Ministry of Tourism, Culture and Sport

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April 5, 2012

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Ministère du Tourisme, de la Culture et du Sport

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RE: Wainfleet Wind Energy Project, Township of Wainfleet, Regional Municipality of Niagara, FIT-F360H43, MTC File HD00532, PIF # P035-104-2010, P035-108-2010, P035-145-2011 and P035-163-2011

Dear Proponent:

This letter constitutes the Ministry of Tourism and Culture's written comments as required by s. 22(3)(a) of O. Reg. 359/09 under the *Environmental Protection Act* regarding archaeological assessments undertaken for the above project.

Based on the information contained in the report(s) you have submitted for this project, the Ministry believes the archaeological assessment complies with the *Ontario Heritage Act's* licensing requirements, including the licence terms and conditions and the Ministry's 1993 Archaeological Assessment Technical Guidelines or the 2011 Standards and Guidelines for Consultant Archaeologists (whichever apply). Please note that the Ministry makes no representation or warranty as to the completeness, accuracy or quality of the report.*

The reports recommend the following:

Stage 1 (PIF # P035-104-2010), August 2010, Received October 07, 2010

8.0 Recommendations

The entire study area for the Wainfleet Wind Energy Project has potential for archaeological remains. A Stage 2 archaeological assessment should be conducted at each wind turbine location that should also include any temporary roads or staging areas required for the development.

9.0 Advice on Compliance with Legislation

This report is filed with the Minister of Culture in compliance with sec. 65(1) of the Ontario Heritage Act. The ministry reviews reports to ensure that the licensee has met the terms and conditions of the licence and archaeological resources have been identified and documented according to the standards and guidelines set by the ministry, ensuring the conservation, protection and preservation of the heritage of Ontario. It is recommended that development not proceed before receiving confirmation that the Ministry of Culture has entered the report into the provincial register of reports.

Should previously unknown or unassessed deeply buried archaeological resources be uncovered during development, they may be a new archaeological site and therefore subject to Section 48(1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed archaeologist to carry out archaeological fieldwork, in compliance with sec. 48 (1) of the Ontario Heritage Act.

Any person discovering human remains must immediately notify the police or coroner and the Registrar of Cemeteries, Ministry of Government Services.

Stage 2 (PIF # P035-108-2010), August 2010, Received October 07, 2010

5.0 Recommendations

- 1. The locations for five proposed wind turbines have been fully assessed for potential archaeological remains. Based on negative survey results, no further archaeological work is required for these turbine locations and the project and construction in these areas can proceed as planned.
- 2. The border between the assessed corn field and the unassessed soybean field on the east side of Turbine #3 should be fenced during construction to prevent any potential impacts.

Stage 2 (P035-145-2011), Revised January 15, 2012, Received January 18, 2012

1. The subject property for the proposed Wainfleet wind farm switching station has been completely assessed through visual assessment. No archaeological remains were encountered and no further work is required.

Stage 2, Access Roads and Taplines (P035-163-2011), Dated 29 March 2012, Received 3 April, 2012

- 1. The subject property for the proposed Wainfleet wind farm access road and taplines has been completely assessed through visual assessment. No archaeological remains were encountered and no further work is required.
- 2. Recommendation #2 in the report PIF # P035-108-2010 for fencing of the previously unassessed area on the east side of Turbine # 3 is no longer required since this area has now been completely assessed through visual assessment. No archaeological remains were encountered and no further work is required.

The Ministry is satisfied with these recommendations.

This letter does not waive any requirements which you may have under the *Ontario Heritage Act*. A separate letter addressing archaeological licensing obligations under the Act will be sent to the archaeologist who completed the assessment and will be copied to you.

This letter does not constitute approval of the renewable energy project. Approvals of the project may be required under other statutes and regulations. It is your responsibility to obtain any necessary approvals or licences.

Please feel free to contact me if you have questions or require additional information.

Sincerely,

Ian Hember

Archaeology Review Officer

cc. Mr. Andrew Murray, A.M. Archaeological Associates

*In no way will the Ministry be liable for any harm, damages, costs, expenses, losses, claims or actions that may result: (a) if the Report or its recommendations are discovered to be inaccurate, incomplete, misleading or fraudulent; or (b) from the issuance of this letter. Further measures may need to be taken in the event that additional artifacts or archaeological sites are identified or the Report is otherwise found to be inaccurate, incomplete, misleading or fraudulent.

THE STAGE 1 ARCHAEOLOGICAL ASSESSMENT FOR THE WAINFLEET WIND ENERGY PROJECT,

R. M. NIAGARA



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ACKNOWLEDGEMENTS

Rob von Bitter from the Ontario Ministry of Tourism and Culture provided the archaeological sites data.

EXECUTIVE SUMMARY

This report discusses the rationale, methods and results of the Stage 1 archaeological assessment for the proposed Wainfleet Wind Energy Project, to be developed by IPC Energy (IPC). The Wainfleet Wind Energy Project is located south of the community of Wainfleet, in the Township of Wainfleet, in Niagara Region, Ontario. A. M. Archaeological Associates was retained by Morrison Hershfield to conduct the Stage 1 archaeological assessment in accordance with the Ontario Regulation 359/09 Renewable Energy Approvals (REA) under Part V.0.1 of the Ontario Environmental Protection Act prior to seeking a Renewable Energy Approval from the Ministry of the Environment (MOE). The purpose of this assessment was to determine which parts of the study area have potential for the location of First Nation and/or Euro-Canadian sites.

The Stage 1 assessment consists of the background research and GIS mapping of areas identified with archaeological potential. Additionally, a field inspection was conducted that consisted of a visual inspection for each of the five proposed wind turbines. Current conditions were recorded and photograph locations were logged by GPS. Archaeological potential for the wider study limits and specific location of each wind turbine was determined by proximity to several factors including: registered sites; historic transportation routes; historic structures; water sources; and modern development.

The entire study area containing the five proposed locations of wind turbines has archaeological potential and a Stage 2 archaeological property assessment is recommended for each location. Each proposed wind turbine is found in fields in active agricultural use. Open ploughed land must be recently ploughed and weathered by one heavy rainfall or several light rains such that at least 80% of the ground surface is visible. A pedestrian survey at five metre intervals should be conducted for all areas to be impacted including turbine locations, temporary roads and staging areas prior to development.

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1.0 INTRODUCTION

This report discusses the rationale, methods and results of the Stage 1 archaeological assessment for the proposed Wainfleet Wind Energy Project, to be developed by IPC Energy (IPC. The Wainfleet Wind Energy Project is located south of the community of Tweedside, in the Township of West Lincoln, in Niagara Region, Ontario. A. M. Archaeological Associates was retained by Morrison Hershfield to conduct the Stage 1 archaeological assessment in accordance with the Ontario Regulation 359/09 Renewable Energy Approvals (REA) under Part V.0.1 of the Ontario Environmental Protection Act prior to seeking a Renewable Energy Approval from the Ministry of the Environment (MOE). This project will review existing conditions along the existing highway, identify any existing and future deficiencies and formulate a strategy with specific recommendations to address those deficiencies. The purpose of this assessment was to determine which parts of the study area have potential for the location of First Nation and/or Euro-Canadian sites.

All archaeological assessment activities were performed according to the *Archaeological Assessment Technical Guidelines* (1993) but also conform to the working draft of the *Standards and Guidelines for Consultant Archaeologists* (June 2009). All work was done under the archaeological consulting license, P035, issued to Andrew Murray of A. M. Archaeological Associates. The field reconnaissance was conducted on April 28, 2010 under partly cloudy skies and temperatures around +16°C.

