9.0 MAPS

All maps follow on the succeeding pages.

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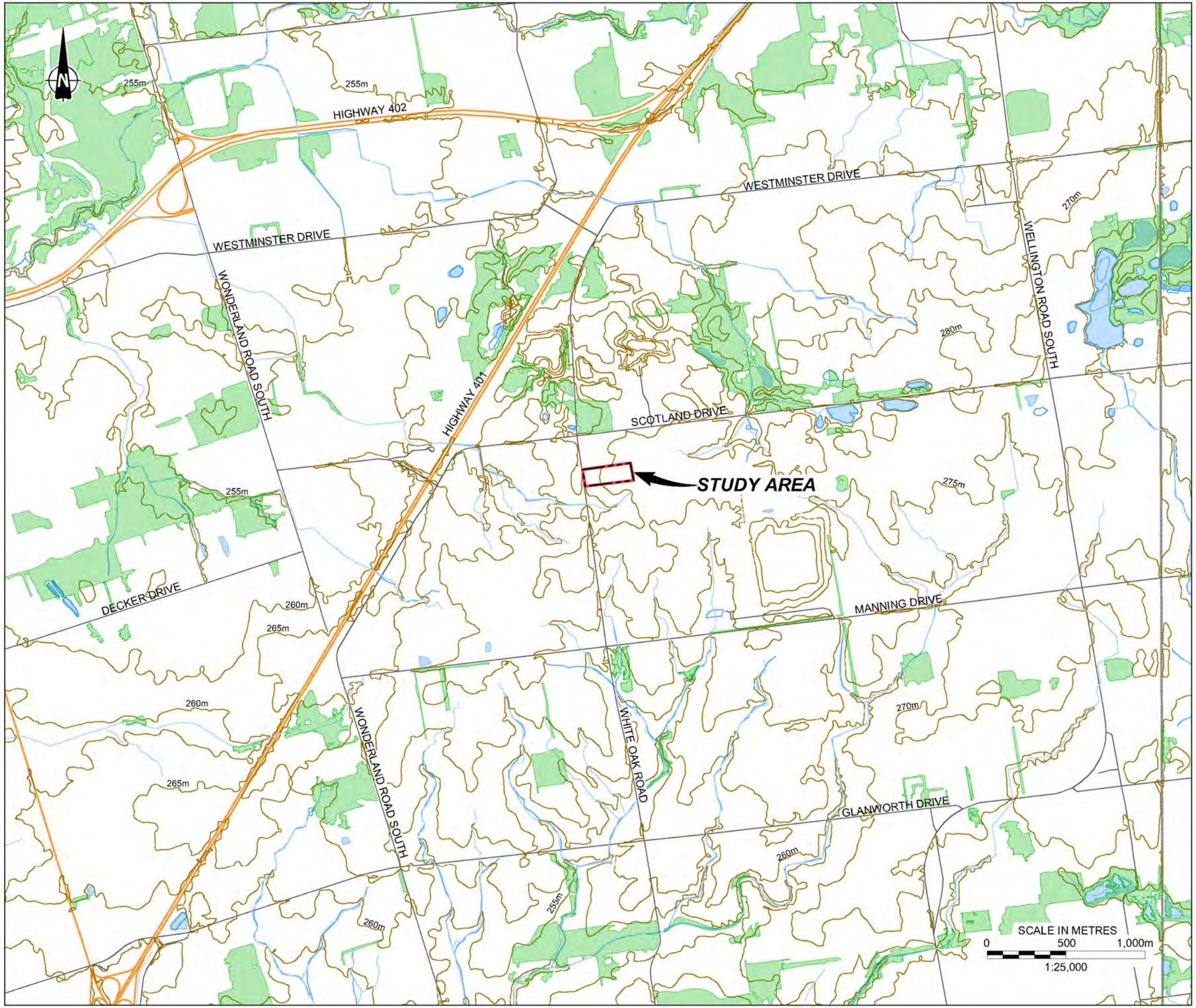

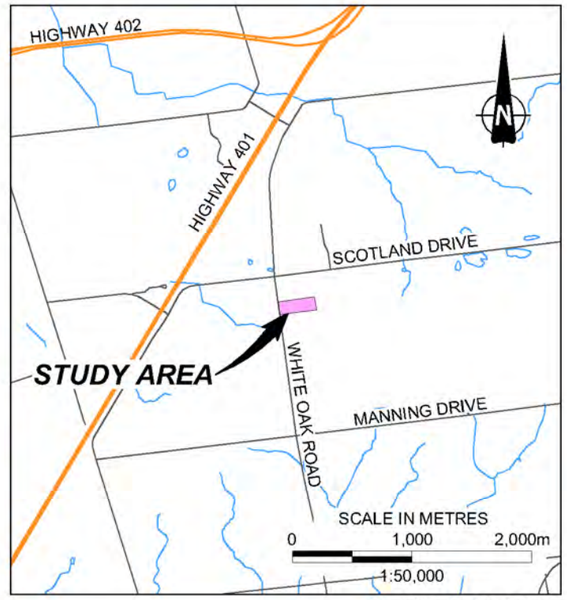

REGIONAL MAP

LEGEND

APPROXIMATE LOCATION OF STUDY AREA

REFERENCE

DRAWING BASED ON MNR LIO, OBTAINED 2017 PRODUCED BY GOLDER ASSOCIATES LTD UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2017; AND CANMAP STREETFILES V2008.4.

NOTES

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ALL LOCATIONS ARE APPROXIMATE.

PROJECT
STAGE 3 ARCHAEOLOGICAL ASSESSMENT
WHITE OAK 1 SITE (AfHh-926)
W12A LANDFILL EXPANSION AREA
LONDON, ONTARIO

TITLE
LOCATION OF STUDY AREA

GOLDER

PROJECT No.		1648176	FILE No.	1648176-40000-R01001
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CADD	DCH	Aug 24/18	REV.	
CHECK	MCT			

MAP 1

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Drawing file: 1648176-40000-R01002.dwg

LEGEND

APPROXIMATE LOCATION OF STUDY AREA

REFERENCE

DRAWING BASED ON 2014 AERIAL IMAGE FROM THE CITY OF LONDON CITYCD.2014.

NOTES

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PROJECT
STAGE 3 ARCHAEOLOGICAL ASSESSMENT
WHITE OAK 1 SITE (AfHh-926)
W12A LANDFILL EXPANSION AREA
LONDON, ONTARIO

TITLE
DETAIL OF STUDY AREA

GOLDER

PROJECT No.			1648176	FILE No:1648176-40000-R01002
				SCALE AS SHOWN REV.
CADD	DCH	Aug 24/18		
CHECK				MAP 2

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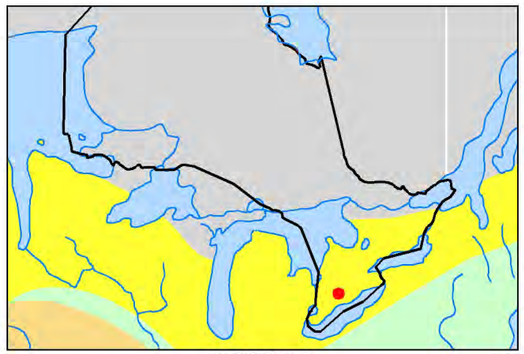

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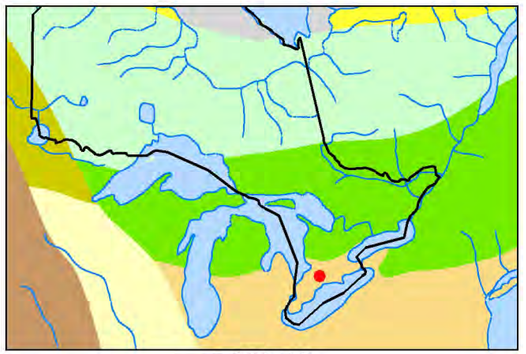

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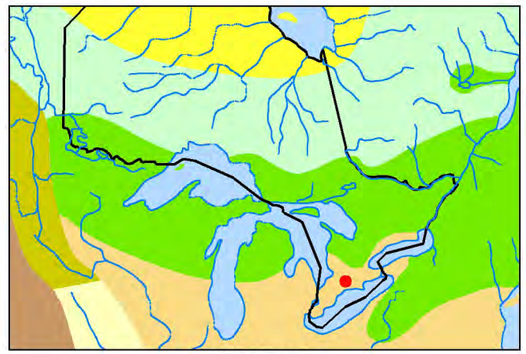
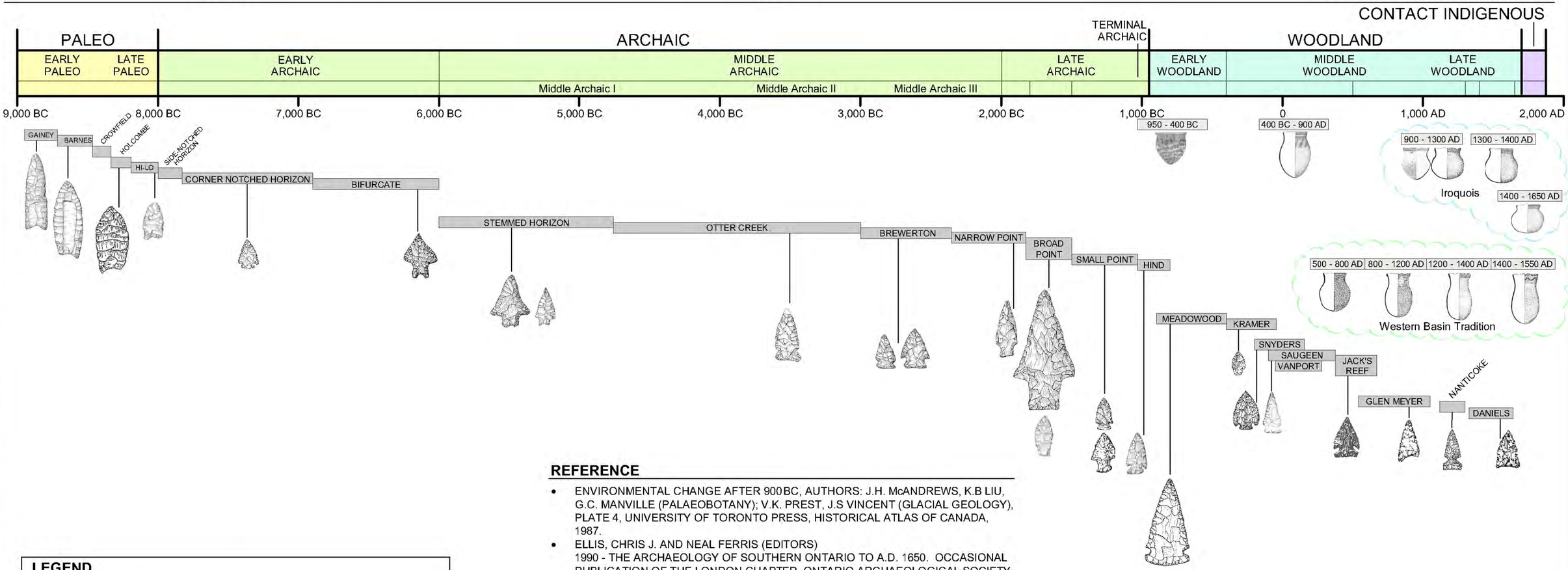


1,000 AD



LEGEND

- PROJECT AREA

VEGETATION COVERAGE:

- Tundra
- Boreal Forest
- Great Lakes-St. Lawrence Forest
- Decidous Forest
- Decidous Woodlands
- Grassland
- Litchen Woodland
- Parkland

REFERENCE

- ENVIRONMENTAL CHANGE AFTER 900BC, AUTHORS: J.H. McANDREWS, K.B LIU, G.C. MANVILLE (PALAEOBOTANY); V.K. PREST, J.S VINCENT (GLACIAL GEOLOGY), PLATE 4, UNIVERSITY OF TORONTO PRESS, HISTORICAL ATLAS OF CANADA, 1987.
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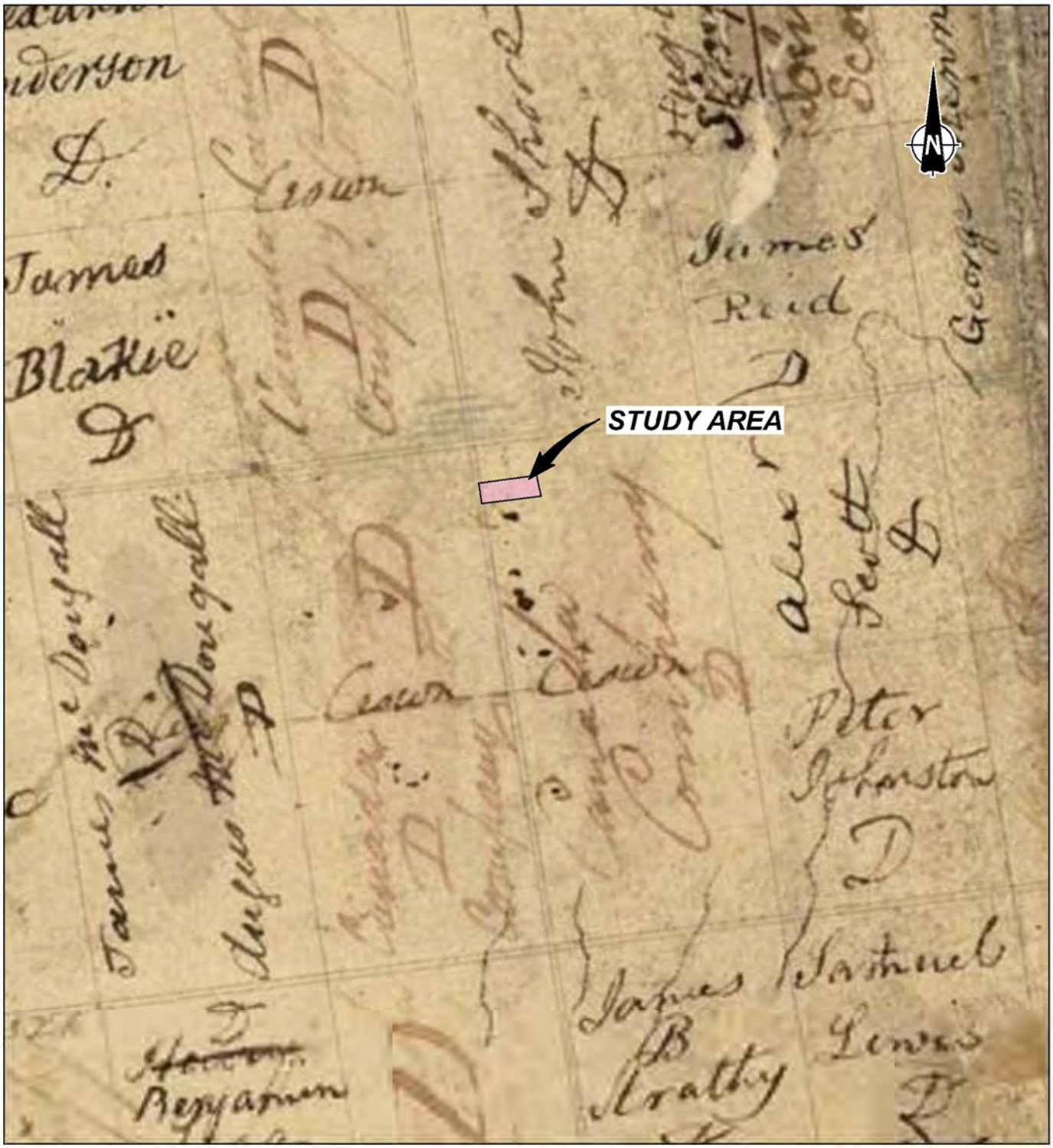
- ADAMS, NICK, IAN KENYON, DENA DOROSZENKO 1994 - FIELD MANUAL FOR AVOCATIONAL ARCHAEOLOGISTS IN ONTARIO. ONTARIO ARCHAEOLOGICAL SOCIETY INC., ARCHAEOLOGICAL STEWARDSHIP PROJECT.
- KENYON, I. - 1980 MEADOWOOD POINTS. KEWA 80-5.
- MURPHY, C. - 1988 SNYDERS POINTS. KEWA 88-3.
- KENYON, I. - 1979 SAUGEEN POINTS. KEWA 79-9.
- RITCHIE, WM. 1971. A TYPOLOGY AND NOMENCLATURE FOR NEW YORK PROJECTILE POINTS. ALBANY, NEW YORK: THE UNIVERSITY OF THE STATE OF NEW YORK, THE STATE EDUCATION DEPARTMENT.
- FOX, W.A. - 1982 GLEN MEYER TANGED-TRIANGULAR. KEWA 82-1.
- FOX, W.A. - 1981 NANTICOKE NOTCHED POINTS. KEWA 81-3.
- FOX, W.A. - 1981 DANIELS TRIANGULAR POINTS. KEWA 81-1.

PROJECT
STAGE 3 ARCHAEOLOGICAL ASSESSMENT
WHITE OAK 1 SITE (AfHh-926)
W12A LANDFILL EXPANSION AREA
LONDON, ONTARIO

TITLE
PRE-CONTACT INDIGENOUS CULTURE HISTORY OF MIDDLESEX COUNTY

GOLDER

PROJECT No.			1648176	FILE No. 1648176-40000-R01003
				SCALE AS SHOWN REV.
CADD	DCH	Aug 24/18		
CHECK	MD			MAP 3



LEGEND

APPROXIMATE LOCATION OF STUDY AREA

REFERENCE

BURWELL, MAHLON, 1857, TOWNSHIP OF WESTMINSTER PATENT PLAN, ONTARIO ARCHIVES REFERENCE CODE RG 1-100-0-0-4142.

NOTES

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PROJECT

STAGE 3 ARCHAEOLOGICAL ASSESSMENT
WHITE OAK 1 SITE (AfHh-926)
W12A LANDFILL EXPANSION AREA
LONDON, ONTARIO

TITLE

A PORTION OF THE 1857 PATENT MAP FOR WESTMINSTER TOWNSHIP

GOLDER

PROJECT No.		1648176	FILE No. 1648176-40000-R01004
			SCALE NTS REV.
CADD	DCH	Aug 30/18	
CHECK			MAP 4

Client: Corporation of the City of London
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Aug 30, 2018 - 9:05am
Drawing file: 1648176-40000-R01004.dwg

LEGEND

APPROXIMATE LOCATION OF STUDY AREA

REFERENCE

TREMAINE GEORGE R., 1862, TREMAINE'S MAP OF THE COUNTY OF MIDDLESEX. GEORGE C. TREMAINE., TORONTO.

NOTES

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PROJECT

STAGE 3 ARCHAEOLOGICAL ASSESSMENT
WHITE OAK 1 SITE (AfHh-926)
W12A LANDFILL EXPANSION AREA
LONDON, ONTARIO

TITLE

A PORTION OF TREMAINE'S 1862 MAP OF THE COUNTY OF MIDDLESEX

GOLDER

PROJECT No.		1648176	FILE No. 1648176-40000-R01004	
			SCALE AS SHOWN	REV.
CADD	DCH	Aug 24/18	MAP 5	
CHECK				

Client: Corporation of the City of London
Original Format is Letter 279mm x 216mm
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Aug 24, 2018 - 8:13am
Drawing file: 1648176-40000-R01004.dwg

LEGEND

APPROXIMATE LOCATION OF STUDY AREA

REFERENCE

PAGE, H.R. AND CO., 1878, ILLUSTRATED HISTORICAL ATLAS OF MIDDLESEX COUNTY. H.R. PAGE & CO., TORONTO.

NOTES

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ALL LOCATIONS ARE APPROXIMATE ONLY.

PROJECT

STAGE 3 ARCHAEOLOGICAL ASSESSMENT
WHITE OAK 1 SITE (AfHh-926)
W12A LANDFILL EXPANSION AREA
LONDON, ONTARIO

TITLE

A PORTION OF THE 1878 HISTORICAL ATLAS MAP OF WESTMINSTER TOWNSHIP

GOLDER

PROJECT No.		1648176	FILE No. 1648176-40000-R01004	
			SCALE AS SHOWN	REV.
CADD	DCH	Aug 24/18	MAP 6	
CHECK				

Client: Corporation of the City of London
Original Format is Letter 279mm x 216mm
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Aug 24, 2018 - 8:12am
Drawing file: 1648176-40000-R01004.dwg

Client: Corporation of the City of London
Original Format is Tabloid 279mm x 432mm
0 25mm
Dec 18, 2018 - 3:00pm
Drawing file: 1648176-40000-R01007.dwg

LEGEND

- APPROXIMATE LOCATION OF STUDY AREA
- STAGE 2 SURFACE FIND
- STAGE 3 UNIT
- 2 — TOTAL PRE-CONTACT ARTIFACT COUNT (WITHIN STAGE 3 UNIT EXCAVATION)
- 2 — TOTAL HISTORIC ARTIFACT COUNT (WITHIN STAGE 3 UNIT EXCAVATION)
- 2 — TOTAL FAUNAL COUNT (WITHIN STAGE 3 UNIT EXCAVATION)
- (2) — PHOTOGRAPH LOCATION, VIEWING DIRECTION, AND PLATE NUMBER

REFERENCE

DRAWING BASED ON 2014 AERIAL IMAGE FROM THE CITY OF LONDON CITYCD.2014.

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PROJECT
STAGE 3 ARCHAEOLOGICAL ASSESSMENT
WHITE OAK 1 SITE (AfHh-926)
W12A LANDFILL EXPANSION AREA
LONDON, ONTARIO

TITLE
STAGE 3 METHODS AND RESULTS

GOLDER

PROJECT No.	1648176	FILE No.	1648176-40000-R01007
		SCALE	AS SHOWN
CADD	DCH/AMS	Dec. 18/18	REV.
CHECK			

MAP 7

10.0 IMPORTANT INFORMATION AND LIMITATIONS OF THIS REPORT

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

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

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

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the Client in the design of the specific project.

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

11.0 CLOSURE

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

Golder Associates Ltd.

Michael Teal, M.A.
Senior Archaeologist

Hugh Daechsel , M.A.
Principal, Senior Archaeologist

RP/LM/MT/HJD/ly

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https://golderassociates.sharepoint.com/sites/114635/project files/5 technical work/5 - archaeology/stage 3/deliverables/revised report/1648176-40000-r01 (revised)_white oak 1 (afhh-926) st. 3.docx

APPENDIX A

Glossary of Terms and Definitions

Debitage

Chipped lithic tools and debitage were found at the site (or sites) described in this report. Some of the more common chert types found on pre-contact Indigenous sites in southern Ontario are described below.

Kettle Point chert: a relatively high quality raw material found within the Upper Devonian age Kettle Point Formation that outcrops between Kettle Point and Ipperwash, on Lake Huron. Currently, Kettle Point occurs as submerged outcrops extending for approximately 1,350 metres into Lake Huron. Secondary deposits of Kettle Point chert have been reported in Essex County and in the Ausable River watershed (Eley and von Bitter 1989; Fox 2009:362).

Onondaga chert: a high quality raw material found within the Onondaga Formation that outcrops along the north shore of Lake Erie west of the mouth of the Grand River as far west as Nanticoke, east of the mouth of the Grand River as far east as Fort Erie, and along the Onondaga Escarpment between Cayuga and Hagersville (Telford and Tarrant 1975). This material can also be recovered from secondary, glacial deposits across much of southwestern Ontario, east of Chatham (Eley and von Bitter 1989; Fox 2009:361-362).

Selkirk chert: a moderate to relatively high quality raw material that occurs within the Dundee Formation; it outcrops along Sandusk Creek and its tributaries just west of the village of Selkirk (Telford and Tarrant 1975). The chert ranges in colour from mottled or banded grey to a predominantly brown colour, the latter of which being of relatively more vitreous fabric than the former. Its distribution as a secondary source material is similar to Onondaga chert and it is frequently encountered as far west as the Chatham area (Eley and von Bitter 1989; Fox 2009:362).

Non-chert: some materials other than chert were occasionally used for the manufacture of chipped tools, and consequently some pieces of non-chert debitage may occur on some sites. Materials in the non-chert category may include quartzite, quartz-like materials, schist and slate or shale.

All chert types discussed herein were identified visually by comparison to reference materials located in Golder's London offices. The flake assemblage was subject to morphological analysis following the classification scheme described by Lennox et al. (1986) and expanded upon by Fisher (1997), with the exception that no attempt was made to distinguish "primary" from "primary bipolar" flakes.

With reference to the analysis of lithic debitage, the following overview provides descriptions of the various types of cores and debitage commonly found on pre-contact Indigenous sites.

Cores: Pieces of stone (usually chert) from which flakes or blades have been removed. A core may be uni-facetted (flake removed from one surface or edge only) or multi-facetted (flakes removed from two or more surfaces or edges. A core may retain a segment of its exterior, weathered surface.

Primary Reduction Flakes: are by-products of the initial stages of the reduction of lithic material, they are derived from cores and are generally attributed to direct hard hammer percussion. Primary flakes may exhibit a large cortical striking platform. This platform may appear on an otherwise unmodified flake scar or a crushed flake margin. Where measureable the striking platform – ventral surface angle is approximately 90 degrees, usually unfacetted and large. Ventral surface attributes are usually well pronounced while the dorsal surface consists of 50-100% cortex, implying little or no modification of the core prior to the removal of the primary flake.

Primary Thinning Flake: a large, thick flake with an unprepared striking platform and few to no flake scars on its dorsal (exterior) surface. These flakes are typically thinner than Primary Reduction Flakes. Their platform is

usually large, flat or minimally facetted, and close to 90 degrees. A Large bulb of percussion is common on the ventral side. Primary Thinning Flakes are typically associated with the hard hammer percussion method from the initial stage of chipped stone tool production.

Biface Thinning Flake: a moderately thick to thin flake with a small platform that can be ground and/or faceted to some degree. The platform angle is usually acute or less than 90 degree. The dorsal side of the flake often has several shallow intersecting scars with no cortex material remaining. Biface Thinning Flakes are associated with the medial stage of biface reduction where a stone tool is thinned through the removal of flakes from opposing surfaces.

Retouch Flakes: small, thin flakes removed from the edge of a stone tool or larger flake through pressure flaking. These flakes tend to have a small, lipped platform that may exhibit crushing or part of a dulled bifacial edge. The dorsal surface typically displays flake scars from previous removals and lacks cortex material. They are associated with the final stage of chipped stone tool production when edges are sharpened and notches for hafting are created. They are also associated with maintenance activities where tools are re-sharpened and broken edges rejuvenated.

