

Appendix F

Summary of 2011, 2012 and 2013 Bat Acoustic Monitoring Surveys – Henvey Inlet Wind Energy Centre Study Area

Henvey Inlet Wind LP

Henvey Inlet Wind

Summary of 2011, 2012 and 2013 Bat Acoustic Monitoring Surveys – Henvey Inlet Wind Energy Centre Study Area

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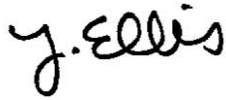
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Appendices

Appendix A.	Field Notes and Documentation
Appendix B.	Work Plans

1. Introduction

In 2011 and 2012, LGL Limited (LGL) collected field data to determine baseline conditions within the Henvey Inlet Wind Energy Centre (HIWEC) study area. The data collected by LGL included:

- Raptor Migration;
- Passerine Migration;
- Breeding Birds;
- Herpetological Surveys; and
- Bat Acoustic Monitoring.

In 2013, Stantec Consulting Ltd. (Stantec) continued field data collection within the HIWEC study area. The data collected by Stantec included:

- | | |
|---|--|
| <ul style="list-style-type: none"> • Raptor Migration; • Passerine Migration; • Waterfowl Migration; • Breeding Birds; • Herpetological Surveys; | <ul style="list-style-type: none"> • Bat Acoustic Monitoring; • Ecosite Classification and Rare Flora; • Herpetological Incidental Observations; and • Other Incidental Wildlife Observations. |
|---|--|

This report has been prepared by AECOM to summarize the **Bat Acoustic Monitoring** field data for the HIWEC study area. This is based on raw field and GIS data collected by LGL and Stantec during the 2011, 2012 and 2013 seasons. This information was provided to AECOM by Stantec in October 2014 and by WSP for the LGL data in May 2015. The following provides the work plans written by LGL and Stantec which outline data collection methods as well as AECOM's summary and analysis of the data collected, and assumptions made concerning the data.

LGL provided AECOM with the following documents which were used to produce this report:

- | | |
|-------------|---|
| 2011 | • An Excel spreadsheet entitled “2011-2012 Bat Box dates & locations.xlsx” summarizing the locations of bat boxes installed in the HIWEC study area. |
| 2012 | • An Excel spreadsheet entitled “2011-2012 Bat Box dates & locations.xlsx” summarizing the locations of bat boxes installed in the HIWEC and transmission line study areas. |

Stantec provided AECOM with the following documents which were used to produce this report:

- | | |
|-------------|--|
| 2013 | <ul style="list-style-type: none"> • Scanned handwritten field notes entitled “Bat Data.pdf”; and • An Excel spreadsheet indicating all survey locations entitled “All survey locations_UTM_MC_07112013.xlsx”. |
|-------------|--|

Copies of the above files are provided in **Appendix A**¹.

In addition, LGL provided acoustic data files (in WAC file format) for monitors deployed in 2011 and 2012, and Stantec provided Anabat-compatible acoustic data files for monitors deployed in 2013.

1. Records of Species At Risk considered to be restricted are not being made public due to the threat of poaching experienced by these species. These records will be provided under a separate cover to the Ministry of Natural Resources and Forestry (MNR) and / or Environment Canada – Canadian Wildlife Service (EC-CWS) for permitting purposes.

2. Methods

2.1 Work Plan

The following section provides a description of work plan methods written by LGL and Stantec for the **Bat Acoustic Monitoring** surveys. These descriptions are taken directly from LGL's *Work plan for the Nigig Power Wind Farm Project Background Ecological Studies* (LGL, 2011a) and Stantec's *Terrestrial Survey Work Program* (Stantec, 2013), respectively.

Complete copies of LGL's *Work plan for the Nigig Power Wind Farm Project Background Ecological Studies* (LGL, 2011a) and Stantec's *Terrestrial Survey Work Program* (Stantec, 2013) is provided in **Appendix B**.

2.1.1 2011 and 2012 Bat Surveys (LGL, 2011a)

"Acoustic Monitoring of Bats

GENIVAR and LGL have initiated preliminary acoustic monitoring in June and July 2011 to attempt to identify the relative levels of bat activity across the study area during the late spring and early summer. These surveys are not focused on any anticipated turbine layout, but were intended to achieve broad geographical coverage of the study area, utilizing the established breeding bird routes for logistical efficiency. This preliminary data will contribute to a landscape-level understanding of bat distribution throughout the study area. The work plan includes:

- Deployment of 10 automatic acoustic monitors (Wildlife Acoustics SM2BAT units) at sites throughout the study area;
- Deployment and retrieval along or adjacent to existing breeding bird study routes for logistical efficiency;
- Shifting monitors to a number of locations to increase coverage; and,
- Incidental observations of bats during field surveys.

Bat Migration Monitoring

Bat migration will be investigated concurrently with bird migration with the use of visual observations augmented by the use of passive IR camera. The fall migratory study period from August to October is intended to capture peak bat activity in August."

2.1.2 2013 Bat Surveys (Stantec, 2013)

"Bat Surveys (Two Surveys, June)

Bat surveys will be conducted in conjunction with Whip-poor-will surveys. A portable, hand-held broad band acoustic monitor will be used to detect bat calls. Recorded bat calls will be analyzed to guild or species, where possible, following completion of the field program. The goal of the bat surveys will be to determine the presence and relative abundance of bat species at risk."

2.2 Data Analysis

2.2.1 2011 and 2012 Bat Acoustic Monitoring Data

The 2011 and 2012 bat acoustic monitoring data provided by LGL was analyzed by AECOM in July 2015 using the Kaleidoscope Pro 3 Analysis Software from Wildlife Acoustics in order to identify the bat species present. This software is designed to convert files, sort and categorize bat data by species.

2.2.2 2013 Bat Acoustic Monitoring Data

The 2013 Anabat-compatible acoustic data files provided by Stantec were analyzed by Natural Resources Solution Inc. (NRSI) in May 2015 in order to identify the bat species present.

3. Results

3.1 Study Area

3.1.1 2011

A total of 20 bat survey locations in the HIWEC study area were provided by LGL and are shown on **Figure 3-1**. Nine (9) of the stations were located on the south side of the HIWEC study area, 10 were located on the north side of the HIWEC study area, and one (1) was located on an island within Henvey Inlet.

3.1.2 2012

A total of eight (8) bat survey locations in the HIWEC study area were provided by LGL and are shown on **Figure 3-1**. Three (3) of the stations were located on the south side of the HIWEC study area, and five (5) were located on the north side of the HIWEC study area.

In addition, two (2) acoustic monitors were deployed by LGL in 2012. While location information was not provided by LGL for these two sites, they are assumed to have been deployed at the meteorological towers. These bat detector deployment locations are shown on **Figure 3-1**.

3.1.3 2013

A total of 11 bat survey locations in the HIWEC study area were provided by Stantec and are shown on **Figure 3-2**. Ten (10) of the stations were located on the south side of the HIWEC study area and one (1) was located on the north side of the HIWEC study area.

3.2 Bat Acoustic Monitoring Results

3.2.1 2011

Based on the data provided, a summary of bat acoustic monitoring survey stations, dates of installation and removal, UTM co-ordinates and any notes taken about the acoustic monitors deployed in 2011 is presented below in **Table 3-1**. Monitoring locations were selected adjacent to open areas within uplands and along Henvey Inlet to record evidence of bat species presence (LGL, 2011b; refer to **Appendix A**). Survey station locations are shown on **Figure 3-1**. Field notes and other documentation provided by LGL are provided in **Appendix A**.

Figure 3-1: 2011 – 2012 LGL Bat Survey Locations



Figure 3-2: 2013 Stantec Bat Surveys

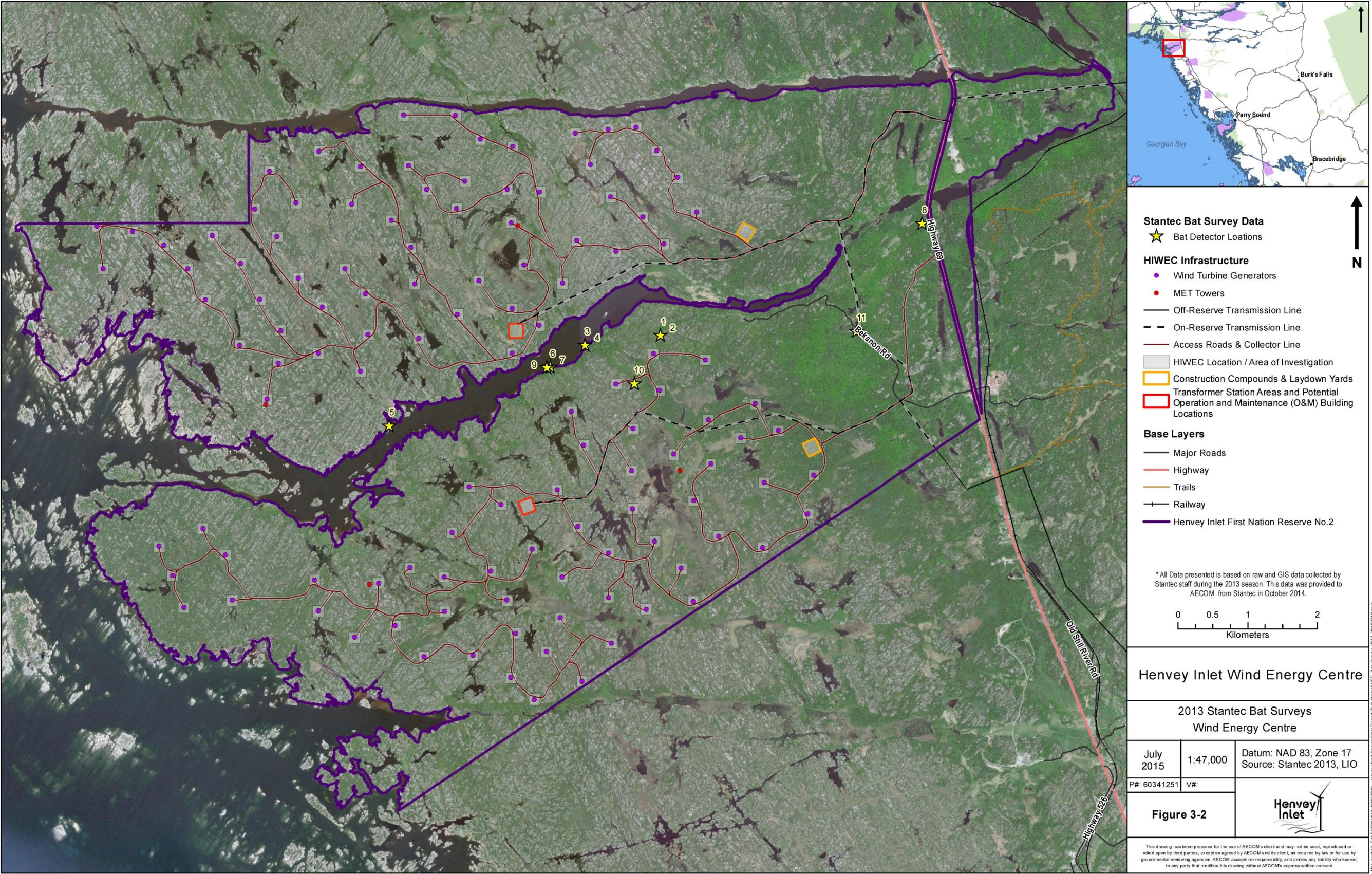


Table 3-1: 2011 Bat Survey Locations, Dates and Notes

Survey Station	Date Installed ¹	Notes	Date Removed ¹	UTM Co-ordinates	
				Easting	Northing
1A	June 15, 2011	None provided.	June 24, 2011	524053	5081378
1B	June 30, 2011	Batteries replaced on July 13; box kept in same location.	July 29, 2011	523873	5076427
2A	June 15, 2011	None provided.	June 22, 2011	528483	5078343
2B	June 23, 2011	None provided.	July 14, 2011	525043	5074684
2C	July 15, 2011	None provided.	August 5, 2011	529462	5077332
3A	June 17, 2011	None provided.	June 29, 2011	524048	5077050
3B	June 29, 2011	Batteries replaced on July 13; box kept in same location until August 4.	August 4, 2011	529310	5079337
4A	June 20, 2011	Box knocked out of tree; microphone chewed on by bear.	July 12, 2011	523896	5078211
5A	June 20, 2011	None provided.	July 12, 2011	523462	5077271
5B	July 12, 2011	None provided.	August 4, 2011	526697	5076858
6A	June 20, 2011	None provided.	June 30, 2011	532228	5078610
6B	July 1, 2011	Batteries replaced on July 13; box kept in same location.	July 18, 2011	527987	5078025
6C	July 18, 2011	None provided.	August 4, 2011	527569	5077035
7A	June 21, 2011	Bungee cord snapped by bear; recording time set incorrectly.	July 13, 2011	527052	5079585
7B	July 14, 2011	None provided.	July 29, 2011	524457	5076595
8A	June 21, 2011	None provided.	July 12, 2011	527489	5078099
8B	July 12, 2011	None provided.	July 29, 2011	525188	5075901
9A	June 21, 2011	None provided.	July 14, 2011	525857	5079081
9B	July 15, 2011	None provided.	August 5, 2011	529502	5077963
10A	June 21, 2011	None provided.	July 14, 2011	526298	5078211
10B	July 14, 2011	Bear knocked box out of tree; chewed on microphone.	August 4, 2011	524635	5077456

Notes: Data are transcribed exactly as given in field notes.

1. Time between deployment and collection does not indicate the total number of days of data recorded as the batteries may have died between those dates.

AECOM analyzed all of the acoustic monitoring data that were provided by LGL for the 2011 season using the Kaleidoscope Pro 3 Analysis Software from Wildlife Acoustics. The results of these analyses, including bat passes identified to species by the software, are provided in Table 3-2. Species identifications were spot checked by a qualified Biologist to confirm the calls recorded were consistent with the typical characteristics of call for each species. The ten (10) acoustic monitors were moved between stations to increase coverage in accordance with the work plan (LGL, 2011). As a result, the acoustic data file for each monitor, except monitor number 4, included call data recorded at more than one survey station.

In total, there were 19,588 identified bat passes, including calls from eight (8) identified bat species, recorded across the ten (10) acoustic monitors in 2011 (Table 3-2). These included the presence of the following four (4) Provincial Species At Risk, all listed as Endangered under the provincial *Endangered Species Act*, Eastern Small-footed Myotis (*Myotis leibii*), Little Brown Bat (*Myotis lucifugus*), Northern Myotis Bat (*Myotis septentrionalis*) and Tri-coloured Bat (*Perimyotis subflavus*). With the exception of Eastern Small-footed Myotis, these species are also Federal Species at Risk, as they are listed as Endangered under the federal *Species At Risk Act*.

3.2.2 2012

Based on the data provided, a summary of bat acoustic monitoring survey stations, dates of installation and removal, UTM co-ordinates and any notes taken about the acoustic monitors deployed in 2011 is presented below in **Table 3-3**. Survey station locations are shown on **Figure 3-1**. Field notes and other documentation provided by LGL are provided in **Appendix A**.