2.0 DEVELOPMENT CONTEXT

2.1 Study Area

The proposed Wainfleet Wind Energy Project is located in south-western Ontario, in the Township of Wainfleet, in Niagara Region (Figure 1). More specifically, the study area is bound by: Side Road 30, CNR Rail Line, Brawn Line Road, Lakeshore Road, Burnaby Road, Regional Road #3 (Corners Road)and Wilson Road. The study area is approximately 3, 400 hectares in size and is mostly in agricultural use. The terrain is mostly flat, with an elevation of 174m to 182 m above mean sea level. All wind turbines are to be placed in open agricultural fields within the

required setbacks from residences, natural heritage, water, and other features required under the REA. The agricultural fields vary considerably in size and most are tilled and planted seasonally with crops such as corn, oats, and soybeans. Field sizes vary considerably. The landscape is fragmented by open fields, roads, fences, planted crops, wood lots, and settlement areas.

2.2 Environmental Setting

There are a number of environmental factors such as water sources, soil types, physiographic features, vegetation and lithic resources that influence settlement and the archaeological potential of an area. These regional features influenced transportation routes, gathering places, food sources, climate (micro-environments), overall vegetation patterns, and soil formation.

2.2.1 Physiographic Features

The study area is in the Haldimand Clay Plain physiographic region (Chapman and Putnam 1984). The clay plain is a gently undulating tract of poorly drained soil deposited during glacial ponding south of the Vinemount Moraine (Kingston and Presant 1989). The clays and silts of the clay plain were deposited mainly during deep water stages of glacial lakes Whittlesey and Warren and ranges in thickness from 1 to 40 metres (Chapman and Putnam 1984).

2.2.2 Water Sources

There is no main watercourse through the Wainfleet Wind Energy Project study limits but Lake Erie is just south of the southern-most boundary. There are numerous small streams and channelized drains throughout the study area. In addition to these extant sources of water, past high water levels of Lake Erie from 11,000-10,500 B.P. and 5,000-4,000 B.P. have inundated the area (Tinkler 1994). This means that any portion of the study area could have been beachfront at particular times in the past 11,000 years.



Figure 1: Location of Wainfleet Wind Energy Project study limits and turbine locations (Ontario Institute of Pedology 1989; Toporama 2010)

The soils include the imperfectly drained lacustrine silty clay deposits of Beverly, Lincoln, Toledo, Welland (Ontario Institute of Pedology 1989) (Figure 1). The extensive Wainfleet Bog along the east side of the study area is organic fen-associated soil which has been exploited since the nineteenth century for peat (H. R. Page 1876).

2.2.4 Vegetation and Fauna

The original forest cover was cleared in the nineteenth century resulting in the current rural, agricultural landscape. However, the early historic records describe a large tamarack and cranberry marsh in the centre of the township and the "usual hardwoods and some pine" throughout the remainder (H. R. Page:15).

2.2.5 Lithic Sources

Onondaga chert outcrops at numerous locations along the north shore of Lake Erie including a former cement quarry site known as "Locality 7", 2.3 km east of the eastern study limit (Eley and von Bitter 1989). Additionally, useable chunks of Onondaga chert are distributed across the fields of the area and numerous unmodified chunks were noted during the field visit to the area.

3.0 ARCHAEOLOGICAL CONTEXT

The archaeological context contributes to the potential for the recovery of both Aboriginal and Euro-Canadian archaeological remains. A search of the archaeological sites database at the Ministry of Culture for sites within two kilometres of the Wainfleet Wind Energy Project study limits revealed 51 registered archaeological sites (Table 1). There is little information accompanying most of the site records but the sites document an extensive occupation of the area by First Nations people from the Late Archaic (2000-1500 BCE) and Late Woodland, Glen Meyer (900-1300 CE).

Table 1: Summary of registered archaeological sites within 2 km

Borden	Name	Site Type	Culture	Reference
AfGt-11	Deyme 2	undetermined	Pre-contact First Nation	
AfGt-12	Deyme 1	undetermined	Pre-contact First Nation	
AfGu-24	Barrick 10	undetermined	Pre-contact First Nation	
AfGu-25	Barrick 7	undetermined	Pre-contact First Nation	
AfGu-26	Barrick 6	undetermined	Pre-contact First Nation	
AfGu-27	Barrick 5	undetermined	Pre-contact First Nation	
AfGu-32	Vanginkel 1	undetermined	Pre-contact First Nation	
AfGu-33	Vanginkel 2	undetermined	Pre-contact First Nation	
AfGu-34	Geiser 2	undetermined	Pre-contact First Nation	
AfGu-36	Mantomani	undetermined	Pre-contact First Nation	
AfGu-37	Grozeibl	undetermined	Pre-contact First Nation	
AfGu-38	Ellsworth 4	undetermined	Pre-contact First Nation	
AfGu-39	Ellsworth 2	undetermined	Pre-contact First Nation	
AfGu-40	Ellsworth 3	undetermined	Pre-contact First Nation	
AfGu-41	Stouth 5	undetermined	Pre-contact First Nation	
AfGu-42	Stouth 6	undetermined	Pre-contact First Nation	
AfGu-43	Burnaby Road	undetermined	Pre-contact First Nation	
AfGu-48	Barrick 4	undetermined	Pre-contact First Nation	
AfGu-50	Hann	quarry	Pre-contact First Nation	Rita Michael 1985-58
AfGu-51	Hazelgrove 1	undetermined	Pre-contact First Nation	Scarlett E. Janusas 1988-25
AfGu-52	Hazelgrove 2	Scatter, lithic	Pre-contact First Nation	Scarlett E. Janusas 1988-25
AfGu-53	Harbourview 1	Scatter lithic	Pre-contact First Nation	Dean H Knight 1990-045
AfGu-54	Harbourview 2	Scatter lithic	Pre-contact First Nation	Dean H Knight 1990-045
AfGu-55	Harbourview 3	Scatter lithic	Pre-contact First Nation	Dean H Knight 1990-045
AfGu-56	Harbourview 4	Scatter lithic	Pre-contact First Nation	Dean H Knight 1990-045
AfGu-57	Harbourview 5	Scatter lithic	Pre-contact First Nation	Dean H Knight 1990-045
AfGu-58	Harbourview 6	Scatter lithic	Pre-contact First Nation	Dean H Knight 1990-045
AfGu-6	Geiser 1	undetermined	Pre-contact First Nation	
AfGu-9	Stouth 2	undetermined	Pre-contact First Nation	
AfGt-14	Rathfon Point 6	Scatter, lithic	Archaic ?: Woodland, initial	C. Ellis 1979
AfGt-17	Rathfon Point 1	Scatter, lithic	Pre-contact First Nation	C. Ellis 1979
AfGt-18	Rathfon Point 2	Scatter lithic	Woodland	C Ellis 1979
AfGt-19	Highway 3 2	undetermined	Pre-contact First Nation	
AfGt-20	Bailey 1	undetermined	Pre-contact First Nation	
AfGt-22	Highway 3 1	undetermined	Pre-contact First Nation	
AfGt-23	Highway 3 3	undetermined	Pre-contact First Nation	
AfGt-24	Bailey 2	undetermined	Pre-contact First Nation	
AfGt-25	Ellsworth 1	undetermined	Pre-contact First Nation	
AfGt-71	Biederman	campsite	Archaic, Late, Broadpoint	James Molnar 1986-96
AfGu-10	Stouth 4	undetermined	Pre-contact First Nation	
AfGu-14	Barrick 3	undetermined	Pre-contact First Nation	
AfGu-15	Barrick 2	undetermined	Pre-contact First Nation	
AfGu-16	Barrick 1	undetermined	Pre-contact First Nation	
AfGu-17	Stouth 3	undetermined	Pre-contact First Nation	
AfGu-18	Barrick 13	undetermined	Pre-contact First Nation	
AfGu-19	Stouth 1	undetermined	Pre-contact First Nation	
AfGu-2	Bonisteel	burial: campsite	Woodland, Late, Glen Mever	Paul A. Lennox 1976
AfGu-20	Barrick 8	undetermined	Pre-contact First Nation	
AfGu-21	Barrick 9	undetermined	Pre-contact First Nation	
AfGu-22	Barrick 12	undetermined	Pre-contact First Nation	
AfGu-23	Barrick 11	undetermined	Pre-contact First Nation	

