

# Appendix F

NATURAL HERITAGE AND ARCHAEOLOGICAL STUDIES



**Ministry of Tourism,  
Culture and Sport**

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November 4, 2016 (EMAIL ONLY)

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**RE: MTCS file #: 25WT050**  
**Proponent: City of Hamilton**  
**Subject: Notice of Public Information Centre #2**  
**Lynden Communal Water Supply**  
**Location: Municipality/Township/District, Ontario**

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Dear Ms. Vega:

Thank you for providing the Ministry of Tourism, Culture and Sport (MTCS) with the Notice of Public Information Centre (PIC) #2 for your project. MTCS's interest in this EA project relates to its mandate of conserving Ontario's cultural heritage, which includes:

- Archaeological resources, including land-based and marine;
- Built heritage resources, including bridges and monuments; and,
- Cultural heritage landscapes.

Under the EA process, the proponent is required to determine a project's potential impact on cultural heritage resources.

At the time of our earlier contact on this project, it was unknown whether technical studies would be necessary to evaluate cultural heritage impacts, and the evaluation of alternatives presented on the current PIC materials does not include cultural heritage factors. We are therefore unsure whether cultural heritage impacts have been screened out. The following is our general advice in determining the need for cultural heritage technical studies as part of the EA process.

While some cultural heritage resources may have already been formally identified, others may be identified through screening and evaluation. Aboriginal communities may have knowledge that can contribute to the identification of cultural heritage resources, and we suggest that any engagement with Aboriginal communities includes a discussion about known or potential cultural heritage resources that are of value to these communities. Municipal Heritage Committees, historical societies and other local heritage organizations may also have knowledge that contributes to the identification of cultural heritage resources.

**Archaeological Resources**

Your EA project may impact archaeological resources and you should screen the project with the MTCS *Criteria for Evaluating Archaeological Potential* to determine if an archaeological assessment is needed. MTCS archaeological sites data are available at [archaeology@ontario.ca](mailto:archaeology@ontario.ca). If your EA project area exhibits archaeological potential, then an archaeological assessment (AA) should be undertaken by an archaeologist licenced under the OHA, who is responsible for submitting the report directly to MTCS for review.

**Built Heritage and Cultural Heritage Landscapes**

The MTCS *Criteria for Evaluating Potential for Built Heritage Resources and Cultural Heritage Landscapes* should be completed to help determine whether your EA project may impact other cultural heritage resources. The Clerk for the City of Hamilton can provide information on property registered or designated under the *Ontario Heritage Act*. Municipal Heritage Planners can also provide information that will assist you in completing the checklist.

If potential or known heritage resources exist, MTCS recommends that a Heritage Impact Assessment (HIA), prepared by a qualified consultant, should be completed to assess potential project impacts. Our Ministry's *Info Sheet #5: Heritage Impact Assessments and Conservation Plans* outlines the scope of HIAs. Please send the HIA to MTCS for review, and make it available to local organizations or individuals who have expressed interest in heritage.

**Environmental Assessment Reporting**

All technical heritage studies and their recommendations are to be addressed and incorporated into EA projects. Please advise MTCS whether any technical heritage studies will be completed for your EA project, and provide them to MTCS before issuing a Notice of Completion. If your screening has identified no known or potential cultural heritage resources, or no impacts to these resources, please include the completed checklists and supporting documentation in the EA report or file.

Thank you for consulting MTCS on this project: please continue to do so through the EA process, and contact me for any questions or clarification.

Sincerely,

Dan Minkin  
Heritage Planner  
Dan.Minkin@Ontario.ca

Copied to: Michelle Albert, WSP Canada Inc

It is the sole responsibility of proponents to ensure that any information and documentation submitted as part of their EA report or file is accurate. MTCS makes no representation or warranty as to the completeness, accuracy or quality of the any checklists, reports or supporting documentation submitted as part of the EA process, and in no way shall MTCS be liable for any harm, damages, costs, expenses, losses, claims or actions that may result if any checklists, reports or supporting documents are discovered to be inaccurate, incomplete, misleading or fraudulent.

Please notify MTCS if archaeological resources are impacted by EA project work. All activities impacting archaeological resources must cease immediately, and a licensed archaeologist is required to carry out an archaeological assessment in accordance with the Ontario Heritage Act and the Standards and Guidelines for Consultant Archaeologists.

If human remains are encountered, all activities must cease immediately and the local police as well as the Cemeteries Regulation Unit of the Ministry of Government and Consumer Services must be contacted. In situations where human remains are associated with archaeological resources, MTCS should also be notified to ensure that the site is not subject to unlicensed alterations which would be a contravention of the Ontario Heritage Act.



**Ministry of Tourism, Culture and Sport**

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Apr 2, 2015

Blake Williams (P383)  
ASI Archaeological and Cultural Heritage Services  
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**RE: RE: Entry into the Ontario Public Register of Archaeological Reports:  
Archaeological Assessment Report Entitled, "Stage 1 Archaeological Assessment  
(Background Research and Property Inspection) Lynden Communal Well System  
Class Environmental Assessment Part Lot 16, Concession 1, Former Township of  
Ancaster City of Hamilton, Ontario", Dated Aug 16, 2013, Filed with MTCS Toronto  
Office on Aug 22, 2013, MTCS Project Information Form Number P383-006-2013**

Dear Mr Williams:

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 has been entered into the Ontario Public Register of Archaeological Reports without technical review.<sup>1</sup>

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 further information, please do not hesitate to send your inquiry to [ArchaeologyReports@Ontario.ca](mailto:ArchaeologyReports@Ontario.ca).

cc. Archaeology Licensing Officer  
Fatema Khalfan, Genivar Inc.  
Carmen Ches, City of Hamilton

<sup>1</sup>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.

**Stage 1 Archaeological Assessment  
(Background Research and Property Inspection)**

**Lynden Communal Well System  
Class Environmental Assessment  
Part Lot 16, Concession 1, Former Township of Ancaster  
City of Hamilton, Ontario**

Prepared for:

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Archaeological Licence P383 (Blake Williams)  
MTCS PIF P383-006-2013  
ASI File 13EA-045

August 7, 2013



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**Stage 1 Archaeological Assessment  
(Background Research and Property Inspection)**

**Lynden Communal Well System  
Class Environmental Assessment  
Part Lot 16, Concession 1, Former Township of Ancaster  
City of Hamilton, Ontario**

**EXECUTIVE SUMMARY**

Archaeological Services Inc. (ASI) was contracted by GENIVAR Inc. (Markham), on behalf of the City of Hamilton, to conduct a Stage 1 Archaeological Assessment (Background Research and Property Inspection) as part of the Lynden Communal Well System Class Environmental Assessment study. The Lynden Communal Well System study area is an approximately 16 hectare (ha) parcel adjacent to Governors Road within Lot 16, Concession 1, Former Township of Ancaster. The project involves installing a secondary well for the Lynden Rural Settlement Area Water Supply.

The Stage 1 archaeological assessment determined that no archaeological sites have been registered within a 1 km of the Lynden Communal Well System study area. A review of the historical and archaeological contexts of the study area suggests that it has potential for the identification of Aboriginal and Euro-Canadian archaeological resources.

Based on the results of the property inspection it was determined that part of the Lynden Communal Well System study area possesses features that indicate archaeological potential. The remainder was identified as not having archaeological potential due to areas of low and wet, or deep and extensive land disturbance. In light of these results, ASI makes the following recommendations:

1. Sections of the Lynden Communal Well System study area retain archaeological potential and require a Stage 2 archaeological assessment by pedestrian survey prior to any land disturbance;
2. Sections of the Lynden Communal Well System study area were documented to be permanently wet. As per Section 2.1 of the Ministry of Tourism, Culture, and Sport's (MTCS) *2011 Standards and Guidelines for Consultant Archaeologists (S & G)*, these lands were evaluated to have no or low archaeological potential and therefore do not require Stage 2 assessment;
3. Sections of the Lynden Communal Well System study area were documented to be building footprints and therefore extensively and deeply disturbed. As per Section 1.3.2 of *S & G*, archaeological potential is determined not to be present in these lands and therefore do not require Stage 2 assessment, and;

4. Should the proposed work extend beyond the current study area then further Stage 1 assessment must be conducted to determine the archaeological potential of the surrounding lands.

Notwithstanding the results and recommendations presented in this study, Archaeological Services Inc. notes that no archaeological assessment, no matter how thorough or carefully completed, can necessarily predict, account for, or identify every form of isolated or deeply buried archaeological deposit. In the event that archaeological remains are found during subsequent construction activities, the consultant archaeologist, approval authority, and the Cultural Programs Unit of the Ministry of Tourism and Culture should be immediately notified.



**ARCHAEOLOGICAL SERVICES INC.  
ENVIRONMENTAL ASSESSMENT DIVISION**

**PROJECT PERSONNEL**

<i>Senior Project Manager:</i>	Lisa Merritt, MSc [MTCS licence P094] <i>Senior Archaeologist, Assistant Manager, Environmental Assessment Division</i>
<i>Project Director (licensee):</i>	Blake Williams, MLitt [MTCS licence P383] <i>Staff Archaeologist</i>
<i>Project Manager:</i>	Paul David Ritchie, MA [MTCS licence P392] <i>Staff Archaeologist</i>
<i>Project Coordinator:</i>	Sarah Jagelowski, Hon BA [MTCS licence R405] <i>Research Archaeologist</i>
<i>Field Director:</i>	Peter Carruthers, MA CAHP [MTCS licence P163] <i>Senior Associate</i>
<i>Report Writer and Graphics:</i>	Paul David Ritchie
<i>Graphics</i>	Blake Williams <i>Geomatics Specialist</i>
<i>Report Reviewer:</i>	Lisa Merritt



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## 1.0 PROJECT CONTEXT

Archaeological Services Inc. (ASI) was contracted by GENIVAR Inc. (Markham) on behalf of the City of Hamilton to conduct a Stage 1 Archaeological Assessment (Background Research and Property Inspection) as part of the Lynden Communal Well System Class Environmental Assessment study. The Lynden Communal Well System study area is an approximately 16 hectares (ha) parcel adjacent to the south of Governor's Road, located in Lot 16, Concession 1, Former Township of Ancaster (Figure 1). The project involves installing a secondary well for the Lynden Rural Settlement Area Water Supply

This assessment was conducted under the project management of Paul David Ritchie, the project direction of Blake Williams (PIF P383-006-2013), and the senior project management of Lisa Merritt, all of ASI.

Section 1 of the Ministry of Tourism, Culture, and Sport's (MTCSS) *Standards and Guidelines for Consultant Archaeologists (S & G)* lists the objectives of a Stage 1 assessment as follows:

- To provide information about the geography, history, previous archaeological fieldwork and current land condition of the study area;
- To evaluate in detail the archaeological potential of the study area which can be used, if necessary, to support recommendations for Stage 2 Archaeological Assessment for all or parts of the property; and
- To recommend appropriate strategies for Stage 2 Archaeological Assessment, if necessary.

This report describes the Stage 1 assessment that was conducted for this project and is organized as follows: Section 1.0 summarizes the background study that was conducted to provide the archaeological and historical context for the project study area; Section 2.0 addresses the field methods used for the property inspection that was undertaken to document its general environment, current land use history and conditions of the study area; Section 3.0 analyses the characteristics of the project study area and evaluates its archaeological potential; Section 4.0 provides recommendations for the next assessment steps; and the remaining sections contain other report information that is required by the *S & G*, e.g., advice on compliance with legislation, works cited, mapping and photo-documentation.

### 1.1 Development Context

All activities carried out during this assessment were completed in accordance with the Municipal Engineers' Association document *Municipal Class Environmental Assessment* (2007), the Ministry of the Environment's (MOE) *Code of Practice: Preparing, Reviewing and using Class Environmental Assessments in Ontario* (2009), the *Ontario Heritage Act* (2005), and the *S & G*.

Authorization to carry out the activities necessary for the completion of the Stage 1 assessment was granted to ASI by GENIVAR Inc. (Markham) on February 27, 2013.





## 1.2 Historical Context

This section provides a brief summary of the past and present landuse and settlement history of the study area. A review of available primary and secondary source material was undertaken to produce a contextual overview of the study area, including a general description of Aboriginal and Euro-Canadian settlement and land use. Historically, the study area exists within Lot 16, Concession 1 in the Former Township of Ancaster, County of Wentworth.

### 1.2.1 Aboriginal Land Use

The Ancaster area is a well known locus for Archaic period settlement. The term Archaic refers to the cultural horizons after the Paleo-Indian period but prior to the advent of ceramic technology (Ellis *et al.* 1990). Many sites have been documented in the area that span 7,000 years. Large Archaic period sites have been well documented in the Big Creek drainage (Jackson and Morrison 1997). Steiss *et al.* (1997) have demonstrated how a number of sites in the Ancaster region had been continuously if intermittently occupied for approximately 7,000 years. This pattern of site re-use is likely indicative of the area being particularly rich in resources and that it continued to draw mobile populations for portions of the year over the span of millennia. Such a seasonal increase in population density has significant implications for our understanding of how territorialism and socio-politics developed in southern Ontario.

The first record of a European visit to southern Ontario was made in 1615 by Samuel de Champlain, who reported that a group of Iroquoian-speaking people situated between the New York Iroquois and the Huron-Wendat were at peace and remained “la nation neutre”. In subsequent years the French visited and traded among the Neutral, but the first documented visit was not until 1626, when the Recollet missionary Joseph de la Roche Daillon recorded his visit to the villages of the Attiwandaron, whose name in the Huron-Wendat language meant “those who speak a slightly different tongue” (the Neutral apparently referred to the Huron-Wendat by the same term). Like the Huron-Wendat, Petun and New York Iroquois, the Neutral people were settled village horticulturalists. The Neutral territory included discrete settlement clusters in the lower Grand River, Fairchild-Big Creek, Upper Twenty Mile Creek, Spencer-Bronte Creek drainages, Milton, Grimsby, Eastern Niagara Escarpment and Onondaga Escarpment areas.

Between 1647 and 1651, the villages of the Neutral were destroyed by the New York Iroquois, who subsequently settled along strategic trade routes on the north shore of Lake Ontario for a brief period during the late 17th-century. One French explorer who is known to have entered the Burlington Bay area during this period was Rene-Robert Cavalier de La Salle, who left Montreal with a flotilla of nine canoes and eventually reached the head of Lake Ontario in September of 1669. After landing, de La Salle’s group travelled to the Seneca village of Tinaouataoua, the exact location of which is open to speculation (ASI 2004:13-14), and his explorations in the area may have utilized the Humber Trail (MPP:1986 42).

During the late 17th and early 18th centuries, the former Neutral territory came to be occupied by the Mississauga, an Algonquian-speaking southeastern Ojibwa people whose subsistence economy was based on garden farming, as well as hunting, fishing and gathering wild plants. The Mississauga and other Ojibwa groups began expanding southward from their homelands in the upper Great Lakes in the late 17th century, coming into occasional conflict with the New York Iroquois who had established themselves in southern Ontario (although alliances between the two groups were occasionally established as well). The colonial government recognized the Mississauga as the “owners” of the north shore of Lake Ontario and entered into negotiations for additional tracts of land as the need arose to facilitate European settlement (ASI 2004:14).



### ***1.2.2 Township Survey and Settlement***

The land within Ancaster Township was acquired by the British from the Mississaugas in 1784. The first township survey was undertaken in 1793, and the first legal settlers occupied their land holdings two years later. The township is said to have been named after a town in Lincolnshire, England. Ancaster was initially settled by disbanded soldiers, mainly Butler's Rangers, and other Loyalists following the end of the American Revolutionary War. In 1805, Boulton noted that this township contained both excellent and indifferent soils. By the 1840s, the township was noted for its fine farms. The township was populated by a number of industries in the latter part of the nineteenth century including the Ancaster Knitting Factory. By 1875 the township was famous for mineral springs found in the township, the waters from which were considered therapeutic and medicinal (Armstrong 1985:141; Boulton 1805:79; Kernighan 1875:8; Rayburn 1997:11; Smith 1846:6).

The Lynden Communal Well System study area is located in the vicinity of three historic settlements: Copetown, Jerseyville, and Lynden.

#### *Copetown*

Copetown is situated on part Lots 30 and 31 Concession 1, Ancaster Township, and on part Lots 29 to 31 Concession 1, Beverly Township. The village was named in honour of the family of William Cope (1719-1813) who first settled this area in 1795 (Woodhouse 1973:94). A plan of subdivision for the village was laid out in 1856. In 1875, it contained two hotels, school, church, stores, a telegraph office, post office and one saw mill. It was a station on the Great Western Railroad. The population was about 200 (Cornell 1889:71-84, 213-220; Crossby 1873:93; Rayburn 1997:80; Winearls 1991:648).

