Appendix D

Mitigation Photomosaics

1 / 2

3 | 7 | 3

4 | 6 | 4 | 6 | 4 | 4 | 4

8 | 6 | 5 | 4 | 5 | 6 | 5 | 4 | 5 | 5

5

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8. Construction within 500m of a landfill – Potential to encounter contaminated soils. Refer to Environmental Report Section 5.2.3 Contaminated Soils and Sediments.

Preliminary Preferred Route
Roads
Watercourse
Waterbody

Designated Environmental Features
Significant Natural Areas
Wetlands
Areas of Natural and Scientific Interest

Tile Drainage Type
Random
Systematic

Hydrocarbon Features
Abandoned Dry Well
Abandoned Gas Show
Abandoned Natural Gas Well
Abandoned Oil Show
Abandoned Well
Active Well
Unknown Gas Show
Unknown Well
Natural Gas Storage Pools (approximate size & location)

Socio-Economic Features
Cemetery
Closed Landfill
Heritage Site
Open Landfill
Place of Worship
Recreation
School
Waterwell

Scale: 1:20,000 Projection: NAD 83 - UTM (Zone 17N)
Aug 06, 2009
0 0.25 0.5 0.75 1 Kms

Sources: Geogratis 2009, Grand River Conservation Authority 2008, Ministry of the Environment 2009, Her Majesty the Queen 2009

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Mitigation
Tile 1

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Waterbody

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Systematic

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Closed Landfill
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Open Landfill
Place of Worship
Recreation
School
Waterwell

Scale: 1:20,000 Projection: NAD 83 - UTM (Zone 17N)
Aug 06, 2009
0 0.25 0.5 0.75 1 Kms

Sources: Geogratis 2009, Grand River Conservation Authority 2008, Ministry of the Environment 2009, Her Majesty the Queen 2009

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BAYFIELD TO LOBO PIPELINE PROJECT

Mitigation
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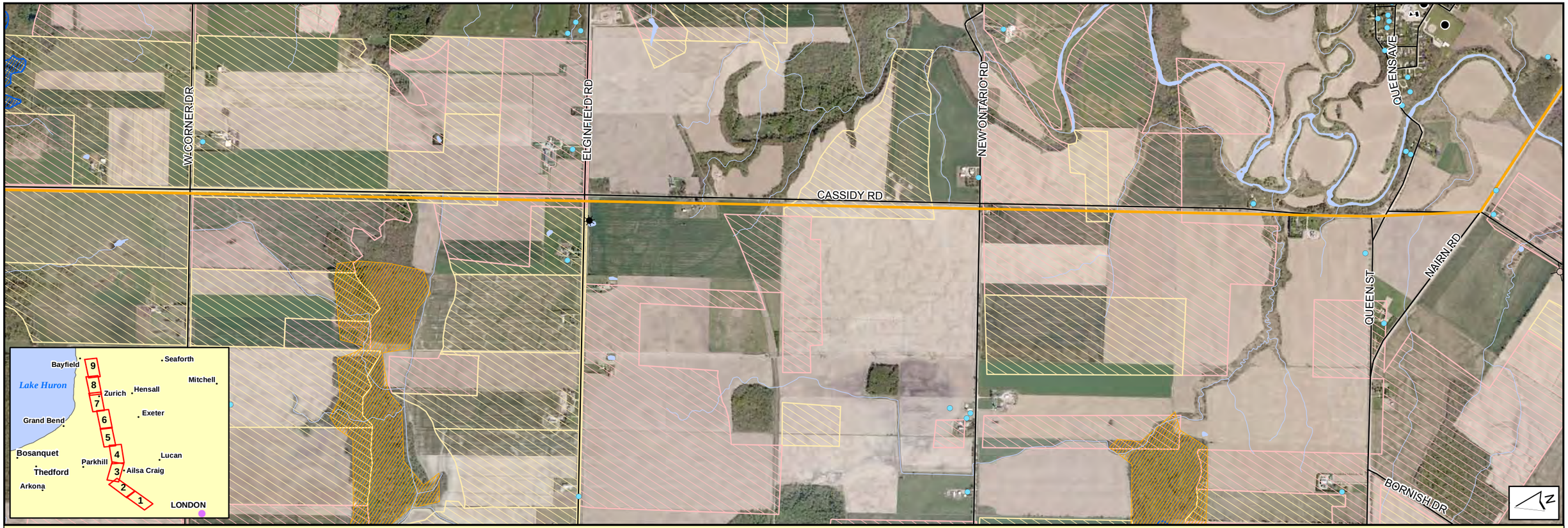

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4 5 6 5 6 4 6 5 4 6 2 5 4 6 2 6 6 5 6 5 4 2 6

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Preliminary Preferred Route
Roads
Watercourse
Waterbody

Designated Environmental Features
Significant Natural Areas
Wetlands
Areas of Natural and Scientific Interest

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Random
Systematic

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Heritage Site
Open Landfill
Place of Worship
Recreation
School
Waterwell

Scale: 1:20,000 Projection: NAD 83 - UTM (Zone 17N)
Aug 06, 2009
0 0.25 0.5 0.75 1 Kms

Sources: Geogratis 2009, Grand River Conservation Authority 2008, Ministry of the Environment 2009, Her Majesty the Queen 2009

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Mitigation
Tile 3

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1 / 3 / 4

5 2 2 5 6 2 2 6 2 5 6 6 2 5 6 6 5 6

1 / 3 / 4

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Preliminary Preferred Route
Roads
Watercourse
Waterbody

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Significant Natural Areas
Wetlands
Areas of Natural and Scientific Interest

Tile Drainage Type
Random
Systematic

Hydrocarbon Features
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Abandoned Gas Show
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Socio-Economic Features
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Closed Landfill
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Open Landfill
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Recreation
School
Waterwell

Scale: 1:20,000 Projection: NAD 83 - UTM (Zone 17N)
Aug 06, 2009
0 0.25 0.5 0.75 1 Kms

Sources: Geogratis 2009, Grand River Conservation Authority 2008, Ministry of the Environment 2009, Her Majesty the Queen 2009

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BAYFIELD TO LOBO PIPELINE PROJECT

Mitigation
Tile 4

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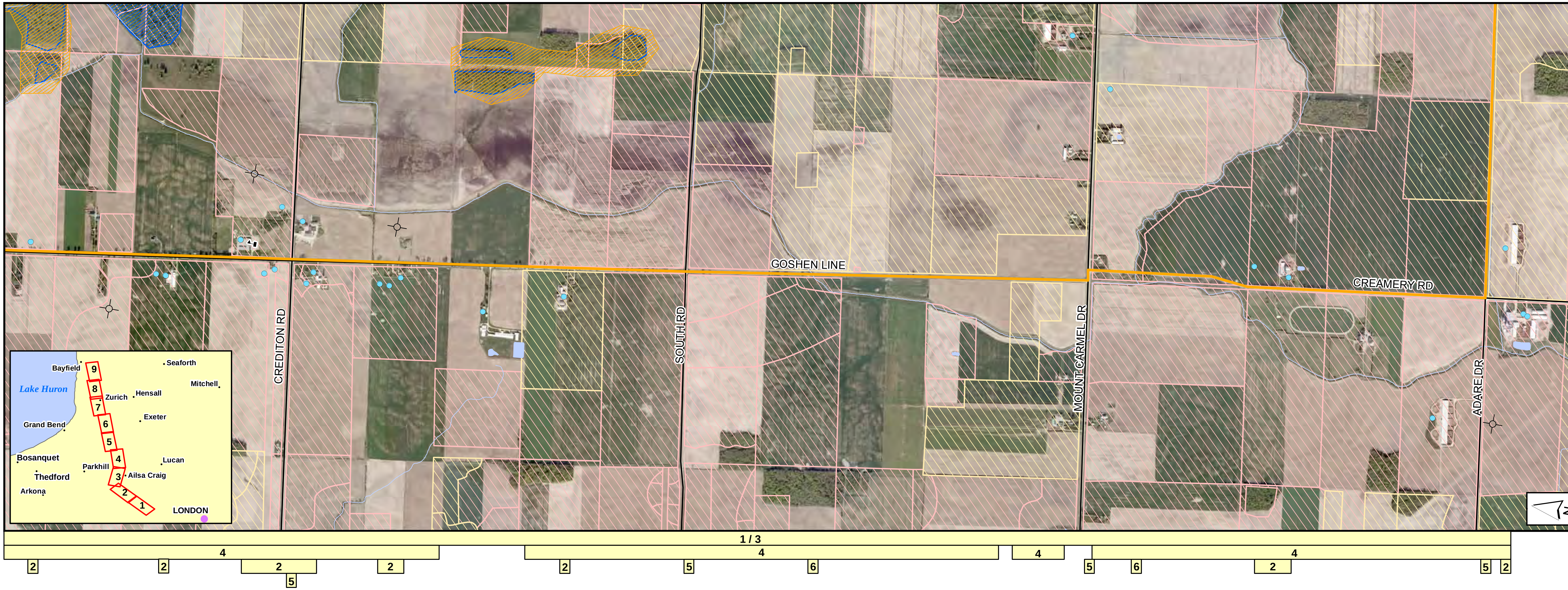

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Preliminary Preferred Route
Roads
Watercourse
Waterbody

Designated Environmental Features
Significant Natural Areas
Wetlands
Areas of Natural and Scientific Interest

Tile Drainage Type
Random
Systematic

Hydrocarbon Features
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Abandoned Gas Show
Abandoned Natural Gas Well
Abandoned Oil Show
Abandoned Well
Active Well
Unknown Gas Show
Unknown Well
Natural Gas Storage Pools (approximate size & location)

Socio-Economic Features
Cemetery
Closed Landfill
Heritage Site
Open Landfill
Place of Worship
Recreation
School
Waterwell

Scale: 1:20,000 Projection: NAD 83 - UTM (Zone 17N)
Aug 06, 2009
0 0.25 0.5 0.75 1 Kms

Sources: Geogratis 2009, Grand River Conservation Authority 2008, Ministry of the Environment 2009, Her Majesty the Queen 2009

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BAYFIELD TO LOBO PIPELINE PROJECT

Mitigation
Tile 5

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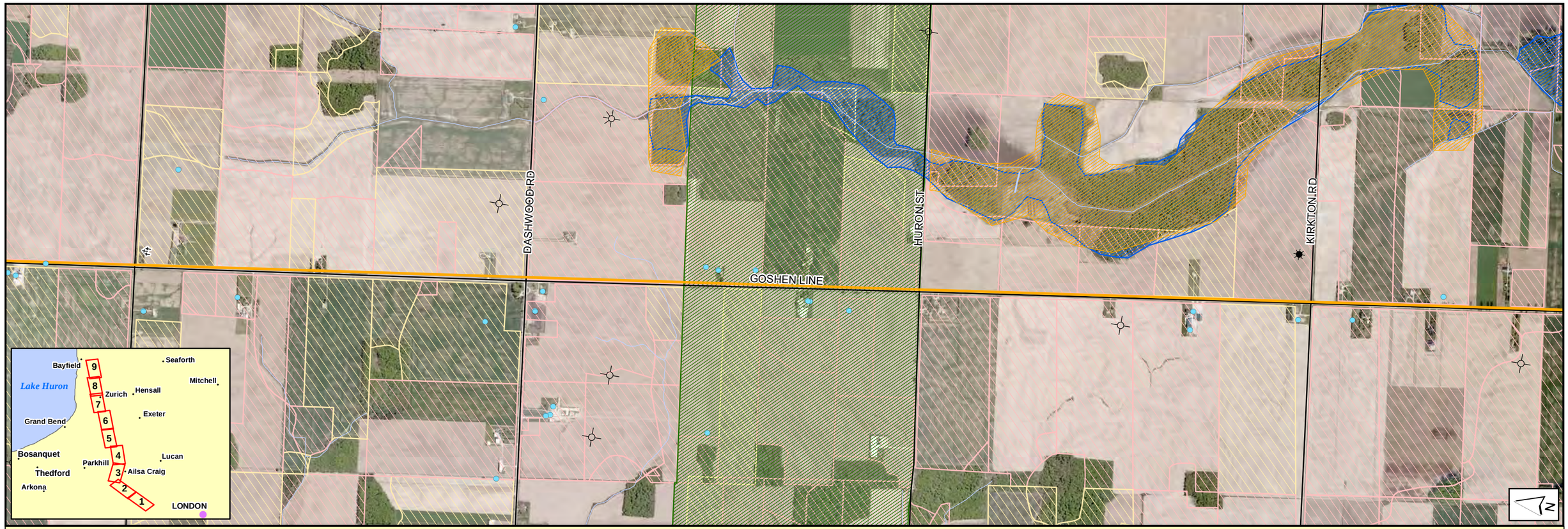

1 / 3 / 4

2 | 5 7 | 6 | 5 2 | 6 | 2 | 5 | 2 | 2 5 | 2 | 2

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Preliminary Preferred Route
Roads
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Hydrocarbon Features
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Sources: Geogratis 2009, Grand River Conservation Authority 2008, Ministry of the Environment 2009, Her Majesty the Queen 2009

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BAYFIELD TO LOBO PIPELINE PROJECT

Mitigation
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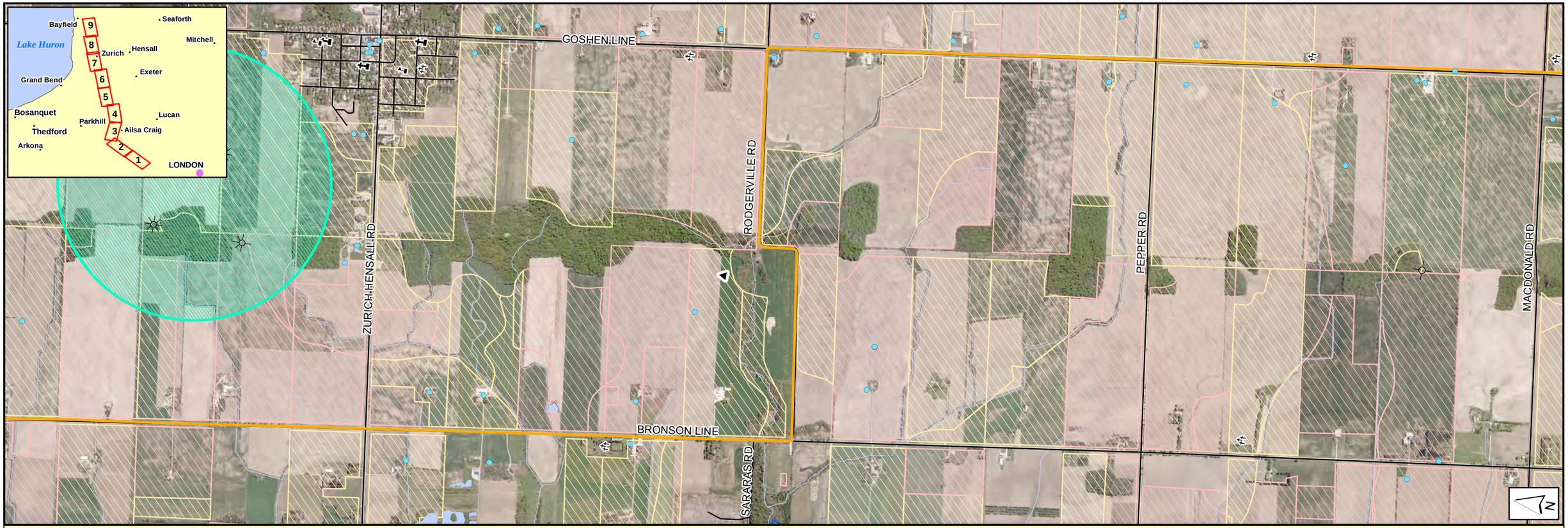