Table 3-2: 2011 Bat Acoustic Monitoring Results

Acoustic Monitor		Species								Total Bat Passes
	ESA Status ¹	-	-	-	-	END	END	END	END	
	SARA Status ²	-	-	-	-	-	END	END	END	
	S-rank ³	S5	S4	S4	S4	S2S3	S4	S3	S3?	
	Survey Dates	Big Brown Bat (<i>Eptesicus fuscus</i>)	Eastern Red Bat (<i>Lasiurus borealis</i>)	Hoary Bat (<i>Lasiurus cinereus</i>)	Silver-haired Bat (<i>Lasionycteris noctivagans</i>)	Eastern Small-footed Myotis (<i>Myotis leibii</i>)	Little Brown Bat (<i>Myotis lucifugus</i>)	Northern Myotis Bat (<i>Myotis septentrionalis</i>)	Tri-coloured Bat (<i>Perimyotis subflavus</i>)	
1	June 9 to July 29, 2011	25	614	194	430	19	2786	97	14	4179
2	June 6 to July 30, 2011	307	139	210	3433	5	1020	63	4	5181
3	June 6 to July 2, 2011	6	396	84	226	17	740	38	15	1522
4	June 20 to 23, 2011	5	30	121	27	0	60	16	0	259
5	June 6 to July 26, 2011	20	95	30	521	0	754	8	10	1438
6	June 6 to August 1, 2011	123	174	70	1303	5	1371	59	9	3114
7	July 14 to 26, 2011	12	135	57	358	5	569	15	10	1161
8	June 21 to July 25, 2011	73	137	27	522	9	1233	53	7	2061
9	June 6 to July 6, 2011	6	87	59	92	0	327	12	5	588
10	June 21 to 24, 2011	2	4	6	10	1	51	9	2	85
Totals		579	1811	858	6922	61	8911	370	76	19,588

Notes:

1.

2.

3.

S1

S2

S3

S4

S5

SH

S#S#

S#?

Extremely rare in Ontario; usually 5 or fewer occurrences in the province or very few remaining individuals; often especially vulnerable to extirpation.

Very rare in Ontario; usually between 5 and 20 occurrences in the province or with many individuals in fewer occurrences; often susceptible to extirpation.

Rare to uncommon in Ontario; usually between 20 and 100 occurrences in the province; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances. Most species with an S3 rank are assigned to the watch list, unless they have a relatively high global rank.

Common and apparently secure in Ontario; usually with more than 100 occurrences in the province.

Very common and demonstrably secure in Ontario.

Possibly Extirpated (Historical). Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years.

A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community.

Rank uncertain.

Table 3-3: 2012 Bat Survey Locations, Dates and Notes

Survey Station	Date Installed ¹	Notes	Date Removed ¹	UTM Co-ordinates	
				Easting	Northing
02	May 25, 2012	Near met tower 4.	June 18, 2012	529737	5076486
02B	June 20, 2012	Along trail to met tower 2.	June 29, 2012	528073	5079059
03	May 30, 2012	At end of H transect.	June 20, 2012	527158	5075210
03B	June 22, 2012	Along M transect.	June 27, 2012	526488	5081253
05	May 23, 2012	Along L transect; changed programming on June 1 2012 and memory card in slot A was 15% full; switched it to slot B, put empty card in slot A.	June 22, 2012	524596	5080567
06	June 5, 2012	Near point O5.	June 25, 2012	523171	5075190
09	May 24, 2012	Same spot as monitor 7 last year, near point C7 (monitor 7 last year had incorrect programming and was torn down by bear); changed batteries on June 4, 2012; memory card said was 35% full.	June 21, 2012	527083	5079585
09B	June 22, 2012	At end of Q transect.	June 28, 2012	528411	5080951

Notes: Data are transcribed exactly as given in field notes.

1. Time between deployment and collection does not indicate the total number of days of data recorded as the batteries may have died between those dates.

While eight (8) acoustic monitor locations were provided by LGL for the 2012 season, acoustic monitoring data files were provided for only two (2) monitors installed in 2012. No locational information was provided for these two (2) monitors; however, these are assumed to have been installed on meteorological towers (refer to Figure 3-1).

AECOM analyzed all of the acoustic monitoring data that were provided by LGL for the 2012 season using the Kaleidoscope Pro 3 Analysis Software from Wildlife Acoustics. The results of these analyses, including bat passes identified to species by the software, are provided in Table 3-4. Species identifications were spot checked by a qualified Biologist to confirm the call recorded were consistent with the typical characteristics of call for each species.

In total, there were 2,266 identified bat passes, including calls from eight (8) identified bat species, recorded across the two (2) acoustic monitors in 2012 (Table 3-4). These included the presence of the following four (4) Provincial Species At Risk, all listed as Endangered under the provincial *Endangered Species Act*, Eastern Small-footed Myotis, Little Brown Bat, Northern Myotis Bat and Tri-coloured Bat. With the exception of Eastern Small-footed Myotis, these species are also Federal Species at Risk, as they are listed as Endangered under the federal *Species At Risk Act*.

3.2.3 2013

Based on the data provided, bat detector site assessments were completed between June 19 and July 11, 2013. The data provided for each station are included in **Table 3-5**, including the characteristics of these stations as reported on the field data sheets provided. Survey station locations are shown on **Figure 3-2**. Field notes and other documentation provided by Stantec are provided in **Appendix A**.

Table 3-4: 2012 Bat Acoustic Monitoring Results

Survey Station	Species									Total Bat Passes
	ESA Status ¹	-	-	-	-	END	END	END	END	
	SARA Status ²	-	-	-	-	-	END	END	END	
	S-rank ³	S5	S4	S4	S4	S2S3	S4	S3	S3?	
	Survey Dates	Big Brown Bat (<i>Eptesicus fuscus</i>)	Eastern Red Bat (<i>Lasiurus borealis</i>)	Hoary Bat (<i>Lasiurus cinerleus</i>)	Silver-haired Bat (<i>Lasionycteris noctivagans</i>)	Eastern Small-footed Myotis (<i>Myotis leibii</i>)	Little Brown Bat (<i>Myotis lucifugus</i>)	Northern Myotis Bat (<i>Myotis septentrionalis</i>)	Tri-coloured Bat (<i>Perimyotis subfavus</i>)	
East Tower Mast 2	September 14 to 23, 2012	2	10	3	43	3	0	26	0	87
East Tower Mast 2	September 14 to October 5, 2012	17	14	4	170	0	6	5	1	217
West Tower Mast 1	August 24 to September 1, 2012	29	32	17	402	1	107	1	5	594
West Tower Mast 1	August 24 to September 23, 2012	44	37	25	412	1	110	2	8	639
West Tower Mast 1	August 24 to October 5, 2012	52	38	27	485	1	116	2	8	729
Totals		144	131	76	1512	6	339	36	22	2,266

Notes:

1.

2.

3.

ESA Status:

SARA Status:

S-rank:

S1

S2

S3

S4

S5

SH

S#S#

S#?

Extremely rare in Ontario; usually 5 or fewer occurrences in the province or very few remaining individuals; often especially vulnerable to extirpation.

Very rare in Ontario; usually between 5 and 20 occurrences in the province or with many individuals in fewer occurrences; often susceptible to extirpation.

Rare to uncommon in Ontario; usually between 20 and 100 occurrences in the province; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances. Most species with an S3 rank are assigned to the watch list, unless they have a relatively high global rank.

Common and apparently secure in Ontario; usually with more than 100 occurrences in the province.

Very common and demonstrably secure in Ontario.

Possibly Extirpated (Historical). Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years.

A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community.

Rank uncertain.

Table 3-5: 2013 Bat Survey Location, Dates and Notes

Bat Detector Location	Date	Detector Height	Community Description					Nearby Community – Woodland						Nearby Community - Wetland		
			ELC	Description	Tree Cover	Potential Roost Sites	Available Snags Nearby	Distance To (m)	Dominant Tree Cover	Canopy Height (m)	Under-storey	Age	Canopy	Distance To (m)	Type	Tree Cover (%)
1	June 19, 2013		Abandoned dump truck on Bekanon Road. No other information provided.													
2	June 20, 2013		Abandoned dump truck on Bekanon Road. No other information provided.													
3	June 21, 2013		Boat launch. No other information provided.													
4	June 22, 2013		Boat launch. No other information provided.													
5	June 23, 2013		Flash's cabin. No other information provided.													
6	June 24, 2013		Joe's cabin. No other information provided.													
7	June 25, 2013		Joe's cabin. No other information provided.													
8	July 8, 2013	Ground level	Deciduous Forest	Detector placed at side of Ground Hog Corners road in the bracken ferns	Forest edge nearby	Mature dead Elm trees	Yes	5	Trembling Aspen	18	Cluttered	Mid-Aged	Closed	30	Swamp	--
9	July 9, 2013	Ground level	Shrubby Beach	Shrubby beach next to Aspen forest; by Joe's cabin	Aspen	Forest, Joe's cabin?	No	20	Aspen	20+	Cluttered	Mid-Aged	Closed	?	--	--
10	July 10, 2013	Ground level	Moist Deciduous Forest	On a stump with abundant bracken fern around it, along a path	Red Maple, White Birch, Black Ash	Mature trees	Yes	0	Red Maple, White Birch	15-20	Cluttered	Mid-Aged	Intermediate	?	--	--
11	July 11, 2013	Ground level	Next to adjacent deciduous woods and Red Pine plantation, also in a sandy open area	On the side of an ATV trail	--	--	--	--	--	--	--	--	--	--	--	--

Notes: Data are transcribed exactly as given in field notes.

All of the acoustic monitoring data that were provided by Stantec for the 2013 season were analyzed by NRSI. The results of these analyses are provided in **Table 3-6**. These results represent 549 identified bat passes recorded. Because the zero cross method was used to collect these data, identification to the species level was not always possible. However, the recorded data includes evidence that all eight (8) of the species identified in 2011 and 2012 were potentially present in 2013.

Table 3-6: 2013 Bat Acoustic Monitoring Results

Species / Call Frequency	Number of Identified Passes	ESA Status ¹	SARA Status ²	S-rank ³
Eastern Red Bat (<i>Lasiurus borealis</i>)	7	-	-	S4
Hoary Bat (<i>Lasiurus cinereus</i>)	7	-	-	S4
Silver-haired Bat (<i>Lasionycteris noctivagans</i>)	7	-	-	S4
Myotis species ⁴	20	-	-	-
30 kHz:	58			
Big Brown Bat (<i>Eptesicus fuscus</i>)		-	-	S5
or Silver-haired Bat (<i>Lasionycteris noctivagans</i>)		-	-	S4
40kHz:	184			
Myotis species ⁴		-	-	-
or Eastern Red Bat (<i>Lasiurus borealis</i>)		-	-	-
or Tri-coloured Bat (<i>Perimyotis subflavus</i>)		Endangered	Endangered	S3?
Low Frequency:	266			
Hoary Bat (<i>Lasiurus cinereus</i>)		-	-	S4
or Big Brown Bat (<i>Eptesicus fuscus</i>)		-	-	S5
or Silver-haired Bat (<i>Lasionycteris noctivagans</i>)		-	-	S4

- Notes:
- ESA Status:** The Endangered Species Act 2007 (ESA) protects Species at Risk (Threatened and Endangered) at a provincial level.
 - SARA Status:** The Species at Risk Act (SARA) protects Species at Risk (Special Concern, Threatened and Endangered) at a federal level.
 - S-rank:** The natural heritage provincial ranking system (provincial S-rank) is used by the MNRF Natural Heritage Information Centre (NHIC) to set protection priorities for rare species and natural communities. Definitions are as follows:
 - S1 Extremely rare in Ontario; usually 5 or fewer occurrences in the province or very few remaining individuals; often especially vulnerable to extirpation.
 - S2 Very rare in Ontario; usually between 5 and 20 occurrences in the province or with many individuals in fewer occurrences; often susceptible to extirpation.
 - S3 Rare to uncommon in Ontario; usually between 20 and 100 occurrences in the province; may have fewer occurrences, but with a large number of individuals in some populations; may be susceptible to large-scale disturbances. Most species with an S3 rank are assigned to the watch list, unless they have a relatively high global rank.
 - S4 Common and apparently secure in Ontario; usually with more than 100 occurrences in the province.
 - S5 Very common and demonstrably secure in Ontario.
 - SH Possibly Extirpated (Historical). Species or community occurred historically in the nation or state/province, and there is some possibility that it may be rediscovered. Its presence may not have been verified in the past 20-40 years.
 - S#S# A numeric range rank (e.g., S2S3) is used to indicate any range of uncertainty about the status of the species or community.
 - S#? Rank uncertain.
 - Because the zero cross method was used to collect these data, identification to the species level was not always possible.

3.3 Bat Migration Monitoring Results

No bats were identified during the 2011 and 2012 passive IR camera surveys completed during nocturnal passerine migration surveys. Refer to *Summary of 2011, 2012 and 2013 Spring and Fall Passerine Migration Surveys – Henvey Inlet Wind Energy Centre* (AECOM, 2015) for additional information related to the methods and results of the passive IR camera surveys.

4. Summary

LGL conducted the following bat acoustic monitoring surveys in 2011 and 2012 within the HIWEC study area:

- A total of ten (10) acoustic monitors were deployed across 20 monitoring stations between June and August 2011.
- While eight (8) acoustic monitor locations were provided by LGL for the 2012 season, acoustic monitoring data files were provided for only two (2) monitors installed in 2012.
- These surveys documented the presence of the following four (4) Provincial Species At Risk, all listed as Endangered under the provincial *Endangered Species Act*, Eastern Small-footed Myotis (*Myotis leibii*), Little Brown Bat (*Myotis lucifugus*), Northern Myotis Bat (*Myotis septentrionalis*) and Tri-coloured Bat (*Perimyotis subflavus*). With the exception of Eastern Small-footed Myotis, these species are also Federal Species at Risk, as they are listed as Endangered under the federal *Species At Risk Act*.

Stantec conducted the following bat acoustic monitoring surveys in 2013 within the HIWEC study area:

- A total of 11 acoustic monitors were deployed in the HIWEC study area in 2013.
- Because the zero cross method was used to collect these data, identification to the species level was not possible for the target species. However, the recorded data includes evidence that all eight (8) of the species identified in 2011 and 2012 were potentially present in 2013.

5. Assumptions and Clarification

5.1 2011 and 2012 Data

The following are assumptions and clarifications made and / or required by AECOM based on the field notes provided by LGL in May 2015:

- LGL provided acoustic data files in a “WAC” format for the ten (10) acoustic monitors (Wildlife Acoustics SM2BAT units) deployed in 2011. Locations for an additional eight (8) additional acoustic monitors deployed in 2012 were provided however acoustic monitoring data was provided for only two (2) monitors installed 2012. No locational information was provided, however, these are assumed to have been installed on meteorological towers.
- Information regarding the length of time that acoustic monitoring was conducted, weather conditions, time of day/night, how many nights were recorded, etc. was not summarized or provided by LGL.

5.2 2013 Data

The following are assumptions and clarifications made and / or required by AECOM based on the field notes provided by Stantec in October 2014:

- Field data sheets were provided for four (4) bat detector sites, which correspond to Stations 8, 9, 10 and 11 based on the UTM co-ordinates on the field sheets and those recorded in the Excel file entitled *All survey locations_UTM_MC_07112013.xlsx*. There were no field data sheets provided for stations 1 to 7. Stantec provided comments to AECOM on February 26, 2015 which confirmed that bat surveys were conducted at all 11 sites (1 to 11).
- Information regarding the length of time that acoustic monitoring was conducted, weather conditions, time of day/night, how many nights were recorded, etc. was not provided by Stantec. Stantec provided comments to AECOM on February 26, 2015 which confirmed that acoustic monitoring was conducted from dusk to dawn and that other details beyond what was provided in the field notes are unavailable.
- Information regarding how the acoustic monitoring survey stations were selected and why the acoustic monitors were set up at ground level was not provided by Stantec. Stantec provided comments to AECOM on February 26, 2015 which confirmed that the monitoring stations were selected based on access and coverage of different habitat types. The surveys were intended to identify bat Species at Risk therefore ground level surveys were considered to be ideal by Stantec.

