

407 East Individual Environmental Assessment (IEA) and Preliminary Design Study

Archaeology Impact Assessment of the Recommended Design

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1. Introduction

1.1 Study Overview

The Ontario Ministry of Transportation (MTO) in consultation with the Region of Durham, its constituents and surrounding municipalities, is undertaking an Individual Environmental Assessment (EA) Study to address the long-term transportation needs in the Region of Durham and surrounding area. The study supports the transportation objectives of the provincial *Growth Plan for the Greater Golden Horseshoe* by providing for the efficient movement of people and goods within the study area. A proposed extension of the 407 transportation corridor, consisting of a highway and transitway, has been recommended as part of a number of transportation improvements, as defined in an earlier phase of the EA.

A technically preferred route (TPR) for the transportation corridor was presented in June 2008. The preferred route extends from the current terminus at Brock Road in Pickering to Highway 35/115 in Clarington and includes two north-south links connecting Highway 401 to the proposed extension of the 407 corridor, one in West Durham (Whitby) and the other in East Durham (Clarington).

Since the release of the TPR, further analysis and preliminary design work has been undertaken to define the transportation corridor in greater detail, including additional route refinements and the location / size of support facilities for the corridor. In addition, ongoing studies and analysis have been undertaken to determine potential environmental impacts and proposed mitigation measures and strategies. The Recommended Design for the proposed transportation corridor, including the two north-south links, was presented in January / February 2009.

1.2 Report Overview

In summary, this report documents the archaeological impact assessment of the Recommended Design associated with the 407 East Environmental Assessment (EA). Readers are encouraged to view this report in its entirety so that the information is reviewed in a comprehensive and logical manner. Similarly, it is recommended that all Impact Assessment Reports (discussed further below) are to be read in tandem with this report, to ensure that measures and recommendations within each discipline's report are compatible and carried forward where recommended.

In the preceding Alternative Methods phase, a net effects analysis and comparative evaluation of the short-listed routes were carried out to determine a Technically Recommended Route (TRR)¹. The potential environmental effects, mitigation or compensation measures to address the potential adverse environmental effects, and the remaining net effects following the application of the mitigation or compensation measures were identified for the TRR.

1. Ministry of Transportation, *407 East Environmental Assessment, Alternative Methods Report, August 2007*.

Based on stakeholder input, further analysis and preliminary design work to define the preferred route in greater detail, including the location / size of support facilities for the corridor, and to further avoid or mitigate environmental effects, the TRR was refined in a number of locations as part of determining the Technically Preferred Route (TPR). The footprint of the Recommended Design for the transportation corridor, including support facilities such as transitway stations, maintenance facilities and stormwater management ponds, is illustrated in **Exhibit 1-1**.

The approved 407 East EA Terms of Reference (ToR) proposed that a concept design (including plan and profile) of the Recommended Design would be prepared so the potential environmental effects and mitigation or compensation measures previously identified during the Alternative Methods phase, could be more accurately defined along with enhancement opportunities and approval requirements². However, MTO has enhanced the design effort from Concept Design to Preliminary Design in order to further increase the level of detail for the Recommended Design and advance the overall project delivery schedule.

The discipline specific work plans developed earlier in the 407 East EA, outlining how impacts associated with the Recommended Design would be assessed, were carried out within the context of Preliminary Design rather than Concept Design. The results from assessing the impacts are documented in the following 11 stand alone Impact Assessment Reports:

- Terrestrial
- Fisheries
- Hydrogeology
- Landscape Composition
- Socio-Economic (including Land Use)
- Noise
- Air Quality
- Agricultural
- Waste Management and Contamination
- Archaeology
- Cultural Heritage

Notwithstanding the fact that the Impact Assessment Reports are stand alone documents, there are interrelationships between the reports where the information discussed overlaps with related disciplines. Examples of this include the following:

- Terrestrial, Fisheries, and Hydrogeology
- Socio-Economic (including Land Use) and Agricultural
- Hydrogeology and Waste Management and Contamination

A Landscape Composition Impact Assessment Report has also been developed which utilizes and builds on the mitigation and compensation measures outlined within this report and within those reports prepared by other disciplines. The landscape composition report and plans have combined the mitigation recommendations of all disciplines to generate a landscape composition plan for the entire transportation corridor. Please refer to the Landscape Composition Impact Assessment report for those plans.

2. Ministry of Transportation, 407 East Environmental Assessment Terms of Reference, as amended November 29, 2004.

Exhibit 1-1 Transportation Corridor Footprint / Sections



1.3 Archaeology Study Team

A study team consisting of Archaeological Services Inc. (ASI) and URS Canada Inc. staff undertook the Archaeology impact assessment. The actual individuals, with Ministry of Culture (MCL) license numbers, and their specific roles are as follows:

General Project Management – ASI

- ▶ **Senior Project Manager:**Robert Pihl, MA, CAHP (MCL License P057)
Partner & Senior Archaeologist
Manager Environmental Assessment Division

- ▶ **Project Administrator:**.....Andrew Douglas, BA
Sarah Jagelewski, BA
Research Archaeologist

- ▶ **GIS/CAD Graphics:**.....Erin King, BA
Blake Williams, MPhil
GIS Technician

- ▶ **Report Writer:**Deborah Pihl, BA (MCL License R130)
Staff Archaeologist

- ▶ **Report Reviewer:**Robert Pihl

Stage 2 Archaeological Assessment of West Section – URS

- ▶ Project Manager:Charlton Carscallen, MA, RPA (MCL License P088)
Senior Archaeologist & Manager, Cultural Resources

- ▶ Project Director/Licensee:Anthony McNichol, MA, RPA (MCL License P290)
Archaeologist

- ▶ Field Directors:Emily Game, BA (MCL License R307)
Tara Jenkins, BA (MCL License R148)
Luke Fischer, BA (MCL License R219)

- ▶ Field Archaeologists:Victoria Sharpe
Justin Tighe
Erin Caley
Sean Henry
Anne Dorion

- ▶ Laboratory Manager:Sally Stewart, PhD (MCL License P314)
Laboratory Manager, Cultural Resources

- ▶ GIS/CAD Graphics:Julie Jakop, MSc
GIS Analyst, Environmental Planning

Stage 2 Archaeological Assessment of Central & East Sections - ASI

- ▶ Project Manager/Licensee:.....Robert I. MacDonald, PhD, RPA (MCL License P117)
Partner & Senior Archaeologist

- ▶ Field work Co-ordinator:Bruce Welsh, MA (MCL License P047)
Senior Archaeologist

- ▶ Field Directors:Lisa Merritt, MS. (MCL License P094)
Staff Archaeologist

Katie Bryant, MA (MCL License P264)
Staff Archaeologist

John Dunlop, BA Hons (MCL License R261)
Staff Archaeologist

Peter Carruthers, MA (MCL License P163)
Staff Archaeologist

- ▶ Field Archaeologists:Denise Li
Rachel Johnston
Shawn Bayes
John Sleath
Hilary Schwering
Teagan Kenward

- ▶ Data Co-ordinator:Deborah Pihl, BA

- ▶ Historic Archaeologist:.....Eva MacDonald, MA (MCL License P125)
Senior Archaeologist & Manager, Historic
Archaeology

- ▶ Archivist:Brian Narhi, MA
Staff Historian

Colin McFarquhar, PhD
Staff Historian

- ▶ Laboratory Manager:Kristine Crawford, Hons BA
Staff Archaeologist

- ▶ Laboratory Assistant:.....Alexis Hutcheson, MSc
Research Archaeologist

- ▶ GIS/CAD Graphics:Erin King, BA

2. Study Area

As illustrated in **Exhibit 1-1**, the study area associated with the Recommended Design is composed of seven sections; five sections for the mainline and one section each for the West and East Links. These seven sections reflect how the TRR was subdivided during the Alternative Methods phase. A description of the transportation corridor for each of these sections is provided below. The Recommended Design plans for each of the seven sections are provided in **Appendix B**.

Transitway stations are proposed at all interchange locations with the exception of Thornton Road on the mainline.

West Mainline – Section 1 (Brock Road to Kinsale Road)

The transportation corridor commences at Brock Road in Pickering and continues easterly to Kinsale Road crossing Highway 7 at Sideline 16. It is compatible with the proposed Brock Road realignment east of the Village of Brougham and the proposed Westney Road realignment east of the Hamlet of Greenwood. Interchanges are located at Brock Road By-Pass, Westney Road and Salem Road, with a realignment of Highway 7 required in the vicinity of Sideline 16 to accommodate the Brock Road Interchange. A highway maintenance facility and a Commercial Vehicle Inspection Facility (CVIF) are also proposed at Salem Road.

West Mainline – Section 2 (Kinsale Road to Ashburn Road)

Continuing easterly from Kinsale Road, the transportation corridor crosses to the south of Highway 7 between Cochrane Street and Ashburn Road in Whitby. The corridor remains to the south of Brooklin and continues east past Baldwin Street. Interchanges are proposed at Lake Ridge Road and Baldwin Street and a freeway to freeway interchange is proposed just east of Lake Ridge Road to accommodate moves between the mainline and the West Durham Link. A transitway maintenance facility is also proposed at Lake Ridge Road.

Central Mainline – Section 3 (Ashburn Road to Simcoe Street)

From the Baldwin Street interchange, the transportation corridor heads directly east to Thickson Road and then northeast crossing Winchester Road in the vicinity of Thornton Road in Oshawa. Interchanges are proposed at Baldwin Street, Thickson Road, Thornton Road and Simcoe Street.

Central Mainline – Section 4 (Simcoe Street to Enfield Road)

From Simcoe Street, the route continues easterly paralleling the hydro corridor north of Winchester Road. East of Harmony Road, the transportation corridor crosses the hydro corridor and heads in a southeasterly direction to Enfield Road in Clarington. Interchanges are

proposed at Simcoe Street, Harmony Road, and Enfield Road within this section. A transitway maintenance facility is proposed at Simcoe Street.