4.0 HISTORIC CONTEXT

The study area is located in the historic township Wainfleet where the pace of settlement was not as fast as most of the surrounding townships. By 1817, it only had 72 houses and a saw mill with no churches, grist mills or medical practitioners. The low population growth has continued and Statistics Canada lists the population as 6,601 in 2006. The town of Wainfleet at the intersection of Feeder Road and Highway 3 was originally known as Marshville had a population of 300 people and two hotels, two general stores and a grist mill by 1876 (H. R. Page 1876). The study area is bisected by a railway line that was originally built as the Buffalo and Lake Huron Railway in 1859 and became part of the Grand Trunk Railway in 1870 (Hilton 203). Wainfleet Station was a stop along the line until it was dismantled in 1965 (Library and Archives Canada 1965). In addition to the buildings in Marshville and the railway station, there are 46 houses, a blacksmith shop, a school and a cemetery shown on the 1876 township map (Table 2). The Welland Canal Feeder, which is a remnant of the structure of the early Welland Canal, stills runs along the northern study area boundary where Feeder Road now resides. This channel was cut in the 1820's to bring water from the Grand River at Dunnville to the first Welland Canal (Bassett 1964).

	om Nineteenth century Grimsby and Caistor Township maps (H. R. Page
1876).	

Historic Structure	Number
Blacksmith Shop	1
Cemetery	1
House	46
Railway	1
School	1
Grand Total	50

There are seven buildings listed within the study area on the Ministry of Tourism and Culture's *Ontario Heritage Properties Database* but they have all been relocated to the Marshville Heritage Village. These buildings include: sawmill, Patrons of Industry Hall, Winger Tabernacle Church, S. S. 11 school house, Palco's blacksmith & carpentry shop, Morgan's log cabin, and a stone house.



Figure 2: Historic Wainfleet Township map with 100 m buffers around structures, roads and railway (H. R. Page 1876).

5.0 METHODOLOGY

5.1 Field Methods

A site visit was made to observe field conditions including any features of archaeological potential that might not be reflected on base mapping. Since the study limits encompass such a large area, the field visit focussed on the locations of the proposed turbines. Current conditions in the vicinity of each of the five proposed turbines and photograph locations were logged by GPS (Figures 3 - 12).

5.2 GIS/ Research Methods

Archaeological potential for lands within the study area including the proposed locations of wind turbines was determined by proximity to several factors including: registered sites; historic transportation routes; historic structures; water sources; topography and modern development.

The locations of registered First Nation and Euro-Canadian archaeological sites from the Ministry of Tourism and Culture's database within two kilometres were plotted but no archaeological sites fall within 300 metres a turbine location and only two fall within the overall study area. Because of the sensitive nature of the archaeological site locations, they are not provided in this report

Primary and secondary water sources were mapped using data from the Ministry of Natural Resources 1:10,000 Ontario Base Map shapefiles obtained from the Geography Network Canada online portal hosted by ESRI Canada. A buffer of 300 metres was extended around the creeks, lakes and wetlands.

The potential for nineteenth century archaeological sites was assessed by geo-referencing the nineteenth century maps for Grimsby and Caistor Townships from 1876 (H. R. Page 1876). The location of each structure shown on the township map was plotted onto the design plans and a 100 metre buffer extended around each location. Additionally, the buffer was also extended around the historic roads and railway.

6.0 ANALYSIS

A five proposed wind turbines within 300 metres of an existing water source. Although the natural water courses have been altered through a system of drains, all of the study area can be considered to have been within 300 metres of water at some point during the last 11,000 years because of the fluctuating levels of Lake Erie. There are no registered archaeological sites in close proximity to the proposed turbines but the registered archaeological sites occupy similar topography and soils to lands within the study area. Forty-one percent of these sites are beyond 300 metres to existing water sources. This deviation from the spatial distribution of archaeological sites in southern Ontario is most likely a result of the fluctuating lake levels and the slightly elevated location of these areas. None of the structures shown on mapping from 1876 are within 100 metres of a turbine location.

7.0 CONCLUSIONS

Based on the proximity to water and similarities in topography and soils to the locations of known archaeological sites within two kilometres of the study limits, the entire study area has potential for locating First Nations and Euro-Canadian sites. It is recommended that a Stage 2 archaeological assessment should be conducted at each wind turbine. The Stage 2 archaeological assessment should also include any temporary roads or staging areas required for the development.



Figure 3: Facing south towards Wainfleet wind turbine #1.



Figure 5: Facing northwest towards Wainfleet wind turbine #3.



Figure 7: Facing north towards Wainfleet wind turbines #4



Figure 4: Facing south towards Wainfleet wind turbine #2.



Figure 6: Facing southeast towards Wainfleet wind turbines #4 and #5.



Figure 8 Facing west towards Wainfleet wind turbines #5.

8.0 RECOMMENDATIONS

On the basis of the above information, the following recommendations can be made:

 The entire study area for the Wainfleet Wind Energy Project has potential for archaeological remains. A Stage 2 archaeological assessment should be conducted at each wind turbine location that should also include any temporary roads or staging areas required for the development.

9.0 ADVICE ON COMPLIANCE WITH LEGISLATION

- This report is filed with the Minister of Culture in compliance with sec. 65 (1) of the Ontario Heritage Act. The ministry reviews reports to ensure that the licensee has met the terms and conditions of the licence and archaeological resources have been identified and documented according to the standards and guidelines set by the ministry, ensuring the conservation, protection and preservation of the heritage of Ontario. It is recommended that development not proceed before receiving confirmation that the Ministry of Culture has entered the report into the provincial register of reports.
- 2. Should previously unknown or unassessed deeply buried archaeological resources be uncovered during development, they may be a new archaeological site and therefore subject to Section 48 (1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed archaeologist to carry out archaeological fieldwork, in compliance with sec. 48 (1) of the Ontario Heritage Act.
- Any person discovering human remains must immediately notify the police or coroner and the Registrar of Cemeteries, Ministry of Government Services.
- Contacts: Heritage and Operations Unit, Ministry of Culture: (416) 314-7148 Registrar of Cemeteries, Cemeteries Regulation Unit: Michael D'Mello (416) 326-8404 or (416)-326-8393

10.0 REFERENCES

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Ministry of Culture

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Figure 9: Wainfleet wind turbines with photograph locations at 1:10,000 scale (MNR OBM data; ESRI Aerial photography).



Figure 10: Wainfleet wind turbines with photograph locations at 1:10,000 scale (MNR OBM data; ESRI Aerial photography).



Figure 11: Wainfleet wind turbines with photograph locations at 1:10,000 scale (MNR OBM data; ESRI Aerial photography).



Figure 12: Wainfleet wind turbines with photograph locations, historic features with 100 m buffer and water features with 300 m buffer at 1:30,000 scale (MNR OBM data; ESRI Aerial photography).



Legend

1

- Wainlieer Study Area Doundary	-	Wainfleet	Study	Area	Boundary	1
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Wainfleet Turbines



Wainfleet Historic Buffer 100 m

Wainfleet Historic Structure

- Blacksmith Shop \oplus
- + Cemetery
- House
 - Railway
 - School

1,200 Mete

THE STAGE 2 ARCHAEOLOGICAL ASSESSMENT FOR THE WAINFLEET WIND ENERGY PROJECT, R. M. NIAGARA

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ACKNOWLEDGEMENTS

Rob von Bitter from the Ontario Ministry of Tourism and Culture provided the archaeological sites data. Special thanks to the Loeffen family for ploughing and assisting with field access.