6. References

AECOM, 2015:

Spring and Fall Passerine Migration Surveys – Henvey Inlet Wind Energy Centre. Prepared for Henvey Inlet Wind LP.

LGL Limited, 2011a:

Work plan for the Nigig Power Wind Farm Project Background Ecological Studies. Prepared for Genivar on behalf of Nigig Power Corporation, 17 p.

LGL Limited, 2011b:

Henvey Inlet Biological Survey Update July 2011 Interim Draft Report. Prepared for Genivar on behalf of Nigig Power Corporation, 17 p.

Stantec Consulting Ltd., 2013:

2013 Terrestrial Survey Work Program. Prepared for Nigig Power Corp., 25 p.

Appendix A

Field Notes and Documentation

Bat Box ID	Date installed	Notes	Date removed	UTM easting	UTM northing
1A	2011-Jun-15		2011-Jun-24	524053	5081378
1B	2011-Jun-30	batteries replaced Wed July 13, box kept in same location	2011-Jul-29	523873	5076427
2A	2011-Jun-15		2011-Jun-22	528483	5078343
2B	2011-Jun-23		2011-Jul-14	525043	5074684
2C	2011-Jul-15		2011-Aug-05	529462	5077332
3A	2011-Jun-17		2011-Jun-29	524048	5077050
3B	2011-Jun-29	batteries replaced Wed July 13, box kept in same location until Aug 4	2011-Aug-04	529310	5079337
4A	2011-Jun-20	Box knocked out of tree, microphone chewed on by bear	2011-Jul-12	523896	5078211
5A	2011-Jun-20		2011-Jul-12	523462	5077271
5B	2011-Jul-12		2011-Aug-04	526697	5076858
6A	2011-Jun-20		2011-Jun-30	532228	5078610
6B	2011July-01	batteries replaced Wed July 13, box kept in same location	2011-Jul-18	527987	5078025
6C	2011-Jul-18		2011-Aug-04	527569	5077035
7A	2011-Jun-21	bungee cord snapped by bear, and recording time set incorrectly	2011-Jul-13	527052	5079585
7B	2011-Jul-14		2011-Jul-29	524457	5076595
8A	2011-Jun-21		2011-Jul-12	527489	5078099
8B	2011-Jul-12		2011-Jul-29	525188	5075901
9A	2011-Jun-21		2011-Jul-14	525857	5079081
9B	2011-Jul-15		2011-Aug-05	529502	5077963
10A	2011-Jun-21		2011-Jul-14	526298	5078211
10B	2011-Jul-14	Bear knocked box out of tree, chewed on microphone	2011-Aug-04	524635	5077456

Bat Box ID (name in GPS)	Date installed	Notes	Date removed	UTM easting	UTM northing
2012 Bat 05	2012-May-23	Along L transect; changed programming on Friday June 1 2012, and Memory card in slot A was 15 percent full, switched it to Slot B, put empty card in Slot A	2012-Jun-22	524596	5080567
2012 Bat 09	2012-May-24	same spot as Bat 7 last year, near point C7 (Bat 7 last year had incorrect programming and was torn down by bear); changed batteries Monday June 4th, 2012, memory card said was 35% full	2012-Jun-21	527083	5079585
2012 Bat 09B	2012-Jun-22	At end of Q transect	2012-Jun-28	528411	5080951
2012 Bat 02	2012-May-25	Near Met tower 4	2012-Jun-18	529737	5076486
2012 Bat 02B	2012-Jun-20	Along trail to Met tower 2	2012-Jun-29	528073	5079059
2012 Bat 03	2012-May-30	At end of H transect	2012-Jun-20	527158	5075210
2012 Bat 03B	2012-Jun-22	Along M Transect	2012-Jun-27	526488	5081253
2012 Bat 06	2012-Jun-05	Near point O5	2012-Jun-25	523171	5075190

*Monday June 25th, 2012; Sarah Richer gave Andrew Davis the bat box data to transfer over

**time between deployment and collection does not indicate number of days of data recorded as the batteries may have died between those times; refer to bat box memory cards

Area A		Point Counts			First Visit	Second Visit
Code	Site	Zone	Easting	Northing		
1 A1	PC201	17T	526702	5078127	4-Jun-13	24-Jun-13
2 A2	PC203	17T	526173	5078766	4-Jun-13	24-Jun-13
3 A3	PC204	17T	526055	5079242	4-Jun-13	24-Jun-13
4 A4	PC206	17T	525618	5079954	4-Jun-13	24-Jun-13
5 A5	PC207	17T	525194	5080508	4-Jun-13	24-Jun-13
6 A6	Marsh 1	17T	525860	5079203	4-Jun-13	24-Jun-13
7 A7	V1	17T	524660	5076679	16-Jun-13	26-Jun-13
8 A8	V2	17T	524778	5077164	16-Jun-13	26-Jun-13
9 A9	V3	17T	524635	5077455	16-Jun-13	26-Jun-13
10 A10	W01	17T	523585	5077154	7-Jun-13	21-Jun-13
11 A11	W02	17T	523365	5077772	7-Jun-13	21-Jun-13
12 A12	W03	17T	523059	5078254	7-Jun-13	21-Jun-13
13 A13	W04	17T	523133	5078765	7-Jun-13	21-Jun-13
14 A14	W05	17T	523320	5079223	7-Jun-13	21-Jun-13
15 A15	W06	17T	523693	5079796	7-Jun-13	21-Jun-13

Area B		Point Counts				
	Site	Zone	Easting	Northing		
16 B1	PC216	17T	528618	5079111	7-Jun-13	20-Jun-13
17 B2	PC217	17T	528666	5079514	7-Jun-13	20-Jun-13
18 B3	PC218	17T	528361	5079267	7-Jun-13	20-Jun-13
19 B4	PC222	17T	528063	5079633	7-Jun-13	20-Jun-13
20 B5	PC233	17T	527935	5080068	7-Jun-13	20-Jun-13
21 B6	PC224	17T	527602	5080573	7-Jun-13	20-Jun-13
22 B7	PC225	17T	527283	5081020	7-Jun-13	20-Jun-13
23 B8	PC226	17T	527388	5080346	7-Jun-13	20-Jun-13
24 B9	PC232	17T	529216	5079462	8-Jun-13	25-Jun-13
25 B10	PC233	17T	528979	5079939	8-Jun-13	25-Jun-13
26 B11	PC234	17T	528937	5080074	8-Jun-13	25-Jun-13
27 B12	PC235	17T	528809	5080360	8-Jun-13	25-Jun-13
28 B13	PC236	17T	528682	5080494	8-Jun-13	25-Jun-13
29 B14	PC237	17T	528532	5080879	8-Jun-13	25-Jun-13
30 B15	PC238	17T	528438	5081043	8-Jun-13	25-Jun-13
31 B16	PC239	17T	528256	5081418	8-Jun-13	25-Jun-13

Area C		Point Counts				
	Site	Zone	Easting	Northing		
32 C1	PC209 (forest)	17T	533565	5081897	6-Jun-13	18-Jun-13
33 C2	X1	17T	530013	5078948	6-Jun-13	20-Jun-13
34 C3	X2	17T	530558	5079625	6-Jun-13	20-Jun-13
35 C4	X3	17T	530764	5080346	6-Jun-13	20-Jun-13
36 C5	X4	17T	531110	5080754	6-Jun-13	20-Jun-13

Area D

		Point Counts				
	Site	Zone	Easting	Northing		
37 D1	PC210	17T	533332	5079992	6-Jun-13	18-Jun-13
38 D2	PC211	17T	532871	5078133	6-Jun-13	18-Jun-13
39 D3	PC212	17T	532092	5078861	6-Jun-13	18-Jun-13
40 D4	PC214	17T	529757	5078310	6-Jun-13	18-Jun-13
41 D5	D1 (?) T01	17T	529201	5077915	17-Jun-13	28-Jun-13
42 D6	D2 (?) T02	17T	529411	5077454	17-Jun-13	28-Jun-13
43 D7	D3 (?) T03	17T	529783	5077131	17-Jun-13	28-Jun-13
44 D8	D4 (?) T04	17T	529758	5076540	17-Jun-13	28-Jun-13
45 D9	D5 (?) T05	17T	530275	5076494	17-Jun-13	28-Jun-13
46 D10	D6 (?) T06	17T	530830	5076637	17-Jun-13	28-Jun-13
47 D11	D7 (?) T07	17T	530650	5077108	17-Jun-13	28-Jun-13
48 D12	Z1	17T	532946	5080021	4-Jun-13	18-Jun-13
49 D13	Z2	17T	532736	5079563	4-Jun-13	18-Jun-13
50 D14	Z3	17T	532482	5079124	4-Jun-13	18-Jun-13
51 D15	Z4	17T	532289	5078660	4-Jun-13	18-Jun-13
52 D16	Z5	17T	531989	5078254	4-Jun-13	18-Jun-13
53 D17	Z6	17T	531846	5077768	4-Jun-13	18-Jun-13
54 D18	Z7	17T	531934	5077271	4-Jun-13	18-Jun-13
55 D19	Z8	17T	532418	5077061	4-Jun-13	18-Jun-13
56 D20	Z9	17T	532493	5076815	4-Jun-13	18-Jun-13
57 D21	Z10	17T	532678	5076615	4-Jun-13	18-Jun-13

Area E

		Point Counts				
	Site	Zone	Easting	Northing		
58 E1	PC10 (swd-ash)	17T	524945	5075396	5-Jun-13	25-Jun-13
59 E2	PC11 (marsh/fom)	17T	525437	5075483	5-Jun-13	25-Jun-13
60 E3	PC12 (swt/fom)	17T	526475	5075295	5-Jun-13	25-Jun-13
61 E4	PC8 (jack pine/red maple)	17T	526691	5075204	5-Jun-13	
62 E5	PC9 (pine)	17T	527088	5075214	5-Jun-13	
63 E6	PC7 (mas/oa/swc)	17T	527537	5074800	5-Jun-13	
64 E7	PC15(fom/poplar,spruce)	17T	525853	5076584	6-Jun-13	27-Jun-13
65 E8	PC13 (jack pine)	17T	526185	5076403	6-Jun-13	27-Jun-13
66 E9	PC14 (swt)	17T	526451	5076545	6-Jun-13	27-Jun-13
67 E10	PC16 (lowland spruce forest)	17T	527005	5076650	6-Jun-13	27-Jun-13
68 E11	PC17 (pine barren)	17T	527537	5076352	6-Jun-13	27-Jun-13
69 E12	PC18 (pine barren)	17T	527765	5075981	6-Jun-13	27-Jun-13
70 E13	PC1 (fom-pin/maple/oak)	17T	528208	5077811	7-Jun-13	24-Jun-13
71 E14	PC2 (bog)	17T	529355	5075881	7-Jun-13	24-Jun-13
72 E15	PC5 (pine barren)	17T	528224	5077357	7-Jun-13	24-Jun-13
73 E16	PC6 (pine barren)	17T	528325	5076931	7-Jun-13	24-Jun-13
74 E17	PC3 (pine barren)	17T	528789	5076454	7-Jun-13	24-Jun-13
75 E18	PC4 (bog)	17T	529180	5076307	7-Jun-13	24-Jun-13
76 E19	U1	17T	526702	5073100	15-Jun-13	26-Jun-13
77 E20	U2	17T	526797	5073664	15-Jun-13	26-Jun-13
78 E21	U3	17T	526621	5074132	15-Jun-13	26-Jun-13

79 E22	U4	17T	526118	5074163	15-Jun-13	26-Jun-13
80 E23	U5	17T	525769	5073789	15-Jun-13	26-Jun-13

Area F

Point Counts

	<i>Site</i>	<i>Zone</i>	<i>Easting</i>	<i>Northing</i>		
81 F1	Y1	17T	523131	5076211	5-Jun-13	19-Jun-13
82 F2	Y2	17T	522657	5076058	5-Jun-13	19-Jun-13
83 F3	Y3	17T	522275	5075719	5-Jun-13	19-Jun-13
84 F4	Y4	17T	522185	5075226	5-Jun-13	19-Jun-13
85 F5	Y5	17T	522697	5075239	5-Jun-13	19-Jun-13
86 F6	Y6	17T	523055	5074843	5-Jun-13	19-Jun-13
87 F7	Y7	17T	523375	5074421	5-Jun-13	19-Jun-13
88 F8	Y8	17T	523625	5074854	5-Jun-13	19-Jun-13
89 F9	Y9	17T	523294	5075229	5-Jun-13	19-Jun-13

Area MTO

Point Counts

	<i>Site</i>	<i>Zone</i>	<i>Easting</i>	<i>Northing</i>		
TL01	TL01	17T	533352	5083133	10-Jun-13	30-Jun-13
TL02	TL02	17T	533608	5080784	10-Jun-13	30-Jun-13
TL03	TL03	17T	533598	5079442	10-Jun-13	30-Jun-13
TL04	TL04	17T	534022	5078237	10-Jun-13	30-Jun-13
TL05	TL05	17T	534484	5076512	10-Jun-13	30-Jun-13
TL06	TL06	17T	534777	5075251	10-Jun-13	30-Jun-13
TL07	TL07	17T	535302	5074024	10-Jun-13	30-Jun-13
TL08	TL08	17T	535857	5072690	10-Jun-13	30-Jun-13
TL09	TL09	17T	536392	5071361	10-Jun-13	30-Jun-13
TL10	TL10	17T	537424	5070118	10-Jun-13	30-Jun-13
TL11	TL11	17T	538725	5069753	10-Jun-13	30-Jun-13
TL12	TL12	17T	539262	5068545	10-Jun-13	30-Jun-13
TL13	TL13	17T	539804	5066946	10-Jun-13	30-Jun-13
TL14	TL14	17T	540363	5065728	10-Jun-13	30-Jun-13
TL15	TL15	17T	540917	5064486	10-Jun-13	30-Jun-13
TL16	TL16	17T	541501	5063176	10-Jun-13	1-Jul-13
TL17	TL17	17T	541923	5061938	10-Jun-13	1-Jul-13
TL18	TL18	17T	542520	5060781	10-Jun-13	1-Jul-13
TL19	TL19	17T	543198	5059275	12-Jun-13	1-Jul-13
TL20	TL20	17T	544066	5058149	12-Jun-13	1-Jul-13
TL21	TL21	17T	544941	5057268	12-Jun-13	1-Jul-13
TL22	TL22	17T	545943	5056213	12-Jun-13	1-Jul-13
TL23	TL23	17T	546861	5054959	12-Jun-13	1-Jul-13
TL24	TL24	17T	547179	5053667	12-Jun-13	1-Jul-13
TL25	TL25	17T	547588	5052527	12-Jun-13	1-Jul-13
TL26	TL26	17T	548249	5051310	12-Jun-13	1-Jul-13
TL27	TL27	17T	548537	5050090	12-Jun-13	1-Jul-13
TL28	TL28	17T	549682	5048337	12-Jun-13	2-Jul-13
TL29	TL29	17T	550511	5047371	12-Jun-13	2-Jul-13
TL30	TL30	17T	551720	5046617	12-Jun-13	2-Jul-13

