Ministry of **Ministère des**
Natural Resources **Richesses naturelles**
Renewable Energy Operations Team
P.O. Box 7000
300 Water Street
4th Floor, South Tower
Peterborough, Ontario K9J 8M5

October 5, 2012

Mr Glen Tomkinson
Penn Energy Renewables, LTD
620 Righters Ferry Road
Bala Cynwyd, PA, 19004

RE: NHA Confirmation for Roseplain Solar Energy Facility

Dear Mr Tomkinson:

In accordance with the Ministry of the Environment's (MOE's) Renewable Energy Approvals (REA) Regulation (O.Reg.359/09), the Ministry of Natural Resources (MNR) has reviewed the Natural Heritage Assessment and Environmental Impact Study for the Roseplain Solar Energy Facility in the Town of Uxbridge submitted by Penn Energy Renewables, Ltd on October 4, 2012

In accordance with Section 28(2) and 38(2)(b) of the REA regulation, MNR provides the following confirmations following review of the natural heritage assessment:

1. The MNR confirms that the determination of the existence of natural features and the boundaries of natural features was made using applicable evaluation criteria or procedures established or accepted by MNR.
2. The MNR confirms that the site investigation and records review were conducted using applicable evaluation criteria or procedures established or accepted by MNR, if no natural features were identified.
3. The MNR confirms that the evaluation of the significance or provincial significance of the natural features was conducted using applicable evaluation criteria or procedures established or accepted by MNR.
4. The MNR confirms that the project location is not in a provincial park or conservation reserve.
5. The MNR confirms that the environmental impact study report has been prepared in accordance with procedures established by the MNR.

In accordance with Section 28(3)(c) and 38(2)(c), MNR also offers the following comments in respect of the project.

<u>Pre and Post Construction Monitoring</u>

In accordance with Appendix D of MNR's NHA Guide, a commitment has been made to complete a pre-construction assessment of habitat use for the following candidate

significant wildlife habitat, Raptor Wintering Area (SWH04). MNR has reviewed and confirmed the assessment methods and the range of mitigative options. Pending completion of the assessments and determination of significance, the appropriate mitigation and post construction monitoring is expected to be implemented, as committed to in the environmental impact study.

This confirmation letter is valid for the project as proposed in the natural heritage assessment and environmental impact study, including those sections describing the Environmental Effects Monitoring Plan and Construction Plan Report. Should any changes be made to the proposed project that would alter the NHA, MNR may need to undertake additional review of the NHA.

Where specific commitments have been made by the applicant in the NHA/EIS with respect to project design, construction, rehabilitation, operation, mitigation, or monitoring, MNR expects that these commitments will be considered in MOE's Renewable Energy Approval decision and, if approved, be implemented by the applicant.

In accordance with S.12 (1) of the Renewable Energy Approvals Regulation, this letter must be included as part of your application submitted to the MOE for a Renewable Energy Approval.

Please be aware that your project may be subject to additional legislative approvals as outlined in the Ministry of Natural Resources' *Approvals and Permitting Requirements Document*. These approvals are required prior to the construction of your renewable energy facility.

If you wish to discuss any part of this confirmation or additional comments provided, please contact Amy Cameron at amy.cameron@ontario.ca or 705-875-7481.

Sincerely,

Amy Cameron
Coordinator
Renewable Energy Operations Team
Southern Region MNR

cc Emily Gryck, Renewable Energy Operations Team, Project Manager, MNR
Erin Cotnam, Renewable Energy Operations Team, Project Manager, MNR
Karen Bellamy, District Manager, Peterborough District, MNR
Narren Santos, Environmental Approvals Access & Service Integration Branch, MOE
Zeljko Romic, Environmental Approvals Access & Service Integration Branch, MOE

PENN ENERGY RENEWABLES, LTD.

Penn Energy – Roseplain

SOLAR ENERGY FACILITY

FIT Contract No. F-001557-SPV-130-505

In the **Town of Uxbridge, Regional Municipality of Durham, Ontario, Canada**

NATURAL HERITAGE ASSESSMENT AND ENVIRONMENTAL IMPACT STUDY

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October 4, 2012

Printed on 100% recycled paper

Canadian Office: 1 Yonge Street, Suite 1801, Toronto, ON M5E 1W7
U.S. Headquarters: 620 Righters Ferry Road, Bala Cynwyd, PA 19004
Telephone: 610-668-0300 www.PennEnergyRenewables.com

Niblett Environmental Associates Inc.
Biological Consultants

October 3, 2012

PN 10-066

Penn Energy Renewables, LTD
620 Righters Ferry Road
Bala Cynwyd, PA 19004
Attention Mr. Glen Tomkinson

RE: Penn Energy- Roseplain
SOLAR ENERGY FACILITY
in the Town of Uxbridge, Regional Municipality of Durham
FIT Application No. FIT-F7TMB91
FIT Contract No. F-001557- SPV-130-505

Natural Heritage Assessment
Environmental Impact Study

Dear Mr. Tomkinson:

We are pleased to submit the following reports as part of the Natural Heritage Assessment for the above-captioned project:

1. Records Review Report, dated August 2012;
2. Site Investigation Report, dated August 2012;
3. Evaluation of Significance Report, dated October 2012; and
4. Environmental Impact Study Report, dated October 2012.

The reports follow the outline provided in the MNR Natural Heritage Assessment Manual.

If there are any comments or questions on the content please contact us.

Yours very truly,

Chris Ellingwood
President and Sr. Terrestrial and Wetland Biologist

Penn Energy- Roseplain
SOLAR ENERGY FACILITY

in the
Town of Uxbridge
Regional Municipality of Durham
FIT Application No. FIT-F7TMB91
FIT Contract No. F-001557- SPV-130-505

Natural Heritage Assessment
Records Review
DRAFT

Prepared for: Penn Energy Renewables Ltd.
620 Righters Ferry Road, Bala Cynwyd, PA 19004

Submitted by: Niblett Environmental Associates Inc.
PN 10-066

August 2012

Niblett Environmental Associates Inc.
Biological Consultants

August 7, 2012 PN 10-066

Penn Energy Trust
620 Righters Ferry Road
Bala Cynwyd, PA 19004

Attention : Mr. Glen Tomkinson

RE: **Penn Energy- Roseplain**
SOLAR ENERGY FACILITY
in the Town of Uxbridge, Regional Municipality of Durham
FIT Application No. FIT-F7TMB91
FIT Contract No. F-001557- SPV-130-505

Natural Heritage Assessment
Records Review-Draft

Dear Mr. Tomkinson:

We are pleased to submit the draft Records Review Report for the proposed Roseplain solar energy facility as part of the Natural Heritage Assessment for this project.

The report follows the outline provided in the MNR Natural Heritage Assessment Manual.

If there are any comments or questions on the content please contact us.

Yours very truly,

Chris Ellingwood
President and Sr. Terrestrial and Wetland Biologist

55 Mary Street West, Suite 112, Lindsay, Ontario K9V 5Z6 Tel: (705) 878-9399 Fax: (705) 878-9390
Email: mail@niblett.ca Website: www.niblett.ca

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1.0 Introduction

1.1 Background

Penn Energy Renewables Ltd. (Penn) has executed a FIT contract with the Ontario Power Authority (OPA) for the construction of a 7.5 MW, ground-mounted, Class 3 solar energy facility located southwest of the populated center of the Town of Uxbridge, within Regional Municipality of Durham, Ontario. The subject lands are located in part of Lot 22 Concession 3, in the Town of Uxbridge. The proposed Renewable Energy Generation Facility (REGF) would consist of a collection of solar photovoltaic (PV) modules (each approximately 1.00 m x 1.67 m or 1.00 m x 2.00 m in dimension) that are grouped into arrays tilted and facing south. These stationary arrays are strung together forming a series of rows oriented east to west. The Environmental Protection Act (EPA) administered by the Ministry of the Environment (MOE) regulates Renewable Energy Approvals (REAs) under Part V.0.1 of the act, pursuant to Ontario Regulation 359/09. The REA regulation requires that applicable renewable energy projects complete a Natural Heritage Assessment (NHA), which identifies natural features and provincial parks and conservation reserves near the proposed Project Location. NHAs determine impacts and setbacks and whether an environmental impact study (EIS) is required. The facility class of the project falls under the Ground Mounted Solar Facility, Class 3, >10 kW and is therefore subject to NHA requirements. Niblett Environmental Associates Inc. (NEA) has been retained by Penn Energy to conduct a NHA.

Natural features protected under the REA regulation include:

- Provincially significant southern wetlands
- Provincially significant coastal wetlands
- Provincially significant northern wetlands
- Significant woodlands
- Significant valleylands
- Significant wildlife habitat
- Provincially significant Area of Natural and Scientific Interest (ANSI)-life and earth science
- Provincial plan areas (Oak Ridges Moraine, Greenbelt)
- Provincial parks and conservation reserves

An NHA study begins with a records review to determine the presence of any natural features within 120 m of the project site (study area). A site investigation then verifies the extent of the natural feature. An evaluation of significance is performed if an unevaluated natural feature exists on the property (project location). The evaluation uses a set of criteria accepted or established by the MNR, which determines whether development restrictions or setbacks apply.

If a project cannot meet the required setback then an EIS is required to define the impacts on the natural feature and associated mitigation measures.

Applicants submit NHA reports to the Ministry of Natural Resources (MNR) for review and written confirmation. These confirmations are then submitted to MOE as part of the application documentation for a REA.

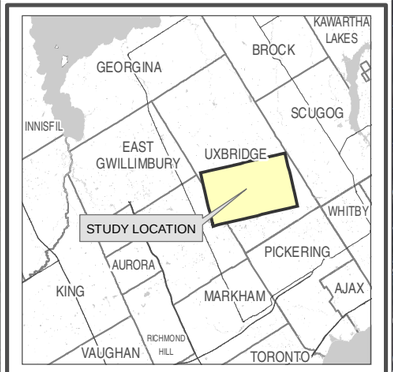
Fish habitat and Endangered and Threatened species fall under separate regulations and require the submission of additional reports to the MOE and MNR respectively. Potential for these are examined to determine the need for targeted searches during the site investigation, however all communication is dealt with outside of the NHA.

The following report includes the records review of natural features found within the project area.

1.2 Project Location

The proposed Roseplain REGF is located northeast of the geographic Town of Goodwood. The entire subject property encompasses +/-90 acres (+/-36.4 ha) is bounded on the east by Concession Road 4 and on the south by private property. The north and western boundaries of the property are surrounded by quarries and pits and undeveloped land (Figure 1). The REGF project area which accounts for the complete area of disturbance is a subset of the subject property and is outlined on Figure 1 (the "Project Location"). Pursuant to the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, July 2011), the study area extends 120 m beyond the boundary of the REGF Project Location to account for setback from Development Prohibition. The project location is shown on Figure 1.

1:36,000



NEA NIBLETT ENVIRONMENTAL ASSOCIATES INC.

FIGURE 1: LOCATION OF PROJECT

17N 644942 4880339
Revision 2
10-066
REGION OF DURHAM
AURORA DISTRICT

1 centimeter = 360 meters

Meters
0 500 1,000 2,000

LEGEND

- Railroad*

Road Classes
- Local
- Arterial
- Collector
- Expressway / Highway
- Freeway

Hydrology*
- Shoreline
- Watercourse
- Waterbody

Municipal
- Lot Parcel

Project Specific
- Project Location

Information
* Obtained under Base Data

Email: mail.niblett.ca
Phone: 705.878.9399
GIS/Mapping Phone: 705.878.9399 x207
www.niblett.ca

NAD83 UTM ZONE 17N

2.0 Methodology

The purpose for the records review is to gather information on natural features within the study area to make preliminary determinations on site feasibility and constraints. Information obtained through the records review is then used in subsequent stages of the NHA. Preliminary mapping using satellite imagery/aerial photography and Ontario Ministry of Natural Resources (OMNR) LIO data layers (2008-2011) helped to delineate areas of interest and vegetation communities. Natural features that were examined included woodlands, wetlands, ANSIs and wildlife habitat. This includes the presence of significant vegetation communities and rare species. Background information has also been requested from the municipality and the Lake Simcoe Region Conservation Authority. A number of records relating to provincial parks and conservation reserves and natural features were analyzed to determine if the project location is in or within 120 m of a natural feature or 50 m from an ANSI-Earth Science. These records included Natural Heritage Information Center (NHIC), Land Information Ontario (LIO), Ontario Breeding Bird Atlas, Ontario Crown Land Use Atlas, and the Regional Municipality of Durham Official Plan.

Niagara Escarpment Plan Area, Greenbelt Plan Area and the Oak Ridges Moraine Conservation Plan were also consulted to verify if the property was within their jurisdiction. Table 1 lists natural features and information sources taken from Appendix B of the Natural Heritage Assessment Manual (2011) that were utilized to compile natural feature information.

Table 1: Information sources contacted to identify known natural features

Natural Feature	Records relating to natural feature	Proximity to Project Location
Provincially significant wetlands and Coastal wetlands	MNR district office, SOLRIS	Feature in or within 120 m of project location
Significant woodlands	MNR district office, municipal official plan, Conservation Authority, Oak Ridges Moraine Conservation Plan	
Significant valleylands	Conservation Authority, MNR district office	
Significant wildlife habitat	MNR district office, Conservation Authority, Significant wildlife habitat technical guide, Land Information Ontario	

Natural Feature	Records relating to natural feature	Proximity to Project Location
Provincially Significant Areas of Natural and Scientific Interest (ANSI)	MNR district office, Land Information Ontario, Ontario's Renewable Energy Atlas, NHIC, Ontario Parks	Feature in or within 50 m (earth science) of project location
Conservation reserves	MNR district office, Land information Ontario, Ontario's Renewable Energy Atlas, NHIC	Feature in or within 120 m of project location.
Provincial parks	MNR district office, Land Information Ontario, Ontario's Renewable Energy Atlas, NHIC, Ontario Parks	
Significant vegetation communities	NHIC	
Wildlife concentration areas	NHIC	
Watercourses	Conservation Authority	
Sand barrens, savannahs, tallgrass prairies and alvars	NHIC, Conservation Authority, Oak Ridges Moraine Conservation Plan	
Unevaluated or locally significant wetlands	SOLRIS, MNR district office	
General information	All of the above	

3.0 Existing Conditions

Residential properties are located to the south and east of the property. Agricultural land is also located to the east. Quarries and pits are located to the north and undeveloped land to the west. A small patch of plantation is found on the adjacent property at the northeast corner. Habitat within the study area is primarily agricultural fields with patches of woodland and hedgerows throughout the property, but mainly concentrated to the northern and western edges. The site is not within a jurisdiction of a local services board, local planning board, local roads board or municipal planning authority. No Crown or Federal Lands are within the project location.

The Durham Regional Official Plan (2008) guides the land uses within the rural areas of Uxbridge. The subject property is zoned as "*Oak Ridges Moraine Area*" on Schedule A (Regional Structure). Schedule D of the official plan also designates the area within the project location as High Aggregate Potential Resource Area. The Durham Region Natural Features map identified wooded areas in and within 120 m of the Project Location.

The subject property is within the protected countryside area of the Oak Ridges Moraine Conservation Plan and is therefore subject to policies of the Oak Ridges Moraine Conservation Act (Ontario Regulation 140/02). Areas of high and low aquifer vulnerability are found on the property (Areas of high aquifer vulnerability are subject to the Oak Ridges Moraine Conservation Plan Section 29). The majority of the property is designated as Landform Conservation Class 3; however a portion of the northeast corner is considered Class 1 (Areas containing a designated Landform Conservation 1 or 2 are subject to section 30 of the Oak Ridges Conservation Plan) . Oak Ridges Moraine woodland has been identified on the property and will require further study using the Oak Ridges Moraine technical paper series. The potential impacts and mitigation measures will be discussed in the Environmental Impact Study Report portion of this REA.

3.1 Natural Features

A summary of the records review results pertaining to the presence of natural heritage features in the study area is provided in Table 2. Correspondence with Lake Simcoe Region Conservation Authority helped determine the natural features existing on the property (Appendix II).

Table 2. Summary of Natural Features Located within the Project Location or Adjacent Lands (based on the records review)

Natural Feature	Feature Within 120m of Project Location	Discussion (based on records review)
Greenbelt Protected Countryside and Niagara Escarpment	No	The study area was not found within the Greenbelt protected area or Niagara Escarpment on the OP
Oak Ridges Moraine	Yes	The study area was found within the Oak Ridges Moraine Conservation Plan on the OP and within the Oak Ridges Moraine Conservation Plan The subject property is located within the Countryside Area and is partially within a high aquifer vulnerability area. Conservation Areas 1 and 2 were found on the subject property.
Provincially significant wetlands and coastal wetlands	No	Upper Pefferlaw Brook Wetland Complex is a locally significant wetland that is situated to the east, over 1 km away from the project location. Uxbridge Brook Headwater Wetland complex, a provincially significant wetland (PSW) is roughly 2 km away to the east
Significant woodlands	Yes	The OP and Conservation Authority listed several woodlands within the study area designated as significant
Significant valleylands	No	No significant valleylands were identified by MNR, LSRCA or within the OP
Significant wildlife habitat	Yes	Agricultural fields and woodlands likely provide wildlife habitat (OBBA) More information is required for the assessment of wildlife habitat
Provincially Significant Areas of Natural and Scientific Interest (ANSI)	No	No ANSIs were identified by MNR or the OP
Conservation reserves	No	No conservation reserves were identified by MNR or the OP
Provincial Parks	No	No provincial parks were identified by MNR or the OP
Significant vegetation communities	No	None were determined as part of the records review process, more work is needed to confirm this.
Wildlife Concentration Areas	No	None were identified within the study area according to records from MNR and the NHIC
Waterbodies	No	No waterbodies were identified within the study area found within the OP

Sand barrens, savannahs, tallgrass prairies and alvars	No	None were identified as occurring within the records review. The presence absence of these features needs to be identified during the site investigations.
Unevaluated or locally significant wetlands	YeS	One unevaluated wetland was identified by MNR adjacent to the property. No other wetlands were identifiedby MNR or in the OP schedules. The presence/absence of these features needs to be identified during the site investigations.
Areas of Natural and Scientific Interest (ANSI) Life Science	No	As project is within Oak Ridges Moraine Conservation Plan Area, Life Science ANSI's of all designations need to be identified. The Pefferlaw Uxbridge Headwaters Life Science ANSI (Regional) is situated to the east, over 1 km away from the project location.

OP=Durham Regional Official Plan

A summary of the records review for natural features identified within the study area are listed in Table 3. A site investigation is required to confirm the existence of these features and if present, an evaluation of significance will be required to confirm and evaluate these natural features.

Table 3: Natural features present within the Solar Energy Facility based on records review

ID	Natural Feature	Data/Information	Evaluation Status	Location of feature relative to project location
WO01-WO06	Woodland	LIO, MNR data layers (2008-2011), Lake Simcoe Region Conservation Authority, OP	Unevaluated	Woodland patches are found throughout the project location, with the greatest extent on the western edge. Woodland within 120 m is also found to the north and northeast. LSRCA mapping shows six batches of Oak Ridges Moraine Woodland on and adjacent to the project location.
WE02	Wetland	MNR data layers (2008-2011).	Unevaluated	The wetland was found outside of the project location boundary however within 120m.
SWH01	Wildlife habitat	Atlas of the Breeding Birds of Ontario	Unknown	Presence of agricultural fields provides potential habitat for species at risk

3.2 Species Records

An NHIC spatial boundary database query was done for element occurrences for species of conservation concern within two 10 km squares (17PJ47 and 17PJ48). The property is within the 10 x 10 km square, 17PJ48, but is located on the southern boundary of the square, and therefore 17PJ47 was also included in the search. The larger scope ensures all potential species are accounted for and habitat requirements of each species are examined to determine the likelihood of its presence in or within the project location. The records for these species have been documented by MNR, though the locations provided are approximate. These are listed in Table 4.

Table 4: Element occurrences for squares 17PJ47 and 17PJ48

Common Name	Scientific Name	Date of observation	S Rank	COSEWIC status	SARO Status
Horned Clubtail	*Arigomphus cornutus*	1941	S3	Not listed	Not listed
Schweinitz's Sedge	*Carex schweinitzii*	1981?	S3	Not listed	Not listed

A square summary of the Breeding Bird Atlas was also analyzed for the 10 km square (17PJ48) that includes the study area. Three (3) regionally rare species were also recorded and include the northern goshawk (*Accipiter gentilis*), bank swallow (*Riparia riparia*) and cliff swallow (*Petrochelidon pyrrhonota*). Appendix I includes the square summary of all species found. Species presence or absence will be assessed during the site investigation if habitat is thought to occur on the property.

4.0 Summary

Natural features identified through the records review will be mapped to display the data spatially for the site investigation. Table 5 provides a summary of agencies contacted and information reviewed. The subsequent site investigation, involving on the ground field visits will help to confirm the presence/absence of these natural features, add to the accuracy of the records and identify additional features not found through the records review.

As stated above, endangered and threatened species are regulated under the Endangered Species Act (2007) and if found will be dealt with by the local MNR district office in a separate report.

Table 5: Summary of agencies contacted and information gathered

Source and Contact Information	Records Requested	Records Received
MNR, Aurora District Office	• Wetlands mapping • Significant wildlife habitat information • Species at risk information	MNR data layers (2008-2011) have been shared with Niblett since 2008.
Land Information Ontario	• Provincial Parks and conservation reserves • Woodland mapping • Wetlands mapping • OHN waterbodies and watercourses	Map with layers provided
Natural Heritage Information Center (NHIC)	• ANSI mapping • Species of conservation concern occurrences • Significant vegetation communities, natural areas and wildlife concentration areas	Element occurrences for 17PJ47 & 17PJ48 from Biodiversity Explorer.
Ontario Breeding Bird Atlas	• Species of conservation concern	Square Summary for 17PJ48
Lake Simcoe Region Conservation Authority Ashlea Rabideau (meeting on September 1st, 2011)	• Watercourses • Oak Ridges Moraine mapping	Map provided

Region of Durham A.L. Georgieff (letter sent September 6, 2011)	• Significant woodlands • Significant valleylands • Natural heritage features	No Response from Agency
Renewable Energy Atlas	• Provincial Parks and conservation reserves • ANSI mapping • Crown or federal lands • Wilderness areas • Watercourses • Bat Hibernacula	Map with layers provided
Oak Ridges Moraine Conservation Plan	• Land Use • Aquifer vulnerability • Landform Conservation	Maps provided
Local Services board	• Not applicable to the area where the project is located	
Planning Authority	• Not applicable to the area where the project is located	
Local Roads Board	• Not applicable to the area where the project is located	

5.0 References

Cadman M.D., Sutherland D.A., Beck G.G., Lepage D. and Couturier A.R. 2001-2005. Atlas of the Breeding Birds of Ontario. Second Atlas. Available: http://www.birdsontario.org/atlas/index.jsp?lang=en. Accessed March 2011.

Land Information Ontario (LIO). 2011. Ontario Ministry of Natural Resources. Queen's Printer for Ontario. Available: http://www.mnr.gov.on.ca/en/Business/LIO/index.html. Accessed March 2011.

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Penn Energy Renewables Ltd. 2010. Project Description Report. Available: http://www.pennenergyrenewables.com/solar-farms-ontario.html. Accessed April 2011.

Regional Municipality of Durham. 2008. Durham Regional Official Plan. Available: http://www.durham.ca/departments/planning/op_documents/dr_official_plan_2008/2008dropoc.pdf. Accessed April 2011.

Appendix I: Square Summary of Breeding Bird Atlas (2005)

Square Summary (17PJ48)

#species (1st atlas)				#species (2nd atlas)				#hours		#pc done	
poss	prob	conf	total	poss	prob	conf	total	1st	2nd	road	offrd
20	30	42	92	28	37	36	101	83	48	22	3

Region summary (#46: Durham)

#squares	#sq with data		#species		#pc done	target #pc
	1st	2nd	1st	2nd		
27	26	27	168	175	1103	675

Target number of point counts in this square: 22 road side, 3 off road (1 in deciduous forest, 1 in coniferous forest, 1 in mixed forest). Please try to ensure that each off-road station is located such that the entire 100m radius circle is within the prescribed habitat.

SPECIES	Code		%	
	1st	2nd	1st	2nd
Canada Goose	FY	FY	96	100
Mute Swan			15	37
Trumpeter Swan †			0	25
Wood Duck		H	80	92
Gadwall			38	40
American Wigeon			23	18
American Black Duck			57	25
Mallard	FY	FY	100	100
Blue-winged Teal	P		88	48
Northern Shoveler			11	22
Northern Pintail			15	18
Green-winged Teal			0	22
Redhead †			0	7
Hooded Merganser			7	37
Common Merganser			15	18
Red-breast Merganser ‡			3	0
Ruddy Duck †			7	14
Ring-necked Pheasant			61	40
Ruffed Grouse	T	T	96	96
Wild Turkey		H	0	77

SPECIES	Code		%	
	1st	2nd	1st	2nd
Black-crown N.-Heron † §			15	3
Turkey Vulture	H	P	57	88
Osprey	H		34	37
Bald Eagle †			0	0
Northern Harrier	S	H	96	92
Sharp-shinned Hawk	H	H	61	92
Cooper's Hawk		H	34	74
Northern Goshawk ‡	NY		34	48
Red-should Hawk †	AE	A	65	51
Broad-winged Hawk	FY	A	65	81
Red-tailed Hawk	T	H	100	100
American Kestrel	NY	H	100	96
Merlin ‡			0	7
Yellow Rail †			3	0
Virginia Rail	T	S	73	74
Sora			69	51
Common Moorhen			46	40
American Coot			30	25
Coot/Moorhen			0	3
Sandhill Crane ‡			0	3
Killdeer	FY	FY	100	96

SPECIES	Code		%	
	1st	2nd	1st	2nd
Herring Gull ‡§			23	11
Lesser Black-backed Gull †			0	0
Great Black-backed Gull †			0	0
Caspian Tern †			0	3
Black Tern † §			57	25
Common Tern §			19	18
Forster's Tern † §			0	0
Mourning Dove	NU	FY	100	100
Yellow-billed Cuckoo			38	37
Black/Yell-billed Cuckoo		S	0	33
Black-billed Cuckoo	T	P	96	81
Barn Owl †			0	0
Eastern Screech-Owl	T	T	53	85
Great Horned Owl	S	S	100	92
Barred Owl			26	29
Long-eared Owl ‡			34	11
Short-eared Owl †			0	3
North Saw-whet Owl			7	11
Common Nighthawk			61	33
Whip-poor-will	T	S	46	25
Chimney Swift			76	62

Northern Bobwhite †			0	3
Common Loon ‡			19	14
Pied-billed Grebe			46	33
Double-crest Cormorant ‡§			3	0
American Bittern			46	44
Least Bittern †			38	33
Great Blue Heron §	S	H	100	55
Great Egret †			0	0
Green Heron ‡§	H	P	92	96
Rock Dove	D	FY	100	100
Spotted Sandpiper	S	T	100	88
Upland Sandpiper	S		73	33
Common Snipe			65	70
American Woodcock		H	80	88
Wilson's Phalarope †			0	3
Little Gull †			3	0
Ring-billed Gull ‡§			3	7
Ruby-thr Hummingbird	N	H	96	96
Belted Kingfisher	T	P	100	100
Red-headed Woodpecker †			80	51
Red-bell Woodpecker			11	18
Yellow-bellied Sapsucker	H	S	61	51
Downy Woodpecker	A	FY	100	96
Hairy Woodpecker	T	P	96	96
Northern Flicker	AE	FY	100	100

next page >>

Ontario Breeding Bird Atlas - Summary Sheet for Square 17PJ48 (page 2 of 3)

SPECIES	Code		%	
	1st	2nd	1st	2nd
Pileated Woodpecker		H	88	92
Olive-sided Flycatcher ‡			7	0
Eastern Wood-Pewee	D	T	100	96
Alder Flycatcher	D	S	84	92
Willow Flycatcher			80	81
Least Flycatcher	S	S	96	92
Eastern Phoebe	AE	T	96	96
Gr Crested Flycatcher	AE	CF	100	100
Eastern Kingbird	AE	CF	100	100
Loggerhead Shrike †			11	0
White-eyed Vireo †			3	0
Yellow-throated Vireo		D	11	7
Blue-headed Vireo		S	15	37
Warbling Vireo	S	T	100	96
Red-eyed Vireo	A	D	100	96
Blue Jay	FY	CF	100	96
American Crow	NY	FY	100	100
Horned Lark	FY	P	100	92
Carolina Wren			3	25
House Wren	AE	AE	100	100
Winter Wren	FY	S	84	85
Sedge Wren ‡			15	22
Marsh Wren			34	40
Golden-crown Kinglet		S	23	62
Ruby-crown Kinglet			11	0
Blue-gr Gnatcatcher			26	48
Eastern Bluebird	S	AE	57	81
Veery	S	S	100	96
Swainson's Thrush ‡			3	0
Hermit Thrush		S	23	55
Wood Thrush	T	T	96	96
American Robin	NY	CF	100	100
Gray Catbird	CF	S	100	100
Northern Mockingbird			7	51
Brown Thrasher	CF	T	100	100
European Starling	CF	CF	100	100
Black-thr Blue Warbler			0	44
Yellow-rumped Warbler	S	P	57	70
Black-thr Green Warbler		S	38	88
Blackburnian Warbler			34	29
Pine Warbler		CF	26	85
Cerulean Warbler †			7	3
Black-white Warbler	CF	A	84	92
American Redstart	S		96	92
Ovenbird	N	A	100	96
North Waterthrush	T	CF	92	92
Louis Waterthrush †			0	7
Mourning Warbler	S	A	80	96
Common Yellowthroat	CF	DD	100	100
Canada Warbler			46	44
Eastern Towhee	A	T	69	70
Chipping Sparrow	NE	CF	100	96
Clay-colored Sparrow			46	55
Field Sparrow	A	P	92	92