EXECUTIVE SUMMARY

This report discusses the rationale, methods and results of the Stage 2 archaeological assessment for the proposed Wainfleet Wind Energy Project, to be developed by IPC Energy (IPC). The Wainfleet Wind Energy Project proposes the construction of five wind turbines on lands located south of the community of Wainfleet, in the Township of Wainfleet, in Niagara Region, Ontario. A. M. Archaeological Associates was retained by Morrison Hershfield to conduct the Stage 2 archaeological assessment in accordance with the Ontario Regulation 359/09 Renewable Energy Approvals (REA) under Part V.0.1 of the Ontario Environmental Protection Act prior to seeking a Renewable Energy Approval from the Ministry of the Environment (MOE). The purpose of this assessment was to determine whether there are any First Nation and/or Euro-Canadian archaeological sites in proximity to the proposed wind turbine locations which could be disturbed by the construction of the five wind turbines.

A previous Stage 1 assessment was by A. M. Archaeological Associates in May 2010 (P035-104-2010). Archaeological potential was determined for five wind turbine locations as well as a wider study area for possible future wind turbine developments. Potential was determined based on the proximity to several factors including: registered sites; historic transportation routes; historic structures; water sources; and modern development. A Stage 2 archaeological property assessment was recommended for all five proposed wind turbine locations and all other lands within the wider study limits, if required.

A Stage 2 archaeological property assessment was conducted for five turbine locations that included a minimum area 150 metres by 150 metres in size. Several of the turbine locations had changed from those detailed in the Stage 1 report. Additional changes were made to the turbine locations during the course of the Stage 2 assessment and as a result more area was assessed than required for some of the currently proposed wind turbine locations. All of the Stage 2 assessment was conducted in fields in active agricultural use. A total of 59.2 acres was visually assessed by pedestrian transects at five metre intervals. No archaeological remains were encountered and no further archaeological assessment is required for the five turbine locations as depicted in this report.

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1.0 INTRODUCTION

This report discusses the rationale, methods and results of the Stage 2 archaeological assessment for the proposed Wainfleet Wind Energy Project, to be developed by IPC Energy. The Wainfleet Wind Energy Project proposes the construction of five wind turbines on lands located south of the community of Tweedside, in the Township of West Lincoln, in Niagara Region, Ontario. A. M. Archaeological Associates was retained by Morrison Hershfield to conduct the Stage 2 archaeological assessment in accordance with the Ontario Regulation 359/09 Renewable Energy Approvals (REA) under Part V.0.1 of the Ontario Environmental Protection Act prior to seeking a Renewable Energy Approval from the Ministry of the Environment (MOE). The purpose of this assessment was to determine whether there are any First Nation and/or Euro-Canadian sites in proximity to the proposed wind turbine locations.

All archaeological assessment activities were performed according to the *Archaeological Assessment Technical Guidelines* (1993) but also conform to the working draft of the *Standards and Guidelines for Consultant Archaeologists* (June 2009). All work was done under the archaeological consulting license, P035, issued to Andrew Murray of A. M. Archaeological Associates. The field reconnaissance was conducted in May and August under clear skies and warm temperatures. Property access was arranged by Jonathan Veale, Morrison Hershfield with the cooperation of the Loeffen family. All field notes, photos and related documents will be stored at the offices of A. M. Archaeological Associates.

2.0 DEVELOPMENT CONTEXT

2.1 Study Area

The proposed Wainfleet Wind Energy Project is located in south-western Ontario, in the Township of Wainfleet, in Niagara Region (Figure 1). More specifically, the wider study area is bound by: Side Road 30, CNR Rail Line, Brawn Line Road, Lakeshore Road, Burnaby Road, Regional Road #3 (Corners Road)and Wilson Road. All of the lands around the proposed wind turbines are recently cultivated agricultural fields. The terrain is mostly flat, with an elevation of 174 m to 182 m above mean sea level.

1



Figure 1: Location of Wainfleet Wind Energy Project assessed wind turbine locations (Toporama 2010)

The previous Stage 1 background research determined that there was considerable potential for the recovery of both Aboriginal and Euro-Canadian archaeological remains (Murray 2010). A search of the archaeological sites database at the Ministry of Culture for sites within two kilometres of the Wainfleet Wind Energy Project study limits revealed 51 registered archaeological sites. There is little information accompanying most of the site records but the sites document an extensive occupation of the area by First Nations people from the Late Archaic (2000-1500 BCE) and Late Woodland, Glen Meyer (900-1300 CE).

The archaeological potential for Euro-Canadian remains includes the town of Wainfleet at the intersection of Feeder Road and Highway 3, a railway line and station, as well as 46 houses, a blacksmith shop, a school and a cemetery shown on the 1876 township map.

No registered archaeological sites or historic features are within 300 metres of any of the proposed turbine locations.

4.0 FIELD METHODOLOGY AND RESULTS

All of the turbine locations are located in agricultural fields and are currently in use for a variety of crops. A minimum area approximately 150 metres by 150 metres (5 acres) around each turbine was assessed to allow for minor adjustments to turbine locations, staging areas or other construction impacts (Figures 14 and 15). A minimum 25 metre wide allowance was assessed for the access roads for each location. The turbine locations were marked in the field by the client using wooden stakes. Additionally, turbine location and perimeter data was loaded onto a handheld GPS to assist with the determination of the assessment area in the field.

Table 1: Summary of turbine assessment

Turbine #	Area (acres)	Assessment method	
1	25.0	Pedestrian transects @ 5m	
2 & 3	17.3	Pedestrian transects @ 3m	
4	6.4	Pedestrian transects @ 5m	
5	5.9	Pedestrian transects @ 5m	
Area not required	4.6	Pedestrian transects @ 5m	
Total	59.2		

The fields around Turbine #1, parts of Turbine #2 and #3, Turbine #4 and Turbine #5 as well as an area no longer required for a wind turbine were ploughed and weathered fields. These fields were assessed at five metre intervals with excellent visibility (Figures 2, 3, 7-10). The proposed locations for Turbines #2 and #3 were moved during the course of this study and spring planted corn had grown to a height between eight and ten feet, which restricted peripheral vision of the ground surface. Since ploughing under this crop would have greatly obscured the otherwise weed-free ground surface, permission was received from the Ministry of Tourism and Culture, Archaeological Review Officer, Shari Prowse by email on July 23rd, 2010 to assess the field. Ground surface visibility was excellent but since the peripheral view was restricted, every second row of corn was assessed by pedestrian transects at an approximate interval of three metres (Figures 4 and 6). The corn field around Turbine #3 only extended 20 metres east of the proposed turbine location. The field to the east was in soybeans which completely obscured the ground surface, so this area was not assessed. The assessed five acrea around Turbine #3 was shifted west to allow for potential relocation of this tower to avoid possible impacts to the unassessed soybean field. If the turbine location cannot be altered, it is recommended that this



Figure 2: Facing southeast across Wainfleet wind turbine #1 area.



Figure 4: Facing north at field conditions around wind turbine #2.



Figure 6: Facing north at field conditions around wind turbine #3



Figure 3: Facing northeast towards Wainfleet wind turbine #2.



Figure 5: Facing north along edge of corn field at turbine #3 where construction fencing will be required.



Figure 7: Facing northeast towards Wainfleet wind turbine #5.

area be temporarily fenced during construction.. No archaeological remains were recovered from any of the areas assessed by pedestrian survey. In order to minimize impacts to surrounding properties, tap lines have been place along the road allowance between Turbine 1 and Turbines 2 and 3 as well as the east side of Station Road . These areas are disturbed by ditching, services and previous road construction (Figures 11-13).



Figure 8: Facing southeast towards Wainfleet wind turbine #4.