TL31	TL31	17T	552831	5046119	12-Jun-13	2-Jul-13
TL32	TL32	17T	554042	5045491	12-Jun-13	2-Jul-13
TL33	TL33	17T	555293	5044758	12-Jun-13	2-Jul-13
TL34	TL34	17T	556389	5043937	12-Jun-13	2-Jul-13
TL35	TL35	17T	557486	5043000	12-Jun-13	2-Jul-13
TL36	TL36	17T	558569	5041932	12-Jun-13	2-Jul-13
TL37	TL37	17T	559620	5040841	12-Jun-13	2-Jul-13
TL38	TL38	17T	560672	5039756	13-Jun-13	2-Jul-13
TL39	TL39	17T	561721	5038694	13-Jun-13	3-Jul-13
TL40	TL40	17T	562680	5037847	13-Jun-13	3-Jul-13
TL41	TL41	17T	563686	5036949	13-Jun-13	3-Jul-13
TL42	TL42	17T	564664	5035972	13-Jun-13	3-Jul-13
TL43	TL43	17T	565706	5034882	13-Jun-13	3-Jul-13
TL44	TL44	17T	566384	5034183	13-Jun-13	3-Jul-13
TL45	TL45	17T	573208	5029393	13-Jun-13	3-Jul-13
TL46	TL46	17T	572989	5029419	13-Jun-13	3-Jul-13
TL47	TL47	17T	568664	5031923	13-Jun-13	3-Jul-13
TL48	TL48	17T	564173	5036499	13-Jun-13	3-Jul-13
TL49	TL49	17T	561024	5039420	13-Jun-13	3-Jul-13
TL50	TL50	17T	558024	5042490	13-Jun-13	3-Jul-13
TL51	TL51	17T	540651	5065085	13-Jun-13	4-Jul-13
TL52	TL52	17T	572659	5030346	14-Jun-13	4-Jul-13
TL53	TL53	17T	578307	5022423	14-Jun-13	4-Jul-13
TL54	TL54	17T	581614	5020363	14-Jun-13	4-Jul-13
TL55	TL55	17T	581561	5020624	14-Jun-13	4-Jul-13
TL56	TL56	17T	582693	5018280	14-Jun-13	4-Jul-13
TL57	TL57	17T	582226	5019032	14-Jun-13	4-Jul-13
TL58	TL58	17T	582508	5016960	14-Jun-13	4-Jul-13
TL59	TL59	17T	583330	5016881	14-Jun-13	4-Jul-13
TL60	TL60	17T	582287	5018595	14-Jun-13	4-Jul-13



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Bat Detector Site Assessment

Project Number 160960824

Project Name: Henvey Inlet Wind Farm

Date / Time: July 8, 2013

Field Personnel: B. Miller, A. Corrigan

Location Data:

UTM: 17T 0533307, 5080078

DETECTOR HEIGHT (m): Ground Level

DETECTOR NAME: _____

ELEVATION (m): _____

DETECTOR TYPE (circle):

PHOTOS TAKEN: yes | no

high | low | tree | other

photos: _____

Community Description:

ELC: Deciduous Forest

General Description: Be sure to include presence of unique landforms (e.g., roads, cliffs, clearings, etc.).

Detector placed at side of Ground Hog Corners road in the Bracken Ferns.

TREE COVER IN VICINITY OF DETECTOR: Forest edge nearby

POTENTIAL ROOST SITES IN VICINITY: (i.e. buildings etc): Mature dead elm trees

AVAILABLE SNAGS NEARBY? ☒ yes | no

Nearby Communities:

WOODLAND CHARACTERISTICS

DISTANCE TO WOODLAND (m): 5

DOMINANT TREE SPECIES: Trembling Aspen

CANOPY HEIGHT (m): 18

UNDERSTOREY IS: open | ☒ cluttered

AGE: (Young, ☒ mid-aged, mature, old-growth): _____

CANOPY IS: open | ☒ closed | intermediate

WETLAND CHARACTERISTICS

DISTANCE TO WETLAND (m): 30

TYPE: marsh | ☒ swamp | open aquatic

other: _____

TREE COVER IN WETLAND (%): _____

Quality Control: This form is complete () & legible ().

Signature: A. Corrigan, B. Miller
(Field Personnel)

Signature: _____
(Project Manager)



Stantec

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Bat Detector Site Assessment

Project Number 160960824

Date / Time: July 9/13

Project Name: Henvey Inlet Wind Farm

Field Personnel: B. Miller, A. Corrigan

Location Data:

UTM: 17T 0527923, 5078019

DETECTOR HEIGHT (m): Ground level

DETECTOR NAME: _____

ELEVATION (m): _____

DETECTOR TYPE (circle):

PHOTOS TAKEN: yes | no

high | low | tree | other

photos: _____

Community Description:

ELC: Shrubby beach

General Description: Be sure to include presence of unique landforms (e.g., roads, cliffs, clearings, etc.).

Shrubby beach next to Aspen forest; by Joe's Cabin

TREE COVER IN VICINITY OF DETECTOR: Aspen

POTENTIAL ROOST SITES IN VICINITY: (i.e. buildings etc): Forest, Joe's Cabin?

AVAILABLE SNAGS NEARBY? yes | no

Nearby Communities:

WOODLAND CHARACTERISTICS

DISTANCE TO WOODLAND (m): 20

DOMINANT TREE SPECIES: Aspen

CANOPY HEIGHT (m): 20+

UNDERSTOREY IS: open | cluttered

AGE: (Young, mid-aged, mature, old-growth): _____

CANOPY IS: open | closed | intermediate

WETLAND CHARACTERISTICS

DISTANCE TO WETLAND (m): ?

TYPE: marsh | swamp | open aquatic

other: _____

TREE COVER IN WETLAND (%): _____

Quality Control: This form is complete () & legible ()

Signature: [Signature]
(Field Personnel)

Signature: _____
(Project Manager)



Stantec

Stantec Consulting Ltd.
70-1 Southgate Drive
Guelph, Ontario, Canada
N1G 4P5
Tel: (519) 836-6050
Fax: (519) 836-2493

Bat Detector Site Assessment

Project Number 160960824

Date / Time: July 10/13

Project Name: Henvey Inlet Wind Farm

Field Personnel: B. Miller, A. Corrigan

Location Data:

UTM: 17T 0529178, 5077784

DETECTOR HEIGHT (m): Ground level

DETECTOR NAME: _____

ELEVATION (m): _____

DETECTOR TYPE (circle):

PHOTOS TAKEN: yes | no

high | low | tree | other

photos: _____

Community Description:

ELC: Moist Deciduous Forest

General Description: Be sure to include presence of unique landforms (e.g., roads, cliffs, clearings, etc.).

On a stump ~~for~~ with abundant Bracken Fern around it, along a path

TREE COVER IN VICINITY OF DETECTOR: Red Maple / White Birch / Black Ash

POTENTIAL ROOST SITES IN VICINITY: (i.e. buildings etc): Mature trees

AVAILABLE SNAGS NEARBY? yes | no

Nearby Communities:

WOODLAND CHARACTERISTICS

DISTANCE TO WOODLAND (m): 0

DOMINANT TREE SPECIES: Red Maple / White Birch

CANOPY HEIGHT (m): 15-20m

UNDERSTOREY IS: open | cluttered

AGE: (Young, mid-aged, mature, old-growth): _____

CANOPY IS: open | closed | intermediate

WETLAND CHARACTERISTICS

DISTANCE TO WETLAND (m): ?

TYPE: marsh | swamp | open aquatic

other: _____

TREE COVER IN WETLAND (%): _____

Quality Control: This form is complete () & legible ().

Signature: [Signature]
(Field Personnel) B. Miller

Signature: _____
(Project Manager)



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Bat Detector Site Assessment

Project Number 160960824

Project Name: Henvey Inlet Wind Farm

Date / Time: July 11/13

Field Personnel: B. Miller, A. Corrigan

Location Data:

UTM: 17T 05 323 72.50 78536

DETECTOR HEIGHT (m): Ground level

DETECTOR NAME: _____

ELEVATION (m): _____

DETECTOR TYPE (circle):

PHOTOS TAKEN: yes | no

high | low | tree | other

photos: _____

Community Description:

ELC: Next to adjacent deciduous woods and Red Pine Plantation.

General Description: Be sure to include presence of unique landforms (e.g., roads, cliffs, clearings, etc.).

On the side of an ATV trail.

also in a sandy open area

TREE COVER IN VICINITY OF DETECTOR: _____

POTENTIAL ROOST SITES IN VICINITY: (i.e. buildings etc): _____

AVAILABLE SNAGS NEARBY? yes | no

Nearby Communities:

WOODLAND CHARACTERISTICS

DISTANCE TO WOODLAND (m): _____

DOMINANT TREE SPECIES: _____

CANOPY HEIGHT (m): _____

UNDERSTOREY IS: open | cluttered

AGE: (Young, mid-aged, mature, old-growth): _____

CANOPY IS: open | closed | intermediate

WETLAND CHARACTERISTICS

DISTANCE TO WETLAND (m): _____

TYPE: marsh | swamp | open aquatic

other: _____

TREE COVER IN WETLAND (%): _____

Quality Control: This form is complete () & legible ().

Signature: [Signature]
(Field Personnel)

Signature: _____
(Project Manager)

Appendix B

Work Plans

WORK PLAN FOR THE NIGIG POWER WIND FARM PROJECT BACKGROUND ECOLOGICAL STUDIES

**HENVEY INLET FIRST NATION
PICKEREL RIVER, ONTARIO**

prepared for

GENIVAR

on behalf of

NIGIG POWER CORPORATION

by



**JULY 2011
LGL PROJECT TA8027**

WORKPLAN FOR THE NIGIG POWER WIND FARM PROJECT BACKGROUND ECOLOGICAL STUDIES

**HENVEY INLET FIRST NATION
PICKEREL RIVER, ONTARIO**

prepared by:

Digital signature



**Arnel Fausto, M.Sc.
SENIOR ECOLOGIST**

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SENIOR BIOLOGIST**

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**JULY 2011
LGL PROJECT TA8027**

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1.0 INTRODUCTION

In 2011, the Nigig Power Corporation received approval under Ontario's Feed-In- Tariff (FIT) Program to construct a Wind Power Project at Henvey Inlet on Georgian Bay in the province of Ontario (Figure 1). With a total proposed rating of 300MW, the Nigig Power Wind Farm Project is the largest wind power project FIT contract awarded in Ontario. The expected Commercial Operation Date (COD) is February 2014. The Project study area encompasses the Reserve Lands of approximately 80 square kilometres (Figure 2). The major components of the Project, including all of the Project's wind turbines, are proposed to be located on Henvey Inlet First Nation Reserve No. 2 (Reserve No. 2). A transmission line that is part of the Project will be located off of Reserve No. 2 and a transformer station may be located off reserve in order to enable an interconnection with the Hydro One Transmission System. Vehicular access is limited to the unpaved Beganon Road, which leads to a boat ramp in the eastern end of the Inlet. The remainder of the study area is accessible only by boat during the open water season and, to some extent, by snowmobile during the winter.

The study area consists of rocky outcrops that form shallow, longitudinal ridges, oriented in a northwest to the southeast direction. Intervening pockets of wetlands, alder thickets, poplar and jack pine stands make up the balance of the site. Topographic relief decreases from the east to west direction with elevations ranging from a high of 216m at the eastern portions near Highway 69 to a low of 168m at the western shoreline at Georgian Bay.

2.0 WORK PLAN OVERVIEW

The background ecological studies were developed to address pathways of effect between the Project and the natural heritage resources that are known to occur in the study area and surrounding region. The study area is large and, given its location on the Georgian Bay shore, it may include migratory routes of birds and bats. Interaction with migratory species is considered to be of primary importance, as it has the potential to profoundly affect Project design, extent and operational strategies to effectively mitigate harm. As such, the background ecological studies include considerable focus on migratory studies.

On the ground, development of the Project will involve watercourse and wetland crossings, and the construction of access roads, overhead electrical collector lines and turbines that may displace some terrestrial habitat. There is considerable scope for identification and avoidance of sensitive habitats and implementation of effective and proven mitigation strategies where limited intrusion is unavoidable. The baseline ecological studies include elements of desktop and on-site evaluation that are tailored to the various wildlife groups based on their habitats and habits.

The documented effects of wind power projects have been largely focused on impacts to migrating and resident birds and bats. Accordingly, wind farms should be located, designed and managed so that there are no significant adverse impacts on seasonal migrants, including those species that are of acknowledged national and international importance, or their habitats. In terms of the location of the project study area, the major physiographic features include the Georgian Bay coastline and Henvey Inlet, which may be used to some degree as migratory pathways by birds and bats. Of secondary concern are the terrestrial and aquatic flora and fauna, which are affected largely by the location of specific Project components in and around their habitats. The following potential effects have been documented in literature with respect to development of wind farms:

- Collision with the moving turbine blades, with the turbine tower or associated infrastructure such as overhead power lines, or the wake behind the rotors causing injury, leading to direct mortality to migrating birds and bats;
- Disturbance or displacement from around the turbines or exclusion from the whole wind farm. Reduced reproductive success or reduced survival may result if birds are displaced from preferred habitat and are unable to find suitable alternatives;
- Barriers to movement disrupting ecological links between feeding, wintering, breeding and moulting areas and extended flights around wind clusters; and,
- Change to or loss of habitat due to wind turbines and associated infrastructure.

As part of effective planning, there is a need to identify migratory pathways and patterns in terms of level of activity across the study area throughout the migratory seasons. This information may be used to identify sensitive areas, seasons and weather conditions that can be used to guide design of the Project extent and operation. In addition, migratory stopover, breeding bird and acoustic bat surveys are being used to understand distribution of birds and bats that use on-site habitats and may therefore be affected by the Project.

With respect to birds and bats, the following guidance documents have influenced and guided the ongoing evaluation of the ecological baseline:

- Ontario Ministry of Natural Resources (2010) Birds and Bird Habitats: Guidelines for Wind Power Projects;
- Ontario Ministry of Natural Resources (2010) Bats and Bat Habitats: Guidelines for Wind Power Projects;
- Environment Canada and Canadian Wildlife Service (2007) Recommended Protocols for Monitoring Wind Impacts of Wind Turbines on Birds; and,
- Environment Canada and Canadian Wildlife Service (2007) Wind Turbines and Birds, A Guidance Document for Environmental Assessment.

It should be noted that the Province has no regulatory jurisdiction over the Henvey Inlet Reserve #2 lands and therefore the above noted MNR documents are being used for reference only.

With respect to resident plants and wildlife, and their habitats, specific approaches have been developed in relation to the known factors of habitat association, life history parameters and Project interactions. Existing ecological information, ranging from large-scale forest resource inventories to studies of specific reptile SAR, is available for the region surrounding the Study Area. This includes data collected in the Highway 400 corridor and within the several large parks on Georgian Bay. Much can be inferred from this information regarding the occurrence, distribution, habitats and habits of wildlife species in the Study Area. This will form the basis of effective mitigation strategies to reduce the interaction of plants and wildlife with the Project.

Table 1, below, summarizes the ecological receptors, pathways of effect and corresponding study approaches recommended, and currently underway, for the Nigig Power Wind Farm Project.

