



November 19, 2014

REVISED STAGE 1 ARCHAEOLOGICAL ASSESSMENT

**SP Belle River Wind LP
Belle River Wind Project
Various Lots and Concessions
Geographic Townships of Maidstone,
Rochester and Tilbury West
Essex County, Ontario**

Submitted to:

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Executive Summary

The Executive Summary highlights key points from the report only; for complete information and findings, as well as the limitations, the reader should examine the complete report.

A Stage 1 archaeological background study was conducted by Golder Associates Ltd. (Golder) on behalf of AECOM Canada Ltd. for the Belle River Wind Project (Belle River Project) (Map 1). The project is being proposed by SP Belle River Wind, LP, by its general partner, SP Belle River Wind, GP Inc. (SP Belle River). SP Belle River is a joint venture limited partnership owned by affiliates of Pattern Renewable Holdings Canada, ULC (Pattern Development) and Samsung Renewable Energy, Inc. (Samsung Renewable Energy).

The study area, which measures approximately 18,600 hectares in size, is located on public and private lands near the southern shoreline of Lake St. Clair in the former Geographic Townships of Maidstone, Rochester, and Tilbury West, now Town of Lakeshore, County of Essex, Ontario. The study area is bounded by County Road 2 and County Road 42 to the north, Scott Sideroad and Hicks Road to the west, Highway 401 and Middle Road to the south, and the intersection of County Road 42 and Highway 401 to the east. Up to 65 wind turbine locations are currently being assessed for the Belle River Wind Project, but have not been finalized.

This assessment was undertaken to meet the requirements for the client's application for a Renewable Energy Approval (REA), as outlined in Ontario Regulation 359/09 Section 22(3) of the *Environmental Protection Act* (Government of Ontario 1990c). The *Green Energy Act* (Government of Ontario 2009) enabled legislation governing project assessments and approvals to be altered to allow for a more streamlined Renewable Energy Approval (REA) process. Under Section 21 and 22 of the REA, an archaeological assessment must be conducted if the proponent concludes that engaging in the project may have an impact on archaeological resources. Currently, Ontario Regulation 359/09 of the *Environmental Protection Act* governs the REA process for renewable energy projects such as wind, anaerobic digestions, solar and thermal treatment facilities.

The objective of the Stage 1 assessment was to compile all available information about the known and potential cultural heritage resources within the study area and to provide specific direction for the protection, management and/or recovery of these resources, consistent with Ontario Ministry of Tourism, Culture and Sport's (MTCS) *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011).

Golder applied archaeological potential criteria commonly used by the MTCS to determine the presence of archaeological potential within the study area. The archaeological potential for pre-contact Aboriginal sites within the study area was deemed to be moderate to high. This assessment was based on the presence of pre-contact Aboriginal sites in the vicinity of the study area, as well as the presence of nearby potable water sources and soils that are considered acceptable for pre-contact Aboriginal agricultural practices. The archaeological potential for Euro-Canadian sites within the study area was deemed to be high. This determination was based on the documentation indicating occupation in the vicinity from the late 18th century onwards, as well as the presence of historic transportation routes.



Based on the background research, it is recommended that **Stage 2 archaeological assessment be performed for all areas that will be impacted by the proposed project, including turbine sites, access roads, transmission lines, collection systems and transformer stations (Map 11)**. The following methods are recommended for the Stage 2 property survey:

- A Stage 2 archaeological assessment will be conducted by a licenced archaeologist using the pedestrian survey method at 5 metre intervals in all areas that will be impacted by the project and where ploughing is possible (e.g., agricultural fields). This assessment will occur when the agricultural fields have been recently ploughed, weathered, and exhibit at least 80% surface visibility;
- A Stage 2 archaeological assessment will be conducted by a licenced archaeologist using the test pit survey method at 5 metre intervals in all areas that will be impacted by the project and where ploughing is not possible (e.g., wood lots, overgrown areas, manicured lawns);
- Areas of low or no archaeological potential such as poorly drained areas, areas of steep slope and areas of previous disturbance (e.g., pipelines, road ROWs, buildings) identified during the Stage 2 assessment within all areas that will be impacted by the project are to be mapped and photo-documented, and if necessary subjected to judgemental test pitting; and,
- The Stage 2 archaeological assessment will follow the requirements set out in the *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011).

The Ontario Ministry of Tourism, Culture and Sport is asked to review the results and recommendations presented herein, accept this report into the Provincial Register of archaeological reports and issue a standard letter of concurrence with the findings presented herein.



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Table of Contents

1.0 PROJECT CONTEXT	1
1.1 Development Context	1
1.2 Historical Context.....	2
1.2.1 Pre-Contact Aboriginal Period.....	2
1.2.1.1 Paleo Period	3
1.2.1.2 Archaic Period	4
1.2.1.3 Woodland Period	5
1.2.1.4 Post-Contact Aboriginal Period.....	7
1.2.2 Historic Euro-Canadian Period.....	8
1.2.2.1 Maidstone Township.....	9
1.2.2.2 Rochester Township	10
1.2.2.3 Tilbury West Township	12
1.3 Archaeological Context.....	14
1.3.1 The Natural Environment	14
1.3.2 Previous Archaeological Research	15
2.0 ANALYSIS AND CONCLUSIONS.....	17
2.1 Assessing Archaeological Potential.....	17
2.1.1 Features Indicating Archaeological Potential	17
2.1.2 Potential for Pre-contact Aboriginal Archaeological Resources	18
2.1.3 Potential for Euro-Canadian Archaeological Resources	18
2.1.4 Features Indicating the Removal of Archaeological Potential	19
2.2 Conclusion.....	19
3.0 RECOMMENDATIONS.....	20
4.0 ADVICE ON COMPLIANCE WITH LEGISLATION	21
5.0 BIBLIOGRAPHY AND SOURCES	22
6.0 MAPS.....	27
7.0 IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT	39
8.0 CLOSURE.....	40



REVISED STAGE 1 ARCHAEOLOGICAL ASSESSMENT SP BELLE RIVER WIND LP, BELLE RIVER WIND PROJECT

TABLES

Table 1: Cultural Chronology for Essex County	2
Table 2: Sites Recorded within One Kilometre Radius of Study Area	16

MAPS

Map 1: Location Plan	28
Map 2: Treaty Boundaries Based on Morris, 1943	29
Map 3: A Portion of the Early Survey Map of Maidstone Township	30
Map 4: A Portion of the 1881 Map of Rochester Township	31
Map 5: A Portion of the Early Survey Map of Rochester Township	32
Map 6: A Portion of the 1881 Map of Rochester Township	33
Map 7: A Portion of the Early Survey Map of Tilbury West Township	34
Map 8: A Portion of the 1881 Map of Tilbury West Township	35
Map 9: Soils and Topography Present in Study Area	36
Map 10: Areas of High Archaeological Potential	37
Map 11: Areas Recommended for Stage 2 Archaeological Assessment	38



1.0 PROJECT CONTEXT

1.1 Development Context

A Stage 1 archaeological background study was conducted by Golder Associates Ltd. (Golder) on behalf of AECOM Canada Ltd. for the Belle River Wind Project (Belle River Project) (Map 1). The project is being proposed by SP Belle River Wind, LP, by its general partner, SP Belle River Wind, GP Inc. (SP Belle River). SP Belle River is a joint venture limited partnership owned by affiliates of Pattern Renewable Holdings Canada, ULC (Pattern Development) and Samsung Renewable Energy, Inc. (Samsung Renewable Energy).

It is anticipated that the Belle River Project will be categorized as a Class 4 wind facility with a generating capacity of up to 150 MW. The major components of this project are expected to include up to 65 wind turbine generators in the 2.3 to 3.0 MW range, pad mounted step-up transformers, buried and overhead electrical collector systems and ancillaries, buried and overhead transmission lines and grid connections to the Hydro One transmission system, a collector substation, a microwave tower, meteorological towers, turbine access roads, temporary staging areas for erection of wind turbines, and an operations building.

The Belle River Project study area, which measures approximately 18,600 hectares in size, is located on public and private lands near the southern shoreline of Lake St. Clair in the former Geographic Townships of Maidstone, Rochester, and Tilbury West, now Town of Lakeshore, County of Essex, Ontario (Map 1). The study area is bounded by County Road 2 and County Road 42 to the north, Scott Sideroad and Hicks Road to the west, Highway 401 and Middle Road to the south, and the intersection of County Road 42 and Highway 401 to the east. Up to 65 wind turbine locations are currently being assessed for the Belle River Wind Project, but have not been finalized.

This Stage 1 assessment was undertaken to meet the requirements for the client's application for a Renewable Energy Approval (REA), as outlined in Ontario Regulation 359/09 Section 22(3) of the *Environmental Protection Act* (Government of Ontario 1990d). The *Green Energy Act* (Government of Ontario 2009) enabled legislation governing project assessments and approvals to be altered to allow for a more streamlined Renewable Energy Approval (REA) process.

Under Section 21 and 22 of the REA, an archaeological assessment must be conducted if the proponent concludes that engaging in the project may have an impact on archaeological resources. Currently, Ontario Regulation 359/09 of the *Environmental Protection Act* governs the REA process for renewable energy projects such as wind, anaerobic digestions, solar and thermal treatment facilities.

The objective of the Stage 1 assessment was to compile all available information about the known and potential cultural heritage resources within the study area and to provide specific direction for the protection, management and/or recovery of these resources. In compliance with the provincial standards and guidelines set out in the *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), the objectives of the Stage 1 archaeological background study are as follows:

- To provide information about the study area's geography, history, previous archaeological fieldwork and current land conditions;



- To evaluate in detail the study area’s archaeological potential which will support recommendations for Stage 2 survey for all or parts of the property; and
- To recommend appropriate strategies for Stage 2 survey.

To meet these objectives, Golder archaeologists employed the following research strategies:

- A review of relevant archaeological, historic and environmental literature pertaining to the study area;
- Consultation with individuals knowledgeable about the study area;
- A review of the land use history, including pertinent historic maps; and
- An examination of the Ontario Archaeological Sites Database (OASD) to determine the presence of known archaeological sites in and around the project area (MTCS 2014).

Background research was also conducted at the Crown Land Survey Records Office at the Ministry of Natural Resources in Peterborough, and Golder’s corporate library.

The Stage 1 background study was conducted under archaeological consulting licence P311, issued to Bradley Drouin of Golder by the Ontario Ministry of Tourism, Culture and Sport, PIF #s P311-0277-2014, P311-0291-2014, P311-0298-2014, and P311-0300-2014. A property inspection was not conducted as part of the Stage 1 archaeological assessment, as it was clearly demonstrated by the background research that the entire study area exhibits archaeological potential (see Section 2.0).

1.2 Historical Context

1.2.1 Pre-Contact Aboriginal Period

Table 2 provides a general outline of the pre- and post-contact culture history for Essex County, drawn from Ellis and Ferris (1990).

Table 1: Cultural Chronology for Essex County

Period	Characteristics	Time	Comments
Early Paleo-Indian	Fluted Projectiles	9000 - 8400 B.C.	spruce parkland/caribou hunters
Late Paleo-Indian	Hi-Lo Projectiles	8400 - 8000 B.C.	smaller but more numerous sites
Early Archaic	Kirk and Bifurcate Base Points	8000 - 6000 B.C.	slow population growth
Middle Archaic	Brewerton-like points	6000 - 2500 B.C.	environment similar to present
Late Archaic	Narrow Points (Lamoka)	2000 - 1800 B.C.	increasing site size
	Broad Points	1800 - 1500 B.C.	large chipped lithic tools
	Small Points	1500 - 1100 B.C.	introduction of bow hunting
Terminal Archaic	Hind Points	1100 - 950 B.C.	emergence of true cemeteries



REVISED STAGE 1 ARCHAEOLOGICAL ASSESSMENT SP BELLE RIVER WIND LP, BELLE RIVER WIND PROJECT

Period	Characteristics	Time	Comments
Early Woodland	Meadowood Points	950 - 300 B.C.	introduction of pottery
Middle Woodland	Vertical Cord-Marked Pottery, Coutuere Complex	300 B.C. - A.D.500	Hopewell Influence
Late Woodland	Riviere au Vase	A.D. 500 – 900	introduction of corn
	Young Phase	A.D. 900 – 1200	dense storage pits, proto-settlements
	Springwell Phase	A.D. 1200 – 1400	emergence of agricultural villages
	Wolf Phase	A.D. 1400 – 1550	palisaded villages, tribal warfare and displacement
Contact Aboriginal	Various Algonquian Groups	A.D. 1700 – 1875	early written records and treaties
Historic	Euro-Canadian	A.D. 1796 – present	European settlement

1.2.1.1 Paleo Period

The first human occupation of the Essex County area, known as the Paleo Period, begins just after the end of the Wisconsin Glacial Period. Although there was a complex series of ice retreats and advances which played a large role in shaping the local topography, southwestern Ontario was finally ice free by 12,500 years ago. The first human settlement can be traced back 11,000 years, when this area was settled by Native groups that had been living south of the Great Lakes.