East Mainline – Section 5 (Enfield Road to Highway 35/115)

From Enfield Road, the transportation corridor continues to the east, remaining south of Winchester Road until Nixon Road, at which point the corridor heads north to connect with Highway 35/115. Local road realignments will be required for Winchester Road at Regional Road 57 as well as Winchester Road at Darlington-Clarke Townline Road. Interchanges are proposed at Regional Road 57, Darlington-Clarke Townline Road and Highway 35/115. A freeway to freeway interchange is proposed just east of Solina Road to accommodate moves between the mainline and the East Durham Link. A highway maintenance facility is proposed at Regional Road 57 and a CVIF is proposed at Bethesda Road.

West Durham Link – Section 6

Commencing at Highway 401, the West Durham Link runs north east of Lake Ridge Road in Whitby. A realignment of Coronation Road is proposed from Dundas Street to Taunton Road. Full interchanges are proposed at Rossland Road and Taunton Road. Partial interchanges are proposed at Dundas Street and Highway 7. A freeway to freeway interchange is proposed to accommodate moves between Highway 401 and the West Durham Link, just east of Lake Ridge Road. Two CVIF lay-bys are proposed north of Taunton Road.

East Durham Link – Section 7

Commencing at Highway 401, the East Durham Link runs to the west of Solina Road to Nash Road in Clarington, where it then crosses Solina Road, running parallel to Rundle Road on the west side. Realignments of Hancock Road at Highway 2 and of Rundle Road just south of Taunton Road are required. A full interchange is proposed at Highway 2 and a partial interchange is proposed at Taunton Road. A freeway to freeway interchange is proposed to accommodate moves between Highway 401 and the East Durham Link east of Courtice Road. A CVIF lay-by is also proposed just north of Bloor Street.

3. Methodology

The assessment of impacts associated with the Recommended Design was undertaken through a series of steps based on a number of previously prepared reports (see **Exhibit 3-1**). The net effects associated with the TRR in the Alternative Methods Technical Report (Archaeology, August 2007) were based on functional plans of the transportation corridor and a Stage 1 archaeological assessment. These effects were then reviewed within the context of the preliminary design plans developed for the TPR to determine the type and extent of additional investigations required as a result of Preliminary Design (including route refinements, preliminary design alternatives and identification of supporting facilities). Additional investigations (documented in **Chapters 3 and 4** of this report) were then carried out where necessary to augment the previous work undertaken during the Alternative Methods phase.

The Stage 1 (see **Chapter 4**) archaeological assessment considered locations of previously registered archaeological sites from the Ontario Archaeological Sites Database (OASD) and a zone of archaeological potential mapped on the basis of various environmental indicators and detailed field reviews. Though certain areas in each section of the transportation corridor exhibited low archaeological potential due to severe slope or poor drainage, the majority of all sections of the corridor fell within the archaeological potential zone and were therefore qualitatively evaluated as exhibiting high potential.

In reviewing the need for additional investigations, it was concluded that the scope and level of detail of the existing Stage 1 archaeological assessment was sufficient in order to evaluate changes to the Recommended Design. Furthermore, since this occurred as the Stage 2 (see **Chapter 4**) archaeological assessment was being initiated, it was decided that a more useful approach would be to adjust the scope of the Stage 2 archaeological assessment to accommodate modifications to the Recommended Design (see **Chapter 4.2**).

Stage 2 archaeological assessment, involving pedestrian and shovel test-pit survey of lands within the transportation corridor was undertaken on properties for which permission to enter was granted. This Stage 2 work was a sampling exercise designed to provide an enhanced understanding of the range of archaeological resources within the proposed transportation corridor. The Stage 2 work is a sampling exercise, rather than a comprehensive archaeological survey, because of access limitations (i.e., limited permission to enter) and limitations in the availability of cultivated land required for purposes of pedestrian survey (MCL 1993, 2006). The portion of the Recommended Design surveyed for purposes of this impact assessment report represents approximately eight months of field work carried out from the beginning of May, 2008, to the end of December, 2008. The results of this sampling exercise are presented in **Chapter 5³**.

3. Although an inventory of archaeological sites is provided, their locations are kept confidential in keeping with MCL archaeological data protocols.

Having developed an enhanced understanding of the archaeology environment, the previously identified potential effects and recommended mitigation measures associated with the TRR (documented in the Alternative Methods Technical Report Archaeology, August 2007) were reviewed to ensure their accuracy in the context of preliminary design. Based on this review, the potential effects, mitigation and/or compensation measures, and net effects associated with Preliminary Design were confirmed and documented in accordance with MTO's Environmental Reference for Highway Design (ERD) (MTO 2006a).

In addition to identifying mitigation or compensation measures, potential enhancement opportunities associated with the Recommended Design were also explored and are discussed in **Chapter 6**.

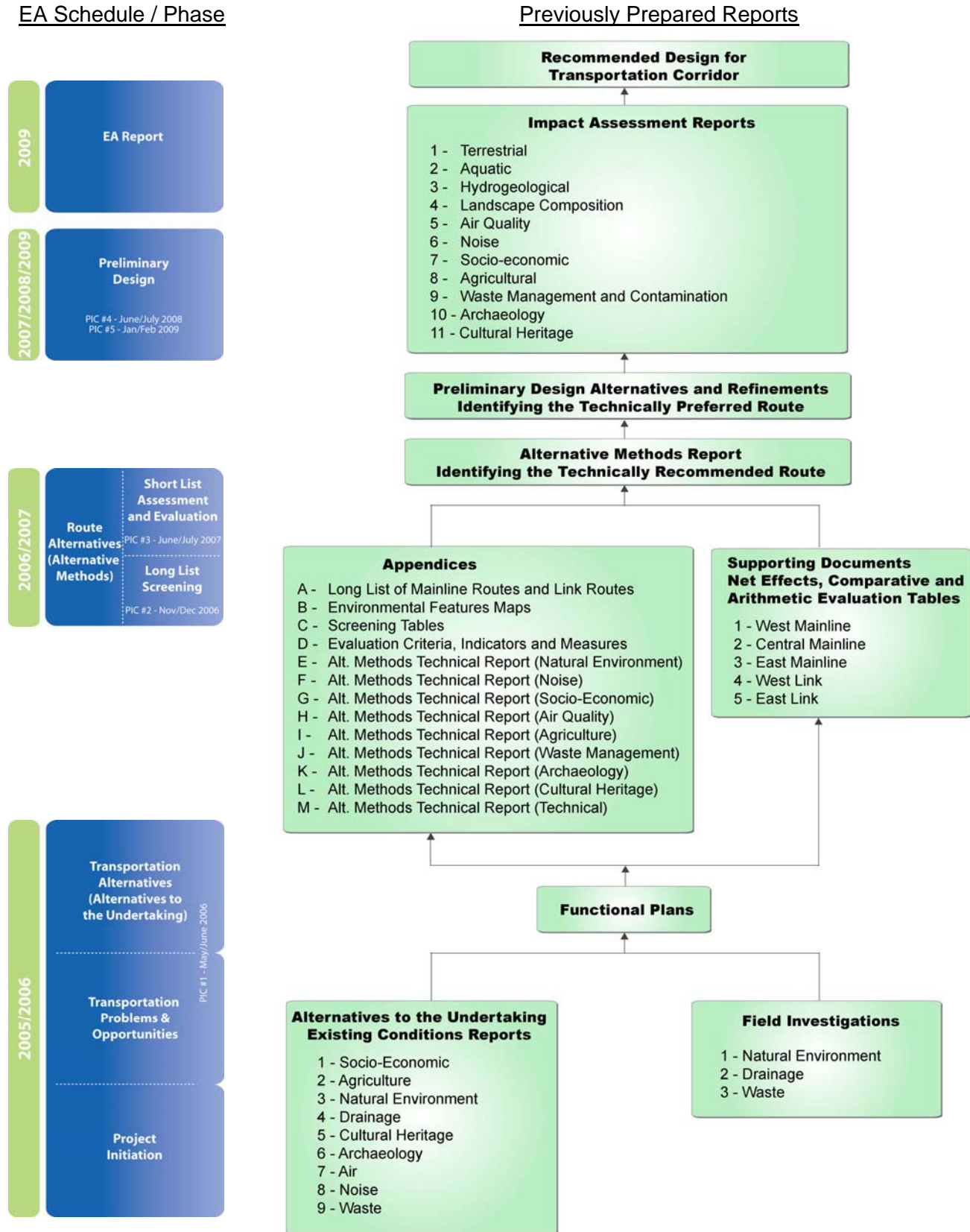
Following this confirmation exercise, monitoring associated with the identified net effects was identified (see **Chapter 7**) as were any additional approvals required as part of implementing the Recommended Design (see **Chapter 8**).

The description of potential impacts to archaeology as a result of the construction and operation of the proposed transportation corridor was completed through an ongoing process to document the archaeological character of the area by following the Technical Requirements for Environmental Impact Study and Environmental Protection / Mitigation as indicated within the Cultural Heritages - Archaeology section (*Section 3.8*) of the ERD. The assessment of impacts is addressed in *Section 3.8.5* of the ERD and the specific items are provided as follows:

Archaeology:

- Disturbance or restriction of known significant archaeological sites
- Disturbance of areas of archaeological potential

Exhibit 3-1 Roadmap of Previously Prepared Reports



4. Additional Investigations

4.1 Archaeological Assessment – Stages 1 - 4

In Ontario, the conservation of archaeological resources is carried out by licensed archaeologists through a four-stage assessment and mitigation process (see **Exhibit 4-1**) administered by the Ministry of Culture under the provisions of the Ontario Heritage Act (R.S.O. 1990, c. O.18) and described in the MCL document, *Standards and Guidelines for Consultant Archaeologists* (MCL 2006).