Shatter: usually consists of thick, blocky pieces of chert which lack striking platforms and ventral flake surface attributes. This category of debitage is thought to be a by-product of the initial stages of reduction through the uncontrolled breakage of the raw material along structural faults or irregularities. They commonly result from the use of horizontally and vertically flawed material, these flaws apparently a result of stresses occurring to the material while still within its primary deposit. A relatively high incidence of shatter is usually associated with the bipolar reduction strategy.

Flake Fragments: are broken flakes with no platform or proximal end. They cannot be convincingly linked to any particular lithic activity. As such, they have very little analytical value.

Micro flake: Very small broken flakes are classed as micro flakes, less than 3mm in size. These flakes are small and generally only recovered from floatation samples.

Stages of Reduction for Chert Bifaces (based on Fisher 1997:25-29)

There have been several different approaches to the definition of the stages of biface reduction, in both Eurasia (Andrefsky 2005:32) and North America (i.e. Callahan 1979: 30-31). Many Ontario-based researchers have adopted the classification scheme used by Fisher (1997: 25-29), which was based largely on Callahan (1979: 30-31). Fisher's definitions of Stage 1 (initial) through Stage 4 (final) bifaces take into consideration characteristics such as number and size of flakes removed, length and depth of flake scars, cross-section, length-width ratio, and edge configuration.

Stage 1: During this initial stage of biface reduction specimens are only roughly shaped. The biface cross-section is hexagonal, irregular to thick lenticular, and is not plano-convex at all (Callahan 1979:36). Biface thinning flake scars are deep, large and generally do not cross half of the biface width, leaving remnants of the original material surface. From a lateral view, the edge of the biface is jagged and highly irregular.

Stage 2: At this stage the biface is still relatively thick compared to its width, with more lateral flake removals crossing over half the biface width, leaving less of the original surface present. As well, thinning flakes are more numerous and smaller. The edge of the biface is still irregular, but less jagged.

Stage 3: This stage of reduction produces a biface with a lenticular cross-section, thinning flakes are shallow and are consistently greater than half the biface width. Also, there is a greater regularity to the edge, and bases may be formed, if only incipiently, on some specimens.

Stage 4: Stage 4 is represented by an almost finished projectile point with a relatively high width to thickness ratio, a relatively regular or even edge, some retouch, and a shaped base. Some items classed as Stage 4 specimens may have been finished projectile points. However, they are not so finely crafted as the definitive finished projectile points, perhaps due to material or knapping flaws, or skills of knappers.

Other Artifacts

The following glossary defines some of the terms for some of the formal and informal chipped lithic tools from the sites discussed in this report. All of the definitions are derived from a reputable online sources such as www.archaeologywordsmith.com . and www.wvculture.org/shpo/glossary.html.

Artifact: “any object made, modified or used by people”.

Biface: “a stone tool which has been flaked on both surfaces or sides”; frequently made as roughed-out blanks or preforms intended for further reduction into finished tools such as projectile points or knives.

Burin: “from the French word *burin*, meaning cold chisel. A specialized engraving tool … that is cut or ground [or flaked] diagonally downward to form a diamond-shaped point at the tip… In its most characteristic form, the working tip is a narrow transverse edge formed by the intersection of two flake scars produced by striking at an angle to the main axis of the blade… Burins were used to carve or engrave softer organic materials such as antler, bone… or wood”.

Debitage: “the by-products or waste materials left over from the manufacture of stone tools”.

Diagnostic artifact: “an item that is indicative of a particular time period or cultural group”.

Drill: “a tool used to drill holes through or into wood, stone or bone”.

Ecofact: “nonartifactual evidence that has not been technologically altered but that has cultural relevance.”

Graver: “a stone tool manufactured from a flake by chipping (pressure-flaking) it on two edges at one end so as to leave a sharp point. Gravers were used to cut or score organic materials such as bone, shell, wood and antler; perhaps for punching leather, and other purposes”.

Lithic: “stone, or made of stone”.

Knife: a purposefully formed cutting tool.

Perforator: “a flint [chert] tool for piercing holes”, or, “a small chipped stone implement with a rather long and slender point and usually a broad base, supposed to have been used for drilling or boring holes”. Perforators are sometimes referred to as borers.

Projectile point: “a general term for points [usually stone] that were hafted to darts, spears or arrows”; commonly referred to as either spearhead or arrowhead.

Retouched flake: “a flake that has had small flakes removed to blunt, sharpen, refine the outline or prepare the edge of the tool”.

Scraper: a stone tool formed by chipping [flaking] the end or side of a flake which can then be used to scrape animal hides or wood.

Spokeshave: “a stone tool with a semi-circular concavity on the edge, used for smoothing spear or arrow shafts; a drawknife or small transverse plane for planning convex surfaces”.

Utilized flake: “a piece of stone debitage that is used for cutting or slicing. The edge may be damaged from use, but not deliberately”.

Wedge: “an object used to split, force open or keep open another object; a tool used to split wood”.

APPENDIX B

Artifact Catalogue

Cat. #	Easting	Northing	Subunit	Lot	Material 1	Material 2	Function 1	Function 2	Object	Fragment	Attribute 1	Attribute 2	Manufacture	Alteration	# of Artifacts	Notes
1	310	520	1	1	stone	chert: onondaga	tools & equipment	debitage	primary reduction flake	complete			chipped		1	
2	310	520	1	1	stone	chert: onondaga	tools & equipment	debitage	primary thinning flake	complete			chipped		1	
3	310	520	1	1	stone	chert: onondaga	tools & equipment	debitage	flake fragment	distal			chipped		3	
4	310	520	1	1	brick	brick	structural	building component	brick	fragments	red				4	
5	310	520	1	1	glass	ind.	structural	building component	window pane glass	fragments		clear/colourless			1	
6	305	515	1	1	stone	chert: onondaga	tools & equipment	debitage	bipolar flake	complete			chipped		1	
7	305	515	1	1	stone	chert: onondaga	tools & equipment	debitage	primary thinning flake	complete			chipped		1	
8	305	515	1	1	stone	chert: onondaga	tools & equipment	debitage	flake fragment	distal			chipped		3	
9	305	510	1	1	stone	till chert	tools & equipment	debitage	biface thinning flake	complete			chipped		1	
10	305	510	1	1	stone	chert: selkirk	tools & equipment	debitage	biface thinning flake	complete			chipped		2	
11	305	510	1	1	stone	chert: onondaga	tools & equipment	debitage	biface thinning flake	complete			chipped		1	
12	305	510	1	1	stone	chert: onondaga	tools & equipment	debitage	potlid	complete			chipped	burnt	1	
13	305	510	1	1	ceramic	refined white earthenware	food & beverage	tableware	tableware; indeterminate	body	plain/undecorated				2	
14	305	510	1	1	brick	brick	structural	building component	brick	fragment	red				1	
15	305	510	1	1	glass	ind.	indeterminate	container; indeterminate	container; indeterminate	fragment		clear/colourless			1	

Cat. #	Easting	Northing	Subunit	Lot	Material 1	Material 2	Function 1	Function 2	Object	Fragment	Attribute 1	Attribute 2	Manufacture	Alteration	# of Artifacts	Notes
16	305	510	1	2	stone	chert: selkirk	tools & equipment	debitage	primary thinning flake	complete			chipped		1	
17	305	510	1	2	stone	chert: onondaga	tools & equipment	debitage	retouch flake	complete			chipped		1	
18	310	515	1	1	stone	chert: onondaga	tools & equipment	debitage	primary reduction flake	complete			chipped		2	
19	310	515	1	1	stone	chert: onondaga	tools & equipment	debitage	biface thinning flake	complete			chipped		5	
20	310	515	1	1	stone	chert: onondaga	tools & equipment	debitage	flake fragment				chipped		1	
21	310	515	1	1	stone	chert: onondaga	tools & equipment	debitage	biface thinning flake	incomplete			chipped	burnt	1	
22	310	515	1	1	stone	chert: indeterminate	tools & equipment	debitage	biface thinning flake	complete			chipped	burnt	1	exhibits potlids
23	310	515	1	1	stone	chert: onondaga	tools & equipment	debitage	spall	complete			chipped		1	
24	305	520	1	1	stone	chert: onondaga	tools & equipment	debitage	primary thinning flake	proximal			chipped		1	
25	305	520	1	1	ceramic	refined white earthenware	food & beverage	tableware	tableware; indeterminate	body	plain/undecorated				2	
26	305	520	1	1	ceramic	vitrified white earthenware	food & beverage	tableware	tableware; indeterminate	body	plain/undecorated				1	
27	305	520	1	1	glass	ind.	indeterminate	container; indeterminate	container; indeterminate	fragment		green			2	
28	305	520	1	1	glass	ind.	indeterminate	container; indeterminate	container; indeterminate	fragment		brown			1	
29	305	520	1	1	brick	brick	structural	building component	brick	fragments	red				2	
30	310	505	1	1	stone	chert: onondaga	tools & equipment	debitage	primary thinning flake	incomplete			chipped		1	

Cat. #	Easting	Northing	Subunit	Lot	Material 1	Material 2	Function 1	Function 2	Object	Fragment	Attribute 1	Attribute 2	Manufacture	Alteration	# of Artifacts	Notes
31	310	505	1	1	stone	chert: onondaga	tools & equipment	debitage	biface thinning flake	complete			chipped		2	
32	310	505	1	1	stone	chert: onondaga	tools & equipment	debitage	flake fragment				chipped		1	
33	310	505	1	1	ceramic	refined white earthenware	food & beverage	tableware	tableware; indeterminate	body	plain/undecorated				1	
34	310	505	1	1	glass	ind.	indeterminate	container; indeterminate	container; indeterminate	fragment		olive			3	
35	315	510	1	1	stone	chert: ancaster	tools & equipment	debitage	primary thinning flake	incomplete			chipped		1	
36	315	510	1	1	stone	chert: onondaga	tools & equipment	debitage	biface thinning flake	complete			chipped		5	2 of 5 pieces broken laterally
37	315	510	1	1	stone	chert: onondaga	tools & equipment	debitage	flake fragment	distal			chipped		3	
38	315	510	1	1	stone	chert: onondaga	tools & equipment	debitage	biface thinning flake				chipped	burnt	5	all exhibit potlids
39	315	510	1	1	ceramic	yelloware	food & beverage	tableware	tableware; indeterminate	body	banded	brown			1	
40	315	510	1	1	glass	ind.	indeterminate	container; indeterminate	container; indeterminate	fragment		green			1	
41	315	510	1	1	brick	brick	structural	building component	brick	fragments	red				5	
42	315	515	1	1	stone	chert: onondaga	tools & equipment	debitage	primary thinning flake	complete			chipped		3	
43	315	515	1	1	stone	chert: onondaga	tools & equipment	debitage	biface thinning flake	distal			chipped		1	
44	315	515	1	1	stone	chert: onondaga	tools & equipment	debitage	bipolar flake				chipped		1	
45	315	515	1	1	stone	chert: kettle point	tools & equipment	debitage	primary thinning flake	complete			chipped		1	

Cat. #	Easting	Northing	Subunit	Lot	Material 1	Material 2	Function 1	Function 2	Object	Fragment	Attribute 1	Attribute 2	Manufacture	Alteration	# of Artifacts	Notes
46	315	515	1	2	stone	chert: indeterminate	tools & equipment	debitage	primary thinning flake	complete			chipped	burnt	1	exhibits potlids
47	315	520	1	1	stone	chert: onondaga	tools & equipment	debitage	flake fragment	distal			chipped	burnt	1	exhibits potlids
48	310	510	1	1	stone	chert: onondaga	tools & equipment	debitage	primary thinning flake	proximal			chipped		1	
49	310	510	1	1	stone	chert: onondaga	tools & equipment	debitage	biface thinning flake	complete			chipped		1	
50	310	510	1	1	stone	chert: onondaga	tools & equipment	debitage	retouch flake	complete			chipped		1	
51	310	510	1	1	stone	chert: selkirk	tools & equipment	debitage	primary reduction flake				chipped		2	1 complete, 1 distal
52	310	510	1	1	stone	chert: selkirk	tools & equipment	debitage	primary thinning flake	complete			chipped		1	
53	310	510	1	1	stone	chert: onondaga	tools & equipment	debitage	flake fragment	distal			chipped		3	
54	310	510	1	2	stone	chert: selkirk	tools & equipment	debitage	flake fragment				chipped		1	broken on both ends
55	320	520	1	1	stone	chert: selkirk	tools & equipment	debitage	primary thinning flake	distal			chipped		1	
56	320	520	1	1	stone	chert: onondaga	tools & equipment	debitage	primary thinning flake	proximal			chipped		2	
57	320	520	1	1	stone	chert: indeterminate	tools & equipment	debitage	primary thinning flake	incomplete			chipped		1	broken laterally
58	320	520	1	1	stone	chert: selkirk	tools & equipment	debitage	flake fragment	distal			chipped		1	
59	320	520	1	1	stone	chert: onondaga	tools & equipment	debitage	flake fragment				chipped	burnt	2	one exhibits potlids, both flakes broken on multiple ends/sides
60	320	520	1	1	glass	ind.	indeterminate	container; indeterminate	container; indeterminate	fragment		clear/colourless			1	

Cat. #	Easting	Northing	Subunit	Lot	Material 1	Material 2	Function 1	Function 2	Object	Fragment	Attribute 1	Attribute 2	Manufacture	Alteration	# of Artifacts	Notes
61	320	520	1	1	glass	ind.	structural	building component	window pane glass	fragments		clear/colourless			1	
62	325	510	1	1	stone	chert: onondaga	tools & equipment	debitage	biface thinning flake	incomplete			chipped		1	broken laterally
63	325	510	1	1	stone	chert: onondaga	tools & equipment	debitage	flake fragment	distal			chipped		1	
64	325	510	1	1	glass	ind.	indeterminate	container; indeterminate	container; indeterminate	fragment		olive			1	
65	325	510	1	1	brick	brick	structural	building component	brick	fragments	red				3	
66	330	510	1	1	stone	chert: onondaga	tools & equipment	debitage	primary thinning flake	incomplete			chipped		1	broken laterally
67	330	510	1	1	brick	brick	structural	building component	brick	fragments	red				6	
68	330	510	1	2	stone	chert: onondaga	tools & equipment	debitage	biface thinning flake	incomplete			chipped		1	broken laterally
69	320	515	1	1	stone	chert: haldimand	tools & equipment	debitage	biface thinning flake	complete			chipped		1	
70	320	515	1	1	stone	chert: onondaga	tools & equipment	debitage	biface thinning flake	complete			chipped		2	one possibly burnt
71	320	515	1	1	stone	chert: selkirk	tools & equipment	debitage	flake fragment				chipped		1	
72	320	515	1	1	stone	chert: kettle point	tools & equipment	debitage	flake fragment				chipped		1	
73	320	515	1	1	ceramic	refined white earthenware	food & beverage	tableware	tableware; indeterminate	body	plain/undecorated				1	
74	320	515	1	1	glass	ind.	indeterminate	container; indeterminate	container; indeterminate	fragment		maganese (purple)			1	
75	320	515	1	2	stone	chert: onondaga	tools & equipment	debitage	primary thinning flake	complete			chipped		1	

Cat. #	Easting	Northing	Subunit	Lot	Material 1	Material 2	Function 1	Function 2	Object	Fragment	Attribute 1	Attribute 2	Manufacture	Alteration	# of Artifacts	Notes
76	325	505	1	1	stone	chert: onondaga	tools & equipment	debitage	biface thinning flake	incomplete			chipped		1	broken laterally
77	325	505	1	1	brick	brick	structural	building component	brick	fragments	red				1	
78	320	510	1	1	stone	chert: onondaga	tools & equipment	debitage	biface thinning flake	complete			chipped		1	
79	320	510	1	1	stone	chert: onondaga	tools & equipment	debitage	flake fragment	distal			chipped		3	
80	320	510	1	1	ceramic	refined white earthenware	food & beverage	tableware	tableware; indeterminate	body	indeterminate decoration	colbalt blue, light blue			1	
81	320	510	1	1	glass	ind.	indeterminate	container; indeterminate	container; indeterminate	fragment		clear/colourless			1	
82	320	510	1	1	brick	brick	structural	building component	brick	fragment	red				1	
83	315	505	1	1	stone	chert: onondaga	tools & equipment	debitage	primary thinning flake	proximal			chipped		1	
84	315	505	1	1	stone	chert: onondaga	tools & equipment	debitage	biface thinning flake	complete			chipped		4	
85	315	505	1	1	stone	chert: onondaga	tools & equipment	debitage	flake fragment				chipped		5	2 distal, 3 broken on multiple ends/sides
86	315	505	1	1	stone	chert: onondaga	tools & equipment	debitage	biface thinning flake	complete			chipped	burnt	1	broken laterally
87	315	505	1	1	plastic	ind.	indeterminate	indeterminate	plastic fragment						1	2 pieces refit
88	320	505	1	1	stone	chert: onondaga	tools & equipment	debitage	biface thinning flake				chipped		2	1 proximal, 1 complete
89	320	505	1	1	stone	chert: onondaga	tools & equipment	debitage	flake fragment	distal			chipped		1	
90	325	500	1	1	stone	chert: indeterminate	tools & equipment	debitage	primary reduction flake	complete			chipped		1	all cortex
91	325	515	1	1	stone	chert: ancaster	tools & equipment	debitage	primary reduction flake	incomplete			chipped		1	

Cat. #	Easting	Northing	Subunit	Lot	Material 1	Material 2	Function 1	Function 2	Object	Fragment	Attribute 1	Attribute 2	Manufacture	Alteration	# of Artifacts	Notes
92	325	515	1	1	stone	chert: indeterminate	tools & equipment	debitage	primary reduction flake	complete			chipped		1	all cortex
93	325	515	1	1	stone	chert: onondaga	tools & equipment	debitage	primary thinning flake	distal			chipped		1	
94	325	515	1	1	stone	chert: onondaga	tools & equipment	debitage	biface thinning flake	complete			chipped		2	
95	325	515	1	1	stone	chert: selkirk	tools & equipment	debitage	biface thinning flake	complete			chipped		1	
96	325	515	1	1	stone	chert: kettle point	tools & equipment	debitage	biface thinning flake	complete			chipped		1	
97	325	515	1	1	ceramic	yelloware	food & beverage	tableware	tableware; indeterminate	body	plain/undecorated				1	
98	325	515	1	1	ceramic	vitrified white earthenware	food & beverage	tableware	tableware; indeterminate	body	plain/undecorated				1	
99	325	515	1	1	brick	brick	structural	building component	brick	fragment	red				1	
100	305	505	1	1	stone	chert: onondaga	tools & equipment	debitage	biface thinning flake	incomplete			chipped		2	broken laterally
101	305	505	1	1	stone	chert: onondaga	tools & equipment	debitage	flake fragment	distal			chipped		1	
102	310	500	1	1	stone	chert: onondaga	tools & equipment	debitage	primary thinning flake	distal			chipped		1	
103	310	500	1	1	stone	chert: onondaga	tools & equipment	debitage	biface thinning flake	complete			chipped		1	
104	315	500	1	1	stone	chert: onondaga	tools & equipment	debitage	biface thinning flake	complete			chipped		1	
105	315	500	1	1	stone	chert: onondaga	tools & equipment	debitage	flake fragment	distal			chipped		1	
106	330	515	1	1	stone	chert: onondaga	tools & equipment	debitage	biface thinning flake	complete			chipped		3	

Cat. #	Easting	Northing	Subunit	Lot	Material 1	Material 2	Function 1	Function 2	Object	Fragment	Attribute 1	Attribute 2	Manufacture	Alteration	# of Artifacts	Notes
107	330	515	1	1	stone	chert: kettle point	tools & equipment	debitage	biface thinning flake	complete			chipped		3	
108	330	515	1	1	stone	chert: onondaga	tools & equipment	debitage	flake fragment	distal			chipped		1	
109	330	515	1	1	brick	brick	structural	building component	brick	fragments	red				2	
110	320	525	1	1	stone	chert: kettle point	tools & equipment	debitage	biface thinning flake	complete			chipped		1	
111	320	525	1	1	stone	till chert	tools & equipment	debitage	primary thinning flake	proximal			chipped		1	
112	320	525	1	1	glass	ind.	structural	building component	window pane glass	fragments		clear/colourless			1	
113	320	525	1	1	plastic	ind.	indeterminate	indeterminate	plastic fragment						1	
114	320	525	1	1	brick	brick	structural	building component	brick	fragment	red				1	
115	320	525	1	1	fauna	bone	ecological	fauna	medium to large mammal bone	long bone proximal fragment					1	
116	300	510	1	1	ceramic	vitrified white earthenware	food & beverage	tableware	tableware; indeterminate	rim	plain/undecorated				1	2 pieces refit
117	300	510	1	1	metal	iron	structural	building component	nail:common	proximal			machine cut		1	
118	300	510	1	1	brick	brick	structural	building component	brick	fragments	red				2	
119	305	500	1	1	stone	chert: onondaga	tools & equipment	debitage	bipolar flake	complete					1	
120	305	500	1	1	ceramic	vitrified white earthenware	food & beverage	tableware	tableware; indeterminate	base, foot ring	plain/undecorated				1	
121	305	500	1	1	brick	brick	structural	building component	brick	fragments	red				1	
122	305	500	1	1	glass	ind.	structural	building component	window pane glass	fragments		aqua			1	

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Ministry of Heritage, Sport, Tourism, Culture Industries

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Ontario

Jun 30, 2020

Lafe Meicenheimer (P457)
Golder Associates Ltd.
1 - 309 Exeter London ON N6L 1C1

RE: Review and Entry into the Ontario Public Register of Archaeological Reports: Archaeological Assessment Report Entitled, "Stage 3 Archaeological Assessment White Oak 1 Site (AfHh-926), W12A Landfill, Stockpile Expansion Area, 3899 Scotland Drive, Part of Lot 20, Concession 6, Former Township of Westminster, Middlesex County, Now City of London, Ontario", Dated Jun 12, 2020, Filed with MTCS Toronto Office on Jun 26, 2020, MTCS Project Information Form Number P457-0071-2018, MTCS File Number 0008522

Dear Mr. Meicenheimer:

This office has reviewed the above-mentioned report, which has been submitted to this ministry as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18.[1] This review has been carried out in order to determine whether the licensed professional consultant archaeologist has met the terms and conditions of their licence, that the licensee assessed the property and documented archaeological resources using a process that accords with the 2011 *Standards and Guidelines for Consultant Archaeologists* set by the ministry, and that the archaeological fieldwork and report recommendations are consistent with the conservation, protection and preservation of the cultural heritage of Ontario.

The report documents the assessment of the study area as depicted in Maps 1 and 7 and Supplementary Documentation Tile 1 of the above titled report as well as the Site Plan dated May 2, 2020 indicating the site and buffer and recommends the following:

Based on the results of the Stage 3 Archaeological Assessment, the White Oak 1 site (AfHh-926) is interpreted as a small, briefly occupied, Late Archaic campsite and it is concluded that the site has further cultural heritage value or interest and will require Stage 4 mitigation prior to development impacts. This recommendation is based on four Stage 3 test units that produced greater than 9 artifacts, all of which were lithic debitage. These findings satisfy standard conditions under Section 3.4.1 of the Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011) that trigger a requirement for Stage 4 mitigation because they have cultural heritage value or interest. Section 3.4.1, Standard 1a, states that small or diffuse sites with one or more Stage 3 test units yielding 10 or more artifacts require Stage 4 mitigation.

The MTCS's preferred method of Stage 4 mitigation is through avoidance and protection. Through

discussions with the proponent and engagement with Indigenous communities, it has been determined that the White Oak 1 site (AfHh-926) can be avoided. As such, Stage 4 mitigation by long-term avoidance and protection is recommended for the White Oak 1 site (AfHh-926). Further records of the engagement between Golder, the proponent and interested First Nations communities are contained in the Supplementary Documentation.

As per Section 4.1.1 of the Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011a) the avoidance and protection strategy for the White Oak 1 site (AfHh-926) will involve the establishment of a “no-go” zone consisting of a 10-metre protective buffer around the extent of the site as defined by the results of the Stage 3 assessment (Map 7). A temporary fencing barrier will be erected to clearly delineate the 10-metre protective buffer around the site. A construction monitoring schedule will be established whereby a licensed archaeologist would be present to monitor any construction activities that extend to the edge of the protected area. The protected area and the location of the temporary barrier will be shown on all contract drawings and be labeled as a “no-go” zone where construction activities will not be permitted. Instructions will be provided to all construction staff to stay outside of this area and to ensure that it is appropriately monitored by a licensed archaeologist during any construction which takes place within 10 m of the protected area. After completion of construction, the area will be inspected and the effectiveness of the monitoring and avoidance strategy for the site will be reported on by the licensed consultant archaeologist. If any archaeological resources turn up during monitoring and construction, the archaeologist must be permitted sufficient time to assess these resources and mitigate as required.

Plans for the avoidance and long-term protection of the White Oak 1 site (AfHh-926) have been provided to the City of London as the proponent and approval authority of this project. These plans include a commitment that any ground alterations will avoid the archaeological site and its protective buffer area. As well, if the City of London or any other future land owner determines at a later date that the White Oak 1 site (AfHh-926) will be altered in any way, either temporarily or permanently, then Stage 4 mitigation will be required. This includes even minor forms of soil disturbance such as tree removal, minor landscaping, and utilities installation.

The City of London has agreed to the long-term avoidance and protection plan (see Supplementary Documentation).

There are no further concerns for impacts to archaeological sites in the remainder of the Study Area outside the 10 m buffer.

The MTCS is asked to review the results and recommendations presented herein, accept this report into the Provincial Register of archaeological reports and issue a standard letter of compliance with the Ministry’s 2011 Standards and Guidelines for Consultant Archaeologists and the terms and conditions for archaeological licencing.

Based on the information contained in the report, the ministry is satisfied that the fieldwork and reporting for the archaeological assessment are consistent with the ministry's 2011 *Standards and Guidelines for Consultant Archaeologists* and the terms and conditions for archaeological licences. This report has been entered into the Ontario Public Register of Archaeological Reports. Please note that the ministry makes no representation or warranty as to the completeness, accuracy or quality of reports in the register.

Should you require any further information regarding this matter, please feel free to contact me.

Sincerely,

Andrea Williams
Archaeology Review Officer

cc. Archaeology Licensing Officer
Andre Joseph,City of London
Michael Losee,City of London

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

D.09 Heritage Impact Assessment Report; completed by Golder Associates Ltd.