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Preliminary Preferred Route
Roads
Watercourse
Waterbody

Designated Environmental Features
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Wetlands
Areas of Natural and Scientific Interest

Tile Drainage Type
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Hydrocarbon Features
Abandoned Dry Well
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Socio-Economic Features
Cemetery
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Place of Worship
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Scale: 1:20,000 Projection: NAD 83 - UTM (Zone 17N)
Aug 06, 2009
0 0.25 0.5 0.75 1 Kms

Sources: Geogratis 2009, Grand River Conservation Authority 2008, Ministry of the Environment 2009, Her Majesty the Queen 2009

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BAYFIELD TO LOBO PIPELINE PROJECT

Mitigation
Tile 7

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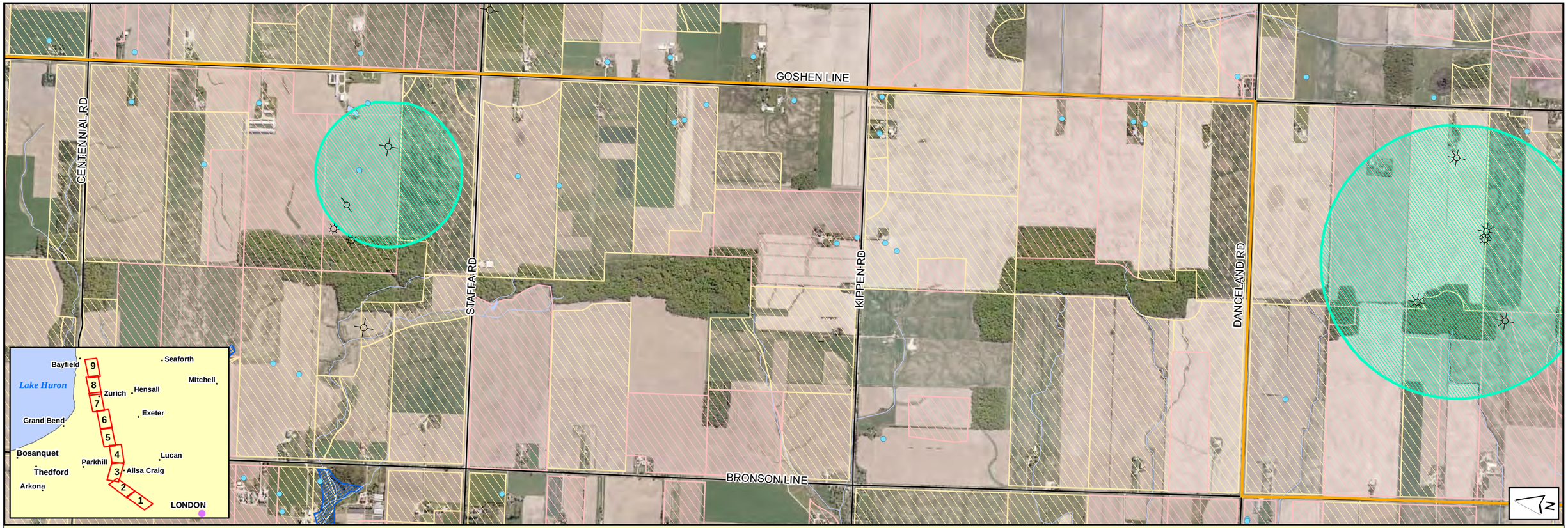

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4 | 2 | 4

2 5 2 2 5 2 2 5 2 2 2 5 5 6 6

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Mitigation
Tile 8

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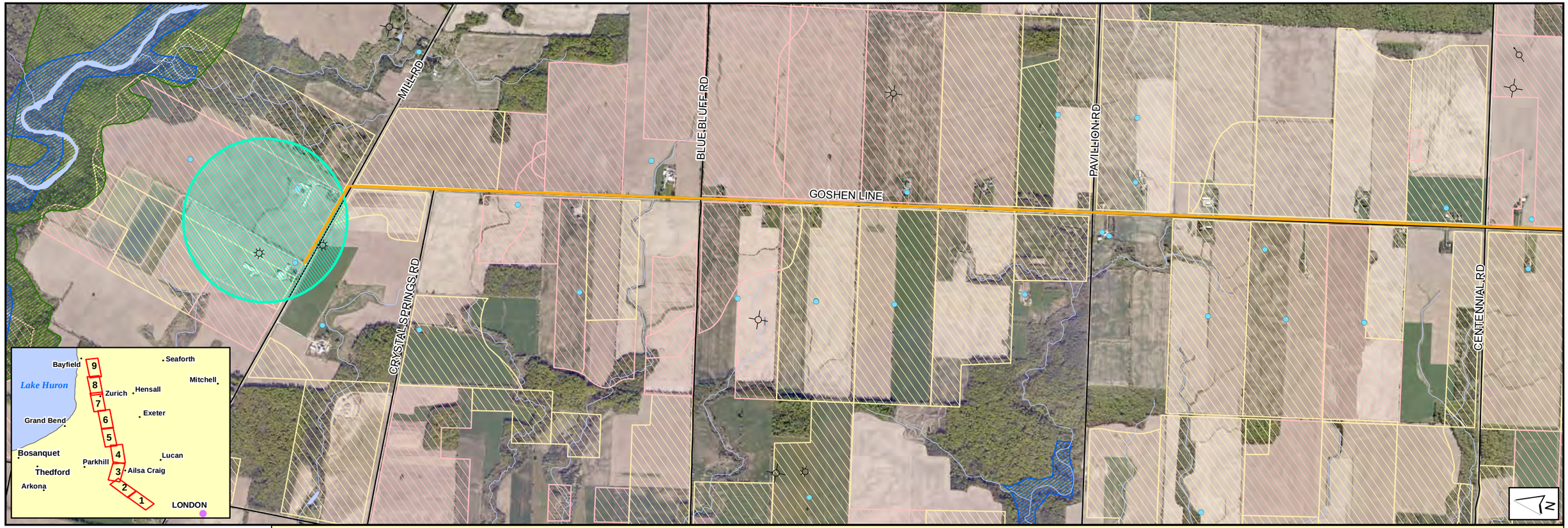

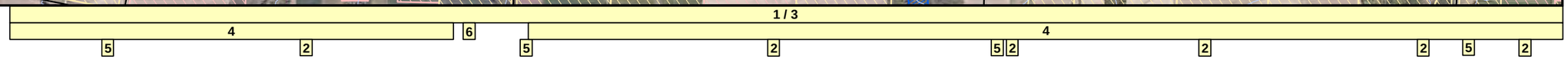

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Roads
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Aug 06, 2009
0 0.25 0.5 0.75 1 Kms

Sources: Geogratis 2009, Grand River Conservation Authority 2008, Ministry of the Environment 2009, Her Majesty the Queen 2009

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Mitigation
Tile 9

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Appendix E

Archaeological Assessment Report

The 2009 Stage 1 Archaeological Assessment of the Bayfield to Lobo Pipeline Project, Huron County & Middlesex County, Ontario

Submitted to

Stantec Consulting Ltd.
70 Southgate Drive, Suite 1,
Guelph, Ontario
N1G 4P5
Telephone – 519 836-6050
Fax – 519 836-2493

and

The Ontario Ministry of Culture

Prepared by

D.R. Poulton & Associates Inc.
69 Langarth Street West, London, Ontario, N6J 1P5
Telephone – 519 434-0319 Facsimile – 519 434-0517
E-mail - drpoulton@rogers.com

CIF #P116-186-2009; Corporate Project Number 09-09

July 2009

TABLE OF CONTENTS

List of Tables

List of Figures

List of Plates

List of Plates (continued)

Project Personnel

Consulting Archaeologists	Dana R. Poulton Christine F. Dodd
Report Preparation	Dana R. Poulton
Draughting	Christine F. Dodd

Acknowledgments

This assessment was facilitated by the following individuals and their agencies:

- ***David Wesenger***, Managing Leader, Environmental Assessment, Stantec Consulting Ltd.;
- ***Mark Knight***, Environmental Planner, Stantec Consulting Ltd.;
- ***Chris Butler***, Manager – Transmission Projects; Tribute Resources Inc.;
- ***Shari Prowse***, Archaeological Review Officer, Culture Programs Unit, Ontario Ministry of Culture; and
- ***Robert von Bitter***, Archaeological Data Coordinator, Culture Services Unit, Ontario Ministry of Culture.

EXECUTIVE SUMMARY

In response to the growing demand for natural gas, Bayfield Resources Inc. is planning to construct a new 12 to 16-inch (324 to 406 millimetre) diameter steel natural gas pipeline. The pipeline will be approximately 65 kilometres in length and will follow existing road right-of-way. The starting point for the proposed pipeline is at the Bayfield Storage Pool on the north side of Mill Road in the Municipality of Bluewater, Huron County. The end point is at the Lobo Compressor Station on the east side of Ivan Drive in the Township of Middlesex Centre, Middlesex County.

To assist with the environmental and planning aspects of the Project, Stantec Consulting Ltd. (Stantec) has been retained to prepare an Environmental Report consistent with the Ontario Energy Board's *Environmental Guidelines for the Location, Construction and Operation of Hydrocarbon Pipelines and Facilities in Ontario, 5th Edition* (2003). On February 5, 2009 Stantec contracted D.R. Poulton & Associates Inc. to carry out the archaeological component of the environmental assessment.

The archaeological assessment focussed on a study area that encompasses a one kilometre wide radius on either side of the Preliminary Preferred Route for the proposed pipeline and consisted of a background study and windshield survey of the Preliminary Preferred Route. This level of assessment is defined as a Stage I study in the 2003 OEB environmental guidelines and as a Stage 1 study in the 1993 technical archaeological guidelines formulated by the Ontario Ministry of Culture, Tourism and Recreation (MCTR 1993) and the draft 2009 archaeological guidelines that are currently being piloted by the Ontario Ministry of Culture (2009).

The Stage 1 background study determined that select segments of the Preliminary Preferred Route for the proposed pipeline have at least a moderate potential for as-yet undiscovered archaeological remains. That applies most particularly to the central and northern segments of the route from the intersection of Adare Drive and Cassidy Road north to the start point for the proposed pipeline at the Bayfield Storage Pool. Much of the rest of the corridor appears to have been impacted by past road and utilities construction and by the excavation of ditches. In order to address that potential, it is recommended that a Stage 2 archaeological survey be carried out once the detailed design for the preferred route and the location and limits of any related proposed impacts have been confirmed, and once large-scale mapping is available.

The background study identified six archaeological sites that have been registered to date within one kilometre of the proposed pipeline route. However, the relative lack of registered sites is considered to be a factor of the relative lack of past archaeological surveys. The study determined that the route had at least a moderate potential for as-yet undiscovered remains and that one of the six previously-registered sites situated within one kilometre of the route was located in close proximity to the route and could be a concern for the proposed pipeline: the Sarepta Tavern and Post Office.

Three other documented 19th century sites have also been defined as archaeological planning concerns for the proposed pipeline. They are the Melville United Church Cemetery on the south side of Nairn Road in Ivan, the Zurich United Church Cemetery on the west side of Bronson Line north of Rogerville Road and the site of St. Luke's Anglican Cemetery on the west side of

Goshen Line north of Centennial Road. Nineteenth century headstones in the first two cemeteries extend to within about five metres of the Preliminary Preferred Route; there are no standing headstones or evidence for a cemetery whatsoever at the site of St. Luke's Anglican Cemetery.

Past experience shows that the segments of the Preliminary Preferred Route adjacent to the above three cemeteries have a high potential for unmarked 19th century graves. In consequence, it is recommended that Stage 3 archaeological test excavations be conducted on the pertinent segments to confirm the presence or absence of unmarked graves. The test trenches adjacent to these cemeteries would only be one metre in width; they would be excavated by heavy machinery under archaeological supervision.

Further to the above, it is recommended that the Ministry of Culture issue a letter accepting the present report into the Provincial registry of archaeological reports. It is also recommended that the letter include a statement that the Ministry concurs with the recommendations presented in this report.

1.0 INTRODUCTION

In response to the growing demand for natural gas, Bayfield Resources Inc. is planning to construct a new 12 to 16-inch (324 to 406 millimetre) diameter steel natural gas pipeline. The pipeline will be approximately 65 kilometres in length and will follow existing road right-of-way. With the possible exception of a few larger intersections, all of these road rights-of-way have their original widths of 66 feet (2 chains, or 20.3 metres). That has implications for the potential survival of below-ground Euro-Canadian archaeological remains of historic structures that were oriented to the road network established in the first half of the 19th century.

The starting point for the proposed pipeline is at the Bayfield Storage Pool on the north side of Mill Road in the Municipality of Bluewater, Huron County. The end point is at the Lobo Compressor Station on the east side of Ivan Drive in the Township of Middlesex Centre, Middlesex County.

To assist with the environmental and planning aspects of the Project, Stantec Consulting Ltd. (Stantec) has been retained to prepare an Environmental Report consistent with the Ontario Energy Board's (OEB) *Environmental Guidelines for the Location, Construction and Operation of Hydrocarbon Pipelines and Facilities in Ontario, 5th Edition* (2003). The OEB is the body that regulates the energy sector in Ontario. Its review and approval is required before the Project can proceed. On February 5, 2009 Stantec contracted D.R. Poulton & Associates Inc. to carry out the archaeological component of the environmental assessment of the proposed pipeline.