Our current understanding of Early Paleo settlement patterns suggest that small bands, that consisted of probably no more than 25-35 individuals, followed a pattern of seasonal mobility extending over large territories (Ellis and Deller 1990:54). One of the most thoroughly studied of these groups followed a seasonal round that extended from as far south as Chatham to the Horseshoe Valley north of Barrie. Early Paleo sites tend to be located in elevated locations on well-drained loamy soils. Many of the known sites were located on former beach ridges associated with Lake Algonquin, the post-glacial lake occupying the Lake Huron/Georgian Bay basin. There are a few extremely large Early Paleo sites, such as one located close to Parkhill, Ontario, which covered as much as six hectares (Ellis and Deller 1990:51).

It appears that these sites were formed when the same general locations were occupied for short periods of time over the course of many years. Given their placement in locations conducive to the interception of migratory mammals such as caribou, it has been suggested that they may represent communal hunting camps. There are also smaller Early Paleo camps scattered throughout the interior of southwestern Ontario, usually situated adjacent to wetlands.

The most recent research suggests that population densities were very low during the Early Paleo Period, with all of southwestern Ontario being occupied by perhaps only 100 to 200 people (Ellis and Deller 1990:54). Because this is the case, Early Paleo sites are exceedingly rare.



While the Late Paleo Period (8400-8000 B.C.) is more recent, it has been less well researched, and is consequently more poorly understood. By this time the environment of southwestern Ontario was coming to be dominated by closed coniferous forests with some minor deciduous elements. It seems that many of the large game species that had been hunted in the early part of the Paleo Period had either moved further north, or as in the case of the mastodons and mammoths, become extinct.

During the late Paleo Period people continued to cover large territories as they moved about in response to seasonal resource fluctuations. On a province wide basis Late Paleo projectile points are far more common than Early Paleo materials, suggesting a relative increase in population.

The end of the Paleo Period was heralded by numerous technological and cultural innovations that appeared throughout the Archaic Period. These innovations may be best explained in relation to the dynamic nature of the post-glacial environment and region-wide population increases.

1.2.1.2 Archaic Period

During the Early Archaic Period (8000-6000 B.C.), the jack and red pine forests that characterized the Late Paleo environment were replaced by forests dominated by white pine with some associated deciduous trees (Ellis, Kenyon and Spence 1990:68-69). One of the more notable changes in the Early Archaic Period is the appearance of side and corner-notched projectile points. Other significant innovations include the introduction of ground stone tools such as celts and axes, suggesting the beginnings of a simple woodworking industry. The presence of these often large and not easily portable tools suggests there may have been some reduction in the degree of seasonal movement, although it is still suspected that population densities were quite low, and band territories large.

During the Middle Archaic Period (6000-2500 B.C.) the trend towards more diverse toolkits continued, as the presence of net-sinkers suggest that fishing was becoming an important aspect of the subsistence economy. It was also at this time that "bannerstones" were first manufactured. Bannerstones are carefully crafted ground stone devices that served as a counterbalance for "atlatls" or spear-throwers. Another characteristic of the Middle Archaic is an increased reliance on local, often poor quality chert resources for the manufacturing of projectile points. It seems that during earlier periods, when groups occupied large territories, it was possible for them to visit a primary outcrop of high quality chert at least once during their seasonal round. However, during the Middle Archaic, groups inhabited smaller territories that often did not encompass a source of high quality raw material. In these instances lower quality materials which had been deposited by the glaciers in the local till and river gravels were utilized.

This reduction in territory size was probably the result of gradual region-wide population growth which led to the infilling of the landscape. This process resulted in a reorganization of Native subsistence practices, as more people had to rely on resources from smaller areas. During the latter part of the Middle Archaic, technological innovations such as fish weirs have been documented as well as stone tools especially designed for the preparation of wild plant foods.



It is also during the latter part of the Middle Archaic Period that long distance trade routes began to develop, spanning the northeastern part of the continent. In particular, native copper tools manufactured from a source located northwest of Lake Superior were being widely traded (Ellis, Kenyon and Spence 1990:66). By 3500 B.C. the local environment had stabilized in a near modern form (Ellis, Kenyon and Spence 1990:69).

During the Late Archaic (2500-950 B.C.) the trend towards decreased territory size and a broadening subsistence base continued. Late Archaic sites are far more numerous than either Early or Middle Archaic sites, and it seems that the local population had definitely expanded.

It is during the Late Archaic that the first true cemeteries appear. Before this time individuals were interred close to the location where they died. During the Late Archaic, if an individual died while his or her group happened to be at some distance from their group cemetery, the bones would be kept until they could be placed in the cemetery. Consequently, it is not unusual to find disarticulated skeletons, or even skeletons lacking minor elements such as fingers, toes or ribs, in Late Archaic burial pits.

The appearance of cemeteries during the Late Archaic has been interpreted as a response to increased population densities and competition between local groups for access to resources. It is argued that cemeteries would have provided strong symbolic claims over a local territory and its resources. These cemeteries are often located on heights of well-drained sandy/gravel soils adjacent to major watercourses.

This suggestion of increased territoriality is also consistent with the regionalized variation present in Late Archaic projectile point styles. It was during the Late Archaic that distinct local styles of projectile points appear. Also during the Late Archaic the trade networks which had been established during the Middle Archaic continued to flourish. Native copper from northern Ontario and marine shell artifacts from as far away as the Mid-Atlantic coast are frequently encountered as grave goods. Other artifacts such as polished stone pipes and banded slate gorgets also appear on Late Archaic sites. One of the more unusual and interesting of the Late Archaic artifacts is the "birdstone". Birdstones are small, bird-like effigies usually manufactured from green banded slate.

1.2.1.3 Woodland Period

The Early Woodland Period (950-400 B.C.) is distinguished from the Late Archaic Period primarily by the addition of ceramic technology. While the introduction of pottery provides a useful demarcation point for archaeologists, it may have made less difference in the lives of the Early Woodland peoples. The first pots were very crudely constructed, thick walled, and friable. It has been suggested that they were used in the processing of nut oils by boiling crushed nut fragments in water and skimming off the oil (Spence, Pihl and Murphy 1990:137). These vessels were not easily portable, and individual pots must not have sustained a long use life. There have also been numerous Early Woodland sites located at which no pottery was found, suggesting that these poorly constructed, undecorated vessels had yet to assume a central position in the day-to-day lives of Early Woodland peoples.

Other than the introduction of this rather limited ceramic technology, the life-ways of Early Woodland peoples show a great deal of continuity with the preceding Late Archaic Period. For instance, birdstones continue to be manufactured, although the Early Woodland varieties have "pop-eyes" which protrude from the sides of their heads.



Likewise, the thin, well-made projectile points which were produced during the terminal part of the Archaic Period continue in use. However, the Early Woodland variants were side-notched rather than corner-notched, giving them a slightly altered and distinctive appearance.

The trade networks which were established in the Middle and Late Archaic also continued to function, although there does not appear to have been as much traffic in marine shell during the Early Woodland Period. During the last 200 years of the Early Woodland Period, projectile points manufactured from high quality raw materials from the American Midwest begin to appear in southern Ontario (Spence, Pihl and Murphy 1990:138).

In terms of settlement and subsistence patterns, the Middle Woodland (400 B.C.-900 A.D.) provides a major point of departure from the Archaic and Early Woodland Periods. While Middle Woodland peoples still relied on hunting and gathering to meet their subsistence requirements, fish became an even more important part of the diet. Some Middle Woodland sites have produced literally thousands of bones from spring spawning species such as walleye and sucker. Nuts such as acorns were also being collected and consumed. In addition, Middle Woodland peoples relied much more extensively on ceramic technology. Middle Woodland vessels are often garishly decorated with hastily impressed designs covering the entire exterior surface and upper portion of the vessel interior. Consequently, even very small fragments of Middle Woodland vessels are easily identifiable.

It is also at the beginning of the Middle Woodland period that rich, densely occupied sites appear on the valley floor of major rivers. Middle Woodland sites are significantly different in that the same location was repeatedly occupied over several hundred years. Because this is the case, rich deposits of artifacts often accumulated. Unlike earlier seasonally utilized locations, these Middle Woodland sites appear to have functioned as base camps, occupied off and on over the course of the year. There are also numerous small upland Middle Woodland sites, many of which can be interpreted as special purpose camps from which localized resource patches were exploited. This shift towards a greater degree of sedentism continues the trend witnessed from at least Middle Archaic times, and provides a prelude to the developments that follow during the Late Woodland Period.

East of London Ontario, the Late Woodland period began with a shift in settlement and subsistence patterns involving an increasing reliance on corn horticulture. Corn may have been introduced into Southwestern Ontario from the American Midwest as early as 600 A.D.; however, it did not become a dietary staple until at least three to four hundred years later.

However in the area west of London, including the study area, Middle Woodland patterns of settlement and subsistence continued unabated. Categorized as the "Riviere au Vase" Phase of the Western Basin Tradition (500 to 900 A.D.), many archaeologists believe that it is possible to trace a direct line from these peoples to the later Algonkian speaking groups that inhabited extreme Southwestern Ontario at the time of first European contact.

While settlement and subsistence patterns during the Riviere au Vase Phase continue to follow patterns established during earlier periods, there were significant changes in some aspects of material culture that make sites from this time period easy to distinguish. Across the region, this period witnessed the emergence of paddled vessel construction techniques and cord wrapped stick decorations. There was also a change in projectile point styles from larger Middle Woodland types to much smaller forms such as Raccoon, Jack's Reef, Port Maitland and Levanna, that clearly functioned as arrowheads rather than spear points.



In addition to these changes in ceramics and lithics, there was also a major discontinuity in exchange networks and in the complexity of mortuary ceremonialism. While it is likely that Riviere au Vase peoples were aware of and even made limited use of corn horticulture, the evidence for this is limited, and it is clear that corn horticulture never achieved as prominent a role as it did with the groups living in the Grand River Drainage to the east. Riviere au Vase ceramics have been recovered from sites in southern Michigan and northern Ohio and extreme southwestern Ontario, including the Sarnia area.

The transition to the subsequent Younger Phase of the Western Basin Tradition occurs around 900 A.D., although it is not well defined. There is a clear continuation in ceramic styles between these two phases, without any clear markers to easily separate the materials. Younger ceramics tend to be more complexly decorated, often with elaborate neck decorations consisting of filled triangles or plaits. In terms of settlement and subsistence, hunting and gathering patterns continue from earlier periods, although corn is more regularly encountered on Younger Phase sites. In fact, recent dietary reconstructions from the Krieger site in Chatham-Kent indicate an increasing reliance on maize horticulture at this time, perhaps to a similar extent as the contemporary and more sedentary Iroquoian groups to the east (Watts et al. 2011).

Additionally, there appears to be a trend toward larger, more substantial occupations in the Younger Phase, which suggests both an increase in population, as well as a trend towards reduced mobility. A reduction in mobility is supported by recent discoveries in the Arkona area, which identified the presence of palisaded villages with multiple house structures dating to the Younger Phase (Golder 2012a, 2012b), a settlement pattern previously believed to begin during the subsequent Springwells Phase.

