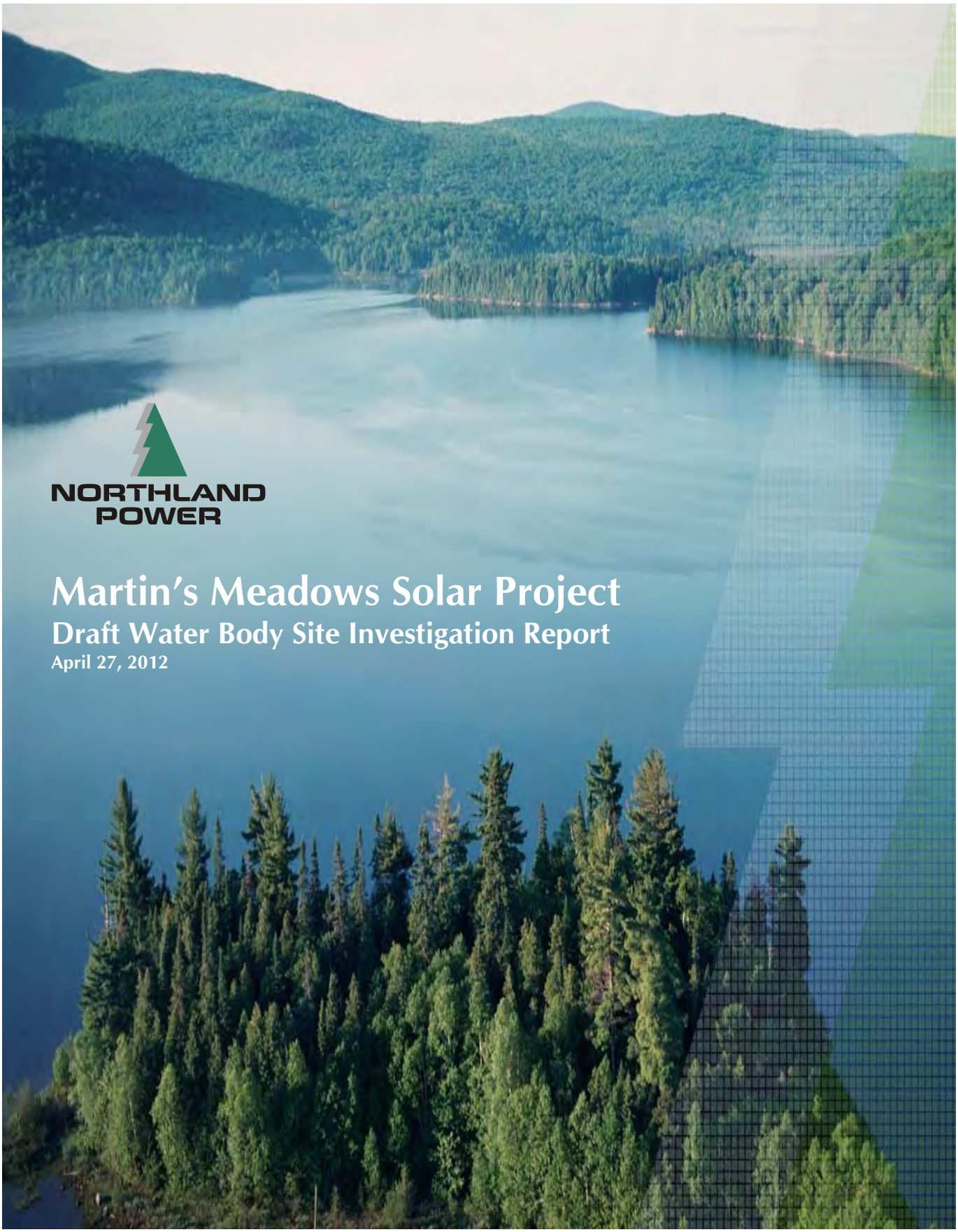

NORTHLAND POWER

Martin's Meadows Solar Project

Draft Water Body Site Investigation Report

April 27, 2012

Northland Power Inc.
on behalf of
Northland Power Solar
Martin's Meadows L.P.
Toronto, Ontario

DRAFT Water Body Site Investigation Report

Martin's Meadows Solar Project

H334844-0000-07-124-0324
Rev. 0
April 27, 2012

Project Report

April 27, 2012

Northland Power Inc.
Martin's Meadows Solar Project

DRAFT Water Body Site Investigation Report

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1. Introduction

1.1 Project Description

Northland Power Solar Martin's Meadows 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 Town of Cochrane. This Project, known as the Martin's Meadows Solar Project, is hereafter referred to as "Martin's Meadows" 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 82 hectares (ha) in size and located on Lot 16, 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 west of the Project location near Hunta, ON. 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 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 meters 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.