Table 1: Summary of Ecological Receptors, Pathways of Effect and Ecological Baseline Studies for the Nigig Power Wind Farm Project

Ecological Receptor	Effects Pathways	Recommended Studies	Timing
Birds and Bats (SAR and non-SAR birds) (non-SAR bats only)	Collision with turbines (migratory and resident/seasonal). Habitat loss (migratory stopover and resident/seasonal).	Visual/IR-assisted studies of spring and fall bird/bat migration across the study area, using Henvey Inlet as an east-west transect. Migratory stopover surveys include boat-based and aerial surveys of waterfowl, hawk-watch stations and terrestrial routes for other species. Breeding bird surveys using point-count survey protocol at sites distributed throughout the study area (spring and summer). Aerial surveys to investigate possible colonial waterbird, heron and raptor nesting sites. Acoustic detection of resident bats using automated Wildlife Acoustics SM2BAT detectors at sites distributed throughout the study area (spring/summer).	Migration (May 2011; Aug-Oct 2011; Mar-May 2012) Breeding birds (Jun-Jul 2011; May-Jun 2012) Bat Acoustic (Jun-Jul 2011; Jun-Jul 2012, if warranted following review of 2011 data)

Ecological Receptor	Effects Pathways	Recommended Studies	Timing
Game/furbearers (non-SAR only)	Habitat loss. Road effects (disturbance, hunting, predation, roadkill).	Incidental observations confirm species and distribution within study area. Traditional knowledge and cultural value of wildlife species and their habitats. Aerial observations (moose/deer winter yards, wildlife trails). Desktop and field confirmation of key wildlife habitat (e.g., wetland, stands of mature trees, etc.) and seasonal biology.	Incidental (year round) Traditional (summer/fall/winter 2011) Aerial (winter 2011)
Reptiles (SAR and non-SAR)	Direct mortality during site preparation. Habitat loss. Road effects during operation (disturbance, roadkill).	Incidental observations confirm species and distribution within study area. Focused habitat identification within construction footprint of Project elements (e.g., road alignments, laydown and tower areas). General habitat identification (and avoidance) by ELC delineation of wetland communities as preliminary constraints. Desktop review of key reptile habitat (e.g., overwintering sites, nesting and incubation areas) and seasonal biology (e.g., timings of key life history elements) to inform spatial and temporal avoidance and mitigation strategies.	Incidental (spring, summer and fall) Mitigation methods will be developed and focused habitat ID and implementation of avoidance/mitigation will occur during design, pre- construction and construction phases.
Amphibians (SAR and non-SAR)	Direct mortality during site preparation (watercourse & wetland crossings). Habitat loss. Sedimentation and erosion effects on aquatic and wetland habitats of amphibians. Road effects during operation (roadkill).	Incidental observations confirm species and distribution within study area. Focused habitat identification within construction footprint of Project elements (e.g., watercourse and wetland crossings). General habitat identification (and avoidance) by ELC delineation of wetland communities as preliminary constraints. Desktop review of key amphibian habitat (e.g., overwintering sites, breeding areas) and seasonal biology (e.g., overwintering, emergence, breeding) to inform spatial and temporal avoidance and mitigation strategies.	Incidental (spring, summer and fall) Mitigation methods will be developed and focused habitat ID and implementation of avoidance/mitigation will occur during design, pre- construction and construction phases.

Ecological Receptor	Effects Pathways	Recommended Studies	Timing
Fish (non-SAR only)	Harmful alteration, disruption, destruction (HADD) of fish habitat at watercourse crossings (minor tributaries only). Sedimentation and erosion during construction and operations.	Focused fish habitat and fish community assessments within construction footprints (e.g., at watercourse crossings). Includes descriptions of physical habitat features (channel form, depth, flow, substrates, migration barriers, etc.), aquatic and riparian plant communities and fish community. Data to support selection of appropriate temporal, spatial and physical mitigation measures to minimize effects on fish habitat.	Incidental (spring, summer, fall) Focused assessment of watercourse crossings will be undertaken at design/permitting stage to support application to DFO for Fisheries Act Authorization if HADD to occur
Plants (SAR and non-SAR)	Direct loss/mortality of vegetation in cleared areas. Loss of vegetation communities during construction. Native plants may be used in traditional native medicine.	Desktop delineation of vegetation communities (aerial image interpretation; Forest Resource Inventory mapping). Supports assessment of effects on plants and basis for wildlife habitat assessment. Identification of wetlands and SAR plants as preliminary constraints. Focused assessment, including confirmation of significant species, within construction footprints. Traditional knowledge and cultural value of wild plant species and their habitats. Aerial and ground-based confirmation of valued vegetation communities (e.g., large stands of white pine, wetlands).	Field observations and confirmation of SAR, etc. (spring, summer, fall) Traditional (summer, fall 2011) Focused vegetation assessments may be required at design and pre-construction phases to confirm SAR or significant plants or plant communities

3.0 ECOLOGICAL STUDY APPROACH

The ecological baseline study approach has been designed to determine site sensitivity to the Project through a broad landscape-scale analysis using known ecological data and life history information, supplemented by new data collected within the study area. Sensitive areas will be identified as preliminary constraints on the basis of such criteria as habitat features, vegetation community, wildlife distribution and migratory patterns. Areas of lower sensitivity will emerge as preliminary opportunities for Project footprint, including access roads, transmission lines and turbine sites. Fine tuning of the layout and configuration will involve focused wildlife habitat identification and avoidance, particularly for Species-at-Risk and plants and wildlife that have traditional cultural significance. These approaches allow for the parallel collection of seasonally dependent ecological information about the site, as well as allow for the design and development of the Wind Power Project within the FIT Program timelines. Consultation with the Responsible Authority is a key component of the work plan and will be initiated early in the process to facilitate and incorporate meaningful feedback.

3.1 PRELIMINARY INFORMATION ACQUISITION AND DESKTOP REVIEW

Initial tasks of the baseline ecological studies were focused on compiling, reviewing and manipulating aerial and satellite imagery and forest/ecological mapping available for the study area. Due to the isolation of the site and lack of established transportation routes within the study area, much of the data available for use in this study include studies that were initiated by HIFN to serve their needs and remote sensing information. Work plan components for preliminary information acquisition include:

- Identification of regional natural heritage features;
- Assessment of landscape component features;
- Forest Resource Inventory Mapping and Ecological Lands Mapping;
- Database query on all known records of birds, bats, and SAR from local band, other studies conducted in the vicinity of the project site, local agency, naturalist and Bird Studies Canada, and other expert records; and
- A literature review of relevant plant and wildlife species studies, conservation objectives and issues related to the pathways of effect identified for the Project.

Assessment of landscape components utilized the following satellite imagery sources:

- FRI aerial photo ortho-images;
- Geoeye-1 new satellite images (0.5 m pixel);
- IKONOS archived satellite images (1 m pixel);
- FRI classification mapping;
- FRI Colour Infrared images; and,
- FRI DEM.

The imagery listed above was used to identify and map discrete units of habitat and cover, and these are among the primary constraints to the wind farm layout. Raw satellite imagery (Figure 2) and Forest Resource Inventory (FRI) mapping (Figure 3) and its associated layers are used to obtain other information regarding the topography and terrain associated with the site and was used to classify data into Ecological Lands Classification (ELC) Units. The ELC is used to delineate areas of landscape for sensitivity analysis based on vegetation community types and habitat associations for wildlife species and communities.

At present, the focus of the ELC-based analysis is identification and delineation of wetland units throughout the study area. The ELC analysis has been based on satellite and air photo images, supplemented by ground-truth surveys by the project botanist through reconnaissance of the study area by fixed wing aircraft, boat and pedestrian surveys. This has provided a preliminary constraint layer for the study area, as there are numerous ecological, engineering and economic justifications for avoiding intrusion of Project elements into wetlands. Specifically, minimizing intrusion into and crossing of wetland areas is a key mitigation strategy to limit Project effects on sensitive plant communities, potential SAR plants, fish and fish habitat, key amphibian habitats including breeding, nursery and overwintering areas, key reptile habitats including overwintering sites of SAR turtles and snakes and important breeding and feeding habitat for many other wildlife species.

3.2 FIELD INVESTIGATIONS

Screening level information will be obtained for the identification of major constraint areas, such as hibernaculae of bats and reptiles, major flyway corridors, waterfowl congregation areas, major wetlands, and areas of high quality vegetation communities (unique habitats such as fens, bogs, seepage zones, sand barrens, alvars) which have the potential for rare plants; and forested areas with high affinity for breeding birds and other wildlife. Once the major constraint areas are identified, it is anticipated that the information can be used to plan project components away from these zones. As constraints and Project design are considered in an iterative fashion, focused confirmation of plant and wildlife habitat, species and community characteristics will be undertaken on a site-specific basis within the project study area to support avoidance, mitigation and restoration strategies.

Because of the timeline associated with this project, preliminary field work collection was recommended to ensure that seasonally dependent data is collected in a timely manner to allow for fine tuning of the wind turbine layout. Biological fieldwork commenced in late April 2011 through reconnaissance investigations of the site and field observations of spring migratory birds, breeding birds, and bats. Incidental observations for other species and habitat features were also collected at that time.

3.2.1 Avian Surveys

Avian surveys have been targeted for migratory and breeding birds, as detailed in the following sections. The sections are separated by breeding bird consideration and field approach, and the migratory birds and field approach.

3.2.1.1 Breeding Bird Survey Considerations

- **Waterfowl** – breeding waterfowl are not expected to be abundant, however could be present in wetlands or small lakes and ponds.
- **Raptors** – breeding raptors may be at increased risk of collision with turbines because they tend to fly high and traverse the area repeatedly on a daily basis.
- **Colonial Waterbirds** – nesting colonies of species such as Double-crested Cormorant, Great Blue Heron, Black-crowned Night-Heron, gulls and terns may be present in the study area, and if so could be a concern depending on their location relative to the Project.
- **Passerines** – although not expected to be at great risk of mortality from turbines, habitat of breeding passerines could be affected by the Project. At this point, field studies have focused on covering the study area well and covering representative habitats to obtain a landscape-level understanding of breeding bird community and distribution.

3.2.1.2 Field Study Approach to Breeding Birds

- **Waterfowl** – incidental observations were made by field staff while in the study area during the 2011 breeding bird season.
- **Raptors** – An aerial survey was flown on June 9th to search for large nests (herons, hawks and eagles). Territories for more secretive species may be detected during breeding bird point counts (see below) or incidentally.
- **Colonial Waterbirds** – Aerial survey conducted to discover nesting colonies of Great Blue Heron. Gull and tern colonies will be investigated by a coastal survey conducted by boat, as well as observations from the air.
- **Passerines** – Point counts and incidental observations will be used as the effective means for developing a species list for the site. Point counts followed EC guidelines, and will be used for the purpose of contributing to existing knowledge of the use of the site by birds during the breeding season, and to facilitate comparisons with the post-construction breeding bird community. Surveys were undertaken twice during the breeding season. Points were placed in representative habitats and distributed across the landscape to capture any habitat gradient which may be present across the study area.

Monitored Species / Behaviour	Sampling Method	Timing and Frequency
Waterfowl	Incidental observations from ground and aerial surveys	Throughout breeding season
Raptors	Aerial survey for large stick nests (Bald Eagle, Osprey), incidental observations.	Breeding season
Colonial Waterbirds	Aerial survey for heron nests, boat-based surveys of outer islands for other species	Breeding season
Passerines	A series of point counts established across the study area	Each point surveyed twice between May 30 and July 7, at least 10 days apart

3.2.1.3 Migratory Bird Considerations

- **Waterfowl** – migrating waterfowl may use Henvey Inlet or inlets to the north or south as stopover areas and this potential needs to be verified by field observations. Of particular concern would be overland flights by migratory waterfowl between Henvey Inlet and inlets to the north or south.
- **Raptors** – migrating raptors typically follow shorelines of Great Lakes. Field investigations will need to determine the magnitude of raptor migration through the site and where it is concentrated.
- **Passerines (nocturnal migrants)** – the majority of passerines migrate at night, at altitudes from close to ground level to well over 1 km. They are at risk of collision with towers and with the turbines, with an increased risk by lighting on the towers. Field investigations will need to determine the magnitude and altitude of nocturnal migrants across the study area. Nocturnal passerine migration generally occurs along a broad front, and flight altitude is largely determined by weather, however local features such as ridges or valleys may concentrate the number of migrants exposed to risk. Fortunately, the study area is characterized by relatively low relief.
- **Passerines (stopover sites)** – migration is energetically demanding for passerines and they require stopover habitat to feed and rest before continuing with migration. Habitat destruction in stopover areas is thought to be a primary cause of decline in migratory birds. This may not be as much of a concern for this project since the habitat in the surrounding area is fairly intact and the Project footprint would disturb only a small percentage of available natural habitat within the study area. However, shorelines can concentrate migrants so field investigations need to determine whether some areas are particularly important stopover sites.

3.2.1.4 Proposed Field Study Approach to Migratory Birds

- **Waterfowl** – visual monitoring, including passive IR camera techniques, and aerial observation surveys using fixed wing aircraft will be used to determine the magnitude and extent of waterfowl migration. These techniques will be employed at the site during the Fall Migration period in 2011 and Spring Migration in 2012.
- **Raptors** – raptor observation posts have been established in three locations along the Inlet. Regular visual watches during spring and fall migration are a straightforward method to determine magnitude of use and species involved. Diurnally migrating passerines such as Blue Jays and blackbirds will also be observed by this method.
- **Passerines (nocturnal migrants)** – visual and passive IR surveys will be used to monitor the movement of passerines during the Fall Migration period in 2011 and Spring Migration in 2012. The survey will utilize a number of locations situated along an east-west transect, accessible by boat along Henvey Inlet.

- **Passerines (stopover sites)** – regular stopover counts will be undertaken along a series of transects which will be surveyed weekly during the migration period. All birds encountered will be recorded (species & number).

Monitored Species / Behaviour	Sampling Method	Timing and Frequency
Waterfowl	Fixed wing aerial surveys of the study area and the immediately surrounding region	3 aerial surveys of region spaced throughout the migration period
Raptors and Diurnal Migrants	Standardized watches from 3 sites along the inlet.	September & October; 3 to 4 days per week
Nocturnal Migrants	Thermal infrared camera will be used to observe nocturnal migrants. A number of acoustic monitoring units will be spaced along the inlet to record night migrating birds.	IR – 2 weeks in September Acoustic – September to October
Stopover sites (passerines)	A series of transects will be set up across the study area and surveyed weekly for migrants	Mid August to October; 2 to 3 times per week

3.2.2 Bat Surveys

A screening level survey will be implemented in 2011 to determine the level of use of the site by bats, to identify significant habitat, and important habitat features or high use areas in the project area. Acoustic monitors were deployed in June and July 2011. The results of the 2011 acoustic monitoring will be reviewed to determine if additional monitoring is warranted perhaps in a more focused assessment based on initial data analysis and emerging Project layout.

3.2.2.1 Acoustic Monitoring of Bats

GENIVAR and LGL have initiated preliminary acoustic monitoring in June and July 2011 to attempt to identify the relative levels of bat activity across the study area during the late spring and early summer. These surveys are not focused on any anticipated turbine layout, but were intended to achieve broad geographical coverage of the study area, utilizing the established breeding bird routes for logistical efficiency. This preliminary data will contribute to a landscape-level understanding of bat distribution throughout the study area. The work plan includes:

- Deployment of 10 automatic acoustic monitors (Wildlife Acoustics SM2BAT units) at sites throughout the study area;
- Deployment and retrieval along or adjacent to existing breeding bird study routes for logistical efficiency;
- Shifting monitors to a number of locations to increase coverage; and,
- Incidental observations of bats during field surveys.

3.2.2.2 Bat Migration Monitoring

Bat migration will be investigated concurrently with bird migration with the use of visual observations augmented by the use of passive IR camera. The fall migratory study period from August to October is intended to capture peak bat activity in August.

3.2.3 Wildlife Habitat, Fish Habitat, and Species-at-Risk

Unlike other wind farm projects where the majority of wind turbine components will be situated in remnant agricultural lands, the Nigig Power Wind Farm Project will be situated in relatively undisturbed lands. Accordingly, it can be assumed that the ultimate wind farm location will be within an area already occupied by native flora and fauna, including several SAR. Blanding's Turtle, Five-lined Skink, Fox Snake, Hognose Snake and Massasauga Rattlesnake have been confirmed in the study area. At least one SAR plant species may occur within wetlands in the study area, although it cannot be confirmed until August or September.