DRAFT REPORT

Heritage Impact Assessment

W12A Landfill Expansion EA, City of London, Ontario

Submitted to:

Mike Losee, Division Manager, Solid Waste Management
City of London
300 Dufferin Avenue
London, Ontario
PO BOX 5035
N6A 4L9
Reviewed by Henry Cary, May 5, 2020

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1648176-6000-R01-RevB

August 2020

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Acknowledgements

City of London	Kyle Gonyou, M.Pl., Heritage Planner, City Planning – Urban Regeneration

Executive Summary

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

Background

The City of London is proposing an expansion of the existing W12A Landfill site (the Project) located at 3502 Manning Drive, part of Lots 18, 19 and 20 of Concession 6 in the former Township of Westminster, in the south end of the City of London, Ontario.

The environment is considered in broad terms to include the natural, social, cultural, and economic aspects of the environment. This document presents the heritage component existing conditions and impact assessment for the Environment Assessment (EA) of the proposed W12A Landfill expansion. This work has been conducted in accordance with the requirements set out in the approved Amended Terms of Reference (ToR), dated February 2019.

This report is a supporting document to the Environmental Assessment Study Report (EASR).

At current disposal rates, the W12A Landfill site is expected to reach its approved capacity at the end of 2023. An additional 13,800,000 cubic metres of airspace at the W12A Landfill site, which will about double the current approved capacity, will be required to satisfy disposal requirements for residual waste for the next 25-year period.

The Proposed Expansion is a vertical expansion over the existing waste footprint.

Scope

The 2019 approved Amended Terms of Reference (ToR) approved for the EA defined the “Site Study Area” as the existing W12A Landfill site and all properties where landfill expansion may occur. The Site Study Area is bounded on the north by Scotland Drive, on the south by Manning Drive, on the west by White Oak Road, and on the east by the agricultural property and the Material Recovery Facility west of Wellington Road South.

To identify all cultural heritage resources potentially impacted by expansion of the W12A Landfill, a Cultural Heritage Study Area (CH Study Area) was defined for this HIA that included all parcels within, and adjacent to, the Site Study Area. This CH Study Area in most cases matches the extent of a Site-vicinity Study Area of 500 m.

Following guidance provided by the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI), this HIA provides: an overview of heritage legislation and policies in Ontario; an outline of the methods used to investigate and evaluate cultural heritage resources in the CH Study Area; and a summary of the historical development and existing conditions in the CH Study Area. This includes an inventory of all known and potential cultural heritage resources identified in each study area through background research, field investigations, and evaluation using the criteria prescribed in *Ontario Regulation 9/06.*

The second part of this report identifies and assesses in detail the predicted direct and indirect impacts of the Proposed Expansion on the cultural heritage resources found in the CH Study Area.

Recommendations

Specific conservation actions for the cultural heritage resources in the CH Study Area based on the results of background research, field investigations, and impact assessment are recommended in the table below. Note that these recommendations are based on a current understanding of the project and may need to be re-visited if components are moved or altered during detailed design, or if it is determined that there will be impacts in areas of the Site-vicinity Study Area excluded from this study.

IDENTIFIED CULTURAL HERITAGE RESOURCES AND CONSERVATION RECOMMENDATIONS

Resource Type and Civic Address	Conservation/ Mitigation Recommendations
Built heritage resources (listed on the City *Register of Cultural Heritage Resources*) 4067 Scotland Drive 3583 Westminster Drive 5435 White Oak Road 3691 Manning Drive	▪ No further cultural heritage studies or monitoring is recommended. All built heritage resources on these listed heritage properties are beyond 60 m to 1.25 km distance from the limits of the Site Study Area and will not be directly or indirectly impacted by future construction and operation of the Proposed Expansion (vertical expansion).
Potential cultural heritage landscape (listed on the City *Register of Cultural Heritage Resources*) 6100 White Oak Road	▪ No further cultural heritage studies or monitoring is recommended. The listed cultural heritage landscape is over 60 m distance from the limits of the Site Study Area and will not be directly or indirectly impacted by future construction and operation of the Proposed Expansion (vertical expansion).
Potential built heritage resources: 3243 Manning Drive 6601/6603 Wellington Road South	▪ No further cultural heritage studies or monitoring is recommended. All potential built heritage resources on these properties are beyond 60 m to 1 km distance from the limits of the Site Study Area and will not be directly or indirectly impacted by future construction and operation of the Proposed Expansion (vertical expansion).

Study Limitations

Golder Associates Ltd. (Golder) has prepared this report in a manner consistent with the guidance developed by the Ontario Ministry of Heritage, Sport, Tourism and Culture Industries, City of London, and Canada's Historic Places, subject to the time limits and physical constraints applicable to this report. No other warranty, expressed or implied, is made.

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

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

Unless otherwise stated, the suggestions, recommendations and opinions given in this report are intended only for the guidance of the City in the design of the specific project.

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APPENDICES

APPENDIX A
Properties with Buildings or Structures 40 or More Years Old Evaluated Not to Have CHVI

APPENDIX B
Properties Inventoried in the Proposed Amended Terms of Reference

Acronyms

Acronym	Definition
AASHTO	American Association of State Highway and Transportation Officials
CH Study Area	Cultural Heritage Study Area
CHER	Cultural Heritage Evaluation Report
CHRS	Canadian Heritage River System
CHVI	Cultural Heritage Value or Interest
EA	Environmental Assessment
EAA	Environmental Assessment Act
EASR	Environmental Assessment Study Report
GIS	Geographic Information System
HCD	Heritage Conservation District
HIA	Heritage Impact Assessment
ICOMOS	International Council on Monuments and Sites
masl	metres above sea level
MCEA	Municipal Class Environmental Assessment
MEA	Municipal Engineers Association
MECP	Ministry of the Environment, Conservation and Parks
MHSTCI	Ministry of Heritage, Sport, Tourism and Culture Industries
MRF	Material Recovery Facility
NOID	Notice of Intent to Designate
NTS	National Topographic System
OHA	Ontario Heritage Act
PPS	Provincial Policy Statement
SCHVI	Statement of Cultural Heritage Value or Interest
ToR	Terms of Reference
UNESCO	United Nations Educational, Scientific and Cultural Organization
UTRCA	Upper Thames River Conservation Authority

1.0 INTRODUCTION

The City of London is proposing an expansion of the existing W12A Landfill site (the Project) located at 3502 Manning Drive, part of Lots 18, 19 and 20 of Concession 6 in the former Township of Westminster, in the south end of the City of London Ontario.

The environment is considered in broad terms to include the natural, social, cultural, and economic aspects of the environment. This document presents the heritage component existing conditions and impact assessment for the Environment Assessment (EA) of the proposed W12A Landfill expansion and represents a Heritage Impact Assessment (HIA). This work has been conducted in accordance with the requirements set out in the approved Amended Terms of Reference (ToR), dated February 2019.

This report is a supporting document to the Environmental Assessment Study Report (EASR).

At current disposal rates, the W12A Landfill site is expected to reach its approved capacity at the end of 2023. An additional 13,800,000 cubic metres of airspace at the W12A Landfill site, which will about double the current approved capacity, will be required to satisfy disposal requirements for residual waste for the next 25-year period.

The 2019 approved Amended Terms of Reference (ToR) approved for the EA defined the “Site Study Area” as the existing W12A Landfill site and all properties where landfill expansion may occur. The Site Study Area is bound on the north by Scotland Drive, on the south by Manning Drive, on the west by White Oak Road, and on the east by the agricultural property and the Municipal Recovery Facility west of Wellington Road South (Figure 1).

To identify all cultural heritage resources potentially impacted by expansion of the W12A Landfill, a Cultural Heritage Study Area (CH Study Area) was defined for this HIA that included all parcels within, and adjacent to, the Site Study Area. This CH Study Area in most cases matches the extents of a 500 m Site-vicinity Study Area.

The Proposed Expansion is a vertical expansion over the existing waste footprint.

Following guidance provided by the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI), this HIA provides:

- background on the legislative framework, purpose and requirements of a HIA, and the methods that were used to investigate and evaluate cultural heritage resources in the CH Study Area
- an overview of the geographic context and history of the CH Study Area
- an inventory of all cultural heritage resources in the CH Study Area, including known properties of cultural heritage value or interest (CHVI) and those evaluated on a preliminary level to have potential CHVI based on a date of construction 40 or more years old, and whether it met one or more of the criteria prescribed in *Ontario Regulation 9/06*
- a description of the Proposed Expansion, followed by an assessment of the direct and indirect impacts on known and potential cultural heritage resources in the CH Study Area
- recommendations to inform the construction and operation of the Proposed Expansion to ensure that the heritage attributes of known or potential properties of cultural heritage resources in the Site and Site-vicinity Study Areas are conserved.

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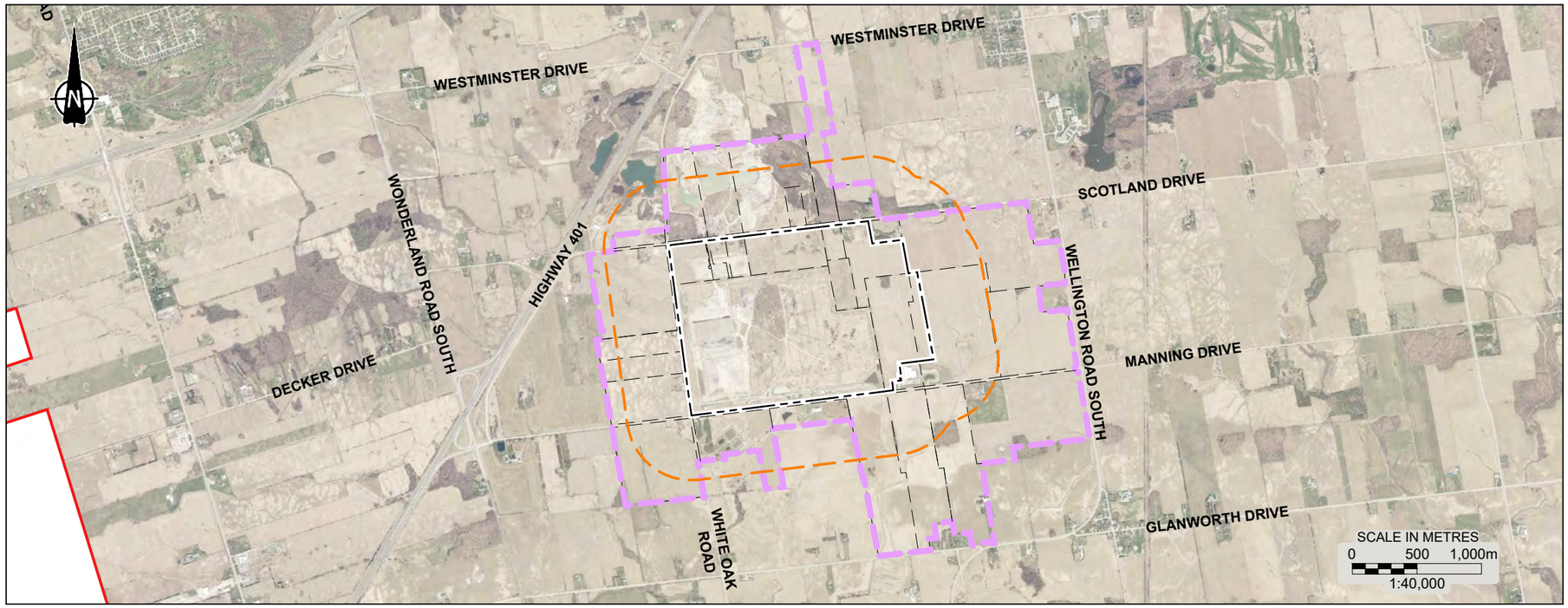

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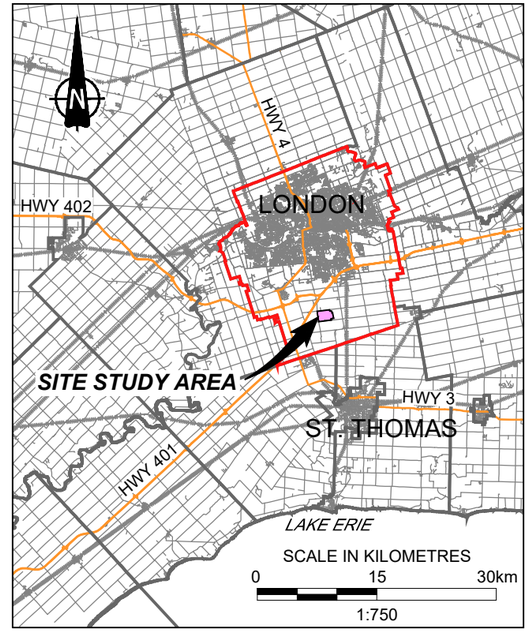

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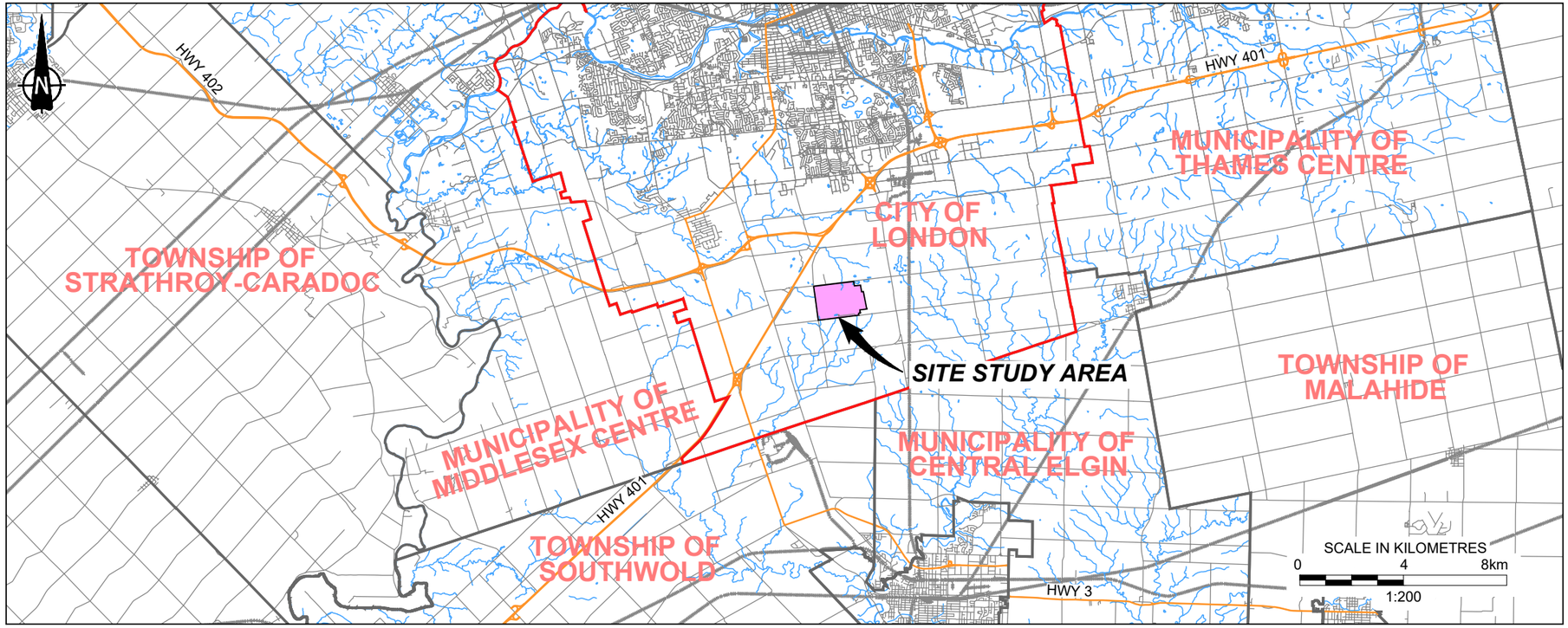

REGIONAL MAP

LEGEND

- APPROXIMATE LOCATION OF SITE STUDY AREA
- APPROXIMATE LOCATION OF CULTURAL HERITAGE STUDY AREA
- SITE VICINITY STUDY AREA
- CULTURAL HERITAGE STUDY AREA PARCEL
- CITY OF LONDON BOUNDARY
- TOWNSHIP/MUNICIPALITY BOUNDARY
- LONDON TOWNSHIP/MUNICIPALITY

REFERENCE

DRAWING BASED ON MNR LIO, OBTAINED 2019, PRODUCED BY GOLDER ASSOCIATES LTD UNDER LICENCE FROM ONTARIO MINISTRY OF NATURAL RESOURCES, © QUEENS PRINTER 2019; CITY OF LONDON, 2019 OPEN DATASET; AND CANMAP STREETFILES V2008.4.

NOTES

THIS DRAWING IS SCHEMATIC ONLY AND IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT.

ALL LOCATIONS ARE APPROXIMATE.

PROJECT

ENVIRONMENTAL ASSESSMENT OF THE PROPOSED W12A LANDFILL EXPANSION LONDON, ONTARIO

TITLE

SITE AND SITE STUDY AREAS

GOLDER

PROJECT No. 1648176	FILE No. 1648176-6000-R01001
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FIGURE 1

2.0 SCOPE AND METHOD

As mentioned above, the CH Study Area was defined as all parcels within, and adjacent to, the Site Study Area. Adjacent parcels were considered as part of the assessment following the Provincial Policy Statement (then 2014) and the City's *Official Plan*. The scope of this HIA was defined by guidance outlined in the MHSTCI *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes: A Checklist for the Non-Specialist* (2016; the MHSTCI *Checklist*, described in Section 3.2.4). The MHSTCI *Checklist* provides a screening tool to identify all known or recognized cultural heritage resources in the study areas, commemorative plaques, cemeteries, Canadian Heritage River watersheds, properties with buildings or structures 40 or more years old, or potential cultural heritage landscapes. Following the MHSTCI *Checklist,* Golder:

- Researched archival, published, and "grey-literature" historical and archaeological sources relevant to the historical and geographic context of the CH Study Area;
- Consulted federal, provincial, and municipal heritage registers, inventories, and databases, that included:
  - Canadian Register of Historic Places (www.historicplaces.ca)
  - Historic Sites and Monuments Board of Canada Directory of Federal Heritage Designations (http://www.pc.gc.ca/apps/dfhd/search-recherche_eng.aspx) and Directory of Heritage Railway Stations (http://www.pc.gc.ca/eng/clmhc-hsmbc/pat-her/gar-sta.aspx)
  - Ontario Heritage Trust Online Plaque Guide (http://www.heritagetrust.on.ca/en/index.php/online-plaque-guide), Ontario Places of Worship Inventory (http://www.heritagetrust.on.ca/Ontario-s-Places-of-Worship/Inventory), and List of Easement Properties (http://www.heritagetrust.on.ca/en/property-types/easement-properties)
  - Ontarioplaques.com (data correlated with the Ontario Heritage Trust Online Plaque Guide)
  - Canadian Heritage Rivers System list of designated heritage river systems (http://chrs.ca/) and Thames River Conservation Authority mapping (https://maps.thamesriver.on.ca/)
  - *CanadaGenWeb's Cemetery Project* (http://cemetery.canadagenweb.org/) and *The Ontario Genealogical Society – Ontario Cemetery Index* (https://ogs.on.ca/resources/cemeteries-name-indexes/)
  - Ontario Council of University Libraries *Historic Topographic Map Digitization Project* (https://ocul.on.ca/topomaps)
  - Aerial photographs from Western University Map and Data Centre, D.B. Weldon Library
  - Ontario Heritage Bridge List in the *Ontario Heritage Bridge Guidelines for Provincially Owned Bridges* (Interim; Ministry of Transport 2008) cross-referenced with Heritage.org *Heritage Bridges of Ontario* (https://historicbridges.org/map_ont.php)

  - City of London *Register of Cultural Heritage Resources* (https://www.london.ca/About-London/heritage/Documents/Register/Register-2019-AODA.pdf) and the City's mapping of Heritage Conservation Districts and Properties (https://maps.london.ca/CityMap/)
  - *Archaeological and Built Heritage Assessment (Stage 1) W12A Landfill Area Study* (Archaeologix 2006)
- Consulted with heritage planning staff at the City of London (see Section 2.1);
- Conducted field investigations from the public right-of-way to inventory and document all known and potential cultural heritage resources within the CH Study Area and to understand the wider built and landscape context;
- Completed screening-level evaluations of properties with buildings or structures 40 or more years old and evaluated their potential CHVI using the criteria prescribed in *Ontario Regulation 9/06*; and,
- Assessed the predicted impacts to properties of known and potential CHVI and recommended mitigation and conservation measures, if required, using MHSTCI and other guidance.

Primary and secondary sources, including historic maps and aerial imagery were accessed from the Western University D.B. Weldon Library and online sources.

Field investigations were conducted by cultural heritage specialist Shannon Neill-Sword on August 29 and October 29, 2019, and January 14, 2020, and included photographing all properties, views, and roads with a Nikon Coolpix P90 digital single lens reflex camera. Although the August and October 2019 investigations were conducted from public rights-of-way, the January 2020 investigation included securing permission to enter 3465 Scotland Drive as the topography obstructed clear views of the property from public rights-of-way.

The descriptions of known and potential cultural heritage resources use terms provided by the City, Blumenson (1990), Ricketts *et al.* (2004), Hubka (2013), and the *Canadian Inventory of Historic Buildings* (Parks Canada 1980).

2.1 Record of Consultation

Table 1 summarizes the consultation undertaken for this HIA.

Table 1: Record of Consultation

Contact	Date of Contact and Query	Response
Kyle Gonyou Heritage Planner, City of London.	Query via email on October 17, 2019 inquiring if there had been any prior studies in the study area other than the 2006 *Archaeological and Built Heritage Assessment (Stage 1) W12A Landfill Area Study* by Archaeologix Inc. and to advise if any properties within the CH Study Area were subject to a Notice of Intent to Designate (NOID).	Response provided via email on October 29, 2019 providing an October 9, 2019 report on the dwelling at 6100 White Oak Road. Also confirmed that no properties in the CH Study Area are subject to a NOID.

3.0 PLANNING, LEGAL, AND REGULATORY CONTEXT

Cultural heritage resources are recognized, protected, and managed through several provincial and municipal planning and policy regimes. These policies have varying levels of authority, though generally all inform decision making on how impacts of new development on heritage assets can be avoided or mitigated.

3.1 Federal and International Heritage Policies

3.1.1 General

Federal heritage policies do not apply to any properties in the CH Study Area, but many provincial and municipal policies align in approach to the Canada's Historic Places *Standards and Guidelines for the Conservation of Historic Places in Canada* (Canada's Historic Places 2010). This document was drafted in response to international and national agreements such as the 1964 *International Charter for the Conservation and Restoration of Monuments and Sites* (*Venice Charter*), 1979 *Australia ICOMOS Charter for Places of Cultural Significance* (*Burra Charter*, updated 2013*),* and 1983 Canadian *Appleton Charter for the Protection and Enhancement of the Built Environment.* The National *Standards and Guidelines* defines three conservation "treatments" — preservation, rehabilitation, and restoration— and outlines the process, and required and recommended actions, to meet the objectives for each treatment for a range of cultural heritage resources.

At the international level, the International Council on Monuments and Sites (ICOMOS) has developed guidance on heritage impact assessments for world heritage properties, which also provide "best practice" approaches for all historic assets (ICOMOS 2011).

3.1.2 Canadian Heritage River Systems

Since the CH Study Area is within the watershed of the Thames River Canadian Heritage River (Canadian Heritage Rivers System 2019), the policies of the Canadian Heritage Rivers System apply. The Canadian Heritage Rivers System is a conservation program intended to give national recognition to Canada's outstanding rivers and encourages their long-term management to conserve their natural, cultural and recreational values. The program is a federal-provincial-territorial government partnership that works with local community-level river stewardship groups.

The 273-km Thames River was designated as part of the Canadian Heritage River System in 2000 for its outstanding natural and cultural heritage values (Upper Thames River Conservation Authority [UTRCA] 2000:3). The river also has recreational values offering "a great diversity of…opportunities to the over half-million people who live in the watershed and millions of others residing a short distance away" (UTRCA 2000:3). While the upper branches of the river flow through landscapes shaped by glaciers, carving out rocky riverbeds with steep slopes, the lower branches contrast this with shallow, sandy channels and gentle water flow (Canadian Heritage River System [CHRS] 2018). The watershed stretches between the Carolinian and Great Lakes-St. Lawrence Forest Regions, all home to many species of plants and animals, including a diverse fish population (CHRS 2018). The Thames River is managed by the Upper Thames River and Lower Thames Valley Conservation Authorities, who work with municipalities and community groups to protect and clean the river, and improve its natural habitats, as well as cultural and recreational areas.

The “broad goal” of the 2000 “Thames Strategy” is “to increase the appreciation, enjoyment and stewardship of the natural and cultural heritage and recreational opportunities of the Thames River and its watershed through community cooperation and involvement”, and outlines ways that voluntary action can conserve all the river’s values (UTRCA 2000: i).

The Thames River’s cultural heritage values include:

- Indigenous occupancy from 11,000 years ago to the present
- A multitude of archaeological sites along the river system
- The birthplace of Canadian agriculture and the agricultural heartland of eastern Canada
- War of 1812 sites
- The terminus of the Underground Railway for fugitive slaves prior to the American Civil War
- A rich architectural heritage
- Rural and human settlement strongly influenced by the river
- A leading role in the establishment of Conservation Authorities in Ontario, and
- The birthplace and/or homes of prominent Canadians including Adam Beck, Timothy Eaton, John Labatt, Harriet Boomer, and Tom Patterson (UTRCA 2000:3).

3.2 The Environmental Assessment Act

The *Environmental Assessment Act* (*EAA*) was legislated to ensure that Ontario’s environment is protected, conserved, and wisely managed. Under the *EAA*, “environment” includes not only natural elements such as air, land, water and plant and animal life, but also the “social, economic and cultural conditions that influence the life of humans or a community”, and “any building, structure, machine or other device or thing made by humans”. To determine the potential environmental effects of a new development, the Environmental Assessment (EA) process was created to standardize decision-making.

3.3 Ontario Planning Act and Provincial Policy Statement

The *Ontario Planning Act* (1990) and associated *Provincial Policy Statement 2020* (PPS 2020) provide the legislative imperative for heritage conservation in land use planning. The *Planning Act* identifies conservation of resources of significant architectural, cultural, historical, archaeological or scientific interest as a provincial interest. PPS 2020 recognizes that protecting cultural heritage and archaeological resources has economic, environmental, and social benefits, and contributes to the long-term prosperity, environmental health, and social well-being of Ontarians. The *Planning Act* serves to integrate this interest with planning decisions at the provincial and municipal level, and states that all decisions affecting land use planning “shall be consistent with” PPS 2020.

The importance of identifying and evaluating built heritage and cultural heritage landscapes is recognized in two policies of PPS 2020:

- Section 2.6.1 – Significant built heritage resources and significant heritage landscapes shall be conserved.
- Section 2.6.3 – Planning authorities shall not permit development and site alteration on adjacent lands to protected heritage property except where the proposed development and site alteration has been evaluated and it has been demonstrated that the heritage attributes of the protected heritage property will be conserved.