By approximately 1200 A.D. the Younger Phase transitioned into the subsequent Springwells Phase, with the appearance of collared castellated vessels decorated with horizontal motifs and a more frequent occurrence of larger Western Basin sites with multiple house structures and palisades.

True longhouses have been identified on sites near Windsor, and it appears that during the summer months, corn horticulture was becoming a growing component of the subsistence economy. Major Springwells Phase communities have been documented in the Windsor area, along the southern and eastern margins of Lake St. Clair, as well as in the Sydenham River drainage.

The Wolf Phase (1400 to 1550 A.D.) is the final and most poorly understood phase of the Western Basin Tradition in southwestern Ontario. Wolf Phase ceramics emerge out of the highly decorated late Springwells Phase styles such as Mixer Dentate. At present, Wolf Phase sites are only known from the extreme western ends of Essex, Kent and Lambton counties. It appears that the Wolf Phase witnesses a continuation of the trend towards reduced residential mobility and the emergence of true villages that had begun during the Springwells Phase.

1.2.1.4 Post-Contact Aboriginal Period

The post-contact Aboriginal occupation of southern Ontario was heavily influenced by the dispersal of various Iroquoian-speaking peoples, such as the Huron and closely related Petun, by the New York State Iroquois and the subsequent arrival of Algonkian-speaking groups from northern Ontario at the end of the 17th century and beginning of the 18th century (Schmalz 1991). The nature of their settlement size, population distribution, and material culture shifted as European settlers encroached upon their territory.



However, despite this shift, “written accounts of material life and livelihood, the correlation of historically recorded villages to their archaeological manifestations, and the similarities of those sites to more ancient sites have revealed an antiquity to documented cultural expressions that confirms a deep historical continuity to Iroquoian systems of ideology and thought” (Ferris 2009:114). First Nation peoples of Southern Ontario have left behind archaeologically significant resources throughout Southern Ontario which show continuity with past peoples, even if they have not been recorded in historical Euro-Canadian documentation.

The study area was most likely occupied by Algonkian-speaking groups who also exhibited cultural influence from Iroquoian-speaking groups, both before and after European contact. Generally, the pre-contact Aboriginal presence in much of southern Ontario reflects occupation by northern Iroquoian speakers. During and following the Iroquois Wars of the mid-17th century and the dispersal of the Iroquoian-speaking Huron-Petun and Neutral, a considerable reduction in the extent of territory occupied by Algonkian speakers occurred in southern Ontario. Beginning about 1690, northern Algonkian speakers from northern Ontario began to move southwards and southern Iroquoian speakers began to push southern Algonkian speakers further west (Ferris 2009; Schmalz 1991).

1.2.2 Historic Euro-Canadian Period

The Belle River Project study area covers large portions of the former Geographic Townships of Maidstone, Rochester and Tilbury West, Essex County, Ontario.

The area that would eventually become Essex County was the first location in Ontario to be settled. Permanent settlements were established along the present Canadian shore of the Detroit River, opposite the location of Fort Ponchartrain, Detroit, as early as 1747 (County of Essex 2010). Early settlers in the area were of French descent and were comprised of a combination of disbanded or discharged soldiers directly from France and French Canadian fur traders. The first settlement established on the Canadian side of the Detroit River was known as the Petite Cote (Lajeunesse 1960: ix), which is located in present day LaSalle. When the river frontage in the Petite Cote settlement was fully occupied, settlers travelled further north toward Lake St. Clair and created a new settlement concentrated around the Church of Assumption, or present day Town of Sandwich (County of Essex 2010; Lajeunesse 1960: xvii). In the late 18th and early 19th centuries, French settlers travelled east along the southern shore of Lake St. Clair and settled in the areas of present day Belle River in Maidstone and Rochester Townships and Stoney Point in Tilbury West Township (County of Essex 2010).

One of the earliest written historic records of this area is found as part of Treaty No. 2, which:

... was made with the O[dawa], Chippew[a], Pottawatomi[i] and Huro[n] May 19th, 1790, portions of which nations had established themselves on the Detroit River all of whom had been driven by the Iroquois from the northern and eastern parts of the Province, from the Detroit River easterly to Catfish Creek and south of the river La Tranche [Thames River] and Chenail Ecarte, and contains Essex County except Anderdon Township and Part of West Sandwich; Kent County except Zone Township, and Gores of Camden and Chatham; Elgin County except Bayham Township and parts of South Dorchester and Malahide. In Middlesex County, Del[a]ware and Westminster Townships and part of North Dorchester [are included].

Morris 1943:17



While it is difficult to delineate treaty boundaries exactly today, Map 2 provides an approximate outline of the limits of Treaty No. 2.

1.2.2.1 Maidstone Township

The historical Township of Maidstone was located south of Lake St. Clair, west of the Township of Rochester, north of the Townships of Gosfield and North Colchester, and east of the Township of East Sandwich within Essex County. The coast of Lake St. Clair and the lots fronting the Puce and Belle Rivers within Maidstone Township were first surveyed according to the single-front survey system by Deputy Surveyor Abraham Iredell in 1799 (Clarke 2002:67). The balance of the township was later surveyed according to the double-front survey system by Lieutenant-Colonel Mahlon Burwell in 1823 (Clarke 2002:73). Map 3, originally produced by Abraham Iredell in 1799 with additions made by Mahlon Burwell in 1823 (Iredell 1799), illustrates the initial surveys of Maidstone Township and some of the early land owners. It is unclear based on this map when these lots were initially granted to the early land owners, or if these early land owners actually resided on the lots, since speculation was a common problem in Essex County during the late 18th and early 19th centuries (Clarke 2002:295-335).

Around the time of the initial survey of Maidstone Township, French fisherman and trappers began settling along the southern shore of Lake St. Clair and in the area that would eventually be known as Belle River Village, which extends into the neighbouring Rochester Township (Belden & Co. 1881). Settlement of the lots fronting on Middle Road did not occur until 1828, with the interior portion of the township being settled in the 1840s.

The first activities that would have occurred on the lots granted to the early settlers of Maidstone Township would have been to fulfill the settlement duties required for patenting. Settlement duties typically included constructing a habitable dwelling and clearing a specified amount of the forest for agricultural use (Clarke 2002:175-177). Typically, dwellings were placed adjacent to the early transportation routes where the initial forest clearing activities would have occurred. Forest clearing would have slowly proceeded away from the concession road in the years that followed with the cleared land typically being reserved for agricultural activities.

Growth of Maidstone Township continued slowly following the initial settlement of the area. Smith's (1846) *Canadian Gazetteer* indicates that the population of the township in 1846 had reached 783, and only 9.4% of the land taken up within the township was under cultivation.

Maidstone was officially incorporated as a township on January 1, 1850 under the Municipal Corporations Act of 1849 and, by 1852 the population had reportedly grown to 1,167 residents (Carter 1984:701). The population increased further to 1,652 residents by 1861 (McEvoy et al. 1866); this additional growth was likely triggered by the construction of the Great Western Railway through the north portion of the township in 1852. Settlers in the area were undoubtedly attracted to the fertile soils and vast forests, which presented excellent opportunities for the lumber industry.

The 1881 map of Maidstone Township in the *Illustrated Historical Atlas of Essex County* (Belden & Co. 1881) (Map 4) indicates the presence of one church in close proximity to the present study area, as well as two school houses, two churches, and a town hall within the limits of the present study area.



This map also depicts three residential structures within the limits of the present study area and three additional residential structures just beyond the limits of the present study area. The limited representation of residential structures on this map is likely a factor of poor atlas subscribership for the area, and not a reflection of sparse settlement in the township at this time.

Several rural communities developed within Maidstone Township over the course of the 19th century, including Patillo, Luttrell, and Woodslee. Patillo is the closest rural community to the study area, being located immediately northwest of the boundary.

Patillo

Located in the north-central portion of Maidstone Township was the community of Patillo. A post office was established in this small community in 1874 and in 1895, the population was reportedly 50 residents (Carter 1984:1023). This community changed its name to Puce in 1893 and, in 1956 the population had reportedly grown to 239 residents.

1.2.2.2 Rochester Township

The historical Township of Rochester was located south of Lake St. Clair, west of the Township of Tilbury West, north of the Townships of Gosfield and Mersea, and east of the Township of Maidstone within Essex County. The coast of Lake St. Clair and the lots fronting the Belle and Ruscom Rivers within Rochester Township were first surveyed according to the single-front survey system by Deputy Surveyor Abraham Iredell in 1799 (Clarke 2002:67). The balance of the township was later surveyed according to the double-front survey system by Lieutenant-Colonel Mahlon Burwell in 1824 (Clarke 2002:73). Map 5, originally produced by Abraham Iredell in 1799 with additions made by Mahlon Burwell in 1824 (Iredell 1799), illustrates the initial surveys of Rochester Township and some of the early land owners. It is unclear based on this map when these lots were initially granted to the early land owners, or if these early land owners actually resided on the lots, since speculation was a common problem in Essex County during the late 18th and early 19th centuries (Clarke 2002:295-335).

As early as the 1790s, settlers primarily of French descent began to establish themselves along the shore of Lake St. Clair and in the area that would eventually be known as Belle River Village (Belden & Co. 1881). Settlement of the lots fronting on Belle River and along Middle Road did not occur until the 1830s, with the interior portion of the township between Middle Road and Lake St. Clair being settled as late as the 1840s.

As indicated above for Maidstone Township, the first activities that would have occurred on the lots granted to the early settlers of Rochester Township would have been to fulfill the settlement duties required for patenting. Settlement duties typically included constructing a habitable dwelling and clearing a specified amount of the forest for agricultural use (Clarke 2002:175-177). Typically, dwellings were placed adjacent to the early transportation routes where the initial forest clearing activities would have occurred. Forest clearing would have slowly proceeded away from the concession road in the years that followed with the cleared land typically being reserved for agricultural activities.



Growth of Rochester Township continued slowly following the initial settlement of the area. Smith's (1846) *Canadian Gazetteer* indicates that the population of the township in 1846 was only 474, and a very small proportion (7.6%) of the land taken up within the township was under cultivation.

Rochester was officially incorporated as a township on January 1, 1850 under the Municipal Corporations Act of 1849 and, by 1852 the population had reportedly grown to 788 residents (Carter 1984:1002). The population increased further to 1,349 residents in 1861 (McEvoy et al. 1866), indicating a rapid growth in the township, likely triggered by the construction of the Great Western Railway through the north portion of the township in 1852.

The Union Publishing Co.'s (1883-84) *Farmer's Directory for the County of Essex* indicates the presence of at least 372 families in Rochester Township at this time, demonstrating continued growth in the township throughout the mid-to-late 19th century.

The 1881 map of Rochester Township in the *Illustrated Historical Atlas of Essex County* (Belden & Co. 1881) (Map 6) indicates the presence of four school houses and three churches within the limits of the present study area. The road system is also recognizable as the current transportation layout. This map also depicts 28 residential structures within the limits of the present study area and three additional residential structures just beyond the limits of the present study area (Map 6). The limited representation of residential structures on this map is likely a factor of poor atlas subscribership for the area, and not a reflection of sparse settlement in the township at this time.

The 1881 map of Rochester Township also indicates that the study area is also located in the vicinity of the historical towns of Belle River, Ruscom River, and Woodslee.

Belle River

Located in the northwest corner of Rochester Township was the village known as Belle River. Originally settled by French residents from the Sandwich Settlement as early as the 1790s, this farming community developed slowly until 1852 when the Great Western Railway was constructed through the area (Belden & Co. 1881). This event triggered a survey of the town plot by the Ouellette family in the same year and led to the establishment of a post office, known as Rochester, in 1854. At this time, a steam saw and grist mill was present in the community, along with two mercantile enterprises. By 1874, the population of Belle River had reached 300 residents, prompting its incorporation as a village. In 1969, Belle River became a town and, in 1976, its population had reportedly grown to 3,254 residents (Carter 1984:1002).

Ruscom River

Ruscom River was a dispersed rural community located in the northeast corner of Rochester Township. A post office was established in this small community in 1874 and in 1892, the population was reportedly 80 residents (Carter 1984:1023). This community changed its name to Deerbrook in 1898 and, in 1976 the population was reported at 131 residents.