The archaeological assessment focussed on a study area that encompasses a one kilometre wide radius on either side of the Preliminary Preferred Route for the proposed pipeline. It is distinct from the larger study area defined by Stantec for the environmental assessment. Figure 1 shows the larger study area, as well as the alignment and start and end points for the Preliminary Preferred Route.

The archaeological assessment consisted of a background study of the Preliminary Preferred Route; it also included a windshield survey. This level of assessment is defined as a Stage I study in the 2003 OEB environmental guidelines and as a Stage 1 study in the 1993 technical archaeological guidelines formulated by the Ontario Ministry of Culture, Tourism and Recreation (MCTR 1993) and the draft 2009 archaeological guidelines that are currently being piloted by the Ontario Ministry of Culture (2009). This report details the rationale, methods and results of the archaeological assessment of the proposed Bayfield to Lobo Pipeline Project.

There were two objectives to the archaeological assessment of the proposed pipeline. The first was to determine the presence and nature of known archaeological sites in the study area. The second was to evaluate known and potential archaeological planning concerns for the Preliminary Preferred Route for the proposed pipeline.

The report is divided into six sequential sections. The present section provides an introduction to the assessment. The location and description of the study area and the Preliminary Preferred Route are detailed in Section 2.0 of the report. Section 3.0 describes the methods and results of the background study. Section 4.0 presents an evaluation of known and potential archaeological resources within the study area and in close proximity to the Preliminary Preferred Route.

Section 5.0 details the recommendations that arose from the assessment. Finally, Section 6.0 presents the references cited in this report.

The archaeological assessment of the proposed pipeline was carried out under Archaeological Consulting Licence # P116, issued by the Ontario Ministry of Culture to Dana Poulton of D.R. Poulton & Associates. The Ministry of Culture designated the project as CIF # P116-186-2009.

The assessment was conducted in accordance with the provisions of the Ontario Heritage Act (Government of Ontario 1990), with the current environmental guidelines of the OEB (2003), and with the technical guidelines for archaeological assessments formulated by the Ontario Ministry of Culture, Tourism, and Recreation (now Ministry of Culture) (MCTR 1993) and the Ontario Ministry of Culture (2009).

Further to the above, the assessment was also conducted in accordance with the 2005 Provincial Policy Statement 2.6.2, which has provisions for the conservation of archaeological resources, a definition of the same, and provisions for archaeological assessments. Finally, it was conducted in accordance with the Ontario Ministry of Culture's 2006 Heritage Tool Kit, most particularly with respect to Infosheet #3 and Infosheet #6 which detail provisions for the conservation of archaeological resources and provisions for heritage impact statements, respectively.

The records pertaining to this project are currently housed in the corporate offices of D.R. Poulton & Associates Inc. However, in the event the opportunity arises, the project archive will be transferred to a suitable long-term repository.

2.0 LOCATION AND DESCRIPTION

The Preliminary Preferred Route for the proposed pipeline has an approximate length of 65 kilometres. The start point is at the Bayfield Storage Pool in the Municipality of Bluewater, in Lot 8, Bayfield Road Concession North, Stanley Geographic Township, Huron County. The end point is at the Lobo Compressor Station in the Township of Middlesex Centre, in Lot 14, Concession 7, Lobo Geographic Township, Middlesex County. From north to south the route transects Stanley, Hay and Stephen Geographic Townships in Huron County and McGillivray, East Williams and Lobo Geographic Townships in Middlesex County.

From the starting point at the Bayfield Storage Pool on the north side of Mill Road, the Preliminary Preferred Route extends south on Goshen Line to Danceland Road, following the west side of the road right-of-way. At Kippen Road the route passes from Stanley Geographic Township into Hay Geographic Township. In order to avoid the village of Zurich, the route then turns west along Danceland Road to Bronson Line (following the north side of the road right-of-way), south on Bronson Line to Rogerville Road (following the west side of the road right-of-way), and east on Rogerville Road (following the south side of the road right-of-way) back to Goshen Line. From that point, it continues south on Goshen Line to Mount Carmel Drive (following the west side of the road right-of-way). At that point, it jogs a short distance east, then continues south on Creamery Road (following the west side of the road right-of-way) to Adare Drive. It then extends east on Adare Drive to Cassidy Road (following the north side of the road right-of-way). Along the way, the route enters Stephen Geographic Township at Dashwood Road, then McGillivray Geographic Township at Mount Carmel Drive.

The route passes into East Williams Geographic Township at West Corner Drive. From the intersection of Adare Drive and Cassidy Road the route extends south on Cassidy Road to Nairn Road. It then follows Nairn Road southeast to the crossroads hamlet of Ivan, crossing into Lobo Township at Fernhill Drive, then northeast on Ivan Drive to the terminus at the Lobo Compressor Station. The segment that parallels Nairn Road follows the north side of the road right-of-way from Cassidy Road east to Fernhill Drive, and then switches over to the south side of the road right-of-way at Fernhill Drive. It continues along the south side of Nairn Road southeast to Ivan, and then follows the south side of Ivan Drive northeast to a point west of the Lobo Compressor Station. The last leg of the route will follow one of two alternative routes from Ivan Drive to the facility.

All of the roads that the Preliminary Preferred Route follows are two lanes wide and most of the combined length consists of paved roads. The exceptions are gravel road segments that are as follows: Danceland Road from Goshen Line to Bronson Line; Rogerville Road from Bronson Line to Goshen Line; Creamery Road from Mount Carmel Drive to Adare Drive; Adare Drive from Creamery Road to Cassidy Road; Cassidy Road from Elginfield Road south to Nairn Road; and Ivan Drive from Nairn Road northeast to the point where it turns a right angle to connect with the Lobo Compressor Station.

The Preliminary Preferred Route bypasses communities of any size. Bayfield is located three kilometres west of the start point for the proposed pipeline and Zurich, Dashwood and Ailsa Craig are all located approximately two kilometres from the route. Reference to modern maps and to the 1878 Historic Atlas map of Middlesex County and the 1879 Historic Atlas map of

Huron County shows that the Preliminary Preferred Route only passes through three named communities. All are small crossroads hamlets. One is Sarepta, at the intersection of Dashwood Road and Goshen Line. The second is Bowood, at the intersection of Nairn Road and Fernhill Drive. The third is Ivan, at the intersection of Nairn Road and Ivan Drive. Sarepta and Ivan both have their origins in the 19th century but the genesis of Bowood is more recent.

The following description of the study area is in large part derived from the environmental assessment report prepared by Stantec. The study area that contains the Preliminary Preferred Route includes two physiographic regions. The Huron Slope alongside Lake Huron is essentially a clay plain bisected by a narrow strip of sand. The clay is overlain by 6-10 feet of till formed by brown calcareous clay. The Horseshoe Moraines region consists of morainic ridges composed of till. Quaternary features in the study area are till, glaciolacustrine and glaciofluvial deposits (Barnett, Cowan and Henry, 1991). The main surficial deposits in the study area are the Wyoming Moraine, spillways and river valleys (Chapman and Putnam, 1984).

Given the physiography of the study area, aggregate potential is high. The study area contains 50 abandoned or wayside aggregate pits, and 16 licensed aggregate pits. Potential natural hazards in the study area are low to moderate seismic hazard (Natural Resources Canada, 2005) and flooding during the freshet or periods of heavy precipitation.

Due to its large size, the study area contains 50 soil types; they represent a broad range of texture, material and drainage characteristics. According to the Canada Land Inventory (CLI), 86.13% of the study area is comprised of prime agricultural land (CLI classes 1-3). Class 4 soils comprise 0.02% of the study area, having fair productivity, Class 5 soils comprise 5.65% of the study area, having severe limitations that restrict the capability to produce perennial forage crops, and organic lands comprise the remaining 8.18% of the study area. The majority of agricultural land within the study area, 62.38%, features artificial drainage; 64.11% of the artificial drainage is systematic, while 35.89% is random.

The study area is drained by ten watersheds that fall within the jurisdiction of two conservation authorities: Main Bayfield River, Bannockburn River, Black Creek, South Gullies, Upper Parkhill Creek, Lower Parkhill Creek, Upper Ausable River, Middle Ausable River, Nairn Creek and the main branch and tributaries of the Sydenham River Headwaters. The Ausable River and its tributaries drain the majority of the study area with the Lake Huron tributaries and the main branch and tributaries of the Sydenham River draining small areas in the northwest and southeast, respectively. The main branch of the Ausable River and Sydenham River are permanently flowing watercourses. All ten watersheds are significantly influenced by the surrounding predominantly agricultural land and the small urban areas located throughout the study area.

Further to the above, from the start point of the proposed pipeline south to MacDonald Road the Preliminary Preferred Route crosses the headwaters of several unnamed stream courses that flow west into Lake Huron. Between MacDonald Road and Dashwood Road and again between South Road and Mount Carmel Drive the route crosses Mud Creek. The most significant stream crossing on the route is the Ausable River, which the proposed pipeline transects at the point where Nairn Road crosses the river just south of Nairn. The section of the route just north of Nairn Road is also closely paralleled to the east by the Ausable River. The route crosses a tributary of the Ausable River just west of the hamlet of Bowood and it crosses the Sydenham River west of Ilderton.

According to the Natural Heritage Information Centre database and information provided by the Ausable Bayfield Conservation Authority, there are 51 significant natural areas within the study area. There are nine wetlands within the study area, four of which have been designated as provincially significant. There are six Areas of Natural and Scientific Interest within the study area: one provincially significant for life science, two provincially significant for earth science, and three regionally significant for life science. There are 34 Environmentally Sensitive Areas, one International Biological Program site, and one Conservation Area within the study area.

The study area is located within the Huron-Ontario section of the Great Lakes – St. Lawrence Forest Region. Sugar maple and beech are common over the entire section, with associates such as basswood, white and red ash, yellow birch, red maple, red, white, black and bur oaks, aspen species, butternut, bitternut hickory, hop-hornbeam, black cherry, sycamore and black walnut. In lowlands, other hardwood species can be found, such as blue-beech, silver maple, red and rock elm, black ash, eastern white cedar. Coniferous species including eastern red cedar, eastern white pine, eastern hemlock and balsam fir can be found amongst hardwood species where appropriate conditions are present.

Land use within the study area falls within a variety of classifications. They include agriculture, urban/residential, environmentally significant features/natural environment, open space/parks and recreation, resource areas, resource extraction areas/extractive resources, restricted agricultural areas, rural industrial and urban reserve areas.

Identified First Nations with a potential interest in the proposed pipeline are as follows: the Aamjiwnaang First Nation; the Chippewas of Kettle and Stony Point; the Chippewas of the Thames; the Munsee-Delaware Nation; the Oneida Nation of the Thames; and Walpole Island First Nation.

To facilitate the archaeological assessment, a windshield survey of the Preliminary Preferred Route was carried out on July 3, 2009. It was conducted by Dana Poulton of D.R. Poulton & Associates.

Plates illustrate the range of conditions along the route, from north to south. As illustrated in Plates 1-7 and Plates 9-11, the lands involved in the proposed construction easement that parallel Goshen Line from Mill Road south to Danceland Road, Danceland Road west to Bronson Line, Bronson Line south to Rogerville Road, Rogerville Road east to Goshen Line and Goshen Line south to Mount Carmel Drive are generally characterized by shallow to non-existent ditches and gentle to imperceptible slopes. The short segment from Goshen Line east to Creamery Road (Plate 17) has a deeper ditch with a culvert and was water-laden at the time of the July 3, 2009 windshield survey.

The segments that follow Creamery Road from Mount Carmel Drive south to Adare Drive and from Creamery Road east to Cassidy Road are again characterized by shallow to non-existent ditches and gentle to imperceptible slopes. The segments that follow the east side of Cassidy Road south to Nairn Road have deeper ditches and a narrower width between the gravel shoulder and the privately-owned lands to the east.

The segments that follow Nairn Road to Ivan are generally characterized by relatively deep or very deep ditches and steeper slopes. An exception is the segment on the south side of Nairn Road in Ivan adjacent to Melville United Church and Cemetery (Plate 24). The segment that follows the east side of Ivan Drive north to the point where the route turns east to connect with the Lobo Compressor Station has a narrow width between the gravel shoulder and the privately-owned lands to the east; it also has a ditch and a line of mature maple trees.

As illustrated in the photographs, with the minor exception of a few hamlets, the entire route passes through a rural landscape flanked by farmland with mixed farming. The fields that are adjacent to the Preliminary Preferred Route vary in land use, from pasture to fallow fields to ploughed fields, fields planted in corn, soy bean and cereal crops, etc. Granting that the detailed design has not yet been draughted for the proposed pipeline, it is understood that the working easement will make use of the existing road right-of-way for the entire route and that the construction easement will be located in the portion of the road right-of-way between the gravel shoulder of the road and the adjacent privately-owned lands.

The construction easement is the only portion of the Preliminary Preferred Route that would be of potential concern to a Stage 2 archaeological survey. Conditions within the construction easement vary somewhat along the route. In general, the lands between the edge of the gravel shoulder and the privately-owned lands have an approximate width of six metres. Along most segments, a ditch is present between the gravel shoulder and the privately-owned lands, and the land declines from the crown of the road and the shoulder down to the ditch, but where a ditch is present it varies considerably in depth and the degree of slope varies accordingly. Throughout virtually the entire route, the construction easement is in grass and the width directly adjacent to the shoulder is mown. Along several segments, a mature row of maples or other trees has been planted between the ditch and the adjacent privately-owned lands.

3.0 STAGE 1: BACKGROUND RESEARCH

3.1 Methods

The initial element of an archaeological assessment of a proposed development undertaking consists of background research. This is defined as a Stage 1 level of assessment in the archaeological guidelines formulated by the Province of Ontario (MCTR 1993). Background research is carried out in order to amass all of the readily available information on previous archaeological surveys in the area:

- determine the location of any registered and unregistered sites within and adjacent to the property;
- identify areas of archaeological potential which represent concerns for Stage 2 field survey; and,
- develop an historical framework for assigning levels of potential significance to any new sites discovered during fieldwork.

For purposes of context, the Stage 1 background study examined data for a study area that encompassed a one kilometre buffer either side of the Preliminary Preferred Route and the start and end points for the proposed pipeline. Two collective sources were examined in the course of the background research. One was the Archaeological Sites Database of the Ministry of Culture; it houses site record forms for registered sites as well as published and unpublished reports on past surveys, assessments and excavations. At the request of the consultant, data on registered sites within the study area were provided by Robert von Bitter, Archaeological Data Coordinator for the Ministry.