PPS 2020 defines significant as resources "determined to have cultural heritage value or interest for the important contribution they make to our understanding of the history of a place, an event, or a people", and this determination can either be based on the provincial criteria prescribed in *O. Reg 9/06* and *Ontario Regulation 10/06* or by "municipal approaches that achieve or exceed the same objective". This definition also stresses that because not all resources may be "identified and inventoried by official sources", the significance of some resources "can only be determined after evaluation".

Conserved is defined in PPS 2020 as "the identification, protection, management and use of built heritage resources, cultural heritage landscapes, and archaeological resources in a manner that ensures their cultural heritage value of interest is retained." *Adjacent lands* are defined as "those lands contiguous to a protected heritage property or as otherwise defined in the municipal official plan". Built heritage resources, cultural heritage landscapes, heritage attributes, and protected heritage property are also defined in the PPS:

- ***Built heritage resources*****:** a building, structure, monument, installation or any manufactured or constructed part or remnant that contributes to a property's cultural heritage value or interest as identified by a community, including an Indigenous community. Built heritage resources are located on property that may be designated under Parts IV or V of the *Ontario Heritage Act*, or that may be included on local, provincial, federal and/or international registers.
- ***Cultural heritage landscapes:*** a defined geographical area that may have been modified by human activity and is identified as having cultural heritage value or interest by a community, including an Indigenous community. The area may include features such as buildings, structures, spaces, views, archaeological sites or natural elements that are valued together for their interrelationship, meaning or association. Cultural heritage landscapes may be properties that have been determined to have cultural heritage value or interest under the *Ontario Heritage Act*, or have been included on federal and/or international registers, and/or protected through official plan, zoning by-law, or other land use planning mechanisms.
- ***Heritage attribute:*** the principal features or elements that contribute to a protected heritage property's cultural heritage value or interest, and may include the property's built, constructed, or manufactured elements, as well as natural landforms, vegetation, water features, and its visual setting (e.g., significant views or vistas to or from a protected heritage property).

- ***Protected heritage property:*** property designated under Parts IV, V or VI of the *Ontario Heritage Act*; property subject to a heritage conservation easement under Parts II or IV of the *Ontario Heritage Act*; property identified by the Province and prescribed public bodies as provincial heritage property under the Standards and Guidelines for Conservation of Provincial Heritage Properties; property protected under federal legislation, and UNESCO World Heritage Sites.

Municipalities implement PPS 2020 through an official plan, which may outline further heritage policies.

3.3.1 *Ontario Heritage Act* and *Ontario Regulation 9/06*

The Province and municipalities are enabled to conserve significant individual properties and areas through the *Ontario Heritage Act* (*OHA*). For municipalities, Part IV and Part V of the *OHA* enables councils to "designate" individual properties (Part IV), or properties within a heritage conservation district (HCD) (Part V) as being of CHVI. Evaluation for CHVI under the *OHA* is guided by *Ontario Regulation 9/06*, which prescribes the "criteria for determining cultural heritage value or interest". The criteria are as follows:

1) The property has ***design value or physical value*** because it:
   i) Is a rare, unique, representative or early example of a style, type, expression, material or construction method
   ii) Displays a high degree of craftsmanship or artistic merit, or
   iii) Demonstrates a high degree of technical or scientific achievement
2) The property has ***historic value or associative value*** because it:
   i) Has direct associations with a theme, event, belief, person, activity, organization, or institution that is significant to a community
   ii) Yields, or has the potential to yield information that contributes to an understanding of a community or culture, or
   iii) Demonstrates or reflects the work or ideas of an architect, artist, builder, designer, or theorist who is significant to a community
3) The property has ***contextual value*** because it:
   i) Is important in defining, maintaining or supporting the character of an area
   ii) Is physically, functionally, visually or historically linked to its surroundings, or
   iii) Is a landmark

If a property meets one or more of these criteria, it may be designated under Part IV, Section 29 of the *OHA*.

Designated heritage properties are formally described with a Statement of Cultural Heritage Value or Interest (SCHVI) that includes a brief property description, a succinct statement of the property's cultural heritage significance, and a list of its heritage attributes. The latter is defined in the *OHA* to mean "in relation to real property, and to the buildings and structures on the real property, the attributes of the property, buildings and structures that contribute to their cultural

heritage value or interest." The designation is then recognized through by-law, and the property must be included on a "Register" maintained by the municipal clerk. A municipality may also "list" a property on the Register to indicate it as having potential CHVI. Importantly, designation or listing in most cases applies to the entire property, not only individual structures or features. The City's *Register of Cultural Heritage Resources* includes designated individual properties, designated HCDs, properties of archaeological significance, properties that are not designated but that City Council believes to be of cultural heritage value or interest ("listed" properties), and cultural heritage landscapes.

3.3.2 Provincial Heritage Guidance

To advise municipalities, organizations, and individuals on heritage protection and conservation, the Province, through the MHSTCI, has developed a series of guidance products. One used primarily for EAs is the MHSTCI *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes: A Checklist for the Non-Specialist* (2016; the MHSTCI *Checklist*). The MHSTCI *Checklist* provides a screening tool for a study area to identify all the known or recognized cultural heritage resources, commemorative plaques, cemeteries, Canadian Heritage River watersheds, properties with structures 40 or more years old, or potential cultural heritage landscapes. If known or potential cultural heritage resources are identified, the MHSTCI *Checklist* then advises whether further investigation as part of a Cultural Heritage Evaluation Report (CHER) or Heritage Impact Assessment (HIA) is necessary.

Further guidance on identifying, evaluating, and assessing impact to built heritage resources and cultural heritage landscapes is provided in the *Ontario Heritage Tool Kit* series. Of these, *Heritage Property Evaluation* (MHSTCI 2006a) describes in detail the *O.Reg. 9/06* criteria and methods for researching and evaluating potential cultural resources, while the *Heritage Resources in the Land Use Planning Process* (MHSTCI 2006b) provides an outline for the contents of an HIA, which it defines as:

> a study to determine if any cultural resources (including those previously identified and those found as part of the site assessment) …are impacted by a specific proposed development or site alteration. It can also demonstrate how the cultural resource will be conserved in the context of redevelopment or site alteration. Mitigative or avoidance measures or alternative development or site alteration approaches may be recommended.

For EAs, the *Ontario Heritage Tool Kit* partially, but not entirely, supersedes earlier MHSTCI advice. Criteria to identify cultural landscapes is detailed in the *Guidelines on the Man-Made Heritage Component of Environmental Assessments* (1980:7) and recording and documentation procedures are outlined in the *Guideline for Preparing the Cultural Heritage Resource Component of Environmental Assessments* (1992:3-7).

For provincial properties, heritage conservation must comply with the MHSTCI *Standards and Guidelines for the Conservation of Provincial Heritage Properties*. Supporting documents include the *Standards and Guidelines for the Conservation of Provincial Heritage Properties – Heritage Identification and Evaluation Process* (MHSTCI 2014) —which provides detailed explanations of the *O. Reg. 9/06* and *10/06* criteria and its application— and *Information Bulletin 3: Heritage Impact Assessments for Provincial Heritage Properties*, which describes how to organize the sections of an HIA and the range of possible impacts and mitigation

measures. Although compliance with the MHSTCI *Standards and Guidelines* is only required for provincial properties, they inform “best practice” approaches for conserving cultural heritage resources not under provincial jurisdiction.

3.4 Municipal Heritage Policies

3.4.1 *The London Plan*

The City’s official plan, entitled *The London Plan,* was approved with modifications by the Province in 2016. The plan was implemented to guide the growth, preservation, and evolution of the City over the next 20 years and includes policies to guide the identification and conservation of cultural heritage properties and landscapes. Cultural heritage is referenced in several sections of *The London Plan* and in two of the key directions:

- Direction #3 (Policy 57_) – Celebrate and support London as a culturally rich, creative and diverse city
  - Item 4. Recognize and celebrate the contributions of Indigenous communities in our shared cultural heritage, and
  - Item 7. Protect our built and cultural heritage to promote our unique identity and develop links to arts and eco-tourism in the London Region
- Direction #7 (Policy 61_) – Build strong, healthy and attractive neighbourhoods for everyone:
  - Item 5. Protect what we cherish by recognizing and enhancing our cultural identity, cultural heritage resources, neighbourhood character, and environmental features

In its “City Building Policies” under “Character”, *The London Plan* states that the “built form will be designed to have a sense of place and character consistent with the planned vision of the place type, by using such things as topography, street patterns, lotting patterns, streetscapes, public spaces, landscapes, site layout, buildings, materials and cultural heritage” (Policy 197_, currently subject to appeal). Heritage conservation and promotion is also to be considered when designing public facilities and public spaces (Policies 429_ and Policy 540_), and in the City’s objective to be a “culturally rich and diverse city” (Policy 525.6_) and to be a regional cultural centre (Policy 532_).

The “Cultural Heritage” section of *The London Plan* defines cultural heritage as:

> The legacy of both tangible and intangible attributes that our community has inherited from past generations, including buildings, monuments, streetscapes, landscapes, books, artifacts and art, folklore, traditions, language and knowledge (Policy 551_)

From this, the City's overall objectives for cultural heritage are to:

- Promote, celebrate and raise awareness and appreciation of London's cultural heritage resources
- Conserve London's cultural heritage resources so they can be passed on to our future generations
- Ensure that new development and public works are undertaken to enhance and be sensitive to our cultural heritage resources (Policy 554_)

How these will be achieved are then focused on three areas of cultural heritage planning:

- General policies for the protection and enhancement of cultural heritage resources
- Specific policies related to the identification of cultural heritage resources including individual heritage resources, heritage conservation districts, cultural heritage landscapes and archaeological resources
- Specific policies related to the protection and conservation of these cultural heritage resources (Policy 555_)

The general policies are then discussed through Policy 556_ to Policy 571_, with Policy 572_ to 582_ outlining the identification of cultural heritage resources. Policy 559_ provides for the conservation of heritage views or vistas as heritage attributes of a property while Policy 565_ sets out the City's approach to protecting heritage resources in the development process:

> New development, redevelopment, and all civic works and projects on and adjacent to heritage designated properties and properties listed on the Register will be designed to protect the heritage attributes and character of those resources, to minimize visual and physical impact on these resources. A heritage impact assessment will be required for new development on and adjacent to heritage designated properties and properties listed on the Register to assess potential impacts, and explore alternative development approaches and mitigation measures to address any impact to the cultural heritage resource and its heritage attributes.

Specific heritage conservation policies are discussed through Policy 583_ to 622_.

In its Glossary of Terms (1795_) the Plan provides the following definitions:

- ***Adjacent when considering potential impact on cultural heritage resources*** means sites that are contiguous; sites that are directly opposite a cultural heritage resource separated by a laneway, easement, right-of-way, or street; or sites upon which a proposed development or site alteration has the potential to impact identified visual character, streetscapes or public views as defined within a statement explaining the cultural heritage value or interest of a cultural heritage resource.

- ***Cultural heritage landscape*** means a defined geographical area that may have been modified by human activity and is identified as having cultural heritage value or interest by a community, including an Aboriginal Community. The area may involve features such as structures, spaces, archaeological sites, or natural elements that are valued together for their interrelationship, meaning or association. Such a cultural heritage landscape is valued by Londoners and is of significance to an understanding of the histories of a people or place.
- ***Cultural heritage resource*** means a human work or a place that gives evidence of human activity or has spiritual or cultural meaning or value, and which has been determined to have historic value. Cultural heritage resources include both the physical and intangible resources, properties protected under the *Ontario Heritage Act*, built heritage resources, cultural heritage landscapes, archaeological resources, paleontological resources and both documentary and material heritage.

The *Plan* also outlines policies with respect to place types and special policy areas. All areas of the City are assigned a place type, while specific policy areas are special areas with unique policies. The CH Study Area is comprised of farmland, green space and Waste Management Resource Recovery Area place types (including the W12A Landfill area). The farmland place type is recognized as a key component of the City's cultural heritage (Policy 1179_); however, no place-type specific cultural heritage policies exist for any of the space types within the CH Study Area. The CH Study Area also contains two specific policy areas: The Waste Management Resource Recovery Area, and the Islamic Cemetery of London, located at 6100 White Oak Road. There are no specific cultural heritage policies related to these areas.

3.4.2 London *Official Plan* (1989)

The *London Plan* is currently under appeal for several heritage-related policies. While these policies are under appeal, policies from the 1989 *Official Plan* remain in effect. Chapter 13 of the *Official Plan* addresses heritage and includes objectives to support the "protection, enhancement, restoration, maintenance, and utilization of buildings, structures, areas, or sites within London which are considered to be of cultural heritage value or interest to the community" (Section 13.1.i)". The *Official Plan* encourages new development to be sensitive to and in harmony with the City's heritage resources.

3.4.3 2015-2019 Strategic Plan for the City of London

The City's *2015-2019 Strategic Plan for the City* adopted in 2014, includes heritage conservation as one of the six goals of building a sustainable city. The City commits to protect and celebrate London's heritage for current and future generations, and encourages investing in "heritage restoration, brownfield remediation, urban regeneration, and community improvement projects through community improvement plans and the London Plan". The goals of the *Strategic Plan* are largely implemented through other plans, studies, policies and documents. A new strategic plan is currently being developed for 2019-2023.

4.0 GEOGRAPHICAL AND HISTORICAL CONTEXT

4.1 Geographic Context

The CH Study Area covers approximately 215 hectares and encompasses all parcels on the north fronting Scotland Drive, on the south fronting Manning Drive, on the west fronting White Oak Road, and on the east by parcels west of Wellington Road South. It is within the Mount Elgin Ridges physiographic region, described by Chapman and Putnam (1984:144-145) as:

> Between the Thames Valley and the Norfolk sand plain lies a succession of ridges and vales which are called the Mount Elgin Ridges.... South of the Westminster and St. Thomas Moraines the county drains to Lake Erie by means of the tributaries of Kettle, Catfish and Otter Creeks....The two major landform components of this region provide obviously contrasting soils. The ridges are well drained while imperfect and even poor drainage characterize the hollows. The ridges are formed from clay till similar to that of the Wyoming Moraine and the Stratford plain.

The localized topography varies from undulating to rolling with elevations ranging from approximately 270 to 290 m above sea level (masl). The study area lies in the Mixed Wood Plains Ecozone of the Lake Erie-Lake Ontario Ecoregion. This area is characterised by its mild climate, productive agricultural use, sparse forests, and aquifers in sand and gravel deposits (The Canadian Atlas Online 2016). The CH Study Area is on part of the watershed divide between the Thames River and Lake Erie Basin Watersheds. One small unnamed tributary of Dingman Creek and three small unnamed tributaries of Dodd Creek run through the CH Study Area.

In relation to artificial features, the CH Study Area is in the single-tier municipality of the City of London, approximately 11.4 km south of downtown London, 4 km north from the City's south boundary, and 2 km east of Highway 401. The nearest historical community is Glanworth, approximately 2.8 km to the southeast.

4.2 Historical Context

4.2.1 Pre-Contact Indigenous Period

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

Table 2: Cultural Chronology for Southern Ontario

Period	Characteristics	Time	Comments
Early Paleo	Fluted Projectiles	9000 – 8400 BC	spruce parkland/caribou hunters
Late Paleo	Hi-Lo Projectiles	8400 – 8000 BC	smaller but more numerous sites
Early Archaic	Kirk and Bifurcate Base Points	8000 – 6000 BC	slow population growth
Middle Archaic	Brewerton-like points	6000 – 2500 BC	environment similar to present

Period	Characteristics	Time	Comments
Late Archaic	Narrow Points	2000 – 1800 BC	increasing site size
	Broad Points	1800 – 1500 BC	large chipped lithic tools
	Small Points	1500 – 1100BC	introduction of bow hunting
Terminal Archaic	Hind Points	1100 – 950 BC	emergence of true cemeteries
Early Woodland	Meadowood Points	950 – 400 BC	introduction of pottery
Middle Woodland	Dentate/Pseudo-Scallop Pottery	400 BC – AD 500	increased sedentism
	Princess Point	AD 550 – 900	introduction of corn
Ontario Iroquoian Late Woodland	Early Ontario Iroquoian	AD 900 – 1300	emergence of agricultural villages
	Middle Ontario Iroquoian	AD 1300 – 1400	long longhouses (100m +)
	Late Ontario Iroquoian	AD 1400 – 1650	tribal warfare and displacement
Western Basin Late Woodland	Riviere au Vase	AD 500 – 900	introduction of corn
	Young Phase	AD 900 – 1200	dense storage pits, proto-settlements
	Springwell Phase	AD 1200 – 1400	emergence of agricultural villages
	Wolf Phase	AD 1400 – 1550	palisaded villages, tribal warfare and displacement
Contact Indigenous	Various Algonquian Groups	AD 1700 – 1875	early written records and treaties
Historical	Euro-Canadian	AD 1796 – present	European settlement

4.2.1.1 Paleo Period

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

Our current understanding of Early Paleo settlement patterns suggests that small bands, that consisted of probably no more than 25 to 35 individuals followed a pattern of seasonal mobility extending over large territories. One of the most thoroughly studied of these groups followed a seasonal route that extended from as far south as Chatham to the Horseshoe Valley north of Barrie. Early Paleo sites tend to be located in elevated locations on well-drained loamy soils.

Many of the known sites were located on former beach ridges associated with Lake Algonquin, the post-glacial lake occupying the Lake Huron/Georgian Bay basin.

There are a few extremely large Early Paleo sites, such as one located close to Parkhill, Ontario, which covered as much as 6 ha. It appears that these sites were formed when the same general locations were occupied for short periods of time over the course of many years.

Given their placement in locations conducive to the interception of migratory mammals such as caribou, it has been suggested that they may represent communal hunting camps. There are also smaller Early Paleo camps scattered throughout the interior of southwestern Ontario, usually situated adjacent to wetlands.

The most recent research suggests that population densities were very low during the Early Paleo Period, with all of southwestern Ontario being occupied by perhaps only 100 to 200 people (Ellis and Deller 1990:54). Because this is the case, Early Paleo sites are exceedingly rare, and within the limits of London only four locations are known. Three of these sites are isolated find spots of the distinctive fluted points or channel flakes, while one site, located near Dingman Creek, represents a rare occupation area with a good deal of potential for contributing to our knowledge of this period. To date, all of the known Early Paleo sites in Middlesex are located south of the Main and South branches of the Thames River.

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

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

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

4.2.1.2 Archaic Period

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

During the Middle Archaic Period (6000 – 2500 BC) the trend towards more diverse toolkits continued, as the presence of net-sinkers suggest that fishing was becoming an important aspect of the subsistence economy. It was also at this time that "bannerstones" were first manufactured. Bannerstones are carefully crafted ground stone devices that served as a counterbalance for "atlatls" or spear-throwers.

Another characteristic of the Middle Archaic is an increased reliance on local, often poor-quality chert resources for the manufacturing of projectile points. It seems that during earlier periods, when groups occupied large territories, it was possible for them to visit a primary outcrop of high-quality chert at least once during their seasonal round.

However, during the Middle Archaic, groups inhabited smaller territories that often did not encompass a source of high-quality raw material. In these instances, lower quality materials which had been deposited by the glaciers in the local till and river gravels were utilized.

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

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

During the Late Archaic (2500 – 950 BC) the trend towards decreased territory size and a broadening subsistence base continued. Late Archaic sites are far more numerous than either Early or Middle Archaic sites, and it seems that the local population had definitely expanded. It is during the Late Archaic that the first true cemeteries appear. Before this time individuals were interred close to the location where they died. During the Late Archaic, if an individual died while his or her group happened to be at some distance from their group cemetery, the bones would be kept until they could be placed in the cemetery. Consequently, it is not unusual to find disarticulated skeletons, or even skeletons lacking minor elements such as fingers, toes or ribs, in Late Archaic burial pits.

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

This suggestion of increased territoriality is also consistent with the regionalized variation present in Late Archaic projectile point styles. It was during the Late Archaic that distinct local styles of projectile points appear. Also, during the Late Archaic the trade networks which had been established during the Middle Archaic continued to flourish. Native copper from northern

Ontario and marine shell artifacts from as far away as the Mid-Atlantic coast are frequently encountered as grave goods. Other artifacts such as polished stone pipes and banded slate gorgets also appear on Late Archaic sites. One of the more unusual and interesting of the Late Archaic artifacts is the "birdstone". Birdstones are small, bird-like effigies usually manufactured from green banded slate. While the function of these artifacts is presently poorly understood, they are especially common in the London area.

4.2.1.3 Woodland Period

The Early Woodland Period (950 – 400 BC) is distinguished from the Late Archaic Period primarily by the addition of ceramic technology. While the introduction of pottery provides a useful demarcation point for archaeologists, it may have made less difference in the lives of the Early Woodland peoples.

The first pots were very crudely constructed, thick walled, and friable. It has been suggested that they were used in the processing of nut oils by boiling crushed nut fragments in water and skimming off the oil (Spence, Pihl and Murphy 1990:137). These vessels were not easily portable, and individual pots must not have sustained a long use life.

There have also been numerous Early Woodland sites located at which no pottery was found, suggesting that these poorly constructed, undecorated vessels had yet to assume a central position in the day-to-day lives of Early Woodland peoples.

Other than the introduction of this rather limited ceramic technology, the life-ways of Early Woodland peoples show a great deal of continuity with the preceding Late Archaic Period. For instance, birdstones continue to be manufactured, although the Early Woodland varieties have "pop-eyes" which protrude from the sides of their heads. Likewise, the thin, well-made projectile points which were produced during the terminal part of the Archaic Period continue in use. However, the Early Woodland variants were side-notched rather than corner-notched, giving them a slightly altered and distinctive appearance.

The trade networks which were established in the Middle and Late Archaic also continued to function, although there does not appear to have been as much traffic in marine shell during the Early Woodland Period. During the last 200 years of the Early Woodland Period, projectile points manufactured from high quality raw materials from the American Midwest begin to appear on sites in the London area.

In terms of settlement and subsistence patterns, the Middle Woodland (400 BC – 900 AD) provides a major point of departure from the Archaic and Early Woodland Periods. While Middle Woodland peoples still relied on hunting and gathering to meet their subsistence requirements, fish became an even more important part of the diet. This is especially true in the nearby London area, where some Middle Woodland sites have produced literally thousands of bones from spring spawning species such as walleye and sucker. In addition, Middle Woodland peoples relied much more extensively on ceramic technology. Middle Woodland vessels are often garishly decorated with hastily impressed designs covering the entire exterior surface and upper portion of the vessel interior. Consequently, even very small fragments of Middle Woodland vessels are easily identifiable.

It is also at the beginning of the Middle Woodland Period that rich, densely occupied sites appear on the valley floor of major rivers. While the valley floors of floodplains had been utilized by earlier peoples, Middle Woodland sites are significantly different in that the same location was repeatedly occupied over several hundred years. Because this is the case, rich deposits of artifacts often accumulated.

Unlike earlier seasonally utilized locations, these Middle Woodland sites appear to have functioned as base camps, occupied off and on over the course of the year. There are also numerous small upland Middle Woodland sites, many of which can be interpreted as special purpose camps from which localized resource patches were exploited. This shift towards a greater degree of sedentism continues the trend witnessed from at least Middle Archaic times and provides a prelude to the developments that follow during the Late Woodland Period.

The Late Woodland Period began with a shift in settlement and subsistence patterns involving an increasing reliance on corn horticulture (Fox 1990:185; Smith 1990; Williamson 1990:312). Corn may have been introduced into southwestern Ontario from the American Midwest as early as 600 AD. However, it did not become a dietary staple until at least three to four hundred years later.

The first agricultural villages in southwestern Ontario date to the 10th century AD. Unlike the riverine base camps of the Middle Woodland Period, these sites are located in the uplands, on well-drained sandy soils. Categorized as "Early Ontario Iroquoian" (900 – 1300 AD), many archaeologists believe that it is possible to trace a direct line from the Iroquoian groups which inhabited southwestern Ontario at the time of first European contact, to these early villagers.

Village sites dating between 900 and 1300 AD, share many attributes with the historically reported Iroquoian sites, including the presence of longhouses and sometimes palisades. However, these early longhouses were actually not all that large, averaging only 12.4 m in length (Dodd et al 1990:349; Williamson 1990:304-305). It is also quite common to find the outlines of overlapping house structures, suggesting that these villages were occupied long enough to necessitate re-building. The Jesuits reported that the Huron moved their villages once every 10-15 years, when the nearby soils had been depleted by farming and conveniently collected firewood grew scarce (Pearce 2010). It seems likely that Early Ontario Iroquoians occupied their villages for considerably longer, as they relied less heavily on corn than did later groups, and their villages were much smaller, placing less demand on nearby resources.

Judging by the presence of carbonized corn kernels and cob fragments recovered from sub-floor storage pits, agriculture was becoming a vital part of the Early Ontario Iroquoian economy. However, it had not reached the level of importance it would in the Middle and Late Ontario Iroquoian Periods. There is ample evidence to suggest that more traditional resources continued to be exploited and comprised a large part of the subsistence economy. Seasonally occupied special purpose sites relating to deer procurement, nut collection, and fishing activities, have all been identified. While beans are known to have been cultivated later in the Late Woodland Period, they have yet to be identified on Early Ontario Iroquoian sites.

The Middle Ontario Iroquoian Period (1300 – 1400 AD) witnessed several interesting developments in terms of settlement patterns and artifact assemblages. Changes in ceramic styles have been carefully documented, allowing the placement of sites in the first or second

half of this 100-year period. Moreover, villages, which averaged approximately 0.6 ha in extent during the Early Ontario Iroquoian Period, now consistently range between one and two hectares.

House lengths also change dramatically, more than doubling to an average of 30 m, while houses of up to 45 m have been documented. This radical increase in longhouse length has been variously interpreted. The simplest possibility is that increased house length is the result of a gradual, natural increase in population (Dodd et al 1990:323, 350, 357; Smith 1990). However, this does not account for the sudden shift in longhouse lengths around 1300 AD. Other possible explanations involve changes in economic and socio-political organization (Dodd et al 1990:357). One suggestion is that during the Middle Ontario Iroquoian Period small villages were amalgamating to form larger communities for mutual defense (Dodd et al 1990:357). If this was the case, the more successful military leaders may have been able to absorb some of the smaller family groups into their households, thereby requiring longer structures.

This hypothesis draws support from the fact that some sites had up to seven rows of palisades, indicating at least an occasional need for strong defensive measures. There are, however, other Middle Ontario Iroquoian villages which had no palisades present (Dodd et al 1990). More research is required to evaluate these competing interpretations.