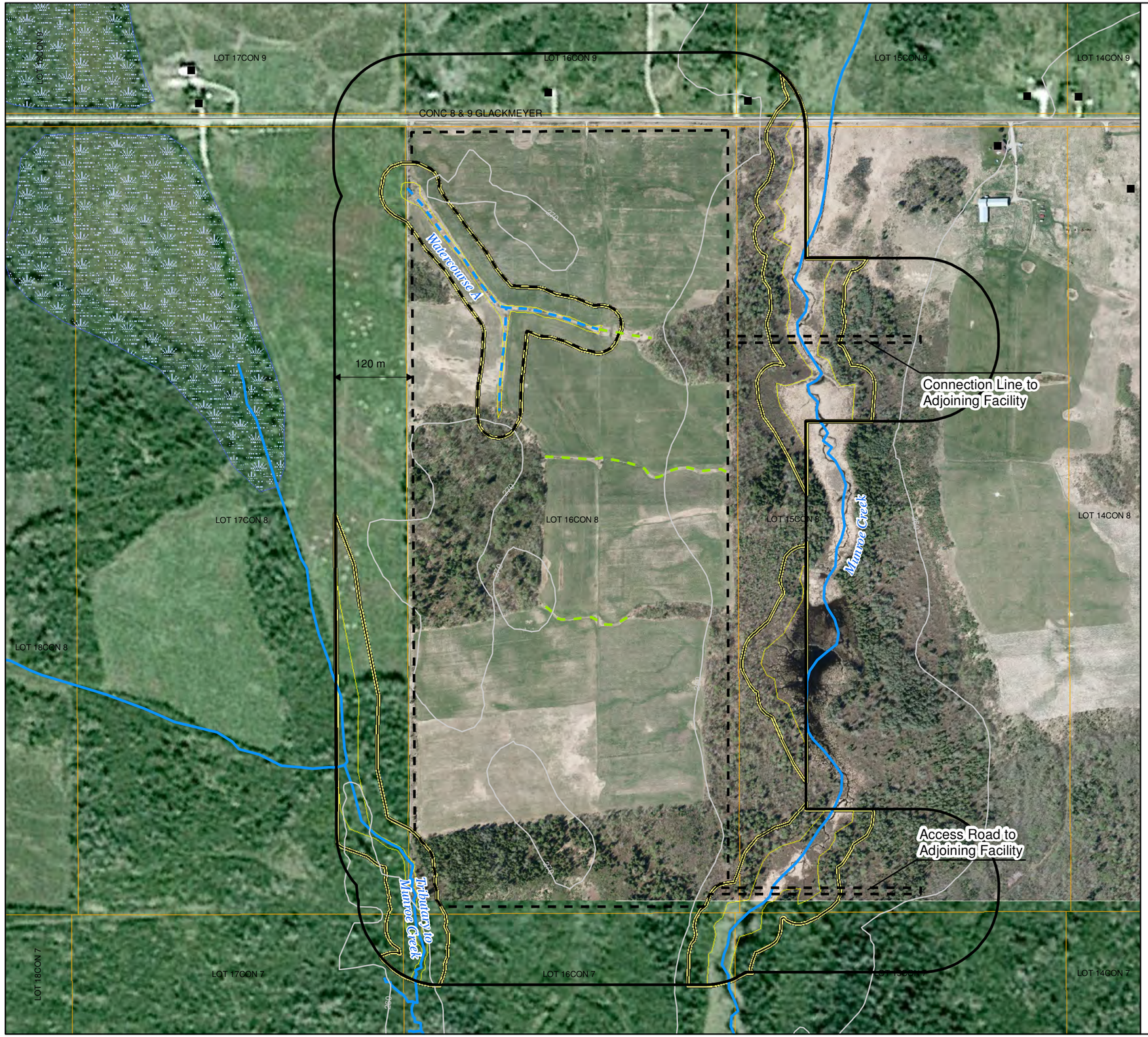
2. Information relating to each water body identified in the Water Body Records Review Report (Hatch Ltd., 2012) and in the site investigation, including the type of water body, plant and animal composition and the ecosystem of the land and water investigated.

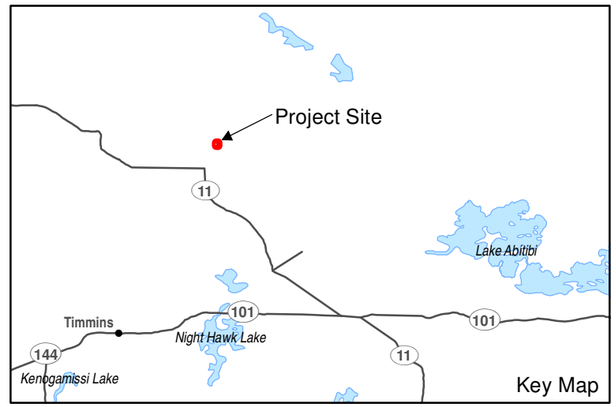
3. A map showing,

    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

- Building
- Grassed Swale (Non-Water Body)
- Intermittent Stream (Water Body)
- Permanent Stream (Water Body)
- Road
- Topographic Contour (5m interval)
- High Water Mark
- 30 m from High Water Mark
- Parcel
- Waterbody
- Wetland Area

Project Components

- Project Location
- 120 m from Project Location

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.

