Port Ryerse Wind Project
Natural Heritage Assessment and Environmental Impact Study Addendum

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1.0 INTRODUCTION

1.1 PROJECT OVERVIEW

Boralex Inc. ("Boralex") is proposing to develop the Port Ryerse Wind Power Project (the Project), a Class 4 Wind Generation Facility situated near the hamlet of Port Ryerse, within Norfolk County, Ontario.

Three wind turbine models were initially assessed as part of the REA process, the Siemens SWT 3.0 113, ENERCON E-92 2.35 MW and ENERCON E-82 E2 2.3MW; however one turbine model has been selected as the preferred alternative; the Siemens SWT 3.0 113.

The Project will include four Siemens SWT 3.0 113 wind turbine generators. The 3.0 MW turbines will be customized to a nameplate capacity of 2.5 MW for this Project. The total maximum installed nameplate capacity of all four turbines will not exceed 10 MW. Other basic components include step-up transformers located adjacent to the base of each turbine (step up voltage from approximately 0.69 kV to 27.6 kV), a 27.6 kV underground collector system, fibre optic data lines, a distribution substation, a permanent parking lot (if required), a meteorological tower and turbine access roads.

Temporary components during construction include laydown areas at the turbine locations and crane pads. No operations and maintenance building or transmission line is anticipated to be required for the Project. No Project components are located within municipal road Rights of Way (ROWs).

The 27.6 kV underground collector lines will transport the electricity generated from each turbine to the distribution substation located on private property east of Port Ryerse Road. Directional bore techniques will be used where the underground collector lines cross valleylands and watercourses. At the substation, a dip-pole connection will be made directly into the local distribution system.

1.2 RATIONALE FOR THE ADDENDUM

This addendum is submitted as a supplement to the Port Ryerse Project Natural Heritage Assessment and Environmental Impact Study (NHA/EIS) (November 2012) and should be read in association with that report as well as the REA reports submitted as part of the REA application for the Project (March 2013).

During field work conducted in support of the NHA/EIS no Bald Eagle nests were found within 800 m of the Project Location. Candidate winter perching habitat for Bald Eagle was identified in the Study Area; however, based on subsequent study, it was evaluated as non-significant.

In the early spring of 2014, Boralex became aware of the presence of a new Bald Eagle nest (Figure 1, Appendix A).

The purpose of this report is to provide an Addendum to the NHA/EIS to address this new natural feature and update the mitigation and monitoring commitments as required. There are no changes to the Project, Project layout or the commitments contained within the REA documents (Stantec, 2013a).

The records review section has been included within this addendum from the NHA/EIS (November, 2012) for context. This addendum provides the updated site investigation, evaluation of significance and EIS components for Bald Eagle nesting, foraging and perching habitat.

This addendum is related only to the addition of significant wildlife habitat for Bald Eagle nesting and the related supplements to the NHA/EIS. It does not provide any additional changes to the NHA/EIS and should be read in association with the NHA/EIS.

Table 1.1: Bald Eagle Addendum Summary of Changes to NHA/EIS and REA Reports

Section within this document	Change	Reports and Sections
2.1 Records Review	No changes to original NHA/EIS submission, included here for context	No changes
2.2 Site Investigation	Methods- update to survey dates/times	NHA/EIS – addition of line to Table 4 (Appendix B)
	Addition to Results - candidate significant wildlife habitat for Bald Eagle nesting is located in the Project Location	NHA/EIS – update Section 3.2.4.3 (Bald Eagle as a Species of Conservation Concern) and addition of line to Table 7 (Appendix B)
2.3 Evaluation of Significance	Addition of evaluation of significance for Bald Eagle nesting Result: Significant wildlife habitat for Bald Eagle nesting is present in the Project Location although boundary of feature has not yet been determined (further surveys required)	NHA/EIS - add to Sections 4.1.3.3 and 4.2.3.3 Construction Plan Report - supplement to Section 3.3.6 Design and Operations Report – supplement to Section 5.3.6
2.4 Environmental Impact Study	Addition of assessment of potential impacts and proposed mitigation measures for Bald Eagle nesting	NHA/EIS- add to Section 5.2.2 and 5.4.2 Construction Plan Report – supplement to Section 3.3.6 Design and Operations Report – supplement to Section 5.3.6 Project Description Report – supplement to Appendix B

Table 1.1: Bald Eagle Addendum Summary of Changes to NHA/EIS and REA Reports

Section within this document	Change	Reports and Sections
2.5 Environmental Effects Monitoring	Addition of monitoring commitments for Bald Eagle disturbance and mortality	NHA/EIS – add to Table 11 (Appendix B) Design and Operations Report – supplement to Section 6.5.1 EEMP- add Table 2.4 Mitigation Measures, Monitoring and Contingency Measures for Operation

2.0 DETAILED AMENDMENTS TO NHA/EIS

2.1 RECORDS REVIEW

The Bald Eagle is a provincial species of special concern, but is federally not at risk. The Bald Eagle almost always nests near water, usually on large lakes. Large stick nests are typically placed in trees located within mature woodlots. They usually require 250 ha of mature forest for breeding, however, along Lake Erie, where the lake provides a valuable food source, the eagles will nest in smaller woodlots or even single trees (Sandilands, 2005). The Lake Erie shoreline is the predominant area for breeding Bald Eagles in southwestern Ontario (Cadman et al., 2007). During the Ontario Breeding Bird Atlas (2001-2005) Bald Eagle was identified as breeding in the 10x10 km square that overlaps the Project Study Area (Cadman et al., 2007).

No known records of Bald Eagle nesting in the Study Area were identified in the Records Review. No amendments are required for this section of the NHA/EIS.