#### *Jerseyville*

Jerseyville is situated on Jerseyville Road on part Lots 18 and 19 in Concessions 2 and 3, Ancaster Township. The first settlers were United Empire Loyalists from New Jersey and came in the 1790's, founding the "Jersey Settlement." It contained a wagon works, three general stores, sawmill, two grist mills, a planing mill, cheese factory, two blacksmiths, two brickyards, woodworking shop, shoemakers, two harness makers, tinsmiths and pump makers, physicians, and schools, Baptist, Methodist, and United churches. The Wesleyan Methodist church was constructed in 1801. This was used until 1860 when the new and present Jerseyville United Church was erected. The town also had a Methodist Episcopal church but this congregation united with the Wesleyan Methodist congregation in 1884. The post office was opened sometime before 1851 (Mika and Mika 1981: 375-376; Rayburn 1997:171; Woodhouse 1973:113-126). The population was about 150 (Crossby 1873:153).

#### *Lynden*

Lynden is situated at the intersection of Lynden Road and Governors Road. It was settled in the first half of the nineteenth century some time before 1835. In the 1840's Benony VanSickle (by whose name the community was originally known) built a sawmill. In 1851 the post office was built and the town's name was changed to Lynden. Following the construction of the Great Western Railway in 1855 Lynden saw the establishment of a second sawmill, a hotel, a tavern, a general store, a blacksmith shop, a large woollen factory, and an oil refinery. In the second half of the nineteenth a third lumber mill was established to produce fuel for the railway as well as shingles and a cooper shop. In 1879 a flour and chopping mill was opened. By 1889 there were sixteen sawmills in the Lynden area. Lynden also had a



pottery works, five institution lodges, and was a pioneering centre in the cash-cropping of turnips. The population of Lynden by the late nineteenth century was less than 500 people. Lynden was incorporated as a police village in 1905 and in the early twentieth century with the exhaustion of the forests the lumber industry at Lynden collapsed (Mika and Mika 1981: 586-587).

### **1.2.3 Historic Map Review**

The 1875 *Illustrated Historical Atlas of the County of Wentworth* was reviewed to determine the potential for the presence of historical archaeological remains along the study area during the nineteenth century (Figure 2). It should be noted, however, that not all features of interest were mapped systematically in the Ontario series of historical atlases, given that they were financed by subscription, and subscribers were given preference with regard to the level of detail provided on the maps. Moreover, not every feature of interest would have been within the scope of the atlases.

Historically, the study area formed part of Lot 16, Concession 1 of Ancaster Township in the County of Wentworth. A. Jones owned the NW  $\frac{1}{4}$  of Lot 16, Concession 1 and features a farmhouse within the study area.

Transportation and communication networks are important because they serve to integrate social and economic activities between disparate settlement centres. As these settlements grew, and traffic increased between them, toll gates, taverns, hotels and other services for travellers were established where major transportation routes were crossed. Early overland routes followed the natural topography, avoiding swamps or rocky outcrops. The historic thoroughfares surrounding the study area, however, were opened along the straight survey lines, creating the familiar grid system of lots and concessions. While there are no historic thoroughfares located within the study area, Governors Road abuts the study area to the north.

For the Euro-Canadian period, the majority of early 19<sup>th</sup> century farmsteads (i.e., those which are arguably the most potentially significant resources and whose locations are rarely recorded on 19<sup>th</sup> century maps) are likely to be located within proximity to water. An added factor, however, is the development of the network of concession roads and railroads through the course of the nineteenth century. These transportation routes frequently influenced the siting of farmsteads and businesses. Accordingly, undisturbed lands within 100 m of an early settlement road are also considered to have potential for the presence of Euro-Canadian archaeological sites.

The *S & G* stipulates that that areas of early Euro-Canadian settlement (pioneer homesteads, isolated cabins, farmstead complexes), early wharf or dock complexes, pioneer churches and early cemeteries, are considered to have archaeological potential. Early historical transportation routes (trails, passes, roads, railways, portage routes), properties listed on a municipal register or designated under the *Ontario Heritage Act* or a federal, provincial, or municipal historic landmark or site are also considered to have archaeological potential.

### **1.2.4 Summary of Historical Context**

The background research and historic mapping demonstrates that the study area is located within Lot 16, Concession 1 of Ancaster Township in the County of Wentworth. The 1875 *Illustrated Atlas of the County of Wentworth* indicates that a historic homestead was located within the study area. The study area is located adjacent to Governor's Road which is a historic transportation route. These features indicate that the study area retains potential for the recovery of historical archaeological resources.



Further, the background research demonstrates that the study area retains potential for the recovery of pre-contact and contact period archaeological resources. The Ancaster region has been intensively used by aboriginal peoples since approximately 10,000 BP and the Lynden Communal Well System study area is within the former territory of the Neutral Nation and, subsequently, the Mississauga in the late 17<sup>th</sup> century.

### **1.3 Archaeological Context**

This section provides background research pertaining to previous archaeological fieldwork conducted within and in the vicinity of the Lynden Communal Well System study area, its environmental characteristics (including drainage, soils or surficial geology and topography, etc.), and current land use and field conditions. Three sources of information were consulted to provide information about previous archaeological research: the site record forms for registered sites housed at the MTCS; published and unpublished documentary sources; and the files of ASI.

The Stage 1 property inspection was conducted by Peter Carruthers, (P163), of ASI, on April 5, 2013 in order to gain first-hand knowledge of the geography, topography, and current conditions of the Lynden Communal Well System study area. During the inspection the archaeological potential of the study area was evaluated and mapped. Field observations are compiled onto maps of the study areas in Section 7.0 (Figure 5) and associated photography is presented in Section 8.0 (Plates 1-8).

#### ***1.3.1 Current Land Use and Field Conditions***

The Stage 1 property inspection was conducted by Peter Carruthers (P163) of ASI, on April 5, 2013. The study area is set within a rural landscape with predominant agricultural land use. The property contains the existing Lynden Well infrastructure. Areas of the now demolished former farmstead are also visible.

#### ***1.3.2 Geography***

In addition to the known archaeological sites, the state of natural environment is a helpful predictor of archaeological potential. Accordingly, a description of the physiography and soils, are briefly discussed for the study corridor.

The *S & G* stipulates that primary water sources (lakes, rivers, streams, creeks, etc.), secondary water sources (intermittent streams and creeks, springs, marshes, swamps, etc.), ancient water sources (glacial lake shorelines indicated by the presence of raised sand or gravel beach ridges, relic river or stream channels indicated by clear dip or swale in the topography, shorelines of drained lakes or marshes, cobble beaches, etc.), as well as accessible or inaccessible shorelines (high bluffs, swamp or marsh fields by the edge of a lake, sandbars stretching into marsh, etc.) are characteristics that indicate archaeological potential.

Water has been identified as the major determinant of site selection and the presence of potable water is the single most important resource necessary for any extended human occupation or settlement. Since water sources have remained relatively stable in Ontario after the Pleistocene era, proximity to water can be regarded as a useful index for the evaluation of archaeological site potential. Indeed, distance from water has been one of the most commonly used variables for predictive modeling of site location.

Other geographic characteristics that can indicate archaeological potential include: elevated topography (eskers, drumlins, large knolls, and plateaux), pockets of well-drained sandy soil, especially near areas of heavy soil or rocky ground, distinctive land formations that might have been special or spiritual places, such as waterfalls, rock outcrops, caverns, mounds, and promontories and their bases. There may be physical indicators of their use, such as burials, structures, offerings, rock paintings or carvings. Resource areas, including: food or medicinal plants (migratory routes, spawning areas) are also considered characteristics that indicate archaeological potential (Section 1.3.1 *S & G*).

The study area is located in the Norfolk Sand Plain physiographic region of southern Ontario. The Norfolk Sand Plain is a wedge shaped plain with a broad, curved based along the shore of Lake Erie and tapers, northward to a point at Brantford on the Grand River (Chapman and Putnam 1984:153). The sands and silts of this region were deposited as a delta in glacial Lakes Whittlesey and Warren (Chapman and Putnam 1984:145). The drainage is through small rivers flowing to Lake Erie, with the exception of a small area in the northern limits of the region where the rivers act as a tributary to the Grand River. The project area is located in the northern tip of the Norfolk sand plain between the Flamborough Plain and the Iroquois Plain. The Niagara Escarpment borders the study area to the south. See Figure 3 for Surficial Geology and Figure 4 for Soil Drainage.

Soils within the study area consist primarily of Grimsby sandy loam, with Vineland sandy loam, and Alberton silt loam. Grimsby soils are well drained soils of alluvial and lacustrine origin. The topography is gently to moderately sloping which gives rise to the problems of erosion and drought. Grimsby soils are generally used to grow forage crops, grain corn, spring grains and fall wheat and increasingly sweet corn, tomatoes, and strawberries as well as some fruit trees (Presant and Wicklund 1965: 40). Vineland soils are imperfectly drained and have developed on sands with level to very gently sloping topography. The imperfect drainage of the soil was developed a mottled colouration. Vineland soils are less prone to drought and erosion than Grimsby soils and are often utilised to grow field corn, sweet corn and tomatoes; wheat and alfalfa are grown where drainage has been enhanced (Presant and Wicklund 1965: 40). Alberton silt loam is an alluvial soil with variable drainage and has been deposited in most of the stream valleys of Ancaster, Glanford, and Binbrook townships. This soil is geologically recent based on the lack of development upon it and has probably been deposited catastrophically during flood periods. Alberton soils occur on level valley flats and frequently overly finer sediments; this latter factor affects the internal drainage of the Alberton soils as does the alluvium thickness, however it is commonly imperfect. These soils are rarely used agriculturally due to their association with flood activity however they are workable, fertile. Where flooding is regular they are often used for pasture but where flooding is only occasional they are used to grow corn (Presant and Wicklund 1965: 44-45).

The main water source in the study area is a tributary of Big Creek and a tributary of Fairchild Creek is adjacent to the west; both are sub-watersheds of the Grand River. Big Creek originates in the Norfolk Sand Plain physiographic region and meanders southeast towards its confluence with the Grand River in the Haldimand Clay Plain physiographic region, draining an area of 259.37 ha. The Big Creek sub-watershed includes areas of rare Carolinian forest (Natural Heritage Information Centre 1998). It crosses the study area in its southeast corner. Fairchild Creek originates in the Norfolk Sand Plain physiographic region and meanders south with a westward arc through a sand plain corridor flanked by clay plains to the west and east of its main valley, to its confluence with the Grand River. The Fairchild Creek sub-watershed drains 366 square kilometres (Yang, Liu, and Shen 2011).



### **1.3.3 Previous Archaeological Research**

In Ontario, information concerning archaeological sites is stored in the Ontario Archaeological Sites Database (OASD) maintained by the MTCS. This database contains archaeological sites registered within the Borden system. Under the Borden system, Canada has been divided into grid blocks based on latitude and longitude. A Borden block is approximately 13 km east to west, and approximately 18.5 km north to south. Each Borden block is referenced by a four-letter designator, and sites within a block are numbered sequentially as they are found. The study area under review is located in Borden block *AhHa*.

According to the OASD (email communication, Robert von Bitter, MTCS Data Coordinator, March 10 2013), no archaeological sites have been previously registered within 1 km of the study area. However the Big Creek watershed and Ancaster area are known to contain many precontact sites.

According to background research no previous archaeological assessment was found to have been conducted within 50 m of the Lynden Communal Well system study area.

### **1.3.4 Summary of Archaeological Context**

The review of archaeological work conducted in the area demonstrated that no archaeological sites have been registered within 1 km of the study area. However the Ancaster area is known to have been a focal point of settlement for Archaic period populations.

As per Section 1.3.1 of the *S & G*, archaeological potential is associated with the presence of certain geographic features. The study area is located near tributaries of Big Creek and Fairchild Creek. The study area contains well-drain sandy soil. As discussed in Section 1.2.3 of this report, the study area contains the locations of a historic homestead. The presence of water sources, well-drained sandy soil, and the historical location of a homestead indicate that the study area has the potential for the recovery of pre-contact and historic archaeological resources.

## **2.0 FIELD METHODS (PROPERTY INSPECTION)**

As mentioned in Section 1.3, the Stage 1 property inspection was conducted Peter Carruthers, (P163), ASI, on April 5, 2013, in order to gain first-hand knowledge of the geography, topography, and current conditions and to evaluate and map archaeological potential of the Lynden Communal Well System study area. It was a visual inspection only and did not include excavation or collection of archaeological resources.

Weather conditions for the inspection were a mix of sun and cloud with a light breeze with temperature of approximately 5°C. Previously identified features of archaeological potential were examined, additional features of archaeological potential not visible on mapping were identified and documented as well as any features that will affect assessment strategies. Field observations are compiled onto map of the study area in Section 7.0 (Figure 5) and associated photography is presented in Section 8.0 (Plates 1-8).

### **3.0 ANALYSIS AND CONCLUSIONS**

The archaeological and historical context has been analyzed to help determine the archaeological potential of the study area. This data is presented below in Section 3.1. Results of the analysis of the property inspection are then presented for the Lynden Communal Well study area.

#### **3.1 Analysis of Archaeological Potential**

The *S & G* list characteristics that indicate where archaeological resources are most likely to be found (Section 1.3.1). Archaeological potential is confirmed when one or more features of archaeological potential are present.

As per Section 1.3.1 of the *S & G*, the study area meets the following criteria used for determining archaeological potential:

- Water sources: primary, secondary, or past water source (e.g. tributary of Big Creek);
- Areas of Euro-Canadian Settlement (e.g. homestead);
- Elevated topography (e.g. knoll);
- Pockets of well-drained sandy soil (e.g. Grimsby sandy loam)
- Early historic transportation routes (i.e. Governor's Road)

These criteria characterize the study area as having potential for the identification of Aboriginal and Euro-Canadian archaeological resources.

#### **3.2 Analysis of Property Inspection Results**

Parts of the Lynden Communal Well System study area were evaluated to be permanently wet. As per Section 2.1 of *S & G*, these lands do not require Stage 2 assessment. Parts of the Lynden Communal Well study area were evaluated to be building footprints. Such lands are considered to have been subject to extensive and deep land alteration. Therefore archaeological potential is not present. As per Section 1.3.2 of the *S & G*, it is not necessary to undertake Stage 2 assessment of these lands.

Sections of the Lynden Communal Well System study area are considered to retain archaeological potential. As per Section 2.1.1 of the *S & G*, these lands require Stage 2 assessment by pedestrian survey prior to any land disturbance.

### **4.0 RECOMMENDATIONS**

The Stage 1 Archaeological Assessment was conducted to assist with the Lynden Communal Well System Class Environmental Assessment study. The assessment determined that no archaeological sites have been registered within a 1 km of the study area. A review of the archaeological and historical context of the study area suggested that it has potential for the identification of Aboriginal and Euro-Canadian archaeological resources. In light of these results, the following recommendations are made:

1. Sections of the Lynden Communal Well System study area retain archaeological potential and



require Stage 2 assessment by pedestrian survey prior to any land disturbance.

2. Sections of the Lynden Communal Well System study area were documented to be permanently wet. As per Section 2.1 of the (*S & G*), these lands were evaluated to have no or low archaeological potential and therefore do not require Stage 2 assessment;
3. Sections of the Lynden Communal Well System study area were documented to be building footprints and therefore extensively and deeply disturbed. As per Section 1.3.2 of *S & G*, archaeological potential is determined not to be present in these lands and therefore do not require Stage 2 assessment, and;
4. Should the proposed work extend beyond the current study area then further Stage 1 assessment must be conducted to determine the archaeological potential of the surrounding lands.

Notwithstanding the results and recommendations presented in this study, Archaeological Services Inc. notes that no archaeological assessment, no matter how thorough or carefully completed, can necessarily predict, account for, or identify every form of isolated or deeply buried archaeological deposit. In the event that archaeological remains are found during subsequent construction activities, the consultant archaeologist, approval authority, and the Cultural Programs Unit of the Ministry of Tourism and Culture should be immediately notified.

## 5.0 ADVICE ON COMPLIANCE WITH LEGISLATION

ASI also advises compliance with the following legislation:

- This report is submitted to the Minister of Tourism, Culture, and Sport as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, RSO 1990, c 0.18. The report is reviewed to ensure that it complies with the standards and guidelines that are issued by the Minister, and that the archaeological field work and report recommendations ensure the conservation, preservation and protection of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism and Culture, a letter will be issued by the ministry stating that there are no further concerns with regard to alterations to archaeological sites by the proposed development.
- It is an offence under Sections 48 and 69 of the *Ontario Heritage Act* for any party other than a licensed archaeologist to make any alteration to a known archaeological site or to remove any artifact or other physical evidence of past human use or activity from the site, until such time as a licensed archaeologist has completed archaeological field work on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of Archaeology Reports referred to in Section 65.1 of the *Ontario Heritage Act*.
- Should previously undocumented archaeological resources be discovered, they may be a new archaeological site and therefore subject to Section 48 (1) of the *Ontario Heritage Act*. The proponent or person discovering the archaeological resources must cease alteration of the site immediately and engage a licensed consultant archaeologist to carry out archaeological





fieldwork, in compliance with sec. 48 (1) of the *Ontario Heritage Act*.

- The *Cemeteries Act*, R.S.O 1990 c. C.4 and the *Funeral, Burial and Cremation Services Act*, 2002, S.O. 2002. c.33 (when proclaimed in force) requires that any person discovering human remains must immediately notify the police or coroner and the Registrar of Cemeteries, Ministry of Consumer Services.
- The documentation related to this archaeological assessment will be curated by Archaeological Services Inc. until such a time that arrangements for their ultimate transfer to Her Majesty the Queen in right of Ontario, or other public institution, can be made to the satisfaction of the project owner(s), the Ontario Ministry of Tourism and Culture, and any other legitimate interest groups.