Purple Martin			80	37	Cedar Waxwing	V	P	100	100	Vesper Sparrow	CF	D	100	85
Tree Swallow	NE	FY	100	100	Blue-winged Warbler	S		15	40	Savannah Sparrow	FY	A	100	100
North Rgh-wing Swallow	AE	H	92	88	Golden-winged Warbler		S	38	25	Grasshopper Sparrow	FY	P	76	66
Bank Swallow ‡§	AE	AE	100	96	Blue/Gold-wing Warbler			0	11	Henslow's Sparrow †			0	0
Cliff Swallow ‡§		AE	80	77	Lawrence's Warbler †			0	0	Song Sparrow	CF	CF	100	100
Barn Swallow	FY	AE	100	100	Brewster's Warbler †			3	11	Swamp Sparrow	CF	CF	84	100
Black-capped Chickadee	CF	FY	100	100	Nashville Warbler	P	CF	84	74	White-throat Sparrow	A	CF	100	85
Tufted Titmouse †			0	0	Northern Parula			3	3	Dark-eyed Junco			15	3
Red-breast Nuthatch	A	CF	65	85	Yellow Warbler	CF	A	100	100	Summer Tanager ‡			0	0
White-breast Nuthatch	S	P	88	96	Chestn-sided Warbler			76	88	Scarlet Tanager	T	T	69	74
Brown Creeper		S	73	66	Magnolia Warbler			19	66	Northern Cardinal	T	CF	96	96

<< previous page next page >>

Ontario Breeding Bird Atlas - Summary Sheet for Square 17PJ48 (page 3 of 3)

SPECIES	Code		%	
	1st	2nd	1st	2nd
Rose-breast Grosbeak	CF	P	100	96
Indigo Bunting	A	A	96	100
Dickcissel †			0	0
Bobolink	NY	CF	100	100
Red-wing Blackbird	DD	CF	100	100
Eastern Meadowlark	NY	CF	100	100
Western Meadowlark ‡			3	0
Brewer's Blackbird ‡			0	0
Common Grackle	AE	CF	100	100
Brown-head Cowbird	FY	P	100	96
Orchard Oriole			15	37
Baltimore Oriole	NY	P	100	100
Purple Finch	T	T	57	66
House Finch		FY	26	96
Red Crossbill ‡			11	3
White-winged Crossbill ‡			3	3
Pine Siskin	H		26	11

American Goldfinch	A	A	100	100
Evening Grosbeak			11	7
House Sparrow	V	CF	100	96

This list includes all species found during the Ontario Breeding Bird Atlas (1st atlas: 1981-1985, 2nd atlas: 2001-2005) in the region #46 (Durham). Underlined species are those that you should try to add to this square. They have not yet been reported during the 2nd atlas, but were found during the 1st atlas in this square or have been reported in more than 50% of the squares in this region during the 2nd atlas so far. In the species table, "BE 2nd" and "BE 1st" are the codes for the highest breeding evidence for that species in square 17PJ48 during the 2nd and 1st atlas respectively. The % columns give the percentage of squares in that region where that species was reported during the 2nd and 1st atlas (this gives an idea of the expected chance of finding that species in region #46). Rare/Colonial Species Report Forms should be completed for species marked: § (Colonial), ‡ (regionally rare), or † (provincially rare). Current as of 6/04/2011. An up-to-date version of this sheet is available from http://www.birdsontario.org/atlas/summaryform.jsp?squareID=17PJ48

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APPENDIX II: Correspondence with Lake Simcoe Region Conservation Authority

Lake Simcoe Region Conservation Authority

International Riverfoundation

Proud Winner of the 2009 International Thiess River*prize*

Uxbridge PIR
IMS No.: RPIC263RI

September 20, 2011

Ms. Ali Giroux
Niblett Environmental Assessments
55 Mary Street West, Suite 112
Lindsay, ON K9V 5Z6

Dear Ms. Giroux

RE: Property Information Request
5240 Concession Road 4
Lot 22, Concession 3
Township of Uxbridge, Region of Durham

Thank you for conferring with the Lake Simcoe Region Conservation Authority (LSRCA) with regard to the above noted property information request. It is our understanding that the purpose of the above inquiry relates to the proposed 6,500 kW Solar PV Renewable Energy Generation Facility at 5240 Concession Road 4 in the Township of Uxbridge. The purpose of this letter is to outline the environmental features located on this property as they relate to the *Conservation Authorities Act* and *Ontario Regulation 179/06*.

Based upon a review of our current regulation mapping, the property appears to be located entirely outside of the Approved Regulation Limit of this Authority. On this basis, permits from LSRCA for the proposed development are not required at this time. However it should be noted that the property located entirely within the Oak Ridges Moraine (ORM). Under the ORM Plan, the key heritage features identified on the property include:

- High Aquifer Vulnerability Level 1;
- Landform Conservation Area 1; and
- Significant Woodlands.

The property has also been identified as being part of the Pefferlaw Infiltration Area, an Environmentally Significant Area (ESA). Additionally, the Township of Uxbridge should also be contacted with regards to the proposed project.

Page 1 of 2

120 Bayview Parkway
Box 282, Newmarket, Ontario L3Y 4X1
Tel: 905.895.1281 1.800.465.0437 Fax: 905.853.5881
E-Mail: info@lsrca.on.ca Website: www.lsrca.on.ca

A Watershed for Life

Lake Simcoe Region Conservation Authority

For any addition information and/or questions that you may have, please do not hesitate to contact me at extension 266, or by e-mail at j.hayward@lsrca.on.ca.

Yours truly,

Jennifer Hayward
Environmental Planner - CSR

JH

S:\Env Plan\Regs Appls\Reg PIR Letters\Uxbridge\2010\RPIC263R1_Giroux_5240Con4_Sept12_JH.docx

Penn Energy- Roseplain
SOLAR ENERGY FACILITY

in the
Town of Uxbridge
Regional Municipality of Durham
FIT Application No. FIT-F7TMB91
FIT Contract No. F-001557- SPV-130-505

Natural Heritage Assessment
Site Investigation

Prepared for: Penn Energy Renewables Ltd.
620 Righters Ferry Road, Bala Cynwyd, PA 19004

Submitted by: Niblett Environmental Associates Inc.
PN 10-066

August 2012

Niblett Environmental Associates Inc.
Biological Consultants

August 23, 2012 PN 10-066

Penn Energy Trust
620 Righters Ferry Road
Bala Cynwyd, PA 19004

Attention : Mr. Glen Tomkinson

RE: **Penn Energy- Roseplain**
SOLAR ENERGY FACILITY
in the Town of Uxbridge, Regional Municipality of Durham
FIT Application No. FIT-F7TMB91
FIT Contract No. F-001557- SPV-130-505

Natural Heritage Assessment
Site Investigation Report

Dear Mr. Tomkinson:

We are pleased to submit the Site Investigation Report for the proposed Roseplain solar energy facility as part of the Natural Heritage Assessment for this project.

The report follows the outline provided in the MNR Natural Heritage Assessment Manual.

If there are any comments or questions on the content please contact us.

Yours very truly,

Chris Ellingwood
President and Sr. Terrestrial and Wetland Biologist

55 Mary Street West, Suite 112, Lindsay, Ontario K9V 5Z6 Tel: (705) 878-9399 Fax: (705) 878-9390
Email: mail@niblett.ca Website: www.niblett.ca

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1.0 Introduction

The site investigation is the second step of a Natural Heritage Assessment (NHA) as required under Part IV, Section 26 of O.Reg 359/. The purpose of the site investigation is to confirm the presence and boundaries of natural features identified through the Records Review that are in or within 120 m of the project location (Figure 1 and 2). Field visits on site verify the accuracy of information sources used in the records review and allow for additional natural features to be identified that were not previously found.

Natural features to be identified on site through the records review included unevaluated woodlands and significant wildlife habitat. The records review was previously sent to the local MNR district office for screening.

The following natural features were carried forward for purposes of this report.

Table 1: Natural features present within the Solar Energy Facility based on records review

ID	Natural Feature	Data/Information	Evaluation Status	Location of feature relative to project location
WO01-WO06	Woodland	LIO, MNR data layers (2008-2011), Lake Simcoe Region Conservation Authority	Unevaluated	Woodland patches are found throughout the project location with the greatest extent on the western edge. Woodland within 120 m is also found to the north and northeast. LSRCA mapping shows six batches of Oak Ridges Moraine Woodland on and adjacent to the project location.
SWH01	Wildlife habitat	Atlas of the Breeding Birds of Ontario	Unknown	Presence of agricultural fields provides potential habitat for species at risk
WE02	Wetland	MNR data layers (2008-2011).	Unevaluated	The wetland was found outside of the project location boundary however within 120m of the project location.

2.0 Methodology

Site investigations were completed on June 25th and July 22th, 2010; and April 13th, June 10, 2011 and September 9th, 2011. A total of 10.0 person hours were spent on site. Table 1 provides a summary of duration and conditions of site visits. Qualifications of personnel are included in Appendix A and field notes can be reviewed in Appendix B. The Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2011) and the Draft Significant Wildlife Habitat Ecoregion 6E Criterion Schedule (MNR, 2011) were used to assist in the identification of Natural Features.

2.1 Ecological Land Classification

All vegetation communities on and adjacent to the study lands were visited on July 22, 2010 and species composition of dominant species in all layers was determined. Vegetation criterion followed that of MNR's Ecological Land Classification for Southern Ontario (ELC) program (Lee et al., 1998) and was classified to the vegetation type level. Species of conservation concern identified through the records review listed as potentially occurring on the property were searched.

Photographs and/or specimens were taken of plants requiring verification of identification.

National, provincial and regional significance was determined from accepted status lists and published reference lists such as SARA (December 2011), COSEWIC (November 2011), COSSARO (January 2012), ESA (2007) and NHIC (2010). Regional and local lists were also reviewed and included Varga et al. (2000).

As the project location is in the Oak Ridges Moraine Conservation Plan Area, ELC Classification was used to identify locations of sand barrens, savannah and tallgrass prairie.

2.2 Wetlands

Wetlands were identified using ELC classification. Wetlands identified through the ELC process would be further classified using the Southern Ontario Wetland Evaluation System (OWES) if they met the size requirements (at least 0.5 ha) for evaluation.

2.3 Woodlands

Woodlands were identified using the ELC data collected and the definition of a woodland in the REA Regulation (O. Reg. 359/09, s. 1 (1).

2.4 Valleylands

Valleylands were identified in the field using the definition of a valleyland in the REA Regulation (O. Reg. 359/09, s. 1 (1).

2.5 Breeding Bird Surveys

Breeding bird surveys were conducted during the breeding season on June 25th 2010 and June 10, 2011. Surveys were timed to coincide with the dawn chorus and within acceptable weather parameters. The surveys were modeled after the Ontario Breeding Bird Atlas (2nd) point count methodologies (2001) and used standardized data collection forms. The surveys were a combination of point counts and area searches and covered all portions of the property.

Species of conservation concern identified through the records review listed as potentially occurring on the property were searched.

Incidental observations were made during all site visits and as such, the data sets include some non-breeding spring and fall migrant species. Stick nests were also searched for within the forested areas and hedgerows.

Significance on a national, provincial or regional level will be based on SARA (Dec. 2010), COSEWIC (2011), SARO (2011), ESA (2007) and Bird Studies Canada (2005).

2.6 Spring Amphibian Surveys

Spring amphibian surveys were conducted using the methodologies of the Marsh Monitoring Program (BSC, 2008) with slight alterations for NEA's requirements. Surveys were completed on April 13th, 2011. Adaptations included only one spring survey, as opposed to the recommended three. Other field investigations (June 25, July 22, 2010; June 10 and September 9, 2011) for plants and mammals also identified the presence and absence of amphibian species. It was for this reason the standard monitoring methods were not used, as multiple field visits for other surveys helped identify the species present. Two wetland areas were identified straddling the south-west property boundary, which were visited each time on site. As the wetland pockets in the study area were seasonal, subsequent site visits in late spring found no standing water. As such only one MMP survey was completed.

2.7 Incidental Wildlife Observations

Incidental observations of mammals, herpetozoa and lepidoptera were made during the site visits on June 25th and July 22nd, 2010 and September 9th, 2011. Observations included direct sightings and indirect evidence such as calls, tracks, scat, burrows, dens and browse. Species of conservation concern identified through the records review listed as potentially occurring on the property were searched.

Species significance on a national, provincial, regional, and local level was based on COSEWIC (2011), SARO (2012), SARA (2011) and Dobbyn (1994).

2.8 Alternative Investigations

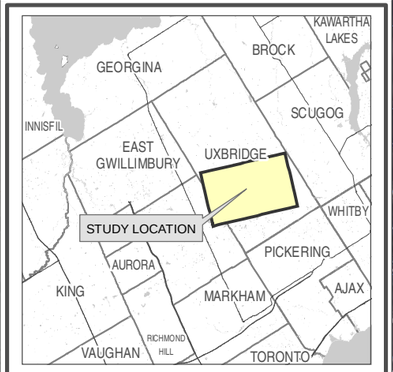
Access to adjacent property was not given. Due to the number of landowners to be contacted, it was not feasible to be granted permission to access all properties within 120 meters of the project location boundary. As the majority of communities extended onto the subject property or bisected roads which were accessible to NEA, surveys were completed within the road allowance. Detailed aerial photos were used to determine the community boundaries. Incidental wildlife observations were conducted from the edge of the property boundary or roadside.

Table 2: Site Investigation Methods Summary

Feature Type	Purpose	Date, Time and Duration	Weather Conditions	Location	Summary of Methods	Names of Investigators
Wetland	Amphibian survey	April 14, 2011; 20:00-21:00 (1 hrs); 100% cloud cover; Beaufort wind scale = 1-2	5°C	3survey stations (Figure 1)	Marsh Monitoring Protocol	Katherine Ryan & Ali Giroux
Woodland	Bird Survey	June 25th, 2010; 6:50am-8:20am (1.5 hrs); 80% cloud cover; Beaufort wind scale = 1	18°C	Point count stations (Figure 1)	Point count surveys	Chris Ellingwood

Feature Type	Purpose	Date, Time and Duration	Weather Conditions	Location	Summary of Methods	Names of Investigators
Woodland	Classify vegetation community	July 22nd, 2010; 15:30-17:30 pm (2 hrs)	28.7°C Sunny, humid	Township of Uxbridge, Part of Lot 22, Concession 3.	ELC, plants, incidental wildlife, connectivity, wetland communities, trees	Kelly Cordick
Woodland	Identify function/ significance	September 9th, 2011; 10:45-13:00 (2 hrs and 15 min)	25 °C Sunny	Township of Uxbridge, Part of Lot 22, Concession 3.	Area Search, Oak Ridges Moraine Technical paper series, ELC, wildlife, functions, connectivity, fall plants.	Chris Ellingwood & Ali Giroux

1:36,000



NEA NIBLETT ENVIRONMENTAL ASSOCIATES INC.

FIGURE 1: LOCATION OF PROJECT & STUDY AREA

17N 644942 4880339
Revision 3
10-066
REGION OF DURHAM
AURORA DISTRICT

1 centimeter = 360 meters

Meters
0 500 1,000 2,000

LEGEND

- Railroad*

Road Classes
- Local
- Arterial
- Collector
- Expressway / Highway
- Freeway

Hydrology*
- Shoreline
- Watercourse
- Waterbody

Municipal
- Lot Parcel

Project Specific
- Project Location
- Study Area

Information
* Obtained under Base Data

Email: mail.niblett.ca
Phone: 705.878.9399
GIS/Mapping Phone: 705.878.9399 x207
www.niblett.ca

NAD83 UTM ZONE 17N

1:16,000

Pefferlaw-Uxbridge Headwaters ANSI

Uxbridge Brook Headwaters Wetland Complex

Upper Pefferlaw Brook Wetland Complex #2

Pefferlaw-Uxbridge Headwaters ANSI

POSSIBLE WILDLIFE CORRIDOR

Upper Pefferlaw Brook Wetland Complex #2

MORAINE

OAK RIDGES

31m (CUP3-1)

34m (CUP3-1)

30m (FOD3-1)

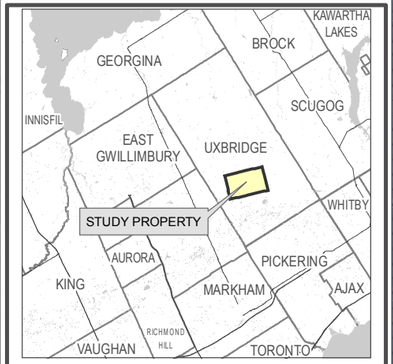
30m (FOD5-2)

31m (FOD1-1)

120m Project Zone

45m (MAS2-1)

33m (MAS2-9)



NEA NIBLETT ENVIRONMENTAL ASSOCIATES INC.

FIGURE 2: PROJECT LOCATION & NATURAL FEATURES

17N 644942 4880339
Revision 8
10-066
REGION OF DURHAM
AURORA DISTRICT

1 centimeter = 160 meters

Meters: 0 225 450 900

LEGEND

Road Classes
- Local
- Arterial
- Collector
- Expressway / Highway
- Freeway

Municipal
- Lot Parcel
- Owner Parcel

Community Types
- Wooded Area
- Wetland Pocket
- Wetland, PSW
- Wetland, Other
- ANSI
- ESA
- Potential Wildlife Corridor

Project Specific
- Project Location
- 120m Project Area
- Study Area

Natural Features within 120m of Project Location

Wetland	Wetland Area WE01, WE02 (within project location and 120m zone)
Woodlot	Wooded Area WO06- (21.54m)
Woodlot	Wooded Area (within project location and 120m project zone)
ESA	Within project location and 120m project zone.
Corridor	Potentially within project location and 120m project zone.
ORM	Within project location and 120m project zone.

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642250 642500 642750 643000 643250 643500 643750 644000 644250 644500 644750 645000 645250 645500 645750 646000 646250 646500 646750 647000 647250 647500 647750 648000 648250 648500

4882250 4882000 4881750 4881500 4881250 4881000 4880750 4880500 4880250 4880000 4879750 4879500 4879250 4879000 4878750 4878500

NAD83 UTM ZONE 17N

3.0 Results

The records review identified three (3) natural heritage features: wetland, woodland and significant wildlife habitat. Site investigations identified additional natural features not found through the records review.

3.1 Ecological Land Classification (ELC)

The site investigations confirmed that the habitat on the property consisted of agricultural fields, hedgerows and woodlands. Additional habitat within 120 m of the project location included residential areas, cropland, active quarry, woodlands, pine plantations and unevaluated wetland. The homestead has likely been farmed for decades and the majority of the areas that have been farmed within the last 20 years or so continue to be. At the time of the site visits, the fields were planted with barley in 2010 and corn in 2011 and have been classified as Agricultural (Figure 3).

Vegetation communities were classified to the vegetation community type level for both upland habitats within 120 m (Figure 3). For properties within 120 m, the ELC classification was to the Ecosite level, where permission to access was not granted. Wetland habitats were not classified using the Southern Ontario Wetland Evaluation System (OWES) because they did not meet the size requirements (at least 0.5 ha) for evaluation. Though also being too small for ELC vegetation mapping they were described to signify their presence. A description of each community is provided below which outlines the dominant vegetation in each layer. No plant species of conservation value was observed during field visits.

3.1.1 Wetland Communities

Two small wetland pockets were found within the study area. Both pockets were wet in the spring with standing water, but were relatively dry in the summer. Both wetlands were shallow marsh community types and were located on the property and within the 120 m adjacent lands at the western portion of the study area.

Forb Mineral Shallow Marsh Type (MAS2-9)
Community 12 (0.36 acres)

Community 12 was a narrow feature that straddles the property boundary and the 120 m adjancent lands. The feature is a shallow swale that conveys seasonal runoff is moist enough to allow a few wetland species to establish. Diversity overall was low. Wetland or moisture tolerant species observed included sensitive fern (*Onoclea sensibilis*), crack willow (*Salix fragilis*), spotted jewelweed (*Impatiens capensis*), alternate-leaf dogwood (*Cornus alternifolia*), blue vervain (*Verbena hastata*), bitter nightshade (*Solanum dulcamara*) and spotted joe-pye weed (*Eupatorium maculatum*).

1:5,000

644400 644500 644600 644700 644800 644900 645000 645100 645200 645300 645400 645500 645600 645700 645800 645900 646000 646100 646200 646300

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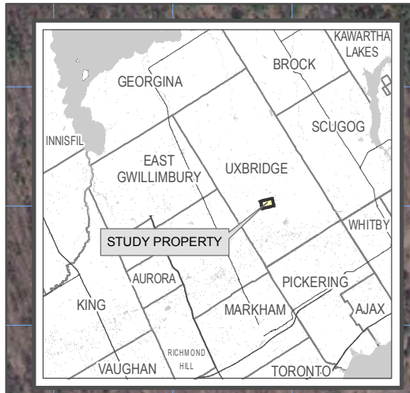

LOT 23 CON 3

LOT 22 CON 3

LOT 21 CON 3

AGGREGATE PIT

20.91 acres

CUM1-1

SWH04

SWH04
CUM1-1
20.91 acres

SWH04
WO03
FOD1-1
0.21 acres

SWH01/SWH04/SWH06
CUM1-1
1.43 acres

WO06
CUP3-1
5.01 acres

WO03
CUP3-1
14.41 acres

SWH04
CUM1-1
4.60 acres

BB6

SWH01
AGRICULTURAL

BUILT-UP AREA

SWH01/SWH04/SWH06
CUM1-1
1.53 acres

SWH04
WO01
FOD3-1
4.19 acres

SWH01/SWH04/SWH06
CUM1-1
0.95 acres

SWH04/SWH05
WO03
FOD3-1
2.78 acres

120m

BUILT-UP AREA

SWH04
CUM1-1
1.64 acres

CONCESSION RD 4

AGRICULTURAL
12.29 acres

BB5

CUT1-1
0.21 acres

SWH01
AGRICULTURAL
9.35 acres

120m

BB1

SWH04

CUT1-1
2.35 acres

SWH04

SWH04
WO04
FOD5-1
2.70 acres

BB4

SWH01
AGRICULTURAL
14.58 acres

120m

MMP3

AGRICULTURAL

SWH01
AGRICULTURAL
51.61 acres

CUT1-1
0.72 acres

SWH04
CUM1-1
6.12 acres

SWH04/SWH05
WO05
FOD5-3
7.06 acres

HEDGEROW
0.52 acres

HEDGEROW
0.22 acres

SWH01
AGRICULTURAL

SWH01/SWH04
CUM1-1
0.40 acres

BB2

WO07
CUP3-1
1.62 acres

AGRICULTURAL
12.11 acres

WO08
CUP3-1
2.04 acres

WO05

SWH02/SWH05

BB2

SWH04/SWH06
CUM1-1
1.15 acres

MMP2

AGRICULTURAL
8.21 acres

120m

AGRI
4.80 acres

AGRI
3.87 acres

FOD5-3
7.82 acres

WO05
SWH02/SWH05
FOD5-3

SWH04
CUM1-1
5.14 acres

SWH04
CUM1-1
0.73 acres

SWH03
WE01
MAS2-9
0.36 acres

MMP1

SWH03
WE02
MAS2-1
0.20 acres

HEDGEROW
0.27 acres

SWH04
CUM1-1
0.86 acres

HEDGEROW
0.10 acres

WAGG RD

WAGG RD

NAD83 UTM ZONE 17N

NEA NIBLETT ENVIRONMENTAL ASSOCIATES INC.

FIGURE 3: COMMUNITIES & CANDIDATE SIGNIFICANT WILDLIFE

17N 644942 4880339
Revision 9

10-066
REGION OF DURHAM
AURORA DISTRICT

1 centimeter = 50 meters

Meters
0 70 140 280

LEGEND

Surveys
- Frog Survey Location
- Breeding Bird Survey Location

Road Classes
- Local
- Arterial
- Collector
- Expressway / Highway
- Freeway

Community Types
- Wetland Community
- Wetland/Wooded Community
- Wooded Community

Project Specific
- Study Property
- 120m Project Area

Community Types Descriptions

SWH01	(No ELC) (CUM1-1)	Agricultural Dry-Moist Old Field Meadow Type
SWH02	(FOD5-3)	Dry-Fresh Sugar Maple-Oak Deciduous Forest Type
SWH03	(MAS2-1)	Cattail Mineral Shallow Marsh Type
	(MAS2-9)	Forb Mineral Shallow Marsh Type
SWH04	(CUM1-1) (FOD1-1) (FOD3-1) (FOD5-1)	Dry-Moist Old Field Meadow Type Dry-Fresh Red Oak Deciduous Forest Type Dry-Fresh Poplar Deciduous Forest Type Fresh Sugar Maple Deciduous Forest Type
SWH05	(FOD5-3)	Dry-Fresh Sugar Maple-Oak Deciduous Forest Type
SWH06	(CUM1-1)	Dry-Moist Old Field Meadow Type
WE01	(MAS2-9)	Forb Mineral Shallow Marsh Type
WE02	(MAS2-1)	Cattail Mineral Shallow Marsh Type
WO01	(FOD3-1)	Dry-Fresh Poplar Deciduous Forest Type
WO02	(FOM)	Mixed Forest
WO03	(FOD1-1) (FOD3-1) (CUP3-1)	Dry-Fresh Red Oak Deciduous Forest Type Dry-Fresh Poplar Deciduous Forest Type Red Pine Coniferous Plantation Type
WO04	(FOD5-1)	Fresh Sugar Maple Deciduous Forest Type
WO05	(FOD5-3)	Dry-Fresh Sugar Maple-Oak Deciduous Forest Type
WO06	(CUP3-1)	Red Pine Coniferous Plantation Type
WO07	(CUP3-1)	Red Pine Coniferous Plantation Type
WO08	(CUP3-1)	Red Pine Coniferous Plantation Type

Candidate Significant Wildlife Habitat Type Descriptions

SWH01	Butterfly Migratory Stop-over
SWH02	Woodlands Supporting Amphibian Breeding Pond
SWH03	Marsh Bird Breeding Habitat
SWH04	Raptor Wintering Area
SWH05	Generalized Significant Wildlife Habitat
SWH06	Monarch Butterfly Habitat

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Photo 1: Small wetland pocket (WE01)

July 22, 2010)

Cattail Mineral Shallow Marsh Type (MAS2-1)
Community 13 (0.20 acres)

Community 13 also straddles the property boundary in the southwest corner of the property. This was a small wetland pocket consisting of common cattail (*Typha latifolia*).

3.1.2 Upland Communities

Eleven (11) upland vegetative communities were delineated on the subject property and within the 120 m study area. The majority of the property in 2011 was active agricultural land. Deciduous hedgerows and natural forest blocks lined the crop land. If a candidate significant natural feature is found within a community it is listed under the community heading.

Forest blocks were also found on adjacent properties to the north, west and south on private land. The lands to the north and west are quarry lands and access was not granted. Likewise, forest blocks to the south belonging to neighbouring residential lands were not assessed because permission to access lands was not provided.

Cultural Meadow (CUM1-1)
Community 1 (3.82 acres)
Candidate significance: Candidate significant wildlife habitat (SWH01)-Butterfly stopover habitat

The majority of the property was in a disturbed state, though most of this was active agricultural land. There were only a few small and isolated patches of the old field meadow community type: three areas along the northeast border and one on the southwest corner of the property. The regenerating fields, roadside edges and ditches and the outer edges of field/hedgerow interface areas all housed typical old field species in various stages of regeneration. These tend to be early-establishing or 'pioneer' species, and are often also not native to the area (i.e. exotic). Species composition tends to be primarily herbaceous with isolated young shrubs or sapling trees only becoming established after the area has been allowed to stabilize for a number of years. The agricultural fields lacked this woody component and therefore can be determined to have been left fallow for no more than a few years.

