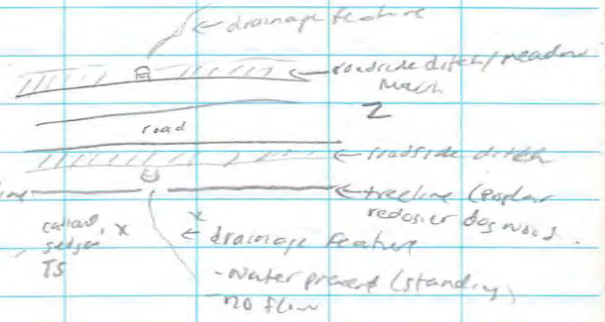
② water feature
- present - yes (east + west); Flow - East
- water present: depth: ~3-4"
- water feature on east does not have a defined bank (at least for the portion observed from the road
- flows through a "meadow marsh" wetland (Tall Shrub) - sedges, cattail, speckled alder, grasses.
- (some, both sides of road)
- water flows east under road through a galvanized culvert ~6-7" wide.
- photos: 4348-4351 (west side, facing NW)
- duckweed, horsetail sp. on 'N' side
- photos: 4352-4353 (east side, facing N)
- "municipal drain" on both sides of road are ~5m lower elevation from road + comprised of cattail, sedges, grasses;
- this low-lying area connects with water feature ② + water feature ①
- low-lying area includes area w/ a defined bank (i.e. municipal drain) + area that are low-lying w/ NO bank or with slight slope. This area is intermittent.
- Changes in slope + rolling topography

"Rite in the Rain"

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

(X1) Drainage Feature
- west of Hwy 668 across from Hunte Mennonite Church / Conc. 6 + 7 Clute.
- Photos
  - 4354 - West
  - 4355 - North
  - 4356 - South
  - 4357 - 4358 - vegetation — horsetails (+ cattail) sedges [illegible]
- ~ 3" standing water present
- drainage feature connected to roadside "ditch".
- no flow present
- slightly sloped bank - grasses / sedges

(X2) Drainage Feature / Wetland under road - culvert
- west side - no defined bank, Low-lying area / meadow-marsh - grasses, sedges, cattail



- east side
  - drainage swale east into "wetland - marsh"
  - some pooled water present
  - no defined bank, TS swale into marsh (open marshy)

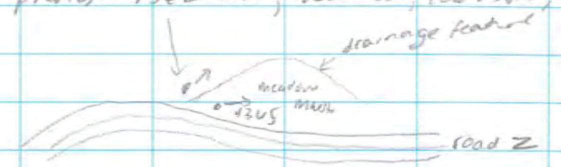
(X3) Drainage feature - 1
- west side only

#354 photos 4360 - W
4361 - N
4362 - S
} ditch W water present, possibly flows North?

- drainage swale through 'open marshy' sedges, grasses, over through woodland - poplar, spruce
- Width - 1-m channel w
- Bank - slight slope - TOP = ~3-m

"Rite in the Rain"

(X4) drainage feature - not a waterbody
- naturally follows topography
photos. 4362 - NW; 4363 NW, 4364 NW, 4365 - N



- some standing water present <1cm

X4-1 - photo 4366 - S
4367 - N

Kennedy Lake
Photos 4368 - 4374 east - S

X5 - west side 4375
- drainage swale cuts west through woodland
- grass, sedges, cattail
- no defined channel
bear scat (wetland)

X5-1 east side - drainage swale - no defined channel
photo 4376

(3) Water feature - culvert (large) under road
present - yes
photo 4378 - east side
4377 - N ("wetland")
- flow - east (water is currently flowing)
3-1 - west side (photo 4379)

East side - <1 m channel
defined bank
- bank depth - ~4-6"
- flows through trees/shrubs & open marshes
- trees - poplar (Aspen) (D) spruce, balsam fir
photo 4378

West side - open marshes ?
- irregular shaped to no "real" defined bank
- grasses, sedges (D)
- immature poplar, redosier dogwood
4380 - gen

"Rite in the Rain"

culvert - both east/west side of road

X6 - east side

East side photo 4381

water present, flow east through poplar/fir balsam & 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 marsh? 4383

X6-4 - east side - open marsh 4384

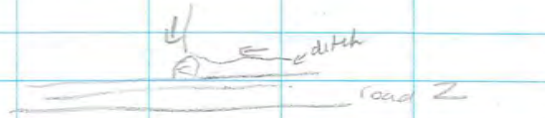
X7 - west side (culvert) 4385, 4387
flow east drainage channel, some water

X7-1 - east side culvert (near pole) 4386
- no defined channel
- grasses/sedges swale through poplar & open meadow/marsh
- cattail

(4) Water Feature (Fowler Creek?)