Early indications are that wildlife SAR may be broadly distributed throughout the study area, occupying specific suitable habitats within the mosaic of upland and wetland that characterizes the local terrain. Baseline ecological investigations may benefit from incidental and focused confirmation of species presence; however detailed identification of specific habitats and occurrences is likely to be focused during an iterative detailed design and "tweaking" of the Project layout. This approach is proposed to address fish habitat and wildlife habitat for plants, amphibians, reptiles, birds and mammals, as detailed avoidance and mitigation strategies are developed using known species-specific life history and habitat associations. Avoidance of critical habitats to the extent possible will be a key strategy, in combination with identification and use of timing windows to avoid harm to sensitive seasonal life stages (e.g., nests) or during vulnerable periods (e.g., hibernation, gestation). Where sensitive habitats may be disturbed, focused mitigation may include relocation of individual specimens and associated habitat elements such as cover items (e.g., rocks and logs) outside of the work area. Mitigation/avoidance strategies throughout the Project phases will shift from early identification of broad preliminary constraints at a landscape level to the site-by-site implementation of mitigation plans during design, assessment and construction of access roads, watercourse crossings, turbines and transmission infrastructure. It is anticipated that ongoing consultation with CWS will occur throughout the project in relation to these species.

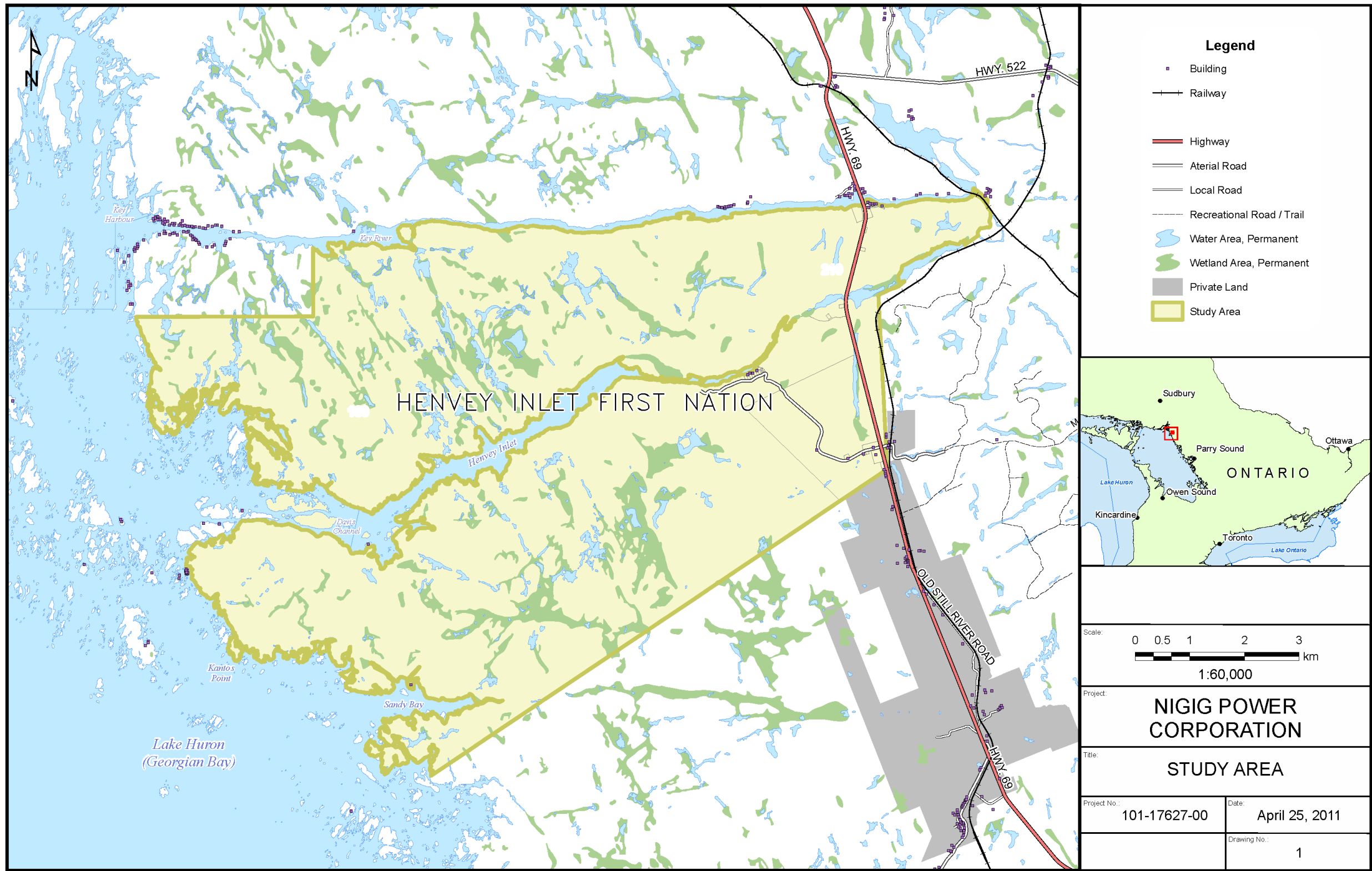


Figure 1 Location of Nigig Power Wind Farm Project Study Area

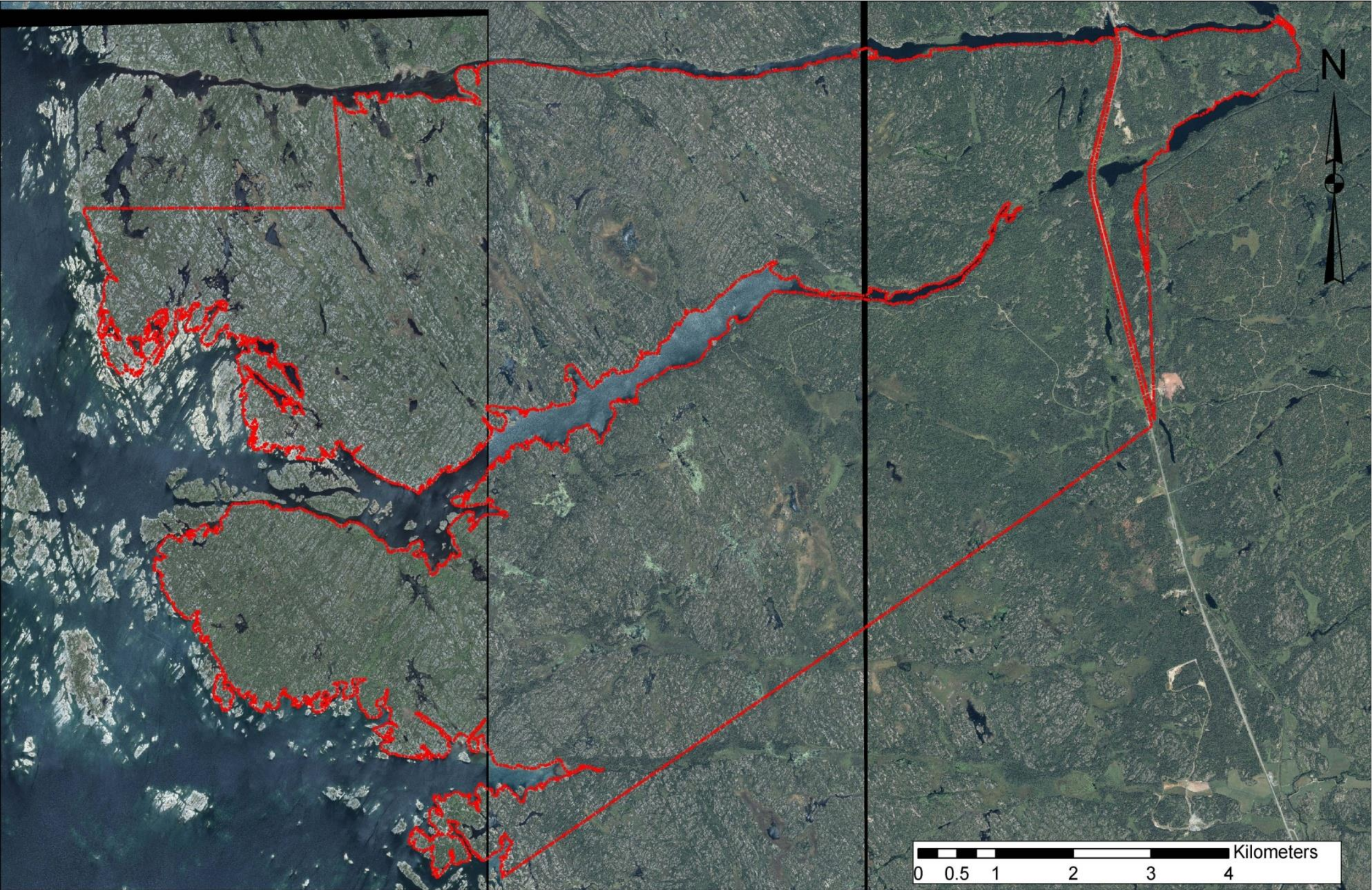
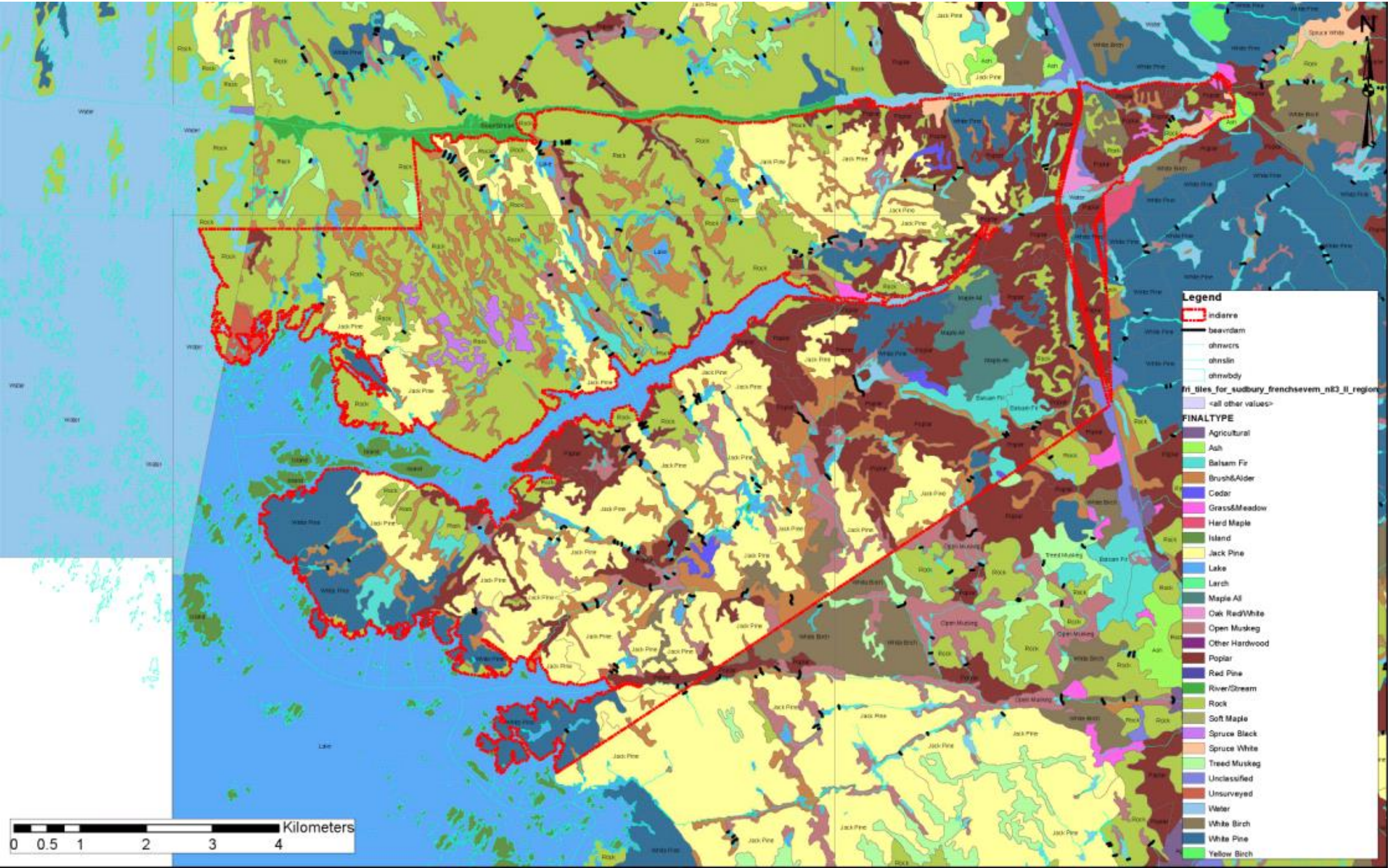


Figure 2 Satellite Imagery of the Nigig Power Wind Farm Project Area (Project Study Area shown in red)

(Source: GeoEye Jun 2003 to July 2008 compilation)



(Source: MNR, 1995-98 data)

Figure 3 Forest Resource Inventory of the Nigig Power Wind Farm Project Area (Project Study Area shown in red)



**2013 TERRESTRIAL SURVEY
WORK PROGRAM**

File No. 160960770
March 2013

Prepared for:

Nigig Power Corp.
Henvey Inlet Wind Project

Prepared by:

Stantec Consulting Ltd.
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Guelph ON N1G 4P5

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1.0 Terrestrial Field Program

Stantec Consulting Ltd. ("Stantec") is providing this work plan to Environment Canada for the terrestrial field investigations for the 300 MW, Feed-In Tariff ("FIT") Contracted, Henvey Inlet Wind Project (the "Project"). The key Project elements include:

- i) *On-Reserve Facilities:* up to 120 wind turbines, a transformer station, operations and maintenance building, access roads, collector lines, and ancillary facilities on Henvey Inlet First Nation Lands (Reserve No. 2); and
- ii) *Off-Reserve Facilities:* approximately 90 km of 230 kV, double circuit overhead transmission line from Reserve No. 2 to the Town of Parry Sound, Ontario where the project will interconnect with the provincial electricity grid at Hydro One Networks Inc.'s ("Hydro One") existing Parry Sound Transformer Station. The transmission line, as presently proposed, would be located within the current and future rights-of-way held by the Ontario Ministry of Transportation for King's Highway 69/400.

Save the Project's transmission line and interconnection works at the Parry Sound Transformer Station, all Project infrastructure will be located on Henvey Inlet First Nation Reserve Lands (Reserve No. 2). Preliminary siting of the wind turbines, collector lines, operations and maintenance building, transformer station, and access roads are in progress and are taking into account important cultural and environmental features as they are identified through field surveys, traditional ecological knowledge studies, and engagement efforts with the Henvey Inlet First Nation community.

For the transmission line, as proposed to be located within the current and future rights-of-way held by the Ontario Ministry of Transportation for King's Highway 69/400, the natural heritage field investigations for the majority of the transmission corridor fall under the requirements of Ontario Regulation 116/01 of Ontario's *Environmental Assessment Act* and will therefore be subject to review and approval by the Ministry of the Environment. However, portions of the highway corridor traverses roughly 35 ha of the Magnetewan First Nation Reserve (No. 1) and about 11 ha of the Shawanaga First Nation Reserve (No. 17), lands which are under federal jurisdiction.

Throughout this document, the wind project component on the Reserve Lands will be referred to as the Project Location and the transmission line corridor will be referred to as the Transmission Line. Collectively, these areas will be referred to as the Study Area for the purpose of the terrestrial survey work program.