The second collective source for the Stage 1 study was the library/archives of D.R. Poulton & Associates Inc. It includes an extensive inventory of published and unpublished reports, as well as inventories of both registered and unregistered archaeological sites in the area.

The above sources were supplemented by reprints of the Historic Atlas of Middlesex County (H. R. Page & Co. 1878) and the Historic Atlas of Huron County (H. Belden & Co. 1879). As stated in Section 2.0 of this report, the Preliminary Preferred Route transects Stanley, Hay and Stephen Geographic Townships in Huron County and McGillivray, East Williams and Lobo Geographic Townships in Middlesex County. For reference purposes, Figures 2-7 illustrate the route through the respective townships. A cultural chronology of the region is presented in Table 1.

3.2 Results

The results of the Stage 1 study may be divided into two separate but related categories: information on past archaeological investigations and known sites in the study area and vicinity; and information on the history of 19th century land use in the area. They will be discussed in turn.

Table 1 Cultural Chronology for Southwestern Ontario

PERIOD	GROUP	TIME RANGE	COMMENTS
PALEO-INDIAN			
	Fluted Point Hi-Lo	9500 - 8500 B.C. 8300 - 7900 B.C.	Big game hunters; small nomadic groups.
ARCHAIC			
Early	Nettling	7700-6900 B.C.	Nomadic hunters and gatherers.
	Bifurcate Based	6800 - 6000 B.C.	
Middle	Laurentian	3500 - 2500 B.C.	Transition to territorial settlements.
Late	Lamoka	2500 - 1800 B.C.	Polished/ground stone tools.
	Broad Point	1800 - 1400 B.C.	
	Crawford Knoll	1500 - 500 B.C.	
	Glacial Kame	ca. 1000 B.C.	Burial ceremonialism.
WOODLAND			
Early	Meadowood Red Ochre	1000 - 400 B.C. 1000 - 500 B.C.	Introduction of pottery.
Middle	Saugeen Princess Point	400 B.C. - 500 A.D. 500 - 800 A.D.	Long distance trade networks. Incipient horticulture.
Late	Glen Meyer	800 - 1280 A.D.	Transition to village life and agriculture.
	Uren	1280 - 1330 A.D.	Large village sites.
	Middleport	1330 - 1400 A.D.	Widespread stylistic horizon.
	Neutral	1400 - 1650 A.D.	Tribal differentiation and warfare.
HISTORIC			
Early	Odawa, Ojibwa, Mississauga	1700 - 1875 A.D.	Social displacement.
Late	Euro-Canadian	1800 A.D. - present	European settlement.

Past Archaeological Investigations and Known Sites

Archaeological assessments that do not result in the registration of archaeological sites will not be captured in a standard archaeological sites data request to the Ontario Ministry of Culture. With that proviso, the background research confirmed that at least two archaeological assessments have been carried out within the study area to date. Both resulted in the registration of one or more archaeological sites. The first was conducted in 1987-1988. It was carried out by

Mayer, Poulton and Associates Incorporated (1988a, 1988b) and involved a Stage 1-4 assessment of the proposed 500 kilovolt (kV) hydro transmission line from the Longwoods Transformer Station in Middlesex County to the Bruce Nuclear Power Plant in Huron County. Copies of the reports on that assessment are on file at D.R. Poulton & Associates Inc.

The assessment of the proposed 500 kV hydro transmission line resulted in the registration of five archaeological sites in the present study area. The alignment of the proposed Bayfield to Lobo Pipeline is parallel to the 500 kV hydro transmission line through much of its length. The transmission line extends through Stanley, Hay and Stephen Geographic Townships to Adare Drive in McGillivray Geographic Township, generally following the midline between Goshen Line and Babylon Line. At that point the Preliminary Preferred Route crosses over to the east side of the hydro transmission line, then continues south, parallel to the hydro transmission line until the two routes divert at Nairn.

The second archaeological assessment was carried out by Mayer Heritage Consultants in 1992. It involved a proposed Union Gas natural gas pipeline and resulted in the registration of one archaeological site in the present study area.

As stated above, six archaeological sites have been registered within the study area to date. Data on the sites are detailed in Table 2. Summary data on the sites are presented in Table 3.

Table 2 Registered Archaeological Sites in the Study Area

Site Name	Borden #	Site Type	Cultural Affiliation & Age
	AgHj-1	findspot	indeterminate pre-contact
	AgHj-2	camp	indeterminate pre-contact
Dawsey Homestead	AhHj-2	homestead	Euro-Canadian, 1840s-1870s
		camp	Middle Archaic, ca. 2900-2500 B.C.
	AhHj-3	findspot	indeterminate pre-contact
	AiHj-3	findspot	indeterminate pre-contact
Sarepta Tavern & Post Office	AiHj-4	tavern & post office	Euro-Canadian

As indicated in Table 2, one of the registered sites has two cultural components. Accordingly, the number of discrete cultural components in the small inventory of registered sites totals seven.

The inventory is dominated by First Nations components (n=5) followed by Euro-Canadian components (n=2). The latter consist of a homestead site and of a tavern and post office. The First Nations sites consist of two camps and three isolated findspots. Four of the five First Nations components are of unknown age and cultural affiliation. The exception is a camp of the Middle Archaic period, ca. 2900-2500 B.C.

Table 3 Summary Data on Registered Archaeological Sites in the Study Area

Age & Culture	Site Type	Total
Middle Archaic	camp	1
Indeterminate Pre-contact First Nations	find spot	3
Indeterminate Pre-contact First Nations	camp	1
subtotal - Indeterminate Pre-contact First Nations		***5***
Euro-Canadian	homestead	1
	tavern & post office	1
subtotal- Euro-Canadian		***2***
Total		**7**

History of Land Use in the Vicinity

At the time of the fall of New France in 1759, what is now Huron County formed part of the territory of the Chippewa. The success of the American forces in the Revolution of 1775-1781 provided the British Crown with an incentive to settle what came to be called Upper Canada.

Stanley, Hay and Stephen Townships all formed part of the 829,430-acre Huron Tract, which was originally patented to the Canada Company. The principal village in Stanley Township was Bayfield, which had its genesis in 1833. Settlement elsewhere in the township began the same year and there was a major influx of settlers in 1836, many of whom came from Scotland. In part, the settlement was divided on religious grounds. For example, Goshen Line, which much of the Preliminary Preferred Route follows, was primarily settled by Protestants, who refused to allow Catholics to settle on the road; the name of this road references the Land of Goshen in the Book of Genesis in the Bible. Babylon Line, to the east, was so-named by the Protestants as a term of dispersion; once again, this was a Biblical reference. It signified the fact that Babylon Line was primarily settled by Catholics (H.R. Page & Co. 1878: xviii), and that there was no love lost between the Protestants and the Catholics during that period of the history of Ontario.

Hay Township was settled somewhat later than the surrounding townships. The first pioneers in Hay arrived in 1837 or 1838 and settled on the London Road (now Highway 4). A low and swampy tract through the centre of the township was settled later, after it was drained. Most of the earliest settlers in Hay Township were immigrants from Germany; the township itself was organized as an independent municipality in 1846. Zurich was the main town in Hay Township in the 19th century. It was founded in the 1850s and had a population of about 600 by 1878.

Stephen Township was first settled in 1831. As with Hay Township, the earliest settlers in Stephen Township also located on the London Road.

McGillivray and East Williams Townships in Middlesex County were originally patented to the Canada Company. McGillivray Township formed part of Huron County until 1865, when it was annexed to Middlesex County; the settlement of this township began around 1849. East Williams Township was surveyed by Sheriff MacDonald and was opened for settlement in 1833. Many of the first settlers in East Williams were from the Scottish Highlands. Nairn was the oldest village

in the township but it declined after it was bypassed by the Grant Trunk Railway. By 1878, East Williams Township had a population of about 2500, 100 of whom lived in Nairn.

Lobo Township was partly surveyed by Mahon Burwell a few years prior to 1820 and several families had settled in the township by the mid 1820s. As with East Williams, the first settlers in Lobo Township were primarily derived from Scotland. By 1878, the township had a population of about 3500, 200 of whom lived in Komoka; it was the principal village in the township.

As stated previously, Figures 2-7 illustrate the alignment that the Preliminary Preferred Route follows through the six townships. With a few minor exceptions, the route avoids 19th century settlements. Reference to the 1878 Historic Atlas map of Middlesex County and the 1879 Historic Atlas map of Huron County shows that the Preliminary Preferred Route passed through three small communities in the third quarter of the 19th century. One is Goshen, at the intersection of Mill Road and Goshen Line (Figure 2); it is no longer in existence. The second community is Sarepta; it is located at the intersection of Dashwood Road and Goshen Line, on the townline that separates Stephen and Hay townships (Figure 4). The third community is Ivan, which is located at the intersection of Nairn Road and Ivan Drive (Figure 7).

By convention, residences and farmsteads are depicted on Historic Atlas township maps as single structures denoted by a square black symbol. In the case of the townships in Middlesex County, an associated orchard is also depicted for each farmstead (Figures 6 and 7).

As illustrated in Figures 2-7, most of the farmsteads and residences that were in existence by the late 1870s were oriented to the historic road network, and as the route follows the road alignments throughout its length; it is flanked on either side by farmsteads and residences. A quick count indicates that there are 217 mapped farmsteads or residences in reasonable proximity to the various roads that the route follows. They include 49 along the corridor segment through Stanley Township, 56 along the segment through Hay Township, 33 along the segment through Stephen Township, 42 along the segment through McGillivray Township, 16 along the segment through East Williams Township and 21 along the segment through Lobo Township.

Further to the above, it should be noted that most of the residences or farmsteads depicted in Figures 2-7 were probably occupied by the second or third generation of settlers in this region. The first residences built by the pioneers of this area would have been log cabins or shanties. Once the family had become established, the log homes were typically replaced by improved frame or brick residences. In some cases, the log cabins continued to be occupied but were covered with a brick or frame veneer. In other cases, a totally new house was built nearby, and the log home was either demolished or was retained as a pig barn or other outbuilding. Regardless, in proximity to the sites of any of the residences or farmsteads depicted in the Historic Atlas maps, there is an enhanced potential for the archaeological remains of earlier and related homes and outbuildings.

Apart from farmsteads and homesteads, 19th century site types in this region include industrial, institutional and commercial structures. They are invariably closely oriented to the road network that was established in the first half of the 19th century and are often, but not always, located at crossroads. The maps illustrate 15 institutional and commercial structures in proximity to the Preliminary Preferred Route. Some of the sites in question had two or more functions, such as a church and cemetery or a tavern and a post office. Enumerating them by function, they include

eight churches or chapels, five cemeteries associated with churches or chapels, five schools, two post offices, one tavern and one toll gate. These sites are circled on the Historic Atlas maps reproduced as Figures 2-7 of this report.

Table 4 19th Century Institutional & Commercial Buildings Along the Preferred Preliminary Route*

Township and County	Lot	Concession	Structure , Location and Condition
Stanley Township, Huron Co.	9	Bayfield Road Concession	Post Office, southeast corner of Mill Road & Goshen Line (no longer extant)
	14	10	Church, east side of Goshen Line south of Pavilion Road (still extant)
	12	11	*St. Luke's Anglican Chapel, School & Cemetery, west side of Goshen Line north of Centennial Road (church & school no longer extant & no standing headstones remain in cemetery)*
	10	11	*Church, near southwest corner of Goshen Line & Centennial Road (no longer extant)*
Hay Township, Huron Co.	18	13	*Hay School (1840-1959 A.D.), west side of Bronson Line north of Rogerville Road (no longer extant)*
	18	13	*Zurich Mennonite Church & Cemetery, west side of Bronson Line north of Rogerville Road (church no longer extant)*
	8 & 9	10	Area Mennonite Church & Cemetery, east side of Goshen Line south of Pepper Road (1864-1883) (church no longer extant)
	5	10	Evangelical United Brethren Church & Cemetery, southeast corner of Goshen Line & MacDonald Road (1860-1970) (church no longer extant)
	1	South Boundary	*Sarepta Tavern & Post Office, northwest corner of Dashwood Road & Goshen Line (no longer extant)*
East Williams Township, Middlesex Co.	20	18	School, southwest corner of New Ontario Road & Cassidy Road (no longer extant)

Township and County	Lot	Concession	Structure , Location and Condition
East Williams Township, Middlesex Co.	16	5	*School, northeast corner of Petty Street & Nairn Road (no longer extant)*
East Williams Township, Middlesex Co.	15	4	Toll Gate, southwest corner of Petty Street & Nairn Road (no longer extant)
	16	3	*School, east side of Nairn Road north of Argyle Street (no longer extant)*
Lobo Township, Middlesex Co.	20	18	*SS #15 School (1870 A.D.), Northwest corner of Nairn Road and Greystead Drive (still extant)*
	12	8	*Melville United Church & Cemetery, northeast corner of Nairn Road and Ivan Drive in Ivan (still extant)*

*structures that are on the same side of the road as the Preliminary Preferred Route are italicized.

It should be noted that the institutional sites listed in Table 4 exclude another cemetery that is located on the same side of the road right-of-way as the Preliminary Preferred Route. It is the Roman Catholic St. Boniface Cemetery, which is situated on the east side of Goshen Line, directly south of the Zurich Mennonite Church & Cemetery, in Hay Geographic Township. Based on the visual examination conducted on July 3, 2009, the St. Boniface Cemetery appears to date from the latter half of the 20th century. In addition, the visible headstones are all located well back from the Goshen Line, in contrast to the Zurich Mennonite Church & Cemetery and the Melville United Church Cemetery, which both have headstones within five metres of the adjacent road right-of-way.

One of the institutional structures listed in Table 4 has been registered as an archaeological site. It is the Sarepta Tavern and Post Office (AiHj-4), which is located at the northwest corner of the intersection of Goshen Line and Dashwood Road.

One of the schools is still standing. It is SS #15 School (1870 A.D.), which is located near the northwest corner of Nairn Road and Greystead Drive, and is set back somewhat from the road (Plate 22); the other four schools are not still standing. Nor are there any standing remains of the lone toll gate.

There are no visible remains whatsoever of one of the churches and its associated cemetery: the St. Luke's Anglican Church and Cemetery. This site is located on Goshen Line in Stanley Township, adjacent to the Preliminary Preferred Route.

The other four cemeteries that were established in the 19th century along the Preliminary Preferred Route are still in use. Two of them are on the same side of the road right-of-way as the route: the Zurich Mennonite Cemetery; and the Melville United Church Cemetery.

