



McCann Solar Project

Draft Natural Heritage Site Investigations Report

April 11, 2011



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

DRAFT Natural Heritage
Site Investigations Report

McCann Solar Project

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Project Report

April 11, 2011

**Northland Power Inc.
McCann Solar Project**

DRAFT Natural Heritage Site Investigations Report

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1. Introduction

1.1 Project Description

Northland Power Solar McCann L.P. (hereinafter referred to as “Northland”) is proposing to develop a 10-megawatt (MW) solar photovoltaic project in the Township of Rideau Lakes, titled McCann Solar Project (hereinafter referred to as the “Project”). The Project will be located on approximately 40 hectares (ha) of land, located just south of Big Rideau Lake in the Township of Rideau Lakes, within the United Counties of Leeds and Grenville (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 name plate capacity greater than 10 kilowatts (kW) are classified as Class 3 solar facilities and require a REA.

Section 26 of the REA Regulation requires proponents of Class 3 solar projects to undertake a natural heritage site investigation for the purpose of determining

- a) whether the results of the analysis summarized in the Natural Heritage Records Review report prepared under subsection 25 (3) are correct or require correction, and identifying any required corrections
- b) whether any additional natural features exist, other than those that were identified in the [natural heritage records review] report prepared under subsection 25 (3)
- c) the boundaries, located within 120 m of the project location, of any natural feature that was identified in the records review or the site investigation
- d) the distance from the project location to the boundaries determined under clause (c).

Natural Features are defined in Section 1.1 of the REA Regulation to be all or part of

- a) an area of natural and scientific interest (ANSI) (earth science)
- b) an ANSI (life science)
- c) a coastal wetland
- d) a northern wetland
- e) a southern wetland
- f) a valleyland
- g) a wildlife habitat, or
- h) a woodland.

Subsection 3 of Section 26 of the REA Regulation requires the proponent to prepare a report setting out the following:

1. A summary of any corrections to the report prepared under subsection 25 (3) and the determinations made as a result of conducting the site investigations under Subsection 1.2.
2. Information relating to each natural feature identified in the records review and in the site investigations, including the type, attributes, composition and function of the feature.
3. A map showing
 - i. the boundaries mentioned in clause 1.2 (c)
 - ii. the location and type of each natural feature identified in relation to the project location
 - iii. the distance mentioned in clause 1.2 (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.

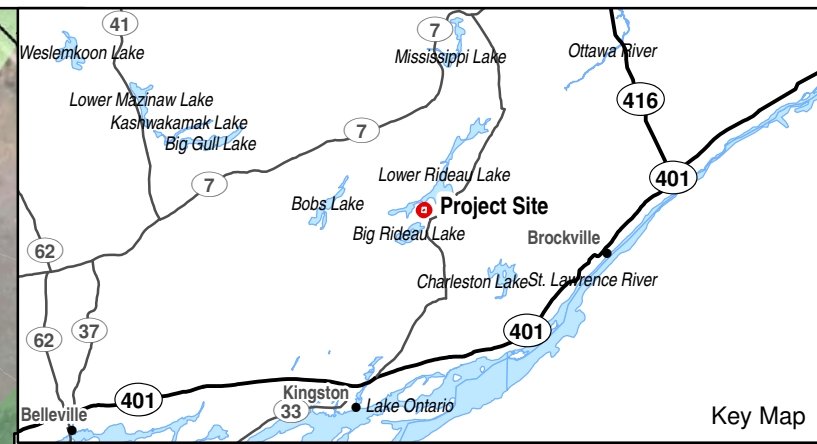
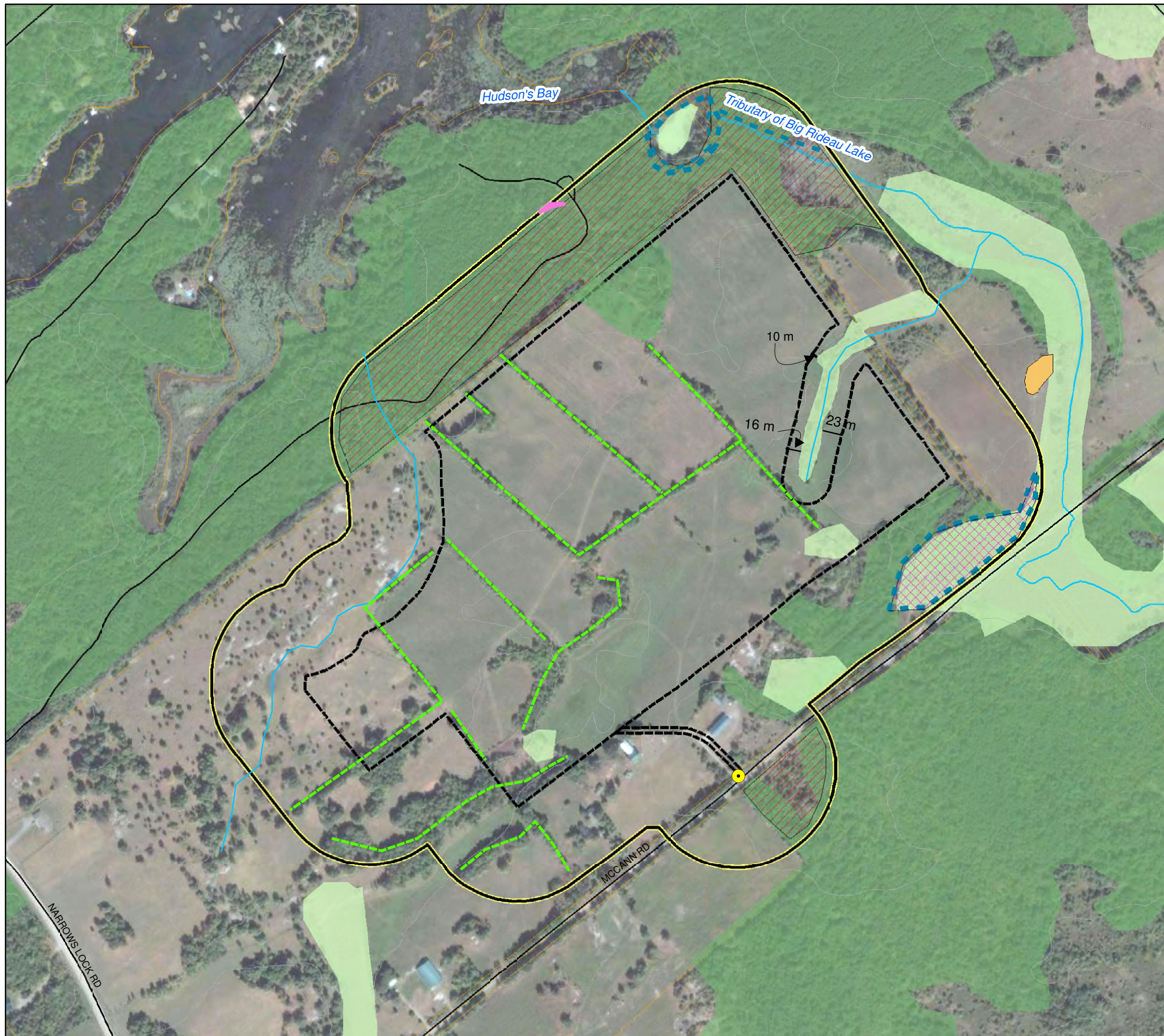
This Natural Heritage Site Investigation Report has been prepared to meet these requirements.

2. Summary of Results of Records Review

Table 2.1 summarizes the results of the records review (Hatch Ltd., 2010a).

Table 2.1 Summary of Records Review Determinations

Determination to be Made	Yes/No	Description
Is the Project in a natural feature?	Yes	There is a woodland identified on the Project location
Is the Project within 50 m of an ANSI (earth science)?	No	The nearest earth science ANSI is located several kilometres from the Project location.
Is the Project within 120 m of a natural feature that is not an ANSI (earth science)?	Yes	The Project location is located within 120 m of wetlands and woodlands.



Legend

- Road
- +— Railway
- Transmission Line
- Topographic Contour (5 m interval)
- Watercourse
- ▭ Parcel

Candidate Significant Natural Heritage Features

- Hedgerow / Animal Movement Corridor
- ▭ Wetland
- ▭ Woodland / Animal Movement Corridor
- ▭ Turtle Nesting Habitat
- ▭ Cerulean Warbler Habitat
- ▭ Western Chorus Frog Habitat
- ▭ Milksnake Habitat / Raptor Winter Feeding and Roosting
- ▭ Eastern Ribbonsnake Habitat / Northern Map Turtle Habitat / Snapping Turtle Habitat / Animal Movement Corridor
- ▭ Habitat for Area Sensitive Species (Red-breasted Nuthatch, Black-and-white Warbler/ Forest providing a high diversity of habitats)

Project Components

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

0 50 100 200 Metres
1:5,000

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

NORTH

Figure 1.1
Northland Power Inc.
McCann Solar Energy Project
Project Location and
Natural Heritage Features

Back of Figure

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: May 17, 2010
- Start Time: 0835 hours
- Duration: approximately 3.5 hours

3.1.1.2 Weather Conditions During Site Investigation

- Temperature: 14°C
- Beaufort Wind: 1
- Cloud Cover: 0%

3.1.1.3 Name and Qualifications of Person Conducting Site Investigation

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 (*Aegolius acadicus*) Migration Banding Project at the Oliver Centre. Following his time at Trent, Sean participated in the Landscape Monitoring Program and was involved 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, ON, 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.

3.1.2 *Site Investigation 2*

3.1.2.1 *Date, Time, and Duration of Site Investigation*

- Date: October 14, 2010
- Start Time: 0900 hours
- Duration: 5 hours

3.1.2.2 *Weather Conditions During Site Investigation*

- Temperature: 14°C
- Beaufort Wind: 2
- Cloud Cover: 80%

3.1.2.3 *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 Ministry of Natural Resources (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, eastern 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 and also holds a certificate in the Ecological Land Classification (ELC) system.

3.1.3 Survey Methods

Lands on and within 120 m of the Project location were searched by the observer on foot in order to document natural features. Photographs of the site were taken. Any observations of wildlife, vegetation, or natural features were noted.

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

3.2 Natural Resource Solutions Inc. Site Investigation

Natural Resource Solutions Inc. (NRSI) conducted a site investigation in order to determine boundaries and evaluate significance of wetland communities. Names, qualifications and survey methodologies are identified within their report provided in Appendix B.

3.2.1 Date, Time, and Duration of Site Investigation

- Date: August 10, 2010
- Start Time: 12:00 hours
- Duration: 5 hours

3.2.2 Weather Conditions during Site Investigation

- Temperature: 30°C
- Beaufort Wind: 2 (5.6 to 11 km/h)
- Cloud Cover: 30%

4. Results of Site Investigation

4.1 Vegetation Observations

The Project location is composed predominantly of agricultural lands, predominated by grasses used for cow pasture (Figure 4.1). Grasses on the Project location are intermixed with weeds common to these habitats, such as clover and hawkweed.