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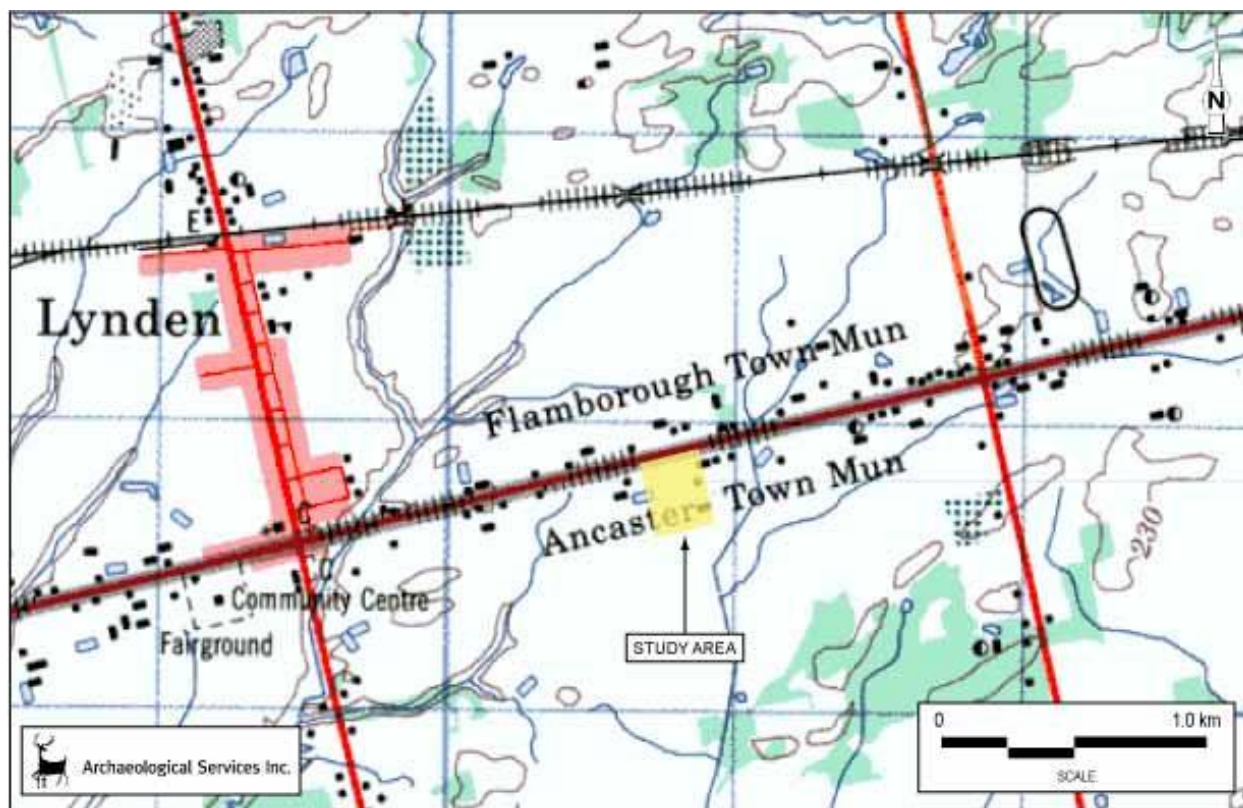
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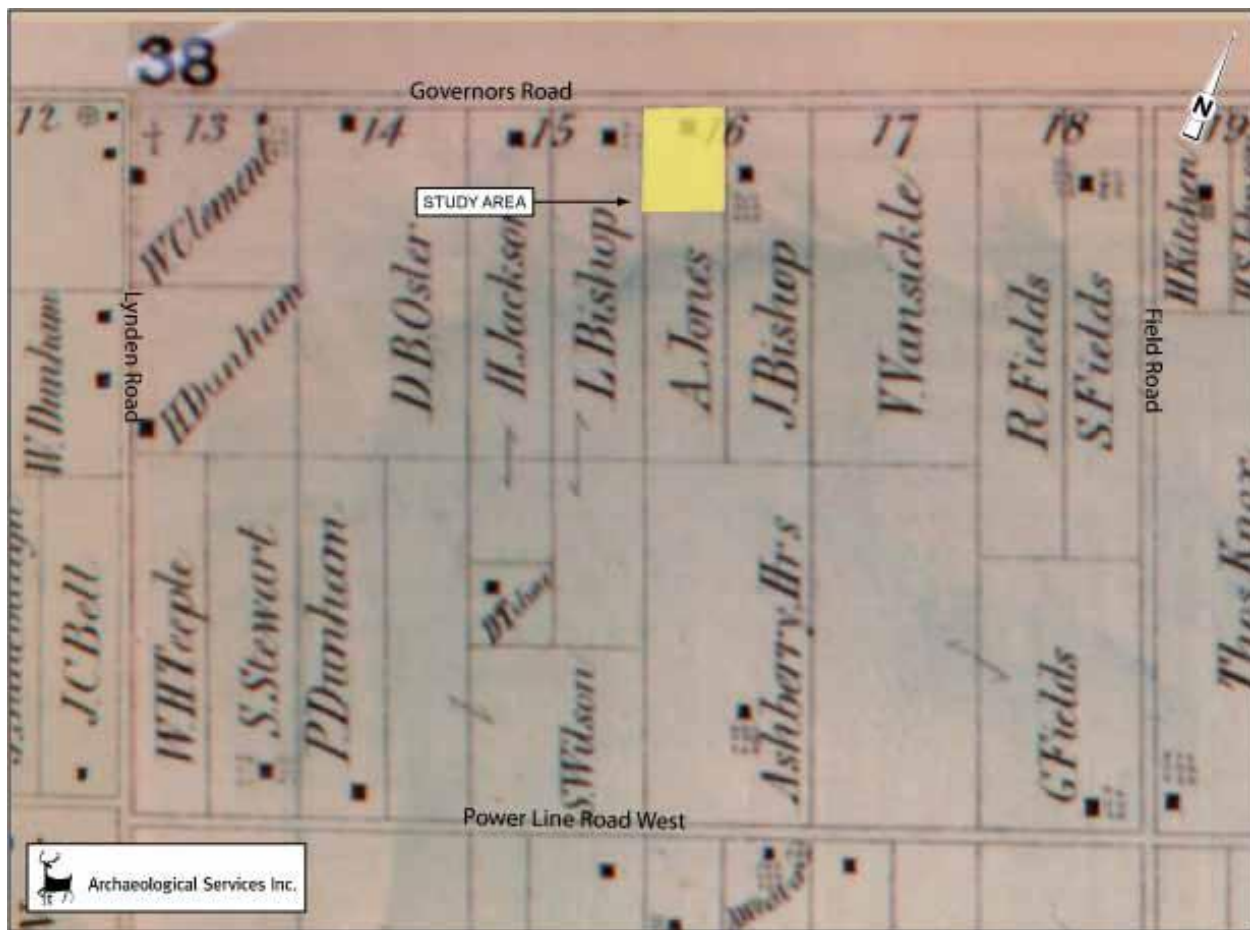


## 7.0 MAPS



**Figure 1:** Location of the Lynden Communal Well System study area.

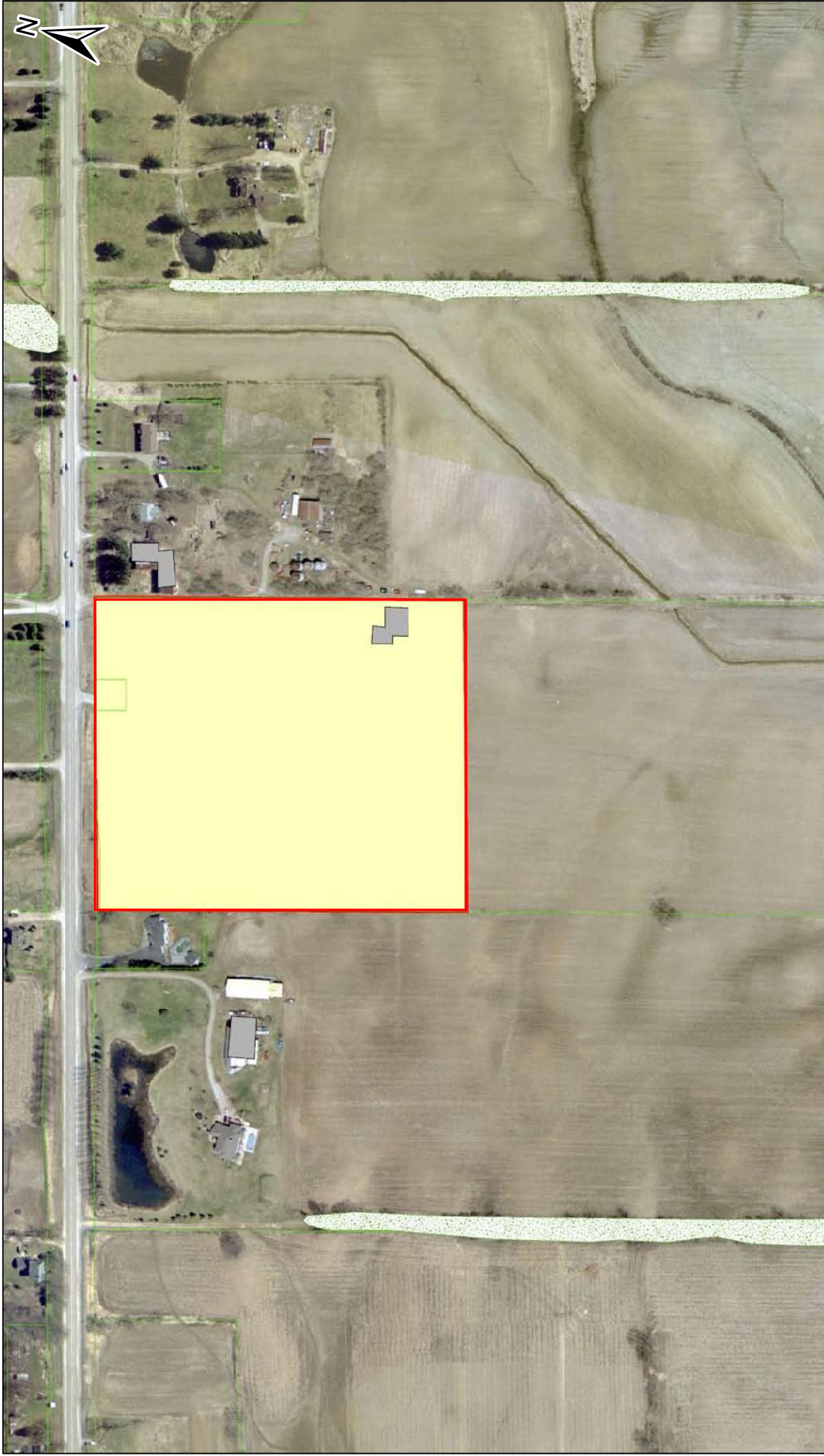
Base Map: NTS Sheets 30 P/1 (Brantford)



**Figure 2:** Lynden Communal Well System study area overlaid on 1875 map of Ancaster Township.

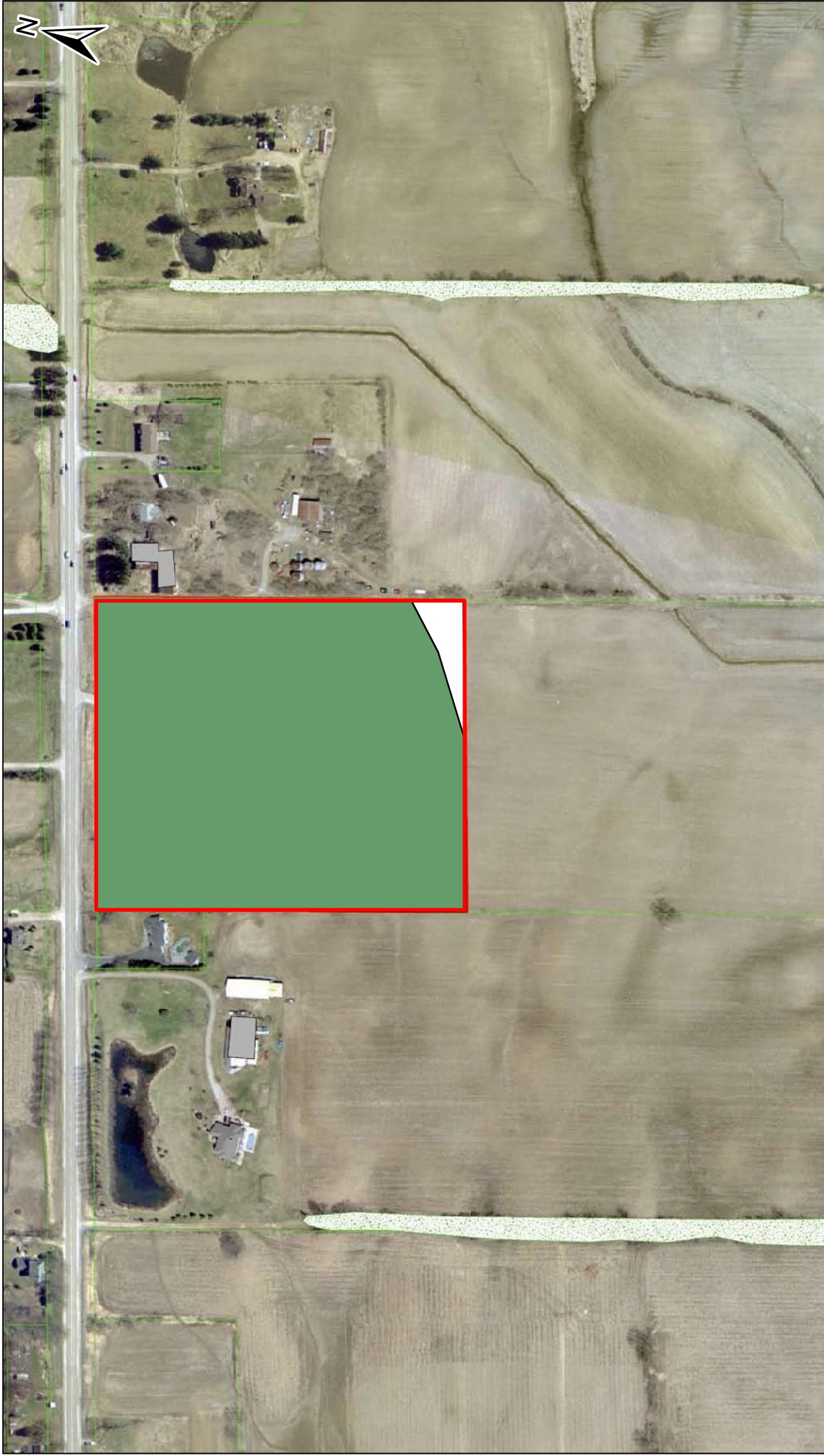
Base Map: Kernighan 1875





 <b>Archaeological Services Inc.</b> 528 Bathurst St. Toronto, Ontario Canada, M5S 2P9 T 416-966-1069 F 416-966-9723 info@IASI.to/www.IASI.to	 Site Location	 Sand	BASE: Hamilton Ortho Microsoft (Bing) 2010	 0 100 Meters	ASI PROJECT NO.: 13EAJ45 DATE: March 28, 2013 DRAWN BY: BW

Figure 3: Lynden Communal Well System - Surficial Geology



 <b>Archaeological Services Inc.</b> 528 Bathurst St. Toronto, Ontario Canada, M5S 2P9 T 416-966-1069 F 416-966-9723 <a href="http://www.ASI.to">www.ASI.to</a> <a href="mailto:info@ASI.to">info@ASI.to</a>	<b>Site Location</b> 	 <b>Well Drained</b>  <b>No Data</b>	<b>BASE:</b> Hamilton Onto Microsoft (Bing) 2010	0 100 <b>Meters</b> 	ASI PROJECT NO.: 13EAJ45 DATE: March 28, 2013 DRAWN BY: BW
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Figure 4: Lynden Communal Well System - Soil Drainage