4.0 EVALUATION OF ARCHAEOLOGICAL RESOURCES

There are two basic categories of archaeological resources for any given property. The first consists of known sites that are of demonstrable or potential significance as cultural resources and planning concerns. The second consists of the potential for as-yet undiscovered sites. These two categories will be addressed in turn.

4.1 Known Sites of Demonstrable or Potential Significance

The original framework for assigning levels of archaeological significance in Ontario was drawn from Provincial environmental assessment guidelines (Weiler 1980). The information included the identification and evaluation of any site that met one or more of the following criteria:

> *it has the potential through archaeological exploration, survey, or fieldwork to provide answers to substantive questions (i.e. relate to particular times and places) about events and processes that occurred in the past and therefore add to our knowledge and appreciation of history;*
>
> *it has the potential through archaeological exploration, survey, and fieldwork to contribute to testing the validity of general anthropological principles, cultural change and ecological adaptation, and therefore to the understanding and appreciation of our man-made heritage; or,*
>
> *it is probable that various technical, methodological, and theoretical advances are likely to occur during archaeological investigation of a feature, alone or in association with other features, and therefore contribute to the development of better scientific means of understanding and appreciating our man-made heritage (Weiler 1980:8).*

The document quoted above was prepared a quarter of a century ago and while the principles it was based upon are still current, some of the language is now dated, including phrases such as "*man-made*". The issue of archaeological site significance is also covered in a more recent publication entitled *Conserving a Future for Our Past: Archaeology, Land Use & Development in Ontario* (Ministry of Citizenship, Culture and Recreation 1997). As stated in that document, the key factors an archaeologist considers in evaluating the significance of an archaeological site include the following:

1. The Integrity of the site (e.g. is it in pristine or near pristine condition; despite past disturbances; can important data still be recovered from it?).

2. The Rarity or Representativeness of the site (e.g. is it one of a kind, locally, regionally or provincially; is it a good comparison to similar sites from other regions, etc?).

3. The Productivity of the site (e.g. does it have the potential to contain large quantities of artifacts or exceptionally detailed data about what occurred there; etc?).

4. The Age of the site.

5. The Potential for Human Remains within the site.

6. The Geographic or Cultural Association (e.g., does the site have a clear and distinct relationship with the surrounding area or to a particular geographic feature, such as a unique rock formation, historic transportation corridor, etc.; is the site associated with a distinctive cultural event, ceremony or festival, etc.?).

7. The Historic Significance of the site (i.e., is the site associated with a renowned event, person or community?).

8. Community Interest (e.g., is the site important to a particular part of the community; does it represent a significant local event; etc.?).

As described in Section 3.2 of this report, a check of the Ministry of Culture's database determined that six sites have been registered within a one kilometre radius of the Preliminary Preferred Route for the proposed Bayfield to Lobo Pipeline. Considering that the study area encompassed by the archaeological assessment covers some 120 square kilometres, that is a very low frequency. The relatively small number of registered sites is a factor of the low development pressures in the area in question and the relatively small number of archaeological assessments that have been conducted.

Following the criteria listed above, three of the six registered sites are insignificant; they are AgHj-1, AhHj-3 and AiHj-3. Two other sites are considered to represent archaeological resources of demonstrable significance; they are the Dawsey Homestead and the Sarepta Tavern & Post Office. The significance of a third site, AgHj-2, is unknown, as it has had an insufficient level of assessment to confirm whether or not it represents a sensitive archaeological resource. All but the Sarepta Tavern & Post Office were found in the course of the Ontario Hydro survey and all five of those sites are located approximately one kilometre east of the alignment of the Preferred Preliminary Route.

Granting that it remains to be determine which side of the road right-of-way the proposed pipeline will follow, only one of the three sites of demonstrable significance is located in proximity to the route and could be a potential planning concern for the pipeline. It is the Sarepta Tavern & Post Office, which is located at the northwest corner of the intersection of Dashwood Road and Goshen Line.

4.2 Potential for as-yet Undiscovered Sites

The potential for as-yet undiscovered pre-contact and historic archaeological resources within a given area or property is generally evaluated on the basis of known sites in the area and on human adaptations to the intrinsic nature of the area itself, including topography and drainage.

It should be noted that another factor in archaeological potential is the extent to which past construction or other impacts have disturbed or eradicated the inherent potential for archaeological remains. That is certainly a factor in the case of the Preliminary Preferred Route,

which follows existing road right-of-way and have been disturbed, at least in part, by past road construction and/or by utilities construction. The same would apply to any segments of the proposed pipeline alignment that coincided with municipal ditches.

Since the mid 1980s several models have been generated in an attempt to quantify archaeological potential in southern Ontario. The results consistently show that distance to water is the most reliable indicator of pre-contact and historic land use and settlement. The degree of inferred archaeological potential varies somewhat with the significance of the water course. Accordingly, the land use primer developed by the Ministry of Citizenship, Culture and Recreation (1997:12-13) identifies a high potential for First Nations sites within 300 metres of a primary water source, including relic shorelines such as post-glacial Lake Iroquois, and within 200 metres of a secondary water source. The primer also includes other site potential criteria, as follows:

- The presence of a known archaeological site within 250 metres of a proposed development;
- The presence of knolls, ridges or other elevated topography within a property;
- The presence of well-drained sandy soils;
- The presence of distinctive or unusual landforms such as waterfalls, rock outcrops, rock faces, caverns, glacial erratics, etc., which often represented special or spiritual places to First Nations peoples;
- The presence of particular resource-specific features that would have attracted past subsistence or extractive land use, such as chert outcrops important to First Nations peoples or white pine stands important to early Euro-Canadian logging;
- The presence of initial non-Aboriginal (primarily but not exclusively Euro-Canadian) military or pioneer settlement;
- The presence of an early transportation route such as a trail, pass, road, rail, portage route or canal;
- The presence of one or more properties designated under the Ontario Heritage Act;
- The association of the property or site with historic events, activities or occupations.

It should be noted that the above mention of well-drained sandy soils as a positive site criterion is potentially misleading, as it would tend to imply that the presence of other types of soils could constitute a negative site criterion. As it happens, in southern Ontario there was a well-documented shift by Iroquoian peoples away from sandy soils and onto heavier clay loam soils during the mid 14th century. This may have been occasioned by the onset of a drought, as heavier soils are more drought-resistant than lighter soils, and the Iroquoian peoples of southern Ontario were heavily dependent on agriculture for their subsistence. In consequence, and contrary to the

Ministry's 1997 Primer, the nature of the soils within a given property is not necessarily a reliable indicator in discounting the presence or degree of archaeological potential.

In the present case, six archaeological sites have been recorded with the study area and the one kilometre buffer surrounding it. Following the above criteria of the land use primer developed by the Ministry of Citizenship, Culture and Recreation (1997: 12-13), that would indicate a positive potential for any portions of the study area that are located within 250 metres of those sites. However, it must be added that only a tiny fraction of the study area has ever been covered by archaeological surveys. It should go without saying, therefore, than an absence of known sites does not mean an absence of the potential for sites.

It remains to consider the inherent characteristics of the study area itself. Since the mid 1980s several models have been generated in an attempt to quantify archaeological potential in southern Ontario (e.g., Peters 1986, Pihl 1986). The results consistently show that distance to water is the most reliable indicator of pre-contact and historic land use and settlement. In addition, the presence of or proximity to water sources applies to First Nations sites, Euro-Canadian sites and sites of other cultures, as potable water is a basic requirement of life.

The degree of inferred archaeological potential varies somewhat with the significance of the water course. Accordingly, the land use primer developed by the Ministry (1997) identifies a high potential for sites within 300 metres of a primary water source, including relic shorelines such as post-glacial Lake Algonquin, and within 200 metres of a secondary water source. The former applies to portions of the study area in proximity to the Ausable River in the vicinity of Nairn; it is the largest order stream course transected by or otherwise close to the Preliminary Preferred Route. In addition, the 200 metre site potential increment applies to segments of the route in proximity to Mud Creek, to the Sydenham River and tributaries thereof, and to various unnamed stream courses.

Other positive potential archaeological factors that apply to the study area include the presence of soils suitable to prehistoric and historic agriculture, the presence of elevated topography suitable for habitation, and the proximity to historic transportation routes. As a rule, the entire study area consists of lands suitable for prehistoric and historic agriculture and it is generally level, to gently rolling and well-drained. In addition, the entire corridor follows historic transportation routes, and as such, has an inferred potential for Euro-Canadian archaeological sites.

The known prehistoric archaeological sites in the study area and vicinity indicate that it has been used on at least an intermittent basis as part of the hunting and gathering territories of a succession of First Nations peoples from 9500-8300 B.C. onward. Based on past discoveries in the study area and vicinity, the theoretical potential for native sites in the study area primarily applies to camps and isolated find spots rather than larger sites such as Late Woodland villages. However, there is a demonstrable potential for Iroquoian village sites of the Late Woodland time period in the Middlesex County portion of the corridor. As a rule, the inferred potential for First Nations sites along the Preliminary Preferred Route is moderate rather than high.

With respect to Euro-Canadian sites, the potential applies to a range of site types that fall into four basic categories: residential; commercial; institutional; and industrial. As stated in Section 3.2 of this report, most of the farmsteads and residences that were in existence by the late 1870s

were oriented to the historic road network, and as the Preliminary Preferred Route follows road alignments throughout its length, it is flanked on either side by numerous farmsteads and residences. As illustrated in the example shown in Plate 3 of this report, however, the ones that are still standing indicate that the homesteads and farmsteads were generally set back somewhat from the roads. In consequence, few if any of the sites of 19th century homesteads and farmsteads are likely to be represented by archaeological remains that extend into the Preliminary Preferred Route.

As listed in Table 4 and discussed in Section 3.2, there are no documented industrial sites along the Preliminary Preferred Route, but there are several institutional sites and there is one commercial site. These sites are all closely oriented to the road network that was established in the first half of the 19th century and some of them are located at crossroads. One has been registered as an archaeological site. It is the Sarepta Tavern and Post Office (AiHj-4), which is located at the northwest corner of the intersection of Goshen Line and Dashwood Road. There is a potential that archaeological remains of this site extend into the alignment of the Preliminary Preferred Route.

One of the documented 19th century schools is still standing, the A.D. 1870 S.S #15 school in East Williams Township (Plate 22); the other four schools are not standing and are likely represented by archaeological remains. That said, if the standing school is an example, structural remains of the other four schools would likely be set too far back from the road to be a concern for the Preliminary Preferred Route.

Cemeteries represent the one remaining class of institutional sites that is a concern for the Preliminary Preferred Route. There are no visible remains whatsoever of one of the churches and its associated cemetery: the St. Luke's Anglican Church and Cemetery. This site is located on Goshen Line in Stanley Township, adjacent to the Preliminary Preferred Route. Many of the graves in this cemetery may have been disinterred for reburial elsewhere when it was closed, but experience shows than many other unmarked graves invariably remain after a 19th century cemetery has been closed.

A case in point is the site of the Sacred Heart Cemetery in Ingersoll, which was closed ca. 1879 A.D. Test and salvage excavations of this site were conducted in 2008 by D.R. Poulton & Associates (2008, n.d.). The cemetery had been partly disturbed by the construction of a sewer prior to the archaeological investigations, but the assessment determined that it had a minimum of 156 individual unmarked graves. Of those, 99 (64%) were fully intact. Fifty-seven other graves (37%) had been exhumed, but 22 of them still contained some human bones. In consequence, human remains were present in 121 of the 156 grave shafts at this site – fully 78% of the sample. What this means is that the closure of the cemetery involved the removal of all of the headstones but only a minority of the burials. These frequencies may be exceptional but they do serve to illustrate that unmarked graves will be present at the site of St. Luke's Anglican Cemetery, and that there is a concern they may extend into the Preliminary Preferred Route in the segment of the route that is adjacent to this cemetery.

Two of the other four cemeteries that were established in the 19th century along the Preliminary Preferred Route are on the same side of the road right-of-way as the route: the Zurich Mennonite Cemetery; and the Melville United Church Cemetery. As illustrated in Plates 8 and 24, 19th century headstones in both of these cemeteries are situated within five metres or so of the

Preliminary Preferred Route. Past experience has shown that all such cemeteries contain numerous unmarked graves and that those unmarked graves sometimes extend outside the fenced limits of the cemeteries, into the adjacent road right-of-way. In consequence, as with St. Luke's Anglican Cemetery, there is a concern for unmarked graves within the Preliminary Preferred Route in the segments that are adjacent to the Zurich Mennonite Cemetery and the Melville United Church Cemetery. It should be noted that the fences that enclose both cemeteries are relatively new. The date of the construction of the one that encloses the Melville United Church Cemetery is unknown but the fence and pillars that enclose the Zurich Mennonite Cemetery were constructed in 1987. The fact that the original fences are no longer extant for these cemeteries increases the chances that unmarked graves may extend beyond the limits of the current fences that enclose them.

As stated earlier, past disturbance will be a mitigating factor in the potential for extant archaeological remains along the Preliminary Preferred Route, as the entire route follows existing road right-of-way. Potential disturbances along the route could include grading from past road construction as well as impacts from utilities construction and the excavation of municipal drains and ditches. Based on the windshield survey of July 3, 2009, most of the segments that follow Ivan Drive, Nairn Road and Cassidy Road from the Lobo Compressor Station north to Adare Drive appear to have been disturbed to the extent that they do not retain a potential for extant archaeological remains and do not warrant systematic archaeological survey. In contrast, the visual examination indicates that most of the segments from the intersection of Adare Drive north to the start point of the proposed pipeline at the Bayfield Storage Pool could retain a potential for extant archaeological remains and would warrant archaeological survey.

5.0 RECOMMENDATIONS

Although the visual examination of the Preliminary Preferred Route provided useful information to the archaeological assessment, it should be noted that the detailed design for the proposed pipeline has not been formulated. Nor have large-scale plans of the proposed pipeline been draughted. These considerations limit the level of detail on potential archaeological planning concerns that can be provided at the present time for any given segment of the route.

Granting the above proviso, and as detailed in Section 4.2 of this report, the background study determined that select segments of the Preliminary Preferred Route for the proposed pipeline have at least a moderate potential for as-yet undiscovered archaeological remains. In order to address that potential, it is recommended that a Stage 2 archaeological survey be carried out once the detailed design for the preferred route have been confirmed and the location and limits of any related potential impacts have been determined, and once large-scale mapping is available.