Woodslee

The community of Woodslee, located in the southwest corner of Rochester Township, developed in the mid-19th century to relieve the inconvenience felt by settlers in the southern portion of the township who had to travel to Belle River village in order to do business and purchase supplies (Belden & Co. 1881). By 1881, this community had 150 residents and contained an iron foundry, three saw mills, several stores, shops, churches, and a hotel, among other establishments (Belden & Co. 1881; Lovell 1874:362).

1.2.2.3 Tilbury West Township

The historical Township of Tilbury West was located south of Lake St. Clair, north of the Township of Mersea and east of the Township of Rochester within Essex County, and west of the Township of Tilbury East in Kent County. The 22 lots fronting on the coast of Lake St. Clair, and the first five concessions in Tilbury West Township were first surveyed according to the double-front survey system by Deputy Surveyor Abraham Iredell in 1798 (Clarke 2002:67). The balance of the township was later surveyed by Lieutenant-Colonel Mahlon Burwell in 1824 (Clarke 2002:73). Map 7, produced by Mahlon Burwell in 1824 (Burwell 1824), illustrates the initial surveys of Tilbury West Township and some of the early land owners. It is unclear based on this map when these lots were initially granted to the early land owners, or if these early land owners actually resided on the lots, since speculation was a common problem in Essex County during the late 18th and early 19th centuries (Clarke 2002:295-335).

As early as the 1790s, settlers primarily of French descent began to establish themselves along the shore of Lake St. Clair and in the area that would eventually be known as Stoney Point (Belden & Co. 1881); however, little improvement was made to the township as a whole at this time. Settlement of the lots fronting on Middle Road did not occur until the late 1830s and 1840s, with the interior portion of the township between Middle Road and Lake St. Clair being settled sometime in the mid-19th century.

As indicated above for Maidstone and Rochester Townships, the first activities that would have occurred on the lots granted to the early settlers of Tilbury West Township would have been to fulfill the settlement duties required for patenting. Settlement duties typically included constructing a habitable dwelling and clearing a specified amount of the forest for agricultural use (Clarke 2002:175-177). Typically, dwellings were placed adjacent to the early transportation routes where the initial forest clearing activities would have occurred. Forest clearing would have slowly proceeded away from the concession road in the years that followed with the cleared land typically being reserved for agricultural activities.

Growth of Tilbury West Township continued slowly following the initial settlement of the area. Smith's (1846) *Canadian Gazetteer* indicates that the population of the township in 1844 was only 437, and a very small proportion (6.7%) of the land taken up within the township was under cultivation.

Tilbury West was incorporated as a township on January 1, 1850 under the Municipal Corporations Act of 1849 and, by 1852 the population was reportedly 672 residents (Carter 1984:1194). The population increased to 1,190 residents in 1861 (McEvoy et al. 1866), indicating a rapid growth in the township, likely triggered by the construction of the Great Western Railway through the north portion of the township in 1852. The Union Publishing Co.'s (1883) *Farmer's Directory for the County of Essex, 1883-84* indicates the presence of at least 782 families in Tilbury West Township at this time, demonstrating continued growth of the township throughout the mid-to-late 19th century.



The 1881 map of Tilbury West Township in the *Illustrated Historical Atlas of Essex County* (Belden & Co. 1881) (Map 8) indicates the presence of four school houses and two churches in close proximity to the present study area, as well as one school house within the limits of the present study area. The road system is also recognizable as the current transportation layout. This map also depicts six residential structures within the limits of the present study area and three additional residential structures just beyond the limits of the present study area (Map 8). The limited representation of residential structures on this map is likely a factor of poor atlas subscribership for the area, and not a reflection of sparse settlement in the township at this time.

The 1881 map of Tilbury West Township also indicates that the study area is located in the vicinity of the historical towns of Comber and Stoney Point.

Comber

The village of Comber was located in the west-central portion of Tilbury West Township. Established in 1846, this post office village remained a very small community for several years, as indicated by a population of only 50 residents in 1857 (Carter 1984:252). The construction of the Canada Southern Railway in 1868 triggered some additional growth in the community resulting in an array of commercial and mechanical industries developing in the community in the second half of the 19th century (Belden & Co. 1881). By 1873, Comber was home to 100 individuals and contained a telegraph office, three or four stores, and was a centre for trade in produce, timber, railroad ties and staves (Lovell 1874:91). By 1881, the population had reached 250 residents and, in 1890, Comber was incorporated as a Police Village, a status which was still in effect as late as 1983 (Carter 1984:252).

Stoney Point

Located in the north-central portion of Tilbury West Township, adjacent to Lake St. Clair, was the hamlet originally known as Chevalier. The name later changed to Stoney Point in 1865 when a post office of the same name was established in the community. Originally settled by French Canadians as early as the 1790s, this rural community developed slowly until 1852 when the Great Western Railway was constructed through the area (Belden & Co. 1881). By 1873, Stoney Point's population had reached 200 residents and the community contained at least four stores and two hotels (Lovell 1874:323). This population increase prompted Stoney Point's incorporation as a Police Village in 1881 (Carter 1984:225).



1.3 Archaeological Context

1.3.1 The Natural Environment

The study area is situated entirely within the physiographic region known as the St. Clair Clay Plains (Chapman and Putnam 1984:146-147).

Adjoining Lake St. Clair in Essex and Kent County Counties and the St. Clair River in Lambton County are extensive clay plains covering 2,270 square miles. The region is one of little relief, lying between 575 and 700 feet a.s.l., except for the moraine at Ridgetown and Blenheim which rises 50 to 500 feet higher....Glacial Lake Whittlesey, which deeply covered all of these lands, and Lake Warren which subsequently covered nearly the whole area, failed to leave deep stratified beds of sediment on the underlying clay till except around Chatham, between Blenheim and the Rondeau marshes, and in a few other smaller areas.

Most of Lambton and Essex Counties, therefore, are essentially till plains smoothed by shallow deposits of lacustrine clay which settled in the depressions while the knolls were being lowered by wave action.

Chapman and Putnam, 1984:147.

The bedrock deposits in the vicinity date to the Middle Devonian Period and consist of the Dundee Formation (Hewitt 1972). The Dundee Formation occupies a belt that runs from west of Port Stanley to east of Port Dover on Lake Erie, and northwest to Lake Huron where it outcrops from southwest of Grand Bend to north of Goderich, and also in parts of Essex County.

This formation consists primarily of light brown, medium-grained limestone with some chert and has a thickness of 60 to 160 feet. Selkirk chert, a moderate quality raw material, outcrops from the Dundee formation from the embouchure of the Grand River along the north shore of Lake Erie, and as far west as the Chatham area (Eley and von Bitter 1989; Fox 2009).

The localized topography of the study area is relatively flat with an elevation of 180 metres above sea level reported throughout. The soils within the study area are comprised almost entirely of the fertile Brookston Clay series, which exhibits poor natural drainage (Richards et al. 1949) (Map 9). The Brookston soils are capable of supporting a variety of general farming activities and are particularly well suited to growing forage crops, such as red clover, sweet clover, grasses and alfalfa when properly drained. When appropriate fertilizers are supplied to the soils and drainage improvements are made to the land, the Brookston series in Essex County is also capable of supporting a variety of cash crops, including corn, wheat, beans, canning crops, peas, barley and black tobacco. McEvoy & Co.'s (1866) *Gazetteer and Directory of the Counties of Kent, Lambton, and Essex, 1866-7* confirms that the principle products for Essex County as a whole during the mid-19th century were fall wheat, spring wheat, oats, barley, rye, corn, peas, tobacco, and a wide variety of fruits.

Small pockets of the poorly drained Sand Spot Phase of the Brookston Clay series and the imperfectly drained Berrien Sandy Loam series occur in the west-central portion of the study area (Richards et al. 1949). These soils are capable of supporting general farming and dairying activities and are well suited to growing a variety of canning crops (e.g., vegetables, strawberries, raspberries).



The poorly drained Wauseon Sandy Loam series occurs in the northern portion of the study area, adjacent to the shores of Lake St. Clair (Richards et al. 1949). If improvements to the natural drainage are made, these soils are capable of supporting the growth of corn, tomatoes, and forage crops.

The imperfectly drained Caistor Clay series occurs along the banks of Pike Creek, Puce River, Belle River, Ruscom River, and Grande Cirque (or Big Creek) (Richards et al. 1949). The Caistor series is capable of supporting general agriculture, stock raising and some cash crops.

The study area lies within the Mixedwood Plains ecozone of Ontario (The Canadian Atlas Online 2014). Although largely altered by recent human activity, this ecozone once supported a wide variety of deciduous trees, such as various species of ash, birch, chestnut, hickory, oak, and walnut, as well as a variety of birds and small to large land mammals, such as raccoon, red fox, white tailed deer, and black bear. Smith's (1846) *Canadian Gazetteer* confirms that the timber present in Maidstone, Rochester and Tilbury West Townships during the first half of the 19th century included white ash, elm, oak, hickory, beech, maple, hickory and basswood.

The majority of the study area is also located within the Essex Region watershed, which covers an area of approximately 1,681 square kilometres and consists of a peninsula in the extreme south-western corner of the province, which is bounded on three sides by the Great Lakes system (Essex Region Source Protection Area 2011). More specifically, the study area falls within portions of the Pike Creek, Puce River, Belle River, Duck Creek, Moison Creek, Ruscom River, and Little Creek subwatersheds. Combined, these subwatersheds drain an area approximately 46,156 hectares in size (Essex Region Source Protection Area 2011).

Pike Creek, Puce River, Major Creek, Belle River, Duck Creek, Moison Creek, Ruscom River, Little Creek, and Lake St. Clair (all primary water sources) are the closest potable water sources for the entire Belle River Project study area. Pike Creek, Puce River, Major Creek, Belle River, Duck Creek, Moison Creek, Ruscom River, and Little Creek all flow in a northerly direction and eventually drain into Lake St. Clair.

The eastern tip of the study area falls within the Lower Thames Valley watershed, which covers an area of approximately 3,274 square kilometres and includes most of the municipality of Chatham-Kent, the western portion of Elgin County, part of southwestern Middlesex County, and a portion of eastern Essex County (LTVCA 2008). More specifically, this portion of the study area falls within the Grand Cirque (or Big Creek) subwatershed. This subwatershed flows in a northerly direction and eventually drains into Lake St. Clair.

No secondary water sources (e.g., intermittent streams and creeks, springs, marshes, swamps) were identified within the present study area.

1.3.2 Previous Archaeological Research

A search of the Ontario Archaeological Sites Database (OASD) indicated that there are four registered pre-contact Aboriginal sites located within a one kilometre radius of the study area (MTCS 2014). None of these sites are situated within 300 metres of the study area. Table 6 provides a summary of these sites.

A fifth archaeological site, AbHq-4, appears to be located within the present study area; however, no data fields were entered into the Archaeological Site Database. As such, it is not possible to provide any additional information about this site at the present time.



Table 2: Sites Recorded within One Kilometre Radius of Study Area

Borden Number	Site Name	Type	Cultural Affiliation
AbHp-1	Ruscom River	campsite	Archaic? and Woodland
AbHp-2	Ruscom-Dupuis I	campsite	Woodland (Western Basin)
AbHp-3	Ruscom-Dupuis II	campsite	Woodland (Western Basin) and Late Archaic
AbHp-5	Silverman	Village with a burial	Middle Woodland and Late Woodland (Riviere au Vase and Younge Phases)

Three additional reports that document work conducted within 50 metres of the present study area are listed below. These reports have yet to be entered into the Ministry of Tourism, Culture and Sport's Provincial Register of Archaeological Reports; thus, copies could not be obtained by Golder at the time of the production of the present Stage 1 background study.

Mayer Heritage Consultants Inc.

2012 *Archaeological Assessment (Stage 1), Lakeshore Eastern Communities Sewage Works Class EA, Town of Lakeshore, Essex County, Ontario.*

Timmins Martelle Heritage Consultants Inc.

2013 *Stage 2 Archaeological Assessment. Union Gas Leamington Expansion Project Part of Lot 76, Concession 6, Lot 77, Concession 7, Lots 25-30 Concession 7 and 8, Geographic Township of Rochester, now Town of Lakeshore; Part of Lot 5, Concession 9-11, Geographic Township of Mersea, now the Municipality of Leamington, Essex County, Ontario.*

Stantec Consulting Ltd.

