NORTHLAND POWER

Burk's Falls East Solar Project

Water Body Site Investigation Report

August 15, 2011

Northland Power Inc.
on behalf of
Northland Power Solar
Burk's Falls East L.P.
Toronto, Ontario

Water Body Site Investigation Report

Burk's Falls East Solar Project

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August 15, 2011

Project Report

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Northland Power Inc.
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1. Introduction

1.1 Project Description

Northland Power Solar Burk's Falls East L.P. (hereinafter referred to as "Northland") is proposing to develop a 10-megawatt (MW) solar photovoltaic project titled Burk's Falls East Solar Project (hereinafter referred to as the "Project"). The Project location will be located on approximately 80 hectares (ha) of land, located on Chetwynd Road in the single tier Municipality of Armour Township (Figure 1.1).

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) made under the *Environmental Protection Act* identifies the Renewable Energy Approval (REA) requirements for renewable energy projects in Ontario. Per Section 4 of the REA Regulation, ground-mounted solar facilities with a nameplate capacity greater than 10 kilowatts (kW) are classified as Class 3 solar facilities and, therefore, require a REA.

Section 31 of the REA Regulation requires proponents of Class 3 solar projects to undertake a water site investigation for the purpose of determining

a) whether the results of the analysis summarized in the Water Body Records Review report prepared under Subsection 30(2) are correct or require correction, and identifying any required corrections

b) whether any additional waterbodies exist, other than those that were identified in the Water Body Records Review Report 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 records review or the site investigation; and

d) the distance from the Project location to the boundaries determined under Clause (c).

The REA Regulation has specific requirements if designated lake trout lakes are present within 300 m of the Project area. These requirements were not deemed applicable to the Project as no such lakes were found during the Water Body Records Review (Hatch Ltd., 2010a).

Waterbodies are defined in Section 1(1) of the REA Regulation to include a lake, a permanent stream, an intermittent stream or a seepage area, but do 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.

Further, intermittent streams are 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).

Seepage areas are 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).

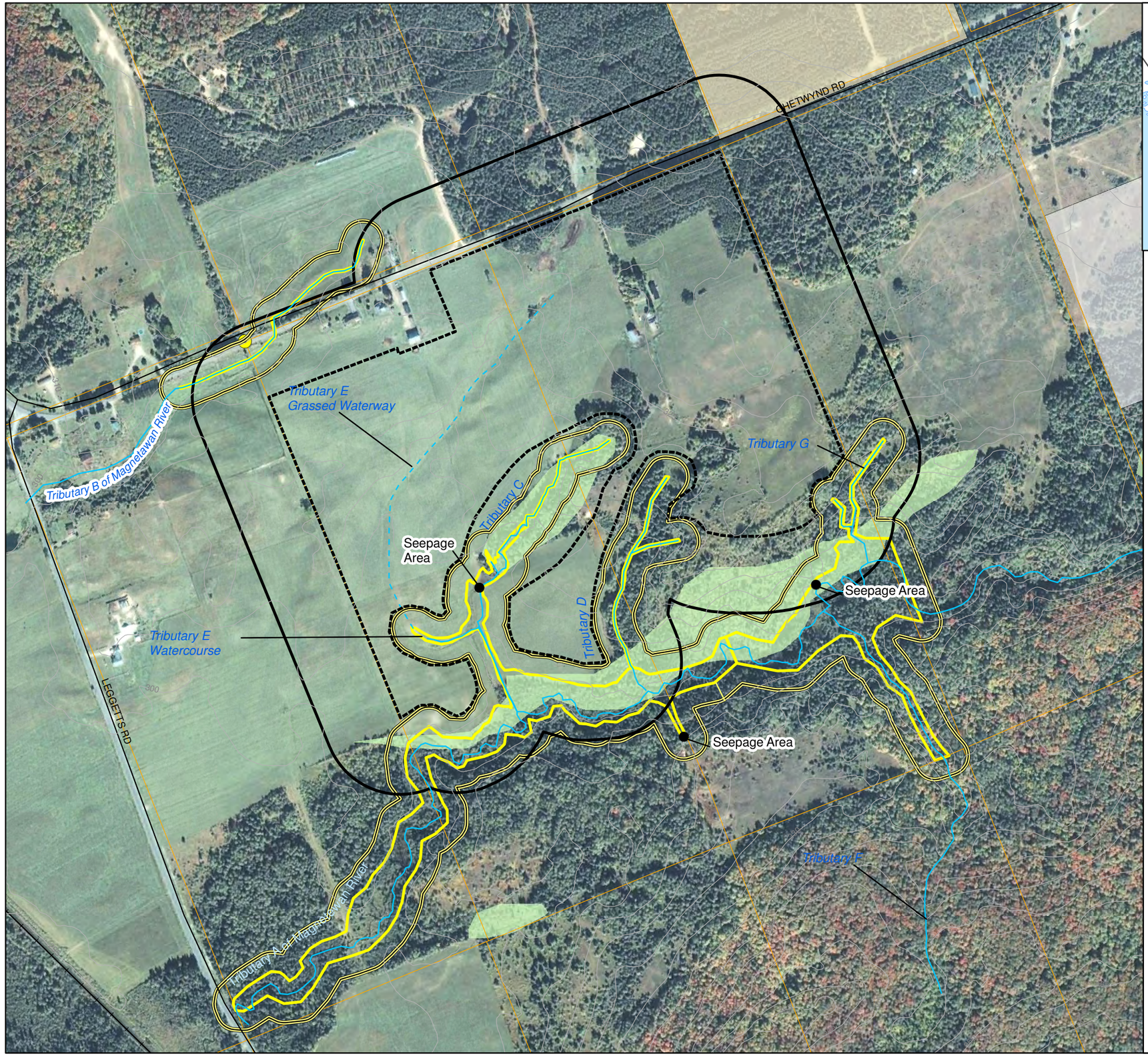
Subsection 3 of Section 31 of the REA Regulation requires the proponent to prepare a report setting out the following:

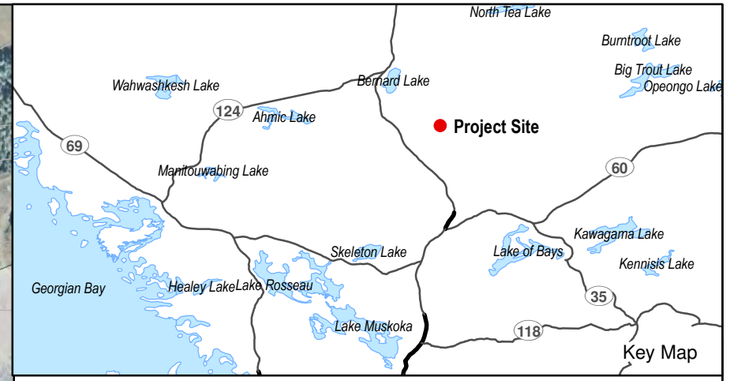
1. A summary of any corrections to the Water Body Records Review report prepared under Subsection 30(2) and the determinations made as a result of conducting the site investigations under Subsection (1).
2. Information relating to each water body identified in the records review and in the site investigations, 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 (1) (c)
    ii. the location and type of each water body identified in relation to the Project location, and
    iii. the distance mentioned in Clause (1) (d).
4. The dates and times of the beginning and completion of the site investigation.
5. The duration of the site investigation.
6. The weather conditions during the site investigation.
7. a summary of methods used to make observations for the purposes of the site investigation.
8. The name and qualifications of any person conducting the site investigation.
9. Field notes kept by the person conducting the site investigation.

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 (Hatch Ltd., 2010a).





Legend

- Seepage Areas
- Roads
- Rail
- Topographic Contour (5m interval)
- Grassed Waterway
- Watercourse
- Average Annual High Water Mark
- 30m Setback from High Water Mark
- Parcels
- Crown Leased Land
- Wetland

Project Components

- Connection Point With Existing Distribution Line
- Project Location
- 120 m from Project Location

NORTH

0 60 120 240 Meters

1:6,245

Notes:
1. OBM and NRVIS data downloaded from LIO, with permission.
2. Spatial referencing UTM NAD 83.
3. Satellite imagery from Google Earth Pro.

Figure 1.1
Northland Power Inc.

Burk's Falls East Solar Energy Project
Water Body and Project Boundaries

HATCH™

P:\NORTHLAND\333751\DATABASES\334844\GIS\BurksFallsE\Burks FallsE_waterinvestigation.mxd

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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	The Project is not located in a water body.
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?	No	No lakes are present within 120 m of the Project location.
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 are present 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	There are six watercourses located on and within 120 m of the Project location.
Is the Project within 120 m of a seepage area?	No	No seepage areas are known to be present on or within 120 m of the Project location.

Therefore, the proposed Project will be located within 120 m of the average annual high water mark of six watercourses. The site investigation was to confirm the presence of these features and identify any additional water body features not noted during the records review.