The Stage 2 survey will effect a field-based assessment of the archaeological potential of the preferred pipeline route. It will also effect a systematic examination of any lands that are determined to be subject to impact from the proposed undertaking and retain a potential for extant archaeological remains.

The purpose of the Stage 2 survey will be to confirm the presence or absence of archaeological resources that could represent potential constraints for the Bayfield to Lobo Pipeline Project. In the event that any sites are discovered that may represent significant planning concerns, it is also recommended that measures for mitigating the concerns be implemented. Options include preservation by avoidance or mitigation by salvage excavation in advance of development.

As described in Section 4.2 of this report, there are three older cemeteries that front on the same side of the road right-of-way as the Preliminary Preferred Route. They are the Melville United Church Cemetery on the south side of Nairn Road in Ivan, the Zurich United Church Cemetery on the west side of Bronson Line north of Rogerville Road and St. Luke's Anglican Cemetery on the west side of Goshen Line north of Centennial Road. Nineteenth century headstones in the first two cemeteries extend to within about five metres of the Preliminary Preferred Route; there are no standing headstones whatsoever at the site of St. Luke's Anglican Cemetery. Past experience shows that the segments of the Preliminary Preferred Route adjacent to these three cemeteries have a high potential for unmarked 19th century graves. In consequence, it is recommended that Stage 3 archaeological test excavations be conducted on the pertinent segments to confirm the presence or absence of unmarked graves. The test trenches adjacent to these cemeteries would only be one metre in width; they would be excavated by heavy machinery under archaeological supervision.

Further to the above, a registered archaeological site, the Sarepta Tavern and Post Office, is located on the same side of the road right-of-way as the Preliminary Preferred Route. Prior to the implementation of the survey, the report on the previous archaeological investigations of the site will be examined. The results may assist in determining the limits of the site relative to the alignment of the Preliminary Preferred Route. Regardless, the Stage 2 survey of this segment of the corridor will also establish the presence or absence of any related archaeological deposits.

In addition to the Sarepta Tavern and Post Office and the aforementioned cemeteries, other mapped 19th century structures that were located on the same side of the road right-of-way as the Preliminary Preferred Route and that are no longer standing may be represented by extant archaeological remains. The Stage 2 survey will determine which, if any, of these sites has extant archaeological remains that extend into the Preliminary Preferred Route.

Beginning in the 1980s, it was standard practice for what is now named the Ontario Ministry of Culture to review archaeological assessment reports and then to issue letters of clearance for proposed developments. That system has changed and the Ministry no longer issues letters of clearance. Rather, Archaeological Review Officers of the Ministry now review reports to ensure that the assessment and the report satisfy consulting licence requirements under the Ontario Heritage Act (R.S.O. 1990) and other legislation, and that they conform to existing standards and guidelines. If the report and the assessment do so conform, the pertinent Archaeological Review Officer then issues a letter confirming that and accepting the report into the Provincial registry of archaeological reports. The Ministry's letter is copied to appropriate agencies including, in this case, the approval agency for the Bayfield to Lobo Pipeline Project: the OEB. The OEB then issues the formal clearance of the archaeological conditions for the construction of the proposed pipeline.

Further to the above, it is recommended that the Ministry of Culture issue a letter accepting the present report into the Provincial registry of archaeological reports. It is also recommended that the letter include a statement that the Ministry concurs with the recommendations presented in this report.

The above conclude the property-specific recommendations of this report. Nevertheless, it should be emphasized that no archaeological assessment can be considered to totally negate the potential for deeply buried cultural remains, including human burials. In recognition of that fact, the archaeological assessment technical guidelines formulated by the Province of Ontario require that all reports on archaeological assessments include recommendations to address the possibility that deeply buried remains may be encountered during earthmoving and construction (MCTR 1993:12).

In accordance with the above, and regardless of the results of the survey, it is recommended that archaeological staff of the Ontario Ministry of Culture be notified immediately if any deeply buried archaeological remains should be discovered during earthmoving or construction related to the Bayfield to Lobo Pipeline Project. In the event that human remains should be encountered, it is similarly recommended that the proponent immediately contact Shari Prowse, Archaeological Review Officer of the London office of the Ontario Ministry of Culture (telephone #519 675-6898; email address Shari.Prowse@ontario.ca) and Michael D'Mello, the Registrar of the Cemeteries Regulation Unit of the Ontario Ministry of Small Business and Consumer Services (telephone #416 326-8404; email address Michael.D'Mello@ontario.ca).

6.0 REFERENCES CITED

H. Belden & Co.
1879 **Belden's Illustrated Historic Atlas of Huron County, Ontario.** Mika Silk Screening Limited Reprint, Belleville, Ontario, 1972.

Chapman, L.J. and D.F. Putnam
1984 **The Physiography of Southern Ontario.** 3rd Edition, Ministry of Natural Resources, Toronto.

Government of Ontario
1990 **The Ontario Heritage Act, RSO 1990**. Queen's Printer, Toronto.

Mayer Heritage Consultants Ltd.
1992 An Archaeological Assessment of the Union Gas Limited Proposed Pipeline in the Former Village of Sarepta, Huron County, Ontario. Report on file, Ministry of Culture.

Mayer, Pihl, Poulton and Associates Incorporated
1988a Archaeological Resource Assessment of Selected Survey Areas within Ontario Hydro's Proposed Bruce NPD x Longwoods TS 500 kV Transmission Line (Southern Section): Final Report. Report on file, Ministry of Culture.

1988b Ontario Hydro's Bruce NPD x Longwoods TS 500 kV Transmission Line (Southern Section): Archaeological Assessment of AiHj-1 (Stephen Township, Huron County), AhHj-2 (Stanley Township, Huron County), and AfHj-9, AfHj-66 and AfHj-68 (Caradoc Township, Middlesex County), Ontario. Report on file, Ministry of Culture.

Ontario Energy Board
2003 Environmental Guidelines for the Location, Construction and Operation of Hydrocarbon Pipelines and Facilities in Ontario. Fifth Edition, May 2003.

Ontario Ministry of Citizenship, Culture and Recreation (MCzCR)
1997 **Conserving a Future for Our Past: Archaeology, Land Use Planning & Development In Ontario. An Educational Primer and Comprehensive Guide for Non-Specialists.** 1997 (Revised March 1998). Ministry of Citizenship, Culture and Recreation, Cultural Programs Branch, Archaeology and Heritage Planning Unit.

Ontario Ministry of Culture, Tourism and Recreation (MCTR)
1993 **Archaeological Assessment Technical Guidelines (Stages 1-3 and Reporting Format)**. Ministry of Culture, Tourism and Recreation, Cultural Programs Branch, Archaeology and Heritage Planning Unit.

Peters, John
1986 Transmission Line Planning and Archaeological Resources: A Model of Archaeological Potential for Southwestern Ontario. Archaeological Consulting in Ontario: Papers of the London Conference 1985. **Occasional Papers of the London Chapter, Ontario Archaeological Society, Inc.** No. 2.

H. R. Page & Co.
1878 **Illustrated Historic Atlas of Middlesex County, Ontario**. Edward Phelps Reprint, Sarnia, Ontario, 1972.

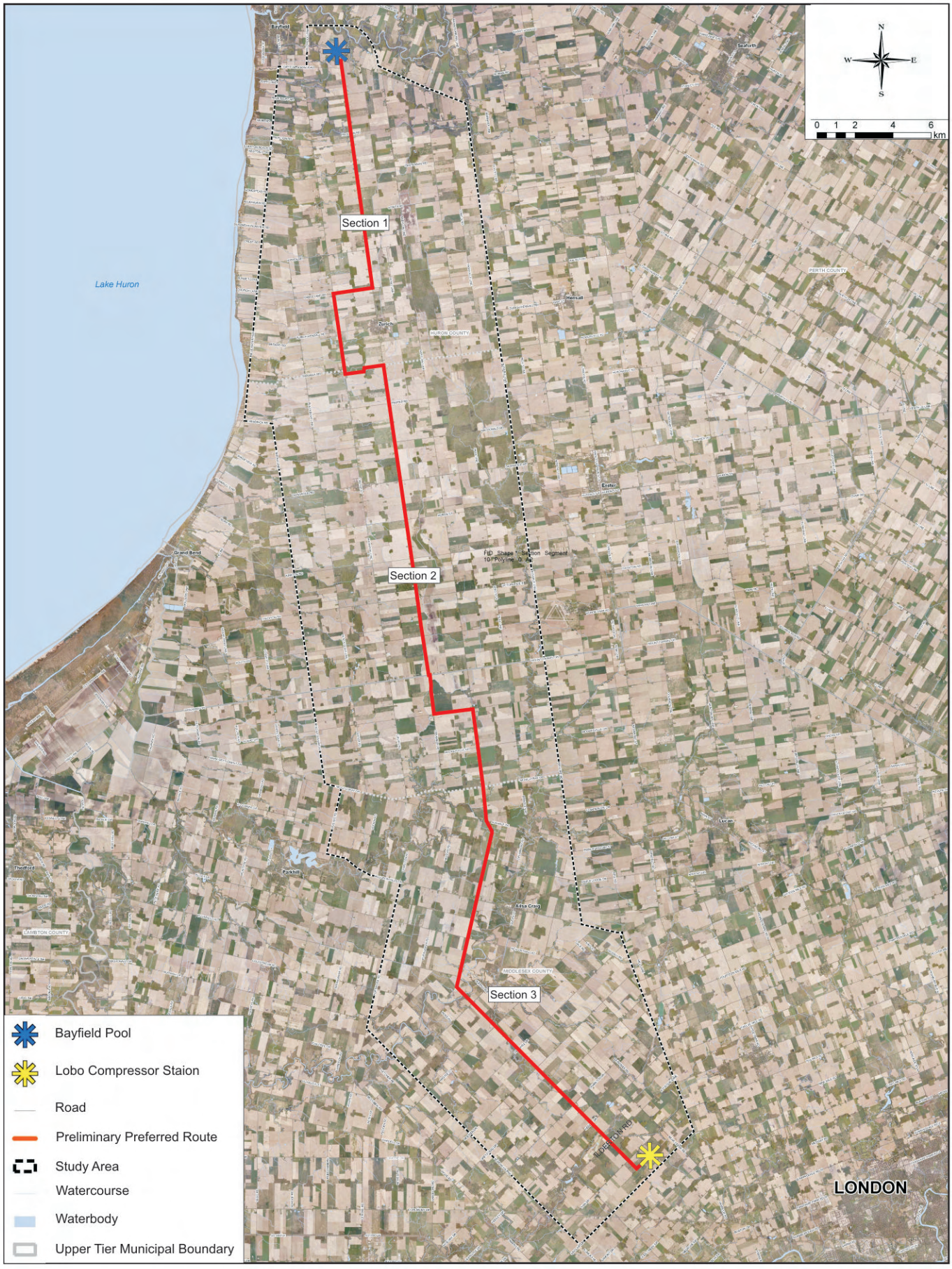
Pihl, Robert
1986 Site Potential Modelling in Archaeological Consulting. Archaeological Consulting in Ontario: Papers of the London Conference 1985. **Occasional Papers of the London Chapter, Ontario Archaeological Society Inc.** No. 2.

D.R. Poulton & Associates Inc.
2008 The 2008 Stage 1 & 3 Archaeological Assessment of the Former Sacred Heart Cemetery, 119 John Street, Town of Ingersoll, Oxford County, Ontario. Report on file, Ministry of Culture.

n.d The 2008 Stage 4 Archaeological Salvage Excavations of the Former Sacred Heart Cemetery, 119 John Street, Town of Ingersoll, Oxford County, Ontario. Report in preparation.

Weiler, John
1980 **Guidelines on the Man-Made Heritage Component of Environmental Assessments.** Historical Planning and Research Branch, Ministry of Culture, Tourism and Recreation, Toronto.

FIGURES



This map has been prepared based on information provided by others. Stantec has not verified the accuracy and/or completeness of this information and shall not be responsible for any errors or omissions that may be incorporated herein as a result