Stage 1 assessment involves the evaluation of environmental indicators (e.g., proximity to water), land use patterns of both pre-contact Aboriginal peoples and Euro-Canadian pioneers, distributions of known archaeological sites, and historical evidence of land disturbance (e.g., grading, filling) in order to assess whether or not a given study area exhibits potential for the discovery of previously undocumented archaeological sites. In cases where a study area is assessed as having little or no archaeological potential, for example where the land has been severely disturbed by previous development, no further investigation would be recommended.

If additional assessment is warranted, the process proceeds to Stage 2 assessment, involving comprehensive archaeological survey of the study area. Stage 2 assessment is accomplished by either pedestrian survey of cultivated and weathered agricultural land or shovel test-pit survey of non-agricultural land, typically employing survey transect intervals of 5 m. If little or no significant archaeological evidence is encountered, the study area would then be considered free of any further archaeological concern and no further investigation would be recommended. However, if potentially significant archaeological evidence is found, Stage 3 assessment would be recommended.

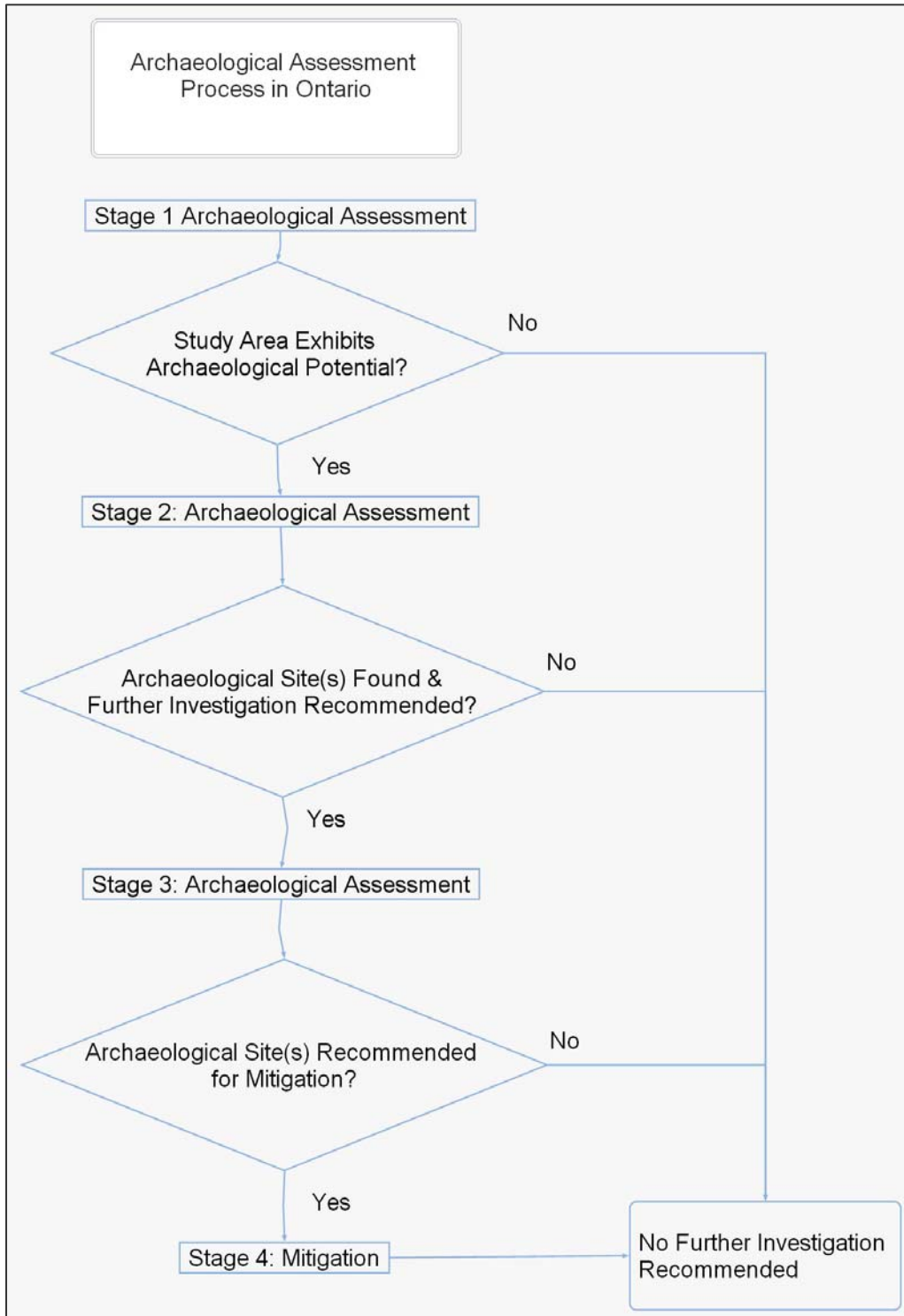
Stage 3 assessment involves the test excavation of an archaeological site in order to clarify its location, extent, artifact distribution and density, age, cultural affiliation, and archaeological integrity. Information pertaining to these assessment criteria is gleaned through the excavation of a series of 1 m squares placed across the site on a checkerboard grid, typically at 5 m intervals, and the analysis of any recovered archaeological materials. The results of Stage 3 assessment determine whether or not the site meets the criteria for recommending Stage 4 mitigation.

Stage 4 mitigation involves either protecting the site from various sources of ground-disturbing impact or conducting a salvage excavation to remove the threatened archaeological resource under the direction of a licensed archaeologist. At the end of Stage 4 the site will have been either protected from further threat or subjected to comprehensive archaeological excavation and analysis. In either case no further archaeological investigation would be required.

All artifacts recovered by licensed archaeologists in the course of archaeological assessment and mitigation work are held in trust for the people of Ontario as stipulated by the Ontario Heritage Act (R.S.O. 1990, c. O.18, s. 66). Non-portable artifacts include classes of settlement

features, such as post moulds, hearths, storage pits, refuse pits, and refuse middens, which are common to both pre-contact Aboriginal and historic Euro-Canadian archaeological sites. The latter may also include structural remains such as stone foundation walls.

Exhibit 4-1 Archaeological Assessment Process in Ontario



Archaeological features are typically mapped and photographed *in situ* prior to being excavated, screened, and sampled for further analysis. The range of portable artifact types varies by age and cultural affiliation. The earliest pre-contact Aboriginal sites often only yield the remains of ground- and chipped-stone tools, including manufacturing debris. Occasionally floral or faunal remains or bone tools may also be recovered.

Later pre-contact Aboriginal sites also yield ceramics. Historic Euro-Canadian sites often yield ceramics as well as glass, metal, brick, and bone artifacts. Floral and faunal remains are frequently recovered from pioneer sites. Pre-contact Aboriginal archaeological sites range from small, ephemeral campsites a few metres in diameter to large settlements over 2 ha in extent. Historic Euro-Canadian archaeological sites similarly range from small log cabin sites to ghost towns or industrial complexes covering many hectares.

Since many archaeological resources in Ontario are of Aboriginal origin, engagement with First Nations in the course of archaeological investigation of Aboriginal sites is consistent with best practices as outlined in the Canadian Archaeological Association's *Statement of Principles for Ethical Conduct Pertaining to Aboriginal Peoples* and the Ministry of Culture's draft *Standards and Guidelines for Consultant Archaeologists* (MCL 2006) (see also MTO's *Environmental Reference for Highway Design (ERD)*, Section 3.8: *Cultural Heritage—Archaeology*, October 2006). Currently, since discussions are ongoing amongst the archaeological consulting industry, government, and First Nations, there is no official protocol in Ontario defining how such engagement should occur. However, in the context of Individual Environmental Assessment projects, engagement on archaeological matters generally occurs as part of the broader First Nations consultation process, as outlined in the Ministry of the Environment's document, *Code of Practice: Consultation in Ontario's Environmental Assessment Process* (MOE 2007), and follows a project-specific series of steps established through the consultation process. MTO is actively engaging with First Nations on issues of interest during the course of archaeological investigations and will continue to carry out this engagement beyond submission of the 407 East Environmental Assessment Study.

4.2 Site Specific Inventories Carried Out

As noted in **Chapter 3**, the additional field investigations carried out for purposes of this impact assessment report constituted a Stage 2 archaeological assessment of a sample of properties throughout the transportation corridor for which both permission to enter and suitable archaeological field conditions were available. The properties assessed provided a comprehensive inventory of actual archaeological resources, both pre-contact Aboriginal and historic Euro-Canadian, rather than the estimate of archaeological potential and documentation of previously registered archaeological sites provided by Stage 1 assessment.

In addition to documenting and registering archaeological resources, Stage 2 archaeological assessment also yields recommendations pertaining to the need for Stage 3 archaeological assessment of sites (to evaluate their size, age, cultural affiliation, nature, and integrity. In the

case of isolated find spots, ephemeral artifact scatters, certain (generally more recent) historic Euro-Canadian sites, or sites with obvious low archaeological integrity), it may be recommended that no further assessment is warranted.

In Ontario, the Ministry of Culture is responsible for reviewing archaeological assessment reports and sanctioning the recommendations made in them through letters of concurrence. For the purposes of the 407 East EA, monthly Stage 2 report submissions have been made to MCL beginning in May 2008. Summaries of the 2008 results are presented in **Exhibit 4-2** and **Exhibit 4-3**. As noted in **Exhibit 4-2**, approximately 506 ha (or 23% of the total) of the transportation corridor had been subjected to Stage 2 archaeological assessment by December 31, 2008, of which 291 ha (or 13% of the total) has been submitted to MCL for review. This represents the sample size employed for purposes of this impact assessment.