2.2 SITE INVESTIGATION

2.2.1 Methods

After Boralex became aware of the presence of a new Bald Eagle nest (on April 10, 2014) they visited the site on April 11, 2014 to confirm the location. A site investigation was conducted by Stantec on April 17, 2014 to confirm the presence and activity of the nest. Field notes for the site investigation are included in Appendix B. Field staff qualifications are provided in Appendix C.

Table 2.1 below provides an update to the natural heritage feature site investigation survey dates (originally Table 4 – Appendix B in the NHA/EIS).

Table 2.1: Update to the Natural Feature Site Investigations Survey Dates

Date	Times	Person Hours	Personnel	Purpose	Weather
April 17, 2014	13:00-15:00	2	Andrea Orr	Confirm presence and activity of new Bald Eagle nest; Investigate size, location, characteristics	8°C, wind 4, 10% cloud, no precipitation

2.2.2 Results

The site investigation confirmed the presence of an active Bald Eagle nest along the south eastern edge of a small deciduous woodland. The location of the nest is shown on Figure 1 (Appendix A).

An 800 m radius buffer zone was applied around the nest location to define the edge of the candidate wildlife habitat for Bald Eagle nesting (see Figure 1). The 800 m zone was identified based on the maximum buffer recommendation provided within the Bald Eagle Habitat Guidelines (MNR, 1987). Evaluation of significance surveys are required to delineate the confirmed significant wildlife habitat.

The distance of each project component to the nest location is provided in Table 2.2.

Table 2.2: Distances of Project Components occurring within 800m of the Bald Eagle Nest

Project Components located within Tertiary Habitat (800m)[1]	Distance to Bald Eagle Nest (m)
T2 Component Laydown Area and Crane Pad	364
T2 Blade Sweep Zone	372
Access road and underground collector line (at its closest point; point it terminates at T2)	418
T1 Blade Sweep Zone	654
T1 Component Laydown area and Crane Pad	672
T1 Access Road and Underground Collector Line	643
T3 Component Laydown area and Crane Pad	735
T3 Blade Sweep Zone	775

Further studies to understand the behaviour of the Bald Eagles using the nest, their flight patterns, landscape topography, and nest success are required. These studies may refine the boundaries of this Bald Eagle nesting habitat feature.

Table 2.3 below provides an update to the description and characterizations of candidate significant wildlife habitat (originally Table 7 – Appendix B in the NHA/EIS).

Table 2.3: Update to the Description and Characterizations of Candidate Significant Wildlife Habitat found within 120 m of the Port Ryerse Wind Project

Feature ID	Size (ha)	Type	Composition	Attributes	Function	Figure #	Significance
Habitat for Species of Conservation Concern							
Bald Eagle Nest	Bald Eagle Nest and 800m radius zone	Bald Eagle Nesting, Foraging and Perching Habitat	FOD (deciduous forest)	Nest in deciduous tree at edge of woodland	This feature provides habitat for nesting Bald Eagles.	1	Yes (MNR, 2012); surveys required to delineate the significant wildlife habitat boundary

2.3 EVALUATION OF SIGNIFICANCE

An active Bald Eagle nest is considered a significant natural feature (MNR, 2012), however evaluation of significance studies are required to delineate the shape and extent of the boundary of the significant wildlife habitat that is associated with the nest. Behavioural monitoring surveys of the Bald Eagles can be used to further refine the boundary of the habitat based on Bald Eagle habitat use, such as perching sites and foraging areas.

Because behavioural monitoring surveys extend into August, the timing of this NHA Addendum means that these surveys have not yet been completed for 2014. As a result, for the purposes of this NHA Addendum, it is assumed that the maximum buffer zone (800 m radius) surrounding the active nest is the significant wildlife habitat.

The evaluation of significance will consist of behavioural surveys undertaken in accordance with methods determined in consultation with the Ontario Ministry of Natural Resources (Southern Region) in May 2014. The information from these surveys will be used to delineate habitat as described in the Bald Eagle Habitat Management Guidelines (MNR, 1987) with consideration of MNR's Draft Ecoregion Criteria (MNR, 2012).

According to the Draft Ecoregion Criteria the nest plus a 400- 800m buffer zone that considers perching and foraging locations is considered the significant wildlife habitat (MNR, 2012). The Bald Eagle Habitat Management Guidelines (MNR, 1987) identify three buffer zones that should be applied to Bald Eagle nests. Varying levels of activity restrictions apply to each level. The primary zone is the immediate 100 m around the nest and carries the highest level of restriction. The secondary zone extends from 100- 200 m around the nest; activities significantly altering the landscape are prohibited within this zone. The tertiary zone is identified as 200- 800 m around the nest and is the least restrictive zone permitting some activities except during the most critical life cycle period for nesting eagles.

2.3.1 Evaluation of Significance Survey Methods

The behavioural monitoring surveys will be conducted from survey stations, as indicated in Figure 1 (Appendix A) that provide good visibility of the nest and the project components. Depending on the refined habitat delineated, this survey location may be changed to maximize viewing area.

The nest was first identified to Boralex (and had a bird present on it) in mid-April, 2014. Two behavioural surveys were conducted on April 17 and May 1, 2014.

Additional behavioural surveys will be conducted twice weekly from the week of May 5 until the time when the young leave the nest. Once the young fledge, the surveys will be conducted in the morning as this is generally a period of higher activity levels.

During each survey the nest will be monitored for 2 hours from the survey location, using a spotting scope. Weather conditions, survey date, time (and duration) and field personnel will be recorded on each visit. Notes will be made on activity of the nest and observations of eagle movements and behaviour. Each behaviour observed (and duration of time spent per behaviour) and flight heights will be recorded. Each flight path observed and any perches used will be identified and mapped. The status of the nest and the activity of adults (and subsequently nestlings) will be recorded through the stages of incubation, hatching, rearing and fledging of the young.