The lay-out of houses within villages also changes dramatically by 1300 AD. During the Early Ontario Iroquoian Period villages were haphazardly planned at best, with houses oriented in various directions. During the Middle Ontario Iroquoian Period villages are organized into two or more discrete groups of tightly spaced, parallel aligned, longhouses.

It has been suggested that this change in village organization may indicate the initial development of the clans which were a characteristic of the historically known Iroquoian peoples (Dodd et al 1990:358).

Initially at least, the Late Ontario Iroquoian Period (1400 – 1650 AD) continues many of the trends which have been documented for the proceeding century. For instance, between 1400 and 1450 AD house lengths continued to grow, reaching an average length of 62 m. One longhouse excavated on a site southwest of Kitchener stretched an incredible 123 m (Lennox and Fitzgerald 1990:444-445). After 1450 AD, house lengths began to decrease, with houses dating between 1500 – 1580 AD averaging only 30 m in length.

Why house lengths decrease after 1450 AD is poorly understood, although it is believed that the even shorter houses witnessed on historical period sites can be at least partially attributed to the population reductions associated with the introduction of European diseases such as smallpox (Lennox and Fitzgerald 1990:405, 410).

Village size also continued to expand throughout the Late Ontario Iroquoian Period, with many of the larger villages showing signs of periodic expansions. The Late Middle Ontario Iroquoian Period and the first century of the Late Ontario Iroquoian Period was a time of village amalgamation. One large village situated just north of Toronto has been shown to have expanded on no fewer than five occasions. These large villages were often heavily defended with numerous rows of wooden palisades, suggesting that defence may have been one of the rationales for smaller groups banding together.

Late Ontario Iroquoian village expansion has been clearly documented in the London area. The ongoing excavations at the Lawson site, a large Late Iroquoian village located on the grounds of the Museum of Ontario Archaeology, has shown that the original village had expanded by at least twenty percent to accommodate the construction of nine additional longhouses (Anderson 2009).

The Ontario Iroquoian and Western Basin are two archaeological traditions that characterize pre-contact Indigenous communities living in the Middlesex County area of southwestern Ontario from about AD 500 to 1650. Peoples of the Western Basin Tradition lived throughout the southwestern-most portion of the province, from the present-day Sarnia/Windsor area to about London. Iroquoian peoples, on the other hand, appear to have lived from the present-day Chatham area east to Toronto. Each of these traditions are divided into distinct temporal phases (see Table 1) defined by material cultural attributes, and settlement and subsistence patterns that exhibit a shift towards larger and more permanent villages due to an increasing reliance on cultivated plants such as corn, beans, squash, sunflower, and tobacco (Dodd et al. 1990; Foreman 2011; Fox 1990; Lennox and Fitzgerald 1990; Murphy and Ferris 1990).

After 1525 AD communities of pre-contact Indigenous peoples of the Late Ontario Iroquoian Period who had formerly lived throughout southwestern Ontario as far west as the Chatham area moved further east to the Hamilton area. During the late 1600s and early 1700s, the French explorers and missionaries reported a large population of Iroquoian peoples clustered around the western end of Lake Ontario. They called these people the "Neutral", because they were not involved in the ongoing wars between the Huron and the League Iroquois located in upper New York State.

It has been satisfactorily demonstrated that the Late Ontario Iroquoian communities which were located in southwestern Ontario as far west as the Chatham area were ancestral to at least some of the Neutral Nation groups (Lennox and Fitzgerald 1990; Smith 1990:283). For this reason, the Late Ontario Iroquoian groups which occupied southwestern Ontario prior to the arrival of the French are often identified as "Prehistorical Neutral". They occupied a large area extending along the Grand River and throughout the Niagara Peninsula as far east as Fort Erie and Niagara Falls (Lennox and Fitzgerald 1990:448).

4.2.2 Post-Contact Indigenous Period

The post-contact Indigenous occupation of southern Ontario was heavily influenced by the dispersal of various Iroquoian-speaking peoples, such as the Huron and closely related Petun, by the New York State Iroquois and the subsequent arrival of Algonkian-speaking groups from northern Ontario at the end of the 17th century and beginning of the 18th century (Schmalz 1991).

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

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

4.2.3 Post-Contact Euro-Canadian Occupation

4.2.3.1 Middlesex County

Following the Toronto Purchase of 1787, today's southern Ontario was within the old Province of Quebec and divided into four political districts: Lunenburg, Mecklenburg, Nassau, and Hesse. These became part of the Province of Upper Canada in 1791, and renamed the Eastern, Midland, Home, and Western Districts, respectively. The CH Study Area was within the former Hesse District, then later the Western District, which originally included all lands west of an arbitrary line running north from the end of Long Point on Lake Erie to the southernmost point of Georgian Bay. Each district was further subdivided into counties and townships.

Official interest in the area dates to 1792 and 1793, when Lieutenant-Governor for Upper Canada John Graves Simcoe and his wife Elizabeth visited the Forks of the Thames during an overland journey from Niagara to Detroit and back (Macleod 1972:155). For Simcoe, the area was naturally strategic and an administrative centre for the colony; equidistant from Detroit and Niagara and well inland from the hostile US border, it could support nearby naval bases on three of the Great Lakes and be easily defended in the event of American attack (Macleod 1972:156). He subsequently ordered the lands of the Thames River basin be surveyed for European habitation and with the Chippewa Nation negotiated a land surrender called London Township Treaty No. 6. The treaty, witnessed on September 7, 1796 read:

> NOW KNOW YE, that we the said principal Chiefs, Warriors and People of the Chippewa Nation for and in consideration of the sum of twelve hundred pounds Quebec currency value in goods estimated according to the Montreal price now delivered to us…beginning at a certain station on the north bank of the said river about nineteen miles above the Deleware [sic] Village following the windings of the said river and about twelve miles distant from the said village in a direct northerly course, being about two miles above a lime stone rock and spring on the said river which station will be more perfectly found by a line run from the main or lower fork at London six miles on a course south, sixty-eight degrees thirty miles; thence north sixty-eight degrees thirty minutes east twelve miles' thence south twenty-one degrees thirty minutes east till it intersects a right line running from the upper forks of the said river at Oxford to the main or lower forks of the said river at London; thence along the said line to the said upper forks on a course north sixty-eight degrees thirty minutes east; thence down the said River Thames following the several winding and courses with the stream to the place of beginning (Indigenous and Northern Affairs Canada 2016).

Two years later, London District was formed from parts of the Home and Western Districts, with the district town established at what is now Turkey Point and Middlesex County formed from Suffolk County.

In 1801, Simcoe's former private secretary Colonel Thomas Talbot sold his commission to promote British settlement of the area, and hired surveyor Colonel Mahlon Burwell, who began his work in 1810 (Brunger 2019; Gentilcore and Donkin 1973). Both the surveys and settlement would be disrupted by the War of 1812, which came to the London area in 1813. After advancing up the Thames, American forces faced a combined British regular, militia, and First Nation force at Moraviantown, near Chatham. In the ensuing Battle of the Thames, the widely respected Shawnee leader Tecumseh was killed, and the British force was routed (Troughton and Quinlan 2009:43-44). During the 1814 campaign season, the Americans again met the British on the Thames, and the latter were again defeated at a skirmish on the Longwoods Road, also known as "Battle Hill" (Troughton and Quinlan 2009:44).

After the war, settlers began arriving in Middlesex County in numbers, concentrating first in Delaware Township, before spreading into Westminster Township and London Township.

4.2.3.2 Westminster Township

The first land patents for Westminster Township were issued as early as 1812, shortly after the initial surveys in 1809 and 1810 (Brock and Moon 1972). Settlement began in the southwest corner of the township along North Branch of the Talbot Road and followed by later settlements along Commissioners Road, with the southeast portion of the township being settled last. The township by 1817 had 107 houses and 428 people, including two schoolhouses, one grist mill and one sawmill (Brock and Moon 1972: 566). In 1842, the township now contained four grist and two sawmills while the population had grown to 3,376 (Smith 1846), while at mid-century the population was 4,525 residents with three grist mills, two carding machines, and a fulling mill (Brock and Moon 1972:566).

The London and Port Stanley Railway line, which runs north-south through the township, was fully operational by 1856 (Brock and Moon 1972: 566). Several small hamlets also developed within the township, including Byron, Lambeth, Hall Mills, Pond Mills, and Glanworth; these communities were settled over the course of the 19th century (Brock and Moon 1972: 577-581).

The growing City of London, however, would soon expand into the township. London South in Westminster Township was annexed by the City in 1890, and in 1961 a large portion of the township was annexed. In 1988 the Town of Westminster was established in an attempt to remain autonomous from London, but it too was annexed on January 1, 1993 (Tourism London 2019; Meligrana 2000).

4.2.3.3 CH Study Area

The CH Study Area includes parts of Lot 16 and Lot 17, Lot 18 to Lot 20, and part of Lot 21 on Concession 6 in the former Westminster Township. It also includes parts of Lot 16 to Lot 21 of Concession 5 and Concession 7.

Tremaine's *1862 Map of Essex County* identifies the CH Study Area as rural with widely dispersed structures (Figure 2). The only structures within the CH Study Area was located on the properties of Ezekiel Burley and M Jackson. By 1862 most of the lots had been subdivided

into half and other part lots, often creating irregular shaped parcels, and few family names are associated with more than a single half-lot. East of the CH Study Area was the Port Stanley Railway line connecting London to St. Thomas.

The 1878 map of Westminster Township in H.R. Page and Company's *Historical Atlas of Middlesex County* depicts buildings on more than a dozen properties in the CH Study Area (Figure 2), most associated with orchards. Most lots had now been further sub-divided into quarters. The map also clearly shows the dividing line between the Thames River and Lake Erie watersheds, with at least four primary channels draining in opposite directions within the CH Study Area.

The 1913 through 1941 national topographic system (NTS) maps show little change to the rural settlement pattern apart from a gravel pit being in operation on the northeast corner of White Oak Road and Scotland Drive by 1913. (Figure 3). The 1962 and 1973 NTS maps indicate that by 1962 almost all the land was cleared for crop farming with few trees remaining, except north of Scotland Drive. The 1962 NTS map also shows multiple buildings on most of the properties as well as Highway 401, constructed in 1959, running just north and west of the CH Study Areas. The most significant change shown on the 1973 NTS map is the addition of "160 ft." and "180 ft." radio towers.

Aerial photos dating from 1960 onward indicate that the area was primarily agricultural (Figure 4).

Client: Corporation of the City of London
Original Format is Tabloid 279mm x 432mm
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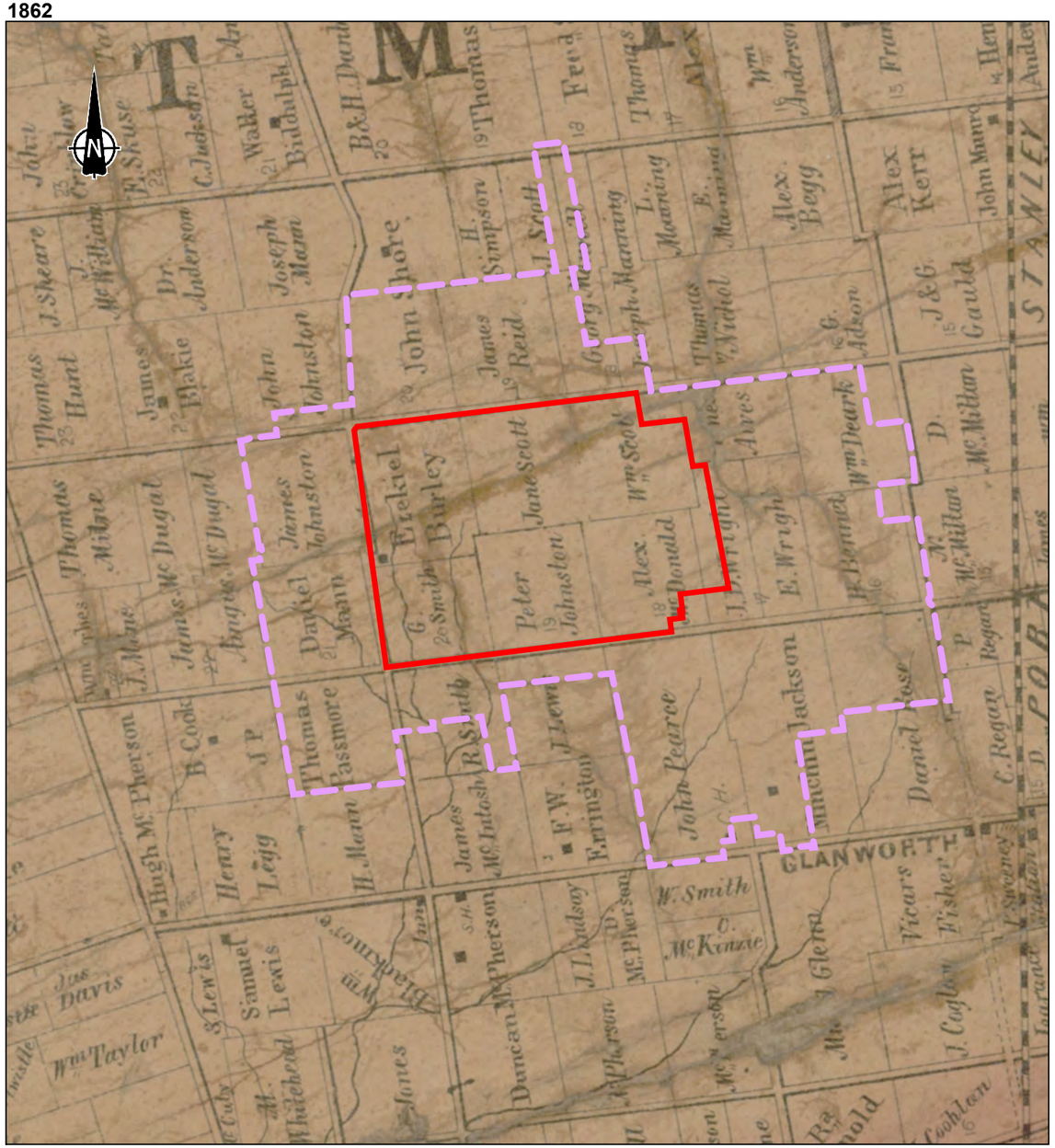
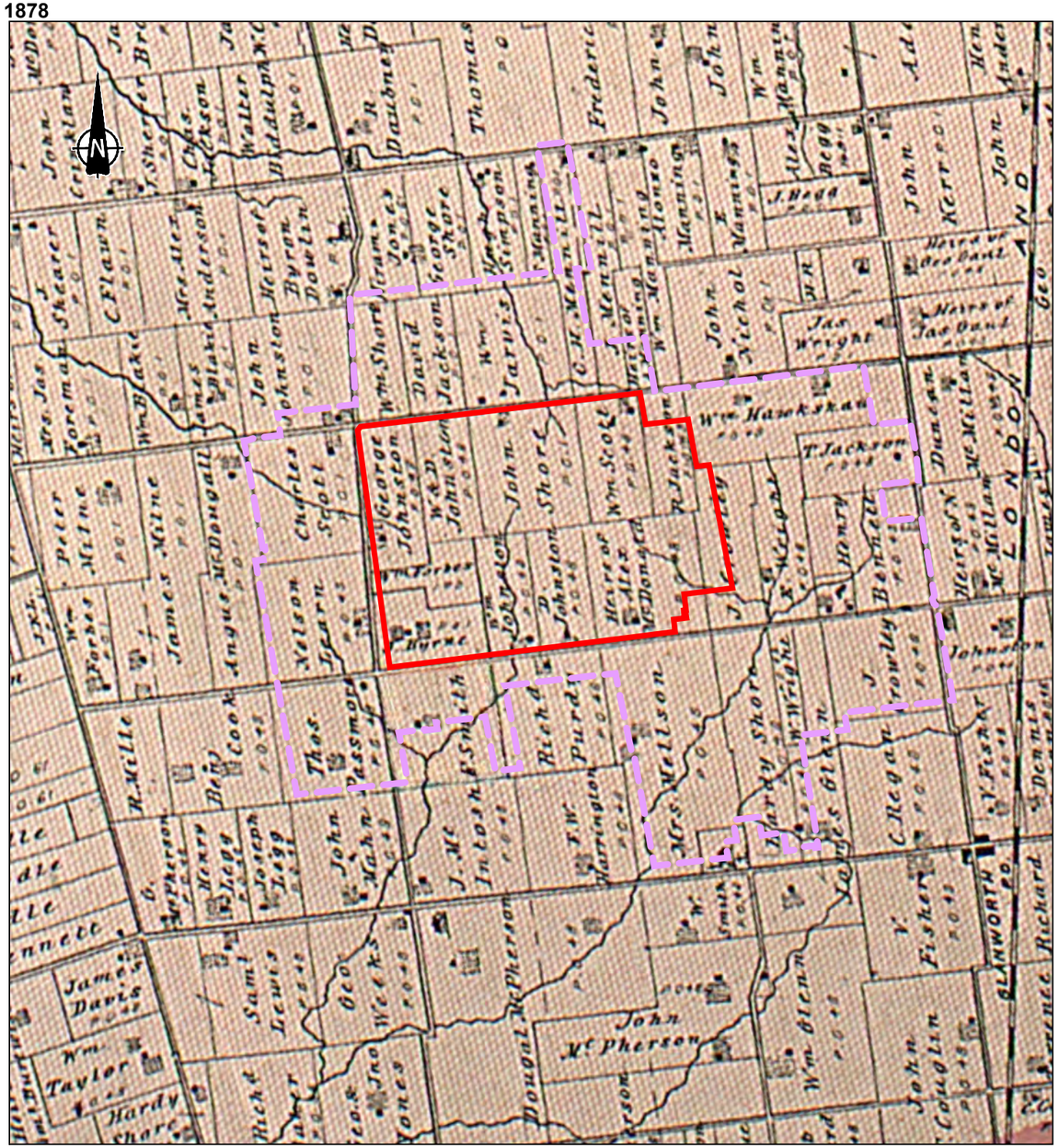
Drawing file: 1648176-6000-R01002.dwg

1862



1878



LEGEND

- APPROXIMATE LOCATION OF SITE STUDY AREA
- APPROXIMATE LOCATION OF CULTURAL HERITAGE STUDY AREA

REFERENCE

TREMAINE GEORGE R., 1862, TREMAINE'S MAP OF THE COUNTY OF MIDDLESEX. GEORGE C. TREMAINE., TORONTO; PAGE, H.R. AND CO., 1878, ILLUSTRATED HISTORICAL ATLAS OF MIDDLESEX COUNTY. H.R. PAGE & CO., TORONTO.

NOTES

THIS DRAWING IS SCHEMATIC ONLY AND IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT.

ALL LOCATIONS ARE APPROXIMATE.

PROJECT

ENVIRONMENTAL ASSESSMENT OF THE PROPOSED W12A LANDFILL EXPANSION LONDON, ONTARIO

TITLE

A PORTION OF TREMAINE'S 1862 AND H.R. PAGE & CO. 1878 ATLAS OF MIDDLESEX COUNTY

GOLDER

PROJECT No.			1648176	FILE No. 1648176-6000-R01002
			SCALE N.T.S.	REV.
CADD	ZJB/DCH	May 5/20		
CHECK				

FIGURE 2

Client: Corporation of the City of London

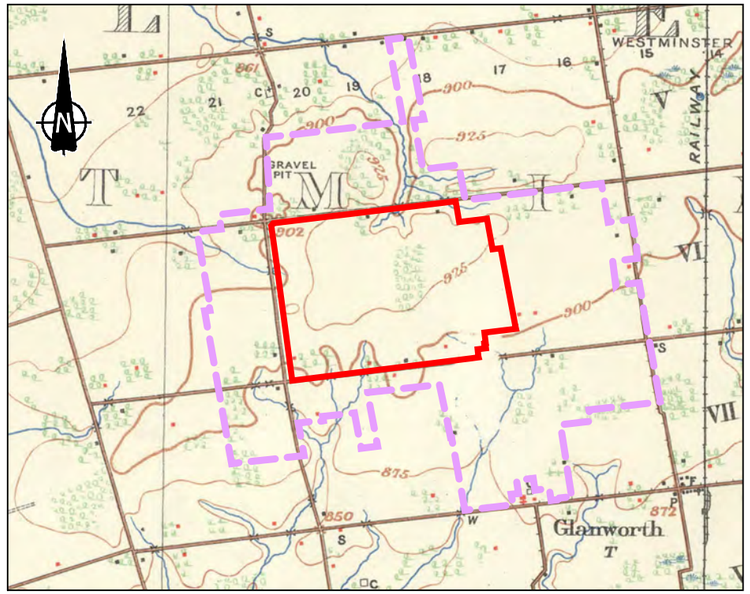
Original Format is Tabloid 279mm x 432mm

0 25mm

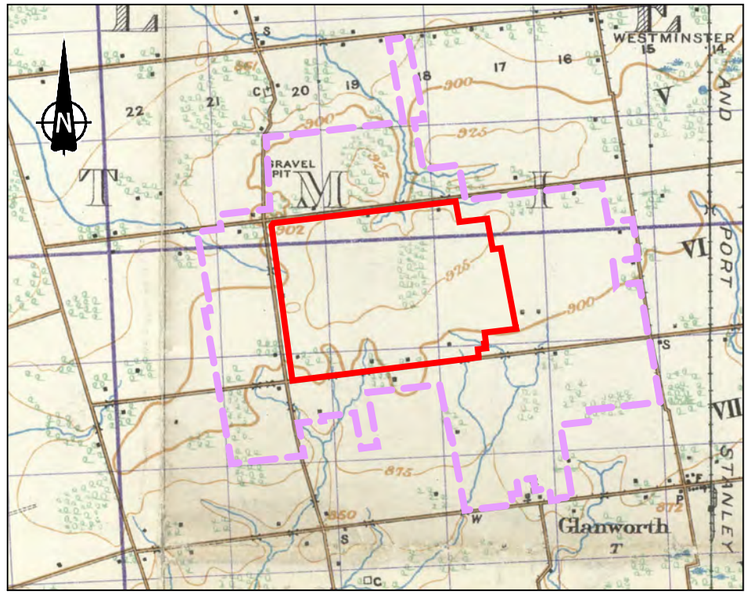
May 05, 2020 – 11:01am

Drawing file: 1648176-6000-R01003.dwg

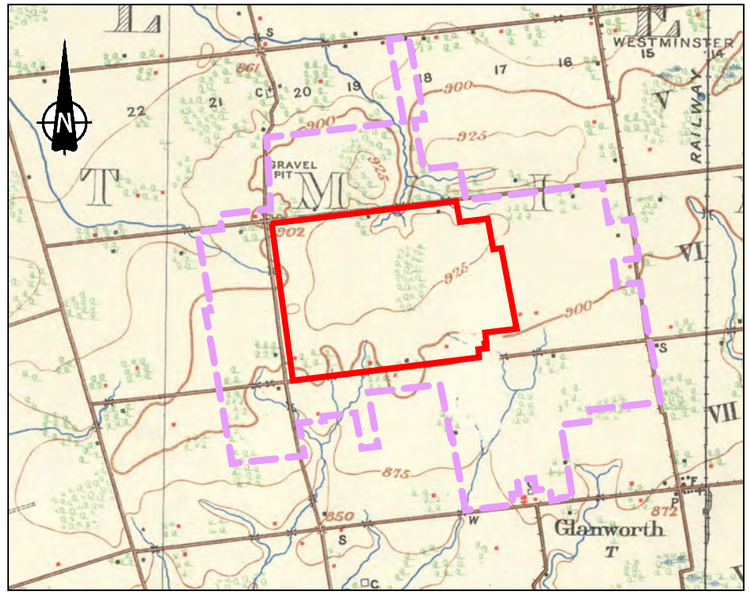
1913



1924



1934



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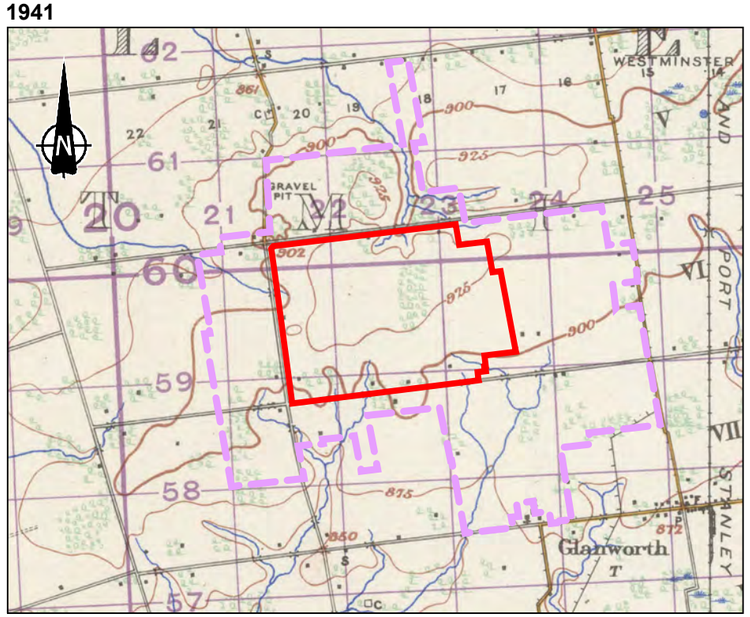

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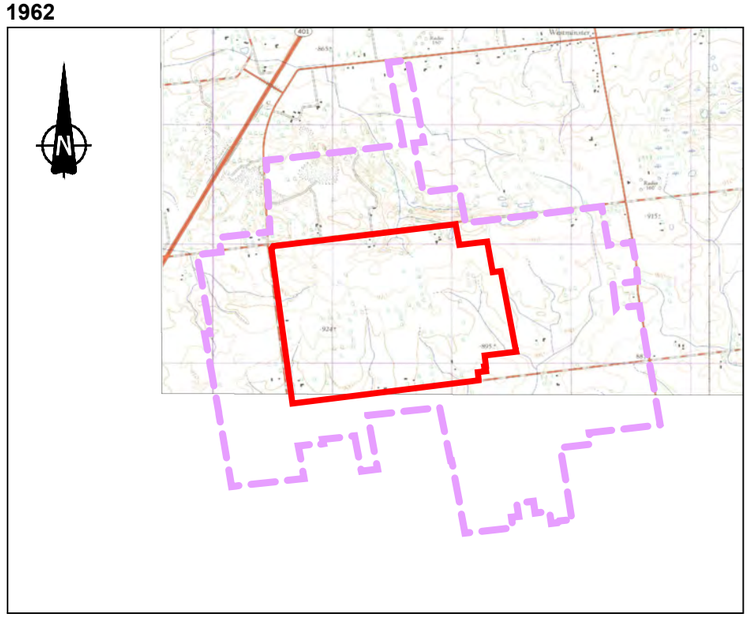
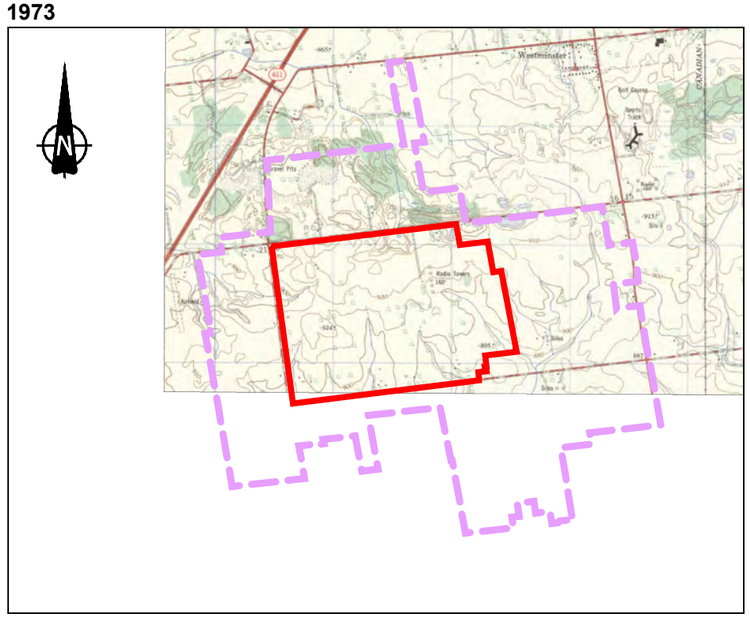


1973



LEGEND

- APPROXIMATE LOCATION OF SITE STUDY AREA
- APPROXIMATE LOCATION OF CULTURAL HERITAGE STUDY AREA

REFERENCE

DEPARTMENT OF MILITIA AND DEFENCE, 1913, ST THOMAS, ONTARIO. 1:63,360. MAP SHEET 040I14;
DEPARTMENT OF NATIONAL DEFENCE, 1924, ST THOMAS, ONTARIO. 1:63,360. MAP SHEET 040I14;
DEPARTMENT OF NATIONAL DEFENCE, 1934, ST THOMAS, ONTARIO. 1:63,360. MAP SHEET 040I14;
DEPARTMENT OF NATIONAL DEFENCE, 1941, ST THOMAS, ONTARIO. 1:63,360. MAP SHEET 040I14;
DEPARTMENT OF MILITIA AND DEFENCE, 1962, ST THOMAS, ONTARIO. 1:25,000. MAP SHEET 040I14G; AND
DEPARTMENT OF ENERGY, MINES AND RESOURCES, 1973, ST THOMAS, ONTARIO. 1:25,000. MAP SHEET 040I14G.