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Figure 1.1
Northland Power Inc.
Martin's Meadows Solar Project
Water Body Site Investigation Results

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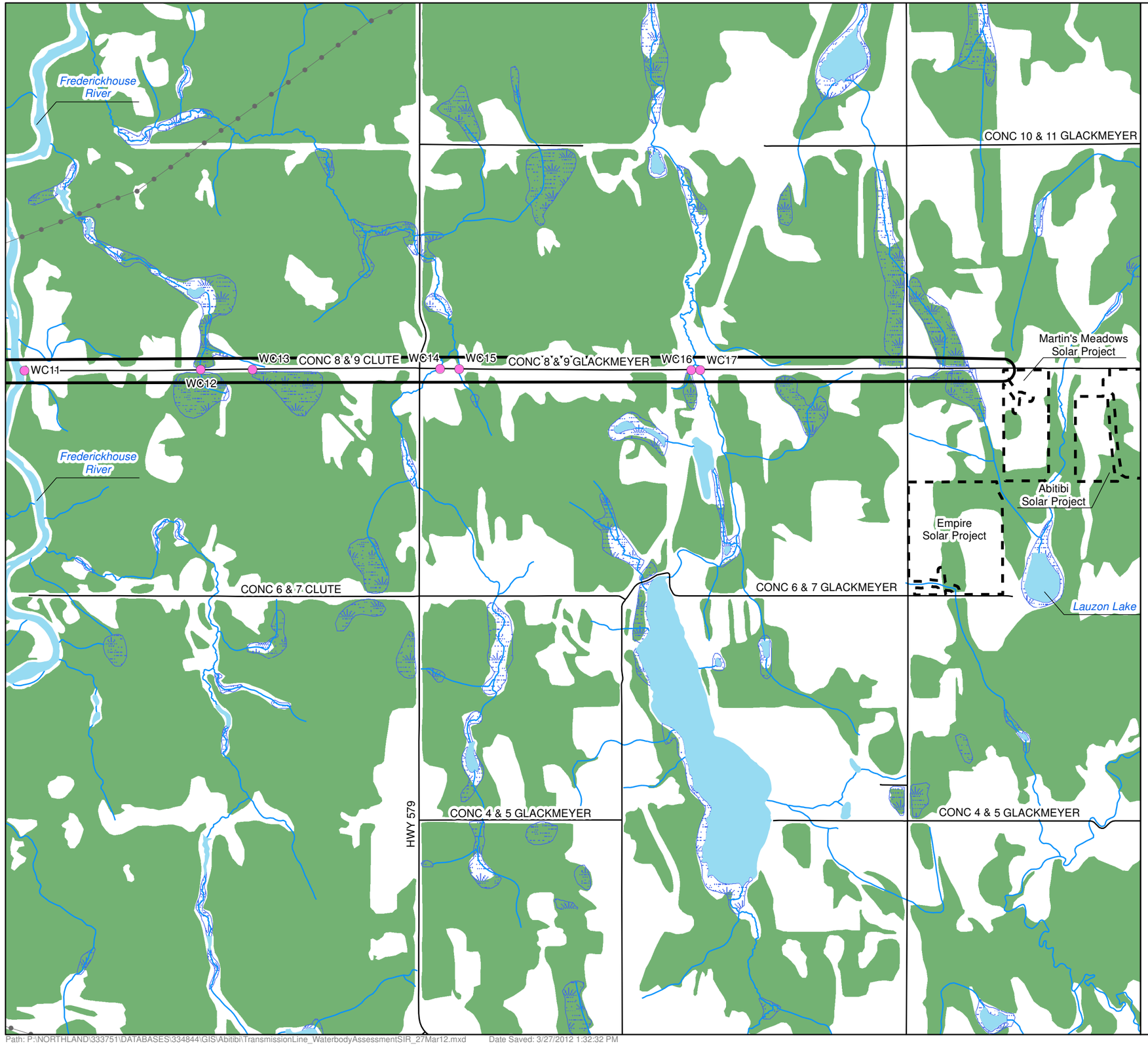