The results of the surveys will be used to identify site lines to the project from the nest, identify flight patterns, flight heights and identify perching and foraging habitat.

Data collected during these surveys will be analyzed to refine the boundary of the habitat zones around the nest as required, in consultation with MNR. Two significant wildlife habitat zones will be identified. The adult Bald Eagle behavioural data will be used to confirm the significant wildlife habitat zone. As a component of this habitat, a significant wildlife habitat zone specific to the juveniles (based on observed juvenile behaviour) will also be identified. Research indicates that most fledglings use a reduced area in close proximity to the nest immediately after fledging (Buehler, 2000). These two areas will be used to determine the mitigation measures that will be implemented at the Port Ryerse Wind Farm for this significant wildlife habitat.

Potential impacts, mitigation measures, and monitoring programs associated with the significant Bald Eagle nesting habitat are provided in Section 2.4.

2.4 ENVIRONMENTAL IMPACT STUDY

Components of the Project are located in wildlife habitat for Bald Eagle nesting that is being treated as significant for the purposes of this Addendum (defined as nest site plus an 800 m buffer). Potential effects to Bald Eagles may occur indirectly from disturbance or directly through mortality.

2.4.1 Direct Impacts

During operation, direct mortality of birds may occur from collisions with turbines or with transmission lines. Various studies throughout North America have documented bird collisions at wind facilities and investigated the underlying mechanisms. In general, resident breeding birds breeding tend to have lower collision rates than non-residents, at least partly because they may become familiar with the turbines and avoid them (Kingsley and Whittam, 2007).

Bald Eagle mortality from wind turbine operation has been very low to date. The only known eagle mortality in Ontario to date is one adult Bald Eagle mortality that was recorded at the Erie Shores Wind Project.

The risk of collision to juvenile eagles is poorly known; studies completed to date examining bird age as a risk factor have indicated mixed findings and are not conclusive to date (U.S. Fish and Wildlife Service, 2013). The presence of circumstances that decrease an eagle's ability to perceive and avoid collision is thought to influence vulnerability to collision (U.S. Fish and Wildlife Service, 2013).

During the period when they have fledged from the nest, but are still developing their full flight skills they may have a reduced ability to avoid turbines and may be at higher risk of collision. Prior to the first flight from the nest, nestlings will flap their wings across the nest and to adjacent limbs to practice flight, develop muscle strength, flight coordination and landing ability (Buehler, 2000). Juveniles continue to grow and develop post-fledging. When fully developed, Bald Eagles are capable of extensive soaring, gliding, and flapping flight.

As a result, the additional precautionary mitigation measure of operational mitigation of turbines located in the refined significant wildlife habitat for juveniles has been included to cover the period when they may have a reduced ability to avoid turbines (i.e. the period when they have fledged from the nest, but are still developing their full flight skills) (see details in Table 2.4).

All collector lines for the Port Ryerse Wind Project will be installed underground; removing the ability of Bald Eagles to use the line as a perch or roost and avoiding the potential for mortality as a result of the collector line.

2.4.2 Indirect Impacts

Disturbance of birds may occur during all phases of the Project as a result of increased human activities on-site (e.g., site preparation, turbine assembly, maintenance activities). Tolerance of eagles to human presence and disturbance can be variable. Studies indicate that eagles will flush when within 200 m of disturbance activity and show signs of alertness within 500 m (Sandilands, 2005). Eagles are also known to habituate to human disturbance (Broley, 1947; Brownell and Oldham, 1984; Kennedy and McTaggart-Cowan, 1998) and there are numerous examples of Bald Eagles in Ontario successfully nesting in close proximity to human activity (Sandilands, 2005).

Eagles are thought to be most intolerant of human disturbance during nesting and feeding activities (SWHTGDSS #22). The Bald Eagle nests early in the year with eggs reported in nests as early as February (Sandilands, 2005). The impact of human disturbance depends on the stage of nesting; disturbance early in the nesting cycle may result in desertion; however if disturbance occurs after incubation is well advanced, eagles tend to finish nesting (SWHTGDSS #22).

Studies have been conducted specific to disturbance effects of wind power projects to Bald Eagles. James (2008) described the nesting activities of a pair of Bald Eagles at the Erie Shores Wind Farm, where one adult Bald Eagle mortality was observed as described in Section 2.4.1. A traditional Bald Eagle nesting site was located within 400 m of a turbine. In 2006, during construction activities of the wind farm, the Bald Eagle pair moved to a second nesting site

approximately 900 m from the turbine, where they successfully nested, raising two young. In 2007, during operation of the facility, the pair nested a second time in the nest 900 m from the turbine. Nesting was unsuccessful (James, 2008). In 2008, the pair of Bald Eagles returned to their original nesting site, 400 m from the turbine, where they successfully raised two young (James, 2008).

Monitoring at the Port Alma Wind Power Project, located along the Lake Erie shoreline, has concluded that no disturbance effects have occurred as a result of the Project to Bald Eagles that are nesting approximately 1 km from the closest turbine (MKInce, 2010).

The Port Ryerse turbines are located at 372 m (T2), 654 m (T1), 775 m (T3) and 1.14 km (T4) from the nest location (as measured from blade tip).

A behavioural study was conducted pre and post construction at a wind project site in Alaska, where Bald Eagles are common. The study monitored Bald Eagle flight paths, mean use and behaviour patterns both pre and post construction of the wind project. The study concluded that mean use of the site did not differ once the project was constructed. The results also indicated that while Bald Eagles did not avoid the facility, they did navigate around turbines (Sharp et al., 2010).