Typical field species that were observed on-site during the field investigations included: white sweet-clover (*Melilotus officinalis*), Queen Anne's lace (*Daucus carota*), low hop clover (*Trifolium agrarium*), common St. John's wort (*Hypericum perforatum*), goat's beard (*Tragopogon dubius*), bladder campion (*Silene vulgaris*), butter-and-eggs (*Linaria vulgaris*), white campion (*Silene latifolia*), black-eyed susan (*Rudbeckia hirta*), awnless brome grass (*Bromus inermis*), wild bergamot (*Monarda fistulosa*), common evening primrose (*Oenothera biennis*), chicory (*Cichorium intybus*), spotted knapweed (*Centaurea maculosa*) and field bindweed (*Convolvulus arvensis*). Scattered immature trees included Manitoba maple (*Acer negundo*), Scot's pine (*Pinus sylvestris*), red pine (*Pinus resinosa*) and black cherry (*Prunus serotina*). The pine trees had spread (naturalized) from the block of plantation (Community 14) on the aggregate pit side of the northern property boundary. Shrubs included wayfaring tree (*Viburnum lantana*), choke cherry (*Prunus virginiana*), tartarian honeysuckle (*Lonicera tatarica*), wild red raspberry (*Rubus idaeus)* and staghorn sumac (*Rhus typhina*).

Photo 2: Old field meadow (July 22, 2010

Photo 3: Portion of meadow community that is undergoing more successional regeneration (July 22, 2010)

Staghorn Sumac Cultural Thicket Type (CUT1-1)
Community 6 (2.35 acres)

This small community was dominated by a mature staghorn sumac thicket. It was very open under the canopy with dense growth of field species (i.e. those found in Community 1). In particular there was a great deal of large, densely growing poison-ivy (*Rhus rydbergii*), wild red raspberry, Alleghany blackberry (*Rubus allegheniensis*), tartarian honeysuckle, New England aster (*Symphyotrichum novae-angliae*) and goldenrods (*Solidago spp*.).

Photo 4: open field (Community 1) with staghorn sumac thicket (Community 2) and mixed deciduous forest (Community 7) beyond (July 22, 2010)

Hedgerows (no applicable ELC code)
Community 8 (0.89 acres)

The hedgerows were quite typical; narrow and arranged to provide a border between different agriculture fields to limit wind fetch across them. Species included American basswood (*Tilia americana)*, black cherry, sugar maple (*Acer saccharum*), staghorn sumac, trembling aspen, American elm (*Ulmus americana*) and a variety of shrubbery and field species. Some of the specimen trees in the hedgerows were larger and mature, but the majority were still quite young indicative of the successional stage. Hedgegrows are identified as woodlands if they meet the definition a woodland in the REA Regulation and are connected to other woodlands. A bisecting opening 20 meters or less in width between crown edges is not considered to divide a woodland into two separate woodlands (NHAG, 2011). The hedgerows were included as part of WO04 and W0O5 as they met the definition in the REA regulation as they are connected to other woodlands

Photo 5: Hedgerows lining the fields (July 22, 2010).

Regenerating cultural meadow (ELC Code: CUM1-1)
Community 11 (42.35 acres)

This open field community differed from Community 1 in that it had a considerable component of Scot's Pine regeneration of approximately 10-15 years old. The remaining species composition was nearly identical.

Photo 6: Community 11 open field with Scot's pine, as viewed from Community 10

3.1.3 Forest Communities

Forest vegetative communities have a tree cover greater than 60% and can be either deciduous, coniferous or mixed depending on the dominance in canopy cover. At total of eleven (11) forest communities were identified in and within the project location.

Dry-fresh Red Oak deciduous forest (ELC Code: FOD 1-1)
Community 2 (0.21 acres)
Feature ID: WO03

In this community, red oak (*Quercus rubra*) dominated with the same tree species found here as in Community 1. These were red pine, Scot's Pine and black cherry; with the addition of white ash (*Fraxinus americana*). There was a great deal of poison-ivy and dense tangles of bristly green-brier (*Smilax hispida*) in this forest pocket as well. Shrub and herbaceous species present in lesser numbers included choke cherry, European buckthorn (*Rhamnus cathartica*), wild red raspberry, wild grape (*Vitis riparia*), swallow-wort (*Cynanchum rossicum*), Canada mayflower (*Maianthemum canadensis*), white campion and false Solomon's seal (*Smilacina racemosa*). This list omits only a few of the species found in this community, which had a very low species diversity.

Photo 7: Young red oak forest (July 22, 2010)

Photo 8: dense bristly greenbrier in understory (July 22, 2010)

Mixed Forest of Scot's Pine and Poplar regeneration (no applicable ELC code)
Community 3 (0.5 acres)
Feature ID: (Formerly WO02) WO03

Found in the northeast corner of the property, this small community housed young trembling aspen (*Populus tremuloides*) and Scot's pine. It was a very open canopy resulting in a dense understory, housing strictly open field species. There was a great deal of large, densely growing poison-ivy, common milkweed (*Asclepias syriaca*), wild red raspberry, New England aster and goldenrods (*Solidago spp.*) with white-sweet clover, common St. John's wort and goat's beard in lesser amounts.

Photo 9: open understory, Scot's pine, poplar regeneration

Dry-Fresh Poplar Deciduous Forest (FOD 3-1)
Community 4 & 5 (2.28 acres and 1.19 acres respectively)
Feature ID: WO03 (community 4) and WO01 (community 5)

Communities 4 and 5 were nearly identical in species make-up with one major difference; Community 4 was dominated by trembling aspen, while Community 5 was dominated by balsam poplar (*Populus balsamifera*). Also, Community 5 was more mature than Community 4. Again due to the regenerating nature of these communities, there were many field species. Additional species included eastern white pine (*Pinus strobus*), white spruce (*Picea glauca*), red oak, common strawberry (*Fragaria virginiana*), black cherry, choke cherry, wild red raspberry, poison-ivy, European buckthorn, Virginia creeper (*Parthenocissus inserta*), sugar maple

Photo 10: Poplar deciduous forest

(*Acer saccharum*), American basswood and both alternate-leaved and red-osier dogwoods *(Cornus alternifolia, C. stolonifera).*

Dry-fresh Sugar Maple deciduous forest type (FOD5-1)
Community 7 (2.70 acres)
Feature ID: WO04 (contiguous of WO05)

For purposes of this report WO04 will be discussed separately from WO05 and will be mapped with separate feature IDs, however WO04 and WO05 are a contiguous feature. This woodlot was a small woodlot containing extensive logging within the community. Currently, WO04 consists of only two main vegetative vertical layers (upper canopy and lower canopy), and there is very little herbaceous ground cover. The species diversity associated with this community is very low. A very narrow strip of larger mature tree species remains with regeneration occurring in the previously logged areas. The mature trees were comprised of mostly sugar maple, and contained secondary species, American basswood (*Tilia americana*), eastern white pine, eastern hemlock (*Tsuga canadensis*), balsam poplar, trembling aspen, black cherry, white ash and green ash (*Fraxinus americana; F.pennsylvanica*). The regeneration was mostly wild red raspberry (*Rubus idaeus*), with ground cover present made up of mostly poison-ivy and wild sarsaparilla (*Aralia nudicaulis*).

Photo 11: logging in mixed forest

Photo 12: mixed deciduous, open understory

Dry-Fresh Sugar Maple-Oak Deciduous Forest Type (FOD5-3)
Community 9 & 10 (15.76 acres)
Feature ID: WO05 (contiguous with WO04)

Immature American basswood, ironwood (*Ostrya virginiana*) and black cherry dominated in the north (Community 9) with increasing sugar maple and American beech (*Fagus grandifolia*) toward the south end of this community and moving into #10. Aside from this, species

composition was quite similar between Communities 9 and 10; however there was a higher level of diversity and larger trees in 10 than in Community 9.

Photo 13: Mature trees in community 10 (July 22, 2010)

Red Pine Coniferous Plantation (CUP3-1)
Community 14 (14.41 acres)
Feature ID: WO03

Community 14 is found to the north of the project location and is on lands owned by a mining company. This community is connected to Community 2 and 4 creating one contiguous woodlot. This is a red pine plantation that is undergoing succession in the understory. The canopy on its southern extent is very open, allowing for deciduous and early successional species to propagate. Tree species found in this community include red pine, Scot's pine, eastern white pine, sugar maple, Manitoba maple, black cherry and red oak. Swallow-wort completely carpets the herbaceous layer with wild red raspberry, rugosa rose **(***Rosa rugosa*), bouncing-bet (*Saponaria officinalis*) and common milkweed as minor associates.

Photo 14: Pine plantation (September 9, 2011)

Red Pine Coniferous Plantation (CUP3-1)
Community 15 (5.01 acres)
Feature ID: WO06

This community is made up of the same species as Community 14, a red pine plantation. It however could not be counted as part of the adjacent woodlot as it was more than 20 meters from that community due to the obstruction of a two lane paved road bisecting the woodlot.

Red Pine Coniferous Plantation (CUP3-1)
Community 16 (1.62 acres)
Feature ID: WO07

This community was similar to Community 14 found north of the study property however was a lot smaller in size. This community was a red pine plantation which was undergoing gradual succession.

Red Pine Coniferous Plantation (CUP3-1)
Community 17 (2.04 acres)
Feature ID: WO08

This community was similar to Community 14 and 15 however is much smaller in size. This community was a red pine plantation which was undergoing gradual succession.

3.1.4 Plants

Plant species were collected as outlined in Section 2.1 of this report. A list of species recorded within the study area is included in Appendix C. A total of 138 species were identified, of which 68.9% were native. No species are tracked by NHIC or is listed as an Endangered or Threatened species by COSEWIC and COSSARO. Seven (7) regionally rare species according to Varga et al. (2000) were found on the property. These include red pine (*Pinus resinosa*), smooth gooseberry (*Ribes hirtellum*), tall blue lettuce (*Lactuca biennis*), white lettuce (*Prenanthes alba*), plantain-leaved sedge (*Carex plantaginea*), white heath aster (*Aster pilosus var.pilosus*) and clammy ground cherry (*Physalis heterophylla*). The average coefficient of conservatism (CC) (Oldham et al. 1995) was 4.12 which indicates that the plants are moderately sensitive to disturbance. The majority of species had a CC value less than 6 and thus no species are considered to be highly sensitive to disturbance. Blue-bead lily (*Clintonia borealis*), plantain-leaved sedge, toothwort (*Cardamine diphylla*) and eastern hemlock (*Tsuga canadensis*) have a CC of 7 which is indicative of a community in advanced successional stage that is sensitive to disturbance. All but eastern hemlock are found in Communities 9 and 10. Poverty grass (*Aristida dichotoma*) has a CC of 10 which means it is highly sensitive to disturbance. This species was

found in old fields adjacent to the red pine plantation and cropland. No provincially or regionally significant plant communities were found on site.

3.2 Wetlands

As detailed in Section 3.1.1. two small wetland pockets were found within the study area. Both pockets were wet in the spring with standing water, but were relatively dry in the summer. Both wetlands were shallow marsh community types (MAS2-9 and MAS2-1) and were located within the 120 m of the project location.

The wetlands were not classified using the Southern Ontario Wetland Evaluation System (OWES) because they did not meet the size requirements (at least 0.5 ha) for evaluation. Though also being too small for ELC vegetation mapping they were described to signify their presence.

Table 3. Summary of Wetlands in or within 120m of the Project Location

Feature ID	Size (ac.)	Significance (if known)	Attributes	Composition	Functions	Minimum distance between feature & project location	Carried forward to EOS (y/n)
Wetland-WE01	0.36	Unknown	Forb Shallow Marsh MAS2-9 (community 12)	Dominated with sensitive fern and spotted jewelweed.	Drainage	33 m	y
Wetland-WE02	0.20	Unknown	Cattail Shallow Marsh MAS2-1 (community 13)	Cattail dominant.	Amphibian breeding	45 m	y

3.3 Woodlands

Woodlands were identified using the definition of a woodland in the REA Regulation (O. Reg. 359/09, s. 1 (1). As the project location is within the Oak Ridges Moraine, significant woodlands will be identified through the EOS as per the Oak Ridges Moraine Conservation Plan (ORMCP) and the associated Technical Paper Series (7 – Identification and Protection of Significant Woodlands). As the project location is within the Countryside Area of the ORMCP, only woodlands 4 hectares or larger (ORMCP Technical Paper 7) will be brought forward to the EOS. Woodland features are mapped in Figure 3.

Table 4 outlines the woodlands and the respective vegetation community types in each. The status of the woodlands, in terms of being classified as significant through the records review are shown in Table 4.

Table 4. Summary of Woodlands in or within 120m of the Project Location

Feature ID	Size (ac.)	Significance (if known)	Attributes	Composition	Functions	Minimum distance between feature & project location	Carried forward to EOS (y/n)
Woodland -W001	1.19	Unknown	Poplar Forest FOD3-1 (community 5)	Trembling Aspen	Wildlife habitat	0	n
Woodland -WO03	2.28 + .21 + plantation (15.76) +0.5 =18.75	Unknown	Poplar forest FOD3-1 (community 4); Red Pine plantation CUP3-1 (community 14); Red Oak Forest FOD1-1 (community 2), Scot's pine /poplar mixed forest	Red Pine, Scot's Pine, Red Oak, Trembling Aspen and Balsam Poplar dominant. Contains three regionally rare species (White Heath Aster, Tall Blue Lettuce and Red Pine)	Wildlife habitat	30 m	y
Contiguous Woodland -WO04 + WO05+ hedgerows	7.06 +8.7+3.81+ .22 +.52 =20.31	Unknown	Sugar Maple-Oak forest FOD5-3 (communities 9 & 10) and unknown forest patch on private property Sugar Maple forest-FOD5-1 (community 7) hedgerows	Contains three regionally rare plants (White lettuce, Plantain-leaved Sedge and Smooth Gooseberry) and three species with high CC. -community 7 (FOD5-1) contains high disturbance due to logging	Wetland buffer, Wildlife habitat Wetland buffer; Woodland amphibian breeding habitat	0 m	y

Woodland WO06	5.01	Unknown	CUP (forest patch is on private property and was not accessed)	n/a	Unknown	34m	n
Woodland -WO07	1.62	Unknown	CUP (forest patch is on private property and was not accessed)	n/a	Unknown	0 m	n
Woodland -WO08	2.04	Unknown	Red pine Plantation undergoing gradual succession	Contains Red Pine (regionally rare)	Wildlife habitat	0m	n

3.4 Valleylands

Site investigations on June 25, July 22, 2010, June 10 and September 9, 2011 did not identify any valleylands as defined in the REA Regulation (O. Reg. 359/09, s. 1 (1).

3.5 Wildlife Habitat

The results of the bird surveys, amphibian surveys incidental wildlife observations are provided below. Candidate significant wildlife habitat detailed was identified in or within 120m of the project location through analysis of the ELC data collected and utilizing the Draft Significant Wildlife Habitat Ecoregion 6E Criterion Schedule (MNR, 2011).

3.5.1 Birds

Bird species were recorded as described in Section 2.2 of this report. A total of 33 bird species were observed within the study area (Appendix D). The majority of the sightings were singing males. Five (5) area sensitive birds were observed and include:

- Savannah Sparrow (*Passerculus sandwichensis*),
- Red-breasted Nuthatch (*Sitta canadensis*),
- Black-throated Green Warbler (*Dendroica virens*),
- Pileated Woodpecker (*Dryocopus pileatus*), and
- Pine Warbler (*Dendroica pinus*).

All other species observed are considered to be common species within the area and no regionally rare species were recorded.

No stick nests were observed during the field investigations.

3.5.2 Amphibians

Amphibian species were surveyed as outlined in Section 2.3 and 2.4 of this report. Amphibian stations on the property and within 120 m confirmed the presence of spring breeders. Western chorus frog (*Pseudacris triseriata*) and spring peepers (*Pseudacris crucifer*) were heard calling on adjacent lands. The highest concentration of species heard was in the small wetland pocket associated with a forested block off property in the southwest corner. Western chorus frog is listed as a Threatened species by COSEWIC. Incidental observations during field investigations recorded one amphibian species, gray treefrog (*Hyla versicolor*) (Appendix E for species list).

3.5.3 Incidental Wildlife Observations

The methods used to record incidental wildlife observations are outlined in Section 2.4 of this report. Wildlife observed included six (6) species: white-tailed deer (*Odocoileus virginianus*), red squirrel (*Sciurus vulgaris*), gray squirrel (*Sciurus carolinensis*), eastern chipmunk (*Tamias striatus*), groundhog (*Marmota monax*) and common porcupine (*Erethizon dorsatum*), which are species common in the area. Monarch butterflies (*Danaus plexippus*) were recorded in Communities 1, 4 and 5 (Appendix E). The monarch is listed as special concern both federally and provincially, however it is commonly observed in the general area.

3.5.4 Candidate Significant Wildlife Habitat

Table 5: Candidate Significant Wildlife Habitat

Wildlife Habitat	Present in or within 120m of the project location	Rationale	Carried forward to EOS (y/n)
SEASONAL CONCENTRATIONS			
Waterfowl Stopover and Staging Area (Terrestrial)	No	Cultural thickets and meadows with significant spring melt water flooding was absent within 120m of the project location.	No
Waterfowl Stopover and Staging Area (Aquatic)	No	Two small wetland features were present within 120m of the Project Location. Though provided an ELC designation, they are both technically to small to classify as per ELC and OWES criteria. Large wetland features were absent in or within 120m of the Project Location.	No
Shorebird Migratory Stopover Area	No	No ELC Ecosite Codes relevant to this wildlife habitat was present in or within 120m of the Project Location.	No
Raptor Wintering Area	YES	The property included a mixture of cultural meadow and deciduous forest. No stick nests were observed on or within 120m from the project location. Bird surveys identified only one raptor species, red tailed hawk. 27 ha of potential habitat existed for raptor species. No short-eared owls were identified on or adjacent to project location.	YES

Bat Hibernacula	No	There are no caves, abandoned mine shafts, underground foundations, and Karsts or crevice/cave communities within 120m of the project location.	No
Bat Maternity Colonies	YES	Two FOD communities (WO01 and WO04) fall within the project location. NEA completed thorough investigations through woodlot 1 and woodlot 4 and confirmed that no snag/cavity trees greater than or equal to 25cm were identified in the two areas. All other FOD communities fall within the 120m setback and will be treated as generalized habitat.	YES Generalized Habitat
Turtle Wintering Areas	No	Two small wetlands (MAS2-9 and MAS2-1) were identified within 120m of the project location. Field surveys identified them as not being permanent bodies of water as they become dry in summer.	No
Snake Hibernacula	No	No Talus, Rock Barren, Crevice, Cave or Alvar were identified on site. No rock piles, rock outcrops, stone fences or crumbling foundations were identified.	No
Colonial-Nesting Bird Breeding Habitat (bank/cliff)	No	Results of the vegetation community surveys determined that there were no eroding banks, sandy hills, borrow pits, steep slopes and sand piles present within 120m of the Project Location.	No
Colonial-Nesting Bird Breeding Habitat (tree/shrub)	No	Results of the vegetation community surveys determined that there were no deciduous or mixed swamps and treed fens. No nests were identified.	No
Colonial-Nesting Bird Breeding Habitat (ground)	No	Results of the vegetation community surveys determined that there were no rocky island or peninsulas within a lake or large river. There is no suitable habitat for the Brewers Blackbird on or within 120 meters of the subject property and is not within this species habitat range.	No

Migratory Butterfly Stopover Area	Yes	Monarch butterflies (*Danaus plexippus*) were recorded in Communities 1, 4 and 5 (Appendix E). The monarch is listed as special concern both federally and provincially, however it is commonly observed in the general area. The project location is not located within 5km of Lake Ontario	No
Landbird Migratory Stopover Areas	No	No woodlots are greater than 10ha and the project location is not located within 5km of Lake Ontario.	No
Deer Yarding Areas	No	No Deer Yards were identified by MNR.	No
Deer Winter Congregation Areas	No	No Deer Winter Congregation Areas were identified by MNR. All woodlots are less than 10ha.	No

Wildlife Habitat	Present in or within 120m of the project location	Rationale	Carried forward to EOS (y/n)
RARE VEGETATION AND SPECIALIZED HABITAT FOR WILDLIFE			
Rare Vegetation			
Cliff and Talus Slopes	No	Results of the vegetation community surveys determined that there were no cliff and talus slopes in or within 120m of the project location.	No
Sand Barren	No	Results of the vegetation community surveys determined that there were no sand barrens in or within 120m of the project location.	No
Alvar	No	Results of the vegetation community surveys determined that there were no alvars in or within 120m of the project location.	No
Old Growth Forest	No	Results of the vegetation community surveys determined that there were no woodlands 30ha or greater in size in or within 120m of the project location.	No
Savannah	No	Results of the vegetation community surveys determined that there were no savannahs in or within 120m of the project location.	No
Other rare vegetation communities	No	Results of the vegetation community surveys determined that there were no provincially rare S1, S2 or S3 vegetation communities as listed in Appendix M of the SWHTG in or within 120m of the project location.	No
Specialized Habitat for Wildlife			
Waterfowl Nesting Areas	No	Two small (<0.5ha) wetlands were identified within 120m of each other, however a cluster of three or more small (<0.5ha) wetlands are required.	No
Bald Eagle and Osprey Nesting, Foraging and Perching Habitat	No	No ELC communities related to Bald Eagle and Osprey Nesting, Foraging and Perching Habitat are located directly adjacent to riparian areas. Field surveys identified no bald eagle or osprey nests in or within 120m of the project location.	No
Woodland Raptor Nesting Habitat	No	No woodlots (Forested ELC ecosites) in or within 120m of the project location are greater than	No

		30ha.	
Turtle Nesting Areas	No	Results of the vegetation community surveys determined that there were no MAM, SAS, SAF, BOO or FEO ELC designations in or within 120m of the project location.	No
Seeps and Springs	No	Results of the vegetation community surveys determined that there were no seeps or springs in or within 120m of the project location.	No
Amphibian Breeding habitat (Woodland)	Yes-	Two wetlands are located within the woodland feature WO05. Amphibian surveys identified spring breeders associated with a forested block off property in the southwest corner but within the 120m of the project location.	Yes
Amphibian Breeding Habitat (Wetlands)	No	Two wetlands less than 500m2 were identified. No pools including vernal pools were identified through vegetation community surveys.	No

Wildlife Habitat	**Present in or within 120m of the project location**	**Rationale**	**Carried forward to EOS (y/n)**
HABITAT FOR SPECIES OF CONSERVATION CONCERN			
Marsh Bird Breeding Habitat	Yes	Results of the vegetation community surveys determined that there were no MAM, SAS, SAF, BOO or FEO ELC designations in or within 120m of the project location. In relation to Green Heron specifically, two marsh wetlands have been identified (MAS2-1 and MAS2-9) within 120m of the project location and five areas of CUM1-1 are located in and within 120m of the project location.	Yes
Woodland Area-Sensitive Bird Breeding Habitat	No	No woodlots (Forested ELC ecosites) in or within 120m of the project location are greater than 30ha.	No
Open Country Bird Breeding Habitat	No	The cultural meadow (CUM1-1) located to the west of project location has an area of 18ha. The majority of the surrounding area is agricultural fields, no contiguous open country breeding bird habitat	No

		exists greater than 17ha on or surrounding the property	
Shrub/Early Succssional Bird Breeding Habitat	No	No large field areas succeeding to shrub and thicket habitats >10ha in size are located in or within 120m of the project location.	No
Terrestrial Crayfish	No	Two shallow marshes were identified. Area searches were conducted on and within 120m of the property. No burrows for terrestrial crayfish were found; in addition no terrestrial crayfish were identified.	No
Special Concern and Rare Wildlife Species	YES	Results of the vegetation community surveys determined that there were no special concern and provincially rare (S1, S3, SH) plant species. One special concern species was identified on the property, monarch butterfly. .	YES
Wildlife Habitat	**Present in or within 120m of the project location**	**Rationale**	**Carried forward to EOS (y/n)**
ANIMAL MOVEMENT CORRIDORS			
Amphibian Movement Corridors	No	No Amphibian Breeding Habitat – Wetland Significant Wildlife Habitat is in or within 120m of the project location.	No
Deer Movement Corridors	No	No deer yarding areas or deer winter congregation areas were identified by MNR.	No

3.6 Oak Ridges Moraine Features

As the project location is within the Oak Ridges Moraine Conservation Plan area and based on the records review, the following features required site investigations: sand barrens, savannahs, tall grass prairies and southern wetlands that are not provincially significant.

Results of the vegetation community surveys determined that there were no sand barrens, savannahs or tall grass prairies in or within 120m of the project location (Section 3.5).

Two wetlands that are not provincially significant were identified within 120m of the project location (Section 3.2). These wetland features will be carried forward to the EOS.

3.7 Summary of Natural Features

One correction was made to results found in the Records Review Report (NEA, 2012).

Table 6. Corrections to Records Review

ID	Natural Feature	Data/Information	Evaluation Status	Location of feature relative to project location	Correction
WO01-WO06	Woodland	LIO, MNR data layers (2008-2011), Lake Simcoe Region Conservation Authority	Unevaluated	Woodland patches are found throughout the project location , with the greatest extent on the western edge. Woodland within 120 m is also found to the north and northeast. LSRCA mapping shows six patches of Oak Ridges Moraine Woodland on and adjacent to the project location.	None
SWH01	Wildlife habitat	Atlas of the Breeding Birds of Ontario	Unknown	Presence of agricultural fields provides potential habitat for species at risk	The agricultural fields were actively farmed and therefore would not provide ideal grassland habitat for significant wildlife habitat.
WE02	Wetland	MNR data layers (2008-2011).	Unevaluated	The wetland was found outside of the project location boundary however within 120m of the project location.	None

Additional natural features identified through the site investigation (in addition to those identified through records review) are summarized in Table 7. These included two unevaluated wetlands, eleven woodlots and additional wildlife habitat. The potential for significant wildlife habitat identified through the records review (grassland habitat) was not found on the property as the agricultural fields were being actively farmed. However, four candidate significant wildlife habitats were identified including: Habitat for species of Special Concern Marsh Bird Breeding Habitat, Raptor wintering habitat, and Woodland supporting amphibian breeding ponds. Generalized Significant wildlife habitat was also identified and will be carried forward to the EIS.

Table 7: Additional natural features within the project location or adjacent lands (found through site investigations AND records review)

Feature Type/ID	Methods used to identify the feature	Minimum distance between feature and project location
Wetland-WE01	Field surveys-ELC	33 m
Wetland-WE02	Field surveys-ELC	45m
Woodland-WO02	Field surveys-ELC	0 m
Candidate significant wildlife habitat –SWH01 (Special Concern and Rare Wildlife Species– Monarch Butterfly)	Field surveys	0 m
Candidate significant wildlife habitat-SWH02-Amphibian Breeding Habitat - Woodlands	Amphibian surveys	30 m
Candidate significant wildlife habitat – SWH04 - Raptor Wintering Area	Field surveys-ELC and Breeding Bird Surveys	0m
Generalized Significant Wildlife Habitat-SWH05	Fields surveys	30m
Candidate significant wildlife habitat-SWH06-Special concern and rare wildlife species	Field surveys-ELC	0m
Candidate significant wildlife habitat – SWH03 - Marsh Bird Breeding Habitat	Marsh Monitoring/Breeding Bird Surveys	33m

4.0 Conclusions

The site investigation confirmed the absence of any valleylands, sand barrens, savannah, tallgrass prairie and alvars. It did, however, confirm the presence of unevaluated wetlands, woodlands and candidate significant wildlife habitat and generalized significant wildlife habitat (Figure 3). Table 8 summarizes the results of the site investigation.

4.1 Wetlands

As the wetlands identified are located within the Oak Ridges Moraine Policy Area, Policy states development is prohibited within 120 meters of the feature unless and EIS is carried out to justify a reduction of this buffer. It is for this reason that the wetlands will be treated as significant. As per Section 6.2.1 of the NHAG (MNR, 2011), the Wetlands Characteristics and Ecological Functions Assessment for Renewable Energy Projects (NHAG Appendix C) will be carried out in order to complete the Evaluation of Significance Report and inform the identification of potential negative environmental effects and mitigation as required for preparation of an EIS.

4.2 Woodlands

The proposed solar energy facility will be within 120 m of the woodlands identified in Section 3.3 and thus an Evaluation of Significance Report (EOS) for these features will be carried forward. As the project location is within the Countryside Area of the ORMCP, only woodlands 4 hectares or larger (ORMCP Technical Paper 7) will be brought forward to the EOS.

4.3 Wildlife Habitat

Four candidate significant wildlife habitat features will be carried forward to the EOS based on site investigation surveys and the Draft SWH Ecoregion 6E Criterion Schedule (MNR, 2011). In addition generalized significant wildlife habitat was confirmed and will be carried forward to the Environmental Impact Study.

4.4 Oak Ridges Moraine

Results of the vegetation community surveys determined that there were no sand barrens, savannahs or tall grass prairies in or within 120m of the project location (Section 3.5).

Two wetlands that are not provincially significant were identified within 120m of the project location (Section 3.2). These wetland features will be carried forward to the EOS.