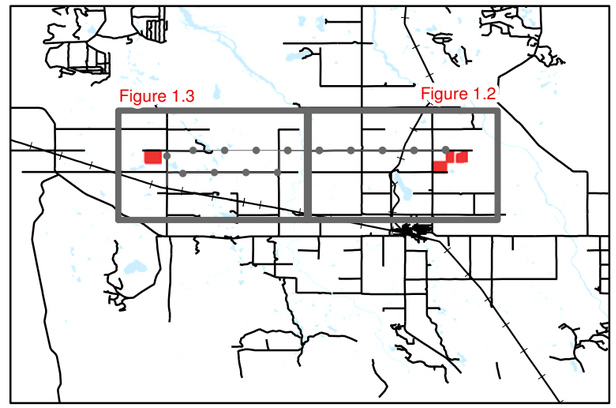

Legend

- 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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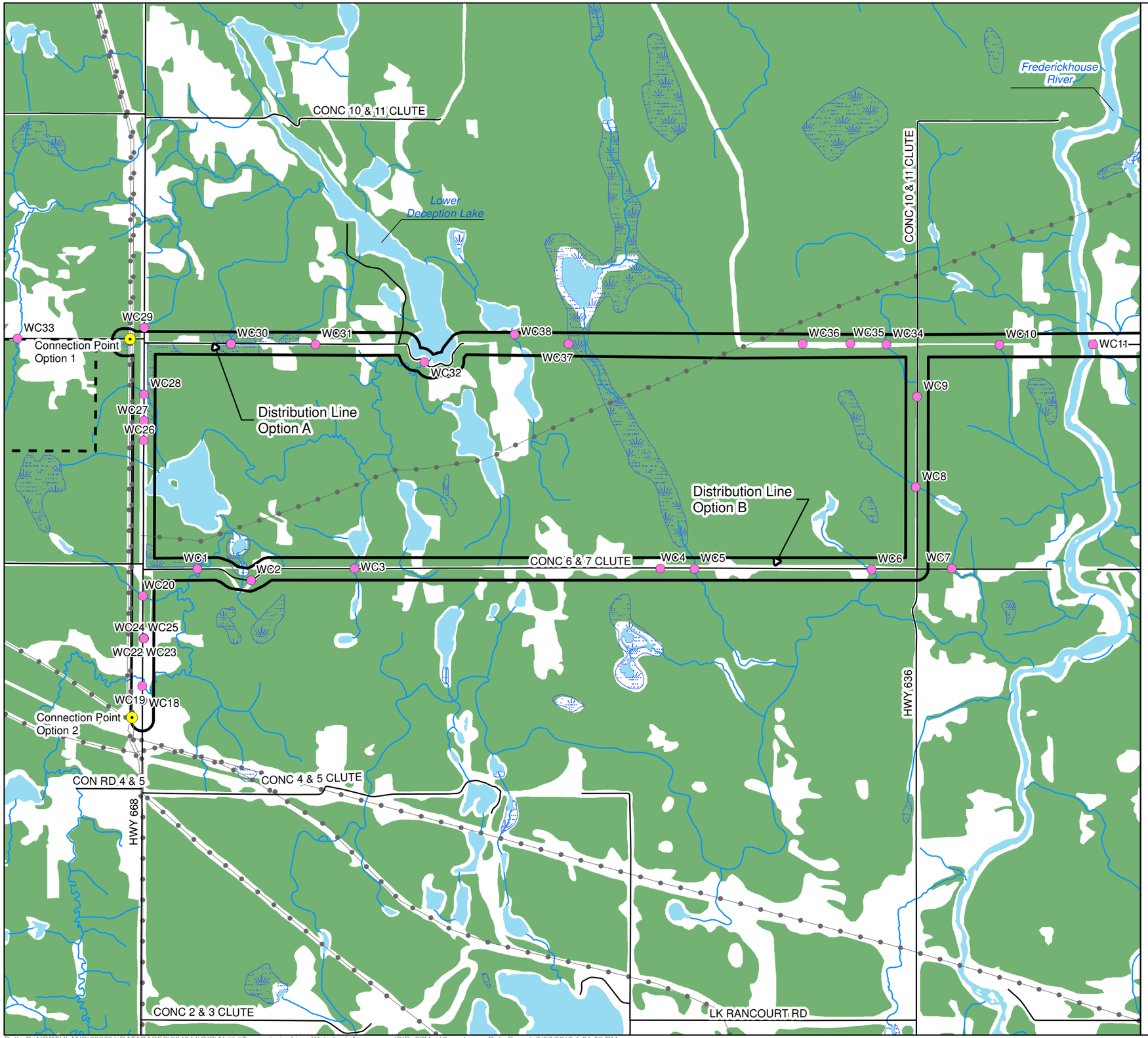

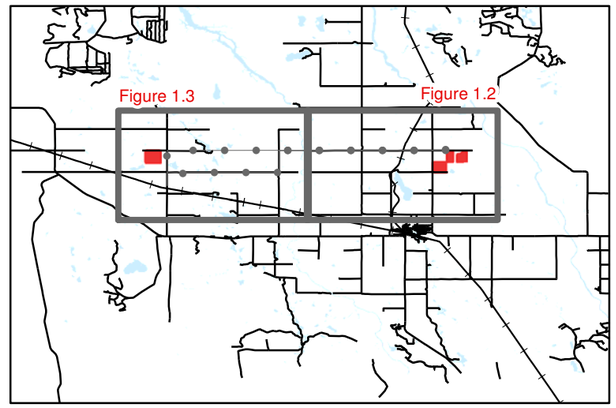

Legend

- 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 summarizes the results of the *Water Body Records Review Report* (Hatch Ltd., 2012).

Table 2.1 Summary of Water Body Records Review Determinations

Determination to be Made	Yes/No	Description
Is the Project in a water body?	Yes	The proposed access road to the adjoining facility will cross Munroe Creek.
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 Project location.
Is the Project within 120 m of the average annual high water mark of a permanent or intermittent stream?	Yes	Two watercourses were identified within 120 m of the Project Location: Munroe Creek to the east and a tributary of Munroe Creek to the west. There are several other drainage features visible on aerial photography of the Project location, but it is unknown if these meet the definition of a water body per the REA Regulation. 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 potentially be located within 120 m of the average annual high water mark of Munroe Creek and/or its tributary. An access road and connection line to the adjoining solar facility will cross Munroe Creek. 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, depending on the route selected.

3. Site Investigation Methodology

A number of different site investigation events were undertaken as part of the overall water body site investigation for the proposed Project. Five 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

3.1.1 Date, Time, Duration and Weather Conditions

The date, time, duration and weather conditions of the three site investigations undertaken at the solar panel Project location are summarized in Table 3.1.