Potential impacts, mitigation measures, monitoring programs and contingency measures for the addition of this natural feature are outlined in Table 2.3. Mitigation and monitoring programs described in Table 2.4 will apply to the turbines that are located within the refined Bald Eagle habitat.

2.5 MONITORING COMMITMENTS

Based on the addition of significant bald eagle nesting, foraging and perching habitat additional monitoring requirements are necessary. Monitoring requirements (detailed in Table 2.3) that are proposed in addition to these currently contained within the NHA/EIS include:

- Pre-construction Bald Eagle behavioural monitoring (see Section 2.3.1.1) in 2014 to determine the significance of the wildlife habitat and identify habitat zones as per the Bald Eagle Habitat Management Guidelines (MNR, 1987)
- During construction Bald Eagle behavioural monitoring surveys as per methods in Section 2.3.1 during any construction that occurs in the tertiary habitat zone between February 15-April 30 and/or May 16 – August 15
- Post-construction Bald Eagle behavioural monitoring surveys as per methods in Section 2.3.1 from mid-February until the nest is no longer active for the first three years of operation
- Mortality monitoring: methods as per the Environmental Effects Monitoring Plan (Stantec, 2013b) as well as raptor mortality monitoring at all wind turbines once per week from mid-February to the end of April for the first three years of operation

Table 2.4: Potential Impacts, Mitigation Measures, Monitoring and Contingency Measures for Bald Eagle Significant Wildlife Habitat

Potential Negative Effect	Mitigation Measures	Performance Objective	Monitoring Plan	Contingency Measures
CONSTRUCTION				
Disturbance/avoidance to breeding Bald Eagles from construction	• No construction activities will occur within the primary or secondary habitat zones; all construction activities will be set back a minimum of 364 m from the nest. • The limits of the construction area for T2 will be staked in the field • Construction within the refined significant wildlife habitat zone (as determined by the behavioural monitoring program) will not occur from March 1- May 15th • For construction activities that occur within the refined significant wildlife habitat zone from February 15- April 30 and/or May 16- August 15 , behavioural monitoring of the nest will be completed	Minimize disturbance and avoidance effects as a result of the construction of the Port Ryerse Wind Project	An environmental inspector will conduct regular visual inspections to ensure stakes are present and works stay within demarcated areas If construction occurs in the refined significant wildlife habitat zone between February 15- April 30 and/or May 16 – August 15 and the nest is confirmed to be active at that time, behavioural monitoring of the eagle nest will be completed as per the preconstruction methods outlined in Section 2.3.1 of this report.	Replace any missing stakes and Immediately stop work in off-limit areas. If disturbance during construction is observed MNR will be contacted to determine whether additional mitigation measures are required.
OPERATION				
Disturbance/avoidance to Bald Eagle nesting from operation of the facility	• No project components will be located in primary or secondary habitat zones • All collector lines will be installed underground; no overhead lines will be constructed for the project • A post-construction disturbance monitoring program will be completed for the first three years of operation	Avoidance of an ecologically significant disturbance/avoidance effect to nesting Bald Eagles	Behavioural monitoring of the eagle nest will be completed from mid-February until the nest is no longer active (as per the preconstruction methods outlined in Section 2.3.1of this report) for the first three years of operation. Nesting activity and flight patterns will be compared to pre-construction conditions. Results will be analyzed to determine if an ecologically	Results will be reviewed collectively by the proponent and MNR to determine if and when additional monitoring and/or mitigation may be required. These may include, but may not be limited to: • Compare to trends noted

Table 2.4: Potential Impacts, Mitigation Measures, Monitoring and Contingency Measures for Bald Eagle Significant Wildlife Habitat

Potential Negative Effect	Mitigation Measures	Performance Objective	Monitoring Plan	Contingency Measures
			significant disturbance/avoidance effect to nesting Bald Eagles is being observed.	through province • Investigate habitat management means to encourage nesting activity • Additional post-construction monitoring • support of research or other management initiatives for Bald Eagles The best available science and information should be considered when determining appropriate mitigation.
Direct mortality to Bald Eagles during operation	• All collector lines will be installed underground; no overhead lines will be constructed for the project • No turbines will be constructed in the primary or secondary habitat zones 1. Beginning the first year the wind project will be operational, or will become operational at any time between May-August, monitoring of the Eagle Nest will occur beginning	Minimize mortality	Post-construction monitoring of Bald Eagle mortality for the first three years of operation In accordance with provincial protocols all turbines will be searched twice-weekly from May 1- October 31, and once a week from November 1- 30 (Stantec, 2013b). To encompass the early nesting and activity period for	In the case that a mortality of an eaglet is observed, the following steps will be implemented: a. MNR will be contacted within 24 hours of when the fatality is identified. b. An additional

Table 2.4: Potential Impacts, Mitigation Measures, Monitoring and Contingency Measures for Bald Eagle Significant Wildlife Habitat

Potential Negative Effect	Mitigation Measures	Performance Objective	Monitoring Plan	Contingency Measures
	in mid-February to confirm activity. a. If no Bald Eagle nesting activity is observed at the nest by April 15th, the nest will be considered unoccupied and no further mitigation or monitoring will occur for that calendar year. b. If the nest is occupied, behavioural surveys will be conducted twice a week starting in mid-February to monitor occupancy, productivity and progress of the nest and young. The behavioural surveys will be conducted as committed to in the post-construction disturbance monitoring program (and detailed in Section 2.3.1). Monitoring will continue until the nest is no longer active (i.e. fails) or until the young have successfully dispersed from the natal area. i. Operational mitigation will be implemented at wind turbines that are located within the refined significant wildlife habitat for juvenile Bald Eagle nesting (as identified and delineated through the 2014 preconstruction monitoring program based on juvenile behaviour). ii. The results of the annual monitoring program will be used to determine the period during which operational mitigation will be		Bald Eagles, raptor mortality surveys will also be conducted at all turbines once per week from mid-February to the end of April for the first three years of operation.	analysis of risk factors and potential factors associated with the fatality event will be undertaken. The results of the analysis will be used to adjust the mitigation plan (which may include, but not be limited to, increasing the daily or seasonal timing or the duration of the operational mitigation). The best available science and information should be considered when determining appropriate mitigation.