Exhibit 4-2 Summary of Assessed Properties Submitted to MCL (Dec 31, 2008)

	West (Sections 1, 2 & 6)		Central (Sections 3 & 4)		East (Sections 5 & 7)		Total	
	#	%	#	%	#	%	#	%
Total Properties	206	100	123	100	324	100	653	100
Assessed Properties to 31DEC08								
▶ Submitted (Nov-Dec)	0	0	4	4	0	0	4	0.6
▶ Submitted (Oct)	5	2	10	8	0	0	15	2.3
▶ Submitted (Sept)	0	0	0	0	5	2	5	0.8
▶ Submitted (August)	1	+	1	1	16	5	18	2.8
▶ Submitted (July)	2	1	1	1	8	2	11	1.7
▶ Submitted (June)	8	4	6	4	2	1	16	2.4
▶ Submitted (May)	2	1	6	5	1	0	9	1.4
▶ Cleared to 31DEC08	0	0	0	0	0	0	0	0
▶ Cleared 31DEC08 w/ exception of outstanding issues	0	0	0	0	0	0	0	0
Sub-total	18	9	28	23	32	10	78	12

Exhibit 4-3 Summary of 2008 Stage 2 Survey Coverage (Dec 31, 2008) by Section

	Section 1		Section 2		Section 3		Section 4		Section 5		Section 6		Section 7		Totals	
	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%	ha	%
Section Total Area	254	100	236	100	179	100	259	100	563	100	361	100	325	100	2177	100.0
Amount Surveyed	48	19	52	22	60	34	111	43	177	31	58	16	+	+	506	23.2
Amount Submitted	6	2	27	11	42	23	58	22	124	22	34	9	0	0	291	13.4

Exhibit 4-4 summarizes the twenty-nine newly documented archaeological sites, resulting from the Stage 2 archaeological assessment, that have been submitted to MCL to December 31, 2008. Stage 3 archaeological assessment has been recommended for eleven of these sites. The submitted sites include eleven Aboriginal sites and find spots, and eighteen historic Euro-Canadian sites.

Exhibit 4-4 Summary of Archaeological Sites Submitted to MCL (Dec 31, 2008)

	West		Central		East		Total	
	Aboriginal	Euro-Can	Aboriginal	Euro-Can	Aboriginal	Euro-Can	Aboriginal	Euro-Can
Under review by MCL								
▶ Nov-Dec. submission	0	0	1	1	0	0	1	1
▶ October submission	0	6	1	1	0	0	1	7
▶ September submission	0	0	0	0	0	0	0	0
▶ August submission	1	0	0	2	4	4	5	6
▶ July submission	0	2	0	0	0	0	0	2
▶ June submission	1	2	0	0	0	0	1	2
▶ May submissions	1	0	2	0	0	0	3	0
Stage 3 concurrence		0						
Clearance concurrence	0		2					
Total Sites	3	10	4	4	4	4	11	18

A total of forty-two additional newly documented sites, including twenty-one historic Euro-Canadian and twenty-one pre-contact Aboriginal sites, will be submitted to MCL in the comprehensive report on the 2008 Stage 2 assessment currently in preparation. Stage 3 assessment will be recommended for twenty-three of these sites, including twelve Euro-Canadian and eleven Aboriginal sites. For three of the Euro-Canadian sites, recommendations have not been determined pending the completion of Stage 2 assessment. Further details regarding these sites are included in **Chapter 5** below.

Overall, seventy-five archaeological sites were identified during the 2008 field survey. Stage 3 assessment is recommended for twelve of the thirty-three Aboriginal sites and for twenty-three of the forty-two historic Euro-Canadian sites. No recommendations have yet been made for three of the historic Euro-Canadian sites.

5. Detailed Description of the Environment Potentially Affected

Each of the following subchapters begins with a review of the existing inventory of registered archaeological sites within the sections of the transportation corridor as previously documented in the Archaeology Alternative Methods Technical Report (August 2007). Also included is an evaluation of archaeological potential as presented in that report. The Stage 2 archaeological assessment results to December 31, 2008, including areas and numbers of properties surveyed and submitted, are then documented. A summary is also provided detailing all newly documented historic Euro-Canadian and pre-contact Aboriginal archaeological sites and recommendations that have been/will be made to the Ministry of Culture with respect to these sites.

In accordance with the methodology described in **Chapter 3**, the potential effects, the compensation and mitigation measures, and the net effects for the Recommended Design have been documented in **Chapter 6**. A more detailed discussion of the mitigation and compensation measures is also provided.

5.1 Section 1 – Brock Road to Kinsale Road

Four archaeological sites have previously been documented within the footprint of this section of the proposed transportation corridor:

- AIGs-27 is an Archaic period Aboriginal campsite
- AIGs-177 and AIGs-179 are Late Paleo-Indian period (Hi-Lo type) isolated find spots
- AIGs-228 is a Euro-Canadian farmstead

The latter site (AIGs-228) has been subjected to a Stage 4 salvage excavation and thus warrants no further archaeological attention. The three pre-contact Aboriginal sites (AIGs-27, AIGs-177 and AIGs-179) all warrant further (Stage 3) archaeological assessment if they can be re-located. Archaeological potential throughout this section is generally considered to be high.

Three properties have been surveyed and submitted to MCL for this section and twelve additional properties have been partly surveyed but not yet submitted to MCL. The total area assessed for impacts to archaeological resources comprises 48 ha, which accounts for 19% of this section of the transportation corridor examined by December 31, 2008.

Eleven archaeological sites of Euro-Canadian origin have been identified (**Exhibit 5-1**). Stage 3 assessment is recommended for three of the sites; sites West H1, West H9, and West H10. No further assessment is recommended for five sites, and Stage 3 recommendations are pending completion of the Stage 2 survey for sites West H15, West H16 and West H27.

Exhibit 5-1 Euro-Canadian Sites Documented within Section 1 (Brock Road to Kinsale Road)

Site	Borden #	Survey Unit, Road Section	Recommendations
West H1		SU 71a (Salem)	Stage 3 recommended
West H9		SU 66a (Salem)	Stage 3 recommended
West H10		SU 66a (Salem)	Stage 3 recommended
West H14		SU 86c (16 th)	No further work
West H15		SU 89a (14 th)	Stage 3 recommendation pending
West H16		SU 89a (14 th)	Stage 3 recommendation pending
West H23		SU 61a (Brock)	No further work
West H24		SU 61a (Brock)	No further work
West H25		SU 61a (Brock)	No further work
West H26		SU 61a (Brock)	No further work
West H27		SU 61a (Brock)	Stage 3 recommendation pending

Seven new Aboriginal sites have been identified in the section (**Exhibit 5-2**), and Stage 3 archaeological assessment is recommended for all seven.

Exhibit 5-2 Aboriginal Sites Documented within Section 1 (Brock Road to Kinsale Road)

Site	Borden #	Survey Unit, Road Section	Recommendations
West P4		SU 74b (Paddock)	Stage 3 recommended
West P5		SU 74b (Paddock)	Stage 3 recommended
West P6		SU 74b (Paddock)	Stage 3 recommended
West P7		SU 86c (16 th)	Stage 3 recommended
West P8		SU 86c (16 th)	Stage 3 recommended
West P9		SU 86c (16 th)	Stage 3 recommended
West P14		SU 61a (Brock)	Stage 3 recommended

With the exception of the above noted archaeological sites, the remaining portions of the assessed survey units are clear of archaeological resources and require no further assessment. The remaining properties within this section of the corridor, comprising approximately 206 ha (81%), still require completion of Stage 2 archaeological assessment.

5.2 Section 2 – Kinsale Road to Ashburn Road

No archaeological sites have previously been documented within the footprint of this section of the proposed transportation corridor although archaeological potential is considered to be high.

Six properties in this section have been surveyed and submitted to MCL for this section of the corridor. Five additional properties have been partly surveyed but not yet submitted to MCL. The total area assessed for impacts to archaeological resources comprises 42 ha, which accounts for 22% of this section of the transportation corridor examined by December 31, 2008.

Six archaeological sites of Euro-Canadian origin have been identified (**Exhibit 5-3**). Stage 3 assessment has been recommended for three sites; West H2 (210a Cochrane), West H3 (211a Halls), and West H17 (201f Country Lane). No further assessment is recommended at the remaining three sites.

Exhibit 5-3 Euro-Canadian Sites Documented within Section 2 (Kinsale Road to Ashburn Road)

Site	Borden #	Survey Unit, Road Section	Recommendations
West H2		SU 210a (Cochrane)	Stage 3 recommended
West H3		SU 211a (Halls)	Stage 3 recommended
West H17		SU 201f (Country Lane)	Stage 3 recommended
West H18		SU 205b (Lakeridge)	No further work
West H21		SU 192b (Coronation)	No further work
West H22		SU 194a (Halls)	No further work

Five pre-contact Aboriginal sites were identified (**Exhibit 5-4**). Stage 3 assessment is recommended at two sites; West P3, and West P11. No further assessment is recommended at the remaining three sites.

Exhibit 5-4 Aboriginal Sites Documented within Section 2 (Kinsale Road to Ashburn Road)

Site	Borden #	Survey Unit, Road Section	Recommendations
West P2		SU 63c (Audley)	No Further Work (small widely dispersed scatter)
West P3		SU 199b (Coronation)	Stage 3 recommended
West P11		SU 192b (Coronation)	Stage 3 recommended (village?)
West P12		SU 194s (Halls)	No further work – (isolated find)
West P13		SU 194b (Halls)	No further work – non-cultural

With the exception of the above noted archaeological sites the remaining portions of each property surveyed are clear of archaeological resources and require no further assessment. Other properties within this section of the corridor, comprising approximately 184 ha (78%), still require completion of Stage 2 archaeological assessment.

5.3 Section 3 – Ashburn Road to Simcoe Street

No archaeological sites have previously been documented within this section of the transportation corridor, although archaeological potential is considered to be high.

Seventeen properties have been surveyed and submitted to MCL for this section of the corridor. Twelve additional properties have been partly surveyed but not yet submitted to MCL. The total area assessed for impacts to archaeological resources comprises 60 ha, which accounts for 34% of this section of the transportation corridor examined by December 31, 2008.

One archaeological site of Euro-Canadian origin has been identified, Central H7 (AIGr-198), the Servillinger site. Follow-up Stage 3 assessment was recommended.