Table 3.3.1 Dates, Times and Weather Conditions During Site Investigations

Site Investigation	Date (dd/mm/yy)	Start Time	Duration	Temperature	Beaufort Wind	Cloud Cover	Assessor(s)
1	22/08/10	1300	6.0 hrs	n/a	1-2	100%	Martine Esraelian (Hatch)
2	23/08/10	1600	3.5 hrs	24 °C	2	0%	Martine Esraelian (Hatch)
3	24/08/10	1400	1 hr	24 °C	3	90%	Martine Esraelian (Hatch)
4	28/09/11	0930	2 hrs	12 °C	0	100%	Martine Esraelian, Joe Viscek (Hatch)

3.1.2 Name and Qualifications of Persons Conducting Site Investigation

Site investigations on the solar panel Project location 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 (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.

3.1.3 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, instream 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 location 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.

3.2 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 and 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 6 Through 11

	Site Investigation 6	Site Investigation 7	Site Investigation 8	Site Investigation 9	Site Investigation 10	Site Investigation 11
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 Site Investigation

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 two watercourses within 120 m of the Project Location: Munroe Creek, situated within 120 m east of the solar panel Project; and a tributary of Munroe Creek, situated within 120 m southwest of the solar panel Project location (Figure 1.1). The presence of each of these water body features was confirmed during the site investigations, and they are described in detail in the following sections.

In addition, a watercourse not previously identified during the records review (hereinafter referred to as Watercourse A) was discovered on the northeast portion of the Project Location (Figure 1.1). An assessment of Watercourse A is also been provided in the following sections. Several other grassed swales, which do not meet the definition of a water body per the REA Regulation, were observed during the site investigation (Figure 1.1). These are also described 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., 2011) indicates that Munroe Creek originates approximately 800 m south of the Project location at the outflow from Lauzon Lake, and flows north towards Abitibi River.

During the site investigations, the presence of Munroe Creek was confirmed, and it was determined to be a permanent stream. Munroe Creek flows in a relatively wide, low lying valley, with abundant wetland vegetation, surrounding by wooded areas adjacent to the agricultural fields on the adjacent properties. This wetland is comprised of emergent vegetation and dominated by broadleaved cattails, grasses and sedges. The meadow marsh type wetland is bordered by a shrub thicket swamp

dominated will willow and dogwood species. Beaver activity is evident at several locations along the creek, with several dams creating online ponds. In these areas, the average annual high water mark is >100 m across. In other areas not affected by beaver activity, the average annual high water mark is approximately 30 m across, due to the meadow vegetation surrounding the main creek channel. A photograph of the wetland area of Munroe Creek, adjacent to the road is shown in Figures 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

Munroe Creek meets the definition of a water body, as outlined in the REA Regulation (Section 1.2). The average annual high water mark of Munroe Creek would be located a minimum distance of 30 m from the solar panel Project location. However, it would be crossed by the proposed access road and connection lines to the adjoining solar facility (Figure 1.1). Therefore, an EIS will be required to assess the potential negative effects of the Project on the creek and lands within 30 m of the average annual high water mark.

4.1.2 Tributary of Munroe Creek

The Land Information Ontario (LIO) mapping obtained for the *Water Body Records Review Report* (Hatch Ltd., 2012) indicates that a tributary of Munroe Creek passes by the southwest corner of the solar panel Project location. The tributary arises in a wooded wetland on the property west of the solar panel Project location, and flows in a generally southern direction, past the southwest corner of the solar Panel Project location within a wooded area.

During the site investigations, the presence of the Tributary of Munroe Creek was confirmed, and it appeared to be an intermittent stream (Figure 1.1). The proposed Project Location is situated outside of the 30 m setback area of the average annual high water mark of the tributary (Figure 1.1). Therefore, an EIS will be required to assess the potential negative effects of the Project on the creek and lands within 30 m of the average annual high water mark.

4.1.3 Watercourse A

The presence of Watercourse A, an intermittent stream, was confirmed during the site investigations. Watercourse A occurs on the northwestern portion of the Project Location. It appears to be a man-made ditch that utilizes the natural contours of the land to help facilitate surface water drainage from the adjacent agricultural fields (Figure 4.3). It was determined to be an intermittent stream that likely receives flow after heavy precipitation events, and is dry the remaining months of the year. The watercourse did not appear to be connected to the municipal ditch. This watercourse has in-stream and riparian vegetation that consists of grasses, sedges, rushes and shrubs, such as small-fruited bulrush, broadleaved cattail, and scattered shrubs including alder and dogwood. The Project Location and adjacent fields appear to be actively used for hay production. The channel itself is approximately 1 to 2 m in width, with an average annual high water mark of approximately 6 m across. Watercourse A follows the property line south, before making a slight bend southeast on the Project Location (Figure 1.1).

The watercourse transitions into a grassed swale (i.e., non-water body) as it extends southeast, just after it connects to a 0.5-m culvert and associated water crossing, likely used by the farmer to easily access different sides of the agricultural field (Figure 1.1). The grassed swale is relatively shallow (i.e., can be driven/tilled through), contains grassy vegetation that is not water dependant and has a width that covers a span of approximately 15 m (Figure 4.4). As such, this segment adjacent to Watercourse A was not considered an intermittent stream (or a water body feature), as per the REA regulation (Section 1.2). The grassed swale continues southeast until it dissipates into the woodland that is located on the western boundary of the Project Location (Figure 4.4).