NOTES

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ALL LOCATIONS ARE APPROXIMATE.

APPROXIMATE SCALE IN METRES

0 400 800m

1:20,000

PROJECT

ENVIRONMENTAL ASSESSMENT OF THE PROPOSED W12A LANDFILL EXPANSION LONDON, ONTARIO

TITLE

PORTIONS OF THE 1913, 1924, 1934, 1941, 1962 AND 1973 TOPOGRAPHIC MAPS

GOLDER

PROJECT No.			1648176	FILE No. 1648176-6000-R01003
				SCALE AS SHOWN / REV.
CADD	ZJB/DCH	May 5/20		
CHECK				FIGURE 3

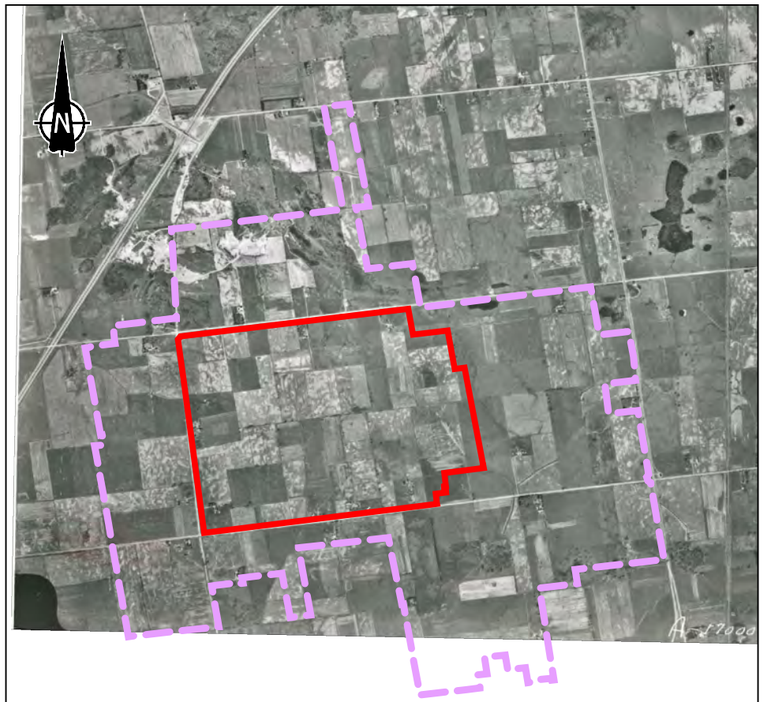
Client: Corporation of the City of London

Original Format is Tabloid 279mm x 432mm

0 25mm

Drawing file: 1648176-6000-R01004.dwg May 05, 2020 - 11:16am

1960



1971

1978

LEGEND

- APPROXIMATE LOCATION OF SITE STUDY AREA
- APPROXIMATE LOCATION OF CULTURAL HERITAGE STUDY AREA

REFERENCE

1960, A17000, PHOTO 34. 1:25,000. NATIONAL AIR PHOTO LIBRARY, APRIL 1960;
1971, A21596, 7, PHOTO 128. 1:30,000. ENERGY, MINES & RESOURCES CANADA. JUNE 1971;
1978, 4262, PHOTO 71. 1:10,000. MINISTRY OF NATURAL RESOURCES, ONTARIO;
1978, 4261, PHOTO 93. 10:000. MINISTRY OF NATURAL RESOURCES, ONTARIO.

NOTES

THIS DRAWING IS SCHEMATIC ONLY AND IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT.

ALL LOCATIONS ARE APPROXIMATE.

PROJECT

ENVIRONMENTAL ASSESSMENT OF THE PROPOSED W12A LANDFILL EXPANSION LONDON, ONTARIO

TITLE

PORTIONS OF THE 1960, 1971 AND 1978 AERIAL PHOTOGRAPHS OF WESTMINSTER TOWNSHIP

GOLDER

PROJECT No. 1648176			FILE No. 1648176-6000-R01004	
			SCALE N.T.S.	REV.
CADD	ZJB/DCH	May 5/20	FIGURE 4	
CHECK				

5.0 EXISTING CONDITIONS AND IDENTIFIED CULTURAL HERITAGE RESOURCES

As described in Section 2.0, known and potential built heritage resources were identified in the CH Study Area based on the MHSTCI *Checklist*, supplemented by field investigations, and analysis of aerial imagery, historical mapping, and architectural style or construction methods. Properties with buildings or structures 40 or more years old were field documented and evaluated as having potential CHVI if they met one or more of the criteria prescribed in *O. Reg. 9/06*.

Properties with buildings or structures 40 or more years old determined not to have CHVI are listed in APPENDIX A. These properties were determined not to have CHVI as they do not demonstrate:

- Design or Physical Value

  The structures on these properties were built in an architectural style or form common in their respective areas and were executed in widely available materials with no high level of craftsmanship. Additionally, there are no rare, unique or representative features associated with each property.

- Historical or Associative Value

  Based on background historical research conducted for this HIA, these properties were not found to be associated with significant themes, events, beliefs, persons, organizations, or institutions, nor to have potential to contribute to understanding of the community or culture.

- Contextual Value

  None of the properties define or support the character of their respective areas, are physically, functionally, visually or historically linked to their surroundings, nor would be considered landmarks of cultural heritage significance.

5.1 Setting

The setting of the CH Study Area can be characterized as rural and includes both agricultural and industrial land uses. The existing W12A Landfill is visually prominent due to its surrounding earthwork berm, while along Concession 4, north of Scotland Drive, there is a mix of agricultural, woodlot, and industrial facilities, with an aggregate pit located near the northeast corner of Scotland Drive and White Oak Road. The lands south, east, and west of the bounding roads are rural agricultural, except for the cemetery on the southeast corner of Manning Drive and White Oak Road. All roads are two-lane (one lane in each direction) and paved with gravel shoulders and drainage ditches either side within the municipal right of way (Figure 5). During the day the roads are travelled by trucks moving to and from the gravel pit (Figure 6). At the time of field investigations on August 29, 2019, earthworks associated with the landfill operations were under construction at 3947 Scotland Drive, near the southeast corner of White Oak Road (Figure 7).

The CH Study Area has a locally undulating to rolling terrain level that rises to the top of the Ingersoll Moraine, (Figure 8). The undulating terrain is most pronounced along Scotland Drive where there are large seasonal ponds and wetlands but to the south and east the land levels out.

Views of the existing W12A Landfill from the north and northwest are limited because of the rise in elevation, while views from the immediate south and west, on Manning Drive and White Oak Road, respectively, are completely obstructed by the significant berm around the existing W12A Landfill (Figure 9 and Figure 10). The widest vistas are those from the more gradual slopes to the east and south (Figure 11).

Vegetation in the CH Study Area is primarily deciduous tree varieties (Figure 12) with some coniferous stands to the northeast as well as some conifers planted on the berm. The largest woodlots are on the north side of Scotland Drive; in addition to these wooded areas, 3713 Scotland Drive contains a large lowland area overtaken by grasses and shrubs (Figure 13).

Figure 5: Scotland Drive East of White Oak Road, Facing West

Figure 6: Trucks Travelling Along Scotland Drive, Facing West

Figure 7: Earthworks Associated with the Landfill, 3947 Scotland Drive, Facing South

Figure 8: Top of the Ingersoll Moraine from Scotland Drive, Facing South

Figure 9: North Berm of the Existing W12A Landfill as Viewed from White Oak Road, Facing East

Figure 10: South Berm of the Landfill along Manning Drive, Facing Northeast

Figure 11: View from Wellington Road South, Facing West

Figure 12: Tree Lines and Landfill from Wellington Road South, Facing West

Figure 13: Grass and Shrub Lowland at 3713 Scotland Drive, Facing South

5.2 Identified Cultural Heritage Resources

An initial cultural heritage existing conditions review to inform the 2019 approved Amended ToR identified the following resources in the vicinity of the existing W12A Landfill:

- Six (6) properties inventoried on the City's 2006 *Inventory of Heritage Resources* and/ or the Heritage Parcels Geographic Information System (GIS) layer
- Twenty (20) properties that were adjacent to properties inventoried on the 2006 *Inventory of Heritage Resources* and/or the City Heritage Parcels GIS layer
- Seven (7) properties with buildings or structures 40 or more years old, and
- Seven (7) properties that contain structures with unknown cultural heritage value or interest

A list of the properties inventoried in the approved Amended ToR is provided in APPENDIX B.

After defining the scope for this HIA and the CH Study Area, Golder identified the following known and potential cultural heritage resources:

- Four (4) properties with built heritage resources listed (not designated) on the City *Register of Cultural Heritage Resources*
- One (1) potential cultural heritage landscape listed (not designated) on the City *Register of Cultural Heritage Resources*, and
- Two (2) properties with buildings or structures 40 or more years old with potential CHVI that meet at least one criterion prescribed in *O. Reg 9/06*

One (1) additional property with buildings or structures 40 or more years old was also identified, but evaluated to not meet at least one criterion for CHVI prescribed in *O. Reg 9/06.*

The listed heritage properties, cultural heritage landscape, and properties of potential CHVI are inventoried in Table 3 in order from north to south, and illustrated in Figure 13. The property evaluated as not having potential CHVI is listed in APPENDIX A.

The description, evaluation, and heritage attributes of 5435 White Oak Road, 4067 Scotland Drive, 3691 Manning Drive, and 3243 Manning Drive are based on the 2006 Archaeologix study, and the description and evaluation of 6100 White Oak Road is excerpted from the City *Report to the London Advisory Committee on Heritage: Demolition Request for Dwelling on Heritage Listed Property at 6100 White Oak Road by the Islamic Cemetery of London* (City of London 2019).

Table 3: Known and Potential Cultural Heritage Resources Identified in the CH Study Area

Civic Address	Photograph	Description	CHVI	Heritage Attributes	Cultural Heritage Status
3583 Westminster Drive		**Built heritage resource:** Storey-and-a-half vernacular Gothic Revival farmhouse built circa 1865. A gabled ell with L-shaped plan, there is a cross gable on the front façade with semi-circular headed window. The original first level windows have segmental arch heads. The veranda is supported by wood posts and there are high turned wood balusters.	The property has design or physical value for its residence, which is a typical vernacular expression of the Gothic Revival style, constructed circa 1865. The property also has potential historical or associative value for the connection between the house that stands today and the property's first patented owner George Mennill or his immediate relatives. It also has historical associations with the early Euro-Canadian settlement of Westminster Township.	Vernacular, storey-and-a-half gabled ell Gothic Revival farmhouse with: ▪ L-shaped plan ▪ Central cross gable with semi-circular headed window ▪ First-level windows with segmental arch heads ▪ Veranda with wood posts and turned balusters	Property listed (not designated) of the City *Register of Cultural Heritage Resources*
5435 White Oak Road		**Built heritage resource:** Two-storey late Georgian farmhouse with symmetrical fenestration and a shallow hipped roof. The three-bay façade features a central entrance with shed roof porch. The original red-brick exterior is now covered with horizontal vinyl siding.	The property has design or physical value for its residence, which dates to circa 1858 and may be a rare example of one of the oldest homes in the southern part of Westminster Township. The house also has design or physical value as a representative example of the Georgian style, still applied for vernacular farmhouses into the Victorian period. The property's historical or associative value is linked to its association with Westminster Township pioneers Peter and John Johnston, and the agricultural development of the Township. The property's contextual value relates to the visual prominence of the house on the landscape and its unusual orientation at an angle to the surrounding roads.	Late Georgian farmhouse with: ▪ Shallow, hipped roof ▪ Symmetrical fenestration ▪ Three-bay façade with central entrance ▪ Local red-brick construction ▪ Visual prominence on the landscape ▪ Orientation at an angle to surrounding roads	Property listed (not designated) of the City *Register of Cultural Heritage Resources*

Civic Address	Photograph	Description	CHVI	Heritage Attributes	Cultural Heritage Status
4067 Scotland Drive		**Built heritage resource:** This vernacular farmhouse dating to circa 1875 shows a Gothic Revival influence, primarily through its gabled ell front with steep cross gable in the side hall. It has a T-shaped plan with a bay window extending from the north end wall, and a single-storey gable roof wing added to the south end wall. A closed porch is over the main entrance on the east façade. As the house is covered with aluminium siding, ornamental details cannot be seen. The window openings have segmental or round arch heads, and the east entrance has a panelled door with round-headed sidelights.	The design or physical value of the property is tied to its residence, which is representative of a vernacular expression of the Gothic Revival style. The property's historical or associative value lies in its association with the Westminster Township pioneering family the Johnstons, as well as the agricultural development of the Township during the 19th century. The property has contextual value since it maintains and supports the rural character of the area.	Storey-and-a-half Gothic Revival vernacular farmhouse with: ▪ T-shaped plan ▪ Steep cross gable on the side hall ▪ Segmental or round arch headed window openings ▪ Main entrance with panelled door and round-headed sidelights ▪ Large rural property in a predominately agricultural context	Property listed (not designated) of the City *Register of Cultural Heritage Resources*
6100 White Oak Road		**Potential cultural heritage landscape:** When **t**he Islamic Cemetery of London was established in 2005-2006 the property included a dwelling that had been part of a farmstead. The barn associated with the dwelling was demolished prior to 1999.	Since 2006 all cemeteries in the City have been included on the *Register of Cultural Heritage Resources* since 2006. Pursuant to a demolition request, the dwelling was recently evaluated by the City heritage planner, who determined that it did not have CHVI. This evaluation is still being considered by London Advisory Committee on Heritage.	Potential cultural heritage landscape with: ▪ Cemetery land use and infrastructure	Property listed (not designated) of the City *Register of Cultural Heritage Resources*
3691 Manning Drive		**Built heritage resources:** Storey-and-a-half and three-bay Gothic Revival farmhouse with centre cross-gable built in 1875. The central front entrance features robust Italianate mouldings. The house is associated with a large central Ontario barn constructed of timber-frame on a stone foundation.	The property has design or physical value for its farmhouse, which is both representative of a vernacular expression of the Gothic Revival style, and one of few remaining in the area. It also has design or physical value for its large timber-frame barn, which is a typical and well-preserved example of a gable central Ontario type.	Storey-and-a-half Gothic Revival farmhouse with: ▪ Side gable roof with steep central cross-gable ▪ Three-bay symmetrical fenestration ▪ Robust Italianate mouldings around the front door Timber-frame barn with: ▪ Gable roof ▪ Board cladding ▪ Heavy hand-squared beams	Property listed (not designated) of the City *Register of Cultural Heritage Resources*

Civic Address	Photograph	Description	CHVI	Heritage Attributes	Cultural Heritage Status
6601/6603 Wellington Road South		**Potential built heritage resource:** Large barn with Gothic-arch roof that pre-dates 1960, but may be older. The first level wall is concrete, and there is vertical board cladding on the north and south gables.	The property has design or physical value for its Gothic arched barn, which is relatively rare in southern Ontario. Usually constructed of laminated trusses, an example of this size may display a high degree of craftsmanship.	Large barn with ▪ Gothic-arch roof ▪ Vertical board cladding ▪ Laminated truss construction	Property of Potential CHVI
3243 Manning Drive		**Potential built heritage resource:** This circa 1885 gabled ell vernacular farmhouse has a low gable roof over its L-shaped plan. The side hall has a lower wall than the ell and may predate it. Metal siding makes the original features difficult to distinguish. The front entrance is Italianate in style.	The property has design or physical value as a representative example of a gabled ell vernacular farmhouse. It also has contextual value since it maintains and supports the rural agricultural character of the area.	Gabled ell vernacular farmhouse with: ▪ L-shaped plan ▪ low gable roofs ▪ Side hall with lower wall height than the ell ▪ Italianate-styled front entrance	Property of Potential CHVI

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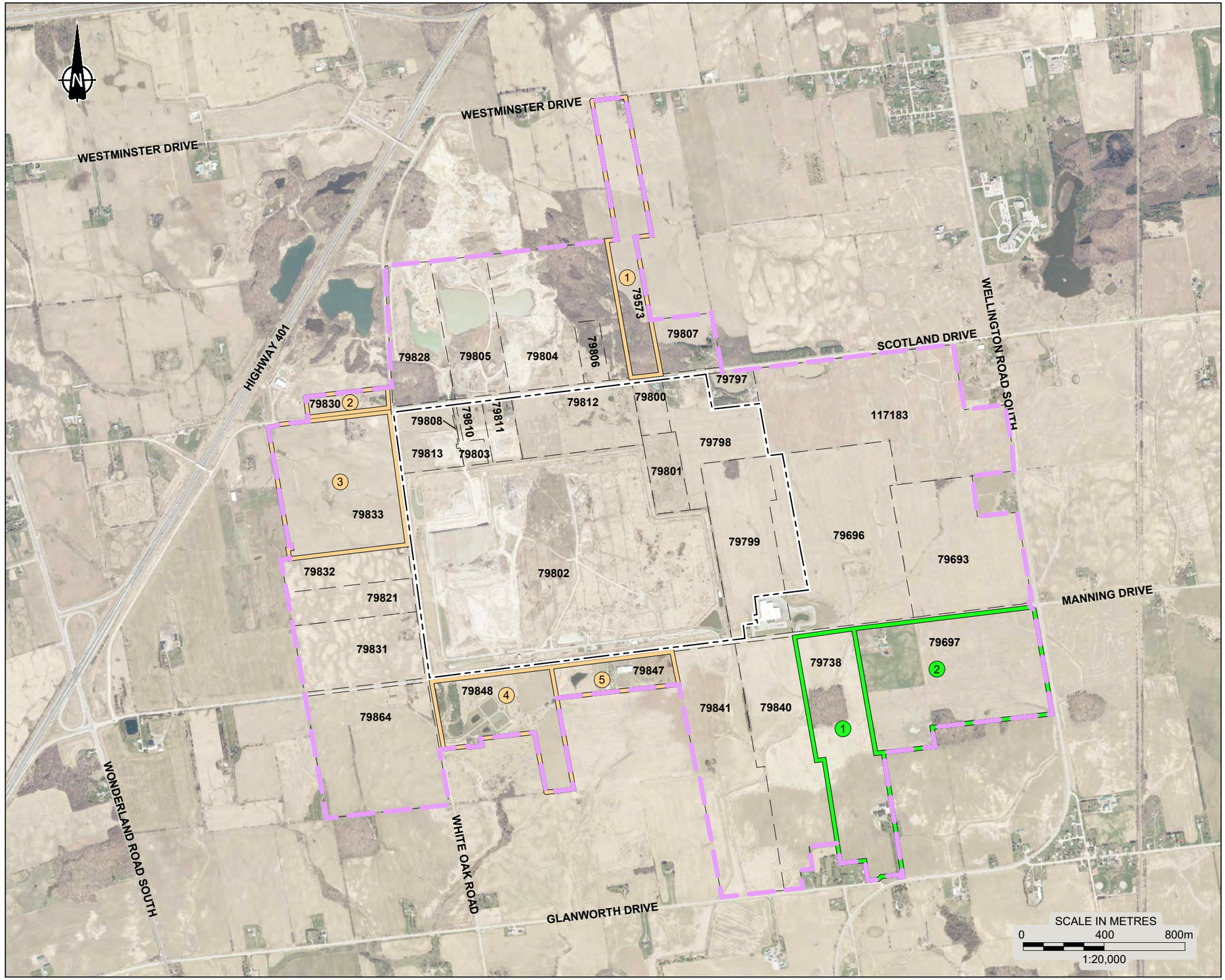

LEGEND

- APPROXIMATE LOCATION OF SITE STUDY AREA
- APPROXIMATE LOCATION OF CULTURAL HERITAGE STUDY AREA
- CULTURAL HERITAGE STUDY AREA PARCEL

(1) LISTED HERITAGE PROPERTY

ID	Description
1	3583 Westminster Dr
2	5435 White Oak Rd
3	4067 Scotland Dr
4	6100 White Oak Rd
5	3691 Manning Dr

(1) PROPERTY OF POTENTIAL CHVI

ID	Description
1	6601/6603 Wellington Rd S
2	3243 Manning Dr

REFERENCE

DRAWING BASED ON CITY OF LONDON, 2019 OPEN DATASET.

NOTES

THIS DRAWING IS SCHEMATIC ONLY AND IS TO BE READ IN CONJUNCTION WITH ACCOMPANYING TEXT.

ALL LOCATIONS ARE APPROXIMATE.

PROJECT

ENVIRONMENTAL ASSESSMENT OF THE PROPOSED W12A LANDFILL EXPANSION LONDON, ONTARIO

TITLE

SITE AND SITE-VICINITY STUDY AREAS: KNOWN AND POTENTIAL CULTURAL HERITAGE RESOURCES

GOLDER

PROJECT No.			1648176
CADD	DCH/ZJB	Feb 22/21	
CHECK			

FILE No. 1648176-6000-R01014

SCALE AS SHOWN REV.

FIGURE 14

6.0 IMPACT ASSESSMENT

6.1 Assessment Methodology

When determining the potential effects that a development or site alteration may have on known or potential built heritage resources or cultural heritage landscapes, the MHSTCI *Heritage Resources in the Land Use Planning Process* (MHSTCI 2006) advises that the following direct and indirect adverse impacts be considered:

- Direct impacts
  - Destruction of any, or part of any, significant heritage attributes, or features
  - Alteration that is not sympathetic or is incompatible, with the historic fabric and appearance
- Indirect Impacts
  - Shadows created that alter the appearance of a heritage attribute or change the viability of a natural feature or plantings, such as a garden
  - Isolation of a heritage attribute from its surrounding environment, context or a significant relationship
  - Direct or indirect obstruction of significant views or vistas within, from, or of built and natural features, or
  - A change in land use such as rezoning a battlefield from open space to residential use, allowing new development or site alteration to fill in the formerly open spaces

Other potential indirect impacts associated with the landfill expansion should also be considered. Heritage structures, particularly those built in masonry, are susceptible to damage from vibration caused by pavement breakers, plate compactors, utility excavations, and increased heavy vehicle travel in the immediate vicinity. There is no standard approach or threshold for assessing construction or traffic vibration impact to historic buildings but work within 60 m of a historic building is generally accepted to require precondition surveys, regular monitoring of the structures for visible signs of vibration damage, and traffic or construction separation (Carman *et al.* 2012:31). Like any structure, historic buildings are also threatened by collisions with heavy machinery or subsidence from utility line failures
(Randl 2001:3-6).

If adverse impacts are identified, the MHSTCI guidance suggests that mitigation be achieved through:

- Alternative development approaches
- Isolating development and the site alteration from significant built and natural features and vistas
- Design guidelines that harmonize mass, setback, setting, and materials
- Limiting height and density
- Allowing only compatible in-fill and additions
- Reversible alterations, and
- Buffer zones, site plan control, and other planning mechanisms

6.2 Description of the Proposed Expansion

The landfill expansion consists of a vertical expansion over the existing landfill footprint to provide 13.8 million m^3 of airspace for waste and daily cover. To accommodate ancillary features and provide additional on-Site buffer width compared to the existing landfill, the northern boundary of the landfill property will be adjacent to Scotland Drive and a 100 m buffer width will be provided on the east side of the landfill footprint and some additional area in the southeast corner to tie into the adjacent Material Recovery Facility (MRF) property line. This results in a 106.3 ha landfill footprint within a 191.7 ha landfill property, with a highest ridge elevation of waste of 318.43 masl.

6.3 Impact Assessment of the Proposed Expansion

An assessment of impacts resulting from the Proposed Expansion is presented in Table 4.

6.4 Mitigation and Monitoring Recommendations

Based on the results of the impact assessment, no cultural heritage mitigation or monitoring is recommended for any properties in the CH Study Area.