2014 *Stage 1 and 2 Archaeological Assessment 2014 NPS 16 Panhandle Replacement Project (Phase 1), Additional Lands Lot 3 Concession 1 Belle River West Side, Lot 5 River Aux Puces East, Geographic Township of Maidstone, Municipality of Lakeshore, County of Essex, Ontario.*

To the best of our knowledge, no additional archaeological assessments have been conducted within 50 metres of the current study area.

Information concerning specific site locations is protected by provincial policy, and is not fully subject to the Freedom of Information Act. The release of such information in the past has led to looting or various forms of illegally conducted site destruction. Confidentiality extends to all media capable of conveying location, including maps, drawings, or textual descriptions of a site location. For this reason maps and data that provide information on archaeological site locations are provided as supplementary documentation and do not form part of this public report.

The Ministry of Tourism, Culture and Sport will provide information concerning site location to the party or an agent of the party holding title to a property, or to a licensed archaeologist with relevant cultural resource management interests.



2.0 ANALYSIS AND CONCLUSIONS

2.1 Assessing Archaeological Potential

2.1.1 Features Indicating Archaeological Potential

Archaeological potential is established by determining the likelihood that archaeological resources may be present on a subject property. In accordance with the MTCS's 2011 *Standards and Guidelines for Consultant Archaeologists* the following are features or characteristics that indicate archaeological potential:

- Previously identified archaeological sites;
- Water sources:
 - Primary water sources (lakes, rivers, streams, creeks);
 - Secondary water sources (intermittent streams and creeks; springs; marshes; swamps);
 - Features indicating past water sources (e.g. glacial lake shorelines indicated by the presence of raised gravel, sand, or beach ridges; relic river or stream channels indicated by clear dip or swale in the topography; shorelines of drained lakes or marshes; and cobble beaches);
 - Accessible or inaccessible shoreline (e.g. high bluffs, swamps or marsh fields by the edge of a lake; sandbars stretching into marsh);
- Elevated topography (eskers, drumlins, large knolls, plateaux);
- Pockets of well drained sandy soil, especially near areas of heavy soil or rocky ground; Distinctive land formations that might have been special or spiritual places, such as waterfalls, rock outcrops, caverns, mounds, and promontories and their bases (there may be physical indicators of their use, such as burials, structures, offerings, rock paintings or carvings);
- Resource areas including:
 - Food or medicinal plants;
 - Scarce raw minerals (e.g. quartz, copper, ochre or outcrops of chert);
 - Early Euro-Canadian industry (fur trade, mining, logging);
- Areas of Euro-Canadian settlement; and
- Early historical transportation routes.



In recommending a Stage 2 property survey based on determining archaeological potential for a study area, the MTCS stipulates the following:

- No areas within 300 metres of a previously identified site; water sources; areas of early Euro-Canadian Settlement; or locations identified through local knowledge or informants can be recommended for exemption from further assessment;
- No areas within 100 metres of early transportation routes can be recommended for exemption from further assessment; and
- No areas within the property containing an elevated topography; pockets of well-drained sandy soil; distinctive land formations; or resource areas can be recommended for exemption from further assessment.

2.1.2 Potential for Pre-contact Aboriginal Archaeological Resources

As outlined above, at least nine sources of potable water exist within the limits of the present study area. There are no features present within the study area that are indicative of past water sources and the localized topography is flat. The Brookston soils found throughout the majority of the study area exhibit poor natural drainage, but are very fertile and capable of supporting general farming activities; thus, these soils would have been acceptable, though not ideal, for pre-contact Aboriginal agricultural practices. Four pre-contact Aboriginal sites have also been previously registered within a one kilometre radius of the study area and one additional site has been registered within the present study area.

Given these factors, the archaeological potential for pre-contact Aboriginal sites within the study area is deemed to be moderate to high. Areas of archaeological potential have been indicated on Map 10.

2.1.3 Potential for Euro-Canadian Archaeological Resources

As discussed in Sections 1.2.2.1 and 1.2.2.2, the townships of Maidstone, Rochester and Tilbury West have a long history of Euro-Canadian occupation dating back to the late 18th century.

The 1881 Maps of Maidstone, Rochester and Tilbury West Townships in the *Illustrated Historical Atlas of Essex County* indicate that the study area is located in the vicinity of the historical communities of Patillo, Belle River, Ruscom River, Woodslee, Comber, and Stoney Point. Several residential buildings, school houses and churches are also depicted within the study area, and the road system is recognizable as the current transportation layout.

Given these factors, the archaeological potential for historic Euro-Canadian sites within the study area is deemed to be high. Areas of archaeological potential have been indicated on Map 10.

It should be noted that although Map 10 also depicts several petroleum wells within the western portion of the study area, the Ontario Oil, Gas & Salt Resources Library (2014) indicates that these wells were all constructed after 1900 and, thus, do not contribute to the Euro-Canadian archaeological potential for the area.



2.1.4 Features Indicating the Removal of Archaeological Potential

A negative indicator of archaeological potential is extensive land disturbance. This includes widespread earth movement activities that would have eradicated or relocated any cultural material to such a degree that the information potential and cultural heritage value or interest has been lost.

Section 1.3.2 of the MTCS's 2011 *Standards and Guidelines for Consultant Archaeologists* states that:

Archaeological potential can be determined not to be present for either the entire property or a part(s) of it when the area under consideration has been subject to extensive and deep land alterations that have severely damaged the integrity of any archaeological resources.

Government of Ontario 2011:18

The types of disturbance referred to above includes, but is not restricted to, quarrying, sewage and infrastructure development, building footprints and major landscaping involving grading below topsoil.

The Ministry of Natural Resources' *Pits and Quarries Online Database* (Government of Ontario 2014) does not indicate the presence of any pits or quarries within the Belle River Project study area. Map 10 illustrates a pipeline running east-west through the northern portion of the study area, as well as several petroleum wells and communication towers across the western half of the study area. The installation of these structures, as well as the construction of roads and buildings, would have likely resulted in extensive land disturbance that would have removed any archaeological potential associated with these portions of the study area; however, the full extent of this disturbance is not known at the present time. As a result, any previously disturbed areas identified within the areas to be impacted by the proposed project will require documentation, but will not require Stage 2 archaeological assessment as they possess low to no archaeological potential.

2.2 Conclusion

Golder applied archaeological potential criteria commonly used by the MTCS to determine the presence of archaeological potential within the study area. The archaeological potential for pre-contact Aboriginal sites within the study area was deemed to be moderate to high. This assessment was based on the presence of pre-contact Aboriginal sites in the vicinity of the study area, as well as the presence of nearby potable water sources and soils that are considered acceptable for pre-contact Aboriginal agricultural practices. The archaeological potential for Euro-Canadian sites within the study area was deemed to be high. This determination was based on the documentation indicating occupation in the vicinity from the late 18th century onwards, as well as the presence of historic transportation routes.



3.0 RECOMMENDATIONS

Based on the background research, it is recommended that **Stage 2 archaeological assessment be performed for all areas that will be impacted by the proposed project, including turbine sites, access roads, transmission lines, collection systems and transformer stations (Map 11).**

The following methods are recommended for the Stage 2 property survey:

- A Stage 2 archaeological assessment will be conducted by a licenced archaeologist using the pedestrian survey method at 5 metre intervals in all areas that will be impacted by the project and where ploughing is possible (e.g., agricultural fields). This assessment will occur when the agricultural fields have been recently ploughed, weathered, and exhibit at least 80% surface visibility;
- A Stage 2 archaeological assessment will be conducted by a licenced archaeologist using the test pit survey method at 5 metre intervals in all areas that will be impacted by the project and where ploughing is not possible (e.g., wood lots, overgrown areas, manicured lawns);
- Areas of low or no archaeological potential such as poorly drained areas, areas of steep slope and areas of previous disturbance (e.g., pipelines, road ROWs, buildings) identified during the Stage 2 assessment within all areas that will be impacted by the project are to be mapped and photo-documented, and if necessary subjected to judgemental test pitting; and,
- The Stage 2 archaeological assessment will follow the requirements set out in the *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011).

The Ontario Ministry of Tourism, Culture and Sport is asked to review the results and recommendations presented herein, accept this report into the Provincial Register of archaeological reports and issue a standard letter of concurrence with the findings presented herein.



4.0 ADVICE ON COMPLIANCE WITH LEGISLATION

This report is submitted to the Minister of Tourism and Culture as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18 (Government of Ontario 1990b). The report is reviewed to ensure that 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 regards to alterations to archaeological sites by the proposed development.

It is an offence under Section 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alterations to a known archaeological site or to 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 to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeological reports referred to in Section 65.1 of the *Ontario Heritage Act* (Government of Ontario 1990b).

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 Section 48(1) of the *Ontario Heritage Act* (Government of Ontario 1990b).

The Funeral, Burial and Cremation Services Act, 2002, S.O. 2002, c.33, requires that any person discovering or having knowledge of a burial site shall immediately notify the police or coroner. It is recommended that the Registrar of Cemeteries at the Ministry of Consumer Services is also immediately notified.



5.0 BIBLIOGRAPHY AND SOURCES

Belden, H. & Co.

1881 *Illustrated Historical Atlas of Essex County*. H. Belden & Co, Toronto.

Burwell, Mahlon

1824 *No. 31 Tilbury West. Surveyed by Order from the Surveyor General's Office, bearing date at York, the 17th day of April 1821. Deputy Surveyor's Office, Port Talbot*. Survey Record 2210. Ontario Ministry of Natural Resources, Survey Records Branch, Toronto.

Chapman, Lyman John and Donald F. Putnam

1984 *The Physiography of Southern Ontario*. 3rd ed. Ontario Geological Survey Special Volume 2. Ontario Ministry of Natural Resources, Toronto.

Clarke, John

2002 *Land, Power, and Economics on the Frontier of Upper Canada*. McGill University Press, Quebec.

County of Essex

2010 *Early History of Essex County (1792-1924)*. Electronic document: [http://www.countyofessex.on.ca/wps/wcm/connect/COE/COE/ABOUT+ESSEX+COUNTRY/History+of+Essex+County/Early+History+of+Essex+County+\(1792++1924\)/](http://www.countyofessex.on.ca/wps/wcm/connect/COE/COE/ABOUT+ESSEX+COUNTRY/History+of+Essex+County/Early+History+of+Essex+County+(1792++1924)/). Last accessed May, 2014.

Eley, Betty E. and Peter H. von Bitter

1989 *Cherts of Southern Ontario*. Royal Ontario Museum, Toronto.

Ellis, Chris J. and D. Brian Deller

1990 Paleo-Indians. In: *The Archaeology of Southern Ontario to A.D. 1650*. Occasional Publication of the London Chapter, Ontario Archaeological Society, Number 5: 37-64.



Ellis, Chris J. and Neal Ferris (editors)

1990 *The Archaeology of Southern Ontario to A.D. 1650*. Occasional Publication of the London Chapter, Ontario Archaeological Society, Number 5.

Ellis, Chris J., Ian T. Kenyon and Michael W. Spence

1990 The Archaic. In: *The Archaeology of Southern Ontario to A.D. 1650*. Occasional Publication of the London Chapter, Ontario Archaeological Society, Number 5: 65-124.

Essex Region Source Protection Area

2011 *Watershed Characterization: Updated/Amended Proposed Assessment Report*. Essex Region Conservation Authority, Essex Region, Ontario.

Ferris, Neal

2009 *The Archaeology of Native-Lived Colonialism: Challenging History in the Great Lakes*. University of Arizona Press, Tucson.

Fox, William A.

2009 Ontario Cherts Revisited. In *Painting the Past With a Broad Brush: Papers in Honour of James Valliere Wright*, edited by David Keenlyside and Jean-Luc Pilon, pp. 353-370. Mercury Series, Archaeology Paper 170. Canadian Museum of Civilization, Gatineau.

Golder Associates Ltd.