Table 2.4: Potential Impacts, Mitigation Measures, Monitoring and Contingency Measures for Bald Eagle Significant Wildlife Habitat

Potential Negative Effect	Mitigation Measures	Performance Objective	Monitoring Plan	Contingency Measures
	implemented. It will be implemented to cover the period considered high risk to the juvenile eagles; from the time they fledge to the time when they have developed strong flight skills. Operational mitigation will be implemented based on the behaviours observed during the monitoring program. Operational mitigation will begin when the young exhibit signs that they are preparing to fledge (stretching, flapping on edge of the nest and adjacent branches). Operational mitigation will cease when the behavioural monitoring survey results indicate that the juveniles have gained strong flight skills (i.e. flight paths, heights and abilities are stable, independent and resemble adult behaviour), or the nest is no longer active. As a result, this will encompass the period of highest risk and exposure for the eaglets. iii. Operational mitigation will consist of the complete shut-down from 6am – 6pm of turbines identified to occur within the refined significant wildlife habitat for juvenile Bald Eagles. iv. Adjustments to the operational mitigation program may be			

Table 2.4: Potential Impacts, Mitigation Measures, Monitoring and Contingency Measures for Bald Eagle Significant Wildlife Habitat

Potential Negative Effect	Mitigation Measures	Performance Objective	Monitoring Plan	Contingency Measures
	proposed by Boralex and determined in consultation with MNR in the case that annual site specific monitoring results dictate. 1. The monitoring and mitigation program as outlined under Bullet #1 (above) will occur for the first five years of the operation of the wind project. At the end of the program results will be reviewed collectively by MNR and Boralex.			

3.0 SUMMARY

This addendum has been prepared to meet the requirements of the REA Regulation with respect to a new natural feature that was identified subsequent to the completion of the Natural Heritage Assessment for the Project.

This report provides a site investigation, evaluation of significance and environmental impact study for the new natural feature. Potential impacts have been identified and supplementary mitigation measures identified for the natural feature.

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(signature)

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Reviewed by N. Kopysh
(signature)

Nicole Kopysh, B.E.S, Terrestrial Ecologist

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Appendix A

Figures

560000

4735000

Radical Road

Gilbert Road

Woolley Road

Port Ryerse Road

County Road 57 Norfolk

FOD7-4

CUW1-3*

RES

Bald Eagle Survey Location

AG-Soybean

FOD

AG-Corn

AG-Winter Wheat

HR

T1

T2

T3

T4

Avalon Lane

CUW

FOD4-2

CUT/CUM

FOD5-2

FOD9-4

N

0 160 320 m

1:6,500

W:\active\160960773\drawing\MXD\Terrestrial\InternalMaps\160960773_BaldEagleNest_20140502.mxd
Revised: 2014-07-03 By: caroberts

Legend

- Study Area (120 m)
- Bald Eagle Nesting Site (2014)
- Bald Eagle Survey Location
- Extent of Primary Habitat Zone: 100m
- Extent of Secondary Habitat Zone: 200m
- Extent of Candidate Significant Wildlife Habitat/ Tertiary Habitat Zone: 800m

Project Components

- Proposed Turbine
- MET Tower
- Bladeswept Area / Rotor Diameter (113 m)
- Component Laydown Area and Crane Pad
- Proposed Access Road
- Proposed Collector Line
- Turning Radius
- Substation/ Distribution
- Proposed Permanent Site Parking Lot

Existing Features

- Major Road
- Local Road
- Watercourse
- Waterbody

Natural Features

- Intermittent Stream
- Permanent Stream
- Ecological Land Classification

Ecological Land Classification:

Cultural Communities
CUT / CUM - Cultural Thicket / Cultural Meadow
CUW - Cultural Woodland
CUW1-3* - Black Walnut Mineral Cultural Woodland
Forest Communities
FOD4-2 - Dry-Fresh Ash Deciduous Forest
FOD5-2 - Dry-Fresh Sugar Maple - Beech, Deciduous Forest
FOD7-4 - Fresh-Moist Black Walnut Lowland Deciduous Forest
FOD9-4 - Fresh-Moist Shagbark Deciduous Forest

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
3. Orthographic Imagery Source: © First Base Solutions, 2011. Imagery taken in Spring 2010.

July 2014
160960773

Client/Project

Boralex/ UDI
Port Ryerse Wind Farm
Port Ryerse, Ontario

Figure No.

1

Title

Bald Eagle Habitat Zones

Appendix B

Bald Eagle Nest Survey Field Notes

Stantec Consulting Ltd.
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Guelph, ON
Canada N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Stantec

Raptor Behaviour Observational Survey Form

Project Number: 160960773
Project Name: Port Ryerse
Date: APRIL 17, 2014
Field Personnel: A. ORR

Weather Conditions:	TEMP (°C):	WIND:	CLOUD:	PPT:	PPT (in last 24 hrs):
	8°C	4	10%	None	None

Station #: Nest # 1
UTM: 17T 0561361 / 4735593
Start Time: 13:00
End Time: 15:00
Raptor Species: Bald Eagle.
If in kettle, indicate size:
Raptor #:
Age: (e.g. juvenile or adult)

Provide a description of each habitat unit within the observational area.