Four Aboriginal sites have been identified (**Exhibit 5-5**). Stage 3 archaeological assessment is recommended for site Central P5 (AIGr-200), a very small lithic scatter. The other three sites are isolated Aboriginal artifacts for which no further assessment is recommended.

Exhibit 5-5 Aboriginal Sites Documented within Section 3 (Ashburn Road to Simcoe Street)

Site	Borden #	Survey Unit, Road Section	Recommendations
Central P4	--	SU 8a, Garrard	No Stage 3 assessment (isolated find)
Central P5	AIGr-200	SU 9a, Garrard	Stage 3 assessment (small lithic scatter)
Central P6	AIGr-195	SU 13a, Garrard	No Stage 3 assessment (isolated find)
Central P7	--	SU 5a, Garrard	No Stage 3 assessment (isolated find)

With the exception of the above noted archaeological sites, the remaining portions of the assessed survey units are clear of archaeological resources and require no further assessment. Other properties within this section, comprising approximately 119 ha (66%), still require completion of Stage 2 archaeological assessment.

5.4 Section 4 – Simcoe Street to Enfield Road

No archaeological sites have previously been documented within the footprint of this section of the proposed transportation corridor although archaeological potential is considered to be high.

Eleven properties have been surveyed and submitted to MCL for this section of the corridor. Fifteen additional properties have been partly surveyed but not yet submitted to MCL. The total area assessed for impacts to archaeological resources comprises 111 ha, which accounts for 43% of this section of the transportation corridor examined by December 31, 2008.

Seven archaeological sites of Euro-Canadian origin have been identified (**Exhibit 5-6**). Stage 3 assessment is recommended for three of the sites; Central H1, Central H6 and Central H8. The remaining four sites are outside of the footprint for the Recommended Design and will not be impacted.

Exhibit 5-6 Euro-Canadian Sites Documented within Section 4 (Simcoe Street to Enfield Road)

Site	Borden #	Survey Unit, Road Section	Recommendations
Central H1 William Mitchell	AIGr-182	SU 331a, Leask	Stage 3 assessment
Central H2 Leask	AIGr-183	SU 331b, Leask	No Stage 3 assessment (outside of TPR)
Central H3	AIGr-184	SU 331b, Leask	No Stage 3 assessment (outside of TPR)
Central H4	AIGr-185	SU 50ab, Winchester	No Stage 3 assessment (outside of TPR)

Central H5	AIGr-186	SU 597a, Harmony	No Stage 3 assessment (outside of TPR)
Central H6 Servillinger	AIGr-197	SU 2a, Winchester	Stage 3 assessment
Central H8 Lyman Gifford	AIGr-199	SU 2b, Winchester	Stage 3 assessment

Six Aboriginal sites have been identified in the section (**Exhibit 5-7**). Stage 3 assessment is recommended for one site, Central P9 (AIGr-196), a lithic findspot scatter that includes a non-diagnostic biface. The other five sites are isolated Aboriginal artifact finds for which no further assessment is recommended.

Exhibit 5-7 Aboriginal Sites Documented within Section 4 (Simcoe Street to Enfield Road)

Site	Borden #	Survey Unit, Road Section	Recommendations
Central P1	AIGr-181	SU 42a, Bridle	No Stage 3 assessment (isolated find)
Central P2	--	SU 47a, Harmony	No Stage 3 assessment (isolated find)
Central P3	--	SU 47a, Harmony	No Stage 3 assessment (isolated find)
Central P8	--	SU 40c, Simcoe	No Stage 3 assessment (isolated find)
Central P9	AIGr-196	SU 40a Simcoe	Stage 3 assessment
Central P10	AIGr-201	SU 49a Harmony	No Stage 3 assessment (isolated find)

With the exception of the above noted archaeological sites, the remaining portions of the assessed survey units are clear of archaeological resources and require no further assessment. The remaining properties within this section of the corridor, comprising approximately 148 ha (57%), still require completion of Stage 2 archaeological assessment.

5.5 Section 5 – Enfield Road to Highway 35/115

No archaeological sites have previously been documented within the footprint of this section of the proposed transportation corridor although archaeological potential is considered to be high.

Thirty-two properties in this section have been surveyed and submitted to MCL for this section of the corridor. Thirteen additional properties have been partly surveyed but not yet submitted to MCL. The total area assessed for impacts to archaeological resources comprises 177 ha, which accounts for 31% of this section of the transportation corridor examined by December 31, 2008.

Five archaeological sites of Euro-Canadian origin have been identified (**Exhibit 5-8**). Stage 3 assessment is recommended for four of the sites; East H1, East H2, East H3 and East H5. Stage 3 assessment will likely also be recommended at Site East H4, pending the completion of Stage 2 assessment:

Exhibit 5-8 Euro-Canadian Sites Documented within Section 5 (Enfield Road to Highway 35/115)

Site	Borden #	Survey Unit, Road Section	Recommendations
East H1 William Elford site	AlGq-88	SU 360a, Rundle	Stage 3 assessment
East H2 James Tilly	AlGq-90	SU 357a, Solina	Stage 3 assessment
East H3 John Elford	AlGq-91	SU 359a, Rundle	Stage 3 assessment
East H4 John Cole	AlGq-98	SU 412b, Bethesda	Stage 3 assessment probable, pending completion of survey
East H5 Frice site	AlGq-99	SU 413b Acres	Stage 3 assessment

Nine new Aboriginal sites have been identified in this section (**Exhibit 5-9**). All are isolated finds or very small scatters of undiagnostic lithics for which no further assessment is recommended.

Exhibit 5-9 Aboriginal Sites Documented within Section 5 (Enfield Road to Highway 35/115)

Site	Borden #	Survey Unit, Road Section	Recommendations
East P1	AlGq-181	SU 357b, Solina	No Stage 3 assessment (isolated find)
East P2	--	SU 357b, Solina	No Stage 3 assessment (isolated find)
East P3	--	SU 357b, Solina	No Stage 3 assessment (isolated find)
East P4	--	SU 415a, Liberty	No Stage 3 assessment (isolated find)
East P5	AlGq-92	SU 415a, Liberty	No Stage 3 assessment (less than 5 widely scattered lithic pieces)
East P6	AlGq-93	SU 415a, Liberty	No Stage 3 assessment (less than 5 widely scattered lithic pieces)
East P7	AlGq-94	SU 415a, Liberty	No Stage 3 assessment (isolated find)
East P8	--	SU 413b, Acres	No Stage 3 assessment (isolated find)
East P9	AlGq-95	SU 415a Liberty	No Stage 3 assessment (isolated find)

With the exception of the above noted archaeological sites, the remaining portions of the assessed survey units are clear of archaeological resources and require no further assessment. The remaining properties within this section of the corridor, comprising approximately 386 ha (69%), still require Stage 2 archaeological assessment.

5.6 Section 6 – West Durham Link

One archaeological site has previously been documented within the footprint of this section of the proposed transportation corridor. Site AlGr-46 is an isolated Aboriginal find spot of undetermined age or cultural affiliation. Such sites do not typically warrant further archaeological assessment. Archaeological potential throughout this section is generally considered to be high.

Nine properties have been surveyed and submitted to MCL for this section of the corridor. Eight additional properties have been partly surveyed but not yet submitted to MCL. The total area

assessed for impacts to archaeological resources comprises 58 ha, which accounts for 16% of this section of the transportation corridor examined by December 31, 2008.

Eleven archaeological sites of Euro-Canadian origin have been identified (**Exhibit 5-10**) Stage 3 assessment is recommended for seven sites; West H4, West H5, West H7, West H8, West H11, West H13 and West H28. No further assessment has been recommended for the remaining four sites.

Exhibit 5-10 Euro-Canadian Sites Documented within Section 6 (West Durham Link)

Site	Borden #	Survey Unit, Road Section	Recommendations
West H4		SU 138b (Taunton)	Stage 3 recommended
West H5		SU 184a (Winchester)	Stage 3 recommended
West H6		SU 140a (Taunton)	No further work
West H7		SU 140b (Taunton)	Stage 3 recommended
West H8		SU 129 a, b (Rossland)	Stage 3 recommended
West H11		SU 137a (Taunton)	Stage 3 recommended
West H12		SU 164a (Lyndebrook)	No further work
West H13		SU 164a (Lyndebrook)	Stage 3 recommended
West H19		SU 122c (Rossland)	No further work
West H20		SU 122c (Rossland)	No further work
West H28		SU 160a (Winchester)	Stage 3 recommended

Two pre-contact Aboriginal sites have been identified (**Exhibit 5-11**). Stage 3 assessment is recommended for one site, West P10, which produced a diagnostic formal tool. No further assessment is recommended for site West P1, a pre-contact Aboriginal artifact find spot.

Exhibit 5-11 Aboriginal Sites Documented within Section 6 (West Durham Link)

Site	Borden #	Survey Unit, Road Section	Recommendations
West P1		SU 172a (Lyndebrook)	No further work – isolated find
West P10		SU 122c (Rossland)	Stage 3 recommended -diagnostic

With the exception of the above noted archaeological sites, the remaining portions of the submitted properties are clear of archaeological resources and require no further assessment. Since the initial survey in May, the area of impact to property no. 172 has increased and this property must be subject to additional archaeological inspection and should now be considered incomplete. The remaining properties within this section of the corridor, comprising approximately 303 ha (84%), still require Stage 2 archaeological assessment.

5.7 Section 7 – East Durham Link

No archaeological sites have previously been documented within the footprint of this section of the proposed transportation corridor.

One property in this section has been partially surveyed. The total area assessed for impacts to archaeological resources comprises 0.1 ha, which accounts for less than 1% of this section of the transportation corridor examined by December 31, 2008.

One site of Euro-Canadian origin has been identified; East H6 (AIGq-96), the Casey Trull site (**Exhibit 5-12**). It is likely that no Stage 3 archaeological assessment will be recommended, pending completion of the Stage 2 survey.