Figure 4.1 Typical View of the Pasturelands of the Project Location

Hedgerows

Hedgerows are commonly found within agricultural landscapes and are described as linear corridors that separate one piece of land from another and are dominated by shrub and tree species. The vegetation observed within all of the hedgerows was consistent throughout the Project location and lands within 120 m. The dominant tree and shrub species included maples (*Acer* sp.), Basswood (*Tilia americana*), and Prickly Ash (*Zanthoxylum americanum*) (Figure 4.2). These hedgerows, though identified as wooded areas on LIO mapping, are not considered to be woodlands according to the definition within O. Reg. 359/09.



Figure 4.2 Hedgerows of the Project Location

Woodlands

Woodlands are defined within Ontario Regulation 359/09 as land,

- a) that is south and east of the Canadian Shield as shown in Figure 1 in the Provincial Policy Statement issued under section 3 of the Planning Act and approved by the Lieutenant Governor in Council by Order in Council No. 140/2005
- b) that has, per hectare, at least
 - (i) 1000 trees of any size
 - (ii) 750 trees measuring over 5 cm in diameter, measured in accordance with Subsection(7),
 - (iii) 500 trees measuring over 12 cm in diameter, measured in accordance with Subsection(7), or
 - (iv) 250 trees measuring over 20 cm in diameter, measured in accordance with Subsection(7), and
- c) that does not include a cultivated fruit or nut orchard or a plantation established for the purpose of producing Christmas trees.

There is a large woodland within 120 m north of the Project location, which intrudes into the Project location near the northeast corner. On the Project location, the woodland is young, predominantly deciduous and dominated by white ash (*Fraxinus americana*), sugar maple (*Acer saccharum*), American Elm (*Ulmus americana*), and Black Cherry (*Prunus serotina*) (Figure 4.3). As the woodland transitions off the Project location, the forest community matures, and changes to a mixedwood community, dominated by Jack Pine (*Pinus banksiana*), Sugar Maple, and Basswood (*Tilia americana*).

Where the woodland intrudes on the Project location, much of the woodland opens up, and becomes sparsely treed, with Common Juniper (*Juniperus communis*) and Ash (*Fraxinus* sp.) commonly observed. The boundary of the woodland was determined to be slightly farther west than that identified through LIO mapping; this represents a correction from the records review.



Figure 4.3 Woodland on the Project Location

A second woodland occurs within 120 m immediately south of the Project location. This woodland primarily consists of a Red Pine (*Pinus resinosa*) plantation, around which immature deciduous tree species (ash, maples, aspen) have now grown.

A small portion of a third woodland is located within 120 m south of the connection point of the Project opposite McCann Rd. The composition of this woodland community is consistent the

deciduous woodland community identified on and within 120 m north of the Project location, and is described as a mid-aged woodland community.

Open Scrubland

There is a large area of open scrubland present on, and within 120 m of, the northwestern corner of the Project location (Figure 4.4). This area is predominantly composed of grasses, with occasional occurrences of juniper and scattered coniferous trees, most commonly spruce and cedar. There are several occurrences of exposed bedrock in this area, suggestive of shallow soils.



Figure 4.4 Open Scrubland within 120 m of the Project Location

Wetland

There are several wetland communities identified on and within 120 m of the Project location (a representative community is shown in Figure 4.5). All wetland communities within 120 m of the Project location are described within a separate report provided in Appendix B.



Figure 4.5 Marshland Southeast of the Project Location

4.2 Wildlife Observations

Several species of wildlife were noted during the site visit. These species are documented in Table 4.1.

Of these species, Bobolink are the lone species considered to be a species at risk. Several declining species, i.e., species of conservation concern, were also recorded during the site investigation.

Table 4.1 Wildlife Species Observed on the McCann Property

Common Name	Scientific Name	Conservation Status ¹		Declining Species ²
		Global (GRank)	Provincial (SRank)	
Reptiles				
Midland Painted Turtle (Figure 4.6)	<i>Chrysemys picta marginata</i>	G5T5	S5	No
Amphibians				
Spring Peeper	<i>Pseudacris crucifer</i>	G5	S5	No
Gray Treefrog	<i>Hyla versicolor</i>	G5	S5	No
Green Frog	<i>Rana clamitans</i>	G5	S5	No
Mammals				
Coyote	<i>Canis latrans</i>	G5	S5	No
White-tailed Deer	<i>Odocoileus virginianus</i>	G5	S5	No
Eastern Chipmunk	<i>Tamias striatus</i>	G5	S5	No
Birds				
Red-tailed Hawk	<i>Buteo jamaicensis</i>	G5	S5	No
Mourning Dove	<i>Zenaida macroura</i>	G5	S5	No
Wild Turkey	<i>Meleagris gallopavo</i>	G5	S5	No
American Crow	<i>Corvus brachyrhynchos</i>	G5	S5B	No
Blue Jay	<i>Cyanocitta cristata</i>	G5	S5	No
Downy Woodpecker	<i>Picoides pubescens</i>	G5	S5	No
Northern Flicker	<i>Colaptes auratus</i>	G5	S4B	Yes
Red-breasted Nuthatch	<i>Sitta Canadensis</i>	G5	S5	No
Black-capped Chickadee	<i>Poecile atricapillus</i>	G5	S5	No
American Robin	<i>Turdus migratorius</i>	G5	S5B	No
Gray Catbird	<i>Dumetella carolinensis</i>	G5	S4B	No
Willow Flycatcher	<i>Empidonax traillii</i>	G5	S5B	No
Great Crested Flycatcher	<i>Myiarchus crinitus</i>	G5	S4B	No
Warbling Vireo	<i>Vireo gilvus</i>	G5	S5B	No
Common Yellowthroat	<i>Geothlypis trichas</i>	G5	S5B	No
Yellow Warbler	<i>Dendroica petechia</i>	G5	S5B	No
Black and white Warbler	<i>Mniotilta varia</i>	G5	S4B	No
American Goldfinch	<i>Carduelis tristis</i>	G5	S5B	No
Red-winged Blackbird	<i>Agelaius phoeniceus</i>	G5	S4	No
Bobolink	<i>Dolichonyx oryzivorus</i>	G5	S4B	Yes
Common Grackle	<i>Quiscalus quiscula</i>	G5	S5B	No
Eastern Meadowlark	<i>Sturnella magna</i>	G5	S4B	Yes
Baltimore Oriole	<i>Icterus galbula</i>	G5	S4B	Yes
White-throated	<i>Zonotrichia albicollis</i>	G5	S5B	No

Common Name	Scientific Name	Conservation Status ¹		Declining Species ²
		Global (GRank)	Provincial (SRank)	
Sparrow				
Chipping Sparrow	<i>Spizella passerine</i>	G5	S5B	No
Field Sparrow	<i>Spizella pusilla</i>	G5	S4B	No
Song Sparrow	<i>Melospiza melodia</i>	G5	S5B	No
<p>¹ MNR, 2010 Acronyms/Definitions Global G5 – Very common (demonstrably secure under present conditions) T – Denotes that the rank applies to a subspecies or variety. Provincial S5 – Secure (Common, widespread, and abundant in the nation or state/province) S4 – Apparently Secure (Uncommon but not rare; some cause for long-term concern due to declines or other factors) SNA – Not Applicable (A conservation status rank is not applicable because the species is not a suitable target for conservation activities)</p> <p>² Mammals (MNR, 2010), Birds (Ontario Partners In Flight, 2005), Amphibians and Reptiles (MNR,2000 and McKenney et al., 2007)</p>				

4.2.1 Wildlife Habitat

The Significant Wildlife Habitat Technical Guide (SWHTG) (MNR, 2000) identifies four main types of wildlife habitat that can be classified as significant:

- habitat for seasonal concentrations of animals
- rare or specialized habitats for wildlife
- habitat for species of conservation concern
- wildlife movement corridors.

Each of these types of wildlife habitat is considered further below and how they were considered during the site investigations.



Figure 4.6 Midland Painted Turtle on McCann Road Southeast of the Project Location

4.2.1.1 *Habitats of Seasonal Concentrations of Animals*

There are many different kinds of seasonal concentration areas, with the likelihood of occurrence of one of these areas depending on the characteristics of the study location. Those that were considered during the site investigations, and the discussion of their potential occurrence on the Project location, are discussed below.

- Winter deer yards/moose late winter habitats – Winter deer yards/moose late winter habitats are sheltered areas where these species congregate during the winter months. A key component of a these areas is a core area predominantly composed of coniferous trees with a 60% canopy cover. Habitat of this type within 120 m of the Project location was considered during the site investigations in relation to the woodlands on and within 120 m of the Project location. Of the woodlands, the conifer plantation within 120 m south of the Project location was the only woodland with dense conifer cover, though the absence of forage species within the woodland and the absence of evidence of deer or moose browse within the area indicates that this feature does not meet the criteria for candidate significant deer yard.
- Colonial bird nesting sites – Colonial bird nesting sites are locations where colonial species, such as herons, gulls, terns, and swallows traditionally nest in colonies of varying size. No colonial birds were observed during the site investigation, and further no heronries were

detected within the wetland communities, and no tern colonies within the marshlands within 120 m of the Project location. Similarly, no areas capable of providing colonial swallow nesting locations were observed on or within 120 m of the Project location.

- Waterfowl stopover and staging areas – Waterfowl traditionally congregate in larger wetlands and clusters of small wetlands located close to one another, and relatively undisturbed shorelines with vegetation during spring and fall migration. Further, during the fall migration, waterfowl may commonly congregate in feeding or roosting ponds. Though the bays of Big Rideau Lake located north of the Project location appear to provide suitable habitat for waterfowl stopover or staging, these areas are located more than 120 m from the Project location, and therefore such suitable habitat is not found on or within 120 m of the Project location. In respect of the wetland communities on and within 120 m of the Project location, these wetlands do not contain large areas of open water (see Appendix B) that would support large numbers of waterfowl, and therefore the clusters of small wetlands do not contain suitable habitat for waterfowl stopover and staging areas.
- Waterfowl nesting – Waterfowl nesting sites can consist of relatively large, undisturbed upland areas with abundant ponds and wetlands, while other species nest within tree cavities in swamps or on the shorelines of waterbodies. Though there is some suitable habitat for waterfowl nesting on and within 120 m of the Project location, no waterfowl were recorded during the site investigation, and therefore this habitat feature is not present.
- Shorebird migratory stopover areas – Shorebird migratory stopover areas are found along the shorelines of the Great Lakes and James Bay, as the Project location is located more than 120 m away from these areas, this habitat type cannot occur on the Project location.
- Landbird migratory stopover areas – Landbird stopover areas are found along the shorelines of the Great Lakes and contain a variety of habitat types from open fields to large woodlands. As the Project location is located greater than 120 m away from these areas, this habitat type cannot occur on the Project location.
- Raptor winter feeding and roosting areas – This combined habitat type features suitable raptor roosting sites in proximity to winter feeding areas. For most raptor species, roosting sites are traditionally mature mixed or coniferous woodlands. The red pine plantation within 120 m south of the Project location is not considered to be a mature forest community and therefore does not meet this habitat requirement. The woodland north of the Project location is considered to be a mature mixed wood forest. As a result, this woodland in combination with the agricultural grasslands and scrubland will be considered a candidate significant wildlife habitat. In addition, the scrubland may also provide roosting habitat for species of raptors that roost in grassy fields.
- Wild turkey winter range – Similar to winter deer yards, wild turkey rely on dense coniferous forest stands for winter protection. This is a habitat type that was not identified on or within 120 m of the Project location.
- Turkey vulture summer roosting areas – Turkey vulture summer roosting areas traditionally consist of cliff ledges and large snags. No cliff ledges were noted during the site investigation, and there were few large dead or partially dead trees present within the area, and those that

were present exhibited no signs of turkey vulture roosting activity, such as whitewashing. Further, turkey vultures were not recorded during the site investigation. As a result, this habitat type is not identified on or within 120 m of the Project location.