Source: LIDS 2006, ESRI, National Road Nework, Ontario Road Network

Figure 1 Location of the Preliminary Preferred Route

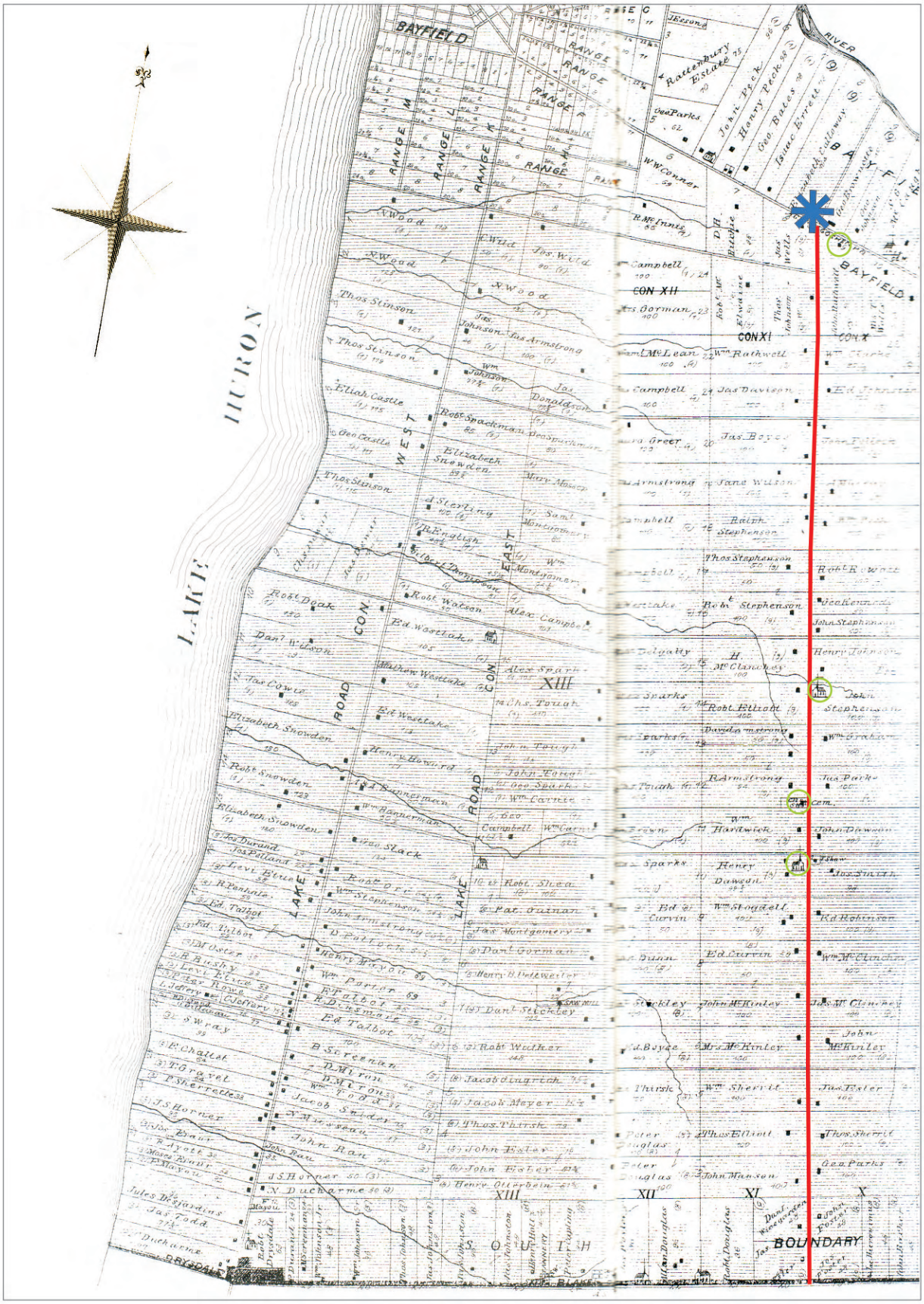


Figure 2 1879 Historical Atlas Map of Stanley Township

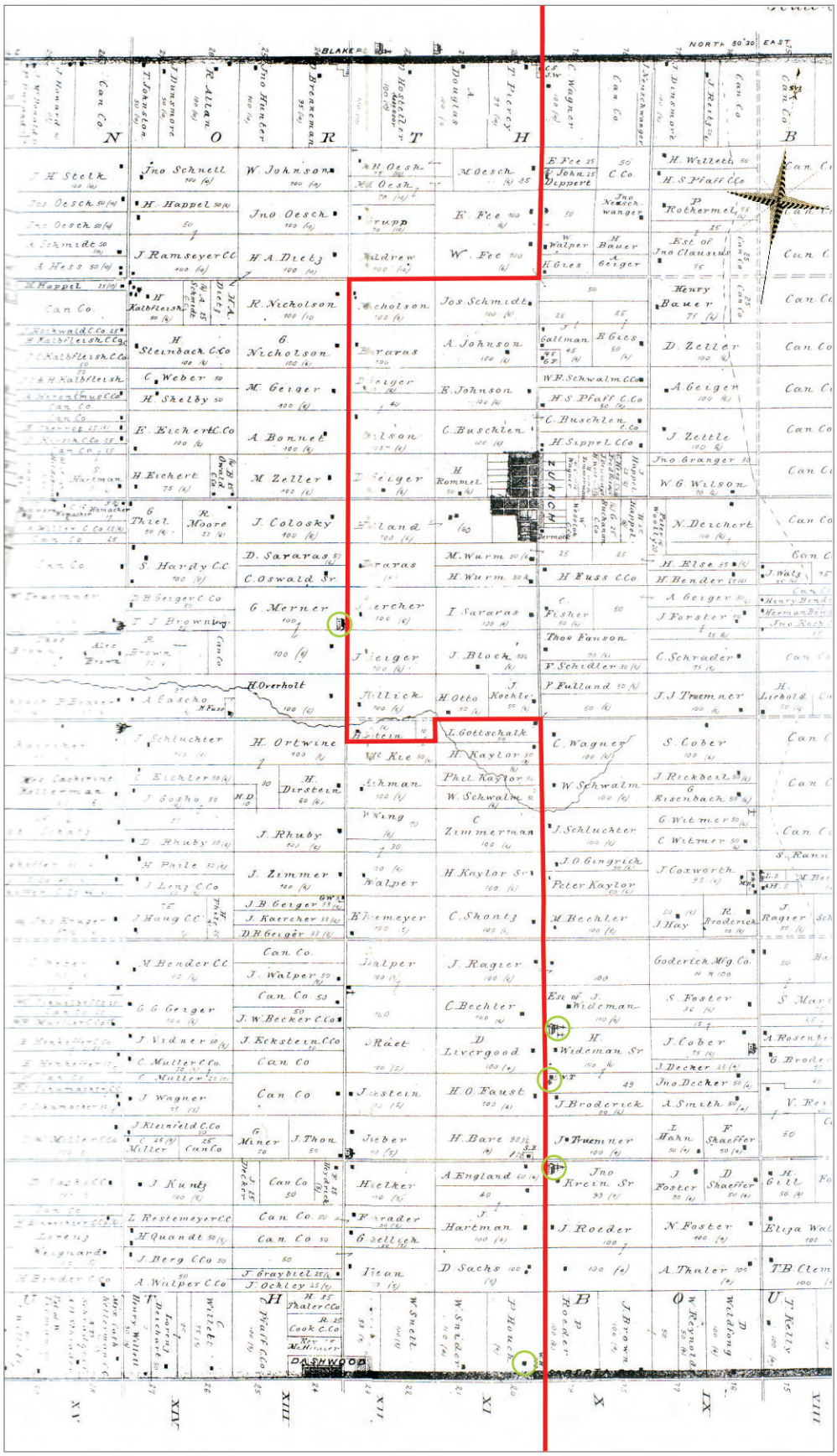


Figure 3 1879 Historical Atlas Map of Hay Township

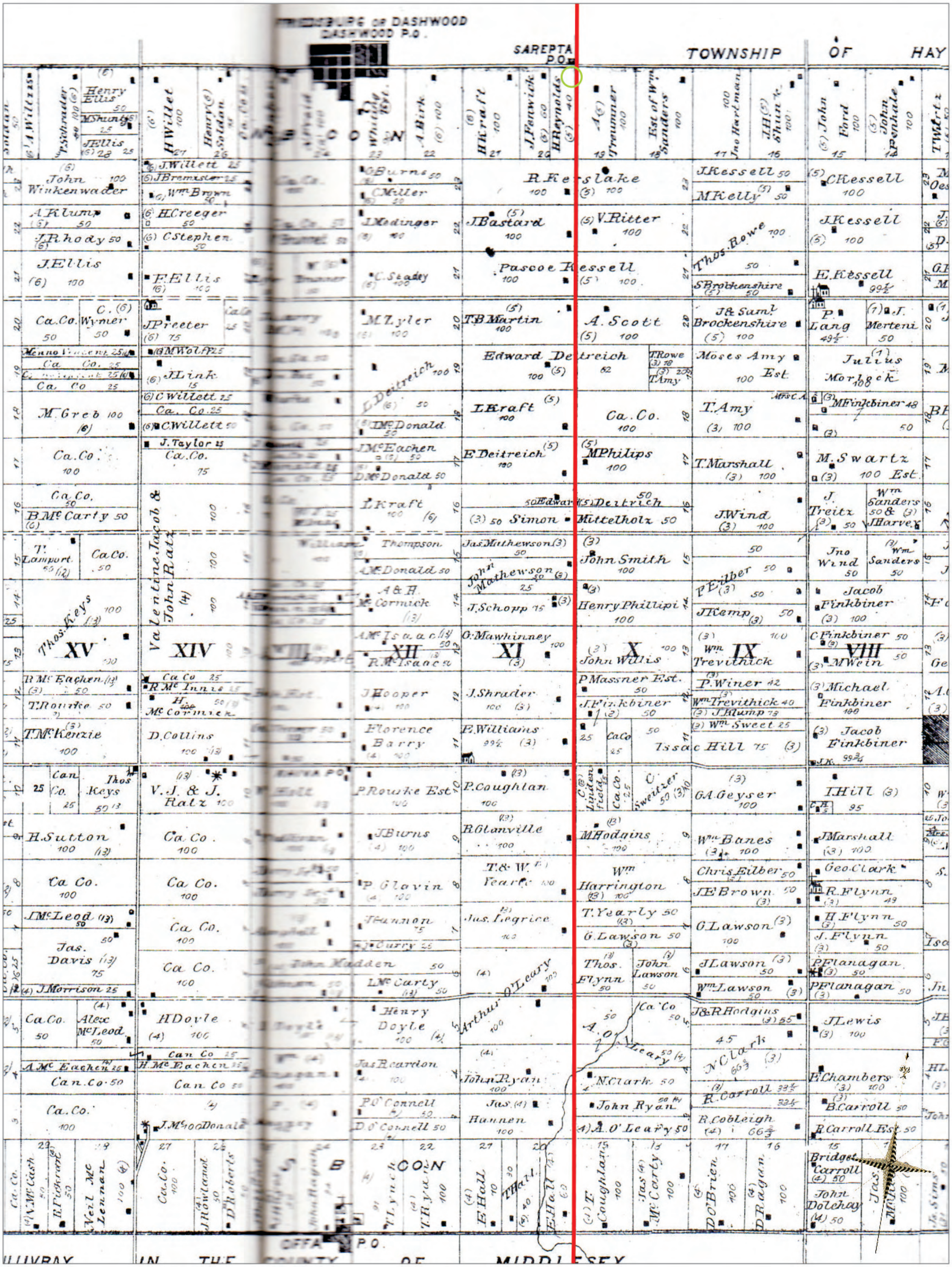


Figure 4 1879 Historical Atlas Map of Stephen Township

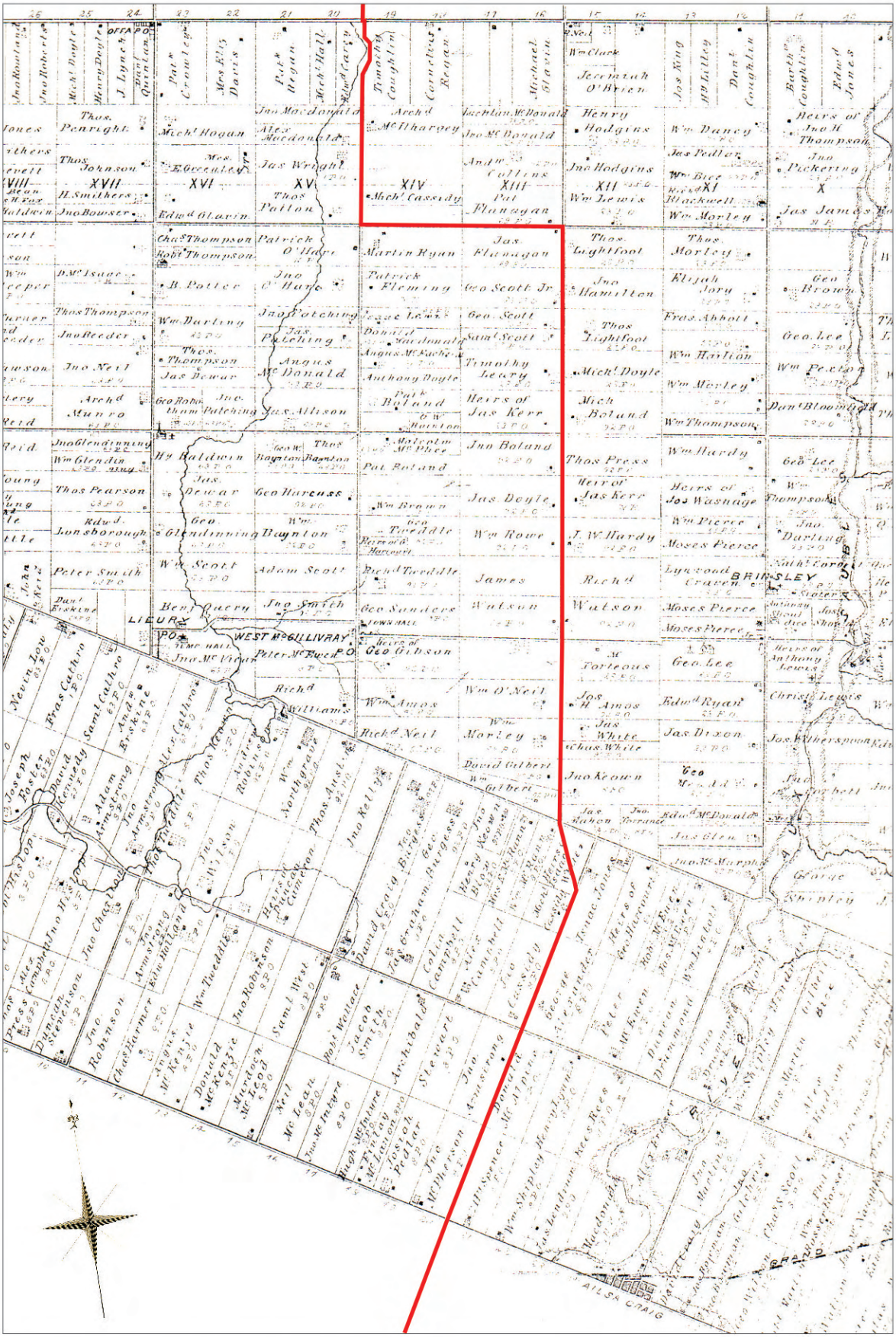


Figure 5 1878 Historical Atlas Map of McGillivray Township

Figure 6 1878 Historical Atlas Map of East Williams Township

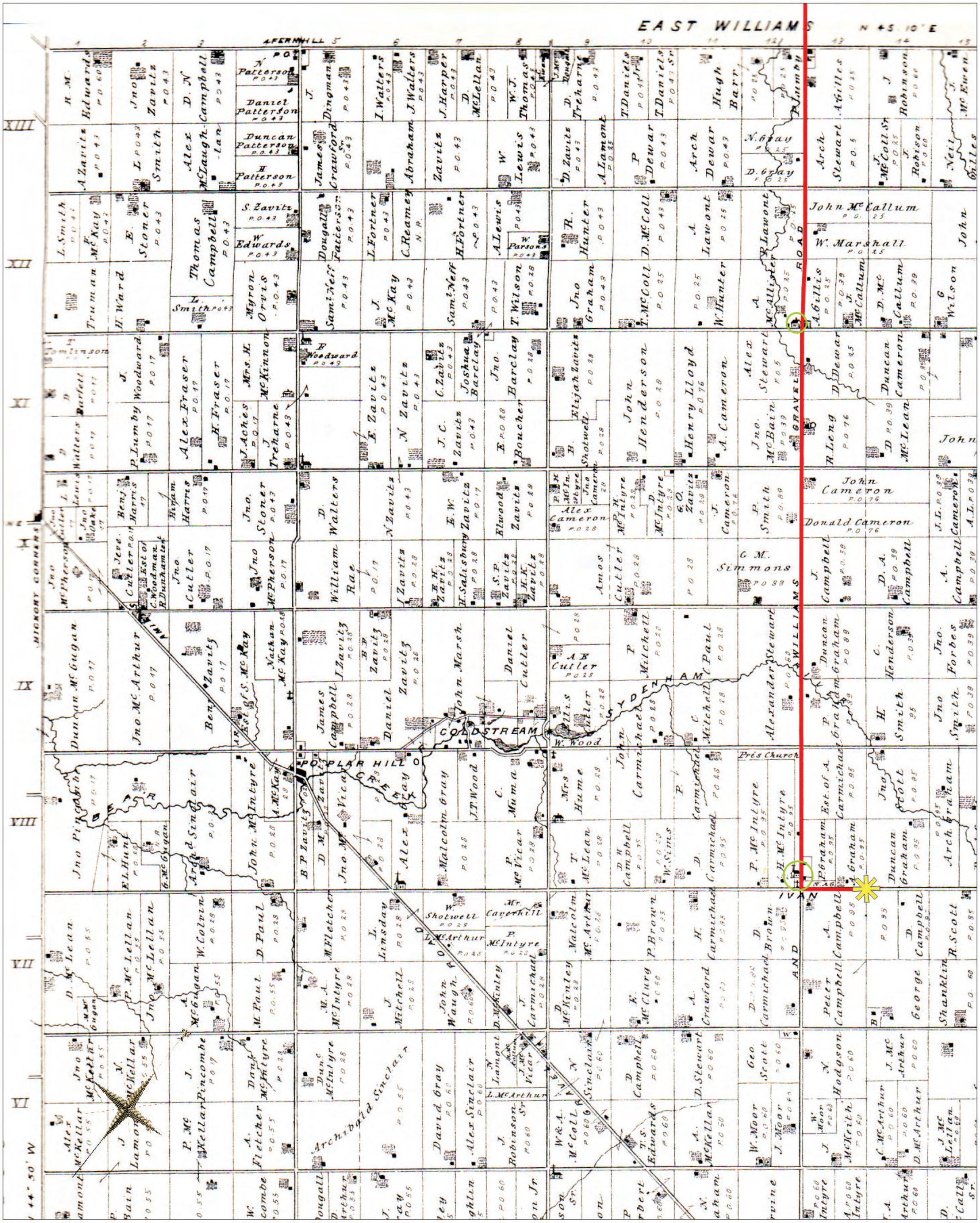


Figure 7 1878 Historical Atlas Map of Lobo Township

PLATES

Plate 1 Goshen Line, View South from Mill Road

Plate 2 Goshen Line, View South to Crystal Springs Road

Plate 3 Fieldstone Farmhouse on Goshen Line, North of Staffa Road, View South

Plate 4 Goshen Line, View South from Kippen Road

Plate 5 Danceland Road, View East from Bronson Line

Plate 6 Bronson Line, View South from Danceland Road

Plate 7 Bronson Line, View South from Zurich-Hensal Road

Plate 8 Zurich Mennonite Cemetery, View North on Bronson Line

Plate 9 Rogerville Road, View East Just West of Bronson Line

Plate 10 Rogerville Road, View West from Goshen Line

Plate 11 Goshen Line, View South from Rogerville Road

Plate 12 Evangelical United Brethren Cemetery on Goshen Line, View East

Plate 13 Goshen Line between Dashwood Road and Huron Street, View North

Plate 14 Goshen Line between Huron Street and Kirkton Road, View North

Plate 15 Goshen Line between Kirkton Road and Crediton Road, View North

Plate 16 Goshen Line North of South Road, View North from Greenway Drive

Plate 17 Mount Carmel Drive, View East from Goshen Line

Plate 18 Ausable River Crossing, View West on Nairn Road

Plate 19 Nairn Road, View East from Petty Street

Plate 20 Nairn Road, View East from Argyle Street

Plate 21 Nairn Road, View West toward Fernhill Drive

Plate 22 SS #15 School (A.D. 1870), View South across Nairn Road

Plate 23 Nairn Road, View East from Ilderton Road

Plate 24 Melville United Church Cemetery, View East on Nairn Road

Memo

Stantec

To:	William Blake	From:	Mark Knight
	Tribute Resources Inc.		Guelph ON Office
File:	160960448	Date:	September 18, 2009

Reference: Pepper Road Route Assessment, Bayfield to Lobo Pipeline

Tribute Resources Inc. has retained Stantec Consulting Ltd. to assess a section of the Bayfield to Lobo pipeline route south of the community of Zurich, Ontario. The current route travels south on Bronson Line, east on Rodgerville Road, and then south on Goshen Line (hereinafter known as Route A). The proposed amendment to this route would travel south on Bronson Line, east on Pepper Road, and then south on Goshen Line (hereinafter known as Route B).

The assessment of Routes A and B was conducted through a desktop survey and GIS analysis of existing background sources and mapping utilized for the environmental assessment, and a field survey conducted on September 15, 2009.

Environmental

Neither of the routes impact designated natural areas (such as wetlands, Areas of Natural and Scientific Interest, or Environmentally Sensitive Areas), or cross agricultural lands. While both routes pass woodlots and vegetated areas, a vegetation field survey will need to be conducted before construction to determine mitigation measures as necessary. Neither route crosses watercourses which contain fish or mussel species at risk[1].

Route B would travel adjacent to fewer private water wells than Route A. Water wells requiring assessment will need to be determined by an independent hydrogeologist prior to construction. Route B would avoid the 500m buffer zone[2,3] around a former landfill on Rodgerville Road, indicating less likelihood of encountering contaminated land. Route B would travel adjacent to 3.5 km of prime agricultural land (Classes 1, 2 and 3), whereas Route A would travel adjacent to 4km of prime agricultural land.

Route B would cross two watercourses. The southern most watercourse on Bronson Line is noted as 'Tiled' in drain classification mapping[4], and was dry at the time of the field visit. The northern most watercourse on Bronson Line is mapped as 'Warm Water' on its western side and 'Intermittent' on its eastern side; however, at the time of the field visit both sides of the watercourse contained water. Route A would cross three watercourses. The southern most watercourse on Goshen Line is noted as 'Intermittent' in drain classification mapping, and was dry on its eastern side and contained standing water on its western side at the time of the field visit. The northern most watercourse on Goshen Line is mapped as 'Warm Water', and