**Exhibit 5-12 Euro-Canadian Sites Documented within Section 7
(East Durham Link)**

Site	Borden #	Survey Unit, Road Section	Recommendations
East H6 Casey Trull	AIGq-96	SU 247a Baseline	No Stage 3 assessment probable, pending completion of survey

No Aboriginal sites have been identified in this section.

With the exception of the above noted archaeological site, the remaining portion of the survey unit is clear of archaeological resources and requires no further assessment. The remaining properties within this section of the corridor, comprising approximately 325 ha (99.9%), still require Stage 2 archaeological assessment.

6. Archaeological Resources Net Effects

Any activity which involves land disturbance, including but not limited to vegetation clearance, agricultural tillage, soil compaction, drilling, earthmoving, land filling, alteration of soil moisture regimes, etc., has the potential to negatively impact archaeological sites. Since construction involves many types of land disturbance, all archaeological sites within the footprint of the transportation corridor are potentially at risk. Stage 2 and Stage 3 archaeological assessment will evaluate all archaeological resources within the Recommended Design to determine which sites warrant Stage 4 mitigation. The two options for Stage 4 mitigation are outlined below (see also *MTO 2006a: Section 3.8.6; MTO 2006B, 2006C*).

Archaeological sites are a non-renewable resource. Conservation of archaeological resources through avoidance and protection is therefore the preferred course of action. With regard to potential effects of the Recommended Design on archaeological resources, effects can be classed as neutral or adverse effects.

The preferred Stage 4 mitigation strategy, avoidance and protection, is considered a neutral effect⁴, as it simply maintains the *status quo* for any given archaeological site.

The alternative for archaeological mitigation, salvage excavation, constitutes an adverse effect as the archaeological resource is destroyed using scientifically controlled procedures in order to recover the majority of the portable artifacts, record any associated non-portable artifacts (i.e., settlement features such as hearths, post moulds, pits, etc.), and document the spatial information that links the portable and non-portable artifacts into a meaningful whole. At the end of this exercise, the archaeological resource no longer exists as such. While Stage 4 salvage excavation is routinely employed for archaeological resources of lower ranking significance, it should not be considered as a viable option in all cases.

The selection of appropriate mitigation strategies often require broadly based discussions among concerned communities and stakeholders, First Nations, government officials, archaeologists, and the project proponent.

6.1 Section 1 – Brock Road to Kinsale Road

6.1.1 Potential Effects on Archaeology

Eighteen archaeological sites have been documented within this section of the transportation corridor (seven Aboriginal and eleven Euro-Canadian), with 81% of this section's area still to be assessed. Seven Aboriginal sites and six Euro-Canadian sites have been recommended for Stage 3 assessment.

4. It could be argued that even avoidance and protection poses a negative effect, since invasive Stage 3 assessment of the site would be required in order to establish the boundaries of the site.

6.1.2 Mitigation/Compensation Measures

As noted, construction-related activities within this section of the proposed corridor threaten all archaeological sites. Stage 2 and Stage 3 archaeological assessment will determine which sites warrant Stage 4 mitigation, either avoidance and protection or salvage excavation. The effects on sites which can be avoided and protected from any land disturbance are considered to be neutral. Stage 4 salvage excavation will have an adverse effect on any site for which this mitigation option is chosen.

Specific mitigation measures for this section of the transportation corridor will be determined upon completion of all Stage 2 and Stage 3 archaeological assessment work. General Stage 4 mitigation measures are outlined in **Chapter 6.8.1**.

6.1.3 Net Effects

Archaeological assessment work has documented a number of archaeological sites within this section of the transportation corridor, several of which have been recommended for Stage 3 archaeological assessment. Given that these finds represent less than a 20% sample of this section, it is almost certain that additional archaeological sites will be encountered as Stage 2 assessments are completed and that some of these sites will warrant Stage 3 assessment. It is also very likely that Stage 3 assessments will result in recommendations for Stage 4 mitigation for some sites. It is also very likely that the mitigation option of avoidance and protection will not be feasible for many / most of these sites and that Stage 4 salvage excavation will be required. The net effect of Stage 4 salvage excavation will be partial or complete removal of the archaeological site.

6.2 Section 2 – Kinsale Road to Ashburn Road

6.2.1 Potential Effects on Archaeology

Eleven archaeological sites have been documented within this section of the transportation corridor (five Aboriginal and six Euro-Canadian), with 78% of the section still to be assessed. Two Aboriginal sites and three Euro-Canadian sites have been recommended for Stage 3 assessment.

6.2.2 Mitigation/Compensation Measures

As noted, construction-related activities within this section of the proposed corridor threaten all archaeological sites. Stage 2 and Stage 3 archaeological assessment will determine which sites warrant Stage 4 mitigation, either avoidance and protection or salvage excavation. The effects on sites which can be avoided and protected from any land disturbance are considered to be neutral. Stage 4 salvage excavation will have an adverse effect on any site for which this mitigation option is chosen.

Specific mitigation measures for this section of the transportation corridor will be determined upon completion of all Stage 2 and Stage 3 archaeological assessment work. General Stage 4 mitigation measures are outlined in **Chapter 6.8.1**.

6.2.3 Net Effects

Archaeological assessment work has documented a number archaeological sites within this section of the transportation corridor, several of which have been recommended for Stage 3 archaeological assessment. Given that these finds represent less than a 25% sample of this section, it is almost certain that additional archaeological sites will be encountered as Stage 2 assessments are completed and that some of these sites will warrant Stage 3 assessment. It is also very likely that Stage 3 assessments will result in recommendations for Stage 4 mitigation for some sites. It is also very likely that the mitigation option of avoidance and protection will not be feasible for many / most of these sites and that Stage 4 salvage excavation will be required. The net effect of Stage 4 salvage excavation will be partial or complete removal of the archaeological site.

6.3 Section 3 – Ashburn Road to Simcoe Street

6.3.1 Potential Effects on Archaeology

Five archaeological sites have been documented within this section of the transportation corridor (four Aboriginal and one Euro-Canadian), with 66% of the section still to be assessed. One Aboriginal sites and one Euro-Canadian sites have been recommended for Stage 3 assessment.

6.3.2 Mitigation/Compensation Measures

As noted, construction-related activities within this section of the proposed corridor threaten all archaeological sites. Stage 2 and Stage 3 archaeological assessment will determine which sites warrant Stage 4 mitigation, either avoidance and protection or salvage excavation. The effects on sites which can be avoided and protected from any land disturbance are considered to be neutral. Stage 4 salvage excavation will have an adverse effect on any site for which this mitigation option is chosen.

Specific mitigation measures for this section of the transportation corridor will be determined upon completion of all Stage 2 and Stage 3 archaeological assessment work. General Stage 4 mitigation measures are outlined in **Chapter 6.8.1**.

6.3.3 Net Effects

Archaeological assessment work has not yet documented any archaeological sites within this section of the Recommended Design. Nevertheless, these results represent less than a 35% sample of this section, and it is almost certain that archaeological sites will be encountered as

the Stage 2 assessment is completed, and that some of these sites will warrant Stage 3 assessment. It is also very likely that Stage 3 assessments will result in recommendations for Stage 4 mitigation for some sites. It is also very likely that the mitigation option of avoidance and protection will not be feasible for many / most of these sites and that Stage 4 salvage excavation will be required. The net effect of Stage 4 salvage excavation will be partial or complete removal of the archaeological site.

6.4 Section 4 – Simcoe Street to Enfield Road

6.4.1 Potential Effects on Archaeology

Thirteen archaeological sites have been documented within this section of the transportation corridor (six Aboriginal and seven Euro-Canadian), with 57% of the section still to be assessed. One Aboriginal sites and three Euro-Canadian sites have been recommended for Stage 3 assessment.

6.4.2 Mitigation/Compensation Measures

As noted, construction-related activities within this section of the proposed corridor threaten all archaeological sites. Stage 2 and Stage 3 archaeological assessment will determine which sites warrant Stage 4 mitigation, either avoidance and protection or salvage excavation. The effects on sites which can be avoided and protected from any land disturbance are considered to be neutral. Stage 4 salvage excavation will have an adverse effect on any site for which this mitigation option is chosen.

Specific mitigation measures for this section of the transportation corridor will be determined upon completion of all Stage 2 and Stage 3 archaeological assessment work. General Stage 4 mitigation measures are outlined in **Chapter 6.8.1**.

6.4.3 Net Effects

Archaeological assessment work has documented a number archaeological sites within this section of the transportation corridor, several of which have been recommended for Stage 3 archaeological assessment. Given that these finds represent less than a 45% sample of this section, it is almost certain that additional archaeological sites will be encountered as Stage 2 assessments are completed and that some of these sites will warrant Stage 3 assessment. It is also very likely that Stage 3 assessments will result in recommendations for Stage 4 mitigation for some sites. It is also very likely that the mitigation option of avoidance and protection will not be feasible for many / most of these sites and that Stage 4 salvage excavation will be required. The net effect of Stage 4 salvage excavation will be partial or complete removal of the archaeological site.

6.5 Section 5 – Enfield Road to Highway 35/115

6.5.1 Potential Effects on Archaeology

Fourteen archaeological sites have been documented within this section of the transportation corridor (nine Aboriginal and five Euro-Canadian), with 69% of the section still to be assessed. One Aboriginal sites and five Euro-Canadian sites have been recommended for Stage 3 assessment.

6.5.2 Mitigation/Compensation Measures

As noted, construction-related activities within this section of the proposed corridor threaten all archaeological sites. Stage 2 and Stage 3 archaeological assessment will determine which sites warrant Stage 4 mitigation, either avoidance and protection or salvage excavation. The effects on sites which can be avoided and protected from any land disturbance are considered to be neutral. Stage 4 salvage excavation will have an adverse effect on any site for which this mitigation option is chosen.

Specific mitigation measures for this section of the transportation corridor will be determined upon completion of all Stage 2 and Stage 3 archaeological assessment work. General Stage 4 mitigation measures are outlined in **Chapter 6.8.1**.