2012a *Stage 4 Archaeological Assessment, Bingo Village (AgHk-42), Bingo West Pit, Part of Lot 2, South Boundary Concession, Township of Bosanquet, Lambton County, Ontario*. Report submitted to the Ministry of Tourism, Culture and Sport.

2012b *Stage 4 Archaeological Assessment, Inland West Pit Locations 1, 3, 6, 9, and 12, Part of Lots 28 and 29, Concession 5 N.E.R., Township of Warwick, Lambton County, Ontario*. Report on file with the Ministry of Tourism, Culture and Sport.



REVISED STAGE 1 ARCHAEOLOGICAL ASSESSMENT SP BELLE RIVER WIND LP, BELLE RIVER WIND PROJECT

Government of Ontario

- 1990a *The Ontario Heritage Act*. Electronic document: <http://www.search.e-laws.gov.on.ca/en/isysquery/22cb421e-c632-498a-a9d8-0fe5ff80454f/1/doc/?search=browseStatutes&context=#hit1> Accessed January 29, 2013.
- 1990b Ontario Regulation 359/09: *Renewable Energy Approvals Under Part V.0.1 of the act*. Electronic document: http://www.e-laws.gov.on.ca/html/regs/english/elaws_regs_090359_e.htm. Last accessed February 26, 2013
- 1990c *The Environmental Protection Act*. Electronic document: http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_90e19_e.htm Last accessed February 26, 2013
- 2002 *Funeral, Burial and Cremation Services Act*. Electronic document: <http://www.search.e-laws.gov.on.ca/en/isysquery/4df81715-b552-4fa4-8098-d72607430cdb/1/doc/?search=browseStatutes&context=#hit1> Accessed January 29, 2013.
- 2009 *The Green Energy Act*, R.S.O. 2009, Chapter 12, Schedule A. Last amended: 2009, c.33, Schedule 11, s. 6. Electronic Document: http://www.e-laws.gov.on.ca/html/statutes/english/elaws_statutes_09g12_e.htm
- 2011 *Standards and Guidelines for Consultant Archaeologists*. Ministry of Tourism, Culture & Sport, Toronto.
- 2014 *Pits and Quarries Online*. Electronic database: http://www.mnr.gov.on.ca/en/Business/Aggregates/1ColumnSubPage/STDPROD_104633.html

Hewitt, D.F.

- 1972 *Paleozoic Geology of Southern Ontario*. Geological Report No. 105, Ontario Division of Mines, Toronto.

Iredell, Abraham

- 1799 [No title]. Survey Record 1989. Ontario Ministry of Natural Resources, Survey Records Branch, Toronto.

Lajeunesse, Ernest J.

- 1960 *The Windsor Border Region: Canada's Southernmost Frontier*. The Champlain Society for the Government of Ontario, University of Toronto Press, Toronto, Ontario.

Lovell, John

- 1874 *Lovell's Gazetteer of British North America*. John Lovell, Montreal.



REVISED STAGE 1 ARCHAEOLOGICAL ASSESSMENT SP BELLE RIVER WIND LP, BELLE RIVER WIND PROJECT

Lower Thames Valley Conservation Authority (LTVCA)

2008 *Thames-Sydenham and Region Watershed Characterization Report*. Lower Thames Valley Conservation Authority, Chatham, Ontario.

Mayer Heritage Consultants Inc.

2012 *Archaeological Assessment (Stage 1), Lakeshore Eastern Communities Sewage Works Class EA, Town of Lakeshore, Essex County, Ontario*.

McEvoy, H. N., W. H. Irwin, and Geo. H. Burnham

1866 *Gazetteer and Directory of the Counties of Kent, Lambeth, and Essex, 1866-7*. McEvoy & Co., Toronto.

Ministry of Tourism, Culture and Sport

2014 Sites within a One Kilometre Radius of the Project Area Provided from the Ontario Archaeological Sites Database, June, 2014.

Morris, J.L.

1943 *Indians of Ontario*. 1964 reprint. Department of Lands and Forests, Government of Ontario.

Ontario Oil, Gas & Salt Resources Library

2014 *Petroleum Well Data – Ontario*. Electronic document:
http://www.ogsrlibrary.com/data_free_petroleum_ontario

Richards, N.R., A.G. Caldwell and F.F. Morwick

1949 *Soil Survey of Essex County. Report No. 11 of the Ontario Soil Survey*. Experimental Farms Service, Dominion Department of Agriculture and the Ontario Agricultural College, Guelph, Ontario.

Schmalz, Peter S.

1991 *The Ojibwa of Southern Ontario*. University of Toronto Press, Toronto.



Smith, Wm. H.

1846 *Smith's Canadian Gazetteer*. H. & W. Rowsell, Toronto.

Spence, Michael W., Robert H. Pihl and Carl Murphy

1990 Cultural Complexes of the Early and Middle Woodland Periods. In: *The Archaeology of Southern Ontario to A.D. 1650*. Occasional Publication of the London Chapter, Ontario Archaeological Society, Number 5: 15-170.

Stantec Consulting Ltd.

2014 *Stage 1 and 2 Archaeological Assessment 2014 NPS 16 Panhandle Replacement Project (Phase 1), Additional Lands Lot 3 Concession 1 Belle River West Side, Lot 5 River Aux Puces East, Geographic Township of Maidstone, Municipality of Lakeshore, County of Essex, Ontario*.

The Canadian Atlas Online

2014 *Mixedwood Plains*. Electronic document:
http://www.canadiangeographic.ca/atlas/themes.aspx?id=mixedwood&sub=mixedwood_basics_ecozones&lang=En. Accessed April 30, 2014.

Union Publishing Co.

1883 *Farmer's Directory for the County of Essex (1883-84)*. Union Publishing Co., Toronto, Ontario

Watts, Christopher, Christine D. White, and Fred J. Longstaffe

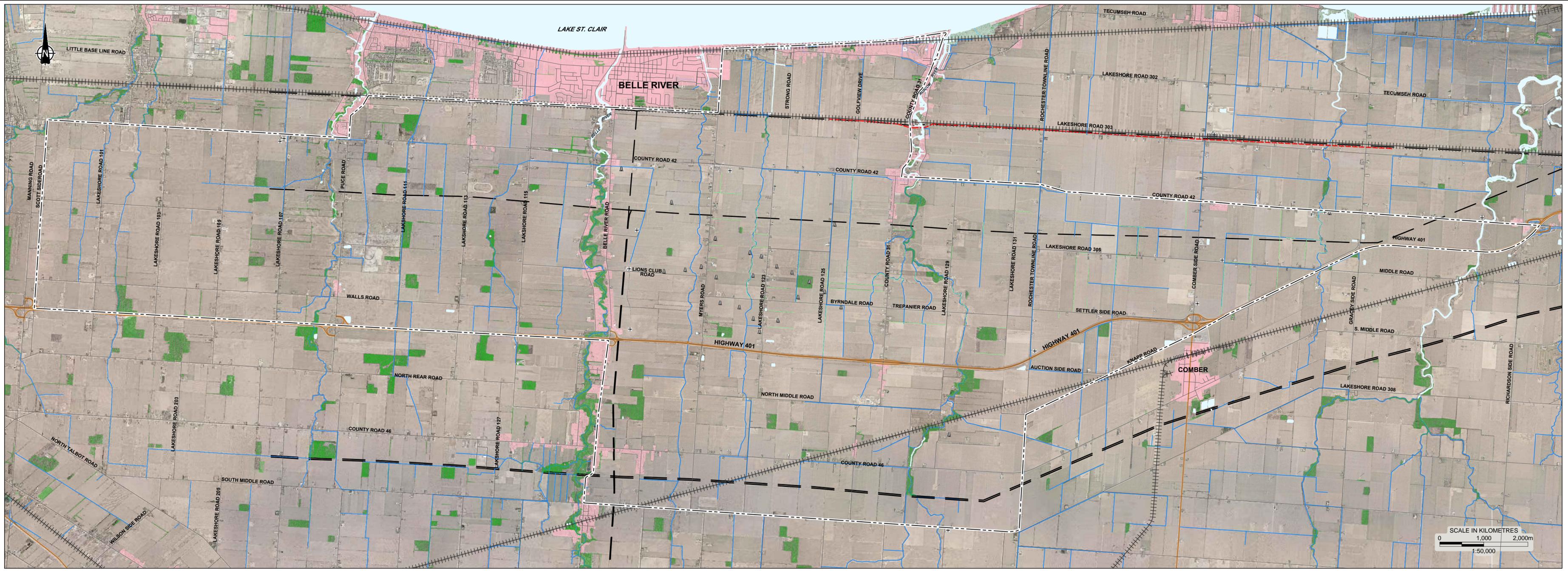
2011 Childhood Diet and Western Basin Tradition Foodways at the Krieger Site, Southwestern Ontario. *American Antiquity* 76(3):446-472.



6.0 MAPS

All maps follow on the succeeding pages.

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LEGEND

- ▲ PETROLEUM WELL
- ⊕ COMMUNICATIONS TOWER
- STUDY AREA
- WATER SEGMENT
- ++++ RAIL LINE (EXISTING OR FORMER)
- PIPELINE
- UTILITY LINE
- BUILT UP AREA
- WOODED AREA
- WETLAND AREA
- WATER BODY

REFERENCE

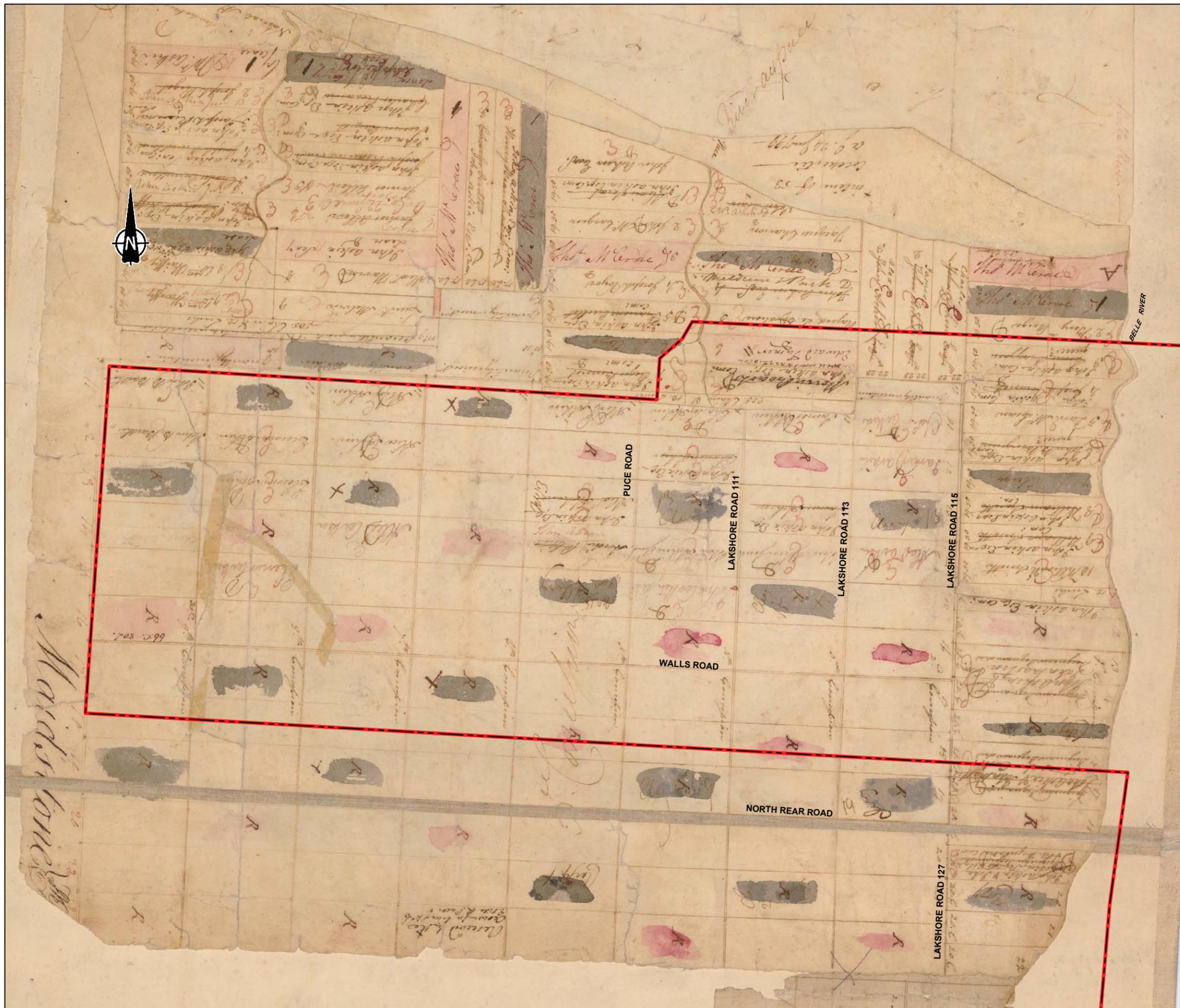
DRAWING BASED ON 2013 AERIAL IMAGE FROM THE COUNTY OF ESSEX INTERACTIVE WEB MAPPING SITE, BY PERMISSION; GIS LAYERS FROM AECOM, MAY 27 - 2014; AND CANMAP STREETFILES V2008.4.