Habitat Unit #	Habitat Type (i.e. woodland, grassland, crop, wetland)	Description
1	Edge of woodlot / agr. field	Nest location - 18m up in deciduous tree, southeast corner of woodlot
2	Agr. fields	

Provide a line entry for each change in behavior or habitat.

Time	Behaviour (see definitions below) 1	2	3	4	5/6	Height* (m)	Habitat Unit # (from table above)	Notes
13:00					6	18m	1	Adult 1 incubating on nest. Preening and housekeeping
1345			✓		✓	10-18m	1	Adult 2 flew into nest location from north. Perched on nest beside Adult 1. May have brought food, but difficult to see. See Flight Path A. stayed at nest for 5 min.
1350					✓	18m	1	Adult 2 flew to adjacent branch & perched for 5 min.
1355					✓	18m	1	Adult 1 got out of nest and flew southwest around woodlot. See flight path B. Adult 2 remained on tree branch for an additional 5 min. leaving nest exposed.
1400					✓	18	1	Adult 2 returned to nest and appeared to be perched on the side of nest, feeding. Head kept bending down into the nest. Did this behavior for another 5 min.

** Height of blade sweep varies from project to project; check with project manager.*
1 – Thermal Soaring (kittling): Soaring in a circle within a thermal, without wingbeats
2 – Flapping: Flight powered by wingbeats
3 – Gliding: Flight in straight line without wingbeats
4 – Hovering: Hovering with or without wingbeats
5 – Perched: Perching
6 - Incubating

Signature: Andrea Orr (Field Personnel)

Quality Control: This form is complete ☐ & legible ☐.
Signature: (Project Manager)

Time	Behaviour (see definitions below)					Height* (m)	Habitat Unit # (from table above)	Notes
	1	2	3	4	5			
1405					✓	18	1	Adult 2 went into nest, to continue incubating. Did some housekeeping before getting settled.
1415			✓		✓	18	1	Adult 1 returned to nest. See flight path C. Adult 1 perched beside adult 2 for 10 min. Resting
1430	✓	✓	✓			10-30	2	Adult 2 flew off from nest edge. See flight path D.

** Height of blade sweep varies from project to project; check with project manager.*

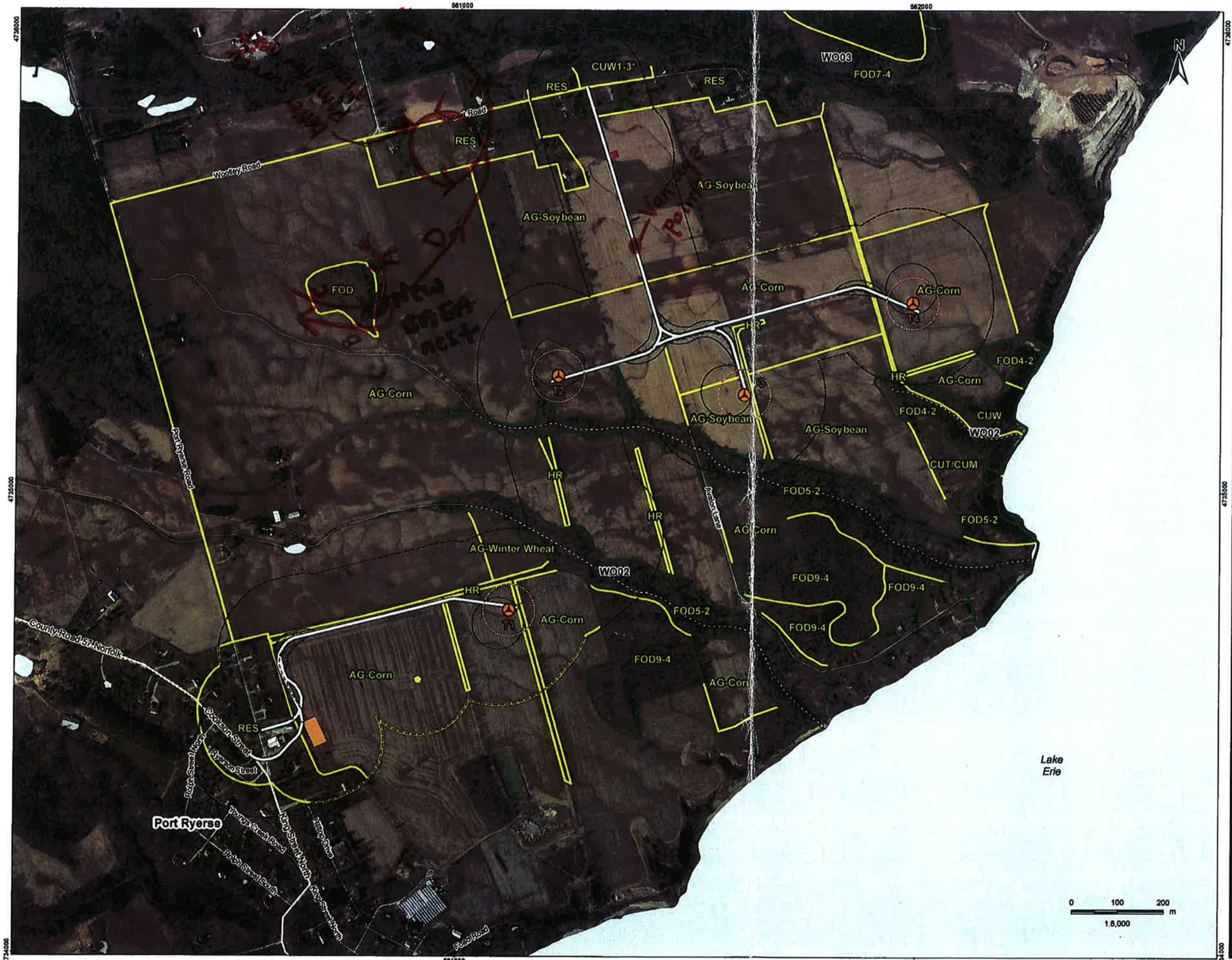
1 – Thermal Soaring (kittling): Soaring in a circle within a thermal, without wingbeats
2 – Flapping: Flight powered by wingbeats
3 – Gliding: Flight in straight line without wingbeats
4 – Hovering: Hovering with or without wingbeats
5 – Perched: Perching