Figure 4.3 View of Watercourse A, Facing South

Figure 4.4 View of Watercourse A After Existing Farmer's Water Crossing Where it Transitions into a Grassed Swale, Facing Southeast

The site investigation confirmed that Watercourse A is a water body feature. The proposed development area will occur within 30 to 120 m of the average annual high water mark of Watercourse A (Figure 1.1). Therefore, an EIS will be required to assess the potential negative effects of the Project on the creek and lands within 30 m of the average annual high water mark.

4.2 Lakes

Lakes are considered water body features under the REA Regulation (Section 1.2). The site investigations further confirmed the findings of the *Water Body Records Review Report* (Hatch, 2012) that there are no lakes present on or within 120 m of the solar Project Location.

4.3 Seepage Areas

Seepage areas are considered water body features under the REA Regulation (Section 1.2). No seepage areas or areas of groundwater discharge were identified on or within 120 m of the solar Project Location during the site investigations.

4.4 Other Water Features

During the site investigations, two grassed swales were identified on the central portion of the Project Location (Figure 1.1). These grassed swales are situated in an east-west manner, respectively, between the woodland on the west side of the Project Location and the woodland/Munroe Creek valley to the east. The swales exist in areas of low topography on the agricultural fields, and likely receive occasional stormwater runoff inputs from the surrounding land. The swales are very shallow (i.e., can be driven/tilled through) and range in width along their length, from several meters to approximately 10 m. No standing water was observed within the grassed swales during the time of the site investigations. The majority of water runoff caught in the swales is likely absorbed by

vegetation, or dries up within. Vegetation within the swales included primarily grasses with some forbs (Figure 4.5).

These grassed swales 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 water bodies (Section 1.2)

Figure 4.5 View of Grassed Swale on Central Portion of Project Location, Facing West

4.5 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)

Watercourse Identifier	Water Body Type	Average Width	Average Depth	Substrate Type	Riparian Vegetation	Additional Notes
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)
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)

Watercourse Identifier	Water Body Type	Average Width	Average Depth	Substrate Type	Riparian Vegetation	Additional Notes
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)
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. 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 Conclusions of the Site Investigations and Corrections Required to the Martin's Meadows Solar Project Water Body Records Review Report

Determination to be Made	Yes/No	Conclusions of the Site Investigations and Necessary Corrections to the Records Review
Is the Project Location in a water body?	Yes	The following corrections are required to the *Water Body Records Review Report* (Hatch Ltd., 2012) based on observations made during the site investigations. • The records review did not identify any water body features on the Project Location. However, the site investigations determined that Watercourse A (i.e., an intermittent stream) is situated on the northwestern portion of the Project Location. The proposed access road connection to the adjoining solar facility will cross Munroe Creek and a water crossing structure (e.g., culvert) will be required.
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 Project Location. 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 *Water Body Records Review Report* (Hatch Ltd., 2012) identified Munroe Creek, within 120 m east of the solar panel Project location; and a tributary of Munroe Creek situated within the 120 m southwest of the solar panel Project location. The presence of these water body features was confirmed during the site investigations, and they were assessed to be permanent streams. The following corrections are required to the *Water Body Records Review Report* (Hatch Ltd., 2012) based on observations made during the site investigations. • The records review did not confirm that Watercourse A (i.e., an intermittent stream) situated on the northwestern portion of the property on which the Project is located, was a water body per the REA Regulation definition.

Determination to be Made	Yes/No	Conclusions of the Site Investigations and Necessary Corrections to the Records Review
		This was confirmed during the site investigation. • 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.
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

Based on the results of the site investigation and the proposed Project components and boundaries shown in Figure 1.1, some components of the solar panel Project Location will be located between 30 and 120 m of Munroe Creek, the Tributary of Munroe Creek and Watercourse A. 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. Therefore, an EIS will be required to assess the potential effects of the Project and the required mitigation measures to prevent or minimize adverse effects on these waterbodies.

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. Martin's Meadows 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. broad leaved cattail, grasses, sedges). Surrounding the meadow marsh community is a thicket swamp dominated by

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willow, spotted red-osier 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

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observed on the properties north of the Project site.

The areas that are not in agricultural production (within [illegible]) 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 equip. & 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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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)
- ~~cws~~
- 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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Small woodlot

willows raspberry sp
trembling aspen
alder.

Abitibi Site

North east Woodlot

wet/moist woodland - 50% canopy cover / understory/groundcover 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) (R)
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 willows / alder that extend from the woodland east - west onto agricultural field (GPS point taken)

- tamarack, white spruce saplings
bear scat?

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

southern portion of Abitibi oak
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 (3.0) Wind: 3

Date Page 57

Project - Site between Martin Meadow & Abitibi

- Rolling topography - water drains west southeast towards conifer [illegible] woodland

- Tamarack (D) mixed with alder & willow and some spruce

Balsam poplar > trembling aspen also observed throughout

Southern portion: aster, strawberry, aster sp., some jewelweed

some tamarack

Balsam poplar (D)

trembling aspen

alder

willow

white birch

SF

- trembling aspen

- balsam fir

willow

alder

No.