NOTES

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PROJECT	STAGE 1 ARCHAEOLOGICAL ASSESSMENT SP BELLE RIVER WIND LP BELLE RIVER WIND PROJECT VARIOUS LOTS AND CONCESSIONS GEOGRAPHIC TOWNSHIPS OF ROCHESTER, TILBURY WEST, AND MAIDSTONE ESSEX COUNTY, ONTARIO		
TITLE	LOCATION PLAN		

<p>Golder Associates LONDON, ONTARIO</p>	PROJECT No.	1404174	FILE No.	1404174-R01001
	CADD	DCH/LMK	Sept. 17/14	SCALE AS SHOWN
CHECK				MAP 1



LEGEND

 APPROXIMATE LIMITS OF STUDY AREA
IN RELATION TO HISTORIC MAP

REFERENCE

DRAWING BASED ON IREDELL, ABRAHAM, 1799 (No Title),
SURVEY RECORD 1989, ONTARIO MINISTRY OF
NATURAL RESOURCES, SURVEY RECORD BRANCH,
TORONTO;
GIS LAYERS FROM AECOM, MAY 27 - 2014; AND
CANMAP STREETFILES V2008.4.

NOTES

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ALL LOCATIONS ARE APPROXIMATE.

PROJECT	STAGE 1 ARCHAEOLOGICAL ASSESSMENT SP BELLE RIVER WIND LP BELLE RIVER WIND PROJECT VARIOUS LOTS AND CONCESSIONS GEOGRAPHIC TOWNSHIPS OF ROCHESTER, TILBURY WEST, AND MAIDSTONE ESSEX COUNTY, ONTARIO		
TITLE	A PORTION OF THE 1799 SURVEY MAP OF MAIDSTONE TOWNSHIP		
PROJECT No.	1404174	FILE No.	1404174-R01003
CADD	DCH	Nov. 18/14	SCALE NTS REV.
CHECK			MAP 3



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LEGEND

 APPROXIMATE LIMITS OF STUDY AREA
IN RELATION TO HISTORIC MAP

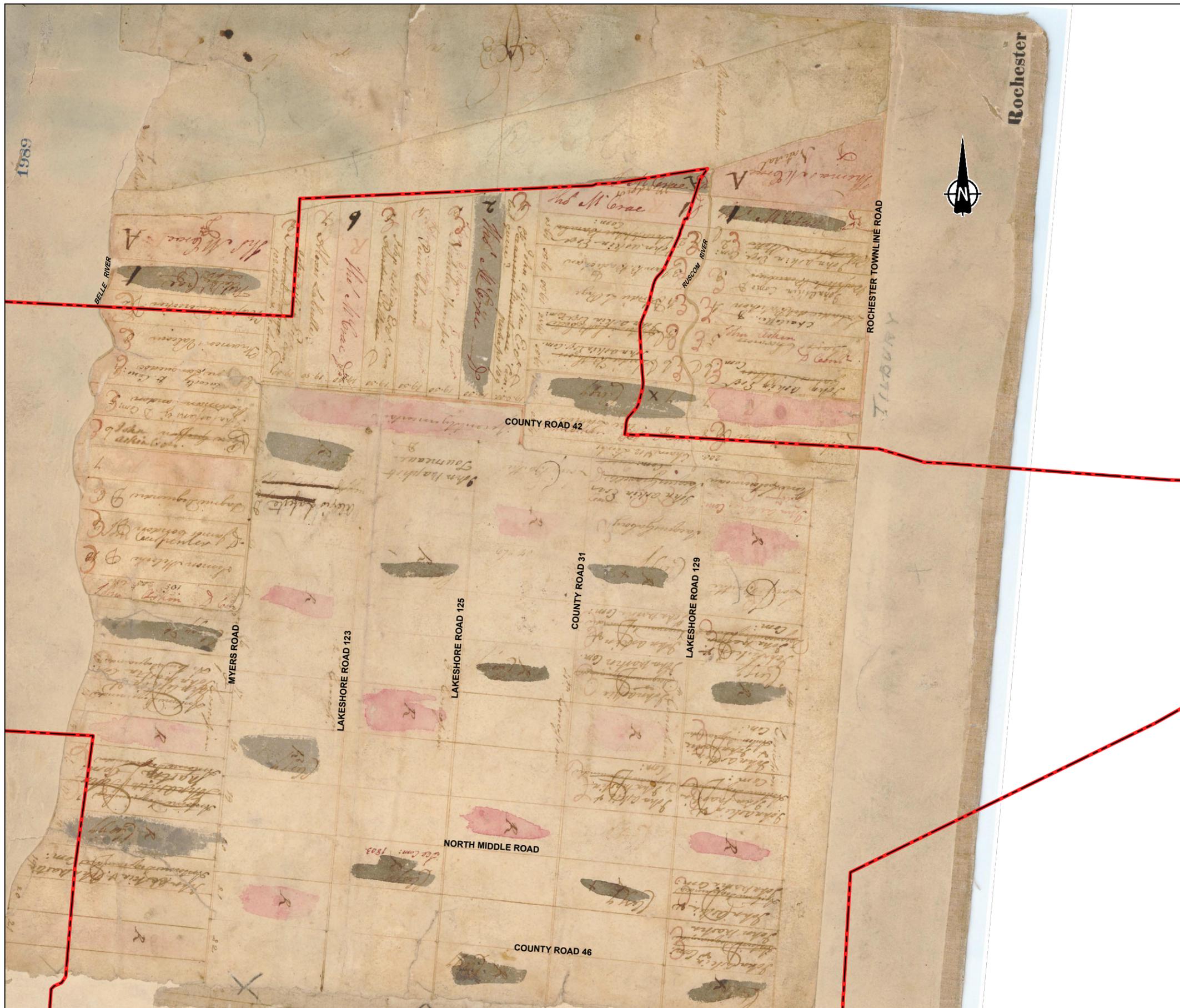
REFERENCE

DRAWING BASED ON 1881 ILLUSTRATED HISTORICAL ATLAS OF ESSEX COUNTY, H. BELDON & Co., TORONTO; GIS LAYERS FROM AECOM, MAY 27 - 2014; AND CANMAP STREETFILES V2008.4.

NOTES

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PROJECT	STAGE 1 ARCHAEOLOGICAL ASSESSMENT SP BELLE RIVER WIND LP BELLE RIVER WIND PROJECT VARIOUS LOTS AND CONCESSIONS GEOGRAPHIC TOWNSHIPS OF ROCHESTER, TILBURY WEST, AND MAIDSTONE ESSEX COUNTY, ONTARIO		
TITLE	A PORTION OF THE 1881 MAP OF ROCHESTER TOWNSHIP		
PROJECT No.	1404174	FILE No.	1404174-R01003
CADD	DCH	Nov. 18/14	SCALE AS SHOWN REV.
CHECK			
 Golder Associates LONDON, ONTARIO			MAP 4



LEGEND

 APPROXIMATE LIMITS OF STUDY AREA
IN RELATION TO HISTORIC MAP

REFERENCE

DRAWING BASED ON IREDELL, ABRAHAM, 1799 (No Title),
SURVEY RECORD 1989, ONTARIO MINISTRY OF
NATURAL RESOURCES, SURVEY RECORD BRANCH,
TORONTO;
GIS LAYERS FROM AECOM, MAY 27 - 2014; AND
CANMAP STREETFILES V2008.4.

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ALL LOCATIONS ARE APPROXIMATE.

PROJECT	STAGE 1 ARCHAEOLOGICAL ASSESSMENT SP BELLE RIVER WIND LP BELLE RIVER WIND PROJECT VARIOUS LOTS AND CONCESSIONS GEOGRAPHIC TOWNSHIPS OF ROCHESTER, TILBURY WEST, AND MAIDSTONE ESSEX COUNTY, ONTARIO		
TITLE	A PORTION OF THE 1799 SURVEY MAP OF ROCHESTER TOWNSHIP		
PROJECT No.	1404174	FILE No.	1404174-R01005
CADD	DCH	Nov. 18/14	SCALE NTS REV.
CHECK			
			MAP 5



LEGEND

— APPROXIMATE LIMITS OF STUDY AREA
IN RELATION TO HISTORIC MAP

REFERENCE

DRAWING BASED ON 1881 ILLUSTRATED HISTORICAL ATLAS OF ESSEX COUNTY, H. BELDON & Co., TORONTO;
GIS LAYERS FROM AECOM, MAY 27 - 2014; AND CANMAP STREETFILES V2008.4.

NOTES

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ALL LOCATIONS ARE APPROXIMATE.

PROJECT		STAGE 1 ARCHAEOLOGICAL ASSESSMENT SP BELLE RIVER WIND LP BELLE RIVER WIND PROJECT VARIOUS LOTS AND CONCESSIONS GEOGRAPHIC TOWNSHIPS OF ROCHESTER, TILBURY WEST, AND MAIDSTONE ESSEX COUNTY, ONTARIO	
TITLE		A PORTION OF THE 1881 MAP OF ROCHESTER TOWNSHIP	
PROJECT No.	1404174	FILE No.	1404174-R01005
CADD	DCH	Nov. 18/14	SCALE AS SHOWN REV.
CHECK			
 Golder Associates LONDON, ONTARIO		MAP 6	



LEGEND

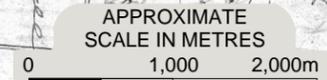
— APPROXIMATE LIMITS OF STUDY AREA
IN RELATION TO HISTORIC MAP

REFERENCE

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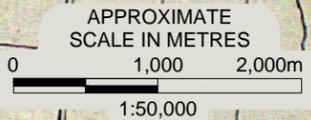
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PROJECT		STAGE 1 ARCHAEOLOGICAL ASSESSMENT SP BELLE RIVER WIND LP BELLE RIVER WIND PROJECT VARIOUS LOTS AND CONCESSIONS GEOGRAPHIC TOWNSHIPS OF ROCHESTER, TILBURY WEST, AND MAIDSTONE ESSEX COUNTY, ONTARIO	
TITLE		A PORTION OF THE 1824 SURVEY MAP OF TILBURY WEST TOWNSHIP	
PROJECT No.	1404174	FILE No.	1404174-R01007
CADD	DCH	Nov. 18/14	SCALE AS SHOWN REV.
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		MAP 7	
LONDON, ONTARIO			