Figure 10: Facing northwest at field conditions around location no longer required for wind turbine.



Figure 12: Ditching along north side of Concession Road 1.



Figure 9: Close-up of field conditions at wind turbine #4.



Figure 11: Facing south along road allowance towards Turbines #1, 2 and 3.



Figure 13: Ditching along east side of Station Road.
5.0 RECOMMENDATIONS

On the basis of the above information, the following recommendations can be made:

- The locations for five proposed wind turbines have been fully assessed for potential archaeological remains. Based on negative survey results, no further archaeological work is required for these turbine locations the project and construction in these areas can proceed as planned.
- 2. The border between the assessed corn field and the unassessed soybean field on the east side of Turbine #3 should be fenced during construction to prevent any potential impacts.

6.0 ADVICE ON COMPLIANCE WITH LEGISLATION

- 1. This report is filed with the Minister of Culture in compliance with sec. 65 (1) of the Ontario Heritage Act. The ministry reviews reports to ensure that the licensee has met the terms and conditions of the licence and archaeological resources have been identified and documented according to the standards and guidelines set by the ministry, ensuring the conservation, protection and preservation of the heritage of Ontario. It is recommended that development not proceed before receiving confirmation that the Ministry of Culture has entered the report into the provincial register of reports.
- 2. Should previously unknown or unassessed deeply buried archaeological resources be uncovered during development, they may be a new archaeological site and therefore subject to Section 48 (1) of the Ontario Heritage Act. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed archaeologist to carry out archaeological fieldwork, in compliance with sec. 48 (1) of the Ontario Heritage Act.
- Any person discovering human remains must immediately notify the police or coroner and the Registrar of Cemeteries, Ministry of Government Services.
- Contacts: Heritage and Operations Unit, Ministry of Culture: (416) 314-7148 Registrar of Cemeteries, Cemeteries Regulation Unit: Michael D'Mello (416) 326-8404 or (416)-326-8393

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Figure 14: Wainfleet wind turbines with photograph locations and disturbed ROW (in yellow) at 1:10,000 scale (MNR OBM data; ESRI Aerial photography).



Figure 15: Wainfleet wind turbines with photograph locations and disturbed ROW (in yellow) at 1:10,000 scale (MNR OBM data; ESRI Aerial photography).



Figure 16: Unused but assessed Wainfleet wind turbines at 1:10,000 scale (MNR OBM data; ESRI Aerial photography).

THE STAGE 2 ARCHAEOLOGICAL ASSESSMENT FOR THE WAINFLEET WIND ENERGY PROJECT (FIT-F360H43),

LOT 22, CON. 2,

TOWNSHIP OF WAINFLEET, R. M. NIAGARA

Prepared for

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Morrison Hershfield Limited and IPC Energy provided the project details including the GIS data for the new switching station.

EXECUTIVE SUMMARY

This report discusses the rationale, methods and results of the Stage 2 archaeological assessment for the proposed Wainfleet Wind Energy Project, to be developed by IPC Energy (IPC) (FIT-F360H43). The Wainfleet Wind Energy Project proposes the construction of five wind turbines and associated facilities on lands located south of the community of Wainfleet, in the Township of Wainfleet, in Niagara Region, Ontario. A. M. Archaeological Associates was retained by Morrison Hershfield to conduct the Stage 2 archaeological assessment in accordance with the Ontario Regulation 359/09 Renewable Energy Approvals (REA) under Part V.0.1 of the Ontario Environmental Protection Act prior to seeking a Renewable Energy Approval from the Ministry of the Environment (MOE). The purpose of this assessment was to determine whether there are any First Nation and/or Euro-Canadian archaeological sites in proximity to the proposed wind turbine locations which could be disturbed by the construction of the five wind turbines.

Separate Stage 1 and Stage 2 assessment reports were prepared by A. M. Archaeological Associates in 2010 (P035-104-2010; P035-108-2010). Archaeological potential was determined for five wind turbine locations as well as a wider study area for possible future wind turbine developments. Potential was determined based on the proximity to several factors including: registered sites; historic transportation routes; historic structures; water sources; and modern development. A Stage 2 archaeological property assessment was recommended for all five proposed wind turbine locations and all other lands within the wider study limits, if required. A total of 59.2 acres were visually assessed by pedestrian transects at five metre intervals. No archaeological remains were encountered and no further archaeological assessment was recommended for the five turbine locations as depicted in the Stage 2 report.

The location of a switching station was changed to a new position north of the area assessed in 2010 for Turbine 1. Since this area also fell within the zone of potential defined in the original Stage 1 report, it was visually assessed by pedestrian transects at five metre intervals. A roughly rectangular area approximately 4.9 hectares was assessed but no archaeological remains were encountered. No further work is recommended.

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1.0 PROJECT CONTEXT

1.1 Development Context

This report discusses the rationale, methods and results of the Stage 2 archaeological assessment for the proposed Wainfleet Wind Energy Project, to be developed by IPC Energy (FIT-F360H43). The Wainfleet Wind Energy Project proposes the construction of five wind turbines on lands located south of the community of Wainfleet, in the Township of Wainfleet, in Niagara Region, Ontario. The five turbines have already been completely assessed but a switching station was relocated to a new position just north of the area assessed for Turbine 1 in 2010. A. M. Archaeological Associates was retained by Morrison Hershfield to conduct the Stage 2 archaeological assessment in accordance with the Ontario Regulation 359/09 Renewable Energy Approvals (REA) under Part V.0.1 of the Ontario Environmental Protection Act prior to seeking a Renewable Energy Approval from the Ministry of the Environment (MOE). The purpose of this assessment was to determine whether there are any Aboriginal and/or Euro-Canadian sites in proximity to the proposed switching station location.

All archaeological assessment activities were performed according to the Ministry of Tourism and Culture's Standards *and Guidelines for Consultant Archaeologists* (MTC 2011). All work was carried out under the archaeological consulting license, P035, issued to Andrew Murray of A. M. Archaeological Associates. Property access was arranged by Morrison Hershfield and IPC Energy. All records pertaining to this project will be curated at the offices of A. M. Archaeological Associates. The field work was conducted on October 11, 2011 under cloudy skies and temperatures around 23°C.

1.2 Archaeological Context

1.2.1 Location

The proposed Wainfleet Wind Energy Project is located in south-western Ontario, on Lot 22, Concession in the Township of Wainfleet, in Regional Municipality of Niagara (formerly Lincoln County). The switching station is located south of the intersection of Abbey Road (Concession 2) and Emerson Road (Figure 1). The terrain is mostly flat, with an elevation of 175 metres above mean sea level. The switching station location is an open agricultural field to fulfill the required setbacks from residences, natural heritage, water, and other features required under the REA.

1.2.2 Environmental Setting

There are a number of environmental factors such as water sources, soil types, physiographic features, vegetation and lithic resources that will influence settlement and the archaeological potential of an area. These regional features would have influenced transportation routes, gathering places, food sources, climate (micro-environments), overall vegetation patterns, and soil formation.

1.2.2.1 Physiographic Features and Soils

Landforms and soils can play a role in determining settlement patterns and human behaviour. In particular, elevated areas that are well drained are preferred areas for settlement.

The study area is in the Haldimand Clay Plain physiographic region (Chapman and Putnam 1984). The clay plain is a gently undulating tract of poorly drained soil deposited during glacial ponding south of the Vinemount Moraine (Kingston and Presant 1989). The clays and silts of the clay plain were deposited mainly during deep water stages of glacial lakes Whittlesey and Warren and ranges in thickness from 1 to 40 metres (Chapman and Putnam 1984).

The soils include the imperfectly drained lacustrine silty clay deposits of Beverly, Lincoln, Toledo, Welland (Ontario Institute of Pedology 1989). The extensive Wainfleet Bog along the east side of the study area is organic fen-associated soil which has been exploited since the nineteenth century for peat (H. R. Page 1876).