- Reptile hibernacula – Reptile hibernacula are commonly found in animal burrows and rock crevices. No animal burrows were noted during the site investigation. Rock crevices were noted associated with a waste pile of rocks (see Figure 4.7); however, the characteristics of the rock pile (max. height of 0.5 m by a width of 3 m) suggest that it is not capable of supporting reptile hibernacula as provision of frost protection/microclimate regulation would not be possible within the piles. Therefore suitable habitat is not found on or within 120 m of the Project location.
- Bat hibernacula – Bat hibernacula are found in caves or abandoned mines, and in areas where karst is present. These features were not identified on or within 120 m of the Project location during the site investigation. According to Brunton and Dodge (2008), there is no identified potential for karst within the area on or within 120 m of the Project location.
- Bullfrog concentration areas – Bullfrog concentration areas are predominantly found in areas of marsh habitat. Though marshlands are present within 120 m of the Project location, no bullfrogs were observed during the site investigation. Further, Bullfrogs are typically found in larger, permanent marshes with extensive floating vegetation communities that permit maturation of tadpoles into adults. Such wetland communities were not identified on or within 120 m of the Project location. Floating vegetation was only identified within one of the wetland communities within 120 m of the Project location, and consisted of 5% duckweed, and 15% *Nymphoides cordata*. Given the limited amount of floating vegetation within this community, this community is unlikely to serve as a bullfrog concentration area. As a result, preferred habitat for bullfrogs, and therefore bullfrog concentration areas are not identified on or within 120 m of the Project location.



Figure 4.7 Rock Pile on the Project Location

Therefore, candidate significant raptor winter roosting and foraging areas may occur on or within 120 m of the Project location.

4.2.1.2 *Rare Vegetation Communities or Specialized Habitat for Wildlife*

Rare vegetation communities include alvars, tall-grass prairies, savannahs, rare forest types, talus slopes, rock barrens, sand barrens and Great Lakes dunes. None of these vegetation communities were identified during the site investigation. Vegetation communities that were observed during the site investigation have been previously described in Section 4.1; none of these communities are considered to be rare or uncommon within the local or provincial area.

Specialized wildlife habitats include

- areas that support species that have highly specific habitat requirements
- areas with high species and community diversity
- areas that provide habitat
- that greatly enhances species survival.

There are many habitat types that may meet these definitions; those that were considered during the site investigations as they had the potential to be present in the area, and the discussion of their potential occurrence on the Project location, are addressed below:

- Habitat for area-sensitive species – Appendix C of the SWHTG lists area-sensitive species. Of these species, Red-breasted Nuthatch and Black-and-White Warbler were recorded during the site investigation. Suitable habitat for these species is found within the large woodlands located within 120 m north and south of the Project location. Therefore these woodlands are considered to be candidate significant habitat for area-sensitive species.
- Forests providing a high diversity of habitats – The large forest communities within 120 m north and south of the Project location were considered in terms of habitat diversity. These communities are discussed separately below:
 - ◆ Woodland on and within 120 m of the northern boundary of the Project location. The woodland is 122 ha in size, though only containing approximately 9 ha of forest interior habitat given that the woodland surrounds the lake and is often very narrow. The woodland encompasses a Tributary of Big Rideau Lake within 120 m east of the Project location. The topography within the woodland community generally slopes toward Big Rideau Lakes, however, no valleylands or other such prominent topographic features were identified on or within 120 m of the Project location. The woodland community is generally described as occurring within a single-age class (i.e., predominantly mature with a minor occurrence of young woodland on the Project location). Woodland community species composition was previously described within Section 4.1. The woodland community is also identified as candidate significant habitat for area sensitive species, animal movement corridor, and raptor winter feeding and roosting habitat. Abundant leaf litter, supercanopy trees, and large dead snags capable of providing support for cavity nesters were not recorded within the woodland. As a result, this woodland is considered to be a forest providing a high diversity of habitats given its size, age and encompassing of a watercourse.
 - ◆ Woodland within 120 m of the southern boundary of the Project location. The woodland is 136 ha in size, with approximately 15 ha of forest interior habitat. The woodland is adjacent to a Tributary of Big Rideau Lake within 120 m east of the Project location. The topography within the woodland community is generally flat within 120 m of the Project location. The woodland community is generally described as occurring within a single-age class (middle-aged). Woodland community species composition was previously described within Section 4.1. The woodland community is also identified as candidate significant habitat for area sensitive species, animal movement corridor, and raptor winter feeding and roosting habitat. Abundant leaf litter, supercanopy trees, and large dead snags capable of providing support for cavity nesters were not recorded within the woodland. As a result, this woodland is considered to be a forest providing a high diversity of habitats given its size, forest interior and location adjacent to a watercourse.
- Old-growth or mature forest stands – Though a mature forest community was identified within 120 m north of the Project location, it was determined to not have characteristics of an old-growth forest, i.e., large deadfall logs were rarely noted and no large snags were observed; no trees with a diameter at breast height greater than 50 cm were observed; gaps in the canopy were small and localized. Further, this woodland community within 120 m does not represent the maturest forest stand within the planning area, given that portions of the woodland beyond 120 m from the Project location have been identified as containing old growth forest (MNR,

2011b). Therefore, old-growth or over-mature forest stands are not present on or within 120 m of the Project location.

- Foraging areas with abundant mast – This habitat type is found within EcoRegion 6E only in relation to foraging areas with abundant mast present on the Bruce Peninsula (EcoDistrict 6E-14). As the Project location is more than 120 m from this area, within EcoDistrict 6E-11 (MNR, 2009). As a result, this habitat type is not found on the Project location.
- Woodlands supporting amphibian breeding ponds – Vernal pools were not recorded within the woodlands that are found on or within 120 m of the Project location. As a result, this habitat type is not found on or within 120 m of the Project location.
- Turtle nesting habitat – A potential area for turtle nesting was identified (shown in Figure 1.1), adjacent to the wetland community around the Tributary of Big Rideau Lake. This area featured exposed soils on a southeastern facing slope. However, this area is located more than 120 m from the Project location and therefore candidate significant turtle nesting habitat is not present on or within 120 m of the Project location.
- Specialized raptor nesting habitat – No raptor species were observed during the site investigations within the breeding season; a Red-tailed Hawk was recorded during the site investigation in October, however this observation was made well outside of the breeding season such that it is not possible to link observations of raptors at that time to nesting locations. Though suitable nesting habitat is found on or within 120 m of the Project location, nesting locations were not identified during the site investigation though the areas were extensively searched. Further, no evidence of raptor distress was noted, as would be expected if the site investigator had approached an active nest location. As a result, specialized raptor nesting habitat were not identified on or within 120 m of the Project location.
- Osprey/Bald Eagle Nesting Habitat – Woodlands on and within 120 m of the Project location were searched for evidence of Osprey/Bald Eagle nests; no such nests were observed and neither species was recorded during the site investigation.
- Mink, otter, marten, and fisher denning sites – Denning sites for these members of the weasel family were not recorded on or within 120 m of the Project location during the site investigation.
- Moose calving areas/aquatic feeding areas/mineral licks – Such features are not candidate significant wildlife habitats in EcoRegion 6E (MNR, 2009).
- Highly diverse areas – The habitats present on and within 120 m of the Project location were considered in respect of diversity. The Project location is situated on the edge of the Frontenac axis, an area that is identified as having high diversity. Characteristics of the areas are described further below in relation to highly diverse areas. Based on the absence of diverse community types on and within 120 m of the Project location, this habitat feature is not identified.
 - ◆ Natural community diversity – Woodlands, plantations, wetlands, scrubland and agricultural fields were recorded on and within 120 m of the Project location. Only the woodland communities were identified as containing a diversity of habitats. Diversity within the scrubland and wetland community types was not identified.

- ◆ Species diversity – Though a complete species inventory of the various communities was not completed, given that many of the communities extend several hundred meters beyond 120 m from the Project location, a diversity of species within the communities within 120 m of the Project location was not noted during the various site investigations.
- ◆ Presence of rare species – No rare species were noted during the site investigation.
- ◆ Size of site – The Project location consists of a 40-ha parcel of land, with characteristics typical of those found within the surrounding regional area.
- Cliffs and caves – These features were not identified on or within 120 m of the Project location during the site investigation.
- Seeps and springs – No seeps or springs were identified on or within 120 m of the Project location during the site investigation (see Hatch Ltd., 2010b).

As a result, the habitat for Black-and-white Warbler and Red-breasted Nuthatch, and forest providing a high diversity of habitats, are considered to be specialized habitats for wildlife on or within 120 m of the Project location.

4.2.1.3 *Habitat of Species of Conservation Concern*

Species of conservation concern that were considered during the site investigation include the following:

- American Kestrel/Black-billed Cuckoo/Northern Flicker/ Red-headed Woodpecker/Belted Kingfisher/Eastern Wood-Pewee/Eastern Kingbird/Brown Thrasher/Eastern Towhee/Golden-winged Warbler/Prairie Warbler/Field Sparrow/Vesper Sparrow/Savannah Sparrow/Baltimore Oriole – Though suitable habitat exists within 120 m of the Project location, none of these species were observed visually or heard calling/singing during the site investigations. As surveys were conducted during suitable periods for detection, these species are determined to not be present.
- Cerulean Warbler – Suitable habitat for Cerulean Warbler is found within 120 m of the Project location within the woodland immediately north of the Project location. The woodland community was described as a mature mixed-wood community. It was the opinion of the site investigators that this woodland would provide suitable habitat for Cerulean Warblers. Cerulean Warblers are an interior forest specialist, and therefore areas of interior forest within 120 m of the Project location would represent candidate significant habitat for Cerulean Warblers. Though not detected during the site investigation, Cerulean Warblers can be difficult to detect and are therefore carried forward to the evaluation of significance.
- Bank Swallow – Suitable nesting habitat (banks along shorelines and in artificial sites such as sand and gravel pits) were not observed on or within 120 m of the Project location.
- Five-lined Skink – Though rocky areas are identified on the Project location, these sites are not part of an extensive rock barren system, and therefore unlikely to provide suitable habitat for five-lined skink. Five-lined Skink are very uncommon within the vicinity of the Project location, and surveys of similar habitats (areas with shallow bedrock that have been used as cow pasture),

have not identified Five-lined Skink (MNR, 2011a). As a result, suitable habitat is not present on or within 120 m of the Project location.