Table 4: Impact Assessment of the Proposed Expansion

Resource Type and Civic Address	Analysis of Impact	Conservation/ Mitigation Recommendations
Built heritage resource: 3583 Westminster Drive	The built heritage resource on this listed heritage property is approximately 1.25 km from the proposed works for the Proposed Expansion and will not be directly impacted through either destruction or alteration, nor indirectly impacted by shadowing, isolation, obstruction, a change in land use, or vibration during construction or operation. The property has design or physical value for its residence, which is a typical vernacular expression of the Gothic Revival style, constructed circa 1865. The property also has potential historical or associative value for the connection between the house that stands today and the property's first patented owner George Mennill or his immediate relatives. It also has historical associations with the early Euro-Canadian settlement of Westminster Township.	▪ No further cultural heritage studies or monitoring is recommended.
Built heritage resource: 5435 White Oak Road	The built heritage resource on this listed heritage property is over 60 m from the proposed works for the Proposed Expansion and will not be directly impacted through either destruction or alteration, nor indirectly impacted by shadowing, isolation, obstruction, a change in land use, or vibration during construction or operation. The property has potential design or physical value for its residence, which dates to circa 1858 and may be a rare example of one of the oldest homes in the southern part of Westminster Township. The house also has design or physical value as a representative example of the Georgian style, still applied for vernacular farmhouses into the Victorian period. The property's historical or associative value is linked to its association with Westminster Township pioneers Peter and John Johnston, and the agricultural development of the Township. The property's contextual value relates to the visual prominence of the house on the landscape and its unusual orientation at an angle to the surrounding roads.	▪ No further cultural heritage studies or monitoring is recommended.

Resource Type and Civic Address	Analysis of Impact	Conservation/ Mitigation Recommendations
Built heritage resource: 4067 Scotland Drive	The built heritage resource on this listed heritage property is over 60 m from the proposed works for the Proposed Expansion and will not be directly impacted through either destruction or alteration, nor indirectly impacted by shadowing, isolation, obstruction, a change in land use, or vibration during construction or operation. The design or physical value of the property is tied to its residence, which is representative of a vernacular expression of the Gothic Revival style. The property's historical or associative value stems from its association with the Westminster Township pioneering family the Johnstons, as well as the agricultural development of the Township during the 19th century. The property has contextual value since it maintains and supports the rural character of the area.	▪ No further cultural heritage studies or monitoring is recommended.
Potential cultural heritage landscape: 6100 White Oak Road	This cultural heritage landscape is over 60 m from the proposed works for the Proposed Expansion and will not be directly impacted through either destruction or alteration, nor will be indirectly impacted by shadowing, isolation, obstruction, a change in land use, or vibration during construction or operation. Since 2006 all cemeteries in the City have been included on the Register of Cultural Heritage Resources.	▪ No further cultural heritage studies or monitoring is recommended.

Resource Type and Civic Address	Analysis of Impact	Conservation/ Mitigation Recommendations
Built heritage resources: 3691 Manning Drive	The built heritage resources on this listed heritage property are over 60 m distant from the proposed works for the Proposed Expansion and will not be directly impacted through either destruction or alteration, nor will be indirectly impacted by shadowing, isolation, obstruction, a change in land use, or vibration during construction or operation. The property has design or physical value for its farmhouse, which is both representative of a vernacular expression of the Gothic Revival style, and one of few remaining in the area. It also has design or physical value for its large timber-frame barn, which is a typical and well-preserved example of a gable central Ontario type.	▪ No further cultural heritage studies or monitoring is recommended.
Potential built heritage resource: 6601/6603 Wellington Road South	The potential built heritage resource on this property is over 60 m (approximately 1 km) from the proposed works for the for Proposed Expansion and will not be directly impacted through either destruction or alteration, nor will be indirectly impacted by shadowing, isolation, obstruction, a change in land use, or vibration during construction or operation. The property has design or physical value for its Gothic arched barn, which is relatively rare in southern Ontario. Usually constructed of laminated trusses, an example of this size may display a high degree of craftsmanship.	▪ No further cultural heritage studies or monitoring is recommended.

Resource Type and Civic Address	Analysis of Impact	Conservation/ Mitigation Recommendations
Potential built heritage resource: 3243 Manning Drive	The potential built heritage resource on this property is over 60 m (approximately 350 m) from the proposed works for the for Proposed Expansion and will not be directly impacted through either destruction or alteration, nor will be indirectly impacted by shadowing, isolation, obstruction, a change in land use, or vibration during construction or operation. The property has design or physical value as a representative example of a gabled ell vernacular farmhouse. It also has contextual value since it maintains and supports the rural agricultural character of the area.	■ No further cultural heritage studies or monitoring is recommended.

7.0 SUMMARY STATEMENT AND RECOMMENDATIONS

The City of London is proposing an expansion of the existing W12A Landfill site (the Project) located at 3502 Manning Drive, part of Lots 18, 19 and 20 of Concession 6 in the former Township of Westminster, in the south end of the City of London Ontario.

The environment is considered in broad terms to include the natural, social, cultural, and economic aspects of the environment. This document presents the heritage component existing conditions and impact assessment for the Environment Assessment (EA) of the proposed W12A Landfill expansion. This work has been conducted in accordance with the requirements set out in the approved Amended Terms of Reference (ToR), dated February 2019.

This report is a supporting document to the Environmental Assessment Study Report (EASR).

At current disposal rates, the W12A Landfill site is expected to reach its approved capacity at the end of 2023. An additional 13,800,000 cubic metres of airspace at the W12A Landfill site, which will about double the current approved capacity, will be required to satisfy disposal requirements for residual waste for the next 25-year period.

The Proposed Expansion is a vertical expansion over the existing waste footprint.

The 2019 approved Amended ToR for the EA defined the “Site Study Area” as the exiting W12A Landfill site and all properties where landfill expansion may occur. The Site Study Area is bounded on the north by Scotland Drive, on the south by Manning Drive, on the west by White Oak Road, and on the east by the agricultural property and the Material Recovery Facility west of Wellington Road South.

To identify all cultural heritage resources potentially impacted by expansion of the W12A Landfill, a Cultural Heritage Study Area (CH Study Area) was defined for this HIA that included all parcels within, and adjacent to, the Site Study Area. This CH Study Area in most cases matches the extents of a Site-vicinity Study Area of 500 m.

Following guidance provided by the Ministry of Heritage, Sport, Tourism and Culture Industries (MHSTCI), this HIA provides: an overview of heritage legislation and policies in Ontario; an outline of the methods used to investigate and evaluate cultural heritage resources in the CH Study Area; and a summary of the historical development and existing conditions in the CH Study Area. This includes an inventory of all known and potential cultural heritage resources identified in each study area through background research, field investigations, and evaluation using the criteria prescribed in *Ontario Regulation 9/06.*

The second part of this report identifies and assesses in detail the predicted direct and indirect impacts of the Proposed Expansion on the cultural heritage resources found in the CH Study Area.

Specific conservation actions for the cultural heritage resources in the CH Study Area based on the results of background research, field investigations, and impact assessment are recommended in Table 5. Note that these recommendations are based on a current understanding of the project and may need to be re-visited if components are moved or altered during detailed design, or if it is determined that there will be impacts in areas of Site-vicinity Study Area excluded from this study.

Table 5: Identified Cultural Heritage Resources and Conservation Recommendations

Resource Type and Civic Address	Conservation/ Mitigation Recommendations
Built heritage resources (listed on the City *Register of Cultural Heritage Resources*) 4067 Scotland Drive 3583 Westminster Drive 5435 White Oak Road 3691 Manning Drive	▪ No further cultural heritage studies or monitoring is recommended. All built heritage resources on these listed heritage properties are beyond 60 m to 1.25 km distance from the limits of the Site Study Area and will not be directly or indirectly impacted by future construction and operation of the Proposed Expansion (vertical expansion).
Potential cultural heritage landscape (listed on the City *Register of Cultural Heritage Resources*) 6100 White Oak Road	▪ No further cultural heritage studies or monitoring is recommended. The listed cultural heritage landscape is over 60 m distance from the limits of the Site Study Area and will not be directly or indirectly impacted by future construction and operation of the Proposed Expansion (vertical expansion).
Potential built heritage resources: 3243 Manning Drive 6601/6603 Wellington Road South	▪ No further cultural heritage studies or monitoring is recommended. All potential built heritage resources on these properties are between 350 m to 1 km distance from the limits of the Site Study Area and will not be directly or indirectly impacted by future construction and operation of the Proposed Expansion (vertical expansion).

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9.0 SIGNATURE PAGE

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https://golderassociates.sharepoint.com/sites/114635/project files/5 technical work/1.0 - technical components/06 - heritage/report/01 draft/1648176-6000-r01-revb aug2020 heritage impact assessment.docx

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APPENDIX A

Properties with Buildings or Structures 40 or More Years Old Evaluated Not to Have CHVI

Table A1: Properties with Buildings or Structures 40 or More Years Old Evaluated Not to Have CHVI

Civic Address	Brief Description	Evaluation
4025/4069 Manning Drive	The remains of a partially demolished two-level barn with wood frame and metal siding. Wood-frame gambrel roof with sheet metal roofing.	This property does not demonstrate CHVI since it is mostly deconstructed and even when complete it did not display exceptional construction expertise or the use of special materials. It has no apparent historical associations.
3405 Scotland Drive	A c1975 one-and-one-half-storey red brick house with hip and valley roof, and two-storey porch on the north front.	This property does not demonstrate CHVI since it is executed with an average level of construction expertise with widely available materials. It has no apparent historical associations.
3465 Scotland Drive	A farm complex including a large bank barn (demolished), a low-gable wood frame barn on poured concrete foundation, and steel-frame shed.	This property does not demonstrate CHVI since the large bank barn on the property has been demolished. The remaining farm structures were constructed with an average level of construction expertise with widely available materials and are in poor physical condition. The property has no apparent historical associations.
3561 Scotland Drive	A 1960s single storey house; the original red brick is covered with aluminium siding. The original roof is open gable, with a shed roof addition on the south-east side of the building.	This property does not demonstrate CHVI since it is executed with an average level of construction expertise with widely available materials. It has no apparent historical associations.
3801 Scotland Drive	A c1978 two-storey red and brown brick house with open gable second-storey roof in a cross arrangement, with single-storey garage and rear wing. The second storey has gabled wall dormers on the north, south, and west fronts.	This property does not demonstrate CHVI since it is executed with an average level of construction expertise with widely available materials. It has no apparent historical associations.

APPENDIX B

Properties Inventoried in the Proposed Amended Terms of Reference

Table B1: Properties Inventoried in the Terms of Reference (2019)

Civic Address or Assessment Roll #	Description from Terms of Reference	Results of Study
4166 Scotland Drive	Adjacent to 5435 White Oak Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer	Property is not adjacent to the Site Study Area – not included in the HIA study
5435 White Oak Road	Listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer	Included in study -property identified as having CHVI
3900 Scotland Drive	Adjacent to 5435 White Oak Road and 4067 Scotland Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer	Property is not adjacent to the Site Study Area – not included in the HIA study
3696 Scotland Drive	Adjacent to 3583 Westminster Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer	Included in study – property has no potential CHVI
3583 Westminster Drive	Listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer	Included in study – property identified as having CHVI
3502 Scotland Drive	Adjacent to 3583 Westminster Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer Property includes house with unknown date of construction.	Included in study – property has no potential CHVI

Civic Address or Assessment Roll #	Description from Terms of Reference	Results of Study
3513 Westminster Drive	Adjacent to 3583 Westminster Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer Property includes house and barn with unknown date of construction.	Property is not adjacent to the Site Study Area – not included in the HIA study
5371 Wellington Road South	Property includes house and barn that may have been constructed more than 40 years ago.	Property is not adjacent to the Site Study Area – not included in the HIA study
4067 Scotland Drive	Listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer	Included in study - property identified as having CHVI
5725 White Oak Road	Adjacent to 4067 Scotland Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer Property includes house with unknown date of construction.	Property is not adjacent to the Site Study Area – not included in the HIA study
Assessment Roll # 080020170000000	Adjacent to 4067 Scotland Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer	Property is not adjacent to the Site Study Area – not included in the HIA study
3801 Scotland Drive	Property includes house with unknown date of construction.	Included in study – property has no potential CHVI
3713 Scotland Drive	Adjacent to 3583 Westminster Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer Property includes house that may have been constructed more than 40 years ago.	Included in study – property has no potential CHVI The house identified on the property has been demolished.

Civic Address or Assessment Roll #	Description from Terms of Reference	Results of Study
3561 Scotland Drive	Adjacent to 3583 Westminster Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer Property includes house that may have been constructed more than 40 years ago.	Included in study – property has no potential CHVI
3465 Scotland Drive	Adjacent to 3583 Westminster Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer Property includes barn that may have been constructed more than 40 years ago.	Included in study – property has no potential CHVI
3405 Scotland Drive	Property includes house and barn with unknown date of construction.	Included in study – property has no potential CHVI
3137 Scotland Drive	Adjacent to 5751 Wellington Road South, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer	Included in study – property has no potential CHVI
5529 Wellington Road South	Property includes house that may have been constructed more than 40 years ago. Appears at the same location as 3137 Scotland Drive	Property is not adjacent to the Site Study Area – not included in the HIA study
5595 Wellington Road South	Property includes house with unknown date of construction.	Property is not adjacent to the Site Study Area – not included in the HIA study
5615 Wellington Road South	Property no longer includes a house.	Property is not adjacent to the Site Study Area – not included in the HIA study

Civic Address or Assessment Roll #	Description from Terms of Reference	Results of Study
3502 Manning Drive	Adjacent to 4067 Scotland Drive, 6100 White Oak Road, and 3691 Manning Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer. This is the landfill.	Included in study – property has no potential CHVI
Assessment Roll # 080020139000000	Adjacent to 5751 Wellington Road South, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer	Included in study – property has no potential CHVI
5751 Wellington Road South	Listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer	Property is not adjacent to the Site Study Area – not included in the HIA study
4069 Manning Drive / 4025 Manning Drive	Adjacent to 6100 White Oak Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer Property possibly includes a barn that may have been constructed more than 40 years ago.	Included in study – property has no potential CHVI Barn located on the property has been demolished
6100 White Oak Road	Listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer	Included in study – property identified as having CHVI
6150 White Oak Road	Adjacent to 6100 White Oak Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer	Property is not adjacent to the Site Study Area – not included in the HIA study
3691 Manning Drive	Listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer	Included in study – property identified as having CHVI

Civic Address or Assessment Roll #	Description from Terms of Reference	Results of Study
Assessment Roll # 080020121000000	Adjacent to 6100 White Oak Road and 3691 Manning Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer	Property is not adjacent to the Site Study Area - not included in the HIA study
Assessment Roll # 080020075000000	Adjacent to 3691 Manning Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer	Included in study – property has no potential CHVI
Assessment Roll # 080020076000000	Adjacent to 3424 Glanworth Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer	Included in study – property has no potential CHVI
6601 Wellington Road South / 6603 Wellington Road South	Adjacent to 3424 Glanworth Drive and 3402 Glanworth Drive, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer Property includes house and barn with unknown date of construction.	Included in study – property has potential CHVI
3243 Manning Drive	Property includes house that may have been constructed more than 40 years ago.	Included in study – property has potential CHVI
5861 White Oak Road	Adjacent to 6100 White Oak Road, listed on the City of London Inventory of Heritage Resources 2006 and/or the City's Heritage Parcels GIS layer.	Included in study – property has no potential CHVI

D.10 Socio-economic Existing Conditions and Impact Assessment Report; completed by Golder Associates Ltd.

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REPORT

Socio-Economic Existing Conditions and Impact Assessment

W12A Landfill Expansion EA, City of London, Ontario

Submitted to:

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November 2020

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Acronyms and Glossary of Terms

Term / Acronym	Definition
BMP	best management practices
EA	Environmental Assessment
EASR	Environmental Assessment Study Report
ha	hectare
HSW	Household Special Waste
MHSW	Municipal Hazardous or Special Waste
MRF	Material Recovery Facility
ToR	Terms of Reference

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1.0 INTRODUCTION

The City of London is proposing an expansion of the existing W12A Landfill site (the Project) located at 3502 Manning Drive, part of Lots 18, 19 and 20 of Concession 6 in the former Township of Westminster, in the south end of the City of London, Ontario.

The environment is considered in broad terms to include the natural, social, cultural, and economic aspects of the environment. This document presents the Socio-Economic component existing conditions and impact assessment for the Environment Assessment (EA) of the proposed W12A Landfill expansion. This work has been conducted in accordance with the requirements set out in the approved Amended Terms of Reference (ToR), dated February 2019.

This report is a supporting document to the Environmental Assessment Study Report (EASR).

1.1 Approach and Methodology

The socio-economic environment considers those features that may be affected by landfill operations from the proposed landfill expansion such as residences, indoor and outdoor recreational facilities such as parks, trails and community centres, businesses (particularly ones with an outdoor component), community facilities such as schools, hospitals and emergency services, traffic and commute times, as well as municipal revenues and expenditures.

The socio-economic environment can be affected both directly and indirectly from both landfill construction work and operational activity. The most common socio-economic effects from landfill operations are nuisance effects such as dust, noise, litter and odour; these can be during both construction and operations phases and can affect the extent to which residents can use and enjoy their personal property and outdoor spaces. This has the potential to cause displacement of local residents who may leave the area due to these adverse effects. Vermin is another potential socio-economic concern associated with landfill sites, notably rats and gulls, and can be a concern for local residents and businesses (including farms). The visual appearance of the landfill is also an issue local residents will be aware of. Economically, the landfill contributes to municipal revenues and provides employment opportunities to the community. Costs to the City may be affected by increased heavy truck volume and effects on road surfaces as well as increased maintenance.

2.0 STUDY AREA CHARACTERIZATION

To characterize the existing environment in the vicinity of the proposed landfill expansion, secondary sources have been used. This includes Google maps, business and municipal websites and available reports on the existing landfill site as noted in Section 9.0. For the purposes of this EA, a radius of approximately 500 m from the Site Area has been used for characterization of relevant features and is identified as the Site-vicinity Study Area. Other notable features beyond that radius noted as the Wider Study Area have been noted where relevant, to give a more fulsome picture of the surrounding socio-economic environment.

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2.1 Demographic Profile

The Project is located within the City of London, Middlesex County. The 2016 census provides the following demographic profile of the area and provides data for Ontario as a whole for comparison:

Table 1: Demographic Profile - City of London, 2016

	City of London	Ontario
Population change (2011-2016)	4.8%	4.6%
Average Age	40.5	41
Gender	51% Male, 49% Female	48% Male, 52% Female
Average Household Income	$43,976	$49,571
Labour Force Participation Rate	63.2%	64.7%
Unemployment rate	7.9%	7.4%

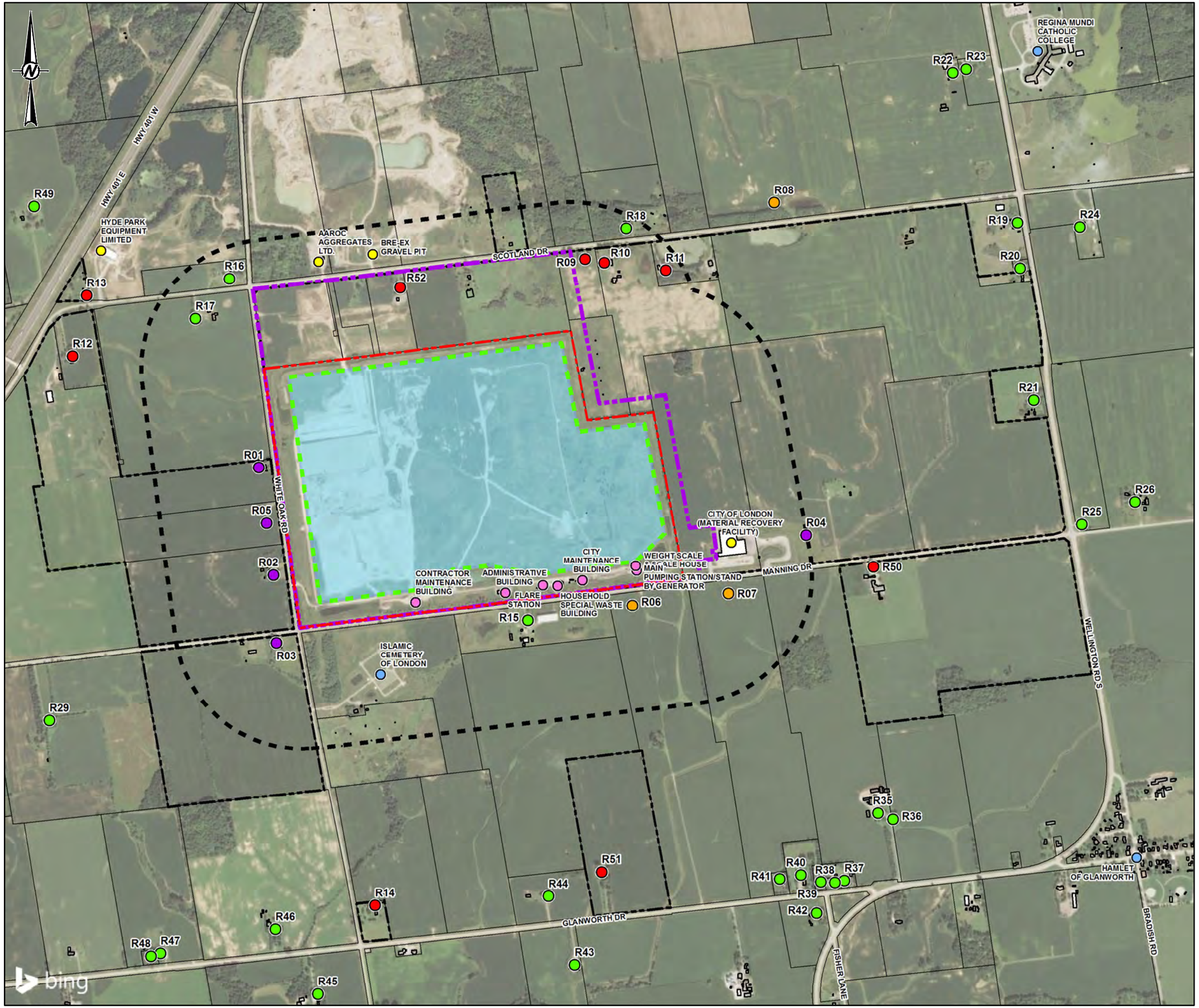
In 2016 the City of London had a population of 383,822, which represented an increase of 4.8% compared to 2011. This is similar to the provincial average. The average age of residents is 40.5 years, which is only slightly younger than the average for Ontario as a whole. The average household income is lower than the Ontario average and the labour force participation rate was also slightly lower. The unemployment rate is not significantly different to the province wide rate (Statistics Canada, 2016).

2.2 Existing Socio-Economic Landscape

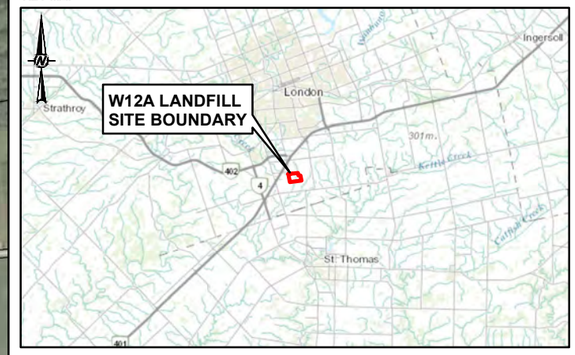
The socio-economic environment surrounding the W12A Landfill site is predominantly rural with few residential properties and farms in the Site-vicinity Study Area, a number of which are owned by the City of London itself. The hamlet of Glanworth is the closest residential area to the Site Area (approximately 1.7 km away to the southeast) as well as the Shaver Subdivision, located approximately 2.0 km to the northeast.

Aerial imagery shows mostly agricultural land and properties with small scale industrial type operations (e.g. auto works). In terms of businesses (excluding farms), there are few in the area. The most notable feature is the Westcliff Pit, operated by AAROC Aggregates, and the Bre-Ex Gravel Pit, operated by Brekelmens Holdings, both located on the north side of Scotland Drive, just north of the existing landfill and the Site Area. There is also a heavy equipment sales (Hyde Park Equipment) located on Scotland Drive to the northwest of the Site Area, as well as a general contractor (Ron Murphy Contracting) located on Manning Drive to the west of the landfill. The City's Material Recovery Facility, separate from the landfill, is located just to the east of the Site along Manning Drive. There are no schools, hospitals or other emergency service facilities in the Site-vicinity Study Area. The above businesses are unlikely to have outdoor elements that are essential to their patronage. The Islamic Cemetery of London is located to the south of the Site Area and is the only notable cultural feature in the area; this facility may host ceremonies outdoors as well as having regular visitors to grave sites. These could potentially be affected by noise, odour or dust from landfill operations and construction activities.

Figure 1 below shows the existing socio-economic environment in the Site-vicinity Study Area and Wider Study Area.



KEY MAP



SCALE 1:750,000

LEGEND

- SITE OPERATIONS
- BUSINESS OPERATIONS
- OTHER OPERATIONS

RESIDENTIAL

- CITY OWNED PROPERTY - EXISTING
- CITY OWNED PROPERTY - VACANT
- NON-CITY OWNED PROPERTY - EXISTING
- NON-CITY OWNED PROPERTY - VACANT

- BUILDING FOOTPRINT
- PROPERTY FABRIC
- CITY OWNED PROPERTY
- EXISTING PROPERTY BOUNDARY
- PROPOSED PROPERTY BOUNDARY
- EXISTING APPROVED LIMIT OF WASTE
- PROPOSED LIMIT OF WASTE
- SITE-VICINITY STUDY AREA

REFERENCE(S)

1. DATA PROVIDED BY THE CITY OF LONDON.
2. PROJECTION: TRANSVERSE MERCATOR DATUM: NAD 83
COORDINATE SYSTEM: UTM ZONE 17 VERTICAL DATUM: CGVD28

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0 150 300 600

1:15,000 METRES

CLIENT
CORPORATION OF THE CITY OF LONDON

PROJECT
SOCIO-ECONOMIC ASSESSMENT - W12A LANDFILL EXPANSION

TITLE
SITE PLAN

CONSULTANT
GOLDER

YYYY-MM-DD	2020-09-02
DESIGNED	----
PREPARED	JEM
REVIEWED	----
APPROVED	----

PROJECT NO.	CONTROL	REV.	FIGURE
1648176	0021	A	1

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2.3 Existing Operations

The City of London's W12A Landfill received approximately 304,000 tonnes of waste in 2019 (City of London, 2020) and collects waste generated within the City of London, the Municipality of Thames Centre, Lake Huron and Elgin Area Water Treatment Plants and the TRY Recycling Construction and Demolition Recycling Facility located just north of the City. There is also a Household Special Waste (HSW) facility and a public drop off depot for household garbage, appliances, Blue Box recyclables, brush, yard waste, cardboard, electronics, scrap metal, tires and wood. The HSW Depot accepts MHSW waste from the City of London, the County of Middlesex and the Oneida Nation of the Thames First Nations.