1.2.2.2 Water Sources

There is no main watercourse through the Wainfleet Wind Energy Project study limits but Lake Erie is just south of the southern-most boundary. A deeply channelized stream runs between the eastern field edge and road allowance. OBM water data and satellite imagery indicates that a seasonal swale runs north-easterly across the middle of the study area (Figures 1 and 2). In addition to these extant sources of water, past high water levels of Lake Erie from 11,000-10,500 B.P. and 5,000-4,000 B.P. have inundated the area (Tinkler 1994). This means that any portion of the study area could have been beachfront at particular times in the past 11,000 years.

1.2.2.3 Vegetation

The original forest cover was cleared in the nineteenth century resulting in the current rural, agricultural landscape. However, the early historic records describe a large tamarack and cranberry marsh in the centre of the township and "the usual hardwoods and some pine" throughout the remainder (H. R. Page:15).

1.2.2.4 Lithic Sources

Onondaga chert outcrops at numerous locations along the north shore of Lake Erie including a former cement quarry site known as "Locality 7", 7.1 km east of the eastern study limit (Eley and von Bitter 1989). Additionally, useable chunks of Onondaga chert are distributed across the fields of the area and two unmodified chunks were noted during the field assessment.

1.2.3 Registered Archaeological Sites

A search of the archaeological sites database at the Ministry of Culture revealed no registered sites within one kilometre of the Wainfleet switching station study area. However, this may be a result of the lack of systematic archaeological assessments in the area and not a reflection of the density of sites. By extending the site catchment area to two kilometres, six archaeological sites document the Pre-contact First Nation occupation of the general area (Table 1).

Borden	Name	Site Type	Culture	Reference
AfGu-9	Stouth 2	undetermined	Pre-contact First Nation	
AfGu-10	Stouth 4	undetermined	Pre-contact First Nation	
AfGu-17	Stouth 3	undetermined	Pre-contact First Nation	
AfGu-19	Stouth 1	undetermined	Pre-contact First Nation	
AfGu-41	Stouth 5	undetermined	Pre-contact First Nation	
AfGu-42	Stouth 6	undetermined	Pre-contact First Nation	

Table 1: Summary of registered archaeological sites within 2 km.

1.2.4 Past Projects

Separate Stage 1 and Stage 2 assessment reports were prepared by A. M. Archaeological Associates in 2010 (P035-104-2010; P035-108-2010). Archaeological potential was determined for five wind turbine locations as well as a wider study area for possible future wind turbine developments. Potential was determined based on the proximity to several factors including: registered sites; historic transportation routes; historic structures; water sources; and modern

development. A Stage 2 archaeological property assessment was recommended for all five proposed wind turbine locations and all other lands within the wider study limits, if required. A total of 59.2 acres were visually assessed by pedestrian transects at five metre intervals. The Stage 2 recommendations are as follows:

- The locations for five proposed wind turbines have been fully assessed for potential archaeological remains. Based on negative survey results, no further archaeological work is required for these turbine locations and the project and construction in these areas can proceed as planned.
- 2. The border between the assessed corn field and the unassessed soybean field on the east side of Turbine #3 should be fenced during construction to prevent any potential impacts.

1.3 Historic Context

The study area is located in the historic Township of Wainfleet where the pace of settlement was not as fast as most of the surrounding townships. By 1817, the entire township only had 72 houses and a saw mill with no churches, grist mills or medical practitioners. The low population growth has continued and Statistics Canada lists the population as 6,601 in 2006. The town of Wainfleet at the intersection of Feeder Road and Highway 3 was originally known as Marshville and had a population of 300 people and two hotels, two general stores and a grist mill by 1876 (H. R. Page 1876). The only historic feature located within 100 metres of the study area is Abbey Road which runs along the northern limit of the study area.

2.0 METHODOLOGY AND RESULTS

2.1 Field Methods and Results

The proposed switching station location is in a field which had recently been ploughed sometime during the week of September 11-17, 2011 and planted with winter wheat. The sprouted wheat was at a height of 5-10 cm and did not significantly restrict the view of the ploughed and weathered soil during the assessment on October 11, 2011 under cloudy skies and temperatures around 23°C (Plates 1 and 2). Switching station and past assessment perimeter data was loaded onto a handheld GPS to assist with the determination of the assessment area in the field. The ASUS A696 was loaded with CMT Field CE and was using WAAS for real-time correction. Photographs of existing conditions were also logged by GPS.

A total of 4.9 hectares were visually assessed by pedestrian transects at five metre intervals. Three small areas within this area were not assessed because they were low and wet with standing water during the assessment (Plates 3, 4 and 5). In addition to the wide buffer around the proposed switching station, a 20 metre wide allowance was assessed northward to Abbey Road in case the existing road allowance cannot be used for construction. No archaeological remains were recovered.

2.2 Record of Finds

No archaeological remains were recovered. The inventory of the documentary record generated in the field includes ten digital photographs, one GPS derived map and one electronic Stage 2 field record form.

3.0 ANALYSIS AND CONCLUSIONS

Based on the proximity to water and similarities in topography and soils to the locations of known archaeological sites within two kilometres of the study limits, the entire study area has potential for locating First Nations archaeological sites. The entire area of the proposed switching station plus a wide buffer has been visually assessed by pedestrian transects at five metre intervals. Approximately 96 percent was visually assessed by pedestrian transects at five metre intervals and four percent was not assessed due to low and wet conditions. No archaeological remains were encountered and no further archaeological assessment is recommended.

4.0 **RECOMMENDATIONS**

Based on the above information, the following recommendations can be made:

1. The subject property for the proposed Wainfleet wind farm switching station has been completely assessed through visual assessment. No archaeological remains were encountered and no further work is required.

5.0 ADVICE ON COMPLIANCE WITH LEGISLATION

- 1. Advice on compliance with legislation is not part of the archaeological record. However, for the benefit of the proponent and approval authority in the land use planning and development process, the report must include the following standard statements:
- a. This report is submitted to the Minister of Culture as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18. The report is reviewed to ensure it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism and Culture, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.
- b. It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report the Minister stating that the site has no further cultural heritage value or interest, and the report has been field in the Ontario Public Register of Archaeological Reports referred to in Section 65.1 of the *Ontario Heritage Act*.
- c. Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with sec. 48 (1) of the *Ontario Heritage Act*.
- d. The Cemeteries Act, R.S.O. 1990 c. C.4 and the Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, C.33 (when proclaimed in force) requires that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services.

Contacts: Heritage and Operations Unit, Ministry of Culture: (416) 314-7148

Registrar of Cemeteries, Cemeteries Regulation Unit, Ministry of Consumer Services: Michael D'Mello (416) 326-8404 or (416)-326-8393

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 September 8, 2009 Filed: September 23, 2009 Published on e-Laws: September 25, 2009.
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7.0 IMAGES



Plate 1: Field conditions towards south end of assessed area.



Plate 2: Field conditions towards north end of assessed area.



Plate 3: Standing water at south end of assessed area.



Plate 4: Standing water in middle section of assessed area.



Plate 5: Standing water in NW corner of assessed area.



8.0 MAPS

Figure 1: Location of Wainfleet Wind Energy Project assessed switching station location (NTS map 30L14).



Figure 2: Wainfleet wind turbine and switching station with photograph locations and assessed areas 2010 (in green) and 2011 (in red) at 1:7,500 scale (MNR OBM data; ESRI Aerial photography).

THE STAGE 2 ARCHAEOLOGICAL ASSESSMENT FOR THE WAINFLEET WIND ENERGY PROJECT REVISED ACCESS ROADS (FIT-F360H43), LOT 21-22, CON. 2, TOWNSHIP OF WAINFLEET, R. M. NIAGARA

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Morrison Hershfield Limited and IPC Energy provided the project details including the GIS data for the new access road and taplines.