3. Site Investigation Methodology

3.1 Hatch Site Visits

3.1.1 Site Investigation 1

3.1.1.1 Date, Time and Duration of Site Investigation

- Date: June 5, 2010
- Start Time: 0900 hours
- Duration: approximately 6 hours

3.1.1.2 Weather Conditions During Site Investigation

- Temperature: 17°C
- Beaufort Wind: 4 to 5
- Cloud Cover: 100%

3.1.1.3 Name and Qualifications of Person Conducting Site Investigation

The site investigation was completed by Martine Esraelian.

Martine Esraelian, B.Sc. is an Environmental Scientist specializing in species at risk and terrestrial ecosystems. She has a B.Sc. from Trent University where she specialized in Conservation Biology and Ecological Management and an Ecosystem Management Technician diploma from Sir Sandford Fleming College. During her time at Trent University, she completed a 1-yr internship with the MNR which involved developing a genetic-based protocol for the extraction of DNA from unknown turtle eggshells to assist with species identification. The project entailed extensive molecular genetics research and intensive lab work to develop a protocol able to supplement existing conservation management practices.

She offers expertise across the full breadth of the field from environmental assessments and technical analysis of environmental data to conservation management, corporate and government consulting, and community outreach. Martine has liaised with all levels of government, the community, and a portfolio of clients that includes consulting firms, planners, and high-profile developers. She has both technical and hands-on experience conducting site investigations (terrestrial and aquatic), evaluations of significance, environmental and agricultural impact studies, constraint analyses, water quality and soil assessments, species at risk, wildlife management and fisheries studies to meet regulatory requirements.

Martine has a wide range of field experience related to terrestrial and aquatic ecosystems and species at risk. She has conducted reptile and amphibian surveys, small-mammal trapping, benthic invertebrate monitoring and fisheries inventories (seine netting and electrofishing). She has conducted detailed natural areas inventories which involve species identification of flora and fauna, vegetation community mapping, identifying rare vegetation communities and significant wildlife habitats.

Martine has project management and fieldwork experience for a number of species at risk monitoring projects. Some of the species she has been involved with include: fowler's toad, eastern massasauga rattlesnake, gray ratsnake, queensnake, eastern ribbonsnake, milksnake, blanding's turtle, map turtle, spotted turtle, snapping turtle, Jefferson salamander, northern dusky and mountain alleghany dusky salamander, butternut, flowering dogwood, swamp rose mallow and spoon-leaved moss.

Martine is a certified Butternut Health Assessor (BHA) and also holds a certificate in the Ecological Land Classification (ELC) system.

3.1.2 Site Investigation 2

3.1.2.1 Date, Time and Duration of Site Investigation

- Date: October 7, 2010
- Start Time: 0900 hours
- Duration: approximately 4.5 hours

3.1.2.2 Weather Conditions During Site Investigation

- Temperature: 10°C

- Beaufort Wind: 1 to 3
- Cloud Cover: 0%

3.1.2.3 Name and Qualifications of Person Conducting Site Investigation

The site investigation was completed by Sean K. Male.

Sean K. Male, M.Sc. is a Terrestrial Ecologist specializing in assessments of terrestrial habitat, flora and fauna. Sean received his Bachelors of Science (Honours) in Biology from Queen's University, where he completed his Honour's thesis under Dr. Raleigh J. Robertson, studying the impacts of nestbox density in Tree Swallows (*Tachycineta bicolor*) on nest-building behaviour. He then completed a Master's of Science degree in the Watershed Ecosystem Graduate Program at Trent University under Dr. Erica Nol. Sean's thesis focussed on examining the impacts of a Canadian diamond mine on a population of breeding passerines. For his thesis, Sean spent two summers in the Canadian arctic studying populations of Lapland Longspurs (*Calcarius lapponicus*) around the Ekati Diamond Mine, located 300 km northeast of Yellowknife. While at Trent, Sean participated in the Northern Saw-whet Owl (*Aegoius acadicus*) Migration Banding Project at the Oliver Centre. Following his time at Trent, Sean participated in the Landscape Monitoring Program, participating in a study of the impacts of woodlot size on breeding birds.