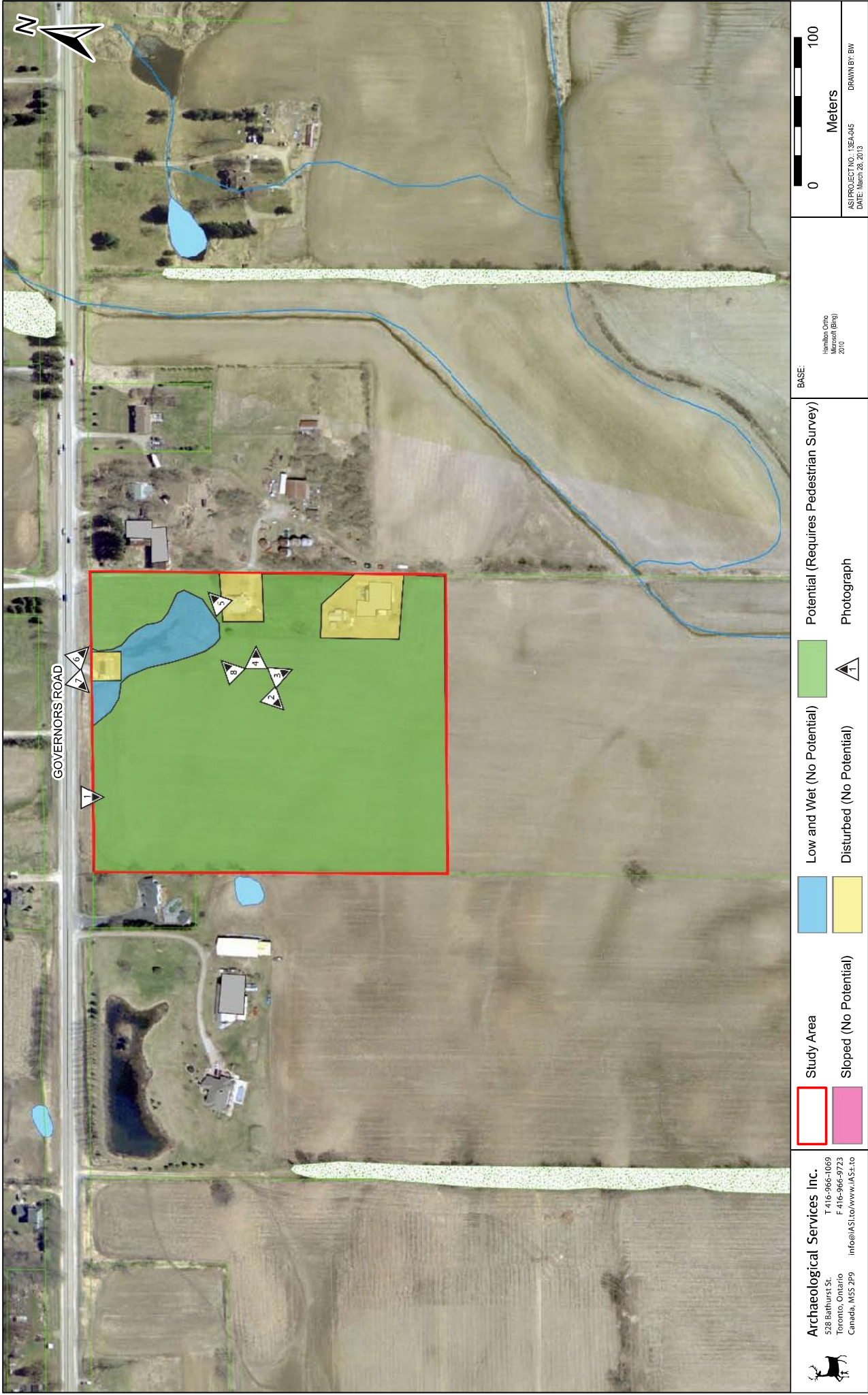


Figure 5: Lynden Communal Well System - Field Inspection Results



## 8.0 IMAGES



Plate 1: View S across semi-level field. Potential within 100 m of road. Requires pedestrian survey.



Plate 2: View SW across upland with potential into swale with seasonal drainage to southeast. Requires pedestrian survey.



Plate 3: View SSE across upland towards site of historic and demolished farmstead. Barn was near tree. Area in foreground has potential. Requires pedestrian survey. Building footprints are disturbed.



Plate 4: View E towards former site of historic farmstead among trees in foreground. All buildings have been leveled and site has been filled and graded.





Plate 5: View NNE. Note level ground to left of driveway; has potential. Requires pedestrian survey.



Plate 7: View SSW. Pump house surrounded by higher, level ground to west and south of swale. Potential beyond pump house. Require pedestrian survey.



Plate 6: View SE across field east of and adjacent to pump house. Historic farmsteads to left and on top of level ground among trees across swale. Potential south of swale. Requires pedestrian survey.



Plate 8: View NE across swale. Higher ground has potential. Bottom and wet area has no potential.












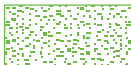

 <b>Archaeological Services Inc.</b> 528 Bathurst St. Toronto, Ontario Canada, M5S 2P9 T 416-966-1069 F 416-966-9723 info@IASI.to/www.IAS±.to	 <b>Site Location</b>	 <b>BuildingFootprints</b>	 <b>Hamilton_Watercourse</b>	<b>BASE:</b>  Hamilton Ortho Microsoft (Bing) 2010	 <b>0 100 Meters</b>
	 <b>WoodedArea</b>	 <b>Hamilton_Roads</b>	ASI PROJECT NO.: 13EA-045 DATE: March 28, 2013		

Figure xx: 13EA-45 -- Lynden Communal Well System Field Map

X:\2013 Projects\13EA-045 Lynden Communal Well\ View\13EA45\_Workspace



**LYNDEN WATER SUPPLY**

**SCHEDULE C MUNICIPAL CLASS**  
**ENVIRONMENTAL ASSESSMENT**  
**NATURAL SCIENCES REPORT**

*prepared for:*

**WSP Canada Inc**

*prepared by:*



**NOVEMBER 2016**  
**LGL PROJECT TA8682**

# LYNDEN WATER SUPPLY

## SCHEDULE C MUNICIPAL CLASS ENVIRONMENTAL ASSESSMENT NATURAL SCIENCES REPORT

*prepared by:*



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**NOVEMBER 2016**  
**LGL PROJECT TA8682**

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Appendix C Amphibian Monitoring Data Sheets  
Appendix D Agency Consultation

## **1.0 INTRODUCTION**

The City of Hamilton has initiated a Schedule “C” Class Environmental Assessment (Class EA) to determine the potential environmental impacts from the twinning of an existing water supply well in Lynden, ON. This new well will be constructed near existing well (FDL-01). LGL Limited, as a sub-consultant to WSP Canada Inc, was retained to provide natural sciences services in support of this Class EA. A Natural Sciences Report was issued in July 2013 in support of the FDL-02 well. It was recently determined that barium levels in the water from FDL-02 were above drinking water standards. In 2016 a new well location was chosen, FDL-03, which is 230m south of FDL-01 in an adjacent agricultural field.

A desktop assessment of orthophotography for the study area and a review of background data, including GIS Layers for natural heritage features, were completed to establish existing conditions within the project area from a natural sciences perspective. In addition, field investigations were conducted by LGL Limited in 2013 and 2016 to better characterize conditions within the site. LGL Limited was directed to focus on the areas within the Zone of Impact (ZOI). Figure 1 illustrates the study area for this project.

### **1.1 POLICY CONTEXT**

#### **1.1.1 Rural Hamilton Official Plan**

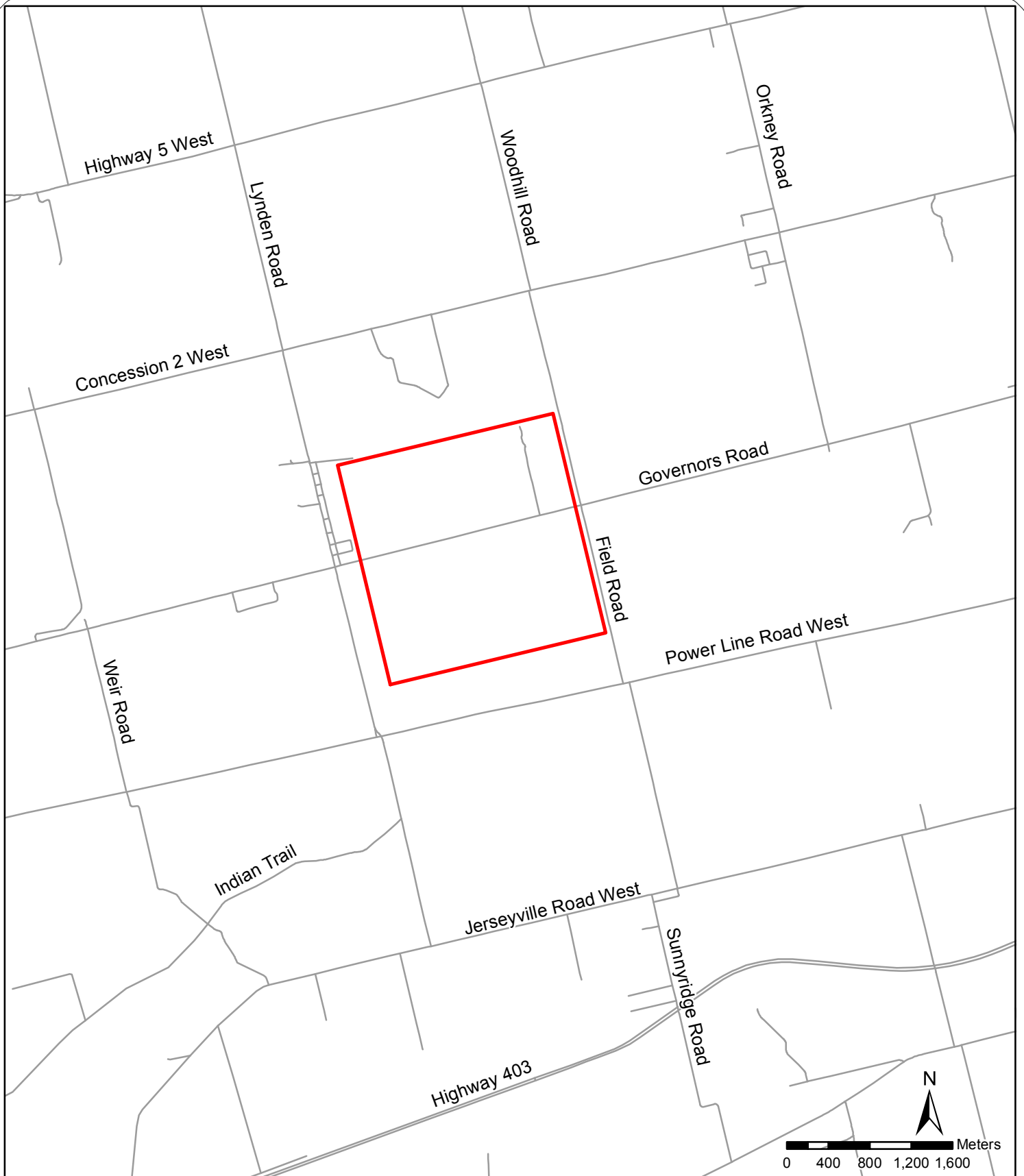
Lynden, Ontario is a rural village in Flamborough, and is part of Hamilton, Ontario. The Rural Hamilton Official Plan Schedule B indicates that the study area is part of the protected countryside of the Greenbelt Plan. Schedule B2 indicates some woodlands are found within the ZOI, and Schedule B4 indicates there are some wetlands in the area. Schedule B6 indicates that the woodland at the southeast portion of the ZOI is an Environmentally Significant Area (Lynden Southeast Woodlot).

#### **1.1.2 Greenbelt Plan**

The Greenbelt Plan identifies where urbanization is to occur in order to provide permanent protection to agricultural land and ecological features and functions (MMAH, 2005). The study area is included within the Protected Countryside lands identified in the Greenbelt Plan and is therefore subject to policies set out in the plan. Several of the natural heritage features in the study area are part of the Natural Heritage System.

#### **1.1.3 Provincial Policy Statement**

A Provincial Policy Statement (PSS) was released in 2014 to provide direction on matters pertaining to land use and development, including direction on the use of municipal water services. The policies include maintaining linkages and functions between groundwater features, surface water features, and their hydrologic functions. The 2014 PSS is issued under Section 3 of the Planning Act. All local planning matters shall be consistent within the 2014 PSS. The policies of the PSS are applicable to this Class EA study.



## Lynden Communal Well EA Well #3

Key Map

Study Area



Project	TA8682	Figure	1
Date	November, 2016	Prepared By	KC
Scale	1:50,000	Verified By	DTS



## **2.0 EXISTING CONDITIONS**

This section describes the existing conditions in the study area relating to natural sciences. This includes physiography and soils, geology/hydrogeology, aquatic habitat and communities, vegetation and vegetation communities, wildlife and wildlife habitat, designated natural areas and species at risk. The existing conditions were based on field investigations by LGL and a review of available background documentation including:

- Lands Information Ontario (LIO);
- Natural Heritage Information Centre (NHIC);
- Hamilton Natural Areas Inventory;
- Ontario Breeding Bird Atlas;
- Natural Heritage Information Database; and,
- Grand River Conservation Authority (GRCA) web mapping tool.

The predominant land use in the area is agricultural with some rural residences. Areas of natural vegetation are sparse and are primarily associated with Fairchild and Big Creeks.

The study area lies within the Grand River watershed which are within the jurisdiction of the Grand River Conservation Authority (GRCA). GRCA administers natural heritage protection programs through a watershed basis, and protection of surface water and natural heritage features are documented in a broader scale through the Grand River Fisheries Management Plan (GRCA 1998). Data on rare species locations are found in the Ontario Ministry of Natural Resources and Forestry (OMNRF) Natural Heritage Information Centre (NHIC) (Biodiversity Explorer) (OMNRF 2013) database. A summary of primary natural environmental features of interest is discussed further in the following subsections.

### **2.1 PHYSIOGRAPHY AND SOILS**

The study area is located within the Norfolk Sand Plain physiographic region (Chapman and Putnam 1984). The soils in the study area are mainly sands and silts. Near streams the water table is lowered and the area has good vertical drainage. The area has abundant well water available. Water readily infiltrates the sandy soils, while the fine sediments hold up the water table (Chapman and Putnam 1984).

### **2.2 AQUATIC HABITAT AND COMMUNITIES**

Within the study area and the projected Zone of Impact (ZOI), the natural heritage features of interest include Fairchild Creek, Big Creek and their associated vegetated riparian corridors (see Figure 2). Details regarding these watercourses are provided in the following subsections. Potential well locations considered under the Class EA are all well away from the natural heritage features. Further details on well locations and the ZOI are provided in Section 3.0 of this report.

The field investigations took place on February 2, 2013 and July 9, 2013. The investigations in February were undertaken in order to ascertain whether any groundwater upwelling was influencing the flows in the winter. The July 9, 2013 investigation was to observe the low flow conditions of the creeks.

### **2.2.1 Fairchild Creek**

Fairchild Creek flows in a southwesterly direction within the ZOI. It is part of the Grand River watershed. Mapping provided by LIO indicates this watercourse is warmwater. Species captured in this watercourse include Brook Stickleback (*Culaea inconstans*), Central Mudminnow (*Umbra limi*), Common Carp (*Cyprinus carpio*), Common Shiner (*Luxilus cornutus*), Fathead Minnow (*Pimephales promelas*), Pumpkinseed (*Lepomis gibbosus*) and White Sucker (*Catostomus commersonii*). These species are not necessarily found within the study area. Mapping provided in LIO also indicates there is a Northern Pike spawning area south of the FDL-03 well, within the ZOI (see Figure 2). Consultation with Guelph District OMNRF did not reveal the potential for any aquatic species at risk in the area.

In the winter months the watercourse was covered in ice, with no indication of groundwater upwelling. During the summer investigation the vegetation growth obscured the watercourse. The creek flows through private property in the study area, and access was not permitted to the project team. As such, we were unable to determine if the creek was flowing at the time of the investigation. In the vicinity of Lynden Road and Governor's Road, the Creek meanders through a meadow marsh. Photos of this watercourse are found in Appendix A.

Typical construction timing windows prescribed by the GRCA for warmwater streams are as follows:

#### **Warmwater Fish Community**

- Construction period: July 16 to March 14
- No In-Water Construction: March 15 to July 15

### **2.2.2 Big Creek**

Just east of the well, Big Creek flows in a southerly direction across Governor's Road. The tributary of the Grand River is a permanent warmwater watercourse according to GRCA mapping tools (2013). The watercourse flows through several agricultural fields. The channel has been altered and is channelized. South of Governor's Road, the channel has also been straightened. During the summer field investigation flow was very low, with a channel width of approximately 0.3m, and a depth of approximately 0.1-0.2m was noted. The culvert at Governor's Road is a 3m corrugated steel pipe, indicating that flows may be high in the spring and during storm events. The culvert is perched at the downstream end, creating a barrier for fish movement under low flows. The channel morphology was difficult to ascertain due to property access limits, however it appears to be mainly flats and runs, with a large pool at the bottom of the culvert. Big Creek was also investigated at Woodhill Road, just north of the CN Rail tracks. This portion of the watercourse flows through a residential lot through manicured grasses and a narrow band of reed canary grass. The watercourse at this location is also altered and straightened.