Table 8: Results of site investigation

Feature ID	Size (ac.)	Significance (if known)	Attributes	Composition	Functions	Minimum distance between feature & project location	Carried forward to EOS (y/n)
Wetland-WE01	0.36	Unknown	Forb Shallow Marsh MAS2-9 (community 12)	Dominated with sensitive fern and spotted jewelweed.	Drainage	33 m	y
Wetland-WE02	0.20	Unknown	Cattail Shallow Marsh MAS2-1 (community 13)	Cattail dominant.	Amphibian breeding	45 m	y
Woodland-W001	1.19	Unknown	Poplar Forest FOD3-1 (community 5)	Trembling Aspen	Wildlife habitat	0	n
Woodland-(Formerly WOO2) WO03	0.5	Unknown	Scot Pine/poplar mixed forest (community 3)	Contains Red Pine (regionally rare)	Wildlife habitat	0 m	y
Woodland-WO03	2.28 + .21 + plantation (15.76)	Unknown	Poplar forest FOD3-1 (community 4); Red Pine plantation CUP3-1 (community 14); Red Oak Forest FOD1-1 (community 2)	Red Pine, Scot's Pine, Red Oak, Trembling Aspen and Balsam Poplar dominant. Contains three regionally rare species (White Heath Aster, Tall Blue Lettuce and Red Pine)	Wildlife habitat	30 m	y

Feature ID	Size (ac.)	Significance (if known)	Attributes	Composition	Functions	Minimum distance between feature & project location	Carried forward to EOS (y/n)
Woodland-WO05, WO04 and hedgerows	7.06 +8.7 +3.81 +.22+ .52= 20.31	Unknown	Sugar Maple-Oak forest FOD5-3 (communities 9 & 10) and unknown forest patch on private property Sugar Maple forest FOD5-1 (community 7);	Contains three regionally rare plants (White lettuce, Plantain-leaved Sedge and Smooth Gooseberry) and three species with high CC. High disturbance in sugar maple forest due to logging- FOD5-1 (community 7)	Wetland buffer, Wildlife habitat Wetland buffer; Woodland amphibian breeding habitat	0 m	y
Woodland WO06	5.01	Unknown	CUP (forest patch is on private property and was not accessed)	n/a	Unknown	34m	n
Woodland-WO07	1.62	Unknown	CUP (forest patch is on private property and was not accessed)	n/a	Unknown	0 m	n
Woodland-WO08	2.04	Unknown	Red pine Plantation undergoing gradual succession	Contains Red Pine (regionally rare)	Wildlife habitat	0m	n

Feature ID	Size (ac.)	Significance (if known)	Attributes	Composition	Functions	Minimum distance between feature & project location	Carried forward to EOS (y/n)
Generalized Significant Wildlife Habitat	2.78+7.82 +7.06 = 17.66	Significant	Deciduous forests-FOD5-3 and FOD3-1	Deciduous forests (FOD5-3, FOD3-1)	Possible bat maternity colony habitat	30m	Significant therefore carried forward to the EIS
Special Concern and Rare Wildlife Species	1.15+1.53 +1.43+.4 +.95 = 5.46	Unknown	Cultural Field Meadow CUM1-1	Several Cultural field meadows containing common milkweed	Monarch habitat	0m	y
Raptor Wintering Area	45.46	Unknown	Cultural Field Meadow CUM1-1 Cultural Thicket CUT1-1 Sugar Maple Oak Deciduous Forest FOD5-3 Poplar Deciduous forest FOD3-1 Red Oak Deciduous Forest FOD1-1	A mixture of cultural field meadows (CUM1-1), cultural thickets (CUT1-1) and Deciduous forests (FOD5-3/FOD3-1/FOD1-1)	Potential Raptor Wintering Area	0m	y
Amphibian Breeding habitat (Woodland)	8.7	Unknown	Sugar Maple-Oak forest FOD5-3 (communities 9 & 10) and unknown forest patch on private property	Three species were identified on and adjacent property : western chorus frog, spring peeper,	Woodland amphibian breeding habitat	30m	y

				gray tree frog			
Marsh Bird Breeding Habitat	0.56	Unknown	Forb Shallow Marsh MAS2-9 (community 12) Cattail Shallow Marsh MAS2-1 (community 13)	Shallow waters in spring with emergent aquatic vegetation present	Potential Marsh bird breeding habitat	33m	y

5.0 References

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APPENDIX A

QUALIFICATIONS OF PERSONNEL

Chris Ellingwood, President and Sr. Terrestrial and wetland biologist

Bird survey qualifications

Mr Ellingwood has conducted breeding bird surveys for numerous projects including wind power and hydroelectric facilities and for over 1000 EIS reports. The surveys are conducted using standard surveys techniques. He also participates annually in various volunteer projects, several for over 15 years including the Breeding Bird Survey, Forest Bird Monitoring Survey Ontario Marsh Monitoring Program (amphibian and bird surveys) Ontario Marsh Monitoring Program (amphibian and bird surveys). He also has participated in the Breeding Bird Census, Ontario Breeding Bird Atlas (1^{st} and 2^{nd}), Maritime Breeding Bird Atlas, , Spring Red-shouldered Hawk and Woodpecker Survey, Nocturnal Owl Survey, Ontario Nest Record Scheme, Christmas Bird Counts, Ontario Rare Breeding Bird Program, Project Feederwatch, Canadian Lakes Loon Survey, Loggerhead Shrike Survey (1987), Couchiching Conservancy volunteer monitoring Shrike Survey, Ontario Grassland Bird Survey, Central Ontario Whip-poor-will survey and the Peregrine Falcon Reintroduction Program.

He acted as Regional Coordinator (Region 14) for the second Ontario Breeding Bird Atlas project (2001-2005) and is currently the volunteer regional coordinator for Bird Studies Canada's Marsh Monitoring Program in the Kawartha Lakes area. He is also the coordinator for the Lindsay Christmas Bird Count.

He regularly conducts workshops for birdwatching, birding by ear, leads nature tours and participates in the Carden Challenge (a 24 hr birding event) in the Carden Plain. He has over 35 years of experience as an expert bird watcher.

Kelly Cordick, Terrestrial and wetland biologist

Vegetation and wetland surveys

Ms. Cordick has over 10 years of experience as a biologist and has worked as a terrestrial and wetland biologist for NEA for 5 years. She has training in the ELC southern Ontario system, the Ontario Wetland Evaluation System and plant biology. As a biologist with NEA, Ganaraska and Toronto Region Conservation Authorities, she has conducted numerous surveys across Ontario in grasslands, woodlands, wetlands and valleylands. She has a strong background in plant identification of Ontario trees, shrubs, groundcover and aquatic/wetland species. She is also a qualified MFTIP evaluator for woodlands on private lands.

Ali Giroux, Terrestrial and wetland biologist

Amphibian survey

Ms. Giroux has four years of experience as a biologist and has worked as a terrestrial and wetland biologist for NEA for less than a year. She has experience identifying amphibians in the field by both sight and sound. Ali was a terrestrial monitoring volunteer with the Toronto and Region Conservation Authority (TRCA) in 2006 which involved amphibian surveys on TRCA land. She has also been involved with the Marsh Monitoring Program performing marsh bird and amphibian surveys in the Aylmer area. She has completed many amphibian surveys this past

spring with NEA for projects across Southern Ontario and currently, Ali monitors a route for the Marsh Monitoring Program in Peterborough for both amphibian and marsh birds.

Katherine Ryan, Terrestrial and wetland biologist

Amphibian survey

Ms. Ryan has two years of experience as a biologist and has worked as a terrestrial and wetland biologist for NEA for over a year. She began with technical training for the identification of frogs through sight and sound at Fleming College. Katherine worked with Otonabee Region Conservation Authority (ORCA) and completed amphibian surveys on ORCA lands. She has completed many amphibian surveys this past spring with NEA for projects across Southern Ontario and is currently a Marsh Monitoring Volunteer for a route in the Lindsay area monitoring amphibians.

APPENDIX B

FIELD NOTES

Niblett Environmental Associates

Vegetation community form

Date: June 25/10

Project Name: 10-0669 Project Number:

Community No.

Soils/bedrock:
Sand, clay, silt, organic gravel, rock, cobble. shingles, limestone, granitic

Type:

Community type:
deciduous forest
mixed forest
coniferous forest
plantation
old field meadow
swamp/marsh/bog/fen
alvar/ledge/talus slope
cliff/ rock barren/outcrop
sand dune/beach

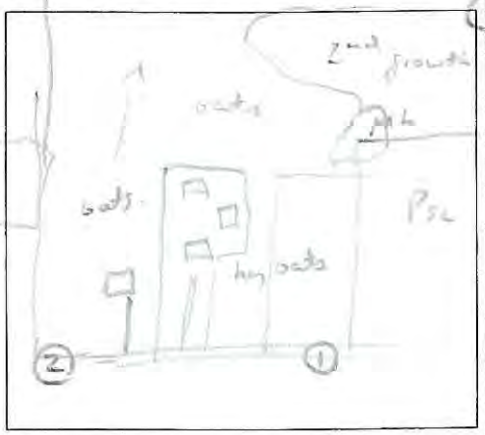
Community age:
1-Pioneer, 2-young
3-mid-aged, 4-mature
5-old growth 6-regen

Physiography:
Rolling, hummocky, hilly valley, floodplain, slope, bottomland, tableland, alvar, riverine, shore

Disturbances:

ELC code: ELC veg. type: WORGAN PROPERTY

Layer	dbh	% cover	Dominant species
Canopy			START 06:50 T°- 18°C
Understory			CLOUD 90%
Groundcover			WIND 1



			HOME/FARM	FOREST		FIELD	
			ANSW	MOWA	1	CAGR	1
			DUST	HAWR	11	AMCR	111
			BLTY 11	INBU	1	BNSW	1111
			CHSP 111	BLOY	11	SASP	1
						AMGO	11
						SASP	11
						TRSW	11
						RWBL	1
						EAKI	1
Trees			4 CAGR	AMCR 1111		INBU	11
			2 AMGO	TRSW 1111		EAME	11
			1111 DUST	BNSW 111	111	AMRO	1
			1 HOWR	SASP 11	1		
			1 RHCO	SOSP 1			
			WAVI				
Shrubs							
			3 AMRO	CHSP AMCR			
			REVI	SOSP BLTY			

all entered

Birds:

Wildlife:

(1)

NEA Niblett Environmental Associates Inc.
Biological Consultants

KAO

Community Description Sheet

Project Name: Penn Energy (Worgan Parcel)
Date: July 27 2018 **Project #: 10-066**

Community #: CUM1-1
ELC Community type: (1)
Location/boundary: or picket

Dominant species (%, dbh range)
canopy-

understory-

soil- very sandy

Herbaceous	Herbaceous
✓ QAL	✓ chic
✓ CAMP	✓ C strab
✓ VERA	✓ L. bis
✓ BCS	✓ b≠e
✓ ABG	✓ rosted lungwort
✓ SNT Chick	✓ NE aster
✓ berg	
✓ Eve prim	
✓ bl damp	
✓ SD. STW	
✓ mull	
✓ DSV	
✓ milk	
✓ bindwd	
✓ alfalfa	
✓ hop clover	
✓ goats	
✓ St. John's	
✓ tall Pwh aster	
✓ many asters, goldrods	
✓ ragwd	

Tree Species (*=dominant)	Shrub Species
✓ MM	✓ Straw
✓ PS	✓ WR Ros
✓ Qr	✓ Cc
✓ Pi	✓ tart
✓ Cb	✓ Indy/purp tree
.	✓
..	
.	
.	

Birds:

Wildlife: monarch

Niblett Environmental Associates Inc.
Biological Consultants

Community Description Sheet

Project Name: Penn Energy (Worgan Parcel)
Date: July 27 **Project #: 10-066**

Community #: 2
ELC Community type: Or FOD
Location/boundary:

Dominant species (%, dbh range)
canopy- Or.
understory- AW
soil-

Tree Species(*=dominant)	Shrub Species	Herbaceous	Herbaceous
. Pt	. DT	. DSV	
. Pg	. Cc	. tall y lett	
. Or	. Eurob	. CAF	
. AW	. WRK	. bed	
. Cb	W grape	. bristly greenbriar *	
.		. CANPU	
..		. false 'strb	
.		. W camp	
		. false sol	
.		.	
		.	

Birds:

Wildlife:

Niblett Environmental Associates Inc.
Biological Consultants

Community Description Sheet

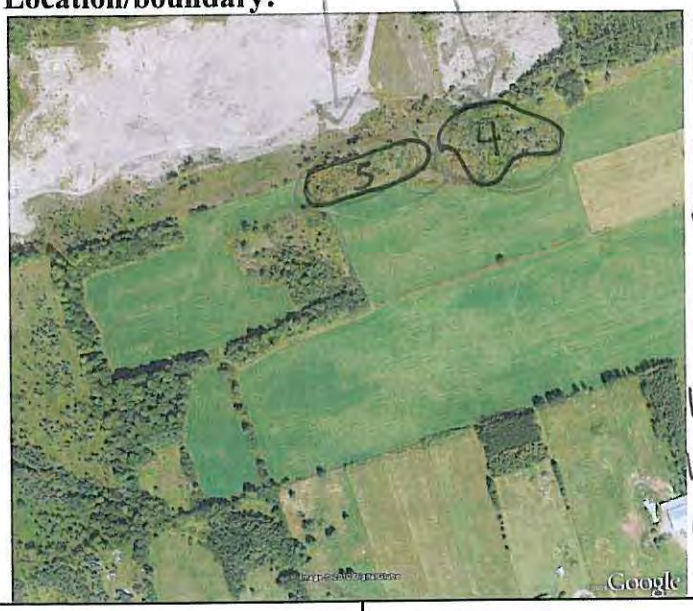
Project Name: Penn Energy (Worgan Parcel)

Date: July 27 **Project #: 10-066**

Community #: POB/POT 4,5

ELC Community type:

Location/boundary:



Dominant species (%, dbh range)

canopy-

understory-

soil-

Herbaceous	Herbaceous
C st john's	G's & g's
C milk	
BFC	
C cin	
C vetch	
GAL	
ABG	
C straw	
SWT clv	
Goats	
thimbleweed	
bristly greenmy	

Tree Species(*=dominant)	Shrub Species
P tem	PT
BF	RON
Dr	ABC
Cb	Hart
AW	Euro b
POB	Creeper
OR	Rc
SW	WRK
BJ	ALD
PW	
Mh	

Birds:

Wildlife:

Monarchs

WTDF scat

NEA Niblett Environmental Associates Inc.
Biological Consultants

Community Description Sheet

Project Name: Penn Energy (Worgan Parcel)
Date: July 08 **Project #: 10-066**

Community #: PGb (7)
ELC Community type:
Location/boundary:

Dominant species (%, dbh range)
canopy-

understory-

soil-

Herbaceous	Herbaceous
✓ Trl	
✓ wild sngr	
✓ Tme Dd	
✓ blee cu	
✓ garrion	
✓ w bane	
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Tree Species(*=dominant)	Shrub Species
✓ Pw +	✓ Cc
✓ Pw	✓ w grape
✓ Cb	✓ tart
✓ Pb	✓ G. buck
✓ Mh	✓ Rr rus
✓ hem	✓ DT
✓ Ag	✓ bf gp
✓ Bd	✓ Blu Pkb.
✓ Pb	
.	W → F
	Pw ✓ Pb Mh

Mh
Cb

Birds:

Wildlife:

NEA
Niblett Environmental Associates Inc.
Biological Consultants

Community Description Sheet

Project Name: Penn Energy (Worgan Parcel)
Date: July 22 **Project #: 10-066**

Community #: 9, 10
ELC Community type:
Location/boundary:

Mature Mh

Dominant species (%, dbh range)
canopy-

understory-

soil-

Tree Species(*=dominant)	Shrub Species	Herbaceous	Herbaceous
*Bd	Gu	false Sol	false carrion flower
*cb	creeper	dwarf r-s	? M spikes
Mh → further	PI	clintonia	Lie 2dg
Aw W↑ in	*CL	y. avens	TTP
*Id waist	sm. goose	g. must	9 shrub
Or - 100 DBH	r g	C T V (6)	r bedst
Be		herb rbt	
		4 flow'd bellwt	
		fml	
		w ginger	
		blood rt	
		helle	*diversity
		motherwort	mature trees
		t w ra	all from W
		bracken	side not n
		c mitr	
		wild sar	
		4g l'd aster	
		sharp lobed hep	
		wh bane	

Birds: KILL

Wildlife: WTDE, Blty Porcu

Niblett Environmental Associates Inc.
Biological Consultants

Community Description Sheet

Project Name: Penn Energy (Worgan Parcel)
Date: July 22 **Project #: 10-066**

Community #:
ELC Community type: CUM
Location/boundary:

Dominant species (%, dbh range)
canopy-

understory-

soil-

Tree Species(*=dominant)	Shrub Species	Herbaceous	Herbaceous
.		.	
.		.	
.		.	
.		.	
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		.	
		.	
		.	

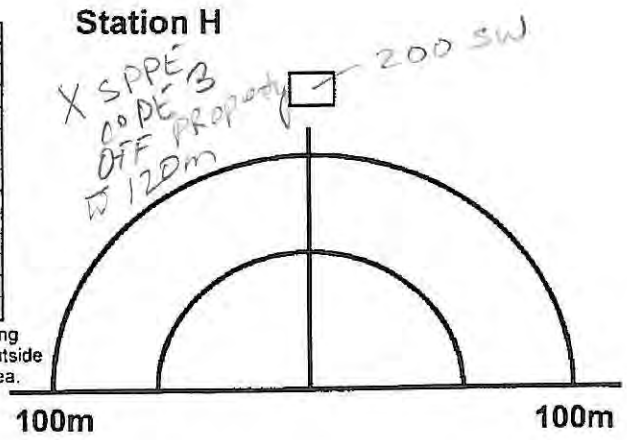
Birds:

Wildlife:

WP 009
17T 0644810
4879998
picture #: 328/329/330

Species	In*	Out*
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		X
WOFR		

* Check if species calling from inside and/or outside 100-metre station area.



Amphibian Data Form

Return by 31 July to Aquatic Surveys Officer, Bird Studies Canada, P.O. Box 160, Port Rowan, Ontario, Canada, N0E 1M0

Please write legibly (in pen).

Observer: Katherine, Ali & Beth		
Route name:		
Date (dd-mm-yr): 13-04-11	Visit No.: 1	Start time (24 hr clock): 20:08
Beaufort Wind Scale No.: 1	Cloud Cover (10ths): 100	Air Temp (°C or °F): 5°C
Precipitation (check one): None/dry:____ Damp/Haze/Fog:____ Drizzle:____ Rain: rained earlier in day		
Has the habitat on your route changed from previous years: Yes:____ No:____ Not applicable: X		
Remarks:		

CALL LEVEL CODES
Code 1: Calls not simultaneous, number of individuals can be accurately **counted**
Code 2: Some calls simultaneous, number of individuals can be reliably **estimated**
Code 3: Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated

AM WO

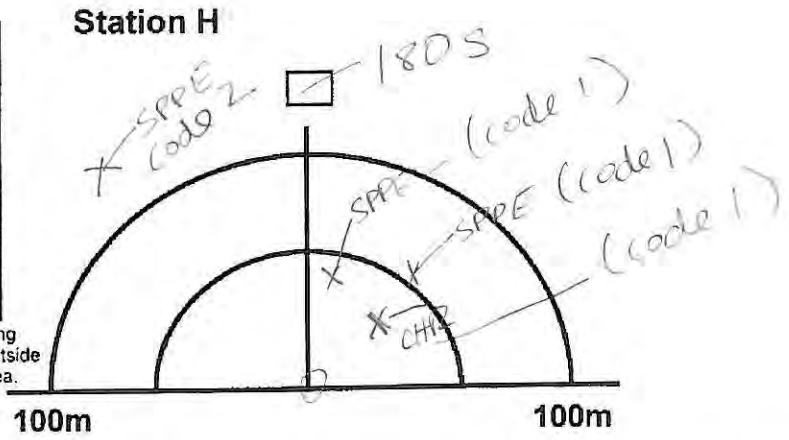
WP10

17T 0644891
4879983

Station H

Species	In*	Out*
AMTO		
BCFR		
BULL		
CHFR	X	
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE	X	X
WOFR		

* Check if species calling from inside and/or outside 100-metre station area.



~ 120m of property

Amphibian Data Form

Return by 31 July to Aquatic Surveys Officer, Bird Studies Canada, P.O. Box 160, Port Rowan, Ontario, Canada, N0E 1M0

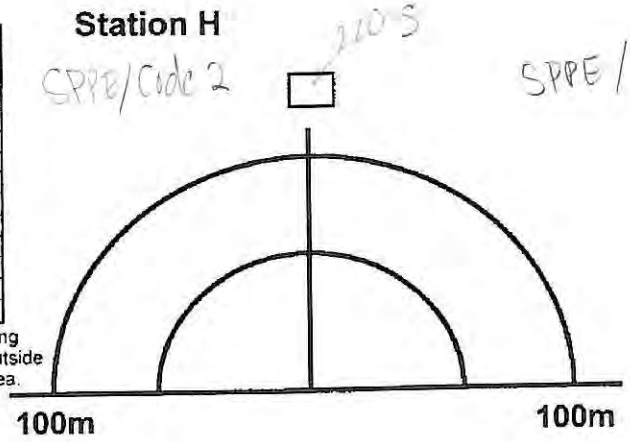
Please write legibly (in pen).

Observer: Katherine, Ali, Beth		
Route name: Morgan		
Date (dd-mm-yr): 13-04-11	Visit No.: 1	Start time (24 hr clock): 20:20
Beaufort Wind Scale No.: 1	Cloud Cover (10ths): 100	Air Temp (°C or °F): 2
Precipitation (check one): None/dry:____ Damp/Haze/Fog:____ Drizzle:____ Rain: rained earlier in day		
Has the habitat on your route changed from previous years: Yes:____ No:____ Not applicable: X		
Remarks:		

CALL LEVEL CODES
Code 1: Calls not simultaneous, number of individuals can be accurately **counted**
Code 2: Some calls simultaneous, number of individuals can be reliably **estimated**
Code 3: Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated

Species	In*	Out*
AMTO		
BCFR		
BULL		
CHFR		
CGTR		
FOTO		
GRTR		
GRFR		
MIFR		
NLFR		
PIFR		
SPPE		X
WOFR		

* Check if species calling from inside and/or outside 100-metre station area.



Win 120m of prop. on either side of Conc 4

Wpt 11
17T 0645740
4886771

Amphibian Data Form

Return by 31 July to Aquatic Surveys Officer, Bird Studies Canada, P.O. Box 160, Port Rowan, Ontario, Canada, N0E 1M0

Please write legibly (in pen).

Observer:	NB, KR, EB
Route name:	Riseplain

Date (dd-mm-yr): 13/04/11	Visit No.: 3	Start time (24 hr clock): 8:39
Beaufort Wind Scale No.: 2	Cloud Cover (10ths): 2/10	Air Temp (°C or °F): 5°C
Precipitation (check one): None/dry: ✓	Damp/Haze/Fog:____	Drizzle:____ Rain:____
Has the habitat on your route changed from previous years: Yes:____	No:____	Not applicable: ✓
Remarks:		

CALL LEVEL CODES
Code 1: Calls not simultaneous, number of individuals can be accurately **counted**
Code 2: Some calls simultaneous, number of individuals can be reliably **estimated**
Code 3: Full chorus, calls continuous and overlapping, number of individuals cannot be reliably estimated

APPENDIX C

PLANT SPECIES LIST

APPENDIX C Plant Species by Community

Families and genera for the plant species found in this appendix are listed in taxonomic order. The species are listed alphabetically by its scientific name within each genus.

Three standard reference works were used for the botanical nomenclature and taxonomy (Newmaster et. al., 1998; Gleason and Cronquist 1991; Voss 1980; 1985). Other published works for botanical names included; ferns (Cody and Britton 1989); grasses (Dore and McNeill 1980); orchids (Whiting and Catling 1986); shrubs (Soper and Heimburger 1982) and trees (Farrar 1995).

Total: Number of communities where plant species was recorded
X : Plant species recorded

			COMMUNITY NUMBER														
Common Name	***Scientific Name***	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
HORSETAIL FAMILY	*EQUISETACEAE*																
field horsetail	*Equisetum arvense*	1										X					
BRACKEN FERN FAMILY	*DENNSTAEDTIACEAE*																
eastern bracken fern	*Pteridium aquilinum*	2									X	X					
WOOD FERN FAMILY	*DRYOPTERIDACEAE*																
spinulose wood-fern	*Dryopteris carthusiana*	1										X					
evergreen wood-fern	*Dryopteris intermedia*	1												X			
sensitive fern	*Onoclea sensibilis*	1												X			

			COMMUNITY NUMBER															
Common Name	***Scientific Name***	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
PINE FAMILY	*PINACEAE*																	
white spruce	*Picea glauca*	2				X	X										
red pine	*Pinus resinosa*	7	X	X	X											X	X
eastern white pine	*Pinus strobus*	7				X	X		X							X	X
Scot's pine	*Pinus sylvestris*	9	X	X	X	X							X			X	X
eastern hemlock	*Tsuga canadensis*	1							X								
DUTCHMAN'S-PIPE FAMILY	*ARISTOLOCHIACEAE*																	
wild ginger	*Asarum canadense*	2									X	X					
BUTTERCUP FAMILY	*RANUNCULACEAE*																	
white baneberry	*Actaea pachypoda*	3							X		X	X					
thimbleweed	*Anemone virginiana*	1	X														
sharp-lobed hepatica	*Hepatica acutiloba*	2									X	X					
tall buttercup	*Ranunculus acris*	2	X			X											
BARBERRY FAMILY	*BERBERIDACEAE*																	
southern blue cohosh	*Caulophyllum thalictroides*	2							X			X					
mayapple	*Podophyllum peltatum*	1										X					
POPPY FAMILY	*PAPAVERACEAE*																	
bloodroot	*Sanguinaria canadensis*	2									X	X					
ELM FAMILY	*ULMACEAE*																	
American elm	*Ulmus americana*	1								X							
NETTLE FAMILY	*URTICACEAE*																	
wood nettle	*Laportea canadensis*	1												X			
BEECH FAMILY	*FAGACEAE*																	
American beech	*Fagus grandifolia*	3					X				X	X					
red oak	*Quercus rubra*	7		X		X	X				X	X				X	
BIRCH FAMILY	*BETULACEAE*																	
white birch	*Betula papyrifera*	1														X	
ironwood	*Ostrya virginiana*	2									X	X					

			COMMUNITY NUMBER															
Common Name	***Scientific Name***	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
GOOSEFOOT FAMILY	*CHENOPODIACEAE*																	
lamb's-quarters	*Chenopodium album*	1	X															
PINK FAMILY	*CARYOPHYLLACEAE*																	
bouncing bet	*Saponaria officinalis*	2	X													X		
white campion	*Silene latifolia*	3	X	X	X													
bladder campion	*Silene vulgaris*	6	X	X	X			X		X			X					
BUCKWHEAT FAMILY	*POLYGONACEAE*																	
black bindweed	*Polygonum convolvulus*	1										X						
sheep sorrel	*Rumex acetosella*	1	X															
ST. JOHN'S-WORT FAMILY	*GUTTIFERAE*																	
common St. John's-wort	*Hypericum perforatum*	6	X		X	X	X	X					X					
LINDEN FAMILY	*TILIACEAE*																	
American basswood	*Tilia americana*	6				X	X		X	X	X	X						
WILLOW FAMILY	*SALICACEAE*																	
balsam poplar	*Populus balsamifera*	5			X	X	X		X					X				
Lombardy poplar	*Populus nigra*	1	X															
trembling aspen	*Populus tremuloides*	5			X	X	X		X	X								
crack willow	*Salix fragilis*	1												X				
MUSTARD FAMILY	*BRASSICACEAE*																	
garlic mustard	*Alliaria petiolata*	2									X	X						
field mustard	*Brassica rapa*	1	X															
toothwort	*Cardamine diphylla*	1					X											
GOOSEBERRY FAMILY	*GROSSULARIACEAE*																	
prickly gooseberry	*Ribes cynosbati*	3							X		X	X						
smooth gooseberry	*Ribes hirtellum*	2									X	X						