6.5.3 Net Effects

Archaeological assessment work has documented a number archaeological sites within this section of the transportation corridor, several of which have been recommended for Stage 3 archaeological assessment. Given that these finds represent less than a 35% sample of this section, it is almost certain that additional archaeological sites will be encountered as Stage 2 assessments are completed and that some of these sites will warrant Stage 3 assessment. It is also very likely that Stage 3 assessments will result in recommendations for Stage 4 mitigation for some sites. It is also very likely that the mitigation option of avoidance and protection will not be feasible for many / most of these sites and that Stage 4 salvage excavation will be required. The net effect of Stage 4 salvage excavation will be partial or complete removal of the archaeological site.

6.6 Section 6 – West Durham Link

6.6.1 Potential Effects on Archaeology

Thirteen archaeological sites have been documented within this section of the transportation corridor (two Aboriginal and eleven Euro-Canadian), with 84% of the section still to be assessed. One Aboriginal sites and seven Euro-Canadian sites have been recommended for Stage 3 assessment.

6.6.2 Mitigation/Compensation Measures

As noted, construction-related activities within this section of the proposed corridor threaten all archaeological sites. Stage 2 and Stage 3 archaeological assessment will determine which sites warrant Stage 4 mitigation, either avoidance and protection or salvage excavation. The effects on sites which can be avoided and protected from any land disturbance are considered to be neutral. Stage 4 salvage excavation will have an adverse effect on any site for which this mitigation option is chosen.

Specific mitigation measures for this section of the transportation corridor will be determined upon completion of all Stage 2 and Stage 3 archaeological assessment work. General Stage 4 mitigation measures are outlined in **Chapter 6.8.1**.

6.6.3 Net Effects

Archaeological assessment work has documented several archaeological sites within this section of the transportation corridor, although none have yet been recommended for Stage 3 archaeological assessment. Given that these finds represent less than a 20% sample of this section, it is almost certain that additional archaeological sites will be encountered as Stage 2 assessments are completed and that some of these sites will warrant Stage 3 assessment. It is also very likely that Stage 3 assessments will result in recommendations for Stage 4 mitigation for some sites. It is also very likely that the mitigation option of avoidance and protection will not be feasible for many / most of these sites and that Stage 4 salvage excavation will be required. The net effect of Stage 4 salvage excavation will be partial or complete removal of the archaeological site.

6.7 Section 7 – East Durham Link

6.7.1 Potential Effects on Archaeology

One archaeological site (Euro-Canadian) has been documented within this section of the transportation corridor, with 99.9% of the section still to be assessed. Based on results to date, a recommendation for Stage 3 assessment does not appear probable, but is dependent on the results of the intensive test pitting at the site.

6.7.2 Mitigation/Compensation Measures

As noted, construction-related activities within this section of the proposed corridor threaten all archaeological sites. Stage 2 and Stage 3 archaeological assessment will determine which sites warrant Stage 4 mitigation, either avoidance and protection or salvage excavation. The effects on sites which can be avoided and protected from any land disturbance are considered to be neutral. Stage 4 salvage excavation will have an adverse effect on any site for which this mitigation option is chosen.

Specific mitigation measures for this section of the transportation corridor will be determined upon completion of all Stage 2 and Stage 3 archaeological assessment work. General Stage 4 mitigation measures are outlined in **Chapter 6.8.1**.

6.7.3 Net Effects

No archaeological assessment work has yet been conducted on this section of the transportation corridor. Nevertheless, it is almost certain that archaeological sites will be encountered as Stage 2 assessments are completed and that some of these sites will warrant Stage 3 assessment. It is also very likely that Stage 3 assessments will result in recommendations for Stage 4 mitigation for some sites. It is also very likely that the mitigation option of avoidance and protection will not be feasible for many / most of these sites and that Stage 4 salvage excavation will be required. The net effect of Stage 4 salvage excavation will be partial or complete removal of the archaeological site.

6.8 Mitigation and Compensation Plan

Once a complete inventory of archaeological resources within the transportation corridor has been completed through Stage 2 archaeological assessment, and further evaluation has been completed for those sites recommended for Stage 3 assessment, a mitigation and compensation plan will be developed for those sites recommended for Stage 4 mitigation. For Aboriginal archaeological sites, engagement with First Nations will occur in advance of Stage 3 archaeological assessment.

6.8.1 Mitigation Measures

Mitigation measures for archaeological resources (**Exhibit 6-1**) will comply with Ministry of Culture's draft standards and guidelines (MCL 2006; see also MTO 2006a, 2006b, 2006c), portions of which are excerpted in the following sub-sections.

Exhibit 6-1 Proposed Mitigation and Compensation Requirements

ID Number	Proposed Mitigation/ Compensation Measure	Associated Licences, Permits or Authorizations
GENERAL and SECTIONS 1-7		
	<i>Avoidance and protection or salvage excavation of all archaeological sites of cultural heritage value or interest</i>	<i>Ministry of Culture concurrence</i>

6.8.1.1 Protection and Avoidance

Guidelines for the protection and avoidance of archaeological resources, including documentation requirements, are detailed in the document entitled, *Standards and Guidelines for Consultant Archaeologists final draft, Unit 1F – Stage 4 Protection and Avoidance* (MCL 2006). The following excerpt from that document outlines the basic protocol:

1. *Any protection strategy must be preceded by complete Stage 2 and Stage 3 assessments to establish the exact limits of the archaeological site. Protection is not an alternative to completing either of these documentation stages. The protected area must include the complete archaeological site as well as a 10 m buffer zone, or 20 m buffer zone for Aboriginal village sites. The buffer zone may be reduced where geographic constraints occur (e.g., river edge, cliff edge) within that zone.*
2. *An interim avoidance strategy (i.e., partial clearance at the end of Stage 2 for the entire property) may be implemented in advance of Stage 3 provided buffer zones for all sites requiring Stage 3 are a minimum 20 m, and that monitoring of construction will occur if land disturbances come within 50 m of the area to be avoided.*
3. *Options that include passing ownership of a protected area to a public land-holding body (e.g., municipality, conservation authority, provincial agency) require that the long-term owner accepts responsibility and has the capacity to ensure the long-term protection of the protected area.*
4. *In order to allow construction up to the edge of a protected area, the proponent must ensure the protected area is not altered, by taking the following measures:*
 - *erecting a temporary barrier around the protected area*
 - *issuing “no go” instructions to all on-site construction crews, engineers, architects or others involved in day to day decisions during construction*
 - *showing the location of the protected area on all contract drawings, when applicable.*
5. *The proponent must ensure that construction does not affect the protected area by engaging a consultant archaeologist to review site and barrier locations before construction and visit the protected area during construction to monitor effectiveness of avoidance strategies.*
6. *A consultant must conduct an inspection after any land use development activity and report to the Ministry of Culture on the strategy’s effectiveness in ensuring that the protected area remains intact.*

6.8.1.2 Salvage Excavation

Standards and guidelines for Stage 4 salvage excavation are detailed in the document entitled, *Standards and Guidelines for Consultant Archaeologists final draft, Unit 1G – Stage 4 Excavation* (MCL 2006). The following is the preamble from that document:

Preserving an archaeological site with cultural heritage value or interest intact for future generations is always the preferred option. Excavation converts the archaeological site into data (excavation records, artifacts) resulting in loss of contextual information. It should only be done if protection and avoidance are not possible.

While it may not be necessary to excavate the whole archaeological site, excavation strategies must focus on recovering as much data as possible rather than sampling the site, to fully document the site's cultural heritage value or interest and ensure the conservation, protection and preservation of the heritage of Ontario.

Objectives

- *To document the archaeological site context, cultural features and artifacts in all portions of the archaeological site*
- *To document the removal of the archaeological site*
- *To preserve the archaeological site's information for future study.*

7. Monitoring and Commitments for the Undertaking

In order to ensure that the mitigation measures identified in **Chapter 6** are implemented as envisioned a strategy and schedule was developed for monitoring environmental effects. Further, commitments have been proposed to ensure they are carried out as part of the construction, operation, and maintenance of the undertaking.

7.1 Monitoring Strategy and Schedule

A monitoring strategy and schedule was developed to ensure that proper implementation of these measures occurs during and post construction (**Exhibit 7-1**).

Exhibit 7-1 Proposed Monitoring Requirements and Related Regulatory Instruments

ID Number	Proposed Monitoring Requirements	Associated Licences, Permits or Authorizations
GENERAL and SECTIONS 1-7		
	<i>Field review and documentation of the implementation of avoidance and protection provisions</i>	<i>Ministry of Culture concurrence</i>

7.1.1 Environmental Effects Monitoring

Monitoring of environmental effects will occur when the Stage 2 and Stage 3 archaeological assessments have been completed and a mitigation plan, based on the Ministry of Culture Stage 4 standards and guidelines, has been developed and implemented. Monitoring of effects will primarily occur to ensure the implementation of avoidance and protection provisions for sites where this mitigation option was selected. Monitoring may also occur in order to document deeply buried or sealed archaeological resources encountered during construction. All monitoring activities will be carried out in accordance with Ministry of Culture Stage 4 standards and guidelines (2006).

7.1.2 Development of an Environmental Management Plan

An Environmental Management Plan (EMPs) or Plans will be prepared following approval of the undertaking by the Minister of the Environment and prior to construction. The EMP(s) will include a description of the proposed mitigation, commitments and monitoring.

7.2 Commitments

The following commitments have been proposed for ensuring that the identified mitigation/compensation measures and monitoring requirements are carried out as part of the construction, operation, and maintenance of the undertaking:

- Complete Stage 2, Stage 3 and Stage 4 archaeological assessments, as appropriate.
- Should deeply buried archaeological remains be found during construction activities, the Heritage Operations Unit of the Ontario Ministry of Culture should be notified immediately.
- In the event that human remains are encountered during construction, the proponent should immediately contact both the Ministry of Culture, and the Registrar or Deputy Registrar of the Cemeteries Regulation Unit of the Ministry of Government Services, Consumer Protection Branch at (416) 326-8404 or toll-free at 1-800-889-9768.
- Acquire all necessary archaeological approvals.