- Milksnake – As Milksnake are habitat generalists, suitable habitat is present on and within 120 m of the Project location. Though not detected during the site investigation, it is assumed that they are present.
- Eastern Ribbonsnake/Northern Map Turtle/Snapping Turtle — The watercourse identified within 120 m northwest of the Project location was determined to not be capable of supporting Ribbonsnake/turtle populations, however the watercourse located within 120 m east of the Project location does provide suitable habitat. Though not detected during the site investigation, it is assumed that they are present.
- Western Chorus Frog – This species was not observed on the Project location, however potential habitat is present within the wetland located within 120 m of the Project location and their associated woodlands. As a result, these areas will be treated as potential habitat for Western Chorus Frog.
- Early Hairstreak – This woodland species of butterfly is associated with fairly extensive mature beech-maple forests, with nuts of mature beech trees forming a critical part of their lifecycle in terms of host and food sources for eggs and larva, respectively. Neither Early Hairstreak, nor mature beech trees, were noted within the woodlands during the site investigation. As a result, this species is not expected on or within 120 m of the Project location.

Based on the results of the site investigation, potential habitat for Cerulean Warbler, Western Chorus Frog, Milksnake, Eastern Ribbonsnake, Northern Map Turtle, and Snapping Turtle will be considered during the evaluation of significance.

4.2.1.4 *Animal Movement Corridors*

The SWHTG (MNR, 2000) defines animal movement corridors as “elongated, naturally vegetated parts of the landscape used by animals to move from one habitat to another”. Animal movement corridors were considered during the site investigation. Such features were found to be present within the hedgerows, woodlands, and the Tributary of Big Rideau Lake within 120 m of the Project location.

These features will be further assessed in the Evaluation of Significance report.

5. Conclusions

Based on the results of the site investigation identified above, the following corrections to the Records Review report are required:

- hedgerows and scrubland on the Project location do not meet the definition of a woodland
- there is a minor reduction in the amount of woodland present on the Project location in the northern extent
- additional wetland communities have been identified within 120 m of the Project location.

The following natural features are present on and within the vicinity of the Project location and will require an evaluation of significance in order to determine whether an environmental impact study is required:

- wildlife habitat of the Project area, specifically:
 - ◆ raptor winter roosting and feeding areas
 - ◆ forest providing a high diversity of habitats
 - ◆ habitat for area-sensitive species (Red-breasted Nuthatch, Black-and-white Warbler)
 - ◆ habitat for species of conservation concern (including Milksnake, Eastern Ribbonsnake, Northern Map Turtle, Snapping Turtle, Cerulean Warbler and Western Chorus Frog)
 - ◆ woodlands, hedgerows and watercourses on and within 120 m of the Project location as animal movement corridors
- woodlands on and within 120 m of the Project location
- wetlands on and within 120 m of the Project location.

6. References

Brunton, F.R. and J.E.P. Dodge. 2008. Karst Map of Southern Ontario, including Manitoulin Island; Ontario Geological Survey, Groundwater Resource Study 5. Ontario Geological Survey.

Hatch Ltd. 2010a. McCann Solar Project – Natural Heritage Records Review. Prepared for Northland Power Inc. on behalf of Northland Power Solar McCann L.P. July 2010.

Hatch Ltd. 2010b. McCann Solar Project – Water Body Site Investigation Report. Prepared for Northland Power Inc. on behalf of Northland Power Solar McCann L.L. July 2010.

Ministry of Natural Resources (MNR). 2011a. Personal communication from A. Cameron (MNR) to S. Male (Hatch).

MNR. 2011a. Personal communication from H. Zurbrigg (MNR) to S. Male (Hatch). MNR. 2009. Significant Wildlife Habitat Ecoregion Criteria Schedules – Addendum to Significant Wildlife Habitat Technical Guide – Working Draft, January 2009.

MNR. 2000. Significant Wildlife Habitat Technical Guide. Fish and Wildlife Branch, Wildlife Section and Science Development and Transfer Branch, Southcentral Sciences Section.

Appendix A
Site Investigation
Field Notes

No Northland McCann
Date May 11/10

Page ①

Time 8:35 - 12:07

Temp - 14°

B1

CC - 0

Birds

WTH → RVL	NOB	AMGO	WTSP
COYE	NOBO	RCCH	MAKO
CHSP	YELA	ROWA	PLSP
COGB	CAGO	SAKE	BLAK
AMCK	SOSP	BLWA	WAVE
PLJA	GRCA	GCPL	

Notes:

- cells all on pasture
- wooded area @ SE
- red pine → very green
- mixed sp.
- in wood
- scrubby open
- sugar maple

No Northland McCann
Date May 12/10

Page ②

Hedgehogs → hedgehogs down
→ shaggy common

→ wash etc.
→ prickly at evening but
he ^{was} ^{seen} ^{trying to} ^{eat}

Hyd course

→ broke bottom

→ lots of algae growth

→ 1.5 m wide → under e edge of
→ one real flow cut out (mainly)

→ drainage?

→ prohibited to hedgehogs, low

→ some algae, snails, etc.
→ some slugs near edge + regions

Shallows

→ shanks in water → dry at of part
→ lake / flow

→ hedgehogs in water course

→ removed a log

→ scrubby open @ edge of upland

→ sugar maples

No. Northland - McCann
Date May 17/10 Page 39

Open Pond →
Bighorn Island along ridge
P.O. → 1000 m
→ steep banked → restricted to 1000 m
than a night.

Washed a bear
→ simple line used for
→ simple area

(W) selected bank
→ rocky
→ open habitat
→ grasses / paper
→ with almost 1000 (m.)

(LA) Above?
Open area
→ similar during 1000 m

No. Northland - McCann
Date May 17/10 Page 40

Washed a bear
→ 1000 m from ridge to grassland
→ 1000 m from ridge to grassland
→ because low vegetation

UTSP
→ 1000 m from ridge to grassland

Washed a bear in field

(ACH) in 1000 m

(W) Washed
Black Cherry
Ash
→ 1000 m from ridge to grassland

→ 1000 m from ridge to grassland
→ 1000 m from ridge to grassland

Appendix B
Natural Resource Solutions Inc.
Wetland Evaluations



Memo

Project No. 1144

To: Sean Male

From: David Stephenson; Kevin Dance

Date: March 22, 2011

**Re: McCann Solar Project Wetland Evaluation
Response to MNR Comments**

The wetlands in the vicinity of the proposed McCann Solar Project lands are unevaluated at this time. The new Natural Heritage Assessment Guide (NHAG) for Renewable Energy Projects (MNR 2010) allows for the evaluation of these wetlands using Appendix C. By completing the wetland evaluation sections outlined in the NHAG's Appendix C the wetlands on site are assumed to be Provincially Significant wetland. An EIS is therefore also required to be completed if Appendix C of the NHAG is used. Based on comments NRSI received from yourself, MNR has identified that the on-site wetlands identified as hS4 (SWDM4-2), neM4 (MASM1-10) and nearby hS5 (SWDM2-2), are not to be included as part of the PSW complex, see *Wetland Vegetation Map*. We agree with this determination, as the three wetlands mentioned above were isolated wetlands and were all <0.5ha in size, which according to the Ontario Wetland Evaluation System for Southern Ontario (OWES) is too small to map and to require a wetland evaluation (OWES 2002). These wetlands were therefore not included in the NHAG Appendix C evaluation for the wetland complex.

The catchment area used in this evaluation is based on that identified by Shaun Thompson of MNR, from February 17, 2011 (Pers. Comm. 2011), see attached *Catchment Area Map*. The location and the vegetation community types of the unevaluated wetlands within the catchment area are shown on the attached *Wetland Vegetation Map*. The size of the wetlands within the catchment area are provided in hectares (ha) on the *Area (ha) of Wetland Vegetation Communities Map*. Completion of Appendix C of the NHAG was completed in accordance with the appropriate sections of the Ontario Wetland Evaluation System for Southern Ontario (MNR 2002), and is attached as Table 1. It is our understanding that this table will be used by Hatch to identify potential negative environmental effects and mitigations as is required for preparation of an EIS.

The field study approach taken by NRSI during the August 10th, 2010 site visit included:

- Collection and review of background information on wetland-related natural features in the vicinity of the project location.

- Identification of all wetlands, evaluated and non-evaluated, within approximately 750m of the subject wetlands to assess the extent of wetland mapping that would be required to address whether wetlands in the vicinity of the project location would be complexed with other wetlands (i.e. to identify whether a 'string' of unevaluated wetlands occur between the subject wetlands and the nearest evaluated wetland)
- Conduct field surveys of subject wetlands on the project location as well as on neighbouring lands. This included mapping of wetland vegetation communities based on Ontario Wetland Evaluation System (OWES) Southern Manual as well as Ecological Land Classification (ELC), and recording all species of flora and fauna within the wetlands.

Some of the wetlands in the catchment area were not able to be visited in the field on August 10th, 2010 by NRSI staff, as they were on private property and not visible from public roads. For wetlands which were not accessible during the site visits or were identified later by MNR, information on those wetlands was based on air photo interpretation. Air photo interpretation took into account MNR NRVIS wetland mapping and the mapping provided by Shaun Thompson (MNR) to determine wetland boundaries for those wetlands that were inaccessible in the field. This allowed for the size of the wetlands to be determined for use in completing the Appendix C evaluation (see the attached Catchment Area and Wetland Size map).

As part of Appendix C of the NHAG, we have completed an interspersion map covering the wetlands in the catchment area, and have attached the interspersion map with this memo.

I trust that this information is adequate. If any further information or clarification is needed please contact me.

Yours Sincerely,
Natural Resource Solutions Inc.

A handwritten signature in black ink, appearing to read "D. Stephenson", with a long horizontal flourish extending to the right.

David Stephenson, M.Sc.,
Senior Biologist

Work Cited

Work Cited:

Ontario Ministry of Natural Resources (MNR). 2010. Natural Heritage Assessment Guide For Renewable Energy Projects. Ontario Ministry of Natural Resources. Pp86.

Ontario Ministry of Natural Resources (MNR). 2002. Ontario Wetland Evaluation System: Southern Manual. Ontario Ministry of Natural Resources. 252p.

Thompson, Shaun. 2011. Personal Communication from February 17th, 2011. Ontario Ministry of Natural Resources.