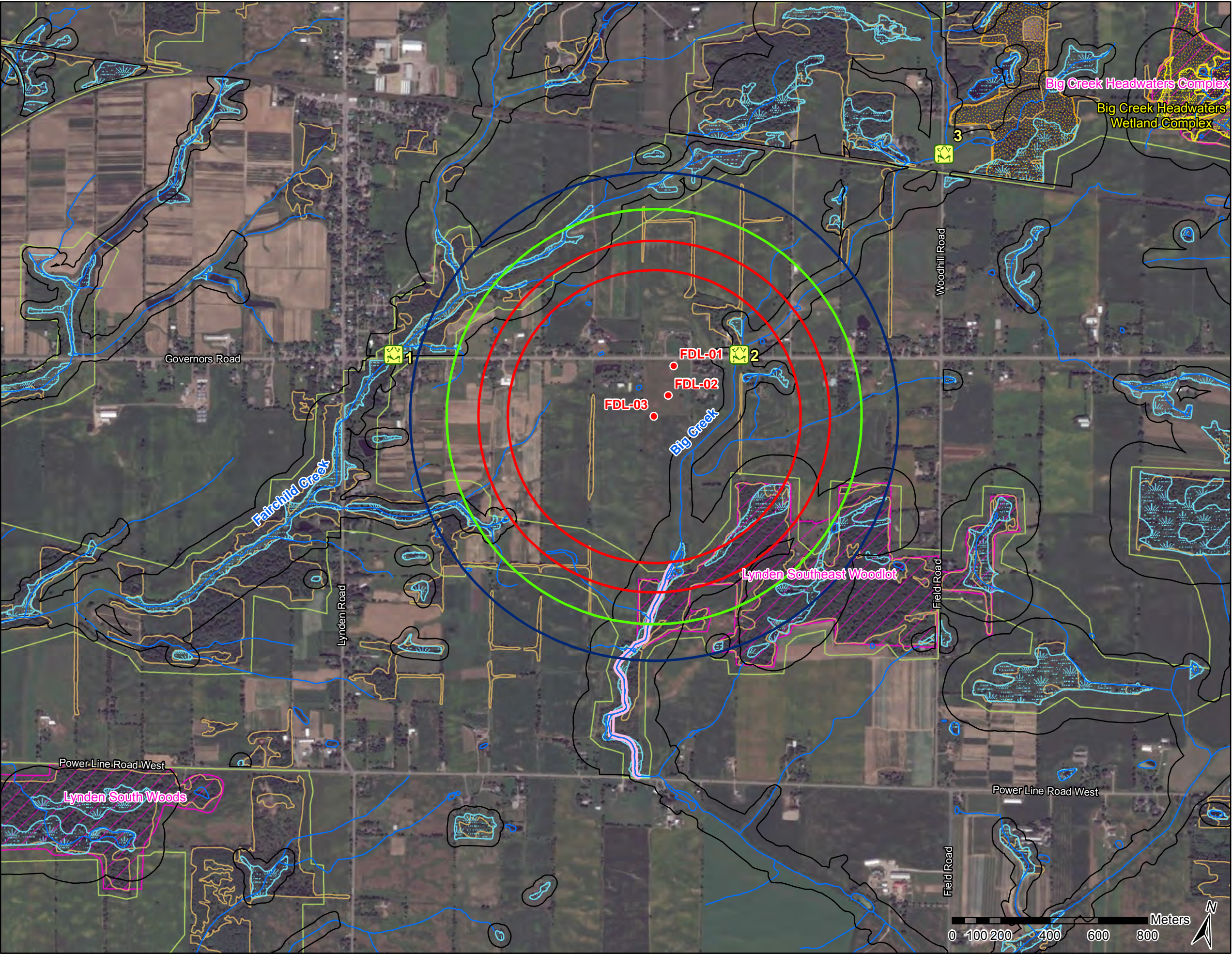
No fish records were found for Big Creek within our study area, or nearby. Consultation with Guelph District OMNRF did not reveal the potential for any aquatic species at risk in the area.

Typical construction timing windows prescribed by the GRCA for warmwater streams are as follows:

**Warmwater Fish Community**

- Construction period: July 16 to March 14
- No In-Water Construction: March 15 to July 15





**LEGEND**

- Municipal Well
- 600-720m ZOI
- 850m ZOI
- 1000m ZOI
- Amphibian Monitoring Station
- Northern Pike Spawning Area (LIO)
- Deer Wintering Area (Stratum 2) (LIO)
- Provincially Significant Wetland (LIO)
- Unevaluated Wetland (LIO)
- Environmentally Sensitive Area (City of Hamilton)
- Greenbelt Plan - NHS Area (LIO)
- Regulation Limits (GRCA)
- Wooded Area (LIO)
- Watercourse (LIO)
- Waterbody (LIO)

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**Lynden Communal Well  
EA Well #3**  
Existing Conditions



Project	TA8682	Figure	2
Date	November, 2016	Prepared By:	KC
Scale	1:15,000	Verified By:	DTS



## **2.3 VEGETATION AND VEGETATION COMMUNITIES**

The geographical extent, composition, structure and function of vegetation communities were identified through air photo interpretation and roadside field investigation. Air photos were interpreted to determine the limits and characteristics of vegetation communities. A field investigation of the natural/semi-natural vegetation within the zone of influence from the road was conducted by LGL Limited on June 13, 2013. On November 7, 2016 LGL conducted a reconnaissance visit of the site to review any changes to the vegetation community.

Vegetation communities were classified according to the Ecological Land Classification for Southern Ontario First Approximation and Its Application (Lee et al. 1998). The community was surveyed from the road as access was not granted at the time of the field visit. Plant species status was reviewed for Ontario (Oldham 2009), and Hamilton Natural Area Inventory (2003). Vascular plant nomenclature follows Newmaster and Ragupathy (2008).

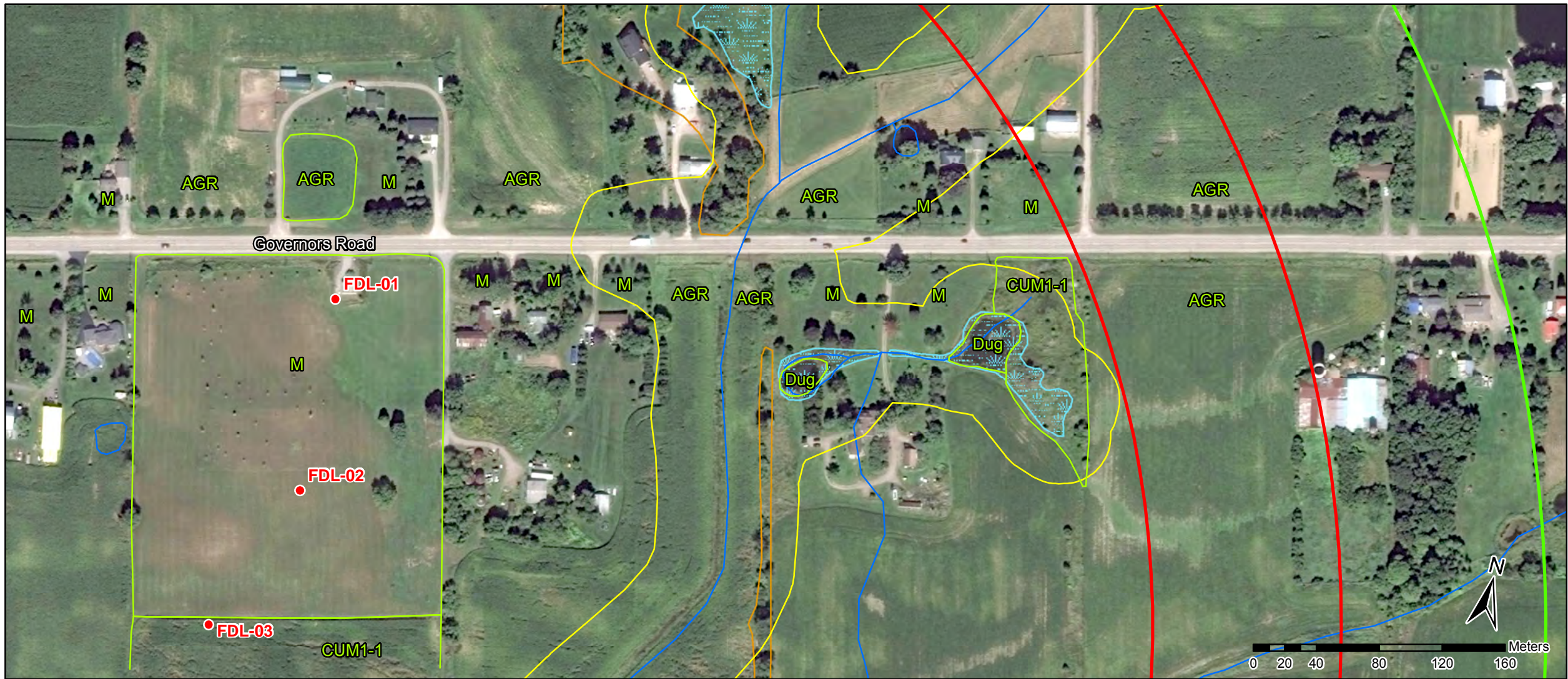
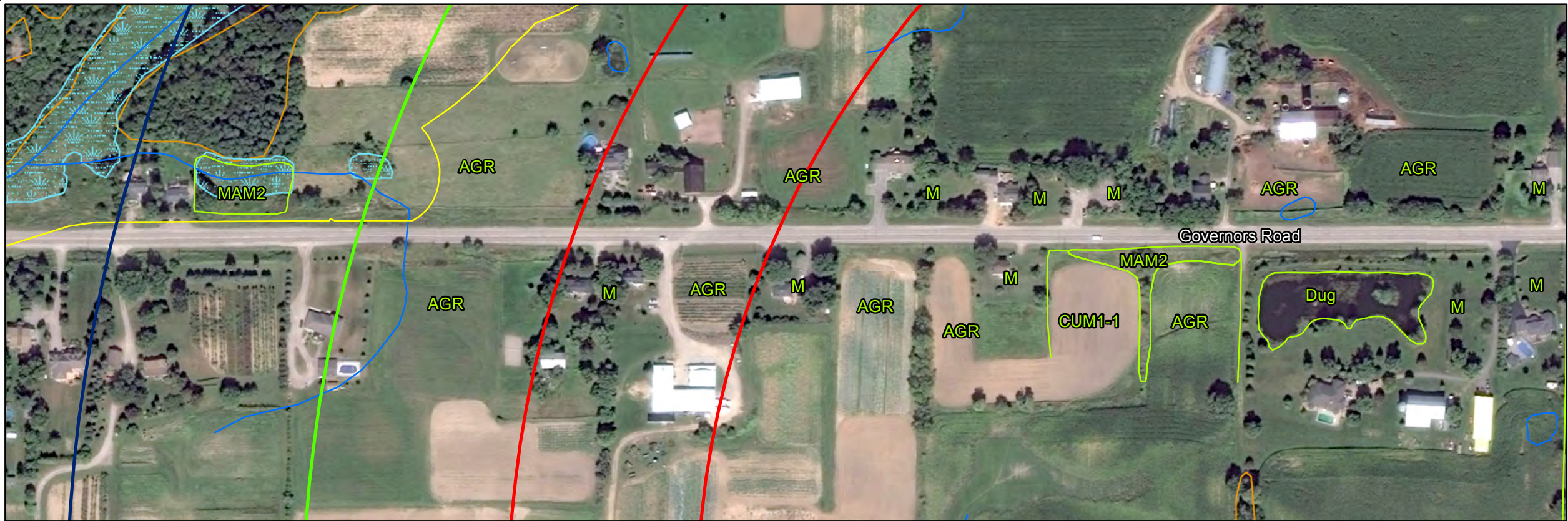
### **2.3.1 Vegetation Communities**

Vegetation communities are very limited within the study area. Natural forested areas were cleared agricultural use. Features on site have colonized post disturbance or are the result of human influence. The dominant vegetation community albeit minor on the landscape, is cultural meadow and meadow marsh (See Figure 3). The cultural meadows communities are a result of fields no longer being used and have gone fallow. Wetland features within the study area are mainly associated with drainage features and edges of agricultural fields where topography is low and soil drainage is poor. Anthropogenic features on site consist of dug ponds and manicured lawn with planted amenity trees. Most of the subject property is being maintained as a manicured lawn. The dug ponds have been either mowed to water's edge or contain a thin margin of cattails and other wetland species. Well FDL-03 is located just inside the cultural meadow community.

A total of 2 vegetation communities have been identified within the agriculture dominated landscape along Governor's Road by LGL Limited within the study area (Figure 3) and described in Table 1. These communities include: cultural meadow (CUM1-1) and meadow marsh (MAM2). These communities are considered widespread and common in Ontario and secure globally. They have experienced various forms of disturbance in the past.

An additional three vegetation communities, identified through airphoto and background review occur within the Lynden Southeast Woodlot Environmentally Significant Area (ESA) (Nature Counts 2014), south east of the proposed new well. These communities include a cultural meadow (CUM1-1), a White Pine Coniferous Plantation (CUP3-2) and a Red Pine Coniferous Plantation (CUP3-1) (Dwyer 2003). These communities are considered widespread and common in Ontario and secure globally. Some areas within the ESA were not surveyed or included in the report by Dwyer due to it being privately owned.





## LEGEND

- Municipal Well
- 600-720m ZOI
- 850m ZOI
- 1000m ZOI
- Unevaluated Wetland (LIO)
- Wooded Area (LIO)
- Regulation Limits (GRCA)
- Watercourse (LIO)
- Waterbody (LIO)
- Vegetation Communities Boundary
- MAM2** Reed Canary Meadow Marsh
- CUM1-1** Dry-Moist Old Field Meadow Type
- AGR** Agricultural
- Dug** Dug Pond
- M** Manicured

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## Lynden Communal Well EA Well #3 Ecological Land Classification



Project	TA8682	Figure	3
Date	November, 2016	Prepared By:	KC
Scale	1:3,000	Verified By:	DTS



**Table 1: Summary of Ecological Land Classification Communities by LGL.**

ELC Code	Vegetation Type	Species Association	Community Characteristics
<b>TERRESTRIAL – CULTURAL</b>			
<b>CUM1</b>	<b>Cultural Meadow</b>		
CUM1-1	Dry-Moist Old Field Meadow	<b>Ground Cover:</b> Awnless Brome ( <i>Bromus inermis ssp. inermis</i> ), Canada Blue Grass ( <i>Poa compressa</i> ), White Sweet Clover ( <i>Melilotus alba</i> ), Alsike Clover ( <i>Trifolium hybridum</i> ), Ribgrass ( <i>Plantago lanceolata</i> ), Canada Thistle ( <i>Cirsium arvense</i> ) and Canada Goldenrod ( <i>Solidago canadensis</i> ).	Tree cover and shrub cover < 25 % (CUM). This community can occur on a wide range of soil moisture regimes (Dry-Moist) (1-1). Grass and forb dominant. Community resulting from, or maintained by, anthropogenic-based influences. Fallow field and early successional species growing on fill/cast off piles from dug pond.
<b>WETLAND - CULTURAL</b>			
<b>MAM2</b>	<b>Mineral Meadow Marsh</b>		
MAM2	Mineral Meadow Marsh	<b>Ground Cover:</b> dominated by Reed Canary Grass ( <i>Phalaris arundinaceae</i> ), with Field Horsetail and other forbs.	Seasonally flooded and dominated by emergent hydrophytic macrophytes (MAM). Mineral soil (2). Dominated by reed canary. Result of poor soil drainage and surface water runoff. Associated with abandoned agricultural field and along channelized drain/creek.

### 2.3.2 Flora

To date, a total of seventy three vascular plant species have been recorded within the study area. Fifty-eight (58%) percent of these plants species are considered introduced and non-native to Ontario. Introduced species were found throughout the study area including the small vegetation communities identified. The vascular plant list presented in Appendix B is a list of the species documented in 2013.

## 2.4 WILDLIFE AND WILDLIFE HABITAT

Based on the habitat observed in the study area, it is anticipated that many of the fauna common to rural South-Central Ontario are expected to be found in the study area. Many species are highly adapted to human landscapes and disturbance and may be found in agricultural and rural settings, where a variety of habitat such as small woodlots, brushy thickets, plantations, small patches of edge or riparian habitat and old fields are present. No specialized habitat, such as dens, burrows, cavity trees, snags, or rubble piles were noted during the site visit, though investigations were limited to roadside observations. The overall area that is presumed to be impacted by installation of the new well is within a fallow agricultural field and a manicured lawn.

An amphibian monitoring survey was conducted in the spring of 2013. Three site visits were conducted in order to determine if the natural areas in the study area are being used as breeding habitat for amphibians. The surveys were conducted on April 15, May 7, and June 20 2013. Table 2 provides the details of this survey. Field data records are found in Appendix C.

**Table 2: Amphibian Monitoring Survey Results.**

Species	Common Name	Station 1 (west of ZOI)	Station 2	Station 3 (north east of ZOI)
<i>Bufo americanus</i>	American Toad		X	X
<i>Hyla versicolor</i>	Gray Treefrog			X
<i>Rana clamitans</i>	Green Frog	X	X	X
<i>Pseudacris crucifer</i>	Spring Peeper	X	X	X

Frogs found calling at Station 1 were southwest of the ZOI. Spring peepers at station 2 were calling from the Lynden Southeast Woodlot ESA, while the green frogs and American toads were heard calling from ponds just south of Governor's Road. All amphibians heard calling at Station 3 were noted in the woodlot to the northeast of the ZOI.

The last amphibian survey was conducted during the window for Whippoorwill (*Antrostomus vociferous*) surveys; therefore a whippoorwill survey was conducted using on June 20, 2013. No whippoorwills were found to be calling during the survey.