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LEGEND

 APPROXIMATE LIMITS OF STUDY AREA IN RELATION TO HISTORIC MAP

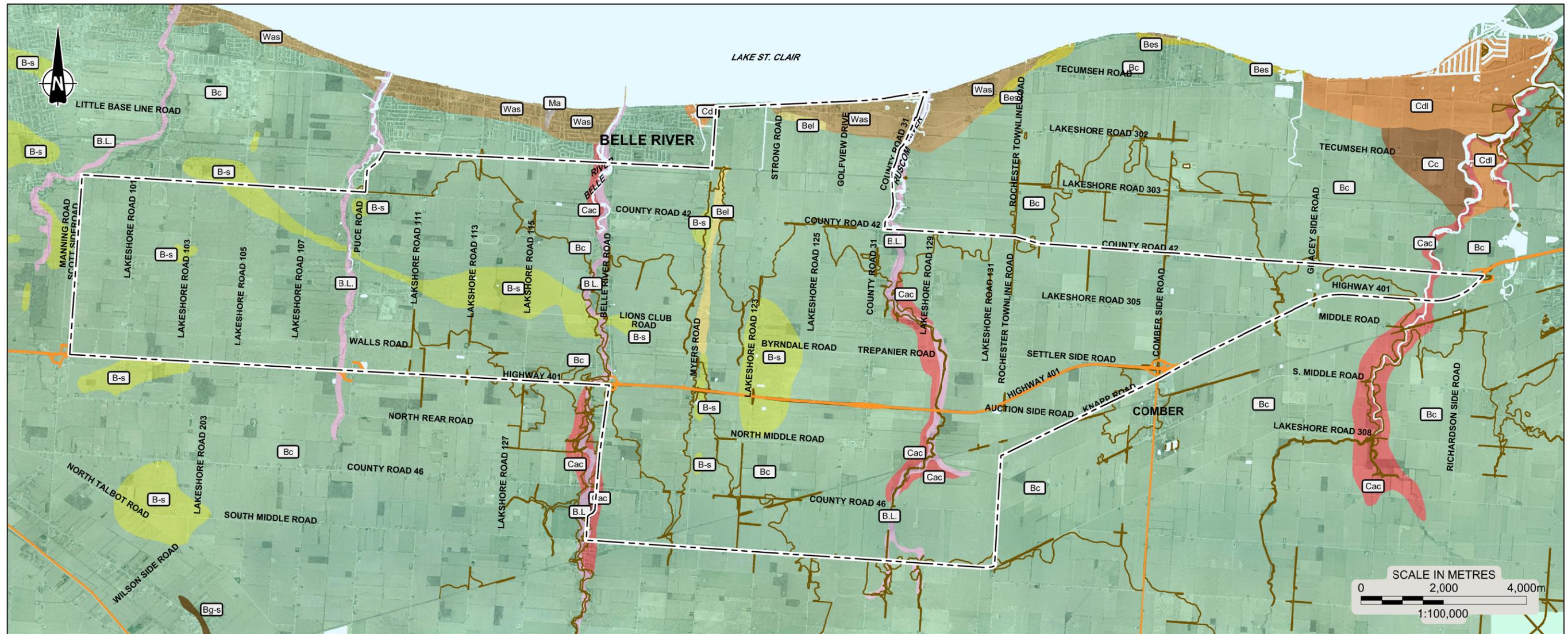
REFERENCE

DRAWING BASED ON 1881 ILLUSTRATED HISTORICAL ATLAS OF ESSEX COUNTY, H. BELDON & Co., TORONTO; GIS LAYERS FROM AECOM, MAY 27 - 2014; AND CANMAP STREETFILES V2008.4.

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PROJECT	STAGE 1 ARCHAEOLOGICAL ASSESSMENT SP BELLE RIVER WIND LP BELLE RIVER WIND PROJECT VARIOUS LOTS AND CONCESSIONS GEOGRAPHIC TOWNSHIPS OF ROCHESTER, TILBURY WEST, AND MAIDSTONE ESSEX COUNTY, ONTARIO		
TITLE	A PORTION OF THE 1881 MAP OF TILBURY WEST TOWNSHIP		
PROJECT No.	1404174	FILE No.	1404174-R01007
CADD	DCH	Nov. 18/14	SCALE AS SHOWN REV.
CHECK			
			MAP 8



LEGEND

- STUDY AREA
- GROUND SURFACE CONTOUR LINE (m amsl)
- CLAY SOILS:**
 - Bc** Dark clay over mottled clay
 - Cac** Grey-brown clay over grey clay
 - Cc** Deep black clay then heavy plastic stratified blue-grey clay
- FINE SANDY LOAMS:**
 - Cdl** Black and dark grey sandy loam over mottled and grey fine sand
- LOAMS:**
 - Bg-s** Similar to Burford loam except gravel strata often mottled and shallow over clay or stony clay loam.

- SANDS:**
 - Bes** Brown sand over yellow and then mottled sand with clay
- SANDY LOAMS:**
 - Bel** Brown sandy loam over yellow and then mottled sand with clay
 - B-s** Mixed areas of shallow sand knolls over clay intermixed with Brookston clay and clay loam
 - Was** Dark grey sandy loam over grey or mottled sand with clay
- MISCELLANEOUS SOILS:**
 - B.L.** Low lying land along stream courses
 - Ma** Low lying areas subject to flooding; covered with water most of the year

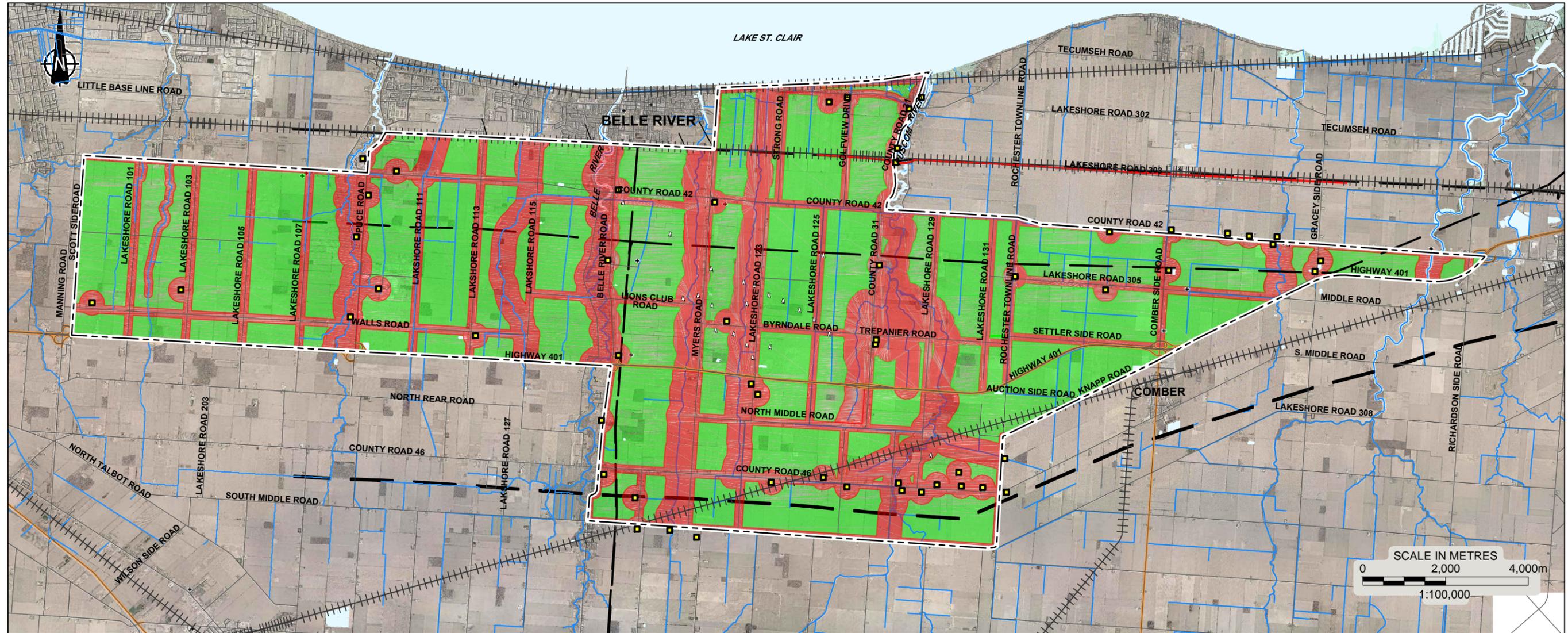
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 GIS LAYERS FROM AECOM, MAY 27 - 2014;
 MNR LIO, OBTAINED 2009, PRODUCED BY GOLDER ASSOCIATES LTD UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2012;
 SOIL MAP OF ESSEX COUNTY ONTARIO, SURVEY REPORT No. 11, EXPERIMENTAL FARMS SERVICES, OTTAWA, 1947; AND
 CANMAP STREETFILES V2008.4.

NOTES

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 ALL LOCATIONS ARE APPROXIMATE.

PROJECT	STAGE 1 ARCHAEOLOGICAL ASSESSMENT SP BELLE RIVER WIND LP BELLE RIVER WIND PROJECT VARIOUS LOTS AND CONCESSIONS GEOGRAPHIC TOWNSHIPS OF ROCHESTER, TILBURY WEST, AND MAIDSTONE ESSEX COUNTY, ONTARIO			
TITLE	SOILS AND TOPOGRAPHY PRESENT IN STUDY AREA			
	PROJECT No.	1404174	FILE No.	1404174-R01009
	CADD	DCH/LMK	Sept. 17/14	SCALE AS SHOWN
	CHECK			MAP 9



LEGEND

- HISTORIC STRUCTURE
- PETROLEUM WELL
- COMMUNICATIONS TOWER
- STUDY AREA
- WATER SEGMENT
- RAIL LINE (EXISTING OR FORMER)
- PIPELINE
- UTILITY LINE
- AREA OF MEDIUM ARCHAEOLOGICAL POTENTIAL
- AREA OF HIGH ARCHAEOLOGICAL POTENTIAL
- WETLAND AREA
- WATER BODY

REFERENCE

DRAWING BASED ON 2013 AERIAL IMAGE FROM THE COUNTY OF ESSEX INTERACTIVE WEB MAPPING SITE, BY PERMISSION; GIS LAYERS FROM AECOM, MAY 27 - 2014; AND CANMAP STREETFILES V2008.4.

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PROJECT	STAGE 1 ARCHAEOLOGICAL ASSESSMENT SP BELLE RIVER WIND LP BELLE RIVER WIND PROJECT VARIOUS LOTS AND CONCESSIONS GEOGRAPHIC TOWNSHIPS OF ROCHESTER, TILBURY WEST, AND MAIDSTONE ESSEX COUNTY, ONTARIO			
TITLE	AREAS OF HIGH ARCHAEOLOGICAL POTENTIAL			
 Golder Associates LONDON, ONTARIO	PROJECT No.	1404174	FILE No.	1404174-R01010
	CADD	DCH/LMK	Sept. 17/14	SCALE AS SHOWN REV.
CHECK				MAP 10



7.0 IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT

Golder has prepared this report in a manner consistent with the level of care and skill ordinary exercised by members of the archaeological profession currently practicing under similar conditions in the jurisdiction in which the services are provided, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied is made.

This report has been prepared for the specific site, design objective, developments and purpose described to Golder by Mr. Marc Rose of AECOM. The factual data, interpretations and recommendations pertain to a specific project as described in this report and are not applicable to any other project or site location.

The information, recommendations and opinions expressed in this report are for the sole benefit of the Client. No other party may use or rely on this report or any portion thereof without Golder's express written consent. If the report was prepared to be included for a specific permit application process, then upon the reasonable request of the client, Golder may authorize in writing the use of this report by the regulatory agency as an Approved User for the specific and identified purpose of the applicable permit review process. Any other use of this report by others is prohibited and is without responsibility to Golder. The report, all plans, data, drawings and other documents as well as electronic media prepared by Golder are considered its professional work product and shall remain the copyright property of Golder, who authorizes only the Client and Approved Users to make copies of the report, but only in such quantities as are reasonably necessary for the use of the report by those parties. The Client and Approved Users may not give, lend, sell, or otherwise make available the report or any portion thereof to any other party without the express written permission of Golder. The Client acknowledges that electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore the Client cannot rely upon the electronic media versions of Golder's report or other work products.

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Special risks occur whenever archaeological investigations are applied to identify subsurface conditions and even a comprehensive investigation, sampling and testing program may fail to detect all or certain archaeological resources. The sampling strategies incorporated in this study comply with those identified in the Ministry of Tourism and Culture's *Standards and Guidelines for Consultants Archaeologists* (Government of Ontario 2011).



8.0 CLOSURE

We trust that this report meets your current needs. If you have any questions, or if we may be of further assistance, please contact the undersigned.

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