EXECUTIVE SUMMARY

This report discusses the rationale, methods and results of the Stage 2 archaeological assessment for the proposed Wainfleet Wind Energy Project, to be developed by IPC Energy (IPC) (FIT-F360H43). The Wainfleet Wind Energy Project proposes the construction of five wind turbines and associated facilities on lands located south of the community of Wainfleet, in the Township of Wainfleet, in Niagara Region, Ontario. A. M. Archaeological Associates was retained by Morrison Hershfield to conduct the Stage 2 archaeological assessment in accordance with the Ontario Regulation 359/09 Renewable Energy Approvals (REA) under Part V.0.1 of the Ontario Environmental Protection Act prior to seeking a Renewable Energy Approval from the Ministry of the Environment (MOE). The purpose of this assessment was to determine whether there are any First Nation and/or Euro-Canadian archaeological sites in proximity to the proposed wind turbine locations which could be disturbed by the construction of the five wind turbines.

Separate Stage 1 and Stage 2 assessment reports were prepared by A. M. Archaeological Associates in 2010 and 2011 (P035-104-2010; P035-108-2010). Archaeological potential was determined for five wind turbine locations as well as a wider study area for possible future wind turbine developments. Potential was determined based on the proximity to several factors including: registered sites; historic transportation routes; historic structures; water sources; and modern development. A Stage 2 archaeological property assessment was recommended for all five proposed wind turbine locations and all other lands within the wider study limits, if required. A total of 59.2 acres were visually assessed by pedestrian transects at five metre intervals. No archaeological remains were encountered and no further archaeological assessment was recommended for the five turbine locations as depicted in the Stage 2 report. An additional 4.9 hectares was assessed in 2011 to accommodate the relocated switching station in the same agricultural field as Turbine 1. No archaeological remains were encountered.

An alternative access road for Turbines 2 and 3 and taplines for Turbines 1, 2 and 3 were required in 2012 and these areas have been visually assessed by pedestrian transects at five metre intervals. Approximately 85 percent was visually assessed by pedestrian transects at five metre intervals and 15 percent was determined to be disturbed. No archaeological remains were encountered and no further archaeological assessment is recommended.

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1.0 PROJECT CONTEXT

1.1 Development Context

This report discusses the rationale, methods and results of the Stage 2 archaeological assessment for the proposed Wainfleet Wind Energy Project revised access road and taplines for Turbines 1, 2, and 3, to be developed by IPC Energy (FIT-F360H43). The Wainfleet Wind Energy Project proposes the construction of five wind turbines on lands located south of the community of Wainfleet, in the Township of Wainfleet, in Niagara Region, Ontario. The five turbines and a switching station have already been completely assessed but an alternative access road for Turbines 2 and 3 and taplines for Turbines 1, 2 and 3 was required in 2012. A. M. Archaeological Associates was retained by Morrison Hershfield to conduct the Stage 2 archaeological assessment in accordance with the Ontario Regulation 359/09 Renewable Energy Approvals (REA) under Part V.0.1 of the Ontario Environmental Protection Act prior to seeking a Renewable Energy Approval from the Ministry of the Environment (MOE). The purpose of this assessment was to determine whether there are any Aboriginal and/or Euro-Canadian sites in proximity to the proposed alternative access road for Turbine 2 and 3 and taplines 1, 2, and 3.

All archaeological assessment activities were performed according to the Ministry of Tourism and Culture's Standards *and Guidelines for Consultant Archaeologists* (MTC 2011). All work was carried out under the archaeological consulting license, P035, issued to Andrew Murray of A. M. Archaeological Associates. Property access was arranged by Morrison Hershfield and IPC Energy. All records pertaining to this project will be curated at the offices of A. M. Archaeological Associates.

1.2 Archaeological Context

1.2.1 Location

The proposed Wainfleet Wind Energy Project is located in south-western Ontario, on Lots 21- 22, Concession 2 in the Township of Wainfleet, in Regional Municipality of Niagara (formerly Lincoln County). The access roads and taplines for Turbines 1, 2 and 3 are located south of the intersection of Abbey Road (Concession 2) and Emerson Road and north of 1st Concession Road (Figure 1). The terrain is mostly flat, with an elevation of 175 metres above mean sea level. The turbines are in an open agricultural field to fulfill the required setbacks from residences, natural heritage, water, and other features required under the REA.

1.2.2 Environmental Setting

There are a number of environmental factors such as water sources, soil types, physiographic features, vegetation and lithic resources that will influence settlement and the archaeological potential of an area. These regional features would have influenced transportation routes, gathering places, food sources, climate (micro-environments), overall vegetation patterns, and soil formation.

1.2.2.1 Physiographic Features and Soils

Landforms and soils can play a role in determining settlement patterns and human behaviour. In particular, elevated areas that are well drained are preferred areas for settlement.

The study area is in the Haldimand Clay Plain physiographic region (Chapman and Putnam 1984). The clay plain is a gently undulating tract of poorly drained soil deposited during glacial ponding south of the Vinemount Moraine (Kingston and Presant 1989). The clays and silts of the clay plain were deposited mainly during deep water stages of glacial lakes Whittlesey and Warren and ranges in thickness from 1 to 40 metres (Chapman and Putnam 1984).

The soils include the imperfectly drained lacustrine silty clay deposits of Beverly, Lincoln, Toledo, Welland (Ontario Institute of Pedology 1989). The extensive Wainfleet Bog along the east side of the study area is organic fen-associated soil which has been exploited since the nineteenth century for peat (H. R. Page 1876).

1.2.2.2 Water Sources

There is no main watercourse through the Wainfleet Wind Energy Project study limits but Lake Erie is just south of the southern-most boundary. A deeply channelized stream runs between the eastern field edge and road allowance. OBM water data and satellite imagery indicates that a seasonal swale runs north-easterly across the middle of the study area (Figures 1 and 2). In addition to these extant sources of water, past high water levels of Lake Erie from 11,000-10,500 B.P. and 5,000-4,000 B.P. have inundated the area (Tinkler 1994). This means that any portion of the study area could have been beachfront at particular times in the past 11,000 years.

1.2.2.3 Vegetation

The original forest cover was cleared in the nineteenth century resulting in the current rural, agricultural landscape. However, the early historic records describe a large tamarack and cranberry marsh in the centre of the township and "the usual hardwoods and some pine" throughout the remainder (H. R. Page:15).

1.2.2.4 Lithic Sources

Onondaga chert outcrops at numerous locations along the north shore of Lake Erie including a former cement quarry site known as "Locality 7", 7.1 km east of the eastern study limit (Eley and von Bitter 1989). Additionally, useable chunks of Onondaga chert are distributed across the fields of the area and unmodified chunks were noted during the field assessment.

1.2.3 Registered Archaeological Sites

A search of the archaeological sites database at the Ministry of Culture revealed no registered sites within one kilometre of the Wainfleet switching station study area. However, this may be a result of the lack of systematic archaeological assessments in the area and not a reflection of the density of sites. By extending the site catchment area to two kilometres, six archaeological sites document the Pre-contact First Nation occupation of the general area (Table 1).

Borden	Name	Site Type	Culture	Reference
AfGu-9	Stouth 2	undetermined	Pre-contact First Nation	
AfGu-10	Stouth 4	undetermined	Pre-contact First Nation	
AfGu-17	Stouth 3	undetermined	Pre-contact First Nation	
AfGu-19	Stouth 1	undetermined	Pre-contact First Nation	
AfGu-41	Stouth 5	undetermined	Pre-contact First Nation	
AfGu-42	Stouth 6	undetermined	Pre-contact First Nation	

Table 1: Summary of registered archaeological sites within 2 km.