Sean joined Hatch as a Terrestrial Ecologist in 2006. Since joining Hatch, Sean has participated in several environmental assessments for hydro and wind power developments. He has developed and implemented baseline monitoring and impact assessment programs for both terrestrial wildlife and plant communities, including detailed bird and bat studies for several wind power developments, including the proposed 100-MW Coldwell Wind Power Development near Marathon, Ontario, a proposed 20-MW facility near Port Dover, Ontario, and a proposed 110-MW wind facility in southwestern Ontario. Sean has also conducted terrestrial and wetland vegetation surveys for several proposed hydropower projects totalling over 40 MW in southern and northern Ontario and has participated in fisheries surveys for several of these projects.

3.2 Survey Methods

The entire site was searched by the observer on foot in order to document waterbodies. Photographs of the site were taken. Any observations of waterbodies, including the type of water body, instream habitat types, surrounding riparian areas, average annual high water mark and wildlife use were noted. 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 sub-meter accuracy global positioning system (GPS) for mapping purposes.

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

4. Results of Site Investigations

This section documents the results of the site investigation and discusses specific water features observed on and adjacent to the Project location. Features noted in the following sections, including the proposed Project location (i.e., the Project footprint boundary) and the average annual high water

mark of watercourses on and within 120 m of the Project location, are shown in Figure 4.1. There were no lakes identified during the site investigation.

4.1 General Site Description

The northern half of the Project location is comprised primarily of agricultural lands and is described as an active livestock (i.e., cattle) operation. The majority of the agricultural fields are used as cattle pasture. There are several woodlands located within 120 m of the Project location. Three of these woodlands extend onto the agricultural fields, along the eastern boundaries and southern portion of the Project location. In addition to woodlands, there is a wetland that follows the length of a tributary of the Magnetawan River which flows east to west south of the Project location. A photograph of the agricultural fields on the Project location is shown in Figure 4.1.

Figure 4.1 South Facing View of the Agricultural Fields and Woodlands on the Project Location

4.2 Permanent or Intermittent Streams

The Water Body Records Review (Hatch Ltd., 2010a) identified six unnamed watercourses within 120 m of the Project location (labelled as Tributaries A through F in Figure 1.1). These tributaries ultimately flow into the Magnetawan River, which is located approximately 1 km east of the Project location. Each of these tributaries is discussed in the following sections.

4.2.1 Tributary A

Tributary A runs in an east to west direction within 120 m south of the Project location. The watercourse was flowing during the site investigation and appears to be a permanent watercourse, given its size. The watercourse was primarily a moderate velocity run, with some slower moving

sections in deeper and or wider reaches and scattered areas of slightly higher flow velocity in more laterally constrained sections of the channel or in areas where debris has created constrictions to flow. Average width was approximately 2 to 3 m and average water depth was less than 0.30 m at the time of the site investigation. Substrate consists of a mix of loamy sand, sandy loam and poorly drained muck (decomposed organic material) soils with scattered organic debris (e.g., leaves, sticks, logs) observed throughout the watercourse. There were several small beaver (*Castor canadensis*) dams observed within the portion of the stream that flows south of the Project location. There was no submergent aquatic vegetation; however, patches of filamentous algae were observed.

The stream meanders through a low-lying, relatively open meadow marsh, bordered by some shrub thicket and surrounding forests. The immediate banks of the watercourse are well vegetated, with some overhanging grasses and sedges. Evidence of erosion and undercutting to the stream bank was observed along portions of the watercourse. During periods of high flow, the watercourse likely inundates the adjacent low-lying meadows, which consist primarily of grasses and sedges.

Photographs of typical aquatic and riparian habitat conditions in Tributary A are provided in Figures 4.2 and 4.3.

Figure 4.2 Photograph of Tributary A South of the Project Location

Figure 4.3 Photograph of a Beaver Dam Across Tributary A South of the Project Location

Based on the observations made during the site investigation, Tributary A appears to be a permanent watercourse capable of providing habitat for a coldwater fish community, comprised of salmonids such as brook trout (*Salvelinus fontinalis*) and common associates such as mottled sculpin (*Cottus bairdi*). Abundant fish cover habitat is available among the woody debris, around the overhanging grasses and undercut banks. No spawning habitat for brook trout was observed, but this may be present in higher gradient reaches farther upstream if gravel is present. Water quality in Tributary A is likely good, being moderated by relatively wide and heavily vegetated riparian buffers, with groundwater inputs observed in several locations.

The average annual high water mark was assessed during the site investigation and was found to be the limit of wet meadow vegetation adjacent to the tributary channel. The surrounding vegetation is dominated by grasses, sedges and rushes which provide evidence of annual flooding during higher flow events. The average annual high water mark, associated 30-m setback limit and the proposed solar panel footprint boundary are shown in Figure 1.1. The proposed development footprint will be located between 30 and 120 m from Tributary A; therefore, an environmental impact study (EIS) will be required.