Table 1 Wetland Characteristics and Ecological Functions Assessment for Renewable Energy Projects, Wetland Complex

Characteristic/ Ecological Function	Evaluation Results	Scoring																				
Actual Wetland Size (ha)	<p>Wetland 1: Tall shrub, swamp #1 (tsS1) = 6.12ha Deciduous, swamp #2 (hS2) = 0.62ha</p> <p>Wetland 2: Herbs, marsh #1 (gcM1) = 0.27ha</p> <p>Wetland 3: Robust emergent, marsh #1 (reM1) = 32.87ha Herbs, marsh #3 (gcM2) = 2.4ha Deciduous, swamp #3 (hS3) = 0.6ha</p> <p>Wetland 4: Herbs, marsh #3 (gcM3) = 0.61ha</p> <p>Wetland 5: Deciduous, swamp #6 (hS6) = 0.66ha</p> <p>Wetland 6: Herbs, marsh #3 (gcM4) = 3.49ha</p> <p>Wetland 7: Robust emergent, marsh #2 (reM2) = 1.2ha</p> <p>Wetland 8: Robust emergent, marsh #3 (reM3) = 0.54ha</p> <p>Wetland 9: Tall shrub, swamp #2 (tsS2) = 0.86ha Narrow-leaved emergent, marsh #2 (neM2) = 2.02</p> <p>Wetland 10: Robust emergent, marsh #4 (reM4) = 0.88ha Submergent, marsh #1 (suM1) = 0.41ha Floating, marsh #1 (fM1) = 8.82ha</p> <p>Total : 62.37 ha (excluding Non PSW wetlands ID'd by MNR)</p>																					
Wetland Type	<p>WETLAND (Fractional Area = area of wetland 1.1.2 TYPE type/total wetland area)</p> <table border="1" data-bbox="548 1402 1203 1633"> <thead> <tr> <th></th> <th>Fractional Area</th> <th></th> <th>Score</th> </tr> </thead> <tbody> <tr> <td>Bog</td> <td></td> <td>x 3</td> <td>0.00</td> </tr> <tr> <td>Fen</td> <td></td> <td>x 6</td> <td>0.00</td> </tr> <tr> <td>Swamp</td> <td>0.14</td> <td>x 8</td> <td>1.12</td> </tr> <tr> <td>Marsh</td> <td>0.86</td> <td>x 15</td> <td>12.9</td> </tr> </tbody> </table> <p style="text-align: right;">Wetland type score (maximum 15 points) 14.02</p> <p>Fractional Area of Wetland Types: Swamp: Swamp (ha) Total ha = 8.86 FA=8.86/62.37 =0.14</p>		Fractional Area		Score	Bog		x 3	0.00	Fen		x 6	0.00	Swamp	0.14	x 8	1.12	Marsh	0.86	x 15	12.9	9
	Fractional Area		Score																			
Bog		x 3	0.00																			
Fen		x 6	0.00																			
Swamp	0.14	x 8	1.12																			
Marsh	0.86	x 15	12.9																			

	<p>Marsh: Marsh (ha) Total ha = 53.65 FA =53.51/62.37 =0.86</p>	
Site Type	<p>Lacustrine (at river mouth): FA= 9.7/62.37= 0.15 0.15*5 = 0.75 Palustrine: FA= 10.98/62.37= 0.18 0.0.18*2 = 0.35 Riverine: FA= 41.69/62.37=0.67 0.67*4 = 2.68</p>	3.73
Vegetation Communities	<p>Ten wetland areas have information on vegetation communities. Seven of the wetlands have no detailed vegetation information as only available information is from air photos as there was no property access to these private property areas.</p> <p>Areas with known vegetation communities: =19 Assuming all areas have only 1-3 forms 19= 12</p>	12
Proximity to other Wetlands	Hydrologically connected by surface water to other wetlands (different dominant wetland type), or open lake or deep river within 1.5 km	8
Interspersion	<p>See Appended Interspersion Map</p> <p>Total vertical: 53 Total horizontal: 46</p> <p>Total = 99</p>	15
Open Water Types	Type 2: Open water occupies 5-25% of the wetland area, occurring in a central area	8
Flood Attenuation (total)	Details of Flood Attenuation calculations are provided below Table 1	89
Water Quality Improvement (Total)	Details of water quality improvement calculations are provided below Table 1	60 +0
Shoreline Erosion Control	Details of shoreline erosion control calculations are provided below Table 1	8
Groundwater Recharge (Total)	Details of Groundwater Recharge calculations are provided below Table 1	22.4
Species Rarity(Total)	No rare species were noted by NRSI staff during 2010 surveys within the wetlands that were able to be examined. Shaun Thompson of MNR has identified that there is a high potential for	

	the following rare species within the wetland communities; Musk Turtle, Snapping Turtle, Blanding's Turtle, Pugnose Shiner, Least Bittern, and Black Tern	
Significant Features and Habitats (Total)	<p>Section:</p> <p>4.2.1 Colonial Waterbirds = black tern (Shaun Thompson, MNR) = 25</p> <p>4.2.2 Winter Cover for Wildlife = none =0</p> <p>4.2.3 Waterfowl Staging and/or Molting Area = none =0</p> <p>4.2.4 Waterfowl Breeding = habitat suitable =10</p>	35
Fish Habitat (Total)	<p>No fisheries information for the unnamed tributary on the Project property was found during the records review. Hatch conducted a visual aquatic habitat survey of the watercourse on May 17, 2010. No specific fish community assessment work was completed.</p> <p>The watercourse consists of a drainage tributary originating on the Project property, flowing for approximately 500 m before draining into the tributary of Big Rideau Lake off the Project location. The tributary runs on the Project property for approximately 200 m. It flows through a narrow, naturally vegetated corridor, surrounded by grassed fields used as cow pastures. The channel bottom is comprised of a mix of organic and mineral soils and the channel is approximately 1.5 to 2 m wide. Water depth during the site investigation was <0.30 m and no flow was evident. It appears as though this watercourse primarily flows during precipitation and snow melt events, and is likely intermittent during the drier parts of the year. Algae was abundant throughout the channel on the Project property. There were some bulrushes (<i>Scirpus sp.</i>) and cattails (<i>Typha sp.</i>) and some inundated willow shrubs (<i>Salix sp.</i>) within the main channel. The riparian areas of the channel are dominated by a variety of shrubs and trees including trembling aspen (<i>Populus tremuloides</i>) and raspberries (<i>Rubus sp.</i>) in the upland areas near the border of the Project property.</p> <p>This watercourse may provide seasonal aquatic habitat for fish residing within the tributary of Big Rideau Lake, although it appears to be intermittent and would not provide direct habitat on a year-round basis. It also likely provides habitat for benthic invertebrates, which may act as a food source for the downstream fish community, and seasonal habitat for frogs, which were observed during the site investigation. The watercourse also provides some hydrology and water quality regulation for the downstream watercourse.</p>	

Flood Attenuation Calculations:

<p>HYDROLOGICAL</p> <p>3.0 COMPONENT</p> <hr/> <p>FLOOD</p> <p>3.1 ATTENUATION</p> <hr/> <p>If the wetland is a complex including isolated wetlands, apportion the 100 points according to area. For example if 10 ha of a 100 ha complex is isolated, the isolated portion receives the maximum</p>
--

proportional score of 10. The remainder of the wetland is then evaluated out of 90.

$$\text{Initial score} = 0.27 + 1.2 + 0.54 + 3.49 + 0.61 + 0.66 = 6.77 / 62.37 = 0.11$$

Initial Score = 88

Step 1: Wetland is located one of the defined 5 large lakes or 5 major rivers (Go to Step 4)

wetland is entirely isolated (ie. not part of a complex) (Go to Step 4)

All other wetlands, go through steps 2, 3, 4b

Step 2: Determination of Upstream Detention Factor (DF)

(a)	Wetland area (ha)		62.37
(b)	Total area (ha) of <u>upstream</u> detention areas (include the wetland itself)		62.37
(c)	Ratio of (a):(b)		1.00
(d)	Upstream detention factor: (c) x 2 = (maximum allowable factor = 1)	2.00	1.00

Step 3: Determination of Wetland Attenuation Factor (AF)

(a)	Wetland area (ha)		62.37
(b)	Size of catchment basin (ha) <u>upstream</u> of wetland (include wetland itself in catchment area)		595
(c)	Ratio of (a):(b)		1:9
(d)	Wetland attenuation factor: (c) x 10 = (maximum allowable factor = 1)	0.1	1

Step 4: Calculation of final score

- (a) Wetlands on large lakes or major rivers
- (b) Wetland entirely isolated
- (c) All other wetlands –calculate as follows:

Upstream Detention Factor (DF) (Step 2)	1.00
Wetland Attenuation Factor (AF) (Step 3)	1.00
Final Score: [(DF + AF)/2] x initial score (88) =	89

*Unless wetland is a complex including isolated portions -- see above

Total Flood Attenuation Score (maximum 100 points)

89

Water Quality Improvement Calculations:

Southern Ontario Wetland Evaluation, Data and Scoring Record

(March 1993)

3.2 WATER QUALITY IMPROVEMENT

3.2.1 SHORT TERM WATER QUALITY IMPROVEMENT

Step 1: Determination of maximum initial score

X Wetland on one of the 5 defined large lakes or 5 major rivers (Go to Step 5a)
 All other wetlands (Go through Steps 2, 3, 4, and 5b)

Step 2: Determination of watershed improvement factor (WIF)

Calculation of WIF is based on the fractional area (FA) of each site type that makes up the total area of the wetland.

(FA= area of site type/total area of wetland)	Fractional Area			
FA of isolated wetland	0.000	x	0.5	= 0.000
FA of riverine wetland	0.67	x	1	= 0.670
FA of palustrine wetland with no inflow	0.18	x	0.7	= 0.126
FA of palustrine wetland with inflows		x	1	= 0.0
FA of lacustrine on lake shoreline	0.15	x	0.2	= 0.03
FA of lacustrine at lake inflow or outflow		x	1	= 0.000
			Sub Total:	0.826
	Sum (WIF cannot exceed 1.0)			0.826

Step 3: Determination of catchment land use factor (LUF)

(Choose the first category that fits upstream landuse in the catchment.)