			COMMUNITY NUMBER															
Common Name	***Scientific Name***	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
ROSE FAMILY	*ROSACEAE*																	
agrimony	*Agrimonia gryposepela*	1										X						
common strawberry	*Fragaria virginiana*	10	X		X	X	X	X	X	X	X	X	X					
yellow avens	*Geum aleppicum*	2									X	X						
rough cinquefoil	*Potentilla norvegica*	3	X			X	X											
black cherry	*Prunus serotina*	13	X	X	X	X	X	X	X	X	X	X	X			X	X	
choke cherry	*Prunus virginiana*	11	X	X	X	X	X	X	X	X	X	X	X					
rugosa rose	*Rosa rugosa*	1														X		
Alleghany blackberry	*Rubus allegheniensis*	4						X	X					X		X		
wild red raspberry	*Rubus idaeus*	14	X	X	X	X	X	X	X	X			X	X		X	X	
dwarf raspberry	*Rubus pubescens*	2									X	X						
PEA FAMILY	*FABACEAE*																	
alfalfa	*Medicago sativa ssp. Sativa*	2	X		X													
white sweet-clover	*Melilotus alba*	4	X		X	X	X											
low hop clover	*Trifolium agrarium*	1	X															
red clover	*Trifolium pratense*	1	X															
cow vetch	*Vicia cracca*	7	X		X	X	X	X		X			X					
EVENING PRIMROSE FAMIL	*ONAGRACEAE*																	
dwarf enchanter's nightshade	*Circaea alpina*	2									X	X						
Canada enchanter's nightshade	*Circaea lutetiana L. ssp.canadensis*	1												X				
common evening primrose	*Oenothera biennis*	5	X		X			X		X			X					
DOGWOOD FAMILY	*CORNACEAE*																	
alternate-leaf dogwood	*Cornus alternifolia*	3				X	X							X				
red-osier dogwood	*Cornus stolonifera*	2				X	X											
BUCKTHORN FAMILY	*RHAMNACEAE*																	
European buckthorn	*Rhamnus cathartica*	7		X		X	X		X		X	X				X		
GRAPE FAMILY	*VITACEAE*																	
Virginia creeper	*Parthenocissus inserta*	4				X	X				X	X						
wild grape	*Vitis riparia*	5		X			X		X			X		X				

			COMMUNITY NUMBER															
Common Name	***Scientific Name***	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
MAPLE FAMILY	*ACERACEAE*																	
Manitoba maple	*Acer negundo*	5	X		X											X	X
red maple	*Acer rubrum*	1					X										
sugar maple	*Acer saccharum ssp.saccharum*	9				X	X		X	X	X	X				X	X
CASHEW FAMILY	*ANACARDIACEAE*																	
western poison-ivy	*Rhus rydbergii*	9		X	X	X	X	X		X	X	X				X	
staghorn sumac	*Rhus typhina*	5	X		X			X		X			X				
GERANIUM FAMILY	*GERANIACEAE*																	
herb Robert	*Geranium robertianum*	3									X	X				X	
TOUCH-ME-NOT FAMILY	*BALSAMINACEAE*																	
spotted jewelweed	*Impatiens capensis*	1												X			
GINSENG FAMILY	*ARALIACEAE*																	
wild sarsaparilla	*Aralia nudicaulis*	5				X	X		X		X	X					
CARROT FAMILY	*APIACEAE*																	
Queen-Anne's lace	*Daucus carota*	6	X		X	X	X	X					X				
woolly sweet cicely	*Osmorhiza claytonii*	2		X								X					
MILKWEED FAMILY	*ASCLEPIADACEAE*																	
common milkweed	*Asclepias syriaca*	7		X	X	X	X				X	X				X	
swallow-wort	*Cynanchum rossicum*	11	X	X	X			X			X	X	X			X	X
NIGHTSHADE FAMILY	*SOLANACEAE*																	
clammy ground-cherry	*Physalis heterophylla*	1	X														
bitter nightshade	*Solanum dulcamara*	1												X			
MORNING-GLORY FAMILY	*CONVOLVULACEAE*																	
field bindweed	*Convolvulus arvensis*	5	X		X			X		X			X				
WATERLEAF FAMILY	*HYDROPHYLLACEAE*																	
Virginia waterleaf	*Hydrophyllum virginianum*	1										X					
VERVAIN FAMILY	*VERBENACEAE*																	
blue vervain	*Verbena hastata*	1												X			

			COMMUNITY NUMBER															
Common Name	***Scientific Name***	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
MINT FAMILY	*LAMIACEAE*																	
henbit	*Lamium amplexicaule*	1										X						
motherwort	*Leonurus cardiaca*	2									X	X						
wild bergamot	*Monarda fistulosa*	4	X		X			X					X					
wild basil	*Satureja vulgaris*	3	X		X	X												
OLIVE FAMILY	*OLEACEAE*																	
white ash	*Fraxinus americana*	6		X		X	X		X		X	X						
green ash	*Fraxinus pennsylvanica var. subintegerr*	2							X								X	
lilac	*Syringa vulgaris*	1					X											
FIGWORT FAMILY	*SCROPHULARIACEAE*																	
butter-and-eggs	*Linaria vulgaris*	5	X		X			X		X			X					
common mullein	*Verbascum thapsus*	6	X		X			X		X			X				X	
BROOM-RAPE FAMILY	*OROBANCHACEAE*																	
beech-drops	*Epifagus virginiana*	1										X						
MADDER FAMILY	*RUBIACEAE*																	
rough bedstraw	*Galium asprellum*	3		X							X	X						
HONEYSUCKLE FAMILY	*CAPRIFOLIACEAE*																	
tartarian honeysuckle	*Lonicera tatarica*	8	X		X	X	X	X	X	X			X					
common elderberry	*Sambucus canadensis*	1										X						
wayfaring tree	*Viburnum lantana*	2	X		X													
high bush cranberry	*Viburnum trilobium*	3				X	X							X				

			COMMUNITY NUMBER															
Common Name	***Scientific Name***	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
ASTER FAMILY	*ASTERACEAE*																	
common yarrow	*Achillea millefolium*	1				X												
common ragweed	*Ambrosia artemisiifolia*	4	X		X			X					X					
tall white aster	*Aster lanceolatus ssp.lanceolatus*	7	X		X	X	X	X		X			X					
calico aster	*Aster lateriflorus*	1	X															
large-leaved aster	*Aster macrophyllus*	2									X	X						
New England aster	*Aster novae- angliae*	6	X		X	X	X	X					X					
white heath aster	*Aster pilosus var.pilosus*	1				X												
spotted knapweed	*Centaurea maculosa*	4	X		X			X					X					
chicory	*Cichorium intybus*	2	X		X													
spotted joe-pyeweed	*Eupatorium maculatum*	1												X				
mouse ear hawkweed	*Hieracium pilosella*	2	X			X												
king devil hawkweed	*Hieracium x florbundum*	1	X															
tall blue lettuce	*Lactuca biennis*	1		X														
white lettuce	*Prenanthes alba*	1										X						
black-eyed Susan	*Rudbeckia hirta*	7	X		X	X	X	X		X			X					
tall goldenrod	*Solidago altissima*	2		X			X											
Canada goldenrod	*Solidago canadensis*	1	X															
zig-zag goldenrod	*Solidago flexicaulis*	2									X	X						
gray-stemmed goldenrod	*Solidago nemoralis ssp. Decemflora*	2	X				X											
goldenrod species	*Solidago spp.*	2			X			X										
spiny-leaved sow thistle	*Sonchus asper*	2	X		X													
goat's-beard	*Tragopogon dubius*	6	X		X	X	X	X					X					
ARUM FAMILY	*ARACEAE*																	
Jack-in-the-pulpit	*Arisaema triphyllum*	3									X	X		X				
SEDGE FAMILY	*CYPERACEAE*																	
hop sedge	*Carex lupulina*	1												X				
Pennsylvania sedge	*Carex pensylvanica*	1										X						
plantain-leaved sedge	*Carex plantaginea*	1										X						

			COMMUNITY NUMBER														
Common Name	***Scientific Name***	**Total**	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**13**	**14**	**15**
GRASS FAMILY	*POACEAE*																
poverty grass	*Aristida dichotoma*	1	X														
awnless brome grass	*Bromus inermis ssp.inermis*	6	X		X	X	X	X					X				
green foxtail	*Setaria viridis*	1	X														
CATTAIL FAMILY	*TYPHACEAE*																
common cattail	*Typha latifolia*	1													X		
LILY FAMILY	*LILIACEAE*																
bluebead lily	*Clintonia borealis*	2									X	X					
lily-of-the-valley	*Convallaria majalis L.*	2									X	X					
Canada mayflower	*Maianthemum canadense*	4		X		X	X					X					
hairy Solomon's seal	*Polygonatum pubescens*	3							X		X	X					
false Solomon's seal	*Smilacina racemosa*	3		X							X	X					
star-flowered Solomon's seal	*Smilacina stellata*	2		X		X											
rose-twisted stalk	*Streptopus roseus*	1									X						
white trillium	*Trillium grandiflorum*	3							X		X	X					
large-flowered bellwort	*Uvularia grandiflora*	2									X	X					
CATBRIER FAMILY	*SMILACACEAE*																
carrionflower	*Smilax herbacea*	3							X		X	X					
bristly greenbrier	*Smilax hispida*	2		X												X	
ORCHID FAMILY	*ORCHIDACEAE*																
helleborine	*Epipactis helleborine*	2									X	X					
Total Number of Plant Species	138		51	22	38	39	39	26	23	19	41	56	24	17	1	20	8

Number of Plant Species Per Community

APPENDIX C Communities 16-17

			COMMUNITY NUMBER	
Common Name	***Scientific Name***	**Total**	**16**	**17**
HORSETAIL FAMILY	*EQUISETACEAE*			
field horsetail	*Equisetum arvense*	1		
BRACKEN FERN FAMILY	*DENNSTAEDTIACEAE*			
eastern bracken fern	*Pteridium aquilinum*	2		
WOOD FERN FAMILY	*DRYOPTERIDACEAE*			
spinulose wood-fern	*Dryopteris carthusiana*	1		
evergreen wood-fern	*Dryopteris intermedia*	1		
sensitive fern	*Onoclea sensibilis*	1		
PINE FAMILY	*PINACEAE*			
white spruce	*Picea glauca*	2		
red pine	*Pinus resinosa*	7	X	X
eastern white pine	*Pinus strobus*	7	X	X
Scot's pine	*Pinus sylvestris*	9	X	X
eastern hemlock	*Tsuga canadensis*	1		
DUTCHMAN'S-PIPE FAMILY	*ARISTOLOCHIACEAE*			
wild ginger	*Asarum canadense*	2		
BUTTERCUP FAMILY	*RANUNCULACEAE*			
white baneberry	*Actaea pachypoda*	3		
thimbleweed	*Anemone virginiana*	1		
sharp-lobed hepatica	*Hepatica acutiloba*	2		
tall buttercup	*Ranunculus acris*	2		
BARBERRY FAMILY	*BERBERIDACEAE*			
southern blue cohosh	*Caulophyllum thalictroides*	2		

		COMMUNITY NUMBER		
Common Name	***Scientific Name***	**Total**	**16**	**17**
mayapple	*Podophyllum peltatum*	1		
POPPY FAMILY	*PAPAVERACEAE*			
bloodroot	*Sanguinaria canadensis*	2		
ELM FAMILY	*ULMACEAE*			
American elm	*Ulmus americana*	1		
NETTLE FAMILY	*URTICACEAE*			
wood nettle	*Laportea canadensis*	1		
BEECH FAMILY	*FAGACEAE*			
American beech	*Fagus grandifolia*	3		
red oak	*Quercus rubra*	7	X	
BIRCH FAMILY	*BETULACEAE*			
white birch	*Betula papyrifera*	1		
ironwood	*Ostrya virginiana*	2		
GOOSEFOOT FAMILY	*CHENOPODIACEAE*			
lamb's-quarters	*Chenopodium album*	1		
PINK FAMILY	*CARYOPHYLLACEAE*			
bouncing bet	*Saponaria officinalis*	2		
white campion	*Silene latifolia*	3		
bladder campion	*Silene vulgaris*	6		
BUCKWHEAT FAMILY	*POLYGONACEAE*			
black bindweed	*Polygonum convolvulus*	1		
sheep sorrel	*Rumex acetosella*	1		
ST. JOHN'S-WORT FAMILY	*GUTTIFERAE*			
common St. John's-wort	*Hypericum perforatum*	6		
LINDEN FAMILY	*TILIACEAE*			
American basswood	*Tilia americana*	6		
WILLOW FAMILY	*SALICACEAE*			
balsam poplar	*Populus balsamifera*	5		
Lombardy poplar	*Populus nigra*	1		

		COMMUNITY NUMBER		
Common Name	***Scientific Name***	**Total**	**16**	**17**
trembling aspen	*Populus tremuloides*	5		
crack willow	*Salix fragilis*	1		
MUSTARD FAMILY	*BRASSICACEAE*			
garlic mustard	*Alliaria petiolata*	2		
field mustard	*Brassica rapa*	1		
toothwort	*Cardamine diphylla*	1		
GOOSEBERRY FAMILY	*GROSSULARIACEAE*			
prickly gooseberry	*Ribes cynosbati*	3		
smooth gooseberry	*Ribes hirtellum*	2		
ROSE FAMILY	*ROSACEAE*			
agrimony	*Agrimonia gryposepela*	1		
common strawberry	*Fragaria virginiana*	10		
yellow avens	*Geum aleppicum*	2		
rough cinquefoil	*Potentilla norvegica*	3		
black cherry	*Prunus serotina*	13		
choke cherry	*Prunus virginiana*	11		
rugosa rose	*Rosa rugosa*	1		
Alleghany blackberry	*Rubus allegheniensis*	4		
wild red raspberry	*Rubus idaeus*	14	X	X
dwarf raspberry	*Rubus pubescens*	2		
PEA FAMILY	*FABACEAE*			
alfalfa	*Medicago sativa ssp. Sativa*	2		
white sweet-clover	*Melilotus alba*	4		
low hop clover	*Trifolium agrarium*	1		
red clover	*Trifolium pratense*	1		
cow vetch	*Vicia cracca*	7		
EVENING PRIMROSE FAMIL	*ONAGRACEAE*			
dwarf enchanter's nightshade	*Circaea alpina*	2		
Canada enchanter's nightshade	*Circaea lutetiana L. ssp.canadensis*	1		

		COMMUNITY NUMBER		
Common Name	***Scientific Name***	**Total**	**16**	**17**
common evening primrose	*Oenothera biennis*	5		
DOGWOOD FAMILY	*CORNACEAE*			
alternate-leaf dogwood	*Cornus alternifolia*	3		
red-osier dogwood	*Cornus stolonifera*	2		
BUCKTHORN FAMILY	*RHAMNACEAE*			
European buckthorn	*Rhamnus cathartica*	7		
GRAPE FAMILY	*VITACEAE*			
Virginia creeper	*Parthenocissus inserta*	4		
wild grape	*Vitis riparia*	5		
MAPLE FAMILY	*ACERACEAE*			
Manitoba maple	*Acer negundo*	5	X	
red maple	*Acer rubrum*	1		
sugar maple	*Acer saccharum ssp.saccharum*	9	X	
CASHEW FAMILY	*ANACARDIACEAE*			
western poison-ivy	*Rhus rydbergii*	9		
staghorn sumac	*Rhus typhina*	5		
GERANIUM FAMILY	*GERANIACEAE*			
herb Robert	*Geranium robertianum*	3		
TOUCH-ME-NOT FAMILY	*BALSAMINACEAE*			
spotted jewelweed	*Impatiens capensis*	1		
GINSENG FAMILY	*ARALIACEAE*			
wild sarsaparilla	*Aralia nudicaulis*	5		
CARROT FAMILY	*APIACEAE*			
Queen-Anne's lace	*Daucus carota*	6		
woolly sweet cicely	*Osmorhiza claytonii*	2		
MILKWEED FAMILY	*ASCLEPIADACEAE*			
common milkweed	*Asclepias syriaca*	7		
swallow-wort	*Cynanchum rossicum*	11	X	X
NIGHTSHADE FAMILY	*SOLANACEAE*			

		COMMUNITY NUMBER		
Common Name	***Scientific Name***	**Total**	**16**	**17**
clammy ground-cherry	*Physalis heterophylla*	1		
bitter nightshade	*Solanum dulcamara*	1		
MORNING-GLORY FAMILY	*CONVOLVULACEAE*			
field bindweed	*Convolvulus arvensis*	5		
WATERLEAF FAMILY	*HYDROPHYLLACEAE*			
Virginia waterleaf	*Hydrophyllum virginianum*	1		
VERVAIN FAMILY	*VERBENACEAE*			
blue vervain	*Verbena hastata*	1		
MINT FAMILY	*LAMIACEAE*			
henbit	*Lamium amplexicaule*	1		
motherwort	*Leonurus cardiaca*	2		
wild bergamot	*Monarda fistulosa*	4		
wild basil	*Satureja vulgaris*	3		
OLIVE FAMILY	*OLEACEAE*			
white ash	*Fraxinus americana*	6		
green ash	*Fraxinus pennsylvanica var. subintege*	2		
lilac	*Syringa vulgaris*	1		
FIGWORT FAMILY	*SCROPHULARIACEAE*			
butter-and-eggs	*Linaria vulgaris*	5		
common mullein	*Verbascum thapsus*	6		
BROOM-RAPE FAMILY	*OROBANCHACEAE*			
beech-drops	*Epifagus virginiana*	1		
MADDER FAMILY	*RUBIACEAE*			
rough bedstraw	*Galium asprellum*	3		
HONEYSUCKLE FAMILY	*CAPRIFOLIACEAE*			
tartarian honeysuckle	*Lonicera tatarica*	8		
common elderberry	*Sambucus canadensis*	1		
wayfaring tree	*Viburnum lantana*	2		
high bush cranberry	*Viburnum trilobium*	3		

		COMMUNITY NUMBER		
Common Name	***Scientific Name***	**Total**	**16**	**17**
ASTER FAMILY	*ASTERACEAE*			
common yarrow	*Achillea millefolium*	1		
common ragweed	*Ambrosia artemisiifolia*	4		
tall white aster	*Aster lanceolatus ssp.lanceolatus*	7		
calico aster	*Aster lateriflorus*	1		
large-leaved aster	*Aster macrophyllus*	2		
New England aster	*Aster novae- angliae*	6		
white heath aster	*Aster pilosus var.pilosus*	1		
spotted knapweed	*Centaurea maculosa*	4		
chicory	*Cichorium intybus*	2		
spotted joe-pyeweed	*Eupatorium maculatum*	1		
mouse ear hawkweed	*Hieracium pilosella*	2		
king devil hawkweed	*Hieracium x florbundum*	1		
tall blue lettuce	*Lactuca biennis*	1		
white lettuce	*Prenanthes alba*	1		
black-eyed Susan	*Rudbeckia hirta*	7		
tall goldenrod	*Solidago altissima*	2		
Canada goldenrod	*Solidago canadensis*	1		
zig-zag goldenrod	*Solidago flexicaulis*	2		
gray-stemmed goldenrod	*Solidago nemoralis ssp. Decemflora*	2		
goldenrod species	*Solidago spp.*	2		
spiny-leaved sow thistle	*Sonchus asper*	2		
goat's-beard	*Tragopogon dubius*	6		
ARUM FAMILY	*ARACEAE*			
Jack-in-the-pulpit	*Arisaema triphyllum*	3		
SEDGE FAMILY	*CYPERACEAE*			
hop sedge	*Carex lupulina*	1		
Pennsylvania sedge	*Carex pensylvanica*	1		
plantain-leaved sedge	*Carex plantaginea*	1		

			COMMUNITY NUMBER	
Common Name	***Scientific Name***	**Total**	**16**	**17**
GRASS FAMILY	*POACEAE*			
poverty grass	*Aristida dichotoma*	1		
awnless brome grass	*Bromus inermis ssp.inermis*	6		
green foxtail	*Setaria viridis*	1		
CATTAIL FAMILY	*TYPHACEAE*			
common cattail	*Typha latifolia*	1		
LILY FAMILY	*LILIACEAE*			
bluebead lily	*Clintonia borealis*	2		
lily-of-the-valley	*Convallaria majalis L.*	2		
Canada mayflower	*Maianthemum canadense*	4		
hairy Solomon's seal	*Polygonatum pubescens*	3		
false Solomon's seal	*Smilacina racemosa*	3		
star-flowered Solomon's seal	*Smilacina stellata*	2		
rose-twisted stalk	*Streptopus roseus*	1		
white trillium	*Trillium grandiflorum*	3		
large-flowered bellwort	*Uvularia grandiflora*	2		
CATBRIER FAMILY	*SMILACACEAE*			
carrionflower	*Smilax herbacea*	3		
bristly greenbrier	*Smilax hispida*	2		
ORCHID FAMILY	*ORCHIDACEAE*			
helleborine	*Epipactis helleborine*	2		
Total Number of Plant Species	138		8	5

Number of Plant Species Per Community

APPENDIX D

BIRD SPECIES LIST

APPENDIX D Project Bird Status Report

Bird species observed by NEA are listed in the order followed the American Ornithologists' Union (AOU) Check-list of North American birds (7th edition, 1999, 47th Supplement). Common and scientific nomenclature are based on those used by AOU. Any significant status for a species on national and provincial lists is displayed as well as those from relevant regional lists.

List Status :

END - endangered	A wildlife species facing imminent extirpation or extinction.
END-R -endangered regulated	A wildlife species facing imminent extirpation or extinction in Ontario which has been regulated under Ontario's Endangered Species Act (ESA).
THR - threatened	A wildlife species likely to become endangered if limiting factors are not reversed.
SC - special concern	A wildlife species that may become threatened or an endangered species because of a combination of biological characteristics and identified threats.
YES - Area Sensitive	A wildlife species that requires large areas of suitable habitat in order to sustain their population numbers.

*** Other status levels are not displayed**

List Sources:

COSEWIC	The Committee on the Status of Endangered Wildlife in Canada, April 2010.
COSSARO	The Committee on the Status of Species at Risk in Ontario, September 2009.
SARA	Species At Risk Act, Schedule 1, Government of Canada, 2009.
Area Sensitive	Significant Wildlife Technical Guide, Appendix C, OMNR, Oct. 2000
Region 6	Northern Ontario Wetland Evaluation Appendix 11B, February 2000

Breeding Status: (Observed By NEA)

B -species observed in breeding season in suitable habitat with some evidence of breeding (confirmed, probable or possible as per Ontario Breeding Bird Atlas, 2002).

F -species observed in breeding season but no evidence of breeding or suitable nest sites available on the study site (includes flyovers, migrants and foraging colonial breeders).

M -species observed outside of breeding season for that species and in area outside of the known breeding range for that species.

			STATUS LISTS						
Common Name	**Scientific Name**	**Observed Breeding Status**	**COSEWIC**	**COSSARO**	**SARA**	**Area Sensitive**	**Region 6**		
Ruffed Grouse	*Bonasa umbellus*	B				No			
Turkey Vulture	*Cathartes aura*	B				No			
Red-tailed Hawk	*Buteo jamaicensis*	B				No			
Killdeer	*Charadrius vociferus*	B				No			
American Woodcock	*Scolopax minor*	B				No			
Downy Woodpecker	*Picoides pubescens*	B				No			
Northern Flicker	*Colaptes auratus*	B				No			
Pileated Woodpecker	*Dryocopus pileatus*	B				Yes			
Eastern Kingbird	*Tyrannus tyrannus*	B				No			
Warbling Vireo	*Vireo gilvus*	B				No			
Red-eyed Vireo	*Vireo olivaceus*	B				No			
Blue Jay	*Cyanocitta cristata*	B				No			
American Crow	*Corvus brachyrhynchos*	B				No			
Tree Swallow	*Tachycineta bicolor*	B				No			
Barn Swallow	*Hirundo rustica*	B	SC			No			
Black-capped Chickadee	*Poecile atricapillus*	B				No			
Red-breasted Nuthatch	*Sitta canadensis*	B				Yes			
House Wren	*Troglodytes aedon*	B				No			

			STATUS LISTS						
Common Name	**Scientific Name**	**Observed Breeding Status**	**COSEWIC**	**COSSARO**	**SARA**	**Area Sensitive**	**Region 6**		
American Robin	*Turdus migratorius*	B				No			
European Starling	*Sturnus vulgaris*	B				No			
Cedar Waxwing	*Bombycilla cedrorum*	B				No			
Black-throated Green Warbler	*Dendroica virens*	B				Yes			
Pine Warbler	*Dendroica pinus*	B				Yes			
Mourning Warbler	*Opororonis philadelphia*	B				No			
Chipping Sparrow	*Spizella passerina*	B				No			
Savannah Sparrow	*Passerculus sandwichensis*	B				Yes			
Song Sparrow	*Melospiza melodia*	B				No			
Indigo Bunting	*Passerina cyanea*	B				No			
Red-winged Blackbird	*Agelaius phoeniceus*	B				No			
Eastern Meadowlark	*Sturnella magna*	B	SC			No			
Common Grackle	*Quiscalus quiscula*	B				No			
Brown-headed Cowbird	*Molothrus ater*	B				No			
American Goldfinch	*Carduelis tristis*	B				No			
NO. of SPECIES: 33	**BREEDING SPECIES:**	33	2	0	0	5	0	0	0

BIRD SPECIES WITH SIGNIFICANT STATUS

APPENDIX E

MAMMAL SPECIES LIST

APPENDIX E Project Mammal Status Report

Mammal species observed by NEA are listed in taxanomic order. Common and scientific nomenclature are based on those used by COSEWIC (2010). Any significant status for a species on national and provincial lists is displayed.

List Status :	**END - endangered**	A wildlife species facing imminent extirpation or extinction.
	END-R -endangered regulated	A wildlife species facing imminent extirpation or extinction in Ontario which has been regulated under Ontario's Endangered Species Act (ESA).
	THR - threatened	A wildlife species likely to become endangered if limiting factors are not reversed.
	SC - special concern	A wildlife species that may become threatened or an endangered species because of a combination of biological characteristics and identified threats.
	YES - Area Sensitive	A wildlife species that requires large areas of suitable habitat in order to sustain their population numbers.

*** Other status levels are not displayed**

List Sources:	**COSEWIC**	The Committee on the Status of Endangered Wildlife in Canada, May 2011.
	COSSARO	The Committee on the Status of Species at Risk in Ontario, June 2011.
	SARA	Species At Risk Act, Schedule 1, Government of Canada, 2009.
	Area Sensitive	Significant Wildlife Technical Guide, Appendix C, OMNR, Oct. 2000

Common Name	Scientific Name	Observation Type	COSEWIC	COSSARO	SARA	Area Sensitive
Common Porcupine	*Erethizon dorsatum*					No
Eastern Chipmunk	*Tamias striatus*					No
Eastern Gray Squirrel (Gray Phase)	*Sciurus carolinensis*					No
Red Squirrel	*Tamiasciurus hudsonicus*					No
White-tailed Deer	*Odocoileus virginianus*					No
Woodchuck / Groundhog	*Marmota monax*					No
SPECIES TOTAL: 6			0	0	0	0
			SPECIES WITH SIGNIFICANT STATUS			

APPENDIX F

HERP SPECIES LIST

APPENDIX F Project Reptile and Amphibian Status Report

Amphibian and reptile species observed by NEA are listed in taxanomic order and grouped in their respective classes. Common and scientific nomenclature are based on those used by Ontario Herpetofaunal Summary Atlas (OHS). Any significant status for a species on national and provincial lists is displayed.

List Status :	**END - endangered**	A wildlife species facing imminent extirpation or extinction.
	END-R -endangered regulated	A wildlife species facing imminent extirpation or extinction in Ontario which has been regulated under Ontario's Endangered Species Act (ESA).
	THR - threatened	A wildlife species likely to become endangered if limiting factors are not reversed.
	SC - special concern	A wildlife species that may become threatened or an endangered species because of a combination of biological characteristics and identified threats.
	YES - Area Sensitive	A wildlife species that requires large areas of suitable habitat in order to sustain their population numbers.

*** Other status levels are not displayed**

List Sources:	**COSEWIC**	The Committee on the Status of Endangered Wildlife in Canada, May 2011.
	COSSARO	The Committee on the Status of Species at Risk in Ontario, June 2011.
	SARA	Species At Risk Act, Schedule 1, Government of Canada, 2009.
	Area Sensitive	Significant Wildlife Technical Guide, Appendix C, OMNR, Oct. 2000

Common Name	Scientific Name	Observation Type	COSEWIC	COSSARO	SARA	Area Sensitive
Amphibian						
Western Chorus Frog	*Pseudacris triseriata*		THR		THR	No
Spring Peeper	*Pseudacris crucifer*					No
Gray Treefrog	*Hyla versicolor*					No
NO. of SPECIES: 3			1	0	1	0
			SPECIES WITH SIGNIFICANT STATUS			

Penn Energy- Roseplain
SOLAR ENERGY FACILITY

in the
Town of Uxbridge
Regional Municipality of Durham
FIT Application No. FIT-F7TMB91
FIT Contract No. F-001557- SPV-130-505

Natural Heritage Assessment
Evaluation of Significance

Prepared for: Penn Energy Renewables Ltd.
620 Righters Ferry Road, Bala Cynwyd, PA 19004

Submitted by: Niblett Environmental Associates Inc.
PN 10-066

October 2012

Niblett Environmental Associates Inc.
Biological Consultants

October 3, 2012 PN 10-066

Penn Energy Trust
620 Righters Ferry Road
Bala Cynwyd, PA 19004

Attention : Mr. Glen Tomkinson

RE: **Penn Energy- Roseplain**
SOLAR ENERGY FACILITY
in the Town of Uxbridge, Regional Municipality of Durham
FIT Application No. FIT-F7TMB91
FIT Contract No. F-001557- SPV-130-505

Natural Heritage Assessment
Evaluation of Significance

Dear Mr. Tomkinson:

We are pleased to submit the Evaluation of Significance Report for the proposed Roseplain solar energy facility as part of the Natural Heritage Assessment for this project.