4.2.2 Tributary B

Tributary B originates in an area of low topography on the property immediately north of the Project location, on the opposite side of Chetwynd Road. The site investigator did not have permission to go on the adjacent property, but from the roadside, there did not appear to be a defined channel associated with this feature. A culvert is present beneath Chetwynd Road to maintain hydraulic gradient. The tributary runs for approximately 70 m past the northwestern corner of the Project

location before running onto the adjacent property. Within 120 m of the Project location, it consists of a poorly defined channel dominated by a variety of grasses and sedges. This section of the tributary is intermittent and likely serves primarily to convey stormwater runoff off the Project location during periods of high precipitation and snow melt. It does not appear capable of providing direct aquatic habitat for any species, but would regulate downstream hydrology and water quality.

Therefore, Tributary B is identified as an intermittent watercourse. The average annual high water mark was assessed as the limit of low-lying wet meadow type vegetation in the watercourse area. Figure 1.1 shows the watercourse, the average annual high water mark and associated 30-m setback, and the proposed development footprint. Since the proposed development will be located between 30 and 120 m from the tributary, an EIS will be required.

4.2.3 Tributary C

Tributary C originates in the agricultural fields and woodlands in the middle of the property on which the Project is located. It flows in a southwesterly direction through a small woodland that extends within 30 m of the Project location. The tributary emerges from the woodland and flows through a narrow vegetated corridor through the adjacent agricultural fields for approximately 175 m before entering the woodland south of the Project location and draining into Tributary A.

The channel within the woodland at the upstream end of Tributary C is well defined and consists of an approximately 1 m wide, shallow channel, dominated by sand and muck substrate, with organic debris observed at the surface. There was a low amount of flow in the channel during the site investigation, but it appears to be intermittent in this section. Overhanging woody debris is relatively abundant within and adjacent to the channel. The bank full depth is approximately 0.15 m. Riparian vegetation within the woodland consisted of white spruce (*Picea glauca*), eastern white cedar (*Thuja occidentalis*), eastern hemlock (*Tsuga canadensis*), balsam fir (*Abies balsamea*) and speckled alder (*Alnus incana*). Groundcover vegetation was dominated by jewelweed (*Impatiens capensis*), sensitive fern (*Onoclea sensibilis*), grasses and sedges. A photograph of typical habitat conditions within this section of Tributary C is provided in Figure 4.4.

Figure 4.4 Portion of Tributary C Within the Woodlot on the Property

The portion of this channel that flows through the agricultural fields is evident as a relatively slow-moving run and was approximately 1.5 m wide and <0.30 m deep during the site investigation. One groundwater seepage area was observed within this section of the channel (see Section 4.3) which suggests that it may be a permanent section of the watercourse. The channel bed consists of sandy loam soils with some muck and organic debris (e.g., leaves, sticks).

The streambank consists of relatively dense meadow vegetation, including common cattail (*Typha latifolia*), small fruited bulrush (*Scirpus microcarpus*), soft rush (*Juncus effuses*) and a variety of sedges, grasses, ferns and forbs tolerant of annual inundation and wet soil conditions. The community transitions into the adjacent upland meadow species. More detailed information the vegetation community in the area can be found in the Natural Heritage Site Investigation Report (Hatch Ltd., 2010b). A photograph of Tributary C and adjacent riparian areas is provided in Figure 4.5.

Figure 4.5 Tributary C and Adjacent Riparian Areas – View South From Edge of Woodlot

There is a water crossing with a culvert approximately 15 m downstream from the edge of the woodland that provides access for farm equipment between the agricultural fields to the west of the tributary.

A view of the channel itself is provided in Figure 4.6. A number of small baitfish were observed within the section of channel immediately upstream from the edge of the shrub thicket that Tributary C flows into. Tributary A is located approximately 40 m farther downstream.

This section of Tributary C may be permanent and appears to provide aquatic habitat for some fish and benthic invertebrate species. It may provide additional habitat on a seasonal basis during higher flow periods, for fish moving upstream from Tributary A. Tributary C also serves to maintain baseflow and water temperature in farther downstream reaches due to the observed groundwater input, while also regulating hydrology and water quality by buffering surface water runoff from the adjacent fields.