A list of the bird species in the study area was obtained from the Ontario Breeding Bird Atlas (OBBA). These lists are summarized in Table 3. A total of 36 bird species were recorded in the study area. A review of this list indicates most species are relatively common. One species at risk, the Eastern Meadowlark (*Sturnella magna*) which is listed as threatened Provincially and Nationally, was recorded in the study area. The preferred habitat for this species is grasslands, however they also utilize hayfields and pastures, which are available in the study area. Eastern Wood Pewee was uplisted to Special Concern Provincially in June 2014. Its habitat includes the edges and clearings within deciduous and mixed forests.

**Table 3: Summary of Bird Species Documented in the Study Area according to the Ontario Breeding Bird Atlas Records (Accessed January 2013).**

Scientific Name	Common Name	Srank	COSEWIC	COSSARO	Hamilton Priority Species
<i>Corvus brachyrhynchos</i>	American Crow	S5B			
<i>Carduelis tristis</i>	American Goldfinch	S5B			level 3
<i>Turdus migratorius</i>	American Robin	S5B			
<i>Icterus galbula</i>	Baltimore Oriole	S4B			
<i>Cyanocitta cristata</i>	Blue Jay	S5			
<i>Toxostoma rufum</i>	Brown Thrasher	S4B			level 1
<i>Branta canadensis</i>	Canada Goose	S5			
<i>Spizella passerina</i>	Chipping Sparrow	S5B			
<i>Petrochelidon pyrrhonota</i>	Cliff Swallow	S4B			level 4
<i>Quiscalus quiscula</i>	Common Grackle	S5B			
<i>Geothlypis trichas</i>	Common Yellowthroat	S5B			
<i>Picoides pubescens</i>	Downy Woodpecker	S5			
<i>Tyrannus tyrannus</i>	Eastern Kingbird	S4B			level 3
<i>Sturnella magna</i>	Eastern Meadowlark	S4B	THR	THR	level 3
<i>Sayornis phoebe</i>	Eastern Phoebe	S5B			level 3
<i>Contopus virens</i>	Eastern Wood Pewee	S4B	SC	SC	
<i>Sturnus vulgaris</i>	European Starling	SNA			
<i>Dumetella carolinensis</i>	Gray Catbird	S4B			
<i>Ardea herodias</i>	Great Blue Heron	S4			
<i>Eremophila alpestris</i>	Horned Lark	S5B			level 3
<i>Carpodacus mexicanus</i>	House Finch	SNA			
<i>Passer domesticus</i>	House Sparrow	SNA			
<i>Charadrius vociferus</i>	Killdeer	S5B,S5N			
<i>Anas platyrhynchos</i>	Mallard	S5			
<i>Zenaidura macroura</i>	Mourning Dove	S5			
<i>Lanius excubitor</i>	Northern Shrike	SNA			
<i>Buteo jamaicensis</i>	Red-tailed Hawk	S5	NAR		
<i>Agelaius phoeniceus</i>	Red-winged Blackbird	S4			
<i>Larus delawarensis</i>	Ring-billed Gull	S5B,S4N			
<i>Aythya collaris</i>	Ring-necked Duck	S5			level 3
<i>Phasianus colchicus</i>	Ring-necked Pheasant	SNA			

Scientific Name	Common Name	Srank	COSEWIC	COSSARO	Hamilton Priority Species
<i>Columba livia</i>	Rock Dove (Pigeon)	SNA			
<i>Passerculus sandwichensis</i>	Savannah Sparrow	S4B			level 1
<i>Melospiza melodia</i>	Song Sparrow	S5B			
<i>Cathartes aura</i>	Turkey Vulture	S5B			level 3
<i>Vireo gilvus</i>	Warbling Vireo	S5B			

**Status Legend**

SRank –Status assigned by the NHIC for the Province of Ontario boundary

S1- Critically Imperiled

S2- Imperiled

S3- Vulnerable

S4- Apparently Secure

S5- Secure

SE- Exotic

SZB- Breeding migrants/vagrants.

SZN- Non-breeding migrants/vagrants.

SNA- Not Applicable - A conservation status rank is not applicable because the species is not a suitable target for conservation activities.

**COSEWIC (Committee on the Status of Endangered Wildlife in Canada):**

END- Endangered

THR- Threatened

SC- Special Concern

**COSSARO (Committee on the Status of Species at Risk in Ontario):**

END- Endangered

THR- Threatened

SC- Special Concern

NAR- Not at Risk

## 2.5 DESIGNATED ENVIRONMENTALLY SIGNIFICANT AREAS

One designated environmentally significant areas was found within to the study area. The Lynden Southeast Woodlot ESA is found at the south east portion of the ZOI. It is also designated as a Life Science Site. The ESA is a mature deciduous woodlot, with some cultural meadows and a red pine plantation. The woodlot sits between the drainage basins for Big Creek and Fairchild Creek and has both well drained sandy hummocks and poorly drained wet depressions (Nature Counts 2014).

The Big Creek Headwaters Wetland Complex is found to the north east of the study area. It is designated as an ESA by the City of Hamilton and also A PSW by the OMNRF. This natural area is a combination of forest, woodland, swamp and marsh habitats (Nature Counts 2014).

## 2.6 SPECIES AT RISK

The Natural Heritage Information Centre (NHIC) keeps records of rare flora and fauna from various studies and investigations. A review of the NHIC records (obtained October 2016) revealed the potential for several species at risk in the study area. The OMNRF was also contacted for their input on potential species at risk. Their response is provided in Appendix D.

### 2.6.1 Fish Species at Risk

No aquatic species at risk were identified during background research for the project.

### 2.6.2 Wildlife Species at Risk

Two wildlife records were found south of the study area, near Jerseyville. These are the Eastern Milksnake (*Lampropeltis triangulum triangulum*) and the Woodland Vole (*Microtis pinetorum*) both species of Special Concern in Ontario and Canada. As discussed in section 2.4, Eastern Meadowlark are known in the study area. As the location of the new well is within a meadow habitat, it is possible this species occurs near the new well site. An in-season survey for this species would be required to detect its presence, and should be completed during detailed design. The habitat for this species, meadows, pastures and hayfields, is available in the study area. The Eastern Wood Pewee (*Contopus virens*), a national and provincial species of special concern was also identified in the OBBN database. Their breeding habitat, deciduous and mixed forests is found in the woodlot to the south east of the study area (Lynden Southeast Woodlot ESA).

Jefferson Salamander (*Ambystoma jeffersonianum*) records are approximately 2.4 km away from the project area, and not within the Zone of Impact (see Appendix D).

### 2.6.3 Plant Species at Risk

A search of the NHIC records revealed that American Chestnut (*Castanea dentate*) was present in the study area over 40 years ago. As was not detected in the field survey in 2013, it is assumed to be extirpated from the area. The SARA registry identifies the potential for two species at risk in the study area. These are Butternut (*Juglans cinerea*) and American Ginseng (*Panax quinquefolius*), both of which are listed as endangered by the OMNRF and COSEWIC. American Ginseng prefers rich, moist, mature deciduous forest, which was not found within the study area limits. Butternut can be found in a wide variety of habitat and was found within the study area.

One species at risk was confirmed within the study area by LGL field investigations. Two Butternut trees were found planted in the front yard of a residential property on Governor's Road approximately 500m east of Lynden Road. This tree is considered Endangered and regulated under the *Endangered Species Act 2007* (ESA). Should project activities occur within 25 m of these trees, a Butternut Health Assessment (BHA) and additional consultation to discuss impacts with OMNRF would be required.

Given their location and associated with non-native trees nearby it is likely that these planted trees are hybrids which are not protected under the Act (subject to confirmation with a BHA). They are situated greater than 25 m from the proposed well and are not anticipated to be directly impacted by the proposed development.

### **3.0 PROJECT DESCRIPTION**

This Schedule 'C' Class Environmental Assessment (EA) was initiated to determine the potential impacts associated with the construction of a new water supply well in Lynden, Ontario. The preferred location for the new well (FDL-03) is approximately 230m south of the current well (see Figure 2). This location was chosen due to its proximity to the community, and it being on a suitable aquifer.

A potential Zone of Impact (ZOI) was determined for:

- the 72 hour pump test;
- 24 hours at average daily rate; and,
- 4 months at maximum daily rate.

The ZOI is shown on Figure 2 in relation to the proposed well location and existing natural heritage features. The ZOI was determined by WSP Canada Inc. (2016).

## 4.0 IMPACT EVALUATION

No alternative locations for the new well are presented here. Only the preferred location of FDL-02 has been evaluated.

Direct impacts for the construction of the well are not anticipated to impact any natural heritage features in the study area as the location is in a fallow agricultural field. Prior to construction the field should be screened for ground nesting bird species such as Eastern Meadowlark. Given that the terrestrial footprint is not considered sensitive, impacts related to well water taking may instead cause indirect impacts to natural heritage features. Potential indirect impacts may include impacts to aquatic habitat due to aquifer drawdown (e.g. reduction of baseflow), potential impacts to vegetation communities reliant on groundwater, and impacts to sensitive species and their habitats.

A hydrogeological report prepared by WSP Canada Inc. (2013) was prepared in order to evaluate the potential drawdown of groundwater in the study area. The new well (FDL-02) will be built in the same deep confined aquifer that the old well (FDL-01) pumps from. It is anticipated that the old well will be kept in place as a backup for the new well. The current well (FDL-01) is rated for 7.6L/s capacity and a maximum flow rate of 227 L/min and a maximum daily volume of 327m<sup>3</sup>/day (GENIVAR 2013). The new well will be designed to meet expected demands of 513 m<sup>3</sup>/day.

The predicted ZOI for the 72 hour pump test, 24 hour drawdown at average daily rate, and 4 month drawdown at maximum daily rate is based on a 1m drop in the confined aquifer. A shallow unconfined aquifer is found in the study area. Groundwater in this unconfined aquifer flows towards the watercourses in the study area. WSP Canada Inc (2016) concluded that pumping of the confined aquifer at a rate of 6L/s is sustainable and does not impact the shallow aquifer or surface wells. As the shallow aquifer was not impacted, hydrogeologists at WSP Canada Inc determined that there will be no surface impacts to the wetlands and watercourses in the study area (Derek Brunner at WSP, Pers.comm.)

Construction of the new well will be confined to the agricultural field on the City's property and will likely have no impact on the natural heritage features in the study area, as the construction area can be contained within anthropogenic features.

### 4.1 MITIGATION OF ENVIRONMENTAL IMPACTS

Construction related impacts can be mitigated by minimizing the extent of disturbance wherever possible. Staging of the project includes prioritizing the project components in such a way that they would minimize the disturbance within the same construction area. The extent of construction can be effectively isolated and secured from the adjacent natural lands through the installation of sediment fences and erosion control measures, the potential for silt and sediment entry into the downstream watercourse (Big Creek) will be effectively mitigated.

It will be particularly important to monitor groundwater levels during the construction and operation of the new well. A summary of potential impacts and recommended mitigation measures during construction are provided in Table 4.

**Table 4: Summary of Recommended Mitigation Measures for the Lynden Water Supply Well.**

<b>Environmental Features</b>	<b>Description of Potential Impacts</b>	<b>Risk of Impact</b>	<b>Recommended Mitigation Techniques</b>
<b>Hydrology</b>	Drawdown of aquifer interfering with surface and subsurface flows	LOW- no impacts anticipated as the surface flows do not appear to be connected to the confined aquifer that will be drawn from	<ul style="list-style-type: none"> <li>• Avoidance - draw water from a confined aquifer;</li> <li>• Monitoring – monitor the surface flows in Big Creek and Fairchild Creek during the initial operational phase of the new well. Monitor the shallow wells in the study area to ensure no impacts to groundwater</li> </ul>
<b>Fisheries</b>	Sedimentation from construction site or drop in baseflow causing HADD of fish habitat	Low – construction site for well is set well back from the watercourses in the study area -No changes to baseflow anticipated	<ul style="list-style-type: none"> <li>• Appropriate silt/sedimentation control at the construction site, including appropriate ESCs during precipitation events;</li> <li>• Monitoring – monitor the surface flows in Big Creek and Fairchild Creek to ensure no loss of fish habitat.</li> </ul>
<b>Terrestrial Vegetation</b>	The new well is to be constructed adjacent to the current well, in an agricultural field and cultural meadow.	Low – Vegetation disturbance will be limited to the agricultural feature and to meadow species that will colonize quickly post disturbance	<ul style="list-style-type: none"> <li>• During detailed design, installation of a temporary page wire fence to limit the extent of construction will prevent encroachment of construction machinery and equipment away from undisturbed areas and can provide sediment and erosion control benefits if it can be installed in combination with sediment and erosion control fabric.</li> </ul>
<b>Wetland</b>	Lowering of water table as a result of drawdown of confined aquifer	Low – wetlands in the study area do not appear to be groundwater dependent. One wetland feature outside of zone of influence.	<ul style="list-style-type: none"> <li>• Monitoring – monitor the groundwater levels near the wetlands in the study area during the initial operational phase of the new well.</li> </ul>



Environmental Features	Description of Potential Impacts	Risk of Impact	Recommended Mitigation Techniques
<b>Wildlife Habitat and Communities</b>	Potential disturbance to wildlife in study area during construction	Low – the well installation poses little concern to wildlife habitat or communities as construction is limited to an agricultural field	<ul style="list-style-type: none"> <li>• Construction commotion may disturb local wildlife communities, but is expected to be short in duration and limited to tolerant wildlife species.</li> <li>• All construction and vegetation clearing must adhere to the Federal <i>Migratory Birds Convention Act</i></li> <li>• Conducting construction outside of the breeding bird window will avoid disturbing species during sensitive periods.</li> <li>• Screen for presence/absence of Eastern meadowlark in fallow agricultural field near construction site to ensure compliance with Endangered Species Act, 2007.</li> </ul>

## **5.0 SUMMARY AND CONCLUSIONS**

In summary, a new well is proposed for the Lynden area. The new well will be situated in close proximity to the current well and will be built in a cultural meadow, which is a common vegetation community in the study area. The new well will be built to meet future daily needs of 513m<sup>3</sup>/day.

A desktop review and field investigation of the natural heritage features in the study area was conducted. The study area was found to be mainly agricultural with other anthropogenic features, such as dug ponds. The main natural heritage features found in the study area were the two watercourses, Fairchild and Big Creeks as well as the wetlands associated with these features. Pump tests conducted by WSP Canada Inc indicated that no impacts are anticipated to surface features such as the watercourses or the wetlands, as pumping will occur within the deeper aquifer, and pump tests indicated that surface aquifer was not influenced by the pumping (WSP Canada Inc 2016).

With appropriate mitigation, the construction of the new well should have minimal to no impacts on the natural heritage features in the study area. A monitoring plan should be in place during the operational phase of the new well in order to ensure no impacts occur to the watercourses or wetlands.