The report follows the outline provided in the MNR Natural Heritage Assessment Manual.

If there are any comments or questions on the content please contact us.

Yours very truly,

Chris Ellingwood
President and Sr. Terrestrial and Wetland Biologist

55 Mary Street West, Suite 112, Lindsay, Ontario K9V 5Z6 Tel: (705) 878-9399 Fax: (705) 878-9390
Email: mail@niblett.ca Website: www.niblett.ca

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1.0 Introduction

The evaluation of significance is the third step of the Natural Heritage Assessment (NHA) as required under Part IV, Section 27 of O.Reg 359/09. The purpose of the evaluation of significance is to confirm the significance of natural features on or within 120 meters of the project location that has not been previously evaluated (Figure 1). Natural features are evaluated using criteria or procedures that have been established or accepted by the MNR. The evaluation of significance makes use of all available information and includes information obtained from the records review and site investigation.

Natural features to be evaluated include two woodlands (WO03 & WOO4/WO05) and candidate significant wildlife habitat that are located on and adjacent to the property (Figure 2). Generalized Significant Wildlife Habitat was also identified, however, such habitat will be treated as significant and will therefore be discussed within the Environmental Impact Study.

Two wetland features (WE01 and WE02) were identified through the site investigation. These wetlands were small in size (< 0.5 ha) and were considered to be significant an are required to be evaluated. As these two wetlands are located outside of the project location but within 120m of it, Appendix C of the NHAG has been applied. The Wetland Characteristics and Ecological Functions Assessment table for these two wetlands is included within Table 4. The two wetlands will be carried forward to the Environmental Impact Study (2011).

No natural features were identified through the records review that had not already been evaluated. The woodlands on site were identified as Oak Ridges Moraine (ORM) woodland in the Lake Simcoe Region Conservation Authority mapping. The boundaries were confirmed during field inventories.

The candidate significant wildlife habitats and generalized significant wildlife habitat were not revealed through the records review but was observed during the site investigation on and adjacent to the property.

2.0 Methodology

2.1 Significant Woodland

The Oak Ridges Moraine Conservation Plan (ORMCP)-Technical Paper Series provides guidance in the identification, delineation and protection of significant woodlands, as described in the ORMCP. Significant woodlands are one of eight categories of key natural heritage features that are protected from development or site alteration.

Significant woodlands shall mean woodland that has either:

a) A tree crown cover of over 60% of the ground, determinable from aerial photography; or

b) a tree crown cover of over 10% of the ground, determinable from aerial photography, together with on-ground stem estimates of:

- 1, 000 trees of any size per hectare, or
- 750 trees measuring over 5 cm in diameter, per hectare, or
- 500 trees measuring over 12 cm in diameter, per hectare, or
- 250 trees measuring over 20 cm in diameter, per hectare.

The project location is situated inside the Countryside Area of the ORMCP. The Countryside Area further adds the requirement that significant woodlands must be at least 4 hectares in contiguous area Two woodlands would not be considered contiguous if there is an opening more than 20 meters wide that bisects them.

2.2 Significant Wildlife Habitat (SWH)

The Significant Wildlife Habitat Technical Guide (2000) is the source for the identification and evaluation of significant wildlife habitat. Additionally, Appendix D in the NHAG, The Process for Identifying and Addressing Significant Wildlife Habitat was consulted and all candidate significant wildlife habitat required to be identified within 120 meters of the project for a solar panel facility was examined. The Draft SWH Ecoregion 6E Criterion Schedule (OMNR 2011b) was also consulted to confirm the significance of wildlife habitat based on the presence of wildlife species, ELC ecosite codes and habitat criteria.

When evaluating the significance of candidate SWH the status, location and nature of the candidate SWH must be confirmed through detailed mapping and investigation of the vegetation cover, population of wildlife species and disruptions that may affect species within the habitat.

There were five candidate SWH identified on the property, amphibian woodland breeding (SWH02), Habitat for Species of Conservation Concern Marsh Breeding Bird Habitat (SWH03), Raptor Wintering Area (SWH04), Special Concern and Rare Wildlife Species (monarch butterfly) (SWH06) and Special Concern and Rare Wildlife species (western chorus frog) (SWH07).

2.2.1 Amphibian Woodland Breeding (SWH02)

Woodland habitats that support amphibian biodiversity are very important within a landscape as they are often the only breeding habitat for local amphibian populations. A summary of the criteria used to assess and confirm SWH is provided in Table 2. Field investigations in the spring, when species are breeding are required to confirm breeding populations.

Spring amphibian surveys were conducted using the methodologies of the Marsh Monitoring Program (BSC, 2008). Three stations were surveyed on the property and along Concession Road 4. Incidental observations were completed during all other field visits to the property (refer to Appendix B in the site investigation report for field notes).

2.2.2 Species of Conservation Concern: Marsh Bird Breeding Habitat (SWH03)

Marsh bird breeding habitat supporting species of Conservation Concern is important within the landscape because local populations depend on these areas for their survival. A summary of the criteria used to assess and confirm SWH is provided in Table 2. Field surveys conducted in May/June are required when the birds are actively nesting to confirm breeding populations.

Breeding Bird Marsh Monitoring Protocol was used (BSC, 2008). Six (6) stations were set up in and around the property. Incidental observations were completed during all other field visits to the property (refer to Appendix B and D in the site investigation report for field notes and bird lists).

2.2.3 Raptor Wintering Area (SWH04)

Raptor wintering area is important within the landscape because local populations depend on these areas for survival. A summary or the criteria used to assess and confirm SWH is provided in Table 2. The significance of raptor wintering area within the study area is outlined in Table 3.

Specific winter surveys were not conducted during the site investigation stage. Diurnal raptors were included as part of the breeding bird surveys. . Incidental observations were completed during all other field visits to the property (Refer to Appendix B and D in the site investigation report for field notes and bird lists). Raptor wintering areas is considered a candidate significant wildlife habitat feature. To assess the significance of this SWH feature, NEA will undertake winter surveys as per NHAG guidelines in January 2013 as part of the pre-construction surveys. Until confirmed otherwise by such surveys, the feature will be considered significant and has been carried forward to the EIS.

2.2.4 Special Concern and Rare Wildlife Species (SWH06)

Habitat for Special Concern and rare wildlife species is important as even small areas of habitat may support local populations. A summary of the criteria used to assess and confirm SWH is provided in Table 2.

Vegetation surveys were completed to identify suitable habitat for the monarch butterfly. Areas with open fields or meadows containing milkweed were targeted during the surveys. Observations were conducted for monarchs and what areas they were spending the most time in. Surveys were conducted between spring and fall.

2.2.5 Special Concern and rare Wildlife Species (SWH07)

Habitat for Special concern and rare wildlife species is important as even small areas of habitat may support local populations. A summary of the criteria used to assess and confirm SWH is provided in Table 2.

Spring amphibian surveys were conducted using the methodologies of the Marsh Monitoring Program (BSC, 2008). Three stations were surveyed on the property and along Concession Road 4. Incidental observations were completed during all other field visits to the property (refer to Appendix B in the site investigation report for field notes).

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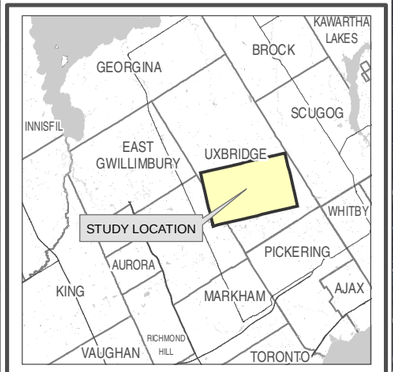

NEA NIBLETT ENVIRONMENTAL ASSOCIATES INC.

FIGURE 1: LOCATION OF PROJECT & STUDY AREA

17N 644942 4880339
Revision 3
10-066
REGION OF DURHAM
AURORA DISTRICT

1 centimeter = 360 meters

Meters
0 500 1,000 2,000

LEGEND

Railroad*

Road Classes
- Local
- Arterial
- Collector
- Expressway / Highway
- Freeway

Hydrology*
- Shoreline
- Watercourse
- Waterbody

Municipal
- Lot Parcel

Project Specific
- Project Location
- Study Area

Information
* Obtained under Base Data

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GIS/Mapping Phone: 705.878.9399 x207
www.niblett.ca

NAD 83 UTM ZONE 17N

1:16,000

Pefferlaw-Uxbridge Headwaters ANSI

Uxbridge Brook Headwaters Wetland Complex

PEFFERLAW-HEADWA

Upper Pefferlaw Brook Wetland Complex #2

Pefferlaw-Uxbridge Headwaters ANSI

POSSIBLE WILDLIFE CORRIDOR

Upper Pefferlaw Brook Wetland Complex #2

MORAINE

OAK RIDGES

31m (CUP3-1)

34m (CUP3-1)

30m (FOD3-1)

30m (FOD5-2)

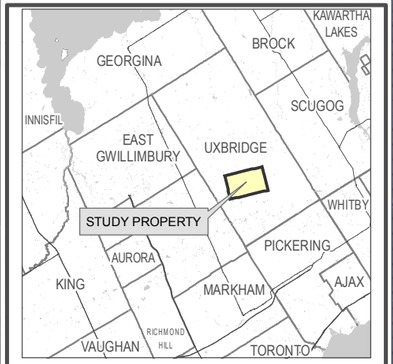
31m (FOD1-1)

120m Project Zone

30m (FOD5-2)

45m (MAS2-1)

33m (MAS2-9)



NEA NIBLETT ENVIRONMENTAL ASSOCIATES INC.

FIGURE 2: PROJECT LOCATION & NATURAL FEATURES

17N 644942 4880339

Revision 6

10-066

REGION OF DURHAM

AURORA DISTRICT

1 centimeter = 160 meters

Meters

0 225 450 900

LEGEND

Road Classes
- Local
- Arterial
- Collector
- Expressway / Highway
- Freeway

Municipal
- Lot Parcel
- Owner Parcel

Community Types
- Wooded Area
- Wetland Pocket
- Wetland, PSW
- Wetland, Other
- ANSI
- ESA
- Potential Wildlife Corridor

Project Specific
- Project Location
- 120m Project Area
- Study Area

Natural Features within 120m of Project Location

Wetland	Wetland Area WE01, WE02 (within project location and 120m zone)
Woodlot	Wooded Area WO06- (21.54m)
Woodlot	Wooded Area (within project location and 120m project zone)
ESA	Within project location and 120m project zone.
Corridor	Potentially within project location and 120m project zone.
ORM	Within project location and 120m project zone.

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642250 642500 642750 643000 643250 643500 643750 644000 644250 644500 644750 645000 645250 645500 645750 646000 646250 646500 646750 647000 647250 647500 647750 648000 648250 648500

4882250 4882000 4881750 4881500 4881250 4881000 4880750 4880500 4880250 4880000 4879750 4879500 4879250 4879000 4878750 4878500

NAD 83 UTM ZONE 17N

Table 1: Summary of Evaluation of Significance Methods

Feature Type/ID	Minimum Distance From Feature Project Location	Evaluation of Significance Criteria & Procedures Used	Dates, Times & Duration of Evaluation	Names & Qualifications of Evaluators
Woodland-WO03	30 m	ORMCP Technical Paper Series 7: Identification and Protection of Significant Woodlands Field inventory: ELC	July 22nd, 2010; 15:30-17:30 pm (2 hrs) 22 C, NW -1 wind, p. cloudy September 9th, 2011; 10:45-13:00 (2 hrs and 15 min)	Kelly Cordick Chris Ellingwood & Ali Giroux
Woodland-WO05	30 m	ORMCP Technical Paper Series 7: Identification and Protection of Significant Woodlands Field inventory: ELC	July 22nd, 2010; 15:30-17:30 pm (2 hrs) 22 C, NW -1 wind, p. cloudy September 9th, 2011; 10:45-13:00 (2 hrs and 15 min)	Kelly Cordick Chris Ellingwood & Ali Giroux
Candidate significant wildlife habitat-SWH02(Amphibian woodland breeding)	30 m	Criterion schedule: See Table 2 Field inventory: Spring amphibian breeding surveys and incidental observations	April 14, 2011; 20:00-21:00 (1 hrs); 100% cloud cover; Beaufort wind scale = 1-2 July 22nd, 2010; 15:30-17:30 pm (2 hrs)22 C, NW -1 wind, p. cloudy	Katherine Ryan & Ali Giroux Kelly Cordick
Candidate significant wildlife habitat-SWH03 (Marsh Bird Breeding)	33m	Criterion schedule: See Table 2. Field inventory: Spring breeding bird surveys and incidental observations	June 25th, 2010; 6:50-7:50 (1 hr); 80% cloud cover;Beaufort wind scale = 1 June 10 2011 Sunny, 21 C, wind 0;	Chris Ellingwood

Candidate significant wildlife habitat- SWH04 (Raptor wintering area)	0m	Criterion schedule: See Table 2. Field inventory: Breeding bird surveys and incidental observations	-no winter surveys -summer diurnal surveys June 25th, 2010; 6:50-7:50 (1 hr); 80% cloud cover; Beaufort wind scale = 1	Chris Ellingwood Chris Ellingwood
Candidate significant wildlife habitat- SWH06 (Special Concern and rare wildlife species) Candidate significant wildlife habitat-SWH07 (Special Concern and rare wildlife species)	0m 30m	Criterion schedule: See Table 2. Field inventory: ELC, incidental observations Field inventory: Spring amphibian breeding surveys and incidental observations	June 25th, 2010; 6:50-7:50 (1 hr); 80% cloud cover; Beaufort wind scale = 1 July 22nd, 2010; 15:30-17:30 pm (2 hrs) 22 C, NW -1 wind, p. cloudy June 10 2011 Sunny, 21 C, wind 0; September 9th, 2011; 10:45-13:00 (2 hrs and 15 min) April 14, 2011; 20:00-21:00 (1 hrs); 100% cloud cover; Beaufort wind scale = 1-2 July 22nd, 2010; 15:30-17:30 pm (2 hrs)22 C, NW -1 wind, p. cloudy	Chris Ellingwood Kelly Cordick Chris Ellingwood, Ali Giroux Chris Ellingwood Katherine Ryan & Ali Giroux Kelly Cordick

Table 2: Criterion schedule for SWH in Eco-region 6E for Amphibian Breeding Habitat (woodland), Habitat for Species of Conservation Concern; Marsh Bird Breeding Habitat and Raptor Wintering Area

Specialized wildlife habitat	Wildlife Species	Candidate SWH		Confirmed SWH
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria
Amphibian breeding habitat (woodland)	• Eastern Newt • Blue-spotted salamander • Spotted Salamander • Gray Treefrog • Spring Peeper • Wood Frog • Western Chorus Frog	All Ecosites associated with these ELC community series; FOC FOM FOD SWC SWM SWD Breeding pools within the woodland or the shortest distance from forest habitat are more significant because they are more likely to be used due to reduced risk to migrating amphibians	• Presence of a wetland, lake, or pond within or adjacent (within 120m) to a woodland (no minimum size). Some small wetlands may not be mapped and may be important breeding pools for amphibians. • Woodlands with permanent ponds or those containing water in most years until mid-July are more likely to be used as breeding habitat cxlviii <u>Information Sources</u> • Ontario Herpetofaunal Summary Atlas (or other similar atlases) for records • Local landowners may also provide assistance as they may hear spring-time choruses of amphibians on their property. • Local OMNR Ecologist • OMNR wetland evaluations • Local field naturalist clubs • Canadian Wildlife Service	Studies confirm; • Presence of breeding population of 1 or more of the listed species with at least 20 individuals (adults, juveniles, eggs/larval masses) • An observational study to determine breeding/larval stages will be required during the spring (Apr-June) when amphibians are concentrated around suitable breeding habitat within or near the woodland. • The habitat is the woodland (ELC polygons) and wetland (ELC polygons) combined. A travel corridor connecting the woodland and wetland polygons is to be included within the habitat. SWHDSS Index #14 provides development effects and mitigation measures.

			Amphibian Road Call Survey Ontario Vernal Pool Association: http://www.ontariovernalpools.org	
Habitat for Species of Conservation Concern; Marsh Bird Breeding Habitat	• American Bittern • Virginia Rail • Sora • Common Moorhen • American Coot • Pied-billed Grebe • Marsh Wren • Sedge Wren • Common Loon • Sandhill Crane • Green Heron • Trumpeter Swan • **Special Concern:** • Black Tern • Yellow Rail	MAM1 MAM2 MAM3 MAM4 MAM5 MAM6 SAS1 SAM1 SAF1 FEO1 BOO1 For Green Heron: All SW, MA and CUM1 sites.	• Nesting occurs in wetlands. • All wetlands habitat is to be considered as long as there is shallow water with emergent aquatic vegetation present • For Green Heron, habitat is at the edge of water such as sluggish streams, ponds and marshes sheltered by shrubs and trees. Less frequently, it may be found in upland shrubs or forest a considerable distance from water. Information Sources: • Contact OMNR, wetland evaluations are a good source of information • Local naturalist clubs • NHIC Records. • Reports and other information available from CAS • Ontario Breeding Bird Atlas	Studies Confirm: • Presence of 5 or more nesting pairs of Sedge Wren or Marsh Wren or 1 pair of Sandhill Cranes; or breeding by any combination of 5 or more of the listed species • Note: any wetland with breeding of 1 or more Black Terns, Trumpeter Swan, Green Heron or Yellow Rail is SWH • Area of the ELC ecosite is the SWH • Breeding surveys should be done in May/June when these species are actively nesting in wetland habitats • Evaluation methods to follow “Bird and Bird Habitats: Guidelines for Wind Power Projects • SWHDSS Index #35 provides development effects and mitigation measures

Specialized wildlife habitat	Wildlife Species	Candidate SWH		Confirmed SWH
		ELC Ecosite Codes	Habitat Criteria and Information Sources	Defining Criteria
Special Concern and Rare Wildlife Species	All Special Concern and Provincially Rare (S1-S3, SH) plant and animal species. Lists of these species are tracked by the Natural Heritage Information Centre.	All plant and animal element occurrences within a 1 or 10km grid. Older element occurrences were recorded prior to GPS being available therefore location information may lack accuracy	• When an element occurrence is identified within a 1km or 10km grid for a Special Concern or provincially Rare species; linking candidate habitat on the site needs to be completed to ELC Ecosites Information Sources: • Natural Heritage Information Centre will have the Special Concern and Provincially Rare (S1-S3, SH) species lists and element occurrences for these species. • NHIC Website: Biodiversity Explorer https://www.biodiversityexplorer.mrn.gov.on.ca/nhicWEB/mainSubmit.do Ontario Breeding Bird Atlas • Expert advice should be sought as many of the rare spp. Have little information available about their requirements.	• Studies confirm: Assessment/inventory of the site for the identified special concern or rare species needs to be completed during the time of year when the species is present or easily identifiable. Habitat form and function needs to be assessed from the assessment of vegetation types and an area of significant habitat that protects the rare or special concern species identified. • The area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. • SWHDSS Index #37 provides development effects and mitigation measures.

Raptor Wintering Area	• Rough-legged Hawk • Red-tailed Hawk • Northern Harrier • American Kestrel • Snowy Owl • **Special Concern:** • Short-eared Owl	Combination of ELC Community Series; need to have present one Community Series from each land class; Forest; FOD. FOM, FOC. Upland: CUM, CUT, CUS, CUW	• The Habitat provides a combination of fields and woodlands that provide roosting, foraging and resting habitats for wintering raptors • Raptor wintering sites need to be > 20 ha with a combination of forest and upland • Least disturbed sites, idle/fallow, or lightly grazed field/meadow with adjacent woodlands • Information Sources: • OMNR Ecologist or Biologist may be aware of locations of wintering raptors. In addition , these staff may know local naturalists that may be aware of the locations of raptor wintering habitats • NHIC Raptor Winter Concentration Area • Data from Bird Studies Canada, Most notably for Short-eared Owls • Reports and other information available from CAs	Studies confirm the use of these habitats by: One or more Short-eared Owls or; At least 10 individuals and two listed spp. To be significant a site must be used regularly (3 in 5 years) for a minimum of 20 days by the above number of birds Evaluation methods to follow "Bird and Bird Habitats: Guidelines for Wind Power Projects SWHDSS Index #10 provides development effects and mitigation measures

3.0 Results

3.1 Woodlands

The woodland (WO03) on and adjacent to the property has been identified by the LSRCA as an ORM woodland and meets the ORMCP criteria for a woodland described in Section 2.1 above. WO03 is a total of 16.9 acres and had approximately 70% canopy cover. The woodland consisted of three vegetation communities: Red Pine plantation, Red Oak and Poplar forest. A high diversity of native tree species were present, however ground vegetation was not as diverse. Swallow-wort (or dog-strangling vine) is a highly invasive plant species that is found on the edges of the pine plantation, which could threaten the diversity of the woodlot if it spreads. A number of bird species were heard within WO03, including many area-sensitive species. Although not a candidate for significant wildlife habitat, it provides valuable habitat within the landscape.

Three regionally rare plant species were also recorded (white heath aster, tall blue lettuce and red pine). Though the majority of WO03 is plantation it does not meet the exceptions outlined in the technical paper series because it is not currently being managed. WO03 is a significant feature. The project location will be within the 120 m setback for significant woodlands and an EIS will be required to determine an appropriate setback.

Woodland WO04, WO05 and connecting hedgerows located on and adjacent to the property have also been identified by the LSRCA as ORM woodland and meets the ORMCP criteria for a woodland outlined in Section 2.1 above. WO04, WO05 and hedgerows are included as one feature however are described with different names for the purpose of further discussion. The total area for this contiguous feature is 20.31 acres or 8.22 ha. Mature sugar maple and yellow birch trees were evident within the sugar maple forest (WO05) and the ground cover had a high diversity of native species, including three regionally rare species (white lettuce, plantain-leaved sedge and smooth gooseberry). The community also represents wildlife habitat for terrestrial amphibians (gray treefrog) and acts as a natural buffer to the small wetland swale in the southwest corner of the property.

WO04 had a lower diversity and was quite disturbed by logging activities by the prior landowners. The hedgerows connecting the two larger woodlot areas contained little value for wildlife movement as they were a linear feature, providing little cover. None-the-less, this feature is a confirmed significant natural feature that will be carried forward to an EIS because the woodland size is greater than 4 ha and its location is within 120m of the project location boundary. The woodlot also meets the criteria from the Oak Ridges Moraine Technical Paper Series as its tree crown cover is over 60%, contains a minimum average width of 40 meters and meets the 4 ha minimum size criteria for significant woodlots within Countryside or Settlement Areas.

3.2 Wildlife Habitat

The candidate Significant Wildlife Habitat, SWH02 for amphibian woodland breeding had met the criteria of a candidate SWH as there were indicator species present, a wetland feature within 120 meters of the woodland, and potential for ponding for a sufficient enough time to permit the hydroperiod of breeding amphibians. To be a confirmed SWH, a field study had to confirm the presence of breeding populations. Spring amphibian surveys (April 2010), July 2011) recorded two (2) of the frog species listed as indicator species. However, breeding populations for spring peepers were at a calling code of 2 with less than 20 peepers calling. Western chorus frog was found calling at a code 1 with less than 10 frogs calling. . Both species are early spring breeding species and take advantage of seasonally ponded areas in fields, low lying areas and wetlands. In this case the ponding in the small wetlands is variable and does not last past early June as observed in 2010 and 2011. As such only one MMP survey was completed. There was no water in those wetlands that would harbour any late spring breeding species (permanent pools, ponds, vernal pools or long term flooded areas. As a result, the MMP was modified to one early spring survey.

Due to the presence of western chorus frog, an S3 species the wetlands (SWH02) are confirmed as Significant Wildlife Habitat-Special Concern and Rare wildlife species. This is carried forward to the EIS.

The candidate Significant Wildlife Habitat SWH03 for marsh breeding bird habitat had met the criteria of a candidate SWH as there was marsh habitat located within the 120m buffer from the project location boundary. To be a confirmed SWH, a field study had to confirm the presence of five or more nesting pairs of sedge wren or marsh wren or one pair of sandhill cranes or breeding of any combination of five or more of the listed species. The presence of breeding black terns, trumpeter swan, green heron or yellow rails would also confirm SWH. None of the above mentioned birds were found on the subject property or within 120m of the project location boundary during our June 25, 2012 and June 10th 2011 . The habitat is poor for all of these species with no ponding, permanent water or large areas of cattails that most require.

The candidate Significant Wildlife Habitat SWH04 for Raptor Wintering Area had met the criteria of a candidate SWH as there was the required area (>20 ha) of CUM, CUT and FOD community types. To be a confirmed SWH, a field study is required to confirm the presence of one or more short-eared Owls, or at least 10 individuals and two listed species (as seen in Table 2). No short-eared Owls were observed on or within 120m from the project location boundary, in addition only one raptor species (red-tailed hawk) was observed during surveys. The candidate Significant Wildlife Habitat SWH04 needs to be confirmed through winter surveys as per the NHAG manual and raptor wintering habitat methodologies. NEA will conduct surveys in January 2013. Until this feature is confirmed through additional surveys in 2013 it is considered significant wildlife habitat and has been carried forward to the EIS.

The candidate Significant Wildlife Habitat SWH06 for Special Concern and Rare Wildlife Species had met the criteria of a candidate SWH as there was the required special concern species (Monarch and Chorus frog) located within 120 meters of the project location boundary. Habitat for this species was found on and within 120m from the project location boundary. To be a confirmed SWH, a field study had to confirm the presence of the species of special concern during the time of year when the species is present or easily identifiable. Habitat form and function needs to be assessed from the assessment of vegetation types and an area of significant habitat that protects the rare or special concern species identified. In addition the area of the habitat to the finest ELC scale that protects the habitat form and function is the SWH, this must be delineated through detailed field studies. The Special Concern species was confirmed during the seasons when this species was present. The habitat however that was most suitable to the monarch butterfly was not found within the project location boundary, but was found within 120 meters from it. One small pocket of open meadow was found within the project location between WO01 and WO03. This meadow was not ideal habitat for monarch butterflies as it contained little milkweed. The several other open meadow communities, identified through ELC, contained valuable habitat for the monarch and were highly populated with common milkweed, a plant this species is most reliant on (Figure 3).

The western chorus frog (SWH07) was found calling in community WE01 and WE02. This will be carried forward to the EIS.

Table 3 and Figure 3 provide a summary of the results of the evaluation of significance.

Table 3: Evaluation of Significance Results Summary

Feature Type/ID	Minimum Distance Between Feature and Project Location	Evaluation Results	Significant/ Provincially Significant Feature or Treated as (y/n)
Wetland – WE1	30 m	• Wetland is treated as candidate significance. Wetland is unevaluated.	Y
Wetland - WE2	30 m	• Wetland is treated as candidate significance. Wetland is unevaluated.	Y
Woodland-W003	30 m	• 70% tree cover • The woodland totals 18.75acres in size • Area sensitive bird species • Regionally rare plant species	Y
Woodland-WO04/WO05 and connecting hedgerows	30 m	• 90% tree cover • The woodland totals 20.31 acres in size • Regionally rare plant species (WO05) • High biodiversity of native plants (WO05) • Mature trees • Highly disturbed from logging activities (WO04)	Y
Candidate SWH-SWH02 (Woodland Amphibian Breeding)	30 m	The woodland meets the habitat criteria listed in Table 2. i.e. Presence of a wetland within 120 m and permanent ponds that provide breeding habitat. Spring amphibian surveys confirmed the presence of spring peepers and western chorus frogs. Calling codes were recorded at code 1 or 2 and it is believed that each population has fewer than 20 individuals.	N

Candidate SWH-SWH03 Habitat for species of Conservation Concern: Marsh Breeding Bird Habitat	33 m	The wetland meets the habitat criteria listed in Table 2 above Ex. Presence of a marsh with shallow water with emergent aquatic vegetation. No marsh birds were recorded on the property or within 120m of the project location boundary	N
Candidate SWH-SWH06 Special Concern and Rare Wildlife Species	>0.1 m	Detailed field studies identified the CUM1-1 communities which were suitable habitat for the monarch. The presence of field communities containing milkweed was confirmed. The presence of the monarch butterfly was confirmed in the field.	Y-however only select CUM communities based on the presence of milkweed
Candidate SWH-SWH04 Raptor Wintering Area	0 m	The study area meets the habitat criteria listed in Table 2 above Ex. A combination of CUM, CUT and FOD that exceeds 20ha. No short-eared owls were recorded on the property or within 120m of the project location boundary, in addition only one raptor species, 1 individual (red-tailed hawk) was recorded within the study area boundaries . No field habitat is present within the project location an low rodent populations as it is planted in soya or corn annually. Until additional surveys are completed, the feature will be considered significant wildlife habitat and carried forward to the EIS.	Y
Special Concern and Rare Wildlife Species – Western Chorus Frog (SWH07)	30 m	The wetlands (SWH02) meet the criteria of significant wildlife habitat due to the presence of western chorus frogs.	Y
Bat Maternity Colonies (SWH05)	0 m	Two FOD communities (WO01 and WO04) fall within the project location. NEA completed thorough investigations through woodlot 1 and woodlot 4 and confirmed that no snag/cavity trees greater than or equal to 25cm were identified in the two areas.	Y – treated as Generalized Candidate Significant Wildlife Habitat

		All FOD communities fall within the 120m setback and will be treated as Generalized Candidate Significant Wildlife Habitat.	