Figure 4.6 Tributary C Channel Within Agricultural Field Portion of Property

The average annual high water mark was assessed as the limit of low-lying wet meadow type vegetation in the watercourse area. Figure 1.1 shows the watercourse, the average annual high water mark and associated 30-m setback, and the proposed development footprint. Since the proposed development will be located between 30 and 120 m from the tributary, an EIS will be required. In addition, upgrading of the existing water crossing and installation of an electrical connection over the tributary will also be required, which also necessitate the need for an EIS.

4.2.4 Tributary D

Tributary D originates on the property within the woodland adjacent to the Project location. From its origin, this watercourse flows in a general southwesterly direction before flowing into Tributary A. Tributary D runs for approximately 300 m adjacent to the Project location through an upland wooded area and then for approximately 100 m through the low-lying meadow marsh and shrub thicket adjacent to Tributary A.

A small amount of flow was present in the section of Tributary D that flows adjacent to the Project location, and it was relatively low gradient and backwatered upstream from Tributary A. Substrate was predominantly muck and sandy loam soils with some organic debris observed at the surface. The streambanks were well vegetated with wet meadow species, with some overhanging grasses and undercutting observed.

There is an approximately 100-m long unnamed tributary flowing into Tributary D adjacent to the Project location within the wooded area. This tributary appears to serve primarily as an intermittent surface drainage feature.

A brook trout was observed in Tributary D approximately 40 m upstream from its mouth at Tributary A. Therefore, based on the observations during the site investigation, the portion of Tributary D adjacent to the Project location provides at least seasonal habitat for fish and benthic invertebrates, while also regulating hydrology and water quality farther downstream and in Tributary A.

The average annual high water mark of Tributary D and its small, unnamed tributary, was assessed as the top of bank feature within the woodland and the edge of wet meadow riparian vegetation in more open areas. The average annual high water mark, associated 30-m setback and the footprint of the proposed solar development are shown in Figure 4.1. The proposed development footprint will be located between 30 and 120 m away from Tributary D and its unnamed tributary, so an EIS will be required.

4.2.5 Tributary E

The Land Information Ontario (LIO) mapping shows that Tributary E originates in the agricultural fields at the north end of the Project location and flows in a westerly direction through the Project location, where it joins with Tributary C (Figure 1.1).

The site investigation confirmed the presence of Tributary E on the Project location and determined that only a portion of this tributary is considered to be a watercourse as defined in the REA Regulation. The site investigation determined that the majority of the tributary length shown on the LIO mapping obtained during the Water Body Records Review (Hatch Ltd., 2010) is a grassed waterway with an intermittent watercourse identified along a reach that extends approximately 100 m downstream before draining into Tributary C (Figure 1.1).

The portion of Tributary E that is identified as a grassed waterway does not have a defined channel and vegetation within the area is not consistent with species that require or prefer submerged or continuously saturated soil conditions. It is dominated by upland meadow vegetation such as red clover (*Trifolium pratense)*, tall buttercup (*Ranunculus acris*), ox-eye daisy (*Chrysanthemum leucanthemum*) and birdsfoot trefoil (*Lotus corniculatus*) as well as a variety of grass species. This portion of the tributary is identified as a grassed waterway given that surface drainage is likely conveyed through this channel through natural processes associated with the sloping topography. As a result of these findings, no setbacks are required around this portion of Tributary E and no EIS is necessary. A photograph along the mapped route of Tributary E is provided in Figure 4.7.

Figure 4.7 View North Along Location of Tributary E Noted During Records Review

The portion of Tributary E that is identified as a watercourse is an approximately 100-m long reach at the downstream end of Tributary E where it drains into Tributary C and is considered to be an intermittent watercourse (Figure 1.1). The channel was more well defined and dominated with vegetation such as sedges and rushes that prefer wetter soil conditions. This low-lying area likely receives some back flow from Tributary C during higher flow conditions. It was damp during the June 2010 site investigation.

The average annual high water mark was assessed as the limit of low-lying wet meadow type vegetation in the watercourse area. Figure 1.1 shows the watercourse, the average annual high water mark and associated 30-m setback, and the proposed development footprint. Since the proposed development will be located between 30 and 120 m from the tributary, an EIS will be required.

4.2.6 Tributary F

Tributary F is located southeast of the Project location. It arises in a wooded area south of the Project location and flows in a northerly direction, before draining into Tributary A near the southern edge of the Project location. This tributary was not investigated during the site investigation since it is located on the opposite side of Tributary A from the proposed development area. Potential adverse effects and mitigation that will be discussed in the EIS to protect Tributary A will also protect Tributary F.