1)	1.0	Over 50% agricultural and/or urban	1.0
2)		Between 30 and 50% agricultural and/or urban	0.8
3)		Over 50% forested or other natural vegetation	0.6
		LUF (maximum 1.0)	1.00

Step 4: Determination of pollutant uptake factor (PUT)

Calculation of PUT is based on the fractional area (FA) of each vegetation type that makes up the total area of the wetland. Base assessment on the dominant vegetation form for each community except where dead trees or shrubs dominate. In that case base assessment on the dominant live vegetation. (FA = area of vegetation type/total area of wetland)

FA of wetland with live trees, shrubs, herbs or mosses (c,h,ts,ls,gc,m)	Fractional Area			
	0.25	x	0.75	= 0.1875
FA of wetland with emergent, submergent or floating vegetation (re,be,ne,su,f,ff)	0.75	x	1	= .75
FA of wetland with little or no vegetation (u)	0.0	x	0.5	= 0.0
fM1+suM1				
	Sum (PUT cannot exceed 1.0)			0.9375

Step 5: Calculation of final score

- (a) Wetland on large lakes or major rivers 0

(b)	All other wetlands -calculate as follows		
	Initial score		88
	Water quality improvement factor (WIF)		0.826
	Land use factor (LUF)		1.00
	Pollutant uptake factor (PUT)		0.9375
	Final score: 88 x WIF x LUF x PUT =		68.145
Short Term Water Quality Improvement Score (maximum 60 points)			60
3.2.2	LONG TERM NUTRIENT TRAP		
Step 1:	Wetland on defined 5 large lakes or 5 major rivers		0 points
	X	All other wetlands (proceed to Step 2)	
Step 2:	Choose only one of the following settings that best describes the wetland being evaluated		
	1)	Wetland located in a river mouth	10 points
	2)	Wetland is a bog, fen or swamp with more than 50% of the wetland being covered with organic soil	10
	3)	Wetland is a bog, fen or swamp with less than 50% of the wetland being covered with organic soil	3
	4)	Wetland is a marsh with more than 50% of the wetland covered with organic soil	3
	5)	X None of the above	0
Long Term Nutrient Trap Score (maximum 10 points)			0

Shoreline Erosion Control and Groundwater Recharge (total):

3.4	SHORELINE EROSION CONTROL		
Step 1:			Score
		Wetland entirely isolated or palustrine	0
	X	Any part of the Wetland riverine or lacustrine (proceed to Step 2)	
Step 2:	Choose the one characteristic that best describes the shoreline vegetation (see text for a definition of shoreline)		
			Score
	1)	Trees and shrubs	15
	2)	8 Emergent vegetation	8
	3)	Submergent vegetation	6
	4)	Other shoreline vegetation	3
	5)	No vegetation	0

Shoreline Erosion Control Score (maximum 15 points)

8

3.5 GROUND WATER RECHARGE

3.5.1 WETLAND SITE TYPE

Score

- (a) Wetland >50% lacustrine (by area) or located on one of the five major rivers
- (b) Wetland not as above. Calculate final score as follows:
(FA= area of site type/total area of wetland)

0

Fractional Area

FA of isolated or palustrine wetland	0.18	x	50	=	9
FA of riverine wetland	0.67	x	20	=	13.4
FA of lacustrine wetland (wetland <50% lacustrine)	0.15	x	0	=	0.00

Ground Water Recharge Wetland Site Type Component Score (maximum 50 points)

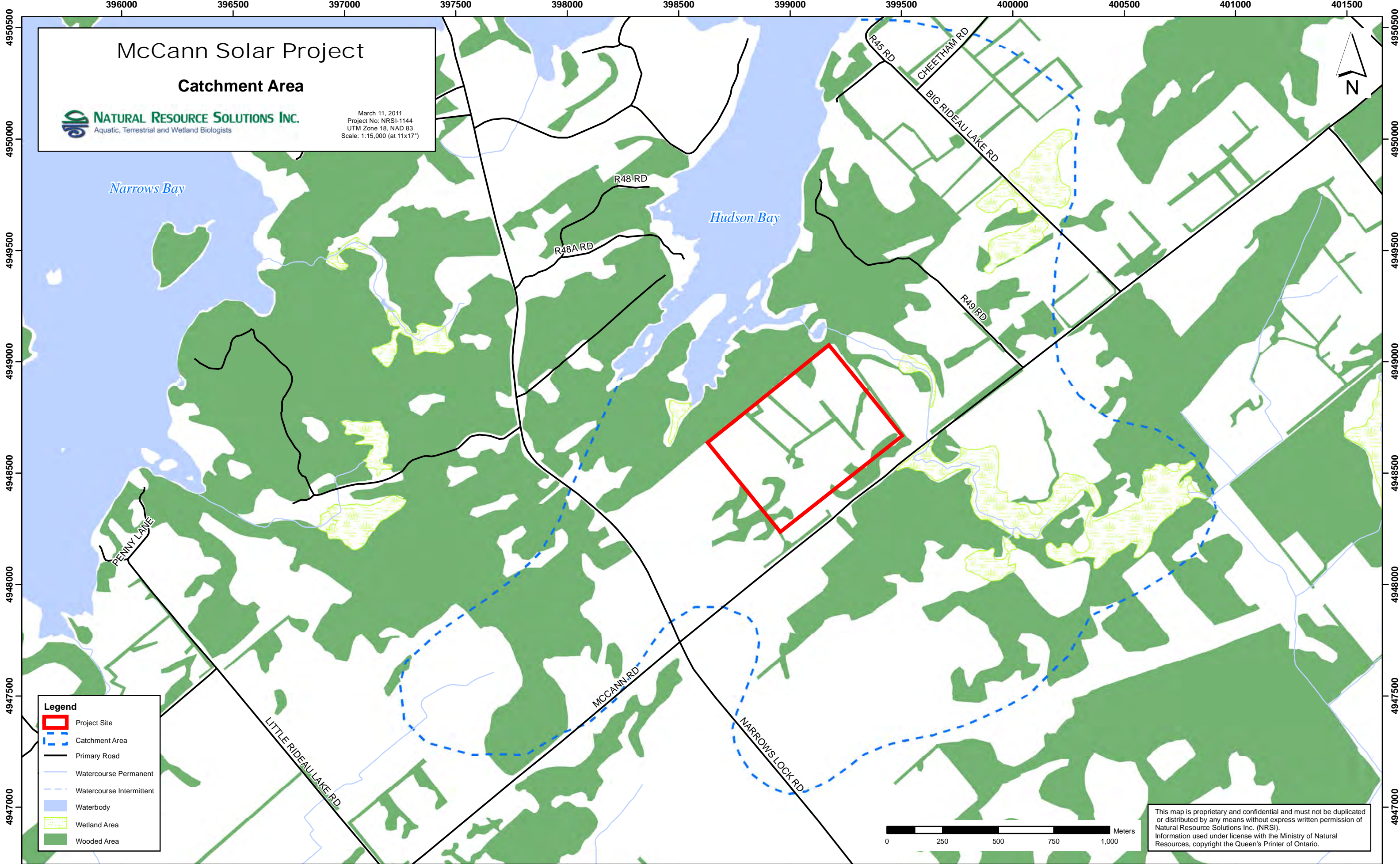
22.4

McCann Solar Project

Catchment Area

NATURAL RESOURCE SOLUTIONS INC.
Aquatic, Terrestrial and Wetland Biologists

March 11, 2011
Project No: NRSI-1144
UTM Zone 18, NAD 83
Scale: 1:15,000 (at 11x17")



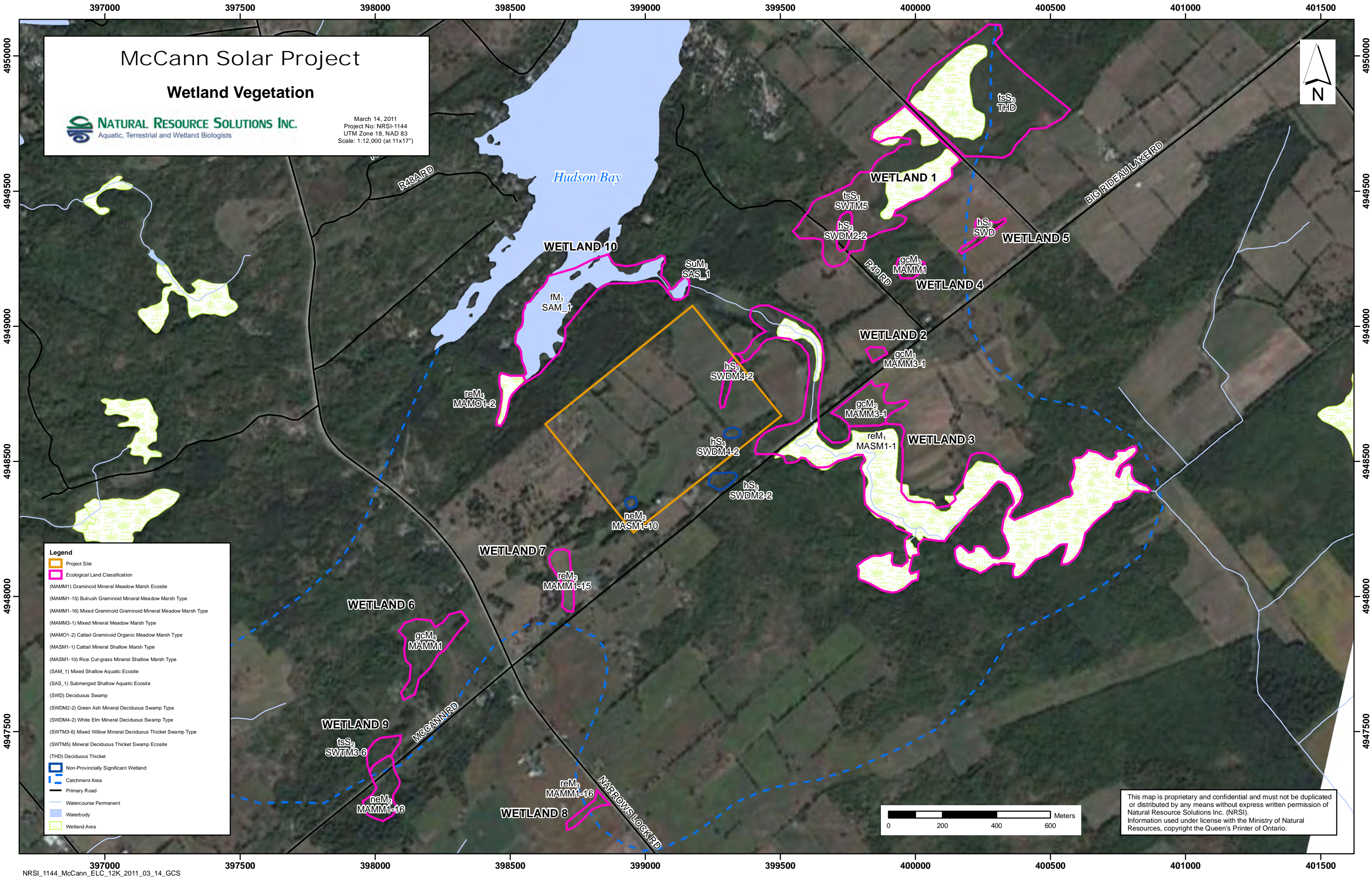
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McCann Solar Project

Wetland Vegetation



March 14, 2011
 Project No: NRSI-1144
 UTM Zone 18, NAD 83
 Scale: 1:12,000 (at 11x17")



Legend

- Project Site
- Ecological Land Classification
- (MAMM1) Graminoid Mineral Meadow Marsh Ecosite
- (MAMM1-15) Bulrush Graminoid Mineral Meadow Marsh Type
- (MAMM1-16) Mixed Graminoid Graminoid Mineral Meadow Marsh Type
- (MAMM3-1) Mixed Mineral Meadow Marsh Type
- (MAMO1-2) Cattail Graminoid Organic Meadow Marsh Type
- (MASM1-1) Cattail Mineral Shallow Marsh Type
- (MASM1-10) Rice Cut-grass Mineral Shallow Marsh Type
- (SAM_1) Mixed Shallow Aquatic Ecosite
- (SAS_1) Submerged Shallow Aquatic Ecosite
- (SWD) Deciduous Swamp
- (SWDM2-2) Green Ash Mineral Deciduous Swamp Type
- (SWDM4-2) White Elm Mineral Deciduous Swamp Type
- (SWTM3-6) Mixed Willow Mineral Deciduous Thicket Swamp Type
- (SWTM5) Mineral Deciduous Thicket Swamp Ecosite
- (THD) Deciduous Thicket
- Non-Provincially Significant Wetland
- Catchment Area
- Primary Road
- Watercourse Permanent
- Waterbody
- Wetland Area