Date Page 58

wetland area

whorled milkweed ?

meadow rue

alder (A)

Tamarack (A)

willow (A)

aster sp.

No. Date Page No. Date Page

Sept 30, 2011 Northland 304
start time 9am, 15°C, windy, cloudy (Cochrane site)
Transmission Line Assessments
→ from car (conc. 6+7 from East - West)
Assessing Water Crossing / roadside 305
wetlands + Vegetation communities
(Joe Vrecek, Martine Esraelian - Natal 306

GPS
B1 - non water body
- Farmers ditch / swale, ~1m wide 307
+ grassy

299 Photo 1458 W Ag
1459 SW Fields

GPS	PHOTOS		
			308
300	1460 S	Ag Fields	
301	1461 W	approaching woodland to west	309
302	1462 N	Woodland	
			310
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	
	1585	N	wetland/ waterhouse
346	1586	N	
	1587	SW	
	1588	NW	culvert
	1589	SW	
347	1590	SE	
	1591	S	
	1592	N	
	1593	NW	

No.....
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369	1648	NE		
	1649	S		
	1650	SE		
End	Time	7pm		

No.....
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Oct 1, 2011 Northland
(Cochrane sites)
5°C, Wind L, Cloud 40%.
Cont'd Roadside Trans. Line Assess.
(Joe Vistek, Martine Israelian + Hatch)
- starting from West (con. 6+7 corner), 9am

GPS
370
371
372
373
374
375
376 / B23
Watercourse
Crossing
(Bridge)

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
1669 NE 1670 N
1671 S. 1672 W 1673 W
~7-8m wide >1m deep
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
398 732 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 Fields
401 1739 N - trailers, small lake to N
1740 S, 1741 SW → open fields
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 - barn
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

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

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

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- 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 - barns
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 - dissipates 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			

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Date. Page.

Sun Oct. 2 2011 Northland Cochrane SHE

Cont'd Trans Line Assessment (Joe Visek, Matthew Eshelman-Hill)

Start Time 9:20am
Sunny 16°C Wind 1, Cloud 10%

- Fence, 8-9, east side of ditch

GPS Photo

472 1891 W (river)
1892 N
473 1894 W
474 1895 W, 1896 SW, 1897 S
1898 SW, 1899 W
1900 W,
475 1901 E NW to
1903 NE
276 1904 NE 1905 SE
477/478 1906 W, 1907 SW, 1908 NW
479
ditch 1909 SW, 1910 W
No waters within ~2m wide, outside

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

	little standing water, wooded			
mostly	dry 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			
	(trail)	(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 toe of bank
	~10-30 cm deep
	- large culvert ~1.5m diam.
	2052 SE 2053 N, 2054 NE
	- water gently flowing N
	- 2055 NE
	mucky substrate visible
	2056 S - ponded water 10 m
	2057 SW east of culvert
	2058 E

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

530 2126 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 - 0.7 m in depth
- cobble with sand substrate

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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 x 1)	Watercourse Crossing 0.75m diam. culvert, ~4 m wide <5cm to no standing water - cattails

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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, ~0.5-1.5m 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 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

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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 / waterscape crossing
~2 m wide, mostly no standing water, some pooled areas < 5 cm. Cattails + grasses

POI 006 (Waterscape 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 (Waterscape 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, 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

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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
~1-2 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

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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 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 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 a.m. 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

75 M 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 (8.0hrs)
%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

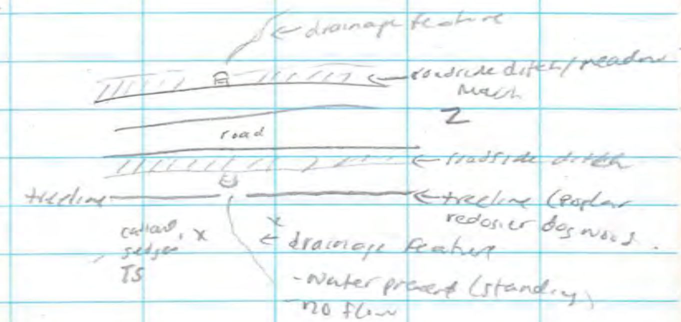
② water feature
- present - yes (east + west); Flow - East
- water present: depth: ~3-4"
- water feature on east does not have a defined bank (at least for the portion observed from the road
- flows through a "meadow marsh" wetland (Tall Shrub) - sedges, cattail, speckled alder, grasses.
- (some, both 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 Hunta Menonite Church / Conc. 6 + 7 Clute.
- Photos
  - 4354 - West
  - 4355 - North
  - 4356 - South
  - 4357 - 4358 - vegetation - horsetails sp (?) cattail, sedges (in redel)
- ~ 3" standing water present
- drainage feature connected to roadside ~~[illegible]~~ "ditch".
- no flow present
- slightly sloped bank - grasses / sedges