4.2.7 Tributary G

This tributary, located 30 m from the southeast boundary of the Project location, was not noted during the Water Body Records Review (Hatch Ltd., 2010a), but was observed during the site

investigation. The tributary originates in the woodlot east of the Project location and flows for approximately 220 m before draining into Tributary A. The upper reaches of the tributary are situated within forested habitat. The watercourse appears to be intermittent in these areas, with a bankfull width of approximately 2-m and a low flow channel width of approximately 0.30 m. The channel up to the bankfull flow width is predominantly grassy.

Near the downstream end, the tributary emerges from the upland forest into the lowlands surrounding Tributary A. The channel width is approximately 2-3 m and runs through a conifer dominated swamp before draining into Tributary A. The banks and bed of Tributary G are dominated by sand and contain emergent and some submergent grasses and other aquatic vegetation species.

The lower reaches of this tributary would provide direct fish habitat during higher flow periods, particularly if flow from Tributary A back floods up the mouth of Tributary G. The upper reaches do not appear capable of providing direct fish habitat, but would contribute to the maintenance of fish habitat in the lower reaches by buffering surface water runoff, enhancing water quality and providing organic materials.

There is a short (approximately 50-m long) unnamed tributary draining into Tributary G, approximately halfway along its length. Watercourse characteristics are similar to the upper reaches of Tributary G, and it appears to serve primarily as intermittent surface drainage.

The average annual high water mark of Tributary G and its small, unnamed tributary was assessed as the limit of low-lying wet meadow type vegetation in the watercourse area. Figure 1.1 shows the watercourse, the average annual high water mark and associated 30-m setback, and the proposed development footprint. Since the proposed development will be located between 30 and 120 m from Tributary G and its short unnamed tributary, an EIS will be required.

4.3 Groundwater Seepage Areas

No groundwater seepage areas were noted during the Water Body Records Review (Hatch Ltd., 2010a). However, three seepage areas were located during the site investigation, as shown in Figure 1.1.

Seepage Area 1 is located approximately midway along Tributary C. The seepage area consists of groundwater bubbling up from the muck and sand channel bed. This seepage area likely provides baseflow and creates cooler water temperatures in Tributary C and the downstream reaches of Tributary A. This would assist in creating conditions conducive to a coldwater fish community of Tributary A. A photograph of the seepage area is provided in Figure 4.8.

Figure 4.8 View of Groundwater Seepage Area on Tributary C

A second seepage area was observed approximately 60 m south of Tributary A. It consists of groundwater emerging as diffuse flow on the upper slopes of the watercourse valley. The groundwater runs down the valley toward Tributary A. Evidence of the seepage area included the presence of saturated soils, small patches of pooled water and meadow vegetation tolerant of such conditions. This seepage area may provide some baseflow and moderate water temperatures in Tributary A. A photograph of this area is provided in Figure 4.9.

Figure 4.9 View of Groundwater Seepage Area on Slope Adjacent to Tributary A

A third seepage area, evidenced by presence of iron precipitates, was observed along the shoreline of Tributary A, near the eastern border of the Project location.

Groundwater seepage areas are identified as waterbodies in the REA Regulation. Since the groundwater seepage area on Tributary C and the seepage area on the eastern end of Tributary A are located between 30 and 120 m from the proposed development, the EIS will have to assess potential effects and mitigation for this feature. The second seepage area into the south side of Tributary A is located >120 m from the proposed development and will not be affected.

5. Conclusions

Based on the results of the site investigation discussed above, there are several corrections to the results of the Water Body Records Review (Hatch Ltd., 2010a) required, including

- addition of a small, unnamed tributary to larger Tributary D as occurring between 30 and 120 m of the Project location
- reduction in the length of Tributary E that is identified as a water body per the REA Regulation
- addition of Tributary G, the unnamed tributary of Tributary G and Tributary F as occurring between 30 and 120 m of the Project location.
- addition of three groundwater seepage areas not identified in the Water Body Records Review Report (Hatch Ltd., 2010a).

Based on the results of the site investigation and the proposed Project location shown in Figure 4.1, some components of the Project will be located between 30 and 120 m of Tributaries A, B, C, D, E, F and G and two groundwater seepage areas. 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.

6. References

Hatch Ltd. 2010a. Burk's Falls East Solar Project – Water Body Records Review Report. Prepared for Northland Power Inc.

Hatch Ltd. 2010b. Burk's Falls East Solar Project – Natural Heritage Site Investigation Report. Prepared for Northland Power Inc.