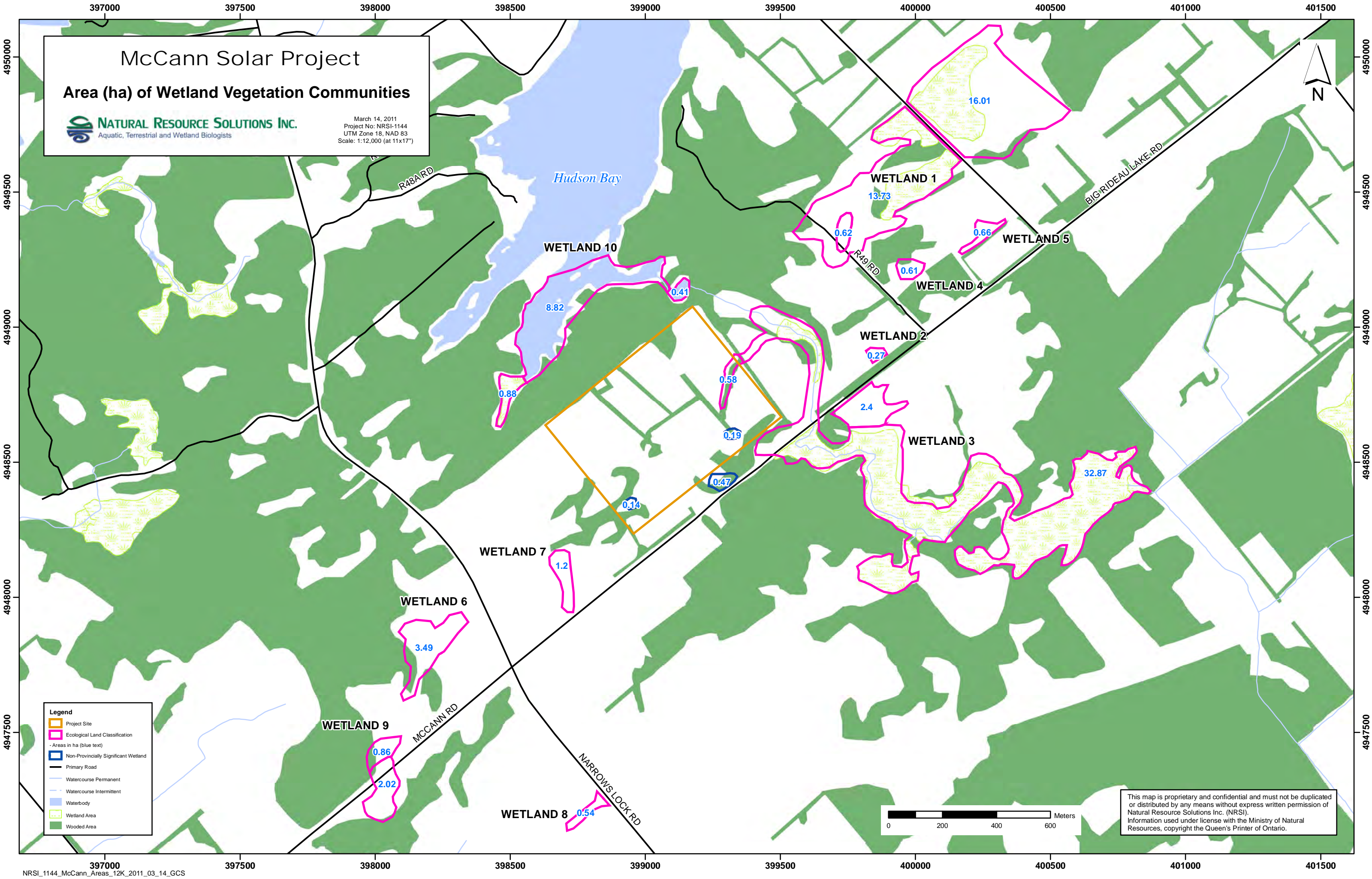
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Area (ha) of Wetland Vegetation Communities Map

McCann Solar Project
Area (ha) of Wetland Vegetation Communities

NATURAL RESOURCE SOLUTIONS INC.
 Aquatic, Terrestrial and Wetland Biologists

March 14, 2011
 Project No: NRSI-1144
 UTM Zone 18, NAD 83
 Scale: 1:12,000 (at 11x17")



Legend

- Project Site
- Ecological Land Classification
- Areas in ha (blue text)
- Non-Provincially Significant Wetland
- Primary Road
- Watercourse Permanent
- Watercourse Intermittent
- Waterbody
- Wetland Area
- Wooded Area



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Project Team:

Member	Qualifications	Role
David Stephenson, MSc	Certified Wetland Evaluator Certified ELC Certified Arborist	<ul style="list-style-type: none">• Project Management• Field Survey• Data Analysis, Evaluation, Reporting• Natural Heritage Assessment Guide Appendix C – for revised catchment area (air photo interpretation, interspersed mapping, and evaluation)
Kevin Dance, M.E.S.	Field Biologist Certified ELC	<ul style="list-style-type: none">• Natural Heritage Assessment Guide Appendix C – for revised wetland evaluation
Megan Anevich, B.Sc. (candidate)	Field Biologist	<ul style="list-style-type: none">• Field Survey
Barry Moss, B.E.S.	Field Biologist Certified ELC	<ul style="list-style-type: none">• Field Survey
Matt Ross, B.Sc	Field Biologist	<ul style="list-style-type: none">• Data Analysis, Evaluation
Shawn MacDonald, B.A.	GIS Mapping	<ul style="list-style-type: none">• Mapping



NATURAL RESOURCE SOLUTIONS INC.

Aquatic, Terrestrial and Wetland Biologists

Wetland Vegetation Communities

Project Name: MCCANN

Project #: 1144

Observer(s): BAN, MA UTM:

Date: AUG 10/2010 Time (24h): 14:10

Field #: 22 Weather: Precipitation: NONE Temp (°C): 30

Map Code: +S1 Wind Speed & Direction: 2-W Cloud %: 20

Wetland Type: S Site Type: P Dominant Form: +S

% Open Water: 0 ELC Code: SWTH5

Forms % (Circle those ≥25%)	Species (dominant species, secondary species, present species)
h 10% - green ash, white elm	
c 1% - red cedar	
dc, dh, ds 2%	
ts 40% - green ash, white elm	
ls 30% - narrow-leaved spirea, green ash, white elm	
gc 50% - purple loosestrife, large-leaved galium, narrow-leaved galium	
ne 10% - reed, many grass, timothy	
be 0	
re 10% - dark green burdock	
ff	
ff	
su	
m	

Rare Species (Local, Regional, Provincial):

NONE

Wildlife Notes:

BCCH

PHOTOS 0128, 0129

SAR observations must also include a specific UTM location.

Forms: h=deciduous trees; c=coniferous trees; dh, dc, ds=dead trees/shrubs; ts=tall shrubs; ls=low shrubs; gc=ground cover; ne=narrow emergents; be=broad emergents; f=floating plants; ff=free-floating plants; su=submerged plants; m=mosses

Wetland Type: S=swamp; M=marsh; B=bog; F=fen

Site Type: L=lacustrine; P=palustrine; R=riverine; IS=isolated



NATURAL RESOURCE SOLUTIONS INC.

Aquatic, Terrestrial and Wetland Biologists

Wetland Vegetation Communities

Project Name: MCCANN

Project #: 1144

Observer(s): BAN, MA UTM:

Date: AUG 10/2010 Time (24h): 14:30

Field #: 23 Weather: Precipitation: NONE Temp (°C): 30

Map Code: HS2 Wind Speed & Direction: 2-W Cloud %: 20

Wetland Type: S Site Type: P Dominant Form: h

% Open Water: 0 ELC Code: SWDH2-2

Forms % (Circle those ≥25%)	Species (dominant species, secondary species, present species)
h 60% - green ash, white elm	
c 0	
dc, dh, ds 5%	
ts 40% - green ash, white elm	
ls 60% - narrow-leaved spirea, green ash, purple ivy	
gc 50% - purple loosestrife, large-leaved galium, narrow-leaved galium	
ne 20% - reed, many grass, timothy	
be 0	
re 10% - narrow dark green burdock	
ff 0	
ff 0	
su 0	
m 0	

Rare Species (Local, Regional, Provincial):

NONE

Wildlife Notes:

BCCH

PHOTOS 0130, 0131

SAR observations must also include a specific UTM location.

Forms: h=deciduous trees; c=coniferous trees; dh, dc, ds=dead trees/shrubs; ts=tall shrubs; ls=low shrubs; gc=ground cover; ne=narrow emergents; be=broad emergents; f=floating plants; ff=free-floating plants; su=submerged plants; m=mosses

Wetland Type: S=swamp; M=marsh; B=bog; F=fen

Site Type: L=lacustrine; P=palustrine; R=riverine; IS=isolated



NATURAL RESOURCE SOLUTIONS INC.

Aquatic, Terrestrial and Wetland Biologists

Wetland Vegetation Communities

Project Name: NCCANN

Project #: 1144

Observer(s): BAH, MA UTM:

Date: AUG 10/2010 Time (24h): 15:00

Field #: 24 Weather: Precipitation: NONE Temp (°C): 30

Map Code: NCM4 Wind Speed & Direction: 2-W Cloud %: 20

Wetland Type: M Site Type: P Dominant Form: nc

% Open Water: 0 ELC Code: NASH-10

Forms % (Circle those ≥25%)	Species (dominant species, secondary species, present species)
h 10%	
c 0	
dc, dh, ds 2%	
ts 2% white elm	
ls 0	
gc 40% gr. sp. wood, yellowed purple laureate	
ne 45% rice cut grass, bam yard grass, in ridge	
be 0	
re 5% soft-stemmed bulrush, dark green bulrush	
ff 0	
ff 0	
su 0	
m 0	

Rare Species (Local, Regional, Provincial):

NONE

Wildlife Notes:

DOWO, SOSP, NLER
CABBAGE WHITE

SAR observations must also include a specific UTM location.

Forms: h=deciduous trees; c=coniferous trees; dh, dc, ds=dead trees/shrubs; ts=tall shrubs; ls=low shrubs; gc=ground cover; ne=narrow emergents; be=broad emergents; f=floating plants; ff=free-floating plants; su=submerged plants; m=mosses

Wetland Type: S=swamp; M=marsh; B=bog; F=fen

Site Type: L=lacustrine; P=palustrine; R=riverine; IS=isolated



NATURAL RESOURCE SOLUTIONS INC.