## 6.0 REFERENCES

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## **APPENDIX A PHOTO APPENDIX**

## PHOTO APPENDIX



Fairchild Creek south of Governor's Road facing downstream



Fairchild Creek north of Governor's Road facing upstream



Meadow marsh associated with Fairchild Creek, north of Governor's Road



Cultural meadow at location of FDL 01 and FDL-02



Big Creek south of Governor's Road facing downstream



Big Creek north of Governor's Road facing upstream

## PHOTO APPENDIX



Big Creek west of Governor's Road facing  
downstream



Big Creek east of Governor's Road facing upstream



Cultural Meadow associated with FDL 03 in  
November 2016



Manicured Lawn north of FDL 03 in November 2016



## PHOTO APPENDIX



Cultural Meadow associated with FDL 03 in  
November 2016



Manicured Lawn north of FDL 03 in November 2016

## **APPENDIX B VASCULAR PLANT CHECKLIST**

	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	Local Status
	<b>EQUISETACEAE</b>	<b>HORSETAIL FAMILY</b>					
	<i>Equisetum arvense</i>	field horsetail	G5	S5			
	<b>PINACEAE</b>	<b>PINE FAMILY</b>					
	<i>Picea glauca</i>	white spruce	G5	S5			
*	<i>Picea pungens</i>	Colorado spruce	G5	SE1			
*	<i>Pinus nigra</i>	Austrian pine	G?	SE2			
	<i>Pinus strobus</i>	eastern white pine	G5	S5			
*	<i>Pinus sylvestris</i>	Scotch pine	G?	SE5			
	<b>CUPRESSACEAE</b>	<b>CEDAR FAMILY</b>					
	<i>Thuja occidentalis</i>	eastern white cedar	G5	S5			
	<b>RANUNCULACEAE</b>	<b>BUTTERCUP FAMILY</b>					
*	<i>Ranunculus acris</i>	tall buttercup	G5	SE5			
	<b>ULMACEAE</b>	<b>ELM FAMILY</b>					
	<i>Ulmus americana</i>	white elm	G5?	S5			
	<b>MORACEAE</b>	<b>MULBERRY FAMILY</b>					
*	<i>Morus alba</i>	white mulberry	G?	SE5			
	<b>JUGLANDACEAE</b>	<b>WALNUT FAMILY</b>					
	<i>Juglans cinerea</i>	butternut	G3G4	S3?	END	END	
	<i>Juglans nigra</i>	black walnut	G5	S4			
*	<i>Juglans regia</i>	English walnut	G?	SE1			
	<b>FAGACEAE</b>	<b>BEECH FAMILY</b>					
*	<i>Fagus sylvatica</i>	European beech					
	<b>BETULACEAE</b>	<b>BIRCH FAMILY</b>					
	<i>Betula papyrifera</i>	white birch	G5	S5			
	<b>CARYOPHYLLACEAE</b>	<b>PINK FAMILY</b>					
*	<i>Cerastium arvense ssp. arvense</i>	field chickweed	G5T?	SE4			
	<b>POLYGONACEAE</b>	<b>SMARTWEED FAMILY</b>					
*	<i>Polygonum persicaria</i>	lady's-thumb	G?	SE5			
	<b>POLYGONACEAE</b>	<b>SMARTWEED FAMILY</b>					
*	<i>Rumex crispus</i>	curly-leaf dock	G?	SE5			
	<b>TILIACEAE</b>	<b>LINDEN FAMILY</b>					
*	<i>Tilia cordata</i>	small leaf linden	G?	SE1			
	<b>CUCURBITACEAE</b>	<b>GOURD FAMILY</b>					
	<i>Echinocystis lobata</i>	prickly cucumber	G5	S5			
	<b>SALICACEAE</b>	<b>WILLOW FAMILY</b>					
	<i>Populus tremuloides</i>	trembling aspen	G5	S5			
*	<i>Salix X rubens</i>	reddish willow	HYB	SE4			
	<b>BRASSICACEAE</b>	<b>MUSTARD FAMILY</b>					
*	<i>Hesperis matronalis</i>	dame's rocket	G4G5	SE5			
	<b>ROSACEAE</b>	<b>ROSE FAMILY</b>					
*	<i>Malus baccata</i>	Siberian crabapple	G?	SE1			

	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	Local Status
	<i>Rubus idaeus ssp. strigosus</i>	wild red raspberry	G5T	S5			
*	<i>Sorbus aucuparia</i>	European mountain-ash	G5	SE4			
*	<i>Sorbus x thuringiaca</i>	oakleaf mountain-ash					
	<b>FABACEAE</b>	<b>PEA FAMILY</b>					
*	<i>Coronilla varia</i>	variable crown-vetch	G?	SE5			
	<i>Gleditsia triacanthos var. inermis</i>	'shade master' honey locust		SE?			
*	<i>Lotus corniculatus</i>	bird's-foot trefoil	G?	SE5			
*	<i>Melilotus officinalis</i>	yellow sweet-clover	G?	SE5			
*	<i>Robinia pseudo-acacia</i>	black locust	G5	SE5			
*	<i>Trifolium hybridum ssp. elegans</i>	alsike clover		SE5			
	<b>LYTHRACEAE</b>	<b>LOOSESTRIFE FAMILY</b>					
*	<i>Lythrum salicaria</i>	purple loosestrife	G5	SE5			
	<b>CORNACEAE</b>	<b>DOGWOOD FAMILY</b>					
	<i>Cornus racemosa</i>	red panicle dogwood	G5?	S5			
	<i>Cornus sericea ssp. sericea</i>	red-osier dogwood	G5	S5			
	<b>RHAMNACEAE</b>	<b>BUCKTHORN FAMILY</b>					
*	<i>Rhamnus cathartica</i>	common buckthorn	G?	SE5			
	<b>VITACEAE</b>	<b>GRAPE FAMILY</b>					
	<i>Vitis riparia</i>	riverbank grape	G5	S5			
	<b>HIPPOCASTANACEAE</b>	<b>BUCKEYE FAMILY</b>					
*	<i>Aesculus hippocastanum</i>	horse chestnut	G?	SE2			
	<b>ACERACEAE</b>	<b>MAPLE FAMILY</b>					
	<i>Acer negundo</i>	Manitoba maple	G5	S5			
*	<i>Acer platanoides</i>	Norway maple	G?	SE5			
	<i>Acer saccharum var. saccharum</i>	sugar maple	G5T?	S5			
	<b>ANACARDIACEAE</b>	<b>SUMAC FAMILY</b>					
	<i>Rhus hirta</i>	staghorn sumac	G5	S5			
	<b>APIACEAE</b>	<b>PARSLEY FAMILY</b>					
	<i>Cicuta bulbifera</i>	bulb-bearing water-hemlock	G5	S5			
	<b>APIACEAE</b>	<b>PARSLEY FAMILY</b>					
*	<i>Daucus carota</i>	wild carrot	G?	SE5			
	<b>ASCLEPIADACEAE</b>	<b>MILKWEED FAMILY</b>					
	<i>Asclepias syriaca</i>	common milkweed	G5	S5			
	<b>PLANTAGINACEAE</b>	<b>PLANTAIN FAMILY</b>					

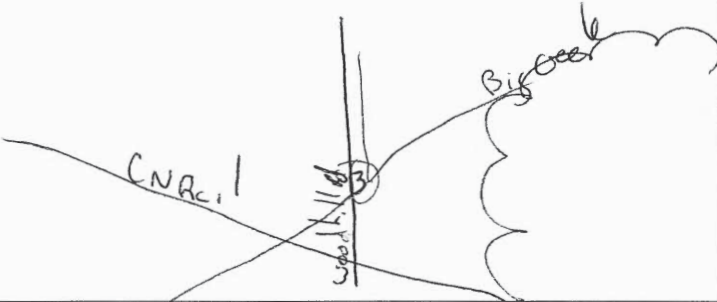
	Scientific Name	Common Name	GRank	SRank	MNR	COSEWIC	Local Status
*	<i>Plantago lanceolata</i>	ribgrass	G5	SE5			
*	<i>Plantago major</i>	common plantain	G5	SE5			
	<b>OLEACEAE</b>	<b>OLIVE FAMILY</b>					
	<i>Fraxinus pennsylvanica</i>	red ash	G5	S5			
	<b>SCROPHULARIACEAE</b>	<b>FIGWORT FAMILY</b>					
*	<i>Verbascum thapsus</i>	common mullein	G?	SE5			
	<b>DIPSACACEAE</b>	<b>TEASEL FAMILY</b>					
*	<i>Dipsacus fullonum ssp. sylvestris</i>	wild teasel	G?T?	SE5			
	<b>ASTERACEAE</b>	<b>ASTER FAMILY</b>					
	<i>Aster puniceus var. puniceus</i>	purple-stemmed aster	G5T?	S5			
*	<i>Carduus nutans ssp. leiophyllus</i>	musk thistle	G?T?	SE5			
*	<i>Cichorium intybus</i>	chicory	G?	SE5			
*	<i>Cirsium arvense</i>	Canada thistle	G?	SE5			
	<i>Erigeron philadelphicus ssp. philadelphicus</i>	Philadelphia fleabane	G5?	S5			
*	<i>Hieracium aurantiacum</i>	devil's paintbrush	G?	SE5			
*	<i>Leucanthemum vulgare</i>	ox-eye daisy	G?	SE5			
	<i>Solidago canadensis</i>	canada goldenrod	G5	S5			
*	<i>Sonchus arvensis ssp. arvensis</i>	field sow-thistle	G?T?	SE5			
	<i>Symphyotrichum novae-angliae</i>	New England aster	G5	S5			
*	<i>Taraxacum officinale</i>	common dandelion	G5	SE5			
	<b>POACEAE</b>	<b>GRASS FAMILY</b>					
*	<i>Agrostis stolonifera</i>	redtop	G5	S5			
*	<i>Bromus inermis ssp. inermis</i>	awnless brome	G4G5T?	SE5			
*	<i>Dactylis glomerata</i>	orchard grass	G?	SE5			
*	<i>Holcus lanatus</i>	common velvet grass	G?	SE2			
	<i>Phalaris arundinacea</i>	reed canary grass	G5	S5			
	<i>Phragmites australis</i>	common reed	G5	S5			
	<i>Poa compressa</i>	Canada blue grass	G?	S5			
	<b>TYPHACEAE</b>	<b>CATTAIL FAMILY</b>					
	<i>Typha angustifolia</i>	narrow-leaved cattail	G5	S5			
	<i>Typha latifolia</i>	broad-leaved cattail	G5	S5			
	<b>LILIACEAE</b>	<b>LILY FAMILY</b>					
*	<i>Asparagus officinalis</i>	garden asparagus	G5?	SE5			
*	<i>Hemerocallis fulva</i>	orange day-lily	G?	SE5			

## **APPENDIX C AMPHIBIAN MONITORING DATA SHEETS**

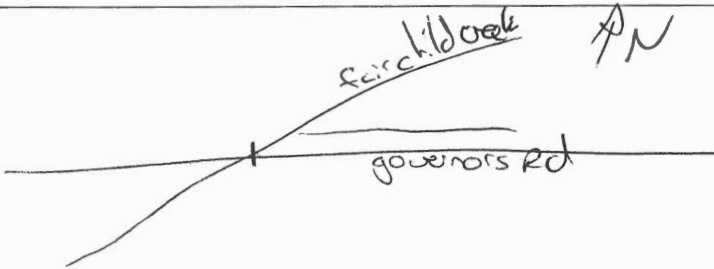


TA8270-Lynden EA

## LGL LIMITED -FROG CALL SURVEY DATA SHEET

Site #: <b>3</b> Location, Nearest 911#:	Stream Name/Associated Wetland: <b>Big Creek</b> UTM Co-ordinates: <b>571658.85, 4787970.39</b>			
Site Description and Map: Adjacent 				
<b>VISIT 1</b> Date: <b>April 15th</b> Time: <b>9pm</b> Weather Conditions: <b>warm, overcast</b> 511 km/h Air Temperature (°C): <b>9°C</b> Investigators: <b>DTB</b>	<b>VISIT 2</b> Date: <b>May 7 2013</b> Time: <b>1035</b> Weather Conditions: <b>clear, calm</b> Air Temperature (°C): <b>11°C</b> Investigators: <b>DTB</b>	<b>VISIT 3</b> Date: <b>June 20</b> Time: <b>1040</b> Weather Conditions: <b>calm, clear</b> Air Temperature (°C): <b>16°C</b> Investigators: <b>DTC</b>		
Species	Code	Visit 1	Visit 2	Visit 3
American Toad	AMTO		1	
Chorus Frog	CHFR			
Gray Tree Frog	GRTR		3	3
Green Frog	GRFR			2
Northern Leopard Frog	NLFR			
Spring Peeper	SPPE	3	3	
Wood Frog	WOFR			
Bull Frog	BUFR			
Other				
Habitat Description (e.g. vegetation type, dominant species, extent of open water): <b>small wetcourse through mowed grass. Some red canopy grasses at edge.</b>				
Comments: <b>visit 1 - call by from 200m east</b> <b>visit 2 " " " "</b> <b>3 " " " "</b>				

# LGL LIMITED -FROG CALL SURVEY DATA SHEET

<b>Site #:</b> 1  <b>Location, Nearest 911#:</b>	<b>Stream Name/Associated Wetland:</b> Fairchild Creek  <b>UTM Co-ordinates:</b> 569668.70 4786628.87																																																					
<b>Site Description and Map: Adjacent</b>  																																																						
<b>VISIT 1</b> <b>Date:</b> April 15 2013 <b>Time:</b> sunset 8:04pm 835pm <b>Weather Conditions:</b> Overcast 511 km/h <b>Air Temperature (°C):</b> 9°C <b>Investigators:</b> DTB	<b>VISIT 2</b> <b>Date:</b> May 7 2013 <b>Time:</b> sunset 1009 <b>Weather Conditions:</b> Calm <b>Air Temperature (°C):</b> 11°C <b>Investigators:</b> DTB	<b>VISIT 3</b> <b>Date:</b> June <b>Time:</b> 10:10 <b>Weather Conditions:</b> Calm, clear <b>Air Temperature (°C):</b> 16°C <b>Investigators:</b> DTC																																																				
<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th style="width:20%;">Species</th> <th style="width:10%;">Code</th> <th style="width:20%;">Visit 1</th> <th style="width:20%;">Visit 2</th> <th style="width:20%;">Visit 3</th> </tr> </thead> <tbody> <tr> <td>American Toad</td> <td>AMTO</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Chorus Frog</td> <td>CHFR</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Gray Tree Frog</td> <td>GRTR</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Green Frog</td> <td>GRFR</td> <td></td> <td></td> <td style="text-align: center;">1</td> </tr> <tr> <td>Northern Leopard Frog</td> <td>NLFR</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Spring Peeper</td> <td>SPPE</td> <td style="text-align: center;">3 ~</td> <td style="text-align: center;">1</td> <td></td> </tr> <tr> <td>Wood Frog</td> <td>WOFR</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Bull Frog</td> <td>BUFR</td> <td></td> <td></td> <td></td> </tr> <tr> <td>Other</td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>	Species	Code	Visit 1	Visit 2	Visit 3	American Toad	AMTO				Chorus Frog	CHFR				Gray Tree Frog	GRTR				Green Frog	GRFR			1	Northern Leopard Frog	NLFR				Spring Peeper	SPPE	3 ~	1		Wood Frog	WOFR				Bull Frog	BUFR				Other					<b>Habitat Description (e.g. vegetation type, dominant species, extent of open water):</b> Meadow marsh, small watercourse			
Species	Code	Visit 1	Visit 2	Visit 3																																																		
American Toad	AMTO																																																					
Chorus Frog	CHFR																																																					
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Bull Frog	BUFR																																																					
Other																																																						
<b>Comments:</b>  Visit 1 - calling from ~200m SW Visit 2 - 1 peeper ~150m N Visit 3 - 1 green tree ~200m SW																																																						

# LGL LIMITED -FROG CALL SURVEY DATA SHEET

Site #: <u>2</u>  Location, Nearest 911#:	Stream Name/Associated Wetland: <u>Big Creek</u>  UTM Co-ordinates: <u>571042.17</u> <u>4786971.31</u>	
Site Description and Map: Adjacent  <u>see map</u>		
<b>VISIT 1</b> Date: <u>April 15 2013</u>  Time: <u>845pm</u> Weather Conditions: <u>overcast</u> <u>511km/h</u> Air Temperature (°C): <u>9°C</u>  Investigators: <u>DTS</u>	<b>VISIT 2</b> Date: <u>May 7 2013</u>  Time: <u>10:20</u> Weather Conditions: <u>calm</u> Air Temperature (°C): <u>11°C</u>  Investigators: <u>DTC</u>	<b>VISIT 3</b> Date: <u>June 20</u>  Time: <u>10:20</u> Weather Conditions: <u>calm, clear</u> Air Temperature (°C): <u>16°C</u>  Investigators: <u>DTC</u>

Species	Code	Visit 1	Visit 2	Visit 3
American Toad	AMTO		<u>1</u>	
Chorus Frog	CHFR			
Gray Tree Frog	GRTR			
Green Frog	GRFR			
Northern Leopard Frog	NLFR			<u>1</u>
Spring Peeper	SPPE	<u>3</u>	<u>1</u>	
Wood Frog	WOFR			
Bull Frog	BUFR			
Other				

Habitat Description (e.g. vegetation type, dominant species, extent of open water): <u>agricultural with worn water drain, narrow meadow riparian band</u>
---

**Comments:**

Visit 1 calling from 500m south  
 Visit 2 calling in 100m North  
 Visit 3 calling from various ponds south of road

## **APPENDIX D AGENCY CONSULTATION**



environmental research associates

445 Thompson Drive, Unit 2  
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✉: [cambridge@lgl.com](mailto:cambridge@lgl.com) 🌐: [www.lgl.com](http://www.lgl.com)

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Robert Messier  
Grand River Conservation Authority  
400 Clyde Rd Cambridge, ON  
N1R 5W6  
[rmessier@grandriver.ca](mailto:rmessier@grandriver.ca)

January 30, 2013

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**Request for Background Information**  
**TA8270 Lynden Water Supply EA**

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Dear Mr. Messier,

I'm writing to request available background data relating to natural heritage features near Lynden, Ontario. We are working with Genivar to assess the potential impacts of a new communal water supply well on Governor's Road, just east of Lynden, ON. This project is an Environmental Assessment, at this stage we are just assessing the potential for impacts to natural heritage features in the zone of influence (ZOI). The ZOI is the potential drawdown area for the new well. The main concern is the potential impact to any groundwater dependent species. There are a few unevaluated wetlands within our study area. We are hoping for your input in order to determine if these wetlands are groundwater dependent. Any information you can provide us regarding these wetlands would be appreciated. A search of the NHIC did not reveal any species at risk in the study area. If there are any species you are concerned about please let us know.

We would also like to request any information you may have for the two watercourses in the study area. I have attached a figure of our study area and the location of the ZOI. The headwaters of Big Creek and Fairchild Creek are within the ZOI. If you have any information regarding these creeks, such as fish records, or known upwelling areas please let us know.

Thank you for your attention to our request, and we look forward to hearing from you.