Appendix A

Site Investigation
Field Notes

Appendix A

Site Investigation
Field Notes

No
Date Location : Chatwynd Rd. Page

Project : Burks Falls East

Date : June 5, 2010
Time : 0900 - 1500 (6.0 hrs)
% C.C - 100%
Temp : 17 °C
Beaufort Wind : 4-5

Rolling Topography
- Red clover (O)
cow vetch
ox-eye daisy (A)
dandelion spp (A)
Tall Buttercup (O)
horsetail spp (O)

2 american elm in field
yarrow
peppergrass
white clover (R)
common strawberry (R)
birds foot trefoil
common plantain

No
Date Page

Bobolink (A) in field / actively calling along watercourse and forested area
Red-winged blackbird
american robin
Savannah Sparrow
American Crow
American Bittern within watercourse
Observed in willows + small clearing in channel watercourse
Sensitive fern
Fringed sedge (A)
small-fruited bulrush (O)
Tall manna grass (O)
Soft rush (A)
Awl-fruited sedge (A)
Rattlesnake manna grass (O)
Bebb's sedge
Lakebank sedge
broad-leaved cattail
Slough grass
Reed canary grass
willow spp
[illegible] (R)

No ....
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Forested area SE

White cedar — oak fern ?
White Spruce (D) — canada mayflower
Balsam Fir — goldthread ?
Hemlock — early meadowrue ? 5550
yellow birch
hairy woodpecker — whorled spur violet
bobolink
wood frog
Water course flows through woodland
possibly a spruce/cedar swamp
open area dominated by
speckled alder + willow spp
white birch (R)
jewelweed (A)
grasses (D)
sedges (A)
Trembling aspen (R) - Canopy (O) understory
avens sp
watercourse - not
- minnows
- 12°C
possible brook trout observed
violet sp

No ....
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[illegible]

Spruce (R) saplings
Ferns (D)
willow spp
Trembling aspen saplings (R)

Woodland (South)

Trembling aspen (D) canopy, (O) understory
White Spruce (A)/(D) subcanopy
Elm

bull thistle

No ....
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Coniferous for...
moist soil
bunchberry
ground cover, sparse

Spruce (A)
Trembling aspen (
Balsam Fir (D)
White birch
downed debris (A)
Sensitive fern
curled dock (O)
sedges
reed spp.
wool grass
duckweed
arrow head
horsetail (O)
jewelweed
mosses (A)

Standing water / wetland spp.

Damflower
wild sarsaparilla

No ....
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Upland slope clearing
- ferns (D)
wildflowers (A)
grasses
goldenrod spp.
bladder sedge (R)
prickly gooseberries
orange hawkweed (R)
red clover, cow vetch
SE border
Black Cherry (R)
Largetooth Aspen (D) canopy
White birch (O)
milkweed (O)
ruffled grouse
common strawberry
meadowsweet
sedges
ox-eye daisy (O)
plantain
red clover
King devil ( )
rough-fruited cinquefoil
birdsfoot trefoil
cow vetch

No
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open area

- Speckled Alder (D)
buttercup
[illegible]
goldenrod
Sedge
Orange hawkweed
cow vetch
red clover
yarrow
common strawberry
spruce saplings/mature (A)
Tamarack (A)
black cherry (O)
red pine (R)
large spruce south side of open area
pin cherry [illegible]

No
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virgins bower
foam flower
trillium sp
goldthread
lily sp.
wild sarsaparilla
violet sp
spreading dogbane
bladder campion
riverbank grape

Burk's Falls E Site Visit

Oct 7 /10

Start @ 09:25am → end @ 1400

Obs - SKM

Weather - clear skies, B1, ~10°C

SWH considerations

→ Winter Deer Yards
→ Moose late Winter
→ Waterfowl stopover & staging
→ Raptor Winter Feeding & Roosting
→ Reptile Hibernacula

Voids → High diversity of habitats
Old growth

Hibernacula [illegible]

Vernal pools
Specialized Raptor nesting

HATCH™

HATCH™

(8) poor understory diversity

→ except in → open canopy slopes where goldenrods + raspberries ...

& 460 → 20 along the Trib A to Lake

Around → 30 along S

Low Area

→ [illegible]

→ spruce lagoon

Prelim. Conclusions

→ Animal Movement Corridor S of site along watercourse

→ candidate SWH for diversity of forest habitat

→ no other candidate SWH confirmed during site visit

→ wetlands prev. evaluated

→ 2 new [illegible] identified.