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The Project Location and Transmission Line alignment are shown on **Figure 1**. The purpose of the natural environment field program is to collect data relevant to vegetation communities (ecosites), wetlands, wildlife habitat, and Species at Risk. The objective of this work plan is to seek Environment Canada's agreement with the study methodologies and protocols set out herein for terrestrial investigations of the Project during the late winter, spring, summer and fall of 2013.

2.0 Field Program Overview

The Project Location is within the Henvey Inlet First Nation Reserve along the eastern shore of Georgian Bay, south of French River Provincial Park and directly north of North Georgian Bay Shoreline and Islands Conservation Reserve. Generally, the Project Location has shallow soils, with many rocky outcrops forming longitudinal ridges running on a northwest to southeast axis, and is divided roughly in half by Henvey Inlet. Numerous wetland pockets are located between the ridges and across the Project Location, with upland areas supporting forested areas of poplar and jack pine.

The characteristics of terrestrial habitat and areas of potential significance or sensitivity will first be identified as part of the early-on consultation with Henvey Inlet First Nations and relevant agencies, as well as a review of the available natural heritage information. Information gained through the consultation process and desktop review will be supplemented by general aerial and ground-level (by foot or boat) surveys of the Study Area to fine-tune the field program and assist in siting monitoring stations. Wildlife and vegetation surveys will begin in March, when raptors begin their spring migration and will continue into November, when the final fall migratory waterfowl are expected to move through the Study Area.

2.1 ECOSITE CLASSIFICATION AND WETLANDS

Ecosite classification forms the backbone of wildlife habitat assessment. For the Project, the Ecosites of Ontario classification system (Banton *et al.*, 2009) will be used as it includes forest and non-forest communities as well as wetlands.

A wetland is land that is saturated with water long enough to promote wetland or aquatic processes as indicated by poorly drained soils, hydrophytic vegetation and various kinds of biological activity which are adapted to a wet environment (The Federal Policy on Wetland Conservation ("FPWC"), Environment Canada, 1991). The protection and conservation of wetlands on federal lands is mandated by the FPWC. Mitigation of adverse environmental effects on wetlands is guided by the FPWC goal of achieving 'no net loss of wetland functions'. The no net loss principal can be achieved by using a hierarchical sequence of mitigation alternatives: avoidance, minimization, and compensation. Wetlands on federal lands can be described using The Canadian Wetland Classification System (National Wetlands Working Group, Second Edition, 1997).

Provincially, the Ontario Wetland Evaluation System (Ministry of Natural Resources, 2002), is used to map and score wetlands based on biological productivity and diversity, human use, hydrologic functions, and unique characteristics such as geographical rarity. It is anticipated that no wetlands have been evaluated using the OWES on the Henvey Inlet First Nation Reserve Lands.

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2.2 WILDLIFE HABITAT

Wildlife habitat is defined as an area where plants, animals and other organisms live, including areas where species concentrate at a vulnerable point in their life cycle and that are important to migratory and non-migratory species. The work program has been designed to capture those wildlife species and their habitats which may occur in the Study Area and may be influenced by the Project.

2.3 ENDANGERED, THREATENED AND SPECIAL CONCERN SPECIES

A desktop review of the MNR Natural Heritage Information Centre (NHIC) database, as well as provincial atlases for breeding birds, mammals, reptiles and amphibians, was conducted to identify species of conservation concern in the vicinity of the Study Area. Twenty-seven terrestrial species listed as endangered, threatened or special concern at the provincial and federal level have the potential to occur within the Study Area (Table 1). Several of these species were recorded within the Project Location during previous terrestrial field investigations by LGL Limited. Site investigations in the proposed 2013 terrestrial work program will assess the presence and identify preferred habitat of these species.

Table 1: Endangered, threatened and special concern terrestrial wildlife species potentially present within the Study Area

Type	Common Name	Scientific Name	S - Rank	COSSARO	COSEWIC
Reptile	Stinkpot / Eastern Musk Turtle	<i>Sternotherus odoratus</i>	S3	THR	THR
Reptile	Blanding's Turtle	<i>Emydoidea blandingii</i>	S3	THR	THR
Reptile	Snapping Turtle	<i>Chelydra serpentina</i>	S3	SC	SC
Reptile	Northern Map Turtle	<i>Graptemys geographica</i>	S3	SC	SC
Reptile	Eastern Hog-nosed Snake	<i>Heterodon platirhinos</i>	S3	THR	THR
Reptile	Eastern Foxsnake (Georgian Bay)	<i>Pantherophis gloydi</i>	S3	THR	END
Reptile	Eastern Massasauga (Great Lakes/ St Lawrence)	<i>Sistrurus catenatus catenatus</i>	S3	THR	THR
Reptile	Eastern Ribbonsnake	<i>Thamnophis sauritus</i>	S3	SC	SC
Reptile	Milksnake	<i>Lampropeltis triangulum</i>	S3	SC	SC
Reptile	Five-lined Skink (Southern Shield population)	<i>Plestiodon fasciatus</i>	S3	SC	SC
Bird	Least Bittern	<i>Ixobrychus exilis</i>	S4B	THR	THR
Bird	Eastern Whip-poor-will	<i>Antrostomus vociferus</i>	S4B	THR	THR
Bird	Chimney Swift	<i>Chaetura pelagica</i>	S4B, S4N	THR	THR
Bird	Barn Swallow	<i>Hirundo rustica</i>	S4B	THR	THR (NS)
Bird	Bobolink	<i>Dolichonyx oryzivorus</i>	S4B	THR	THR (NS)
Bird	Eastern Meadowlark	<i>Sturnella magna</i>	S4B	THR	THR (NS)
Bird	Bald Eagle	<i>Haliaeetus leucocephalus</i>	S4B, S2N	SC	SC
Bird	Common Nighthawk	<i>Chordeiles minor</i>	S4B	SC	THR
Bird	Olive-sided Flycatcher	<i>Contopus borealis</i>	S4B	SC	THR
Bird	Eastern Wood-Pewee	<i>Contopus virens</i>	S4B	-	SC (NS)
Bird	Wood Thrush	<i>Hylocichla mustelina</i>	S4B	-	THR (NS)

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Table 1: Endangered, threatened and special concern terrestrial wildlife species potentially present within the Study Area

Type	Common Name	Scientific Name	S - Rank	COSSARO	COSEWIC
Bird	Golden-winged Warbler	<i>Vermivora chrysoptera</i>	S4B	SC	THR
Bird	Canada Warbler	<i>Wilsonia canadensis</i>	S4B	SC	THR
Mammal	Little Brown Myotis	<i>Myotis lucifugus</i>	S5	END	END (NS)
Mammal	Northern Myotis	<i>Myotis septentrionalis</i>	S3?	END	END (NS)
Mammal	Tri-coloured Bat	<i>Perimyotis subflavus</i>	S3?	-	END (NS)

COSSARO: Committee on the Status of Species at Risk in Ontario

COSEWIC: Committee on the Status of Endangered Species in Canada

S2 – Imperiled in the nation or state/province because of rarity due to very restricted range, very few populations (often 20 or fewer), steep declines, or other factors making it very vulnerable to extirpation from the nation or state/province.

S3: Vulnerable—Vulnerable in the province, relatively few populations (often 80 or fewer)

S4: Apparently Secure—Uncommon but not rare

S5: Secure—Common, widespread, and abundant in the province

S#B: Breeding status rank

S#N – Non-breeding status rank

S? – Rank Uncertain

NAR: Not At Risk

END: Endangered

THR: Threatened

SC: Special Concern

N/A: not applicable

NS: Not on Species at Risk Act Schedule

3.0 Proposed Field Work Program

Due to the known presence of Species at Risk, the project is considered to have “Very High” site sensitivity and would be ranked as “Category 4” by Environment Canada’s “Wind Turbines and Birds: A Guidance Document for Environmental Assessment” (2007a). Projects in this category usually require comprehensive baseline surveys; a requirement that has been considered in the development of this work program.

The survey protocols are consistent with Environment Canada’s “Recommended Protocols for Monitoring Impacts on Wind Turbines on Birds” (Environment Canada, 2007b) and on Environment Canada’s comments on LGL Limited’s 2011 workplan for the Project. Recommended protocols for species at risk are based on Stantec’s technical expertise and on experience with the Ministry of Natural Resources species-specific surveys requirements.

Detailed protocols of each survey type are outlined below. The suite of surveys proposed along the Transmission Line differs slightly than those within the Project Location, due to differences in potential environmental effects. For example, migratory bird surveys are not proposed along the Transmission Line. **Table 4** provides a summary of all proposed surveys, including a breakdown of which surveys are to be conducted within the Project Location and those to be conducted along the Transmission Line.

3.1 GENERAL RECONNAISSANCE (EARLY APRIL)

Given the limited access in and around the Project Location and the relatively rugged topography and abundance of wetlands in the Study Area, multi-purpose broad-scale surveys will be completed to obtain an overall understanding of the landscape, and to put the detailed field study locations in context.

An aerial survey by helicopter will be conducted in early April to observe the landscape without leaf cover and at a time of pronounced hydrological activity (i.e. spring melt). Leaf-off conditions will also allow a search for habitat features such as stick nests and wetland types. A reconnaissance survey of the Project Location by boat and foot will be undertaken in early April, guided by local members of the Henvey Inlet First Nations. The purpose of the reconnaissance survey will be to gain a better understanding of site access and points of interest, including locations of rare species, based in local knowledge.

3.2 SPRING MIGRATORY BIRD SURVEYS

3.2.1 Spring raptor migration (Ten surveys, early March to end of April):

Monitoring will consist of ten surveys throughout the spring migration period (March to end of April) to record presence of diurnal migrant raptors. Surveys will be comprised of six-hour point counts starting at 9:00 am, conducted by two observers stationed at two appropriate vantage

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points within the Project Location. When site access allows, surveys stations will be situated in the east and west portions of the Project Location. However, during times of year when site access is limited (i.e. late winter, early spring) alternative locations may be used with efforts to maximize spatial coverage.

All raptors observed during the surveys will be recorded and mapped. Behaviour of the raptors will be noted with emphasis on flight height and determining which individuals were actively migrating as opposed to staging (e.g. hunting, perching, etc.). For actively migrating raptors, flight paths will be mapped.

3.2.2 Spring passerine migration (Eight surveys, early April to late May):

Natural habitat located in close proximity to the Georgian Bay shoreline provides stopover habitat for migrating passerine birds. Eight weekly surveys are proposed in April and May. Monitoring will consist of ten, 500m long transects distributed throughout the Project Location. Transects will be placed in different habitat types (i.e. woodland, rock barren and wetland). Given the variable nature of vegetation communities within the Project Location, it is likely most 500m transects will include more than one habitat type. A description of the habitat along each of the 10 transects will be recorded.

Surveys will be conducted in the morning, between dawn and approximately 10:00 am. A tally of all species observed will be recorded on each transect. These surveys will include characterizing the abundance and diversity of passerines within the Project Location.

3.2.3 Spring waterfowl migration (Four surveys, April to late May):

Spring monitoring for migrating waterfowl will be focused along Henvey Inlet and will consist of four bi-weekly surveys undertaken by boat in April and May. Surveys will include waterfowl counts to record species and number of individuals observed along the inlet, as well as characteristics of the wetlands to support migrating waterfowl (e.g. size, vegetation, permanence, etc.).

The use of scattered wetlands and ponds throughout the Project Location by staging waterfowl will be assessed through the spring passerine surveys.

3.3 BREEDING BIRD SURVEYS**3.3.1 Daytime breeding birds (Two surveys, late May to early July):**

Two rounds of breeding bird surveys will be conducted in each major habitat type with the Study Area (woodland, rock barren and wetland). Surveys will consist of ten-minute point counts, in conjunction with area searches (wandering transects) between point count locations. The area searches will allow for collection a comprehensive species list, whereas point counts will provide information on species density.

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Surveys would take place starting 30 minutes before sunrise and continue until approximately 10:00 am. As per Environment Canada guidance, a minimum of 20 point counts will be sited in each major habitat type. However, given the variability of habitat types that occur within the Study Area, it is anticipated that many point counts may cover more than one habitat type.

In marsh habitat, play-back call surveys for marsh breeding birds will be conducted following the ten-minute point count, to assist in detection of more secretive marsh bird species, specifically, the threatened Least Bittern.

Location of all species at risk observations will be geo-referenced using a hand-held GPS unit, mapped and compared to ecosite classification to develop habitat mapping for each species.

3.3.2 Crepuscular breeding birds (Two surveys, May and June):

Eastern Whip-poor-will surveys will be conducted in suitable open habitat within forested areas. Surveys will be conducted in May and June and will consist of six-minute point counts at stations spaced within the Project Location and Transmission Line corridor. Due to the remote location of much of the Study Area, survey locations may be selected with consideration to access and surveyor safety.

Surveys will begin approximately 30 minutes after sunset within appropriate weather conditions (not in high winds, persistent rain or an overcast sky) and will, if possible, coincide with the full moon. All individuals heard will be recorded, with an estimated direction and distance from the observer.

3.3.3 Owls (One survey, April):

Given the difficulty in detecting owl species, the use of playback calls to elicit a response will be used. A single survey in April is proposed, and will include various stations throughout the Project Location. Due to the remote location of much of the Study Area, survey locations may be selected based on facility of access and surveyor safety.

Surveys will begin approximately 30 minutes after dark and will consist of 10 minute point counts incorporating playback and periods of silent listening. All individual heard will be recorded, with an estimated direction and distance from the observer.

3.3.4 Raptor and colonial nesting birds (Two surveys, April and June):

Searches for large stick nests or “nest bowls” in trees, typically exhibiting a DBH (diameter at breast height) of >50 cm, will be conducted during the aerial reconnaissance prior to leaf-out. Searches will target trees along watercourses, with special attention afforded to large white pines, and swamps along large bodies of water, as well as other appropriate habitat within the Study Area. If present, nests will be surveyed for activity concurrent with breeding bird point counts and area searches in June.

3.4 AMPHIBIAN AND REPTILE SURVEYS

3.4.1 Western Chorus Frog and Salamanders (April):

Western Chorus Frog surveys will consist of 3-minute call counts at potential breeding habitat conducted in April, during appropriate weather conditions. This species breeds in small or shallow aquatic habitats associated with moist, open terrestrial habitat (COSEWIC, 2008c). Males call from the water and are typically active when air temperatures are above 5°C, although calls have been detected at air temperatures as low as -1°C (COSEWIC, 2008c).

Unlike many anurans, Western Chorus Frogs are generally very active throughout the day. As such, daytime survey will be used to cover larger portions of the Study Area than evening call surveys would permit.

Surveys for amphibian egg masses will take place concurrent with calling surveys. These will consist of perimeter surveys of suitable breeding ponds by trained field personnel. Egg masses of different species are often characteristic based on features such as where they are laid, how many eggs are in the mass, density of the egg mass, and whether or not the eggs are encased in jelly.

3.5 REPTILE HABITAT AND TARGETED SURVEYS (MAY AND JUNE):

Reptile habitat and targeted species surveys will take place in three stages.

Preliminary surveys for reptiles will also take place throughout the migratory and breeding bird survey periods. Field biologists familiar with reptile species identification will be conducting area searches and wandering transect surveys in a variety of areas providing habitat for reptiles at both the Project Location, weekly from early April until early July, and along the Transmission Line, weekly from late May until early July. Any incidental observations of turtles, snakes or lizards, including shed skins or shells, will be recorded on survey forms and used to refine the field survey program proposed for June.

Potential snake or turtle habitat within the Study Area will also be identified during Ecosite surveys, beginning in May. The habitat assessment will involve identification of potential reptile habitat features, including:

- Turtle overwintering habitat and snake/skink hibernacula;
- Nesting sites; and,
- Foraging habitats.