1:5,000

644400 644500 644600 644700 644800 644900 645000 645100 645200 645300 645400 645500 645600 645700 645800 645900 646000 646100 646200 646300

4880900 4880800 4880700 4880600 4880500 4880400 4880300 4880200 4880100 4880000 4879900 4879800

LOT 23 CON 3

LOT 22 CON 3

LOT 21 CON 3

WO06
CUP3-1
5.01 acres

WO03
CUP3-1
14.41 acres

SWH04
CUM1-1
20.91 acres

SWH04
WO03
FOD1-1
0.21 acres

SWH01/SWH04/SWH06
CUM1-1
1.43 acres

SWH04
CUM1-1
4.60 acres

BUILT-UP AREA

SWH01/SWH04/SWH06
CUM1-1
1.53 acres

SWH04
WO01
FOD3-1
1.19 acres

SWH01/SWH04/SWH06
CUM1-1
0.95 acres

SWH04/SWH05
WO03
FOD3-1
2.78 acres

SWH01
AGRICULTURAL

BUILT-UP AREA

CONCESSION RD 4

SWH04
CUM1-1
1.64 acres

AGRICULTURAL
12.29 acres

120m

20.91 acres

CUM1-1

SWH04

CUT1-1
0.21 acres

SWH04
CUT1-1
2.35 acres

SWH04
WO04
FOD5-1
2.70 acres

SWH01
AGRICULTURAL
9.35 acres

SWH01
AGRICULTURAL
14.58 acres

SWH01
AGRICULTURAL
51.61 acres

CUT1-1
0.72 acres

SWH04
CUM1-1
6.12 acres

SWH04/SWH05
WO05
FOD5-3
7.06 acres

HEDGEROW
0.52 acres

HEDGEROW
0.22 acres

SWH01
AGRICULTURAL

SWH10 1/SWH04
CUM1-1
0.10 acres

WO07
CUP3-1
1.62 acres

AGRICULTURAL
12.11 acres

WO08
CUP3-1
2.04 acres

SWH04/SWH06
CUM1-1
1.15 acres

WO05
SWH02/SWH05

FOD5-3
7.82 acres

WO05
SWH02/SWH05
FOD5-3

AGRICULTURAL
8.21 acres

AGRI
4.80 acres

AGRI
3.87 acres

SWH04
CUM1-1
5.14 acres

SWH04
CUM1-1
0.73 acres

SWH03/SWH07

SWH03/SWH07
WE02
MAS2-9
0.20 acres

WE01
MAS2-9
0.36 acres

HEDGEROW
0.27 acres

SWH04
CUM1-1
0.86 acres

HEDGEROW
0.10 acres

WAGG RD

WAGG RD

120m

120m

120m

644400 644500 644600 644700 644800 644900 645000 645100 645200 645300 645400 645500 645600 645700 645800 645900 646000 646100 646200 646300

NAD 83 UTM ZONE 17N

NEA NIBLETT ENVIRONMENTAL ASSOCIATES INC.

FIGURE 3: SIGNIFICANT COMMUNITIES & SIGNIFICANT WILDLIFE HABITAT

17N 644942 4880339
Revision 6
10-066
REGION OF DURHAM
AURORA DISTRICT

N
W E
S

1 centimeter = 50 meters

Meters
0 70 140 280

LEGEND

Plan
- Proposed Solar Array
- Proposed Road

Road Classes
- Local
- Arterial
- Collector
- Expressway / Highway
- Freeway

Community Types
- Vegetation Community
- Significant Community

Project Specific
- Study Property
- 120m Project Area

Municipal
- Lot Parcel
- Owner Parcel

Significant Community Type Descriptions

WE01	(MAS2-9)	Forb Mineral Shallow Marsh Type
WE02	(MAS2-1)	Cattail Mineral Shallow Marsh Type
WO03	(FOD1-1)	Dry-Fresh Red Oak Deciduous Forest Type
	(FOD3-1)	Dry-Fresh Poplar Deciduous Forest Type
	(CUP3-1)	Red pine Coniferous Plantation Type
WO04	(FOD5-1)	Dry-Fresh Sugar Maple Deciduous Forest Type
WO05	(FOD5-3)	Dry-Fresh Sugar Maple-Oak Deciduous Forest Type

Total amount of Significant Communities is 39.52 acres.

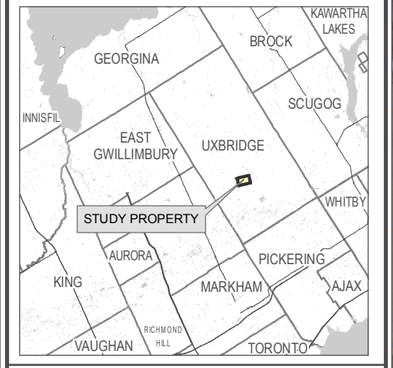

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Table 4: Wetland Characteristics and Ecological Function Assessment

ID	Size (ha)	Biological						Hydrological				Special Features		
		Wetland Type	Site Type	Vegetation Communities	Proximity to Other Wetlands	Interspersion (# of intersections and description of "edges" of communities)	Open Water Types	Flood Attenuation (Total)	Water Quality Improvement (Total)	Shoreline Erosion Control	Groundwater Recharge (Total)	Species Rarity (Total)	Significant Features and Habitats (Total)	Fish Habitat (Total)
WE-01	0.15	Marsh	Isolated	One vegetation community(gc)	Within 1km of other wetlands, but not hydrologically connected by surface water	Low interspersion (26 intersections or less), wetland is very small comprised of only one vegetation community	None	Wetland is entirely isolate, (100) Total=100	FA of isolated wetland (0.5) Over 50% agricultural and/or urban (1) FA of wetland with live trees, shrubs, herbs or mosses (c, h, ts, ls, gc, m) (0.75) Total= 22.5	Wetland entirely isolated (0) No shoreline present (0) Total =0	The wetland is isolated (50) and could provide valuable groundwater recharge , soils surrounding the wetland are sandy loam (10) Total=60	Western Chorus Frog present based on NEA Marsh Monitoring Surveys (50) Total=50	No known nesting of colonial waterbirds (0) Little or poor winter cover present (0) No known waterfowl staging and/or moulting (0) No suitable habitat for waterfowl breeding (0) No significant passerine shorebird or raptor stopover area (0) Total=0	None (0) Total=0
WE-02	0.08	Marsh	Isolated	One vegetation community (re)	Within 1km of other wetlands, but not hydrologically connected by surface water	Low interspersion (26 intersections or less), wetland is very small comprised of only one vegetation community	None	Isolated (100) Total=100	FA of isolated wetland (0.5) Over 50% agricultural and/or urban (1) FA of wetland with live trees, shrubs, herbs or mosses (c, h, ts, ls, gc, m) (1) Total= 30	Wetland entirely isolated (0) No shoreline present (0) Total=0	The wetland is isolated (50) and could provide valuable groundwater recharge , soils surrounding the wetland are sandy loam (10) Total=60	Western Chorus Frog present based on NEA Marsh Monitoring Surveys (50) Total=50	No known nesting of colonial waterbirds (0) Little or poor winter cover present (0) No known waterfowl staging and/or moulting (0) No suitable habitat for waterfowl breeding (0) No significant passerine shorebird or raptor stopover area (0) Total=0	None (0) Total=0

4.0 References

Bird Studies Canada (BSC). 2008. Marsh monitoring protocols. Available at: http://www.bsc-eoc.org/volunteer/glmmp/index.jsp?targetpg=glmmpfrog&lang=EN.

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OMNR. 2011a. Natural Heritage Assessment Guide for Renewable Energy Projects. First edition, July 2011. Queen's Printer for Ontario. 97 p.

OMNR. 2011b. Draft SWH Ecoregion 6E Criterion Schedule. 42 p.

Penn Energy- Roseplain
SOLAR ENERGY FACILITY

in the
Town of Uxbridge
Regional Municipality of Durham
FIT Application No. FIT-F7TMB91
FIT Contract No. F-001557- SPV-130-505

Natural Heritage Assessment
Environmental Impact Study

Prepared for: Penn Energy Renewables Ltd.
620 Righters Ferry Road, Bala Cynwyd, PA 19004

Submitted by: Niblett Environmental Associates Inc.
PN 10-066

October 2012

Niblett Environmental Associates Inc.
Biological Consultants

October 3, 2012 PN 10-066

Penn Energy Trust
620 Righters Ferry Road
Bala Cynwyd, PA 19004

Attention : Mr. Glen Tomkinson

RE: **Penn Energy- Roseplain**
SOLAR ENERGY FACILITY
in the Town of Uxbridge, Regional Municipality of Durham
FIT Application No. FIT-F7TMB91
FIT Contract No. F-001557- SPV-130-505

Natural Heritage Assessment
Environmental Impact Study

Dear Mr. Tomkinson:

We are pleased to submit the Environmental Impact Study Report for the proposed Roseplain solar energy facility as part of the Natural Heritage Assessment for this project.

The report follows the outline provided in the MNR Natural Heritage Assessment Manual.

If there are any comments or questions on the content please contact us.

Yours very truly,

Chris Ellingwood
President and Sr. Terrestrial and Wetland Biologist

55 Mary Street West, Suite 112, Lindsay, Ontario K9V 5Z6 Tel: (705) 878-9399 Fax: (705) 878-9390
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1.0 Introduction

1.1 Overview

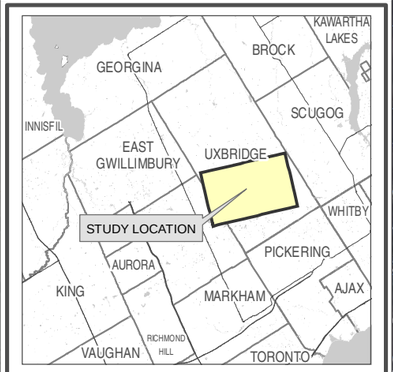
Part V, Section 38 of the O.Reg 359/09 requires that an Environmental Impact Study (EIS) be completed to identify the potential negative environmental effects that may result from the proposed solar facility and outline mitigation and monitoring required to minimize any impacts. An EIS report is necessary when the Project Location is proposed within 120 meters of a natural feature that has been evaluated as significant in the Evaluation of Significance report or otherwise treated as significant.

The NHA process on the Roseplain Solar Energy Facility has identified 7 natural features that have been evaluated as significant, Woodland-WO03, Woodland-WO05, Wetland WE01, Wetland WE02, Significant Wildlife Habitat- Monarch Butterfly (SWH06), Species of Conservation Concern Western Chorus Frog (SWH07), Generalized Candidate Significant Wildlife Habitat-Bat Maternity Colonies (SWH05) and raptor wintering area (SWH04).

The proposed Penn Energy- Roseplain project area is located near the Town of Goodwood on part of Lot 22, Concession 3 in the township of Uxbridge, known municipally as 5240 Concession 4, R.R. #1 (Figure 1).

The proposed solar energy facility will consist of approximately 36000 PV modules and seven (7) or more modular collection houses. Solar arrays are mounted and sloped to face south and reach a maximum height of 4 meters above ground. The entire project area will be enclosed with a security/safety fence and a driveway will be located around the perimeter adjacent to the fence and additional driveways will pass through the array field to provide access to the collection houses. Electrical collection and distribution lines will consist of underground and/or overhead lines and will connect to the power grid at a nearby distribution line. Native grass/groundcover will grow beneath and between the rows of solar panels to minimize erosion and permit infiltration of precipitation. The Site Plan for the Roseplain site can be seen in Figure 4 with the projects constraints.

1:36,000



NIBLETT ENVIRONMENTAL ASSOCIATES INC.

FIGURE 1: LOCATION OF PROJECT

17N 644942 4880339
Revision 2
10-066
REGION OF DURHAM
AURORA DISTRICT

1 centimeter = 360 meters

Meters
0 500 1,000 2,000

LEGEND

- Railroad*

Road Classes
- Local
- Arterial
- Collector
- Expressway / Highway
- Freeway

Hydrology*
- Shoreline
- Watercourse
- Waterbody

Municipal
- Lot Parcel

Project Specific
- Project Location

Information
* Obtained under Base Data

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NAD 1983 UTM ZONE 17N

1.2 Construction

The construction activities of the proposed solar energy facility will include the driveway construction, installation of panels, framing, foundations and collection houses and electrical work. The construction and installation will be completed in one phase and will take approximately 6 months.

To accommodate construction, the Project Location will have to be cleared with possible minor grading, particularly for the driveways and inverter houses. Table 1 summarizes the construction activities.

No solid, liquid or gaseous wastes will be generated and there is no anticipated change to the water flow on site. No toxic or hazardous materials will be used or generated and thus no disposal procedures are required. The REA regulation requires the preparation of a construction plan report.

1.3 Operation

Once construction and installation is complete, regular light maintenance is required which consists of site visits to inspect electrical and non-electrical components and conduct minor site maintenance. Since maintenance is on an as-needed basis, on-site personnel are limited for daily operations. Additional visits will occur as necessary to maintain the solar components. Table 1 summarizes the operation activities. The solar facility will run year round during the daylight hours.

1.4 Decommissioning

The installed components have almost no long-term or permanent impact on the site. Panels can be removed after they have fulfilled their life-expectancy of 20-30 years and the site can return to a natural state. A decommissioning plan will be provided to the Ministry of the Environment as part of the requirements under O.Reg 359/09.

Table 1: Summary of typical construction, operation and decommissioning activities

Phase	Activity	Description of Activity
Construction	Access road construction	• Clearing and grubbing of upland areas within project location boundary. • Stripping and removing topsoil in areas of driveways and inverters/transformers/ switchgears • Grading • Compaction of soil and re-vegetation
Construction	Installation of panels, collection houses and fence.	• Laying the foundation of the system: framing elements are driven, screwed or cored and grouted into the ground (depending on soil conditions)
Operation	General maintenance	• Washing/clearing of solar panels • Inspection of electrical and non-electrical components • Replacing panels, wiring or other components as required. • General landscape maintenance
Decommissioning (per final Decommissioning Plan approved by the Ministry of the Environment)	Removal of installed components	• Removal of materials and disposal off-site at an appropriate location • Materials are recycled or refurbished if possible • Site is re-vegetated or left to regenerate back to existing conditions or a condition deemed appropriate at the time.

2.0 Identification of Potential Negative Environmental Effects and Mitigation Measures

2.1 Existing Environmental Conditions

Residential properties are located to the south and east of the property. Agricultural land is also located to the east. Aggregate pits are located to the north and undeveloped land to the west. A small patch of plantation is found on the adjacent property at the northeast corner. Habitat within the study area is primarily agricultural fields with patches of woodland and hedgerows throughout the property, but mainly concentrated to the western edge and two small wetlands located in the south-western corner straddling the property boundary. The property surrounds an existing house and barn structures, but is not located on the property. No provincially significant wetlands are located in proximity to the property and an ANSI is found to the north-east of the property over 120 meters from the property boundary. The project location is relatively flat with the northern limits of the property slightly elevated.

2.2 Natural Features

A number of significant natural features were identified through the records review, site investigation and evaluation of significance (Figure 2). These included:

- Significant Woodlands
    - WO03
    - WO04/WO05
- Wetlands
    - WE01
    - WE02
- Significant Wildlife Habitat
    - SWH04-Raptor wintering habitat
    - SWH06 – Species of Conservation Concern (Monarch Butterfly)
    - SWH07-Species of Conservation Concern (Western Chorus frog)
- Generalized Candidate Significant Wildlife Habitat
    - SWH05 – Bat Maternity Colonies

No valleylands or ANSIs are within 120m (or within 50m of an ANSI-Earth Science) of the project location.

The wetland WE01 and WE02 straddled the south-western boundary of the property and were automatically considered significant as per guidelines outlined in Table 3 of the Natural Heritage Assessment Guide for Renewable Energy Project (Figure 3). Refer to Table 4 in the Evaluation of Significance (NEA, 2012) for the Wetland Characteristics and Ecological Functions Assessment for WE01 and WE02.

Wetland WE01 was considered a significant community. This wetland was 0.36 acres or 0.15 ha in size. It was classified as a forb Shallow Marsh and was dominated by common plant species including sensitive fern and spotted jewelweed. The main importance to this wet area was for collection of seasonal runoff. This wetland was entirely isolated and contained no fish habitat. The western chorus frog, a species of conservation concern was observed within this wetland. Refer to Table 4 of the Evaluation of Significance (NEA, 2012) for more details on Ecological Features and Functions.

Wetland WE02 was also considered a significant community. This wetland was 0.2 acres or 0.08 ha in size. Common cattails dominated this community acting as an important collection feature or seasonal runoff from agricultural fields. This wetland was entirely isolated and contained no fish habitat. The western chorus frog, a species of conservation concern was observed within this wetland. Refer to Table 4 of the Evaluation of Significance (NEA, 2012) for more details on Ecological Features and Functions.

Woodlot WO03 was found on and adjacent to the property and has been identified by the Regional Municipality of Durham as a Natural Heritage Feature (Schedule B of Durham Region OP, 2008) as well as Lake Simcoe Region Conservation Authority as “ORM Woodland” (Figure 3). Site investigations of the woodland confirmed the significance of the forest community located on the north-eastern corner, with the majority of the woodland on the adjacent property to the north. This woodland maintained a tree crown cover of over 60% of the ground, determinable from aerial photography. The northern boundary of the project location will be within the 120m setback of the significant woodland. This large woodlot contained several vegetation communities dominated by different tree species. Due to its size (18.75 acres), this woodlot provided valuable natural linkages moving northeast for the movement of wildlife across the landscape.

Woodlot WO04, contiguous with WO05 is identified in the Durham Regional Official Plan (Schedule B, Durham OP, 2008) as a natural heritage feature (Figure 3). Lake Simcoe Region Conservation Authority also deemed this woodlot as an ORM Woodland. This woodlot area has been historically disturbed. Woodlot WO05 is also identified in the Durham Regional Official Plan (Schedule B, Durham Region OP, 2008) as a natural heritage feature (Figure 3). Lake Simcoe Region Conservation Authority also deemed this woodlot as an ORM Woodlot. The western and southern boundaries of the project location will be within the 120m setback of the feature. Field investigations confirmed the designation as a significant woodlot due to its size and diversity. Two wetlands were located within the boundaries of this community, however off

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4882250 4882000 4881750 4881500 4881250 4881000 4880750 4880500 4880250 4880000 4879750 4879500 4879250 4879000 4878750 4878500

Pefferlaw-Uxbridge Headwaters ANSI

Uxbridge Brook Headwaters Wetland Complex

PEFFERLAW-HEADWA

Upper Pefferlaw Brook Wetland Complex #2

Pefferlaw-Uxbridge Headwaters ANSI

POSSIBLE WILDLIFE CORRIDOR

Upper Pefferlaw Brook Wetland Complex #2

MORAINE

OAK RIDGES

31m (CUP3-1)

34m (CUP3-1)

30m (FOD3-1)

30m (FOD5-2)

31m (FOD1-1)

120m Project Zone

30m (FOD5-2)

45m (MAS2-1)

33m (MAS2-9)

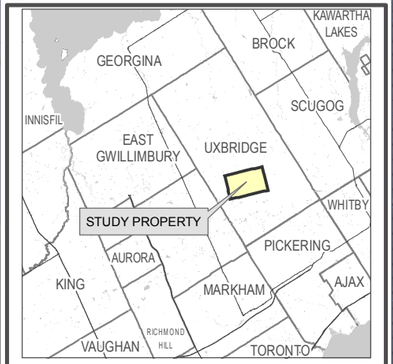

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FIGURE 2: PROJECT LOCATION & NATURAL FEATURES

17N 644942 4880339

Revision 6

10-066

REGION OF DURHAM

AURORA DISTRICT

1 centimeter = 160 meters

Meters

0 225 450 900

LEGEND

Road Classes
- Local
- Arterial
- Collector
- Expressway / Highway
- Freeway

Municipal
- Lot Parcel
- Owner Parcel

Community Types
- Wooded Area
- Wetland Pocket
- Wetland, PSW
- Wetland, Other
- ANSI
- ESA
- Potential Wildlife Corridor

Project Specific
- Project Location
- 120m Project Area
- Study Area

Natural Features within 120m of Project Location

Wetland	Wetland Area WE01, WE02 (within project location and 120m zone)
Woodlot	Wooded Area WO06- (21.54m)
Woodlot	Wooded Area (within project location and 120m project zone)
ESA	Within project location and 120m project zone.
Corridor	Potentially within project location and 120m project zone.
ORM	Within project location and 120m project zone.

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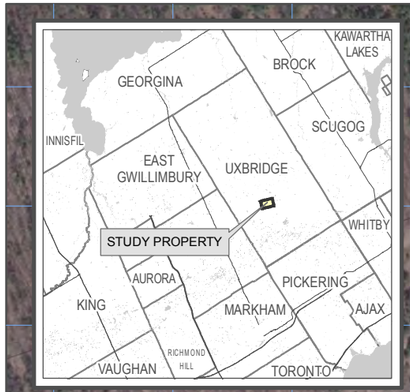

LOT 23 CON 3

LOT 22 CON 3

LOT 21 CON 3

CONCESSION RD 4

WAGG RD

WO06 CUP3-1

WO03 CUP3-1

SWH04/SWH06

SWH04

SWH04/SWH05 WO03 CUP3-1

WO01 FOD3-1

SWH04/ WO04 FOD5-1

SWH04/SWH05 WO05 FOD5-3

SWH04/ SWH06

SWH05 WO05 FOD5-3

SWH03/SWH07 WE01 MAS2-9

SWH03/SWH07 WE02 MAS2-1

WO08 CUP3-1

WO07 CUP3-1

120m

NAD 1983 UTM ZONE 17N

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FIGURE 3: NATURAL FEATURES & COMMUNITIES

17N 644942 4880339
Revision 6
10-066
REGION OF DURHAM
AURORA DISTRICT

1 centimeter = 50 meters

Meters
0 70 140 280

LEGEND

Road Classes
- Local
- Arterial
- Collector
- Expressway / Highway
- Freeway

Municipal
- Lot Parcel
- Owner Parcel

Community Types
- Wetland Community
- Wetland/Wooded Community
- Wooded Community
- Significant Community

Project Specific
- Study Property
- 120m Project Area

Community Types Descriptions

WE01	(MAS2-9)	Forb Mineral Shallow Marsh Type
WE02	(MAS2-1)	Cattail Mineral Shallow Marsh Type
WO01	(FOD3-1)	Dry-Fresh Poplar Deciduous Forest Type
WO02	(FOM)	Mixed Forest
WO03	(FOD1-1) (FOD3-1) (CUP3-1)	Dry-Fresh Red Oak Deciduous Forest Type Dry-Fresh Poplar Deciduous Forest Type Red Pine Coniferous Plantation Type
WO04	(FOD5-3)	Dry-Fresh Sugar Maple-Oak Deciduous Forest Type
WO05	(FOD5-3)	Dry-Fresh Sugar Maple-Oak Deciduous Forest Type
WO06	(CUP3-1)	Red Pine Coniferous Plantation Type
WO07	(CUP3-1)	Red Pine Coniferous Plantation Type
WO08	(CUP3-1)	Red Pine Coniferous Plantation Type
SWH04	Potential Rapter Habitat	

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property. This woodland provides valuable habitat for amphibians using the ponds, in addition, also providing valuable wildlife habitat.

Generalized Significant Wildlife Habitat SWH05 was associated with the potential areas for bat maternity colonies. This generalized habitat was not found within the project location boundary but within the 120 meters of the project location boundary. As generalized significant wildlife habitat is automatically considered significant, those areas that ELC found classified as FOD and FOM were investigated for cavity trees. Site investigations confirmed ELC communities FOD and FOM within the project location boundary and 120 meters from it. Locations of cavity trees were also noted. No cavity trees were found within the project location boundary within the FOD and FOM communities. Therefore the FOM and FOD communities outside of the project location boundary but within the 120 meters were considered generalized wildlife habitat. WO05 was characterized as generalized significant wildlife for its potential for cavity trees and its ELC classification of FOD.

The candidate Significant Wildlife Habitat SWH06 for Habitat for Special Concern and rare wildlife species is important as even small areas of habitat may support local populations. A summary of the criteria used to assess and confirm SWH is provided in Table 2 of the EOS Report (NEA, 2012). Vegetation surveys were completed to identify suitable habitat for the monarch butterfly. Areas with open fields or meadows containing milkweed were targeted during the surveys. Observations were conducted for monarchs and what areas they were spending the most time in. Surveys were conducted between spring and fall. The SWH was confirmed as significant habitat for the monarch butterfly was confirmed containing open meadows with a concentration of common milkweed.

Significant wildlife habitat (Special Concern and rare wildlife species) (SWH07) was identified for the Western Chorus frog. This species was found in low numbers (less than 10 individuals) using wetlands WE01 and WE02. The western chorus frog is listed as an S3 species and is therefore considered a special concern species in Ontario.

SWH04-Raptor wintering area was identified as being significant wildlife habitat in the Evaluation of Significance report. As specific surveys were not conducted based on methodologies found in Schedule 6E of the Natural Heritage Assessment Guide for Renewable Energy Projects (MNR, 2011), we were not able to confirm whether the raptor wintering area was present based on confirmed criteria and therefore have assumed significance. Raptor wintering area requires an area of >20ha of CUM, CUT and FOD community types. The project location and 120m beyond that was comprised of field meadows (cum1-1), cultural thickets (CUT) and a pocket of deciduous forest. To be a confirmed SWH a field study must confirm the presence of one or more short-eared owls or at least 10 individuals and two listed species (refer to Table 2 in EOS report, NEA) NEA will conduct further surveys prior to construction to confirm the presence or absence of raptor wintering area (see Section 2.4.2 for Methodologies) and then determine, if consultation with MNR, whether mitigation measures are necessary.

2.3 Analysis of Ecological Functions of Natural Features

2.3.1 Significant Features (Wetland, Woodland)

Determining the ecological function of the natural features for which an NHE is being prepared is important in understanding the potential impacts relating to the solar energy facility.

The significant wetland WE01 (forb mineral shallow marsh type) was a small shallow swale which contained a few wetland species from seasonal runoff. The diversity was low overall and this community did not contain any rare species. The main function of this wetland is to hold seasonal runoff from adjacent lands and is an important drainage feature. Refer to Table 4 in the Evaluation of Significance Report (NEA, 2012) for the Wetland Characteristics and Ecological Functions Assessment

The wetland WE02 was a cattail mineral shallow marsh type which also straddled the property in the southwest corner. This wetland was not diverse and was dominated primarily by common cattail. A limited number of frogs were found in this wetland therefore this community is not considered significant wildlife habitat. Again, the main function of this wetland is to hold seasonal runoff from adjacent lands and is an important drainage feature. Refer to Table 4 in the Evaluation of Significance Report (NEA, 2012) for the Wetland Characteristics and Ecological Functions Assessment

The significant woodland WO03 contained several vegetation communities representing a large forested area providing a valuable corridor for wildlife species in a highly fragmented area. This woodland contained a diversity of species throughout various vegetation communities. The woodland consisted of three vegetation communities: Red Pine plantation, Red Oak and Poplar forest. A high diversity of native tree species were present, however ground vegetation was not as diverse. Swallow-wort (or dog-strangling vine) is a highly invasive plant species that is found on the edges of the pine plantation, which could threaten the diversity of the woodlot if it spreads. A number of bird species were heard within WO03, including many area-sensitive species. Though not a candidate for significant wildlife habitat it provides valuable habitat within the landscape. Three regionally rare plant species were also recorded (white heath aster, tall blue lettuce and red pine).

Woodlands: WO04 and WO05

On June 27, 2012, two terrestrial biologists from Niblett Environmental Associates, Inc. ("NEA") conducted site investigations on the Woodland community described as WO04 in the EOS. The purpose of this site investigation was to more precisely evaluate the woodland's potential significance, beyond the initial desktop assessment; by obtaining further vegetation data on the communities within WO04.

It is evident that WO04 has been extensively logged of many of the taller tree species and, accordingly, sections along its length appear indented with only a few large trees remaining in a narrow strip along the northern boundary.

Photo 1. Foreground showing heavy logging with very sparse larger trees remaining in background, forming a narrow strip.