Pg. 2 of 2

Signature: Andrea Au
(Field Personnel)

Quality Control: This form is complete ☐ & legible ☐.

Signature: _____
(Project Manager)



Legend

- Zone of Investigation (120 m)

Project Components

- Proposed Turbine
- MET Tower
- Bladeswept Area / Rotor Diameter (113 m)
- Proposed Access Road
- Turning Radius
- Proposed Collector Line
- Component Laydown Area and Crane Pad
- Substation/Distribution
- Proposed Permanent Site Parking Lot

Existing Features

- Major Road
- Local Road
- Watercourse
- Waterbody

Natural Features

- Intermittent Stream
- Permanent Stream
- Ecological Land Classification
- Significant Woodland

Ecological Land Classification:

Vegetation Community
CUT / CUM - Cultural Thicket / Cultural Meadow
CUW - Cultural Woodland
CUW1-3* - Black Walnut Mineral Cultural Woodland
FOD4-2 - Dry-Fresh Ash Deciduous Forest
FOD5-2 - Dry-Fresh Sugar Maple - Beech, Deciduous Forest
FOD7-4 - Fresh-Moist Black Walnut Lowland Deciduous Forest
FOD9-4 - Fresh-Moist Shagbark Deciduous Forest

Notes

1. Coordinate System: NAD 1983 UTM Zone 17N
2. Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2012.
3. Orthographic Imagery Source: © First Base Solutions, 2011.
   Imagery taken in Spring 2010.

Stantec

March 2013
160960773

Client/Project
Boralex/ UDI
Port Ryerse Wind Farm
Port Ryerse, Ontario

Figure No.
2

Title
ELC Communities and Natural Features

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Revised: 2013-03-04 By: carobertson

PORT RYERSE

160960773. 203.

BAEA Nest Observations
(Behavioural)

APRIL 17, 2014

A. ORR

Appendix C

Field Staff CV

Andrea M. Orr B.Sc., Tech. Dipl.

Terrestrial Ecologist

Andrea Orr is a terrestrial ecologist who has practiced in both the public and private sectors. She is a graduate from Trent University with a Bachelor of Science degree in Biology and Environmental Studies, specializing in Environmental Politics, Policy, and Law. She is also a graduate from Sir Sandford Fleming College, School of Natural Resource Sciences as a Forestry Technician.

Andrea is certified in Ontario Ministry of Natural Resources Ecological Land Classification (ELC), and has conducted ecology work in northern and southern Ontario for several years. Her experience includes conducting various forestry practices, vegetation surveys, soil analysis, entomological surveys, bat surveys/monitoring, as well as avian surveys, including breeding birds, migration, forest monitoring plots, Species at Risk (SAR), and wind energy mortality monitoring.

Andrea's experience stems from such key projects as assisting with the Natural Areas Inventory (NAI) program, managing small wind energy development projects throughout Canada, and contributing to research projects focusing on forestry practices and bird communities. She is familiar with environmental policies and regulations, and has participated in Natural Heritage Assessments (NHA), and the corresponding Renewable Energy Approval (REA) process, Environmental Impact Studies (EIS), Class Environmental Assessments, Endangered Species Act, and Species at Risk Act.

EDUCATION

B.Sc., Trent University, Peterborough, Ontario, 2008

Forestry Technician Diploma, Sir Sandford Fleming College, Lindsay, Ontario, 2003

MEMBERSHIPS

Member, Field Botanists of Ontario

Member, Ontario Field Ornithologists

PROJECT EXPERIENCE

Natural Sciences & Heritage Resources

Hastings Prince Edward Land Trust*, Picton, Ontario (Project Coordinator)

Landowner liaison for planning and finalizing reports for Conservation Easements and Managed Forest Tax Incentive Plans (MFTIP). Planned and organized volunteer and fundraising events. Produced bi-annual newsletter

Natural Heritage Education Program, Ministry of Natural Resources*, Kakabeka Falls Provincial Park, Ontario (Programmer)

Created and conducted environmental programs for children and adults. Conducted interpretive hikes and presentations

Effects of Silvicultural Treatments on Avian Communities and Forest Regeneration in Tolerant Hardwood Forests*, Algonquin Provincial Park, Ontario (Avian Field Biologist)

Conducted nest searches for target bird species and Species at Risk (SAR). Monitored forest bird species and their nests while recording detailed field data. Sampled forest vegetation and nest habitat for wildlife habitat assessment. Performed entomological surveys, including collection of forest insects using tangle-foot and malaise traps. Assisted in bird banding for target species. Used radio-telemetry techniques to attract birds

Natural Areas Inventory (NAI), Credit Valley Conservation*, Mississauga, Ontario (NAI Assistant)

Inventoried natural areas using Ecological Land Classification (ELC) within the Credit Valley watershed. Recorded data while identifying numerous plant and wildlife species. Performed data entry and extraction of large volumes of data from ELC database

** denotes projects completed with other firms*

Andrea M. Orr B.Sc., Tech. Dipl.