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



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

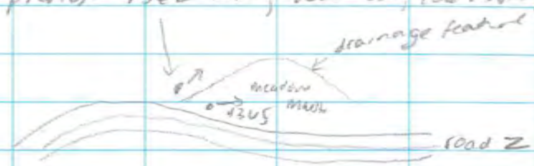
(X3) Drainage feature -
- west side only
4359 photo 4360 - W
4361 - N
4362 - S
} ditch w water present ~~[illegible]~~ possibly flows North?
- drainage swale through 'open muskeg' sedges, grasses, cuts through woodland - poplar, spruce
- Width - 1 m channel w
Bank - slight slope - TOP: ~3 m

"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 currently flowing)

3-1 - west side (photo 4379)

East side - <1 m channel
defined bank

photo 4378

- bank depth - ~4-6"
- flows through trees/shrubs & open marshes
- trees - 19 alder (D) (Aspen), spruce, fir, balsam fir

West side - open marshes?
- irregular shaped to no "real" defined bank
- grasses, reedgrass (D)
- immature poplar, red-osier 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 West 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

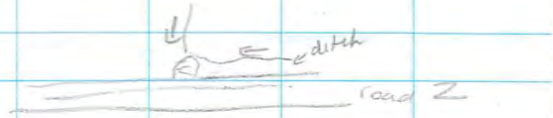
X7 - west side (culvert) 4385, 4387
flow east drainage channel, some water

X7-1 - east side culvert (near pole) 4386
- no defined channel
- grasses/sedges/swamp 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 & 9 Clute

GPJ - 005

Conc. 8 & 9 Clute

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 east side (N-S)

- culvert -

width - ~6m wide

sloped bank - TOP - 7M

- "cut" grass along bank

- Alder & poplar surrounding

- grasses/sedges Marsh pockets

- depth - < 20cm (nearly @ bankfull)

(5-1) west side - 4410

- drainage swale; no defined bank

- grasses, sedges

east/west ditches are steep

Conc. 8 & 9 Clute heading east

⑥ Water Feature (culvert under road

⑥ north side 4411 - N, 4412 west

water present

- Alder/grasses/sedges 'M' along bank; riparian

- Black spruce surrounding

- channel width - 5-6 m

- depth - ~≥ 30cm (almost @ bankfull)

muck substrate

(6.1) south side - 4414

- pooled water (doesn't go anywhere)

- might 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?

~~through~~ from ditch ~~through~~ & flows north

4416 facing west through culvert

- sedges 'M', 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 spruce removed

rock, cobble substrate; downed logs

TS riparian - alder, red osier dogwood

- depth - ~1m

- water present

POI027

(D)

- 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

"Rite in the Rain"

CONTENTS

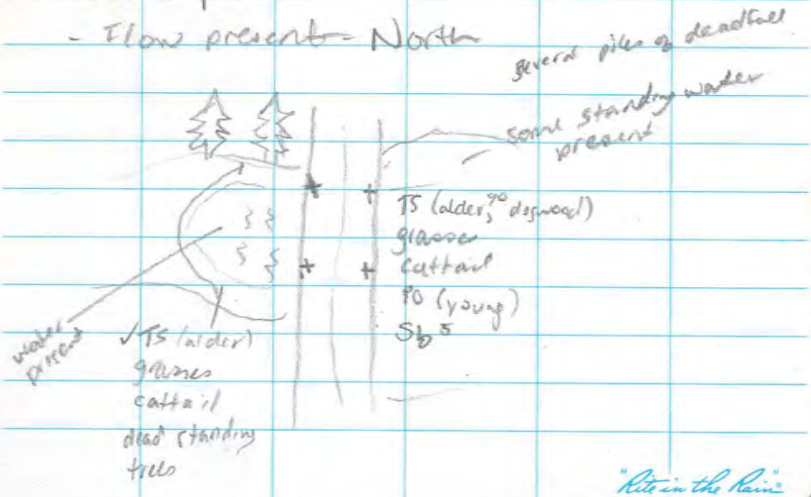
PAGE	REFERENCE	DATE

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
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.

"Rite in the Rain"

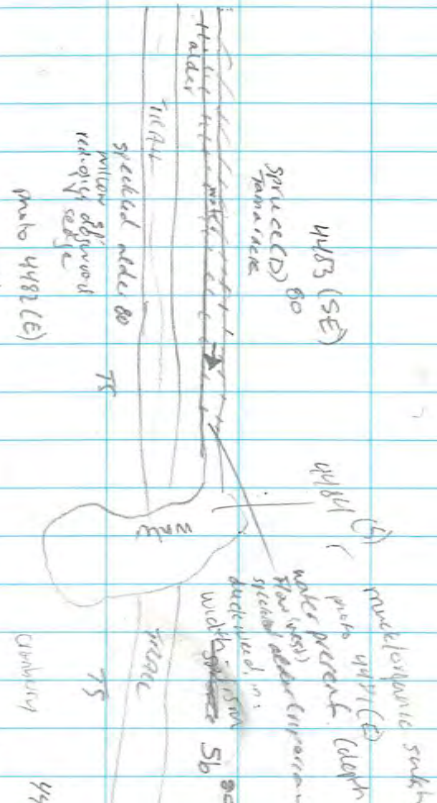
(43) west of X9
presence of ~~water~~ begins & continues east. This is true for both ditches (north & south of Rd)

(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"