In 2019 the landfill component of the Site activities employed 11 full time and 2.1 full time equivalent seasonal staff working for the City directly, and about 4 to 5 full time equivalent staff working for a contractor at the landfill. The Project is not expected to change these numbers. In 2019, a total of 58 odour complaints were made by local residents; the majority of these complaints were in the evening between 6:00 pm and midnight. Complaints in recent years included 19 in 2014, 21 in 2015, 17 in 2016, 34 in 2017 and 60 in 2018 (City of London, 2020). The landfill's operating costs in 2019 were approximately $4.5 million and revenues were approximately $6.4 million.

Existing noise in the area will likely come from agricultural operations, limited industry and traffic as well as from the existing Site. Odour sources are related to agricultural practices and the landfill (see Volume IV, Appendices D.01 and D.02 for more information on odour and noise existing conditions, respectively). Vermin such as gulls are present at landfill sites but can be reduced through good site maintenance (e.g. litter control program, hawk program, etc.); no complaints were received regarding vermin or litter from the site in 2019 (City of London, 2020).

3.0 PROJECT DESCRIPTION

The landfill expansion consists of a vertical expansion over the existing landfill footprint to provide 13.8 million m^3 of airspace for waste and daily cover. To accommodate ancillary features and provide additional on-Site buffer width compared to the existing landfill, the northern boundary of the landfill property will be extended northward to Scotland Drive and a 100 m buffer width will be provided on the east side of the landfill footprint and some additional area in the southeast corner to tie into the adjacent MRF property line. This results in a 106.3 hectares (ha) landfill footprint within a 192.4 ha landfill property, with a highest ridge elevation of waste of 318.43 metres above sea level.

The expanded landfill will operate, at the maximum, from 7 a.m. to 5 p.m., Monday through Saturday plus one hour before, i.e., 6 a.m. to 7 a.m., for site preparations and one hour after, i.e., 5 p.m. to 6 p.m. to complete placement of daily cover. The Site will be closed on Sundays; on statutory holidays site operations will be as required to accommodate hauling contracts.

It is proposed that the maximum annual receipt of waste for the expanded landfill will be 500,000 tonnes per year, reduced from the 650,000 tonnes/year allowed for the existing landfill.

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The expanded landfill will also need to continue to occasionally operate 24 hours per day, 7 days per week when lime stabilized dewatered biosolids (dewatered sewage sludge) from the Greenway Wastewater Treatment Plant are being received and disposed at the landfill. This is typically required for three weeks per year; however, some years this period could be extended. In addition, re-builds or major equipment repairs typically occur approximately every five years or longer and can take up to two to three months to complete. The landfill typically receives a load of biosolids (approximately 15 tonnes) every 75 to 90 minutes. Disposal of the biosolids involves excavating a hole in the existing waste in the active area (when practical) prior to the load arriving and covering the biosolids with daily cover soil as soon as the load has been dumped.

The main site access for the expansion will be at the same location as for the existing site, off Manning Drive at the southeast corner of the Site. The main ancillary facilities are located along the perimeter road across the south side of the Site. It is proposed that many of the existing ancillary facilities at the site will be progressively upgraded or replaced during the expansion at or close to their existing location, except for a new site office / administration building to be relocated close to the site entrance and the small vehicle drop-off area to be relocated to the vacant southeast corner area between the landfill and the MRF. These facilities consist of the contractor's office and garage; administration building; flare and control system; weigh scales and scale house and leachate pump station; and small vehicle waste drop-off. A new enclosed night waste storage facility for receipt and temporary storage of three to five loads of waste may also be constructed; access to the landfill at night will be done using card key access and automatic gates. The new small vehicle drop-off area will include a new scale and scalehouse, a grade-separated small vehicle drop-off for waste, a grade-separated small vehicle drop-off for recyclable materials, an area for drop-off of brush, tires and large items, and a new Household Special Waste depot.

The source of heating for all site buildings will be natural gas.

The existing paved roads on the south and west sides of the landfill are paved and will remain paved for the expansion. It is proposed that the perimeter access road around the north and east sides of the landfill will also be asphalt surfaced, as will the vehicle access roads for the proposed recycling drop-off facilities in the southeast corner between the landfill facilities and the MRF. Access for collection vehicles to the expansion Phases will be mainly from the south side perimeter road, and for Phases 1E and 2E from the west side perimeter road. From the south side it is anticipated that the two existing granular surfaced haul roads will continue to be utilized.

An access off Scotland Drive will be used as a secondary site access and service road for operations and maintenance vehicles to the north part of the landfill property and as an emergency access/exit. The secondary access will have a locked gate to prevent unauthorized usage and will be gravel surfaced.

Figure 2 below shows the proposed landfill expansion area.

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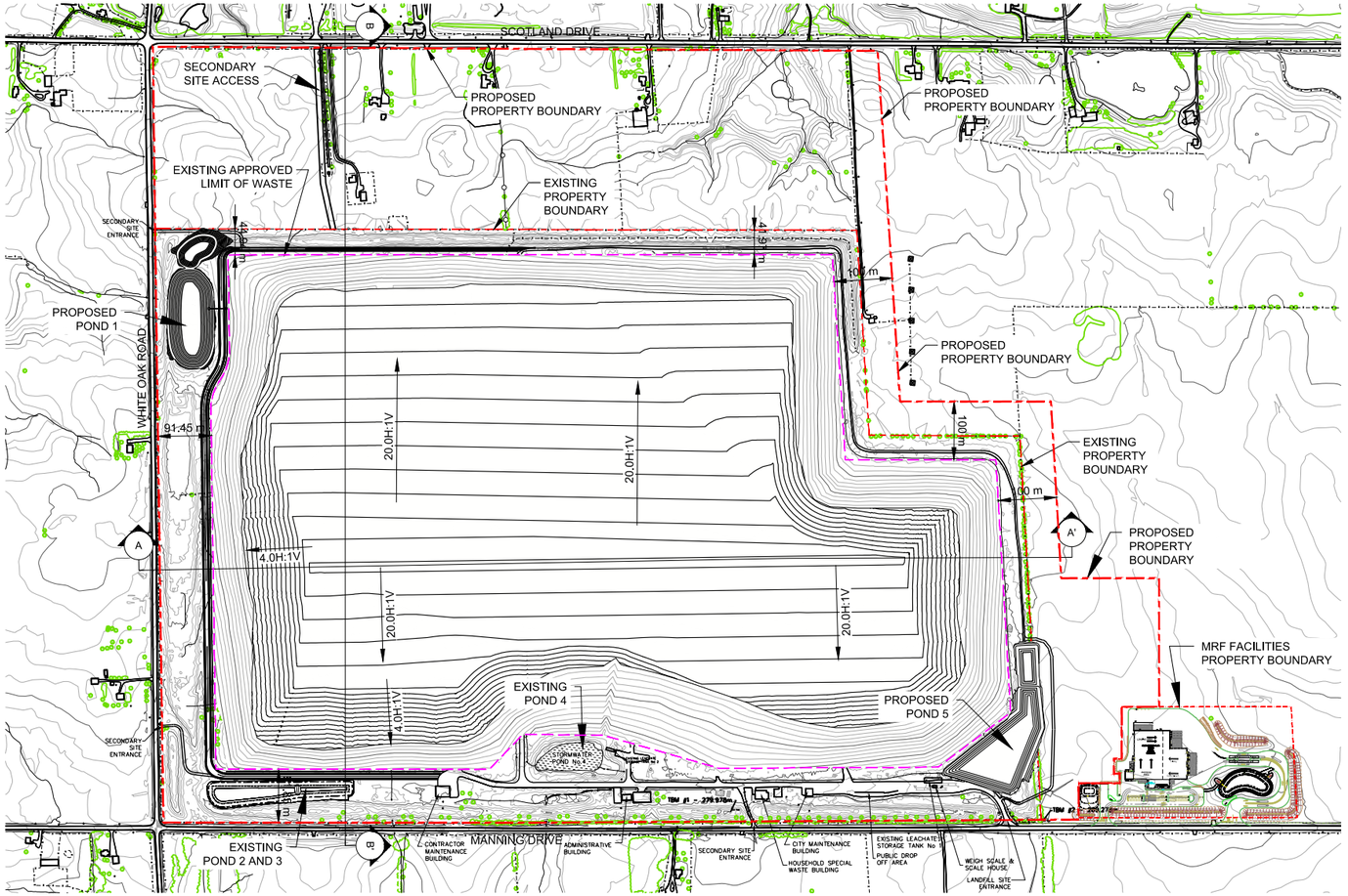

SITE PLAN
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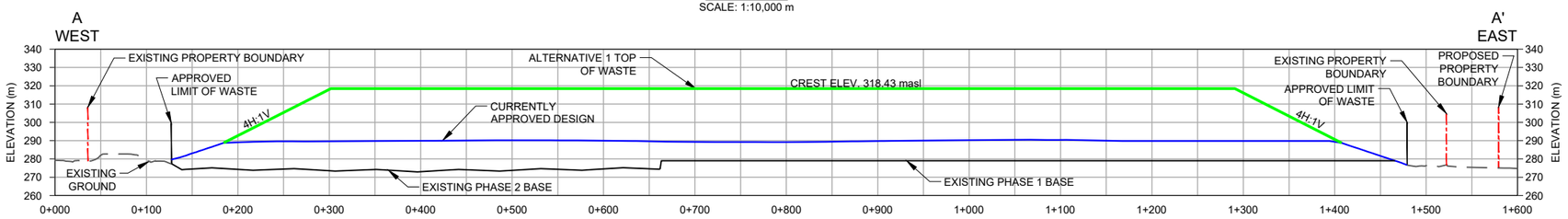
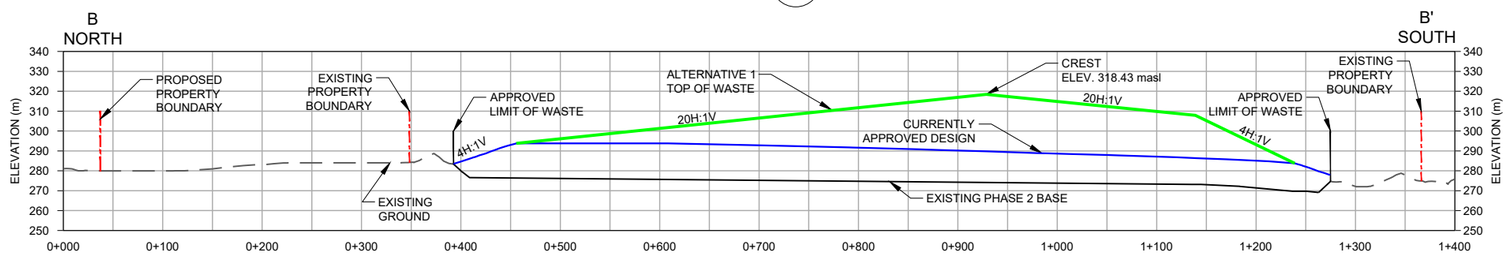
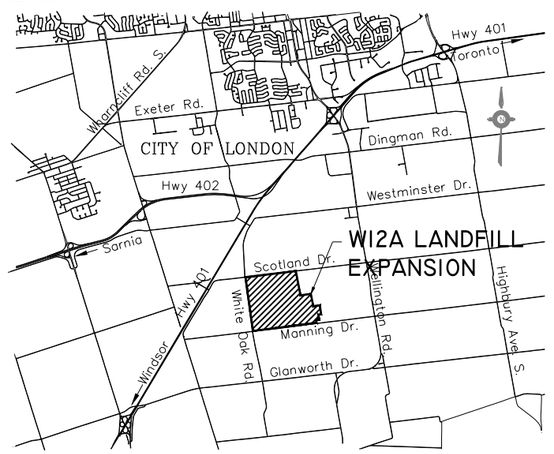


HORIZ. SCALE: 1:6,000 m
VERT. SCALE: 1:3,000 m
A-A' CROSS-SECTION



HORIZ. SCALE: 1:6,000 m
VERT. SCALE: 1:3,000 m
B-B' CROSS-SECTION

KEY MAP



NOTE(S)

1. ELEVATION CONTOURS SHOWN ARE TOP OF WASTE, masl.

REFERENCE(S)

BASE INFORMATION AND EXISTING CONTOURS AS PER CITY OF LONDON SURVEY DATED NOVEMBER 22, 2016.

NOT FOR CONSTRUCTION

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0 100 200
1:6,000 METRES

0 250 500
1:10,000 METRES

CLIENT
CORPORATION OF THE CITY OF LONDON
LONDON, ONTARIO
CANADA

PROJECT
SOCIO-ECONOMIC ASSESSMENT W12A LANDFILL EXPANSION

TITLE
LANDFILL EXPANSION FINAL CONTOUR PLAN AND CROSS-SECTIONS

CONSULTANT
GOLDER

YYYY-MM-DD	2020-10-22
DESIGNED	MLF
PREPARED	MLF
REVIEWED	PAS
APPROVED	PAS

PROJECT NO.	CONTROL	REV.	FIGURE
1648176	0017	B	2

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0 25 mm

4.0 IMPACT ASSESSMENT OF THE PROPOSED LANDFILL EXPANSION

This section evaluates the effects from the proposed landfill expansion (vertical expansion) on the socio-economic environment.

4.1 Methodology

The socio-economic environment is evaluated in a number of different ways and looks at both direct and indirect effects and the level of change that may result to the baseline environment described in Section 2.0.

Direct effects – These are effects to the socio-economic environment that occur as a direct result of a change to a socio-economic feature such as population change or employment effects.

Indirect effects – these are effects to the socio-economic environment that occur indirectly as a result of project related changes on other aspects of the environment (e.g., increased noise, dust or odour creating nuisance effects).

This assessment was completed in collaboration with data collection and analyses undertaken by other disciplines (including noise, air quality and visual). These data and analyses were used to determine the effects (both beneficial and adverse) associated with the measurable changes in the socio-economic environment resulting from the Project and identify mitigation measures that are technically and economically feasible to prevent, reduce or otherwise ameliorate the adverse environmental effects. For more detail on Air Quality, Noise and Visual impacts, refer to Volume IV, Appendices D.01. D.02 and D.11, respectively.

4.2 Evaluation of Effects

4.2.1 Local Economy

The following indicators were evaluated to assess effects to the local economy:

- Expected effect on local employment;
- Expected effects on local businesses and commercial activity; and
- Expected effects on municipal finances.

Potential Effects

The following criteria were used to evaluate potential effects on the local economy:

- Employment opportunities during landfill expansion construction and operation;
- Potential effects to local commercial businesses in the Site-area (excludes agriculture); and
- Capital costs associated with construction and operation.

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The local economy can be affected through the potential for the creation of new employment opportunities at the site. Effects to local businesses could occur through increased usage of services during construction or effects on operations that may change patronage. Increased capital costs associated with construction and operation may affect municipal finances, e.g., maintenance, equipment replacement, etc. These are evaluated using relevant figures and information provided by the City of London and findings from applicable discipline studies.

Evaluation of Effects on the Local Economy

The Project is not expected to create any new jobs in the community, the existing landfill workforce is deemed sufficient. It is estimated that with the additional infrastructure operations associated with the expansion, the annual operating cost could increase to $5 million. Several stop-controlled approaches along the haul routes are forecast to operate at a poor level of traffic control in the future (2048) conditions. However, traffic signals, if warranted, would be due to the projected increase of background traffic volume and/or movement of this background traffic and not the traffic associated with the landfill expansion. Other businesses (excluding farms) in the Site-vicinity Study Area are not anticipated to be affected negatively or positively as a result of the landfill expansion.

In terms of capital costs, the proposed expansion design has an estimated budget of $55 to $90 million, with a midpoint estimate of approximately $72 million (in 2020 dollars). Waste projections by the City of London show an increase in Industrial, Commercial and Industrial (IC&I) and water treatment plant residuals, both of which are charged tipping fees. It is also planned to increase the service area that may result in new waste coming to the landfill, which will be charged a tipping fee. Overall, revenue to the landfill will increase if the waste coming to the landfill matches the waste quantity projections.

4.2.2 Residents and Community

The following factors were evaluated to assess effects to the local economy:

- Displacement of residents; and
- Expected interference with use and enjoyment of residential properties (nuisance effects).

Potential Effects

The following criteria were used to evaluate potential effects on residents and communities in the Site-vicinity Study Area.

- Proximity to nearby residences; and
- Biophysical and social interactions with nearby residential and community receptors (i.e., noise, dust, odour, and nuisance wildlife/pests).

The effect of landfill operations on the local population and on the use and enjoyment of residences are typical public concerns. The proximity of the expanded landfill to residences may cause out-migration of local residents or discourage new residents from moving in. The extent to which local residents can use and enjoy their properties and outdoor spaces can be affected by project-related activity that results in, for example, litter, noise, odour, dust and/or vermin or change the visual aspect in an objectionable way. These are evaluated using

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findings from the respective studies for these components of the environment, as well as qualitative findings from engagement and professional judgement.

Evaluation of Effects on Local Residences and Community Features

There are eight properties that can be considered residential and have existing homes within the Site-vicinity Study Area; there are residences located on farm operations and about half of the residences in the Site-vicinity Study Area are owned by the City of London. The physical landfill expansion does not require any displacement of residences although the buffer lands identified by the City as being beneficial for on-going landfilling will require the removal of one residence located on a City-owned property north of the landfill expansion. The Islamic Cemetery to the south of the site is the only community feature within the Site-vicinity Study Area. Nuisance effects may affect use of outdoor spaces such as funeral ceremonies or visitors to the cemetery. To date, the City has never received a complaint from the Islamic Cemetery about the operation of the landfill. Current noise, dust and odour sources within the Site-vicinity Study Area will primarily be agricultural and traffic as well as potential noise, dust and odour from the existing site.

Air quality studies identified anticipated measurable air emissions and evaluated them to determine effects. The residual effects were evaluated and concluded that they do not result in adverse effects in terms of air quality, dust or odour for the neighbouring existing residences as they meet appropriate provincial regulatory limits. As such, interference with use and enjoyment of property and other outdoor spaces from air quality, dust or odour are not expected. Appropriate monitoring and best practice measures will control air quality, dust and odour levels such that they do not exceed acceptable levels.

Potential noise impacts were evaluated using existing information and predictive modelling. Ancillary equipment and emergency equipment are expected to operate below provincial sound level limits. The change in traffic noise levels between the existing landfill and the landfill expansion is insignificant to noticeable using the provincial scale to quantify this change; this is considered an acceptable change. On-site noise from the landfill expansion itself is predicted to require mitigation when the landfill operations are within 330 m of existing residential properties. There is only one residence that presently is located in this proximity and the mitigation is a berm that will act as a sound barrier when landfilling occurs in this limited area along the southern boundary of the expanded landfill. With this berm, the noise is predicted to be within allowable provincial requirements.
Concerns relating to traffic may include changes to access/egress to the site for trucks, increased truck traffic and noise from vehicles during construction and operations. No changes to access and egress are anticipated from the expanded site. As noted above, the anticipated increase in traffic as a result of increasing population and additional communities using the expanded landfill is not forecast to cause any issues with traffic movement along the haul routes. Applicable by-laws will be adhered to for truck traffic and operational hours, and good housekeeping practices will be maintained such that noise and emissions are not above acceptable levels.

Close views of the existing landfill are mainly seen by local residents and truck drivers on the landfill haul routes but can also be viewed from private residences in areas where individuals may be enjoying their property. Depending on the location from which the W12A Landfill is

viewed, features in the immediate landscape such as landscaping and buildings can take visual precedence over the landfill. The landfill expansion will have a high visual impact to three properties and have a moderate-high visual impact on two properties. Three of the five properties with moderate-high to high visual impacts are owned by the City and two properties are privately owned. All other properties will have a moderate visual impact or less. To reduce the visual impact of daily operations, waste would be placed initially to build a berm along the south side of the landfill's waste disposal area and will be covered with final cover soil and seeded to establish vegetation. With the expansion, the landfill property boundary will be moved northward to Scotland Drive and new berms with tree plantings will be constructed along the new property boundary (White Oak Road northward to Scotland Drive, Scotland Drive). The existing Community Enhancement and Mitigative Measures Program will be seeking stakeholder feedback on how the program can be improved including what are appropriate screening measures for private properties.
Vermin such as rats and gulls are concerns associated with landfill sites. No complaints regarding vermin have been noted and continued good site maintenance practices (e.g., application of daily cover, litter control program) will continue.

4.3 Summary of Effects Assessment

Table 2 below summarizes the criteria and indicators and potential effects from the proposed expansion.

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Table 2: Evaluation of Effects on the Socio-Economic Environment

	Indicator	Factors Used to Evaluate Potential Effects	Assessment of Effects	Conclusion
Local Economy	Expected effect on local employment. Expected effects on local businesses and commercial activity. Expected effects on municipal finances.	Employment opportunities during landfill expansion construction and operation. Potential effects to local commercial businesses in the Site-vicinity area (excludes agriculture). Capital costs associated with construction and operation.	There will be no decrease or increase in employment numbers at the landfill during operations. Contractors to be hired for construction. Local businesses neither positively nor negatively affected by the landfill expansion Increased costs will be incurred to construct the new landfill, which could be partially offset by increased revenues from an expanded service area and fees incurred from increased volume of industrial and water treatment plant waste. Operational costs are projected to be marginally higher than existing conditions.	The Project is not anticipated to have any lasting positive or negative effects on the local economy. Over time, the landfill will cost more and be a higher source of revenue for the City of London than currently.
Residences and Community	Displacement of residents. Expected interference with use and enjoyment of	Proximity to nearby residences. Biophysical and social interactions with nearby residential receptors (i.e., noise, dust, odour,	There are 8 residences within the Site-vicinity Study Area, most of which are owned by the City of London. Air quality and odour impacts are not anticipated to exceed	Out-migration is not anticipated since residents are already accustomed to living in an agricultural area and near the existing landfill

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	Indicator	Factors Used to Evaluate Potential Effects	Assessment of Effects	Conclusion
	residential properties (nuisance effects).	and nuisance wildlife/pests).	regulatory limits during construction or operations. Noise impacts associated with ancillary and emergency equipment and traffic are not anticipated to exceed regulatory limits. Noise impacts associated with landfill filling could exceed regulatory limits at one residence, but mitigation measures are available and will be used to reduce noise to within regulatory limits at this residence. Visual impacts are predicted at five residences that could be considered high or moderately-high but these impacts can be mitigated and will be discussed with the community. –Additional traffic related to the landfill expansion is not predicted to cause negative traffic-related issues.	where any noise, odour or dust associated with existing conditions are fairly commonplace. Nuisance effects are expected to be managed and mitigated appropriately so as not to cause increased issues for local residents and users of outdoor spaces.

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5.0 MITIGATION

Adherence to applicable municipal and provincial guidelines and best management practices (BMP) for effects such as litter, noise, dust or odour will assist in reducing potential effects to local residents. Examples include:

- Updating the existing Odour Management Plan
- Dust Management Plan
- Noise Best Management Practices
- Best practice measures and good housekeeping practices such as vehicle and equipment maintenance, use of mufflers, minimal idling, etc.
- Updating Complaints Response Protocol.

6.0 MONITORING

Appropriate monitoring of biophysical environment components such as noise, odour and dust are important such that potential effects to the socio-economic environment are minimized. Refer to the monitoring plans for air quality, noise, odour in Volume IV, Appendices D.01 and D.02. In addition to these, appropriate measures to respond to complaints and maintaining good community relations will help monitor public concerns and any unanticipated socio-economic complaints and address them as required.

7.0 OTHER APPROVALS

No specific approvals for the socio-economic environment apply; however, approvals for biophysical disciplines will be required.

8.0 CONCLUSION

The W12A Landfill site is located in a largely agricultural area with few socio-economic features of note. The most likely potential impact to the socio-economic environment is from nuisance effects such as litter, noise, odour or dust, which can affect use and enjoyment of private properties or outdoor spaces. The presence of the landfill and proposed changes to it associated with the expansion are not expected to result in any out-migration of existing residents who are accustomed to living in an area where agricultural and industrial noise is commonplace. Adherence to applicable by-laws and provincial guidelines as well as implementation of best management practices and mitigation will minimize potential effects on the existing environment. In terms of the local economy, no changes to employment or use of local vendors is anticipated and over time the landfill is expected to have increased costs and generate additional revenue for the City of London. Continued use of a complaints protocol and ensuring good community relations will be key tools in monitoring socio-economic effects during construction and operations.

9.0 LIMITATIONS

This report was prepared for the exclusive use of the City of London. The report, which specifically includes all tables, figures and attachments, is based on data and information collected by Golder Associates Ltd. and is based solely on the conditions of the properties at

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the time of the work, supplemented by historical information and data obtained by Golder Associates Ltd. as described in this report.

Electronic media is susceptible to unauthorized modification, deterioration and incompatibility and therefore authenticity of any electronic media versions of Golder's report should be verified.

Golder Associates Ltd. has relied in good faith on all information provided and does not accept responsibility for any deficiency, misstatements, or inaccuracies contained in the report as a result of omissions, misinterpretation, or fraudulent acts of the persons contacted or errors or omissions in the reviewed documentation.

The services performed, as described in this report, were conducted in a manner consistent with that level of care and skill normally exercised by other members of the engineering and science professions currently practicing under similar conditions, subject to the time limits and financial and physical constraints applicable to the services.

Any use which a third party makes of this report, or any reliance on, or decisions to be made based on it, are the responsibilities of such third parties. Golder Associates Ltd. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The findings and conclusions of this report are valid only as of the date of this report. If new information is discovered in future work, including excavations, borings, or other studies, Golder Associates Ltd. should be requested to re-evaluate the conclusions of this report, and to provide amendments as required.

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Signature Page

Golder Associates Ltd.

Sara Jarrett
Environmental and Social Impact Specialist

Trish Edmond, P.Eng.
Principal

SJ/TE/sg

https://golderassociates.sharepoint.com/sites/114635/project files/5 technical work/1.0 - technical components/07 - socio-ec/7.2 baseline conditions and effects assessment/1648176-london_ea-socioec-assessment.docx

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10.0 REFERENCES

City of London, 2019, *W12A Landfill Annual Status Report January 1 to December 31, 2018*.

City of London 2020, *W12A Landfill Annual Status Report January 1 to December 31, 2019*.

Statistics Canada, 2016: *Census profile*, 2016, City of London. Found at: https://www12.statcan.gc.ca/census-recensement/2016/dp-pd/prof/details/page.cfm?Lang=E&Geo1=PR&Code1=35&Geo2=CSD&Code2=3539036&SearchText=ontario&SearchType=Begins&SearchPR=01&B1=All&TABID=1&type=0

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