Terrestrial Ecologist

Renewable Energy

Niagara Region Wind Corporation, Niagara Region and Haldimand County, Ontario (Terrestrial Ecologist)

Conducted pre-construction field investigations as part of the Natural Heritage Assessment process. Corresponding field surveys included, snake hibernacula observations and Species at Risk identification, bat maternity colony, and landbird fall migration surveys.

West Cape Wind Farm*, Prince Edward Island (Biologist)

Organized all terrestrial aspects of post-construction mortality monitoring, which included conducting surveys of carcass searches, scavenger trials, and searcher efficiency tests. Supervised and coordinated other post-construction monitoring field personnel. Co-authored post-construction report and contributed to the Environmental Impact Study

Napier Wind Project, Middlesex County, Ontario (Terrestrial Ecologist)

Agency liaison with MNR included provision of comments regarding Species at Risk (SAR) report, with focus on wildlife biology and habitat assessment

Grand Valley Wind Project, Phase 3, Dufferin County, Ontario (Terrestrial Ecologist)

Conducted and co-organized various aspects of the Natural Heritage Assessment (NHA) process. Including assistance with the organization of the field program, data analysis and contributing author to the NHA report. Field surveys included; Ecological Land Classification (ELC) and mapping, significant wildlife habitat assessment, waterfowl migration and nesting, Species at Risk (SAR) Butler's Gartersnake cover-board surveys, SAR Bobolink and Eastern Meadowlark breeding bird surveys, and bat maternity colony surveys. Aboriginal consultation and relations with Saugeen-Ojibway Nation was also provided during site-walk visit.

Grand Renewable Energy Park, Haldimand County, Ontario (Terrestrial Ecologist / Task Manager)

Managed and conducted terrestrial field surveys which included wetland delineation and mapping, and spring/fall landbird migration surveys. Author to the subsequent Pre-Construction Monitoring Bird Report, which included field data analysis and interpretation.

Roads and Highways

New North Oakville Transportation Corridor, Halton Region, Ontario (Terrestrial Ecologist)

Assessed Species at Risk (SAR) Bobolink and Eastern Meadowlark breeding habitat and created survey protocol based on findings. Bobolink and Eastern Meadowlark surveys were conducted with subsequent data analysis and mapping.

Highway 17B CNR Overhead Bridge, Duchesnay Creek Bridge Replacement / Rehabilitation, and Highway 17B Resurfacing, North Bay, Ontario (Terrestrial Ecologist)

Author to the Terrestrial Ecosystems Existing Conditions and Impact Assessment Report. Performed the corresponding field surveys of Ecological Land Classification (ELC) and mapping, significant wildlife habitat assessment, and Species at Risk identification and mitigation. Field data was then analyzed and incorporated into the above report.
Consultation and engagement to Nipissing First Nations was also provided at time of field investigations.

Highway 11 Chippewa Creek Bridge and Duchesnay Creek Bridge Replacement / Rehabilitation, North Bay, Ontario (Terrestrial Ecologist)

Author to the Terrestrial Ecosystems Existing Conditions and Impact Assessment Report. Performed the corresponding field surveys of Ecological Land Classification (ELC) and mapping, significant wildlife habitat assessment, and Species at Risk identification and mitigation. Field Data was then analyzed and incorporated into the above report.

Holland Drain Canal Bridge Replacement on Highway 9, Ontario (Terrestrial Ecologist)

Contributing author to Existing Conditions and Impact Assessment reports. Performed ELC community classification and mapping, and Species at Risk identification and mitigation, as well as field data analysis and reporting.

Highway 7 and 35 Structure Replacement / Rehabilitation, Ontario (Terrestrial Ecologist)

Contributing author to Existing Conditions and Impact Assessment reports. Performed ELC community classification and mapping, and Species at Risk identification and mitigation, as well as field data analysis and reporting

** denotes projects completed with other firms*

Highway 6/10 from Chatsworth to Owen Sound, Ontario (Terrestrial Ecologist)
Contributing author to Existing Conditions and Impact Assessment reports. Performed ELC community classification and mapping, and Species at Risk identification and mitigation, as well as field data analysis and reporting

Railroads

GO Transit Hamilton Expansion – CN Yard Track Expansion, Hamilton, Ontario (Terrestrial Ecologist)
Contributing author to the Environmental Evaluation Report and performed the corresponding field investigations of Ecological Land Classification (ELC), mapping, and significant wildlife habitat assessments. Background information, identification, and mitigation for Species at Risk was also provided and incorporated into the above report.

Restoration, Remediation and Redevelopment

Annual Monitoring and Adaptive Management of Beaverdams Channel
Author to the 2013 Annual Monitoring and Adaptive Management Report and performed the corresponding field investigations of spring and summer vegetation restoration monitoring. Survivorship data of vegetation was collected, analyzed, and incorporated into the above report with invasive species management recommendations.

Oil and Gas Pipelines

Integrity Digs - Line 9 between Hilton and Westover, Mississauga, Pickering, Hamilton, Oakville (Terrestrial Ecologist)
Conducted tree inventory surveys in various locations along the Line 9 Pipeline. Identified Species at Risk (SAR) Butternut trees and any mid-age to mature trees that may be impacted. Also conducted significant wildlife habitat and turtle habitat assessments.

** denotes projects completed with other firms*

Andrea M. Orr B.Sc., Tech. Dipl.

Terrestrial Ecologist

PUBLICATIONS

Orr, Andrea and Melissa Straus. Bat Maternity Colony Staff Training Workshop. *Presentation to Stantec Consulting Ltd. Terrestrial Team, Guelph, Ontario*, 2012.