(4) west-side 4390-4395

next photos west side 4388-4389-N



water from ditch (north side of water feature) flows south into water feature; water feature flows east
- water present - ~4" deep?
channel width 1.5-2 m
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-sedge around bank & tall shrub (alder)

"Rite in the Rain"

Conc. 8 & 5 climb

GPJ - 005 — Conc. 8 & 9 climb

photo 4401 (west side) — transmission line

photo 4402 (north)

photo 4403 (east side) — transmission line

(5) Water Feature (east side) 4404 N

4405 - East

4406 - SE

4407 - S

4408 - NE

4409 - NE

electric fence (E side) / 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 (near @ bankfull)

(5-1) west side - 4410

- drainage swale; no defined bank

- grasses, sedges

east/west - ditches are steep

Conc. 8 & 9 climb heading east

(6) Water Feature (culvert under road

(6) north side 4411 - N; 4416 west

water present 'M'

- Alder/grasses/sedges along bank; riparian

- Black spruce surrounding

- channel width - 5-6 m

- depth - ~≥ 30 cm (almost @ bankfull)

muck substrate

(6.1) south side - 4414

- pooled water (doesn't go anywhere)

must be water feature #17

North side of Rd - culvert -

(X8) drainage feature

Flow - North (flow present/water present)

4415 -N- cattail, sedges, grasses

alder, poplar

(X8.1) south side (culvert) drainage

ditch - water flows east & west

from ditch & Flows north

4416 Saline West through culvert

- sedges 'M', cattails

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 spruce removed

rock, cobble substrate; downed logs

TS riparian - alder, red. osier dogwood

- depth - ~1m

- water present

POI027

(11)

- Trembling Aspen, Balsam Fir, White birch, Balsam Poplar

Cedar (along shoreline), Jack pine?

(35) Water feature (Long Lake)

Flow - north

photo 4433 - 4435 - North

photo 4436 - 4437 - South

CONTENTS

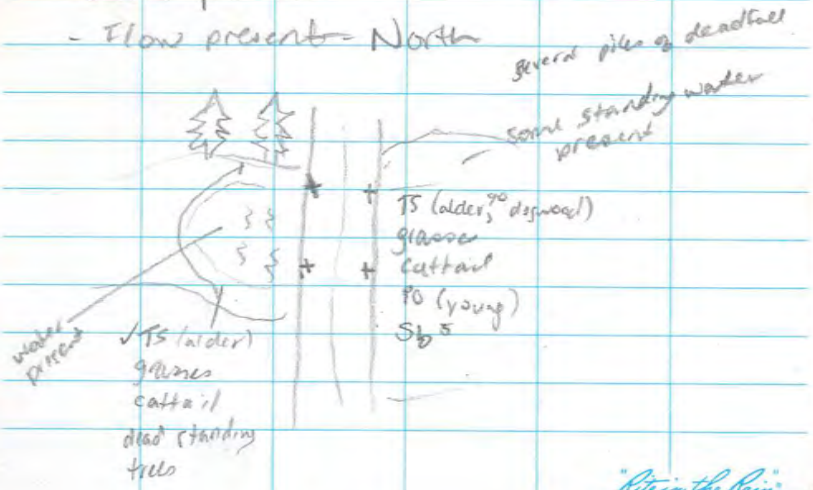
PAGE	REFERENCE	DATE

Location - Cochrane, ON
Conc 8 & 9 Clute & Conc. 10 & 11 Clute

Date : Nov. 11, 2011
Time : 0800 - 1600 (8.0 hrs)
% C.C : 100
Temp : -3°C
Wind : 10 km/h
Precip : Light snow <1 mm, ≤1 cm snow on ground

(17) Water Feature / Wetland -
- no defined channel, more of a wetland.

photos : 4438 - 4441 facing south.
2 - culvert under Rd ~ 7-8 m apart
- water present
- flow present - North



"Rite in the Rain"

(Y1) TS

- alder @ 75
Red-osier dogwood @ 85
568
905

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 - willows SP

(X9) Water Feature

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

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

- only on north side of road
- Width - ~ 2m
depth 20-30 cm @ bankside
organic substrate
Riparian - sedge
Blue 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.

"Rite in the Rain"

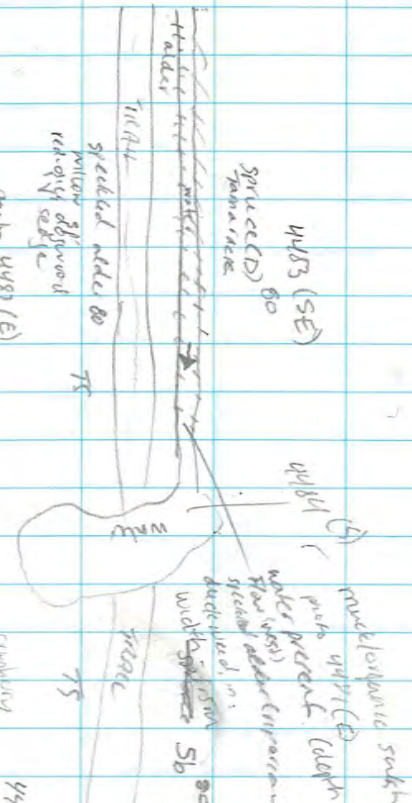
(43) west of X9
presence of ~~water~~ begins & continues east. This is true for both ditches (north & south of Rd)

(44) south side of road
photo - 4465 - S
4466 - W

- grasses (4)
willow speckled alder present
patche of cattail observed further south

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

(16) Water feature / wetland
- water present (permanent)



"Rite in the Rain"