8. Archaeology Approvals Required for the Undertaking

The Ontario Heritage Act provides the Ministry of Culture (MCL) with the mandate to determine policies and programs related to the provincial interest in conserving, protecting and promoting Ontario's heritage. Under the Environmental Assessment (EA) process, MCL's Archaeology and Heritage Planning Unit assists proponents, including other provincial and municipal approval authorities, in meeting the relevant Ontario Heritage Act requirements. It does this primarily through the licensing, regulation, and review of archaeological consulting work, and the implementation of technical standards and guidelines.

All archaeological assessment and mitigation work is subject to MCL licensing authorization prior to commencement, and all the necessary reports are subject to technical review on completion. Recommendations forthcoming from this work are subject to MCL concurrence, and development approvals are contingent on receipt of this concurrence.

Recommendations involving long-term protection of archaeological resources generally involve the provision of additional documentation to MCL such as documentation of provincial designation under *Part VI* of the Ontario Heritage Act. Currently there are no fees associated with receipt of approvals (i.e., letters of concurrence) from MCL. The review process generally requires several months.

9. Summary

Following the identification of the transportation corridor, an impact assessment of the Recommended Design was carried out to confirm the potential environmental effects, mitigation or compensation measures, and remaining net effects previously identified during the Alternative Methods phase.

The majority of the transportation corridor falls within an area of high potential for archaeological resources. From an archaeological perspective, the primary potential adverse environmental effects include:

- Disturbance or restriction of known significant archaeological sites
- Disturbance of areas of archaeological potential

Monitoring of environmental effects will occur once the Stage 2 and Stage 3 archaeological assessments have been completed and a mitigation plan, based on the Ministry of Culture Stage 4 standards and guidelines, has been developed and implemented. Mitigation for archaeological resources will comply with Ministry of Culture's draft standards and guidelines (MCL 2006; see also MTO 2006a, 2006b, 2006c).

Exhibit 9-1 provides a summary of the archaeological assessment findings and recommendations submitted to MCL thus far (as of December 2008). **Exhibit 9-2** provides a summary of the Stage 2 archaeological fieldwork completed to date (as of May 2009).

Exhibit 9-1 Summary of Stage 2 Archaeological Fieldwork Completed To Date (as of May 2009)

Corridor Section	1	2	3	4	5	6	7	Total
Total Area of Land (%)	254	236	179	259	563	361	325	2177
Completed Stage 2 Assessment (total ha)	48	42	60	111	177	58	0.1	496
Remaining Stage 2 Assessment (total ha)	206	194	119	148	386	303	325	1681
Stage 2 Assessment submitted to MCL (total ha)	6	27	42	58	124	34	0	291

Exhibit 9-2 Summary of Archaeological Findings Submitted to MCL (as of December 2008)

Corridor Section	1	2	3	4	5	6	7	Total
Assessed Area of Land (total ha)	6	27	42	58	124	34	0	291
Assessed Area of Land (%)	2	11	23	22	22	9	0	13
Remaining Area of Land (total ha)	248	209	137	201	439	327	325	1886
Remaining Area of Land (%)	98	89	77	78	78	91	100	87
Aboriginal Sites Documented								11*
Euro-Canadian Sites Documented								21*
Total No. of Sites Recommended for Stage 3								11*

*subject to further work

The following commitments have been proposed for ensuring that the identified mitigation/compensation measures and monitoring requirements are carried out as part of the construction, operation, and maintenance of the undertaking

- Complete Stage 2, Stage 3 and Stage 4 archaeological assessments, as appropriate.
- Acquire all necessary archaeological approvals.

All archaeological assessment and mitigation work is subject to MCL licensing authorization prior to commencement, and all the necessary reports are subject to technical review on completion. Recommendations forthcoming from this work are subject to MCL concurrence, and development approvals are contingent on receipt of this concurrence.

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10. References

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The Canadian Environmental Assessment Act. Reference Guide on Physical and Cultural Heritage Resources. Minister of Supply and Services Canada.

Ministry of Culture (MCL), 1993:

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Standards and Guidelines for Consultant Archaeologists, Final Draft. August 2006.

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Appendix A

Glossary of Terms

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Glossary of Terms

Aboriginal: Pertaining to the descendants of the original inhabitants of North America. The Canadian Constitution recognizes three groups of Aboriginal people — Indians, Métis and Inuit. These are three separate peoples with unique heritages, languages, cultural practices and spiritual beliefs. (see also *First Nation*)

Aboriginal community: A First Nation community (also known as a “band” under the Indian Act), a Métis community, or a group of other Aboriginal peoples who identify themselves as a community, such as those living in urban centres or those belonging to an indigenous Nation or tribe that encompasses more than one community (e.g., the Pottawatomi, Mississauga, Mohawk). (see also *Band, First Nation*)

Aboriginal rights: Rights that some Aboriginal peoples of Canada hold as a result of their ancestors' long-standing use and occupancy of the land. The rights of certain Aboriginal peoples to hunt, trap and fish on ancestral lands are examples of Aboriginal rights. Aboriginal rights vary from group to group depending on the customs, practices and traditions that have formed part of their distinctive cultures.

Approval authority: In the land use and development context, this includes any public body (e.g., municipality, conservation authority, provincial agency, ministry) that has the authority to regulate and approve development projects that fall under its mandate and jurisdiction (e.g., Planning Act, Environmental Assessment Act, Aggregate Resources Act).

Archaeological potential: The likelihood that a given property contains archaeological resources.

Archaeological resources: In the context of the draft Standards and Guidelines, objects, materials and physical features identified by licensed archaeologists during a Stage 2 archaeological assessment as possibly possessing cultural heritage value or interest. Analysis using the criteria set out in the draft Standards and Guidelines determines whether those objects, materials and physical features meet the definition of an archaeological site under the Ontario Heritage Act and whether Stage 3 archaeological assessment is required. In various planning and development contexts, the term may refer to any or all of archaeological potential, artifacts and archaeological sites.

Archaeological site: Defined in Ontario regulation as “any property that contains an artifact or any other physical evidence of past human use or activity that is of cultural heritage value or interest”.

Artifact: Defined in Ontario regulation as “any object, material or substance that is made, modified, used, deposited or affected by human action and is of cultural heritage value or interest”.

Band: A group of Aboriginal people for whose collective use and benefit lands have been set apart or money is held by the Crown, or declared to be a band for the purposes of the Indian Act. Each band has its own governing band council, usually consisting of one chief and several councillors. Community members choose the chief and councillors by election, or sometimes through custom. The members of a band generally share common values, traditions and practices rooted in their ancestral heritage. Today, many bands prefer to be known as First Nations. (see also *Aboriginal community, First Nation*)

Consultant archaeologist: Defined in Ontario regulation as “an archaeologist who enters into an agreement with a client to carry out or supervise archaeological fieldwork on behalf of the client, produce reports for or on behalf of the client and provide technical advice to the client.” In Ontario, these people also are required to hold a valid Professional licence issued by the Ministry of Culture.

Contact period: The time period following the date Europeans made first contact with North American Aboriginal peoples. In Southern Ontario, roughly after 1650; in Northern Ontario, at later dates depending on the time at which European explorers first arrived in a region. (see also *Historic period*)

Cultural feature: The physical remains of human alteration at a given location that cannot be removed intact and are not portable in the way that artifacts can be removed and are portable. Typically, a cultural feature must be documented in the field, although samples can be taken. Examples include post moulds, pits, living floors, middens, earthworks, and various historic structural remains and ruins.

Cultural heritage value or interest: For the purposes of the Ontario Heritage Act and its regulations, archaeological resources that possess cultural heritage value or interest are protected as archaeological sites under Section 8 of the Act. Where analysis of documented artifacts and physical features at a given location meets the criteria as stated in the draft Standards and Guidelines, that location is protected as an archaeological site and further archaeological assessment may be required.

Diagnostic artifact: An artifact that indicates, by its markings, design or material, the time period it was made, the cultural group that made it, or other data that can identify its original context.

Euro-Canadian: Pertaining to archaeological resources attributable to settlers or pioneers of European origin or ethnicity.

First Nation: A term that came into common usage in the 1970s to replace the word “Indian,” which some people found offensive. Although the term First Nation is widely used, no legal definition of it exists. Among its uses, the term “First Nations peoples” refers to the Indian peoples in Canada, both Status and non-Status. Some Indian peoples have also adopted the

term “First Nation” to replace the word “band” in the name of their community. (see also *Aboriginal community, Band*)

Formal tool: Most often a stone artifact with a form or design that indicates the reason it was made, like a stone spear point or hide scraper. Contrasted with an informal tool, like a chert flake used for cutting.

Historic period: The colonial period for which historic (i.e. written) records are available. (see also *Contact period*)

Lithic scatter: A concentration of chert (flint) flakes, which are the by-products of stone tool manufacturing, distributed over a particular area.

Midden: A refuse deposit, usually spread over an area of metres to tens of metres, containing artifacts and organic remains; contrasted with refuse pit.

Pedestrian survey: An archaeological survey conducted by means of the visual inspection of the surface of cultivated and weathered soil along a series of survey transects.

Pre-contact period: The time period before the date Europeans made first contact with North American Aboriginal peoples. In Southern Ontario, roughly before 1650; in Northern Ontario, at later dates depending on the time at which European explorers first entered an area.

Shovel test-pit survey: An archaeological survey conducted by means of transects of hand-excavated test pits, each being 30 cm or more in diameter, excavated to sterile subsoil, screened through 6mm mesh, and backfilled.

Survey transects: A series of parallel lines, traversing and systematically covering a subject property, along which an archaeological survey is carried out.

Survey transect interval: The spacing between survey transects, either five or ten metres depending on archaeological potential.

Test units: A series of square holes, each usually one metre square, excavated on a checkerboard pattern across an archaeological site in order to sample the distribution and density of artifacts within the soil.

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Appendix B

Recommended Design Plans

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