[1] Fisheries and Oceans Canada, Distribution of Fish & Mussel Species at Risk, May 2009.
[2] Ministry of the Environment, Guideline D-4, Land Use On or Near Landfills and Dumps.
[3] Huron County, GIS Mapping, http://gis.huroncounty.ca/imf/imf.jsp?site=Huron_County.
[4] Ausable Bayfield Conservation Authority. Drain Classification Mapping.

Reference: Pepper Road Route Assessment, Bayfield to Lobo Pipeline

contained water at the time of the field visit. The watercourse on Rodgerville Road is mapped as 'Unclassified' on its northwestern side and 'Warm Water' on its southeastern side; however, at the time of the field visit both sides of the watercourse were dry.

Socio-Economic

Neither of the routes impact designated built heritage features, culture and tourism facilities, designated heritage landscapes, or institutional facilities. Neither route crosses within 50 metres of an oil and gas well. Both routes travel adjacent to the same number of residential properties (nine).

Route B would travel adjacent to 3.5 km of agricultural land featuring tile drainage, whereas Route A would travel adjacent to 2.7 km of agricultural land featuring tile drainage. Route B would also travel adjacent to land designated for extractive purposes.

Route Length

Route B would result in 3.9 km of pipeline and associated environmental and socio-economic impacts, whereas Route A would result in 4.3 km of pipeline and associated environmental and socio-economic impacts.

Conclusion

Based on the above assessment, both Route A and Route B are environmentally acceptable. While Route B would increase socio-economic impacts, certain environmental impacts would be reduced and overall route length would be decreased.

Please contact us if you have any questions regarding the above assessment.

Sincerely,

STANTEC CONSULTING LTD.

Mark Knight, M.A.
Environmental Planner
mark.knight@stantec.com

Attachments: GIS Analysis, Field Notes, Photolog

Lengths of Alternative Pipeline Routes for the Bayfield to Lobo Pipeline Project

16-Sep-09 160960448

Total Distance of Route (m)

Route B	3891.16
Route A	4267.3

Length of Tile Drainage Along Alternative Routes

	Route B				Route A			
	South West Side		North East Side		South West Side		North East Side	
	Random	Systematic	Random	Systematic	Random	Systematic	Random	Systematic
	1007	810	1015	966.9	395.1	126.8	604	334.5
	225.14	164.24	828.8	382.9	127.8	154.5	152.2	784.8
	395	410.6		395.8	246	169.5		1041.9
					454.5	70		
					52.74	88.4		
					602			
Total Distance (m)	1627.14	1384.84	1843.8	1745.6	1878.14	609.2	756.2	2161.2

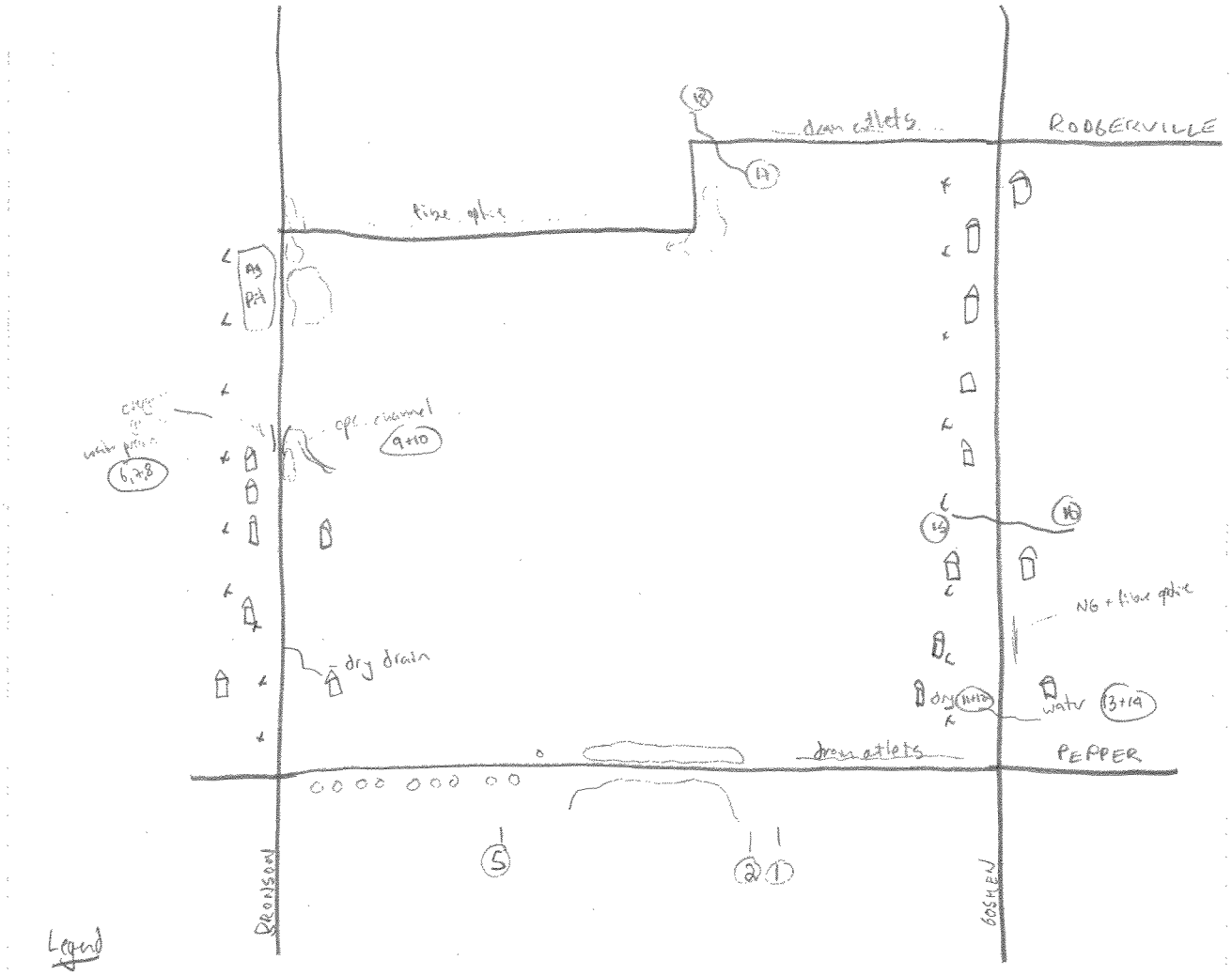
Length of CLI Classes Along Alternative Routes

Route B				Route A			
South West Side		North East Side		South West Side		North East Side	
Soil Class	Distance (m)	Soil Class	Distance (m)	Soil Class	Distance (m)	Soil Class	Distance (m)
organic	0	**organic**	0	**organic**	0	**organic**	0
1	2245.4	**1**	2240	**1**	3189.1	**1**	3189
2	1258.9	**2**	1259	**2**	811	**2**	811.6
3	0	**3**	0	**3**	0	**3**	0
4	0	**4**	0	**4**	0	**4**	0
5	286.6	**5**	301.6	**5**	265	**5**	290.1

W:\active\60960448\graphics\GIS\Data\60960448_LenghtsAlternativePipelineRoutes_BayfieldLobo_20090916_DH.xls

Stantec

Bypass to Lobo Pipeline, 160960448
Sept 15/09, Mark Knight
Field Notes



Legend
- photo #
- poles
- business
- residences
- veg/woodlots
- watercourse

Designed by: Mark Knight

Checked by:

Stantec

Pepper Road Route Assessment, Bayfield to Lobo Pipeline
Photolog – Sept. 15, 2009 Field Visit

Mid-Concession Woodlot (West on Pepper Road)

Roadside Vegetation (West on Pepper Road)

Bronson Line Watercourse and Vegetation (Western View)

Bronson Line Watercourse and Vegetation (Eastern View)

Goshen Line Watercourse and Vegetation (Western View)

Goshen Line Watercourse and Vegetation (Eastern View)

Pepper Road Route Assessment, Bayfield to Lobo Pipeline
Photolog – Sept. 15, 2009 Field Visit

Goshen Line Northern Watercourse
and Vegetation (Western View)

Goshen Line Northern Watercourse
and Vegetation (Eastern View)

Rodgerville Road Vegetation and Dry
Watercourse (Southeastern View)