Aquatic, Terrestrial and Wetland Biologists

Wetland Vegetation Communities

Project Name: NCCANN

Project #: 1144

Observer(s): BAH, MA UTM:

Date: AUG 10/2010 Time (24h): 15:30

Field #: 25 Weather: Precipitation: NONE Temp (°C): 30

Map Code: N53 Wind Speed & Direction: 2-W Cloud %: 20

Wetland Type: S Site Type: R Dominant Form: h

% Open Water: 0 ELC Code: SNDM4-2

Forms % (Circle those ≥25%)	Species (dominant species, secondary species, present species)
h 40% white elm, green ash	
c 0	
dc, dh, ds 5%	
ts 30% white elm, white birch, common buckthorn	
ls 10% white elm, white birch, common buckthorn	
gc 60% purple loosestrife, gr. sp. wood, coccoloba glandulosa	
ne 10% reed, narrow grass	
be 0	
re 20% cattail, dark green bulrush	
ff 0	
ff 0	
su 0	
m 0	

Rare Species (Local, Regional, Provincial):

NONE

Wildlife Notes:

WITU, WIFL
GRFR, GRAY TREEFROG

PHOTOS: 0134, 0135

SAR observations must also include a specific UTM location.

Forms: h=deciduous trees; c=coniferous trees; dh, dc, ds=dead trees/shrubs; ts=tall shrubs; ls=low shrubs; gc=ground cover; ne=narrow emergents; be=broad emergents; f=floating plants; ff=free-floating plants; su=submerged plants; m=mosses

Wetland Type: S=swamp; M=marsh; B=bog; F=fen

Site Type: L=lacustrine; P=palustrine; R=riverine; IS=isolated



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Aquatic, Terrestrial and Wetland Biologists

Wetland Vegetation Communities

Project Name: MCCANN

Project #: 1144

Observer(s): BAN, MA

UTM:

Date: AUG 10 / 2010

Time (24h): 12:45

Field #: 18

Weather: Precipitation: NONE Temp (°C): 30

Map Code: h55

Wind Speed & Direction: 2-W Cloud %: 20

Wetland Type: S

Site Type: P Dominant Form: h

% Open Water: 0

ELC Code: SWDNZ-2

Forms % (Circle those >25%)	Species (dominant species, secondary species, present species)
h 40%	green ash, white elm
c 0	
dc, dh, ds 1%	
ts 30%	white cedar, black pine, green ash
ls 10%	green ash, red alder, dogwood, red cedar
gc 50%	purple aster, juncus, blueberry
ne 40%	fox sedge, smartweed
be 0	
re 10%	dark green bulrush
ff 0	
ff 0	
su 0	
m 0	

Forms % (Circle those >25%)	Species (dominant species, secondary species, present species)
h 1%	red maple
c 1%	white cedar
dc, dh, ds 2%	
ts 10%	river willow, salt herbaceous, green ash
ls 30%	salt discolor, salt herbaceous, red alder, dogwood
gc 30%	marsh fern, purple aster, yellow fern
ne 10%	Carex lasiocarpa
be 25%	common haggweed, burrhead
re 70%	marsh phragmites
ff 5%	dark wood
ff 15%	oxeye daisy, cordate
su	
m 0	

Rare Species (Local, Regional, Provincial):

NONE

Wildlife Notes:

PHOTOS: 0123, 0124

SAR observations must also include a specific UTM location.

Forms: h=deciduous trees; c=coniferous trees; dh, dc, ds=dead trees/shrubs; ts=tall shrubs; ls=low shrubs; gc=ground cover; ne=narrow emergents; be=broad emergents; f=floating plants; ff=free-floating plants; su=submerged plants; m=mosses

Wetland Type: S=swamp; M=marsh; B=bog; F=fen

Site Type: L=lacustrine; P=palustrine; R=riverine; IS=isolated

3



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Aquatic, Terrestrial and Wetland Biologists

Wetland Vegetation Communities

Project Name: MCCANN

Project #: 1144

Observer(s): BAN, MA

UTM:

Date: AUG 10 / 2010

Time (24h): 13:10

Field #: 19

Weather: Precipitation: NONE Temp (°C): 30

Map Code: r048

Wind Speed & Direction: 2-W Cloud %: 20

Wetland Type: M

Site Type: R Dominant Form: re

% Open Water: 20

ELC Code: NASH-1

Forms % (Circle those >25%)	Species (dominant species, secondary species, present species)
h 1%	red maple
c 1%	white cedar
dc, dh, ds 2%	
ts 10%	river willow, salt herbaceous, green ash
ls 30%	salt discolor, salt herbaceous, red alder, dogwood
gc 30%	marsh fern, purple aster, yellow fern
ne 10%	Carex lasiocarpa
be 25%	common haggweed, burrhead
re 70%	marsh phragmites
ff 5%	dark wood
ff 15%	oxeye daisy, cordate
su	
m 0	

Forms % (Circle those >25%)	Species (dominant species, secondary species, present species)
h 1%	red maple
c 1%	white cedar
dc, dh, ds 2%	
ts 10%	river willow, salt herbaceous, green ash
ls 30%	salt discolor, salt herbaceous, red alder, dogwood
gc 30%	marsh fern, purple aster, yellow fern
ne 10%	Carex lasiocarpa
be 25%	common haggweed, burrhead
re 70%	marsh phragmites
ff 5%	dark wood
ff 15%	oxeye daisy, cordate
su	
m 0	

Rare Species (Local, Regional, Provincial):

NONE

Wildlife Notes:

AMEO

PHOTOS: 0125, 0126

SAR observations must also include a specific UTM location.

Forms: h=deciduous trees; c=coniferous trees; dh, dc, ds=dead trees/shrubs; ts=tall shrubs; ls=low shrubs; gc=ground cover; ne=narrow emergents; be=broad emergents; f=floating plants; ff=free-floating plants; su=submerged plants; m=mosses

Wetland Type: S=swamp; M=marsh; B=bog; F=fen

Site Type: L=lacustrine; P=palustrine; R=riverine; IS=isolated



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H 1

Wetland Vegetation Communities

Project Name: MCCANN Project #: 1144

Observer(s): BAN, MA UTM:

Date: AUG 10/2010 Time (24h): 13:30

Field #: 20 Weather: Precipitation: NONE Temp (°C): 30

Map Code: GCH2 Wind Speed & Direction: 2-W Cloud %: 20

Wetland Type: H Site Type: P Dominant Form: gc

% Open Water: 0 ELC Code: HANN3-1

Forms % (Circle those >25%)	Species (dominant species, secondary species, present species)
h <input type="checkbox"/>	
c <input type="checkbox"/>	
dc,dh,ds <input type="checkbox"/>	
ts <input type="checkbox"/>	
ls <input type="checkbox"/>	2% green asp
gc <input checked="" type="checkbox"/>	60% purple loosestrife Canada goldenrod common milkweed
ne <input checked="" type="checkbox"/>	40% reed canopy grass
be	
re	
ff	
ff	
su	
m	



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H 2

Wetland Vegetation Communities

Project Name: MCCANN Project #: 1144

Observer(s): BAN, MA UTM:

Date: AUG 10/2010 Time (24h): 13:50

Field #: 21 Weather: Precipitation: Temp (°C):

Map Code: GCH1 Wind Speed & Direction: Cloud %:

Wetland Type: H Site Type: P Dominant Form: gc

% Open Water: 0 ELC Code: HANN3-1

Forms % (Circle those >25%)	Species (dominant species, secondary species, present species)
h <input type="checkbox"/>	
c <input type="checkbox"/>	
dc,dh,ds <input type="checkbox"/>	
ts <input type="checkbox"/>	
ls <input type="checkbox"/>	
gc <input checked="" type="checkbox"/>	70% purple loosestrife Canada goldenrod common milkweed
ne <input checked="" type="checkbox"/>	30% reed canopy grass
be	
re	
ff	
ff	
su	
m	

SAR observations must also include a specific UTM location.

Forms: h=deciduous trees; c=coniferous trees; dh, dc, ds=dead trees/shrubs; ts=tall shrubs; ls=low shrubs; gc=ground cover; ne=narrow emergents; be=broad emergents; f=floating plants; ff=free-floating plants; su=submerged plants; m=mosses

Wetland Type: S=swamp; M=marsh; B=bog; F=fen

Site Type: L=lacustrine; P=palustrine; R=riverine; IS=isolated

SAR observations must also include a specific UTM location.

Forms: h=deciduous trees; c=coniferous trees; dh, dc, ds=dead trees/shrubs; ts=tall shrubs; ls=low shrubs; gc=ground cover; ne=narrow emergents; be=broad emergents; f=floating plants; ff=free-floating plants; su=submerged plants; m=mosses

Wetland Type: S=swamp; M=marsh; B=bog; F=fen

Site Type: L=lacustrine; P=palustrine; R=riverine; IS=isolated



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Aquatic, Terrestrial and Wetland Biologists

Wetland Vegetation Communities

Project Name: MCCANN

Project #: 1144

Observer(s): BAM, MA UTM:

Date: AUG 10 2010 Time (24h): 16:00

Field #: 26 Weather: Precipitation: NONE Temp (°C): 30

Map Code: h54 Wind Speed & Direction: 2-W Cloud %: 20

Wetland Type: S Site Type: R Dominant Form: h

% Open Water: 0 ELC Code: SWDM4-2

Forms % (Circle those $\geq 25\%$)	Species (dominant species, secondary species, present species)
(h) 40%	white elm green ash trunking spruce
c 0	
dc, dh, ds 10%	
ts 30%	small birch, poplar, white elm
ls 15%	small birch, poplar, white elm, green ash
gc 30%	purple inkberry, yellow pine, wood, sensitive fern
ne 20%	reed, common grass, fox sedge
be 0	
re 10%	dark green bullrush
ff	
ff	
su	
m	

Rare Species (Local, Regional, Provincial):

NONE

Wildlife Notes:

BCH

PHOTOS 0136, 0137

SAR observations must also include a specific UTM location.

Forms: h=deciduous trees; c=coniferous trees; dh, dc, ds=dead trees/shrubs; ts=tall shrubs; ls=low shrubs; gc=ground cover; ne=narrow emergents; be=broad emergents; f=floating plants; ff=free-floating plants; su=submerged plants; m=mosses

Wetland Type: S=swamp; M=marsh; B=bog; F=fen

Site Type: L=lacustrine; P=palustrine; R=riverine; IS=isolated



NATURAL RESOURCE SOLUTIONS INC.

Aquatic, Terrestrial and Wetland Biologists

Wetland Vegetation Communities

Project Name:

Project #:

Observer(s): UTM:

Date: Time (24h):

Field #: Weather: Precipitation: Temp (°C):

Map Code: Wind Speed & Direction: Cloud %:

Wetland Type: Site Type: Dominant Form:

% Open Water: ELC Code:

Forms % (Circle those $\geq 25\%$)	Species (dominant species, secondary species, present species)
h	
c	
dc, dh, ds	
ts	
ls	
gc	
ne	
be	
re	
ff	
ff	
su	
m	

Rare Species (Local, Regional, Provincial):

Wildlife Notes:

SAR observations must also include a specific UTM location.

Forms: h=deciduous trees; c=coniferous trees; dh, dc, ds=dead trees/shrubs; ts=tall shrubs; ls=low shrubs; gc=ground cover; ne=narrow emergents; be=broad emergents; f=floating plants; ff=free-floating plants; su=submerged plants; m=mosses

Wetland Type: S=swamp; M=marsh; B=bog; F=fen

Site Type: L=lacustrine; P=palustrine; R=riverine; IS=isolated