WO04 consists of only two main vegetative vertical layers (upper canopy and lower canopy), and there is very little herbaceous ground cover. The species diversity associated with this community is very low. There is no water associated with this community and it is bordered by active agricultural fields, making it less attractive to wildlife. During site visits, no federally, provincially or locally significant species were observed. The woodland provides limited functions due to the lack of vertical structure, low diversity of herbaceous plants, narrowness of the feature, logging activities, pioneer communities in the disturbed areas, and limited wildlife habitat in terms of nesting opportunitiesThe significant woodland WO05, which was contiguous, as determined above with WO04 consisted of a sugar maple and oak deciduous forest. The woodlot as a whole had a high level of diversity and contained fairly mature trees. As this woodlot surrounded the two wetlands mentioned above, it provided tree cover and forest habitat for amphibians using the wetlands. The woodlot provided a natural buffer to the wetland features adjacent the property. This community contained three regionally rare species (white lettuce, plantain-leaved sedge and smooth gooseberry).

2.3.2 Significant Wildlife Habitat

The generalized significant wildlife habitat SWH05 for bat maternity colonies was found within 120m of the project location boundary and within WO05. Bat maternity colonies are important due to bats high juvenile mortality and their low reproductive potential. The protection of these colonies is crucial for long-term stability of bat populations.

The significant wildlife habitat SWH06 for Special Concern and Rare Wildlife Species (Monarch Butterfly) was found within 120m of the project location boundary and within several CUM1-1 communities. The protection of open meadow communities with common milkweed present is important as the monarch butterfly is reliant on the common milkweed for its survival.

The raptor wintering area (SWH04) was not confirmed within the field, however surveys beginning in January 2013 will determine its significance. Raptor wintering area will be treated as significant based on the potential for habitat to occur until such surveys are completed. Communities >20ha of CUM, CUT and FOD were present within the study area. Studies will be completed prior to construction to assess significance and will be followed with by consultation with MNR. The protection of raptor wintering habitat is important to sustain raptor populations.

The significant wildlife habitat SWH07 for Special Concern and Rare Wildlife Species (Western Chorus frog) was considered significant based on the presence of the western chorus frog within WE01 and WE02. The western chorus frog is listed as an S3 species and the protection of its wetland habitat is critical for the survival of this species.

2.4 Potential Negative Environmental Effects and Mitigation Measures

The potential negative effects and mitigation measures for each of the following natural features is found in Table 2.

2.4.1 Significant Features (Wetland, Woodland)

The wetlands will be protected by a 30 meter setback to be implemented around both WE01 and WE02 which has been incorporated into the site plan by the proponent (Figure 4). The features and functions of these wetlands will not be compromised as a result of the solar project.

The woodland WO03 will be a minimum of 30 meters from the solar panels to the trunk of the outermost tree which has been incorporated into the site plan by the proponent. A fence will follow the parcel boundary and present a barrier to movement between the woodlot location. This will minimize the function of the contiguous woodland habitat. A small local wildlife corridor is found through the property, however the main regional corridor is found just north and west of the property. The wildlife will continue to use the regional corridor. Grading and levelling of the site may increase erosion and create noise disrupting nearby wildlife however, grading is expected to be minimal as the majority of the project installation will follow the

Table 2: Summary of potential negative effects and proposed mitigation measures for significant features

Feature Type/ID	Project Phase & Activity within 120 m of the feature	Distance between Feature and all Project Components within 120 of it	Potential Negative Effects to the Feature	Mitigation Measures	Performance Objectives, Monitoring and Contingency Plans
Wetland WE01	Construction-fence, grading and levelling	>30 metres	Sedimentation	- The same mitigation measures detailed for WO03 will be implemented for WE01.	Minimize the impact to the features and functions of the wetland
Wetland WE02	Construction-fence, grading and levelling	>30 metres	Sedimentation	- The same mitigation measures detailed for WO03 will be implemented for WE02.	Minimize the impact to the features and functions of the wetland
Woodland WO03	Construction-fence, grading and levelling	>30 m	Barrier to movement (fence), noise and erosion	- A 30 meter Vegetation Protection Zone from the outermost tree trunks will be implemented. - Installation of silt fences along the Vegetation Protection Zone - Workers to be instructed on the	- Minimize impact to form and function of woodland - Improve wildlife habitat and cover including habitat for the special concern species, monarch butterfly through naturally regenerating buffers. - An Environmental Inspector will regularly monitor operations to ensure that

				importance of avoiding entrance to the demarcated area. - Daily visual monitoring of work area to ensure compliance (construction outside WO03 feature and associated 30 m VPZ) - Implement dust suppression when needed such as wetting gravel or topsoil piles, and limiting vehicle speeds on gravel or dirt roads - Storage and disposal of petroleum, oil and lubricants (POL), and equipment fuelling is not allowed within 120m of any significant natural feature, watercourse or waterbody.	activities do not encroach into the woodland. - Silt fences will be regularly inspected to ensure they are functioning and are maintained as required. - If silt fences are not functioning properly, alternative measures will be implemented and prioritized above other construction activities.

Feature Type/ID	Project Phase & Activity within 120 m of the feature	Distance between Feature and all Project Components within 120 of it	Potential Negative Effects to the Feature	Mitigation Measures	Performance Objectives, Monitoring and Contingency Plans
Woodland WO04/ WO05	Construction- fence, grading and levelling Site Clearing	0 m	Removal of WO04 and hedgerows. Barrier to movement (fence), noise and erosion, wildlife habitat removal	- No clearing of vegetation between May 1st and July 31st - If clearing needs to occur in this time period have a qualified Bird Biologist conduct area searches for nesting birds within the woodlot to be removed (W0O4 and hedgerows). - A 30 meter Vegetation Protection Zone from the outermost tree trunks will be implemented. - Installation of silt fences along the Vegetation Protection Zone - Buffer area within the 30m Vegetation Protection Zone will be allowed to	- Minimize impact to form and function of woodland - Avoid interference with breeding bird activity - Improve wildlife habitat and cover including habitat for the special concern monarch butterfly through naturally regenerating buffers - An Environmental Inspector will regularly monitor operations to ensure that activities do not encroach into the woodland. - Silt fences will be regularly inspected to ensure they are functioning and are maintained as required. - If silt fences are not functioning properly, alternative measures will be implemented and prioritized above other construction activities.

				regenerate naturally - Workers to be instructed on the importance of avoiding entrance to the demarcated area. - Daily visual monitoring of work area to ensure compliance (construction outside WO05 feature and associated 30 m VPZ) - Implement dust suppression when needed such as wetting gravel or topsoil piles, and limiting vehicle speeds on gravel or dirt roads - Storage and disposal of petroleum, oil and lubricants (POL), and equipment fuelling is not allowed within 120m of any significant natural feature, watercourse or waterbody.	

Feature Type/ID	Project Phase & Activity within 120 m of the feature	Distance between Feature and all Project Components within 120 of it	Potential Negative Effects to the Feature	Mitigation Measures	Performance Objectives, Monitoring and Contingency Plans
SWH06 Monarch Butterfly,	Construction -fence, grading and levelling	0 m	Loss of habitat	-ensure no work or project activities are conducted within any of the designated vegetation protection areas or designated significant wildlife habitat for species of conservation concern (monarch butterfly). -buffer area within the 30 m vegetation protection zones will be allowed to regenerate naturally to sustain existing habitat and to create more habitat for the monarch butterfly	-An Environmental Inspector will regularly monitor operations to ensure that activities do not encroach into 30 m vegetated buffer or the designated SWH for monarch butterfly to allow regeneration of monarch butterfly habitat.
Species of Conservation Concern Western Chorus Frog (SWH07),	Construction -fence, grading and levelling	>30 m	Loss of habitat	The same mitigation measures detailed for WO03 will be implemented for SWH for western chorus frog	Minimize the impact to the features and functions of the wetland to preserve habitat for the western chorus frog

Feature Type/ID	Project Phase & Activity within 120 m of the feature	Distance between Feature and all Project Components within 120 of it	Potential Negative Effects/impacts to the Feature	Mitigation Measures	Performance Objectives, Monitoring and Contingency Plans
Generalized Candidate Significant Wildlife Habitat (Bat Maternity Colonies).	Construction -fence, grading and levelling	>30 m	Disruption to habitat	The same mitigation measures detailed for WO03 will be implemented for generalized candidate significant wildlife habitat(bat maternity colonies)	Minimize impact to the woodlot to ensure habitat for bat maternity colonies is protected.
Raptor Wintering Area	Construction -fence, grading and levelling	0 m	-Removal of WO01, WO04 and CUT communities -loss and/or disruption of habitat for roosting and hunting in woodland and CUT area considered minimal as it is only 1% of potential RWA habitat	-To confirm the presence/absence of SWH raptor wintering area within the project location boundary or 120m of it, a qualified bird biologist will conduct surveys in winter of 2012/2013 pre-construction. Mitigation measures if RWA present: -Field habitat will be created within the buffers and outside of the project location boundary through natural regeneration of agricultural fields and abandoned farmland, and	-A qualified bird biologist conduct surveys in winter 2012/2013 pre-construction (see section 2.4.2 of this report for survey methods) to determine if RWA is present and significant according to criteria. -the proposed woodlot for removal is a small percentage (10%) of the total potential raptor wintering in the project location, 120m buffer and adjacent lands. -post construction surveys if required based on assessment of significance will need to show:

			-open agricultural fields not good hunting habitat for raptors due to lack of prey, -hayfields, abandoned farmland and rural lots have been identified in the RWA boundary that provide better habitat and potential prey densities than the CUT communities being removed.	will act as hunting area. -Perching trees (live and dead trees, unless hazard trees) will be maintained within the buffer and within retained forest edges. -possible use of solar facility and higher structures as perching and hunting sites -during construction if raptors hunting in construction zone limit disturbances in that area -do not disturb or flush raptors if perched on equipment or feeding on prey on ground. Allow them to leave on their own. -if raptor found injured or is injured, report incident to site supervisor and contact MNR or rehabilitation centre -if clearing of forest or fields is to occur during the winter period and raptors are on site, seek advice from environmental inspector as to timing or areas to be retained. -If post-construction surveys are being	a. avoidance by raptors of part or all of RWA defined b. changes to behaviour or foraging area avoidance

				conducted and raptors are using area of project location but safety of the birds around the site is an issue, artificial perches (cedar posts-5-10 feet in height) could be installed in the buffers or more open habitat along the edges of the project location	

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LOT 23 CON 3

LOT 22 CON 3

LOT 21 CON 3

WO03
CUP3-1

WO03
CUP3-1

SWH06

WO03
CUP3-1

120m

120m

120m

120m

CONCESSION RD 4

WAGG RD

WAGG RD

SWH05
WO05
FOD5-3

SWH06

SWH05
WO05
FOD5-3

SWH05
WO05
FOD5-3

WE01
MAS2-9

WE02
MAS2-1

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FIGURE 4: SITE FACILITES & CONSTRAINTS

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Revision 4
10-066
REGION OF DURHAM
AURORA DISTRICT

N
W E
S

1 centimeter = 50 meters

Meters
0 70 140 280

LEGEND

Road Classes
- Local
- Arterial
- Collector
- Expressway / Highway
- Freeway

Municipal
- Lot Parcel
- Owner Parcel

Community Types
- Wetland Community
- Wetland/Wooded Community
- Wooded Community
- Significant Community

Project Specific
- Study Property
- 120m Project Area
- Proposed Solar Array
- Proposed Road

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existing, relatively flat topography. To minimize these impacts, a Vegetation Protection Zone (VPZ) utilizing Best Management Practices (BMPs) of 30 meters is to be implemented from the outermost tree trunks of the woodlot. The VPZ will protect the features and functions of the woodlot including providing a buffer from noise for the wildlife while grading is being completed. The installation of sediment control fencing around the buffer of the woodlot edge will prevent erosion and excess soils encroaching on the woodlot.

The woodland WO04 and connecting hedgerows, of contiguous WO04/WO05 will be removed as part of the project development, in addition to the hedgerows connecting WO04 and WO05. It is proposed that 19% of this feature be removed. This feature prior to construction contained an area of 18.32 acres. With the removal of the northern portion of the feature (WO04) post construction the area of this feature will be 14.88 acres. A timing window for clearing to protect breeding birds will be required. No clearing is to occur in nesting season between May 1st and July 31st, as per Environment Canada's Guidelines. In the case that removal is required between the dates of May 1st and July 31st a qualified Bird Biologist will conduct nest searches to ensure there are no breeding birds within the woodlot being removed. The woodland-WO05 will be a minimum of 30 meters from the solar panels to the outermost tree trunk. The communities within the woodland where amphibians were recorded are located on the south side of the parcel. The erection of a fence around the project area will minimize the movement of wildlife between woodlots and its current contiguous habitat. This will minimize the function of the contiguous woodland habitat. The Project Location was placed by the proponent to exclude as many woodlots from fencing as possible, hence, the fencing will disrupt minimal wildlife movement. Grading and levelling of the site may increase erosion and create noise disrupting nearby wildlife however, grading is expected to me minimal as the majority of the project installation will follow the existing, relatively flat topography. To minimize these impacts, a VPZ utilizing BMPs of 30 meters is to be implemented from the outermost tree trunks of the woodlot. The VPZ will protect the features and functions of the woodlot including providing a buffer from noise for the wildlife while grading is being completed. The installation of sediment control fencing around the buffer of the woodlot edge will prevent erosion and excess soils encroaching on the woodlot.

2.4.2 Significant Wildlife Habitat

The generalized significant wildlife habitat for bat maternity colonies (SWH05) is located in Woodlot feature WO05 and WOO3. These woodland features are already designated as significant due to their size and will have a 30 meter buffer surrounding it. The generalized significant wildlife habitat will not be comprised by the solar energy project and no negative effects will occur as a result of the construction of this project.

The significant wildlife habitat (SWH06) for Special Concern and Rare wildlife species (Monarch butterfly) will not be compromised as a result of the solar energy project. The open meadow communities (CUM1-1) that are located within the project location boundary were not considered significant as they were not suitable habitat and contained no common milkweed.

The open meadow communities that were considered suitable habitat for the monarch were located adjacent the project location boundary and within the buffered areas. The buffered areas area required to be left in their natural state to vegetate naturally, no disruption of any kind may occur in the buffered areas. This restriction will allow these locations to be protected and there will be no negative effects on the monarch butterfly habitat adjacent the property as a result of the solar energy project. In addition, the buffered areas that are now agricultural fields will be left to regenerate into meadows creating suitable habitat for the monarch butterfly and increasing its habitat on and adjacent the property.

The significant wildlife habitat (SWH07) Special Concern and rare wildlife species (Western chorus frog) is wetland surrounded by woodlot feature WO05. The woodland feature which surrounds the wetland pockets is already designated as significant due to its size and will contain a 30 meter buffer surrounding it, also providing protection to the wetland areas. In addition, it is recommended that silt fencing be installed along the south-western corner of the project location boundary limits to protect these features to their full extent.

The raptor wintering area (SWH04) requires additional study to be confirmed significant wildlife habitat. SWH for wintering raptor areas will be assessed during the winter of 2012-2013 to determine if raptors are using the project location or adjacent communities within the study area as hunting, roosting or perching sites. The two RWA sampling locations are mid-way through the property within feature WO04 and along Concession Road 4 adjacent to the open field meadows. It is proposed that WO01, WO04 and CUT communities be removed, which contain the potential for raptor wintering area.

The following table outlines the calculations for the raptor wintering area (Figure 6-RWA).

Existing raptor wintering area in study area	178.0 hectares
RWA to be removed as part of project FOD5-1, CUT1-1 and FOD3-1	2.98 hectares (1.67% of RWA identified)
New RWA habitat to be created through regeneration of agricultural field in 30 m buffers to meadow habitat	2.2 hectares (74 % of RWA to be removed)

This area amounts to 2.98 ha of potential raptor wintering habitat or 1.67% of the total potential raptor wintering area in the project location, within the 120m and adjacent lands. The loss will be made up by the regeneration of the current agricultural fields that are within the 30 m buffer and outside the project location boundary. Those areas will be left to regenerate in grasses and flowers and create potential foraging habitat for overwintering raptors. The habitat that will be removed by the project is woodland (possible roosting or perching habitat) and cultural thicket (possible perching or foraging habitat).

If habitat is confirmed as significant through the surveys, mitigation measures listed in Table 3 will be implemented.

The methodology for the surveys will follow the MNR protocols provided to NEA.

Monitoring Frequency and Timing

NEA will conduct winter raptor surveys at two locations approximately every 7-10 days throughout January and if raptors present into February 2013. All surveys will be conducted for at least 30 minutes to allow enough time to thoroughly scan the woodland edge and field for indication of raptor perching or foraging (Figure 5). All surveys will occur during daylight hours, between 0900-1600hrs, when raptors are expected to be most visible at potential perching locations or actively hunting.

NEA will conduct surveys approximately 10 days apart, totalling three (3) visits in January and if necessary three (3) visits in February. Approximate timing of the visits is tentatively scheduled for January 4, 15 and 25 and February 5, 15 and 26. Despite a tentative monitoring schedule, these dates may be shifted slightly depending on weather conditions. In the event that a survey cannot be completed as planned, all attempts will be made to re-schedule this trip as quickly as possible.

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LOT 23 CON 3

LOT 22 CON 3

LOT 21 CON 3

PROJECT LOCATION BOUNDARY

CONCESSION RD 4

WAGG RD

WOODLOTS TO BE REMOVED

WO06 CUP3-1 5.01 acres

WO03 CUP3-1 14.41 acres

SWH04 CUM1-1 20.91 acres

SWH04 WO03 FOD1-1 0.21 acres

SWH01/SWH04/SWH06 CUM1-1 1.43 acres

SWH04 CUM1-1 4.60 acres

BUILT-UP AREA

SWH01/SWH04/SWH06 CUM1-1 1.53 acres

SWH04 WO01 FOD3-1 1.19 acres

SWH01/SWH04/SWH06 CUM1-1 0.95 acres

SWH04/SWH05 WO03 FOD3-1 2.78 acres

SWH01 AGRICULTURAL

BUILT-UP AREA

SWH04 CUM1-1 1.64 acres

AGRICULTURAL 12.29 acres

120m

20.91 acres

CUM1-1

SWH04

CUT1-1 0.21 acres

SWH04 CUT1-1 2.35 acres

SWH04 WO04 FOD5-1 2.70 acres

SWH01 AGRICULTURAL 9.35 acres

SWH01 AGRICULTURAL 14.58 acres

SWH01 AGRICULTURAL 51.61 acres

CUT1-1 0.72 acres

AGRICULTURAL

SWH04 CUM1-1 6.12 acres

SWH04/SWH05 WO05 FOD5-3 7.06 acres

HEDGEROW 0.52 acres

HEDGEROW 0.22 acres

SWH01 AGRICULTURAL

SWH01/SWH04 CUM1-1 0.40 acres

WO07 CUP3-1 1.62 acres

AGRICULTURAL 12.11 acres

WO08 CUP3-1 2.04 acres

SWH04/SWH06 CUM1-1 1.15 acres

WO05 SWH02/SWH05 FOD5-3 7.32 acres

AGRICULTURAL 8.21 acres

AGRI 4.80 acres

AGRI 3.87 acres

WO05 SWH02/SWH05 FOD5-3

SWH04 CUM1-1 5.14 acres

SWH04 CUM1-1 0.73 acres

SWH03 WE01 MAS2-9 0.36 acres

SWH03 WE02 MAS2-1 0.20 acres

HEDGEROW 0.27 acres

SWH04 CUM1-1 0.86 acres

HEDGEROW 0.10 acres

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FIGURE 5: WOODLAND HABITAT TO BE REMOVED & RAPTOR STATIONS

17N 644942 4880339
Revision 8
10-066
REGION OF DURHAM
AURORA DISTRICT

N W E S

1 centimeter = 50 meters

Meters
0 70 140 280

Road Classes
- Local
- Arterial
- Collector
- Expressway / Highway
- Freeway

Community Types
- Woodlot to be Removed
- Wetland/Wooded Community
- Wooded Community

Municipal
- Lot Parcel
- Owner Parcel

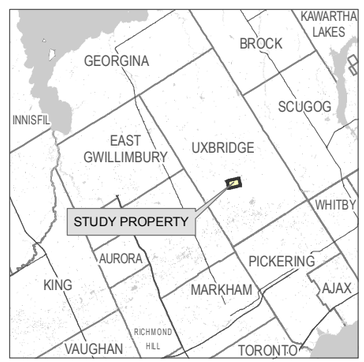
Project Specific
- Project Location
- 120m Project Area
- NEA Rapter Winter Survey Stations

Woodlots to Be Removed

WO01	(FOD3-1)	Dry-Fresh Poplar Deciduous Forest Type [1.19 acres]
WO04	(FOD5-3)	Dry-Fresh Sugar Maple-Oak Deciduous Forest Type [3.81 acres]

Interior Woodland Habitat

No woodlot fits the criteria for interior woodland (100m in from edge).



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NAD 1983 UTM ZONE 17N

1:16,000

642250 642500 642750 643000 643250 643500 643750 644000 644250 644500 644750 645000 645250 645500 645750 646000 646250 646500 646750 647000 647250 647500 647750 648000 648250 648500

4882250 4882000 4881750 4881500 4881250 4881000 4880750 4880500 4880250 4880000 4879750 4879500 4879250 4879000 4878750 4878500

Uxbridge Brook Headwaters Wetland Complex

PEFFERLAW-HEADWA

34m (CUP3-1)

31m (CUP3-1)

30m (FOD3-1)

30m (FOD5-2)

87.172 ha

3.2 ha

31m (FOD1-1)

soya bean field

27.672 ha

120m Project Zone

30m (FOD5-2)

2.85 ha

2.91 ha

53.549 ha

45m (MAS2-1)

33m (MAS2-9)

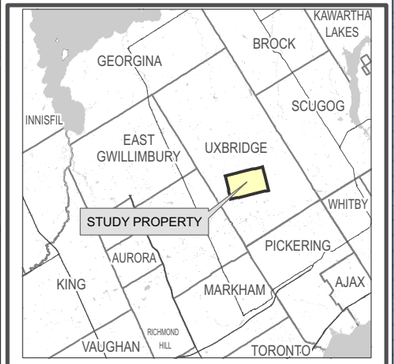

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Figure 6: Raptor Wintering Area

17N 644942 4880339

Revision 6

10-066

REGION OF DURHAM

AURORA DISTRICT

1 centimeter = 160 meters

Meters

0 225 450 900

LEGEND

Road Classes
- Local
- Arterial
- Collector
- Expressway / Highway
- Freeway

Municipal
- Lot Parcel
- Owner Parcel

Community Types
- Wooded Area
- Wetland Pocket
- Wetland, PSW
- Wetland, Other
- ANSI
- ESA
- Potential Wildlife Corridor

Project Specific
- Project Location
- 120m Project Area
- Study Area

Raptor wintering area (RWA)
- existing (178 ha)
- potential RWA habitat to be removed by project (2.98 ha)
- potential new RWA habitat post construction (2.2 ha)
- RWA survey point

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NAD83 UTM ZONE 17N

If no indicator species are observed during the first three (3) surveys then MNR will review the habitat and determine if the remaining three (3) surveys are required. In this instance, an email notification to the MNR will be provided to provide initial results and confirm the approach for further surveys.

Survey Methods

The raptor wintering habitat is located both on and off the property, where in some cases specific access has not been granted. As a result, NEA will conduct behavioural studies from within the Project Location and from adjacent roadsides or other suitable vantage points. These surveys will be conducted for at least 30 minutes to allow enough time to thoroughly scan the woodland edge and field for indication of raptor perching or foraging. All surveys will be conducted using binoculars and/or spotting scopes that are suitable for observing bird activity and identify species composition (if possible), from the survey location. Data collected will be similar to that for standardized area searches, and will include:

- *Level of effort (including start and end time, date, time spent, weather conditions, etc.),*
- *Complete list of all wildlife species and their behaviour,*
- *Description of habitats or areas scanned during the survey,*
- *Location of any raptors observed will be recorded on field maps,*
- *The entire standardized route of the walking transect will be recorded using a handheld GPS in order to ensure consistency between transects and to record the length of the transect.*
- *The surveys will include checking woodland WO04, that is to be removed, for roosting raptors.*

Evaluation of Significance and Reporting

At the completion of the monitoring program, NEA will review all data collected during the monitoring period and compare it to provincial standards for significant raptor wintering areas. These standards, as observed in the SWH 6E Ecoregion Criteria, include:

- *One or more short-eared owls (Asio flammeus), or*
- *At least 10 individuals and two indicator species, and*
- *To be significant a site must be used regularly (3 in 5 years) for a minimum of 20 days by the above number of birds*

Following the review of the data collected during the winter raptor field studies, NEA will prepare a detailed memo that describes the specific methods and present the results of the winter raptor surveys. This memo will be prepared in a way that is consistent with appropriate provincial guidelines and recommendations relating to renewable energy projects, including specific details relating to the evaluation of significance of each feature. For each feature, NEA will also outline any potential impacts and appropriate mitigation measures (if necessary). Other appropriate information, including habitat descriptions, photos, and detailed mapping, will also be included as part of the memo submission. This memo will be provided to the MNR for review and comment.

Post Construction Monitoring

Post construction surveys will only be required if raptor wintering area is confirmed significant during pre-construction surveys. If deemed significant, two years of post-construction monitoring will be required. The same methodology will be adopted as was conducted in the pre-construction monitoring.

3.0 Environmental Effects Monitoring Plan

The Design and Operations Report will include an Environmental Effects Monitoring Plan (EEMP). The EEMP addresses any negative environmental effects that may result from engaging in the project. As per the REA Regulation, the monitoring plan identifies:

- performance objectives in respect of the negative environmental effects
- mitigation measures to assist in achieving the performance objectives
- a program for monitoring negative environmental effects for the duration of the time that the project is engaged in, including a contingency plan to be implemented if any mitigation measures fail

Table 3 shows the EEMP monitoring measures with respect to negative effects on the significant and provincially significant natural features, primarily the Raptor Wintering Area (if found to be significant during pre-construction surveys). The monitoring proposed in Table 3 will serve to verify that mitigation measures are functioning as designed to meet performance objectives. If monitoring shows that performance objectives are not being met, the contingency measures documented in Table 3 will be used to ensure that remedial action is undertaken as necessary to meet the performance objectives.

Table 3: Summary of the Environmental Effects Monitoring Plan for significant/provincially significant natural features in and within 120m of the Project Location where an operational impact has the potential to occur.

Feature(s)	Distance to project locations (components)	Potential Negative Environmental Effects	Mitigation Strategy	Performance Objective	Environmental Effects Monitoring Plan					Contingency Measures
					Methodology	Monitoring Locations	Frequency and Duration of Sample Collection	Technical and Statistical Value of Data	Reporting Requirements	
SWH-04	*0 m*	*Habitat displacement*	*In the event that habitat is found significant based on the pre-construction surveys, the mitigation measures will be employed including post construction monitoring* *In the event that habitat is found not to be significant based on the pre-construction surveys, the mitigation measures detailed in the EIS are not employed*	*Continued use of the habitat by the raptor species (short-eared owls, rough-legged hawk, red-tailed hawk, northern harrier, American kestrel, snowy owl) that may currently inhabit the feature once confirmed during field visits*	*See Section 2.4.2 of this report for the detailed methodology.*	*Surveys will take place in feature WO04, the deciduous woodland for roosting or perched bird and fields visible from that location; and from a location on the east side of Concession Road 4 that allows for views of all adjacent fields. (Figure 5 and 6)*	*Pre-Construction Surveys:* *Every 10 days throughout January of 2013 (totaling 3 visits in January and if needed, 3 visits in February, as determined by MNR. Surveys conducted for 30 min during daylight hours between 0900-1600hrs*	*Data will provide evidence as to whether raptor wintering area is present within the project location boundary.*	*Reporting will include the specific methods and detailed findings following the winter raptor surveys including specific details relating to the evaluation of significance of each feature in memo format. Provided to the MNR for comment* *Estimated report submission date will be in March of 2013*	*If raptor wintering area is confirmed through our pre-construction site visits, consultation with MNR whether contingency measures are required and the contingency measures to be undertaken will be completed.*

4.0 References

Durham Region. 2008. Adopted Official Plan.

Lake Simcoe Region Conservation Authority. 2011. Roseplain REA project Map.

Ministry of Natural Resources. 2011. Oak Ridges Moraine Conservation Plan- Technical Paper 7-Identification and Protection of Significant Woodlands.

Ministry of Municipal Affairs and Housing. 2002. Oak Ridges Moraine Conservation Plan.

Natural Heritage Information Centre. 2010. NHIC website, geographical query and natural areas. Accessed on the World Wide Web at: https://www.biodiversityexplorer.mnr.gov.on.ca/nhicWEB/eoNaturalAreasDetailReport.do?naSearchResultsId=5626

OMNR. 2009. Special features mapping. MNR GIS database.

OMNR. 2011a. Natural Heritage Assessment Guide for Renewable Energy Projects. First edition, July 2011. Queen's Printer for Ontario