Targeted field surveys for reptile species at risk will occur in June. Timing of these surveys will coincide with a period of high activity for reptiles (nesting and foraging), but also when air temperatures encourage basking behavior. Surveys for snake species at risk and Five-lined Skink will consist of wandering transects through all appropriate habitat types (**Table 2**).

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Additional survey effort will be directed toward areas with previous observations of these species which may indicate high quality or limited habitat. To the extent possible, surveys will be conducted on sunny days when air temperatures are a minimum of 15°C (ideally 20°C). Surveys for turtles will consist of daytime basking surveys from land or boat in suitable wetland and open water habitat (**Table 2**), and evening nesting surveys in potential upland nesting sites identified during Ecosite surveys. Basking surveys will be conducted on sunny days when air temperatures are a minimum of 15°C (ideally 20°C). Nesting surveys will take place on warm evenings (daytime air temperature >20°C), ideally before or after rainfall. All surveys will record species, number, location and behaviour of observed reptiles.

The purpose of the targeted surveys is to confirm habitat used by the various reptile species at risk within the Study Area and provide information on general abundance and distribution. Survey results will be used to produce detailed mapping of reptile habitat features which will be used to guide the siting layout process and maximize avoidance of sensitive features.

Table 2: General Habitat Description and Use by Reptile Species at Risk

Common Name	General Habitat and Use*
Turtles	
Blanding's Turtle	Lakes, ponds and wetlands with clear shallow water and muck bottoms. Will move between habitats within active season; aerial basking; nesting in late May to early July, in open sandy soil up to 2.5km from primary wetland, but typically within 400m of water; overwinter in marsh, bog or fen with >0.5m water depth.
Stinkpot	Shallow water in rivers, lakes and ponds with slow current and soft bottom; aquatic basking, often under floating vegetation; nesting in June, in shallow soil near water, occasionally in or under leaf litter; overwinter in primary habitat with muck bottom.
Northern Map Turtle	Large rivers and lakes with soft bottom; aerial basking; nesting June and July in sandy soil; overwinter in general habitat in areas with >5m water depth.
Snapping Turtle	All aquatic habitats, but rarely in moving water, prefer large water bodies associated with marsh and/or swamp; aquatic basking
Snakes and Lizard	
Eastern Hog-nosed Snake	Open forest and forest edges with sandy soil in proximity to water; egg-laying in late June and July in nests excavated in sandy soil, often under cover objects; hibernation in mammal burrows.
Eastern Foxsnake	Georgian Bay populations inhabit rock barrens with sparse trees and shrubs in close proximity to shoreline; basking under or near rocks or in rock crevices; egg-laying late June to July in rock crevices or decaying vegetation; communal hibernation in rock crevices near shoreline.
Eastern Massasauga	Georgian Bay populations use rock barrens, wetlands and shorelines; viviparous, bearing young in late summer; communal gestation under rock cover; hibernation in rock crevices or animal burrows where water level is close to surface.
Eastern Ribbonsnake	Wetland edges with low vegetation and open basking areas; often seen swimming; viviparous, bearing young in late summer; hibernation in rock crevices and mammal burrows.

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Table 2: General Habitat Description and Use by Reptile Species at Risk

Common Name	General Habitat and Use*
Milksnake	Forest edges and open meadow; bask under cover objects; egg-laying May to July in loose soil, decomposing wood or vegetation; hibernation in rock crevices and mammal burrows, often communally and with other species.
Five-lined Skink	Open forest and rock barren; abundance of cover objects (rocks and woody debris) is important, longer/larger cover is preferred; nesting in shallow soil under cover objects.

* Habitat description and use data obtained from COSEWIC assessment and status reports.

3.6 BAT SURVEYS (TWO SURVEYS, JUNE):

Bat surveys will be conducted in conjunction with Whip-poor-will surveys. A portable, hand-held broad band acoustic monitor will be used to detect bat calls. Recorded bat calls will be analysed to guild or species, where possible, following completion of the field program. The goal of the bat surveys will be to determine the presence and relative abundance of bat species at risk.

3.7 ECOSITE, WETLAND AND VEGETATION SURVEYS**3.7.1 Ecosite Classification, including Wetlands (May to July):**

Vegetation communities within the Study Area will be delineated on aerial photographs and confirmed during field investigations. Community characterizations will be based on the Ecosites of Ontario system (Banton et al., 2009) and will be identified to the Vegetation Type unit level.

The Ecosites of Ontario classification system includes wetlands. Searches for wetlands not previously identified within the Study Area will be conducted as part of the Ecosite surveys. If encountered, previously unidentified wetlands will be recorded through field notes, photographs and geo-referenced using handheld GPS units.

3.7.2 Rare flora (May to July):

Searches for rare plants and habitat supporting these plants will be conducted concurrent with Ecosite surveys, where possible, but may also require spring assessments for ephemeral species or mid-summer assessments for species where identification is dependent on the flowering period of the species. If encountered, rare plants or habitat will be recorded through field notes, photographs and geo-referenced using handheld GPS units.

A review of the MNR Natural Heritage Information Centre (NHIC) database (NHIC, 2012) indicates that two provincially rare vegetation communities are known to occur within the Study Area:

- Atlantic Coastal Plain Shallow Marsh Type; and,
- Buttonbush Organic Thicket Swamp Type

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The following rare plant species (Table 3) may also be encountered in the Study Area:

Table 3: Rare Plant Species and Flowering Period		
Common Name	Scientific Name	Flowering Period
Flowering Plants		
St. Lawrence Grape Fern	<i>Botrychium rugulosum</i>	Mid-Spring
Thread-like Naiad	<i>Najas gracillima</i>	Summer to Fall, seeds important to ID so survey at end of period
Large Round-leaved Orchid	<i>Plantathera macrophylla</i>	June to August
Snailseed Pondweed	<i>Potamogeton bicupulatus</i>	Early Summer to Fall, seeds important to ID so survey at end of period
Alga Pondweed	<i>Potamogeton confervoides</i>	Summer, seeds important to ID so survey at end of period
Twin-stemmed Bladderwort	<i>Utricularia geminiscapa</i>	July to August
Liverworts		
Liverwort sp.		Unknown, best period for general identification is June-August

3.8 FALL MIGRATORY BIRD SURVEYS

3.8.1 Fall passerine migration (Eight surveys, end of August to mid October)

Natural habitat located in close proximity to shorelines provides stopover habitat for migrating birds. Eight weekly surveys are proposed between the end of August and mid October. Monitoring will consist of ten, 500 m long transects distributed throughout the Project Location. The same transects will be used as in the Spring Passerine Migration surveys.

Survey will be conducted in the morning, between dawn and approximately 10:00 am. A tally of all species observed will be recorded on each transect. These surveys will include characterizing the abundance and diversity of passerines within the Project Location.

3.8.2 Fall waterfowl migration (Six surveys, September to October):

Fall monitoring for migrating waterfowl will be focused along Henvey Inlet and will consist of four bi-weekly surveys undertaken by boat in September through October. Surveys will include waterfowl counts to record species and number of individuals observed along the inlet, as well as characteristics of the wetlands to support migrating waterfowl (e.g. size, vegetation, permanence, etc.).

The use of scattered wetlands and ponds throughout the Project Location by staging waterfowl will be assessed through the Fall Passerine surveys.

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3.8.3 Fall raptor migration (Ten surveys, September to October):

Monitoring will consist of ten surveys throughout the fall migration period (September to October) to record presence of diurnal migrant raptors. Surveys will be comprised of six-hour point counts starting at 9:00 am, conducted by two observers stationed at two appropriate vantage points within the Project Location. When site access allows, surveys stations will be situated in the east and west portions of the Project Location.

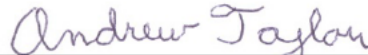
All raptors observed during the survey will be recorded and mapped. Behaviour of the raptors will be noted with emphasis on flight height and determining which individuals were actively migrating as opposed to staging (e.g. hunting, perching, etc.). For actively migrating raptors, flight paths will be mapped.

3.9 INCIDENTAL OBSERVATIONS

In addition to targeted wildlife surveys described above, all incidental observations of terrestrial wildlife or other significant sightings made during surveys throughout the 2013 field season will be recorded. Notes will be taken on the species, number of individuals, locations and behavior. Observations made early in the field season may be used to refine the remainder of the field program.

STANTEC CONSULTING LTD.

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Table 4: Summary of Natural Environment Field Program

Study	Mode	Frequency	Timing	Study Area
General Reconnaissance				
Aerial survey	Helicopter	Once	early April, prior to leaf-out	PL
Ground survey	Foot / boat survey with Henvey Inlet First Nations	Once	early April	PL
Bird Surveys				
Spring Migration				
Passerines	Ten, 500m long transects	Once per week, each transect (8 surveys)	Early April to late May	PL
Waterfowl Stopover and Staging	Henvey Inlet	Once every other week (4 surveys)	April to Late May	PL
Raptors	2 stations	Ten surveys	Early March to end April	PL
Breeding Birds				
Point Counts	Minimum of 20 stations in each major habitat type	Two rounds of surveys	Late May to early July	PL, TL
Area Searches	Wandering transect between point count stations	Two rounds of surveys	Late May to early July	PL, TL
Play-back call surveys	Stations in suitable habitat	Owls – once Marsh Birds – Two rounds of surveys	Owls – April Marsh Birds – May to July	PL, TL
Crepuscular surveys	In suitable Whip-poor-will habitat	Two round of surveys	May - June	PL, TL
Raptor and Colonial Bird Nests	Visual survey for raptor and colonial nesting bird nests	Twice – once to locate, once to confirm use	Concurrent with aerial reconnaissance, then with point counts to confirm use	PL, TL
Fall Migration				
Passerines	Ten, 500m long transects	Once per week, each transect (8 surveys)	End August to mid-October	PL
Waterfowl Stopover and Staging	Henvey Inlet only	Once every other week (4 surveys)	September to October	PL
Raptors	2 stations	Ten surveys	September to October	PL

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WORK PROGRAM

Proposed Field Work Program

March 2013

Table 4: Summary of Natural Environment Field Program

Study	Mode	Frequency	Timing	Study Area
Bat Surveys				
Ultrasonic Recording Units	Handheld units	Twice	June, in conjunction with crepuscular surveys	PL, TL
Reptile Surveys				
General Habitat Survey	Habitat Assessment	Once	Concurrent with Ecosite and vegetation surveys	PL, TL
SAR Surveys	Targeted surveys for turtle, snake and lizard species at risk	Once	June	PL, TL
Amphibian Surveys				
Western Chorus Frog Call Counts	Daytime call surveys, including audio recordings	Once	April	PL, TL
Salamander Egg Mass	Daytime surveys in wetlands	Once	April, concurrent with frog call counts	PL, TL
FEC / Botanical Surveys				
Ecosite classification, including wetlands	Ground surveys	Once	May to July	PL, TL
Rare Plants – Spring Ephemerals	Ground surveys	Once	May and June	PL, TL
Rare Plants – Summer Botanical	Ground surveys	Once	July	PL, TL

PL – Project Location.

TL – Transmission Line.

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WORK PROGRAM

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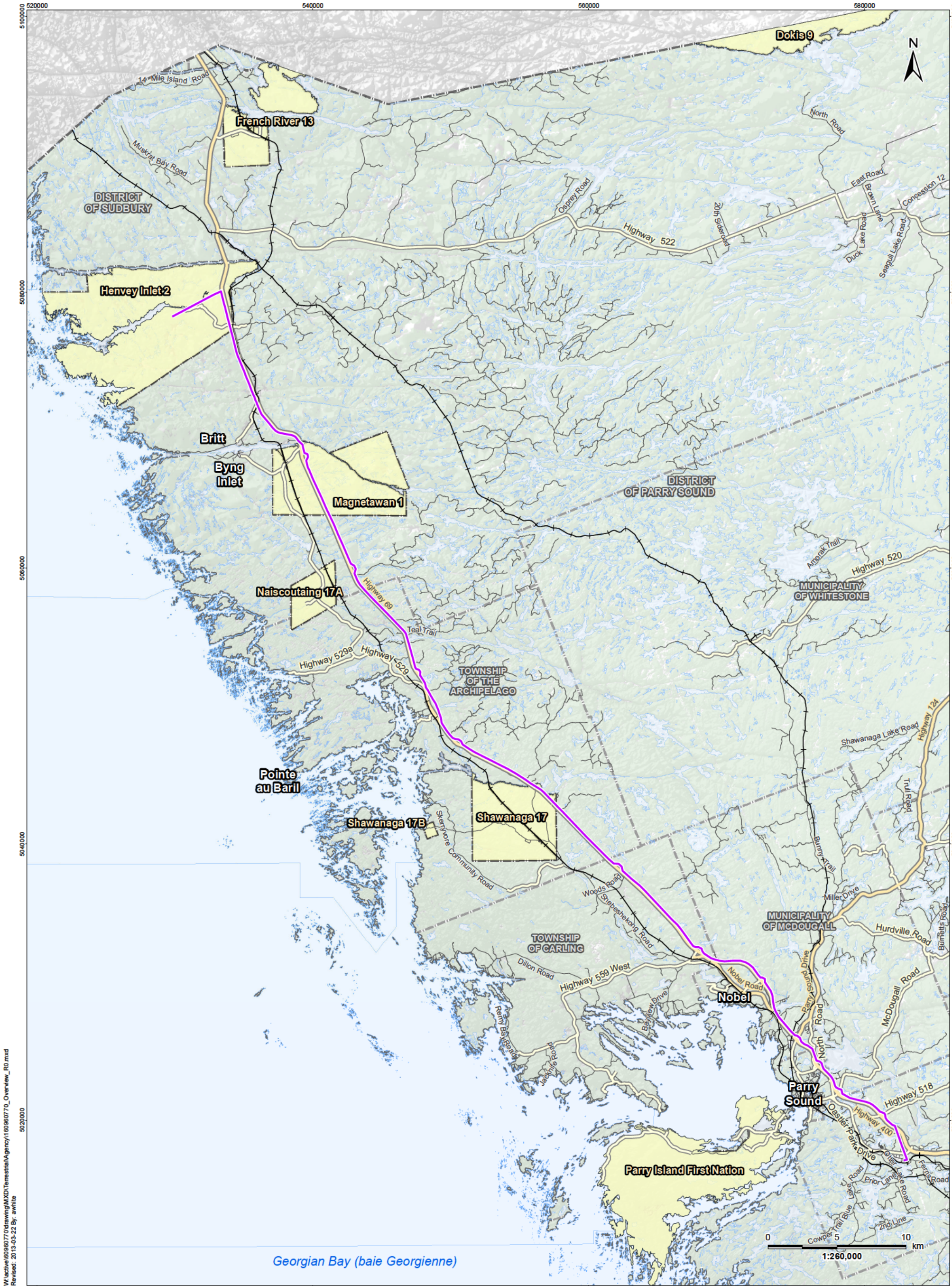
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Appendix A

Figures



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Revised: 2013-03-22 By: awhite



Legend

- | | |
|----------------------------|----------------------|
| Proposed Transmission Line | Railway |
| Existing Features | Watercourse |
| Highway | First Nation Reserve |
| Major Road | Upper Tier Boundary |
| Local Road | Lower Tier Boundary |
| | Waterbody |

Notes

- Coordinate System: NAD 1983 UTM Zone 17N
 - Base features produced under license with the Ontario Ministry of Natural Resources © Queen's Printer for Ontario, 2013.
- *Precise location of transmission line within highway corridor to be determined

Client/Project
NIGIG POWER CORP.
HENVEY INLET WIND PROJECT

Figure No.
1

Title
Study Area Overview

DRAFT

March 2013
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