1.2.4 Past Projects

Separate Stage 1 and Stage 2 assessment reports were prepared by A. M. Archaeological Associates in 2010 (P035-104-2010; P035-108-2010). Archaeological potential was determined for five wind turbine locations as well as a wider study area for possible future wind turbine developments. Potential was determined based on the proximity to several factors including: registered sites; historic transportation routes; historic structures; water sources; and modern development. A Stage 2 archaeological property assessment was recommended for all five

proposed wind turbine locations and all other lands within the wider study limits, if required. A total of 59.2 acres were visually assessed by pedestrian transects at five metre intervals. The Stage 2 recommendations are as follows:

- The locations for five proposed wind turbines have been fully assessed for potential archaeological remains. Based on negative survey results, no further archaeological work is required for these turbine locations and the project and construction in these areas can proceed as planned.
- 2. The border between the assessed corn field and the unassessed soybean field on the east side of Turbine #3 should be fenced during construction to prevent any potential impacts.

The location of a switching station was changed to a new position north of the area assessed in 2010 for Turbine 1 in 2011. Since this area also fell within the zone of potential defined in the original Stage 1 report, it was visually assessed by pedestrian transects at five metre intervals in the fall of 2001 (Murray 2011; P035-145-2011). A roughly rectangular area approximately 4.9 hectares was assessed but no archaeological remains were encountered. No further work was recommended.

1.3 Historic Context

The study area is located in the historic Township of Wainfleet where the pace of settlement was not as fast as most of the surrounding townships. By 1817, the entire township only had 72 houses and a saw mill with no churches, grist mills or medical practitioners. The low population growth has continued and Statistics Canada lists the population as 6,601 in 2006. The town of Wainfleet at the intersection of Feeder Road and Highway 3 was originally known as Marshville and had a population of 300 people and two hotels, two general stores and a grist mill by 1876 (H. R. Page 1876). The only historic feature located within 100 metres of the study area is 1st Concession Road which runs along the southern limit of the study area.

2.0 METHODOLOGY AND RESULTS

2.1 Field Methods and Results

The new proposed access roads and taplines was loaded along with the past assessment data onto a handheld GPS to assist with the determination of the required assessment areas in the field. The ASUS A696 was loaded with CMT Field CE and was using WAAS for real-time correction. Photographs of existing conditions were also logged by GPS. The assessment was conducted on March 27th, 2012 under partly cloudy skies and temperatures around 5°C.

The proposed tapline to Turbine 1 is in an agricultural field which was ploughed sometime during the week of September 11-17, 2011 and planted with winter wheat. The sprouted wheat was at a height of 10-15 cm and restricted the view of the ploughed and weathered soil to 80-85 percent during the assessment (Plates 1 and 2). An L-shaped area of approximately 1.9 hectares was visually assessed by pedestrian transects at five metre intervals. The agricultural field to the southeast, where the access road and tapline for Turbines 2 and 3 are proposed, was ploughed after harvest in December 2011 according to the landowner. The surface visibility was between 90 and 95 percent (Plates 3 and 4). Much of the area required for the access roads and taplines had been previously assessed but a small 0.13 hectare area north of Turbine 2 and a linear area of 1.0 hectares south of Turbine 3were visually assessed by pedestrian transects at five metre intervals. An additional area (1.5 hectares) to the east of Turbine 3 was similarly assessed since it had not been available for assessment during the previous two site visits (Plate 5). The first 315 metres of the access road and tapline will utilize an existing gravel driveway to existing farm buildings that runs northward from 1st Concession Road (Plates 6-8; Figure 3-inset). This area has already been disturbed by the farm buildings and driveway and requires no further assessment but a single pedestrian transect was inspected along each side of the driveway. Unmodified natural till chert cobbles were noted across all areas in greater quantities than the previous assessments which suggests that the longer period of weathering of the heavier silty clay soils provided excellent opportunities for the recovery of potential lithic artifacts (Plate 9).

2.2 Record of Finds

No archaeological remains were recovered. The inventory of the documentary record generated in the field includes 19 digital photographs; one GPS derived map and one electronic Stage 2 field record form.

3.0 ANALYSIS AND CONCLUSIONS

Based on the proximity to water and similarities in topography and soils to the locations of known archaeological sites within two kilometres of the study limits, the entire study area has potential for locating Aboriginal archaeological sites. The areas required for the proposed access road and taplines has been visually assessed by pedestrian transects at five metre intervals. Approximately 85 percent was visually assessed by pedestrian transects at five metre intervals and 15 percent was determined to be disturbed. No archaeological remains were encountered and no further archaeological assessment is recommended.

4.0 **RECOMMENDATIONS**

Based on the above information, the following recommendations can be made:

- The subject property for the proposed Wainfleet wind farm access road and taplines has been completely assessed through visual assessment. No archaeological remains were encountered and no further work is required.
- Recommendation #2 in the report PIF # P035-108-2010 for fencing of the previously unassessed area on the east side of Turbine #3 is no longer required since this area has now been completely assessed through visual assessment. No archaeological remains were encountered and no further work is required.

5.0 ADVICE ON COMPLIANCE WITH LEGISLATION

- 1. Advice on compliance with legislation is not part of the archaeological record. However, for the benefit of the proponent and approval authority in the land use planning and development process, the report must include the following standard statements:
- a. This report is submitted to the Minister of Culture as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18. The report is reviewed to ensure it complies with the standards and guidelines that are issued by the Minister, and that the archaeological fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism and Culture, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.
- b. It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological fieldwork on the site, submitted a report the Minister stating that the site has no further cultural heritage value or interest, and the report has been field in the Ontario Public Register of Archaeological Reports referred to in Section 65.1 of the *Ontario Heritage Act*.
- c. Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological fieldwork, in compliance with sec. 48 (1) of the *Ontario Heritage Act*.
- d. The Cemeteries Act, R.S.O. 1990 c. C.4 and the Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, C.33 (when proclaimed in force) requires that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ministry of Consumer Services.

Contacts: Heritage and Operations Unit, Ministry of Culture: (416) 314-7148

Registrar of Cemeteries, Cemeteries Regulation Unit, Ministry of Consumer Services: Michael D'Mello (416) 326-8404 or (416)-326-8393

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7.0 IMAGES



Plate 1: Field conditions at Turbine 1 tapline



Plate 3: Surface visibility Turbine 2 tapline.



Plate 2: Field conditions at Turbine 1 tapline.



Plate 4: Surface visibility Turbine 2 & 3 access road.



Plate 5: Surface conditions in enlarged Turbine 3 buffer zone.



Plate 6: View looking south along west side of disturbance around farm buildings and lane.



Plate 7: View looking north along west side of disturbance Plate 8: View looking east along south side of disturbance around farm buildings and lane.

around farm buildings and lane.



Plate 9: Example of natural chunk of Onondaga chert.



^{8.0} MAPS

Figure 1: Location of Wainfleet Wind Energy Project assessed switching station location (NTS map 30L14).
The Stage 2 Archaeological Assessment For The Wainfleet Wind Energy Project Revised Access Roads (FIT-F360H43) R. M. Niagara



Figure 2: Wainfleet wind turbine # 1 and tap line with photograph locations and assessed areas 2010 (in green), 2011 (in red) and 2012 (in yellow) at 1:7,500 scale (MNR OBM data; ESRI Aerial photography).

The Stage 2 Archaeological Assessment For The Wainfleet Wind Energy Project Revised Access Roads (FIT-F360H43) R. M. Niagara



Figure 3: Wainfleet wind turbines tap lines and access road with photograph locations and assessed areas 2010 (in green), 2011 (in red) and 2012 (in yellow) at 1:7,500 scale with inset detail of disturbed area at 1:4,000 scale (MNR OBM data; ESRI Aerial photography).