With thanks,

**LGL LIMITED**  
**environmental research associates**

Dana Summach  
Aquatic Biologist

*Established in 1971*

ONTARIO · BRITISH COLUMBIA · NEWFOUNDLAND · ALASKA · TEXAS · WASHINGTON STATE



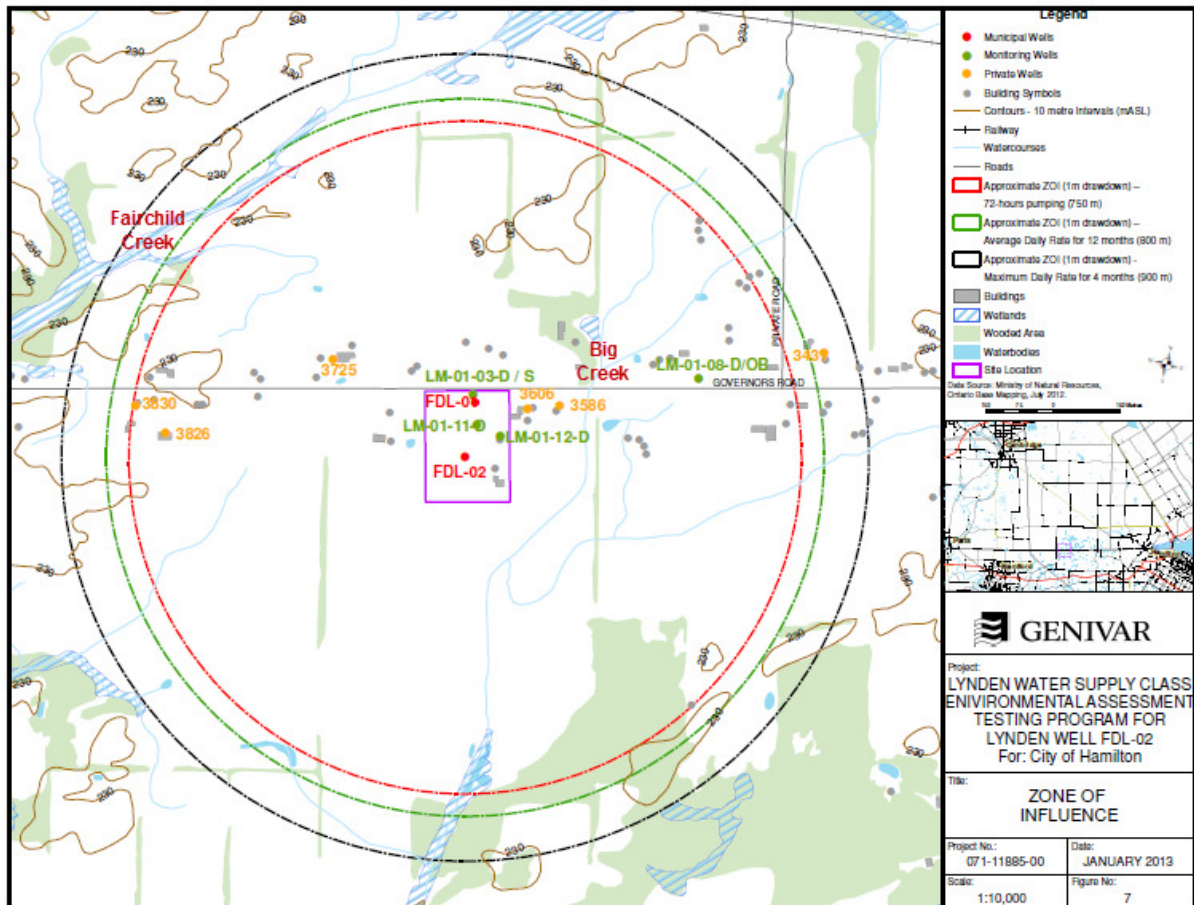


Figure 1: Study area and location of Lynden Water Supply ZOI.



April 25, 2013

Drew Cherry  
Resource Planner  
Grand River Conservation Authority  
400 Clyde Road  
Cambridge, ON  
N1R 5W6

**RE: DRAFT Terms of Reference Environmental Impact Study (Scoped)  
Lynden Water Supply- Municipal Class Environmental Assessment  
Lynden, Ontario**

---

LGL Limited has been retained to provide natural sciences support in order to address the potential impacts of a new communal drinking water well on the natural heritage features in the study area. Our first step is to prepare a Terms of Reference for the Environmental Impact Study (EIS) and distribute it as part of the pre-consultation with appropriate agencies.

If you have any questions regarding this submission please do not hesitate to contact the undersigned or Allison Featherstone at our Cambridge office.

Respectfully Submitted,



Dana Summach, M.Sc.  
Aquatic Biologist  
LGL Limited

**Terms of Reference**  
**Lynden Water Supply Class EA**  
**Lynden, Ontario**

***Introduction***

GENIVAR Inc (for the City of Hamilton) has retained LGL Limited to complete a Natural Heritage Study (NHS) to determine potential impacts of a new communal drinking water well on the natural heritage features in the study area. The proposed location for the new well is just east of Lynden, Ontario south of Governors Road (see Figure 1).

***Background***

Lynden is currently supplied with water from an existing well which is rated at a maximum daily volume of 327 m<sup>3</sup>/day (GENIVAR 2013). Projected future demands for the area are expected to reach 411 m<sup>3</sup>/day, therefore a new well is required (GENIVAR 2013). The preferred location of the new well (FDL-02) is south of Governor's Road, approximately 100m south of the existing well. It is to be built in a confined overburden aquifer, and will provide redundancy for the existing well (FDL-01) (GENIVAR 2013). Attached to this TOR is a copy of the testing study report by GENIVAR (GENIVAR 2013). A 750m potential Zone of impact was investigated by Genivar. They concluded that pumping of the confined aquifer at a rate of 4.7L/s is sustainable and does not impact the shallow aquifer or surface wells.

The study area is mainly agricultural land with some rural residences. In the south/east portion of the study area is the Lynden Southeast Woodlot ESA. It is a small deciduous woodlot with coniferous plantations. It was surveyed as part of Natural Area Inventory 2003 project. Two headwater watercourses are found in the study area, Big Creek and Fairchild Creek. Several unevaluated wetland pockets are associated with these surface water features.

Big Creek is a warmwater stream with pumpkinseed (*Lepomis gibbosus*), brook stickleback (*Culaea inconstans*), common carp (*Cyprinus carpio*), fathead minnow (*Pimephales promelas*), white sucker (*Catostomus commersonii*), common shiner (*Luxilus cornutus*), and central mudminnow (*Umbra limi*) (GRCA, email). The thermal regime and species in Fairchild Creek are unknown based on a review of the GRINS web mapping service and consultation with R. Messier (GRCA).

A search of the Natural Heritage Information Center (NHIC) did not reveal the presence of any known species at risk in the study area. Further consultation with MNR is planned, and they have been contacted.

### ***Proposed Work Plan for the NHS***

The proposed work plan is intended to provide information to assess the potential impacts of the new well on the natural heritage features in the study area. As the hydrogeological study indicated the new well will not impact the surface features, we are proposing a scoped NHS. This will be sufficient to characterize the communities in the study area for the environmental assessment. The NHS will include:

- a description of the proposed undertaking;
- a description of the topography of the study area;
- a description of the existing vegetation features and functions within and adjacent to the subject property;
- a description of the aquatic habitat features within and adjacent to the subject property;
- a description the existing ecological features and functions within the study area (ie: wildlife, vegetation, aquatic, linkages, soil/drainage, hydrogeology) based on existing background data sources and in-season biological inventories – in season inventories are further outlined below ;
- screening for species at risk in the area through a review of available habitat and consultation with the MNR;
- an evaluation of the potential impacts of the proposed well on the natural environment features and functions; and,
- a series of environmental management and mitigation recommendations to protect key features/functions of natural heritage features from impacts.

Based on the above requirements, we propose the following course of study:

- Compile, review and summarize available policies, background data/reports and mapping (i.e. Rural Hamilton Official Plan, Grand River Conservation Authority sources, Ministry of Natural Resources databases, Clean Water Act sources, etc.);
- Single season (summer) vegetation ELC survey of the study area, according to the OMNR Ecological Land Classification System for Southern Ontario. Only one season is proposed, as no impacts are anticipated;
- Record incidental wildlife observations;
- Survey the habitat of Big Creek and Fairchild Creek (no fish sampling proposed) and determine appropriate management options for the watercourse;
- Develop existing conditions mapping, based on background and supplemental field data;
- Identify potential impacts of proposed well (none anticipated); and

- Document results of natural heritage inventory and constraints analysis in an NHS report;

### ***Proposed Table of Contents***

The following is draft Table of Contents for the NHS report.

1. Introduction
2. Policy Setting
  - 2.1. Rural Hamilton Official Plan
  - 2.2. Clean Water Act
3. Existing Conditions
  - 3.1 Physiography
  - 3.2 Aquatic Habitat and Communities
  - 3.3 Vegetation and Communities
  - 3.4 Wildlife Habitat and Communities
4. Impact Assessment
5. Management and Mitigation Recommendations
6. Summary and Conclusions

If you have any questions regarding this submission, please do not hesitate to contact undersigned at our Cambridge Office.

Respectfully Submitted,



Dana Summach, M.Sc.  
Aquatic Biologist  
LGL Limited



environmental research associates

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Head Office 22 Fisher St., P.O. Box 280, King City, ON CANADA L7B 1A6 t 905-833-1244 f 905-833-1255 ✉ [kingcity@lgl.com](mailto:kingcity@lgl.com) 🌐 [www.lgl.com](http://www.lgl.com)

April 17, 2013

Drew Cherry  
Resource Planner  
Grand River Conservation Authority  
400 Clyde Road  
Cambridge, ON  
N1R 5W6

**RE: DRAFT Terms of Reference Environmental Impact Study (Scoped)  
Lynden Water Supply- Municipal Class Environmental Assessment  
Lynden, Ontario**

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Respectfully Submitted,

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**Terms of Reference**  
**Lynden Water Supply Class EA**  
**Lynden, Ontario**

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GENIVAR Inc (for the City of Hamilton) has retained LGL Limited to complete a Natural Heritage Study (NHS) to determine potential impacts of a new communal drinking water well on the natural heritage features in the study area. The proposed location for the new well is just east of Lynden, Ontario south of Governors Road (see Figure 1).

***Background***

Lynden is currently supplied with water from an existing well which is rated at a maximum daily volume of 327 m<sup>3</sup>/day (GENIVAR 2013). Projected future demands for the area are expected to reach 411 m<sup>3</sup>/day, therefore a new well is required (GENIVAR 2013). The preferred location of the new well (FDL-02 is south of Governor's Road, approximately 100m south of the existing well. It is to be built in a confined overburden aquifer, and will replace the current well (FDL-01) (GENIVAR 2013). Attached to this TOR is a copy of the testing study report by GENIVAR (GENIVAR 2013). A 750m potential Zone of impact was investigated by Genivar. They concluded that pumping of the confined aquifer at a rate of 4.7L/s is sustainable and does not impact the shallow aquifer or surface wells.

The study area is mainly agricultural land with some rural residences. In the south/east portion of the study area is the Lynden Southeast Woodlot ESA. It is a small deciduous woodlot with coniferous plantations. It was surveyed as part of Natural Area Inventory 2003 project. Two headwater watercourses are found in the study area, Big Creek and Fairchild Creek. Several unevaluated wetland pockets are associated with these surface water features.

Big Creek is a warmwater stream with pumpkinseed (*Lepomis gibbosus*), brook stickleback (*Culaea inconstans*), common carp (*Cyprinus carpio*), fathead minnow (*Pimephales promelas*), white sucker (*Catostomus commersonii*), common shiner (*Luxilus cornutus*), and central mudminnow (*Umbra limi*) (GRCA, email). The thermal regime and species in Fairchild Creek are unknown based on a review of the GRINS web mapping service and consultation with R. Messier (GRCA).

A search of the Natural Heritage Information Center (NHIC) did not reveal the presence of any known species at risk in the study area. Further consultation with MNR is planned, and they have been contacted

### ***Proposed Work Plan for the NHS***

The proposed work plan is intended to provide information to assess the potential impacts of the new well on the natural heritage features in the study area. As the hydrogeological study indicated the new well will not impact the surface features, we are proposing a scoped NHS. This will be sufficient to characterize the communities in the study area for the environmental assessment. The NHS will include:

- a description of the proposed undertaking;
- a description of the topography of the study area;
- a description of the existing vegetation features and functions within and adjacent to the subject property;
- a description of the aquatic habitat features within and adjacent to the subject property;
- a description the existing ecological features and functions within the study area (ie: wildlife, vegetation, aquatic, linkages, soil/drainage, hydrogeology) based on existing background data sources and in-season biological inventories – in season inventories are further outlined below ;
- screening for species at risk in the area through a review of available habitat and consultation with the MNR;
- an evaluation of the potential impacts of the proposed well on the natural environment features and functions; and,
- a series of environmental management and mitigation recommendations to protect key features/functions of natural heritage features from impacts.

Based on the above requirements, we propose the following course of study:

- Compile, review and summarize available policies, background data/reports and mapping (i.e. Rural Hamilton Official Plan, Grand River Conservation Authority sources, and Ministry of Natural Resources databases);
- Single season (summer) vegetation ELC survey of the study area, according to the OMNR Ecological Land Classification System for Southern Ontario. Only one season is proposed, as no impacts are anticipated;
- Record incidental wildlife observations;
- Survey the habitat of Big Creek and Fairchild Creek (no fish sampling proposed) and determine appropriate management options for the watercourse;
- Develop existing conditions mapping, based on background and supplemental field data;

**Comment [CoHU1]:** ELC should be done –doing the work in the summer is fine. While ELC and botanical surveys are related, they usually are identified separately on the scope of work. I think the main potential impacts would be to plants and vegetation (ELC) so I would recommend that the two season botany survey (late spring and late summer-fall) plus ELC be completed.

**Comment [CoHU2]:** I am satisfied with incidental observations of wildlife but please use the 2003 Nature Counts. I can also check to see if we have re-surveyed this site in 2011-2013 Nature Counts 2 Project, so there may be even more current data.



- Identify potential impacts of proposed well (none anticipated); and
- Document results of natural heritage inventory and constraints analysis in an NHS report;

### ***Proposed Table of Contents***

The following is draft Table of Contents for the NHS report.

1. Introduction
2. Policy Setting
  - 2.1. City of Hamilton Official Plan
  - 2.2. Clean Water Act
3. Existing Conditions
  - 3.1 Physiography
  - 3.2 Aquatic Habitat and Communities
  - 3.3 Vegetation and Communities
  - 3.4 Wildlife Habitat and Communities
4. Impact Assessment
5. Management and Mitigation Recommendations
6. Summary and Conclusions

If you have any questions regarding this submission, please do not hesitate to contact undersigned at our Cambridge Office.

Respectfully Submitted,



Dana Summach, M.Sc.  
Aquatic Biologist  
LGL Limited



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LGL Limited  
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Cambridge, ON N1T 2K7

Dana Summach, Aquatic Biologist

Dear Dana:

**Subject: Draft Terms of Reference for Environmental Impact Study (Scoped)  
Lynden Water Supply – Municipal Class Environmental Assessment  
Lynden, Ontario**

Staff at the Grand River Conservation Authority have now had an opportunity to review the above noted Terms of Reference for the Lynden Water Supply. The proposed works involve the establishment of a new water supply well approximately 100 metres south of the existing municipal well. Our comments and recommendations are as follows:

**Comments:**


- The proposed Environmental Impact Study will have to interpret the hydrogeological study that has been completed, to identify what is sustaining surface and groundwater flows within Big Creek and Fairchild Creek as well as the adjacent wetland areas. If the current hydrogeological study has not adequately assessed the adjacent creeks and wetlands, then the report should be amended and updated.
- A monitoring plan should be identified as part of the draft Terms of Reference to assess impacts to the two watercourses and the adjacent wetland areas.

**Recommendation:**

- The hydrogeological study should be included as an appendix to the EIS so GRCA technical staff can provide appropriate review.

I trust these comments are of assistance. Should you have any questions or require additional information, please contact me.

Yours truly,

  
Drew Cherry  
Resource Planner  
Grand River Conservation Authority  
519-621-2763 ext. 2237



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January 30, 2013

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**Request for Species at Risk Background Information**  
**TA8270 Lynden Water Supply EA**

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Dear Mr. Mariott,

I'm writing to request available background data relating to Species at Risk near Lynden, Ontario. We are working with Genivar to assess the potential impacts of a new communal water supply well on Governor's Road, just east of Lynden, ON. This project is an Environmental Assessment, at this stage we are just assessing the potential for impacts to species at risk in the zone of influence (ZOI). The ZOI is the potential drawdown area for the new well. The main concern is the potential impact to any groundwater dependent species. There are a few unevaluated wetlands within our study area. We are hoping for your input in order to determine if there is any possibility of species at risk in the study area. A search of the NHIC did not reveal any species at risk. If there are any species you are concerned about please let us know.

We would also like to request any information you may have for the two watercourses in the study area. I have attached a figure of our study area and the location of the ZOI. The headwaters of Big Creek and Fairchild Creek are within the ZOI. If you have any information regarding these creeks, such as fish records, or known upwelling areas please let us know.

Thank you for your attention to our request, and we look forward to hearing from you.

With thanks,

**LGL LIMITED**  
**environmental research associates**

Dana Summach  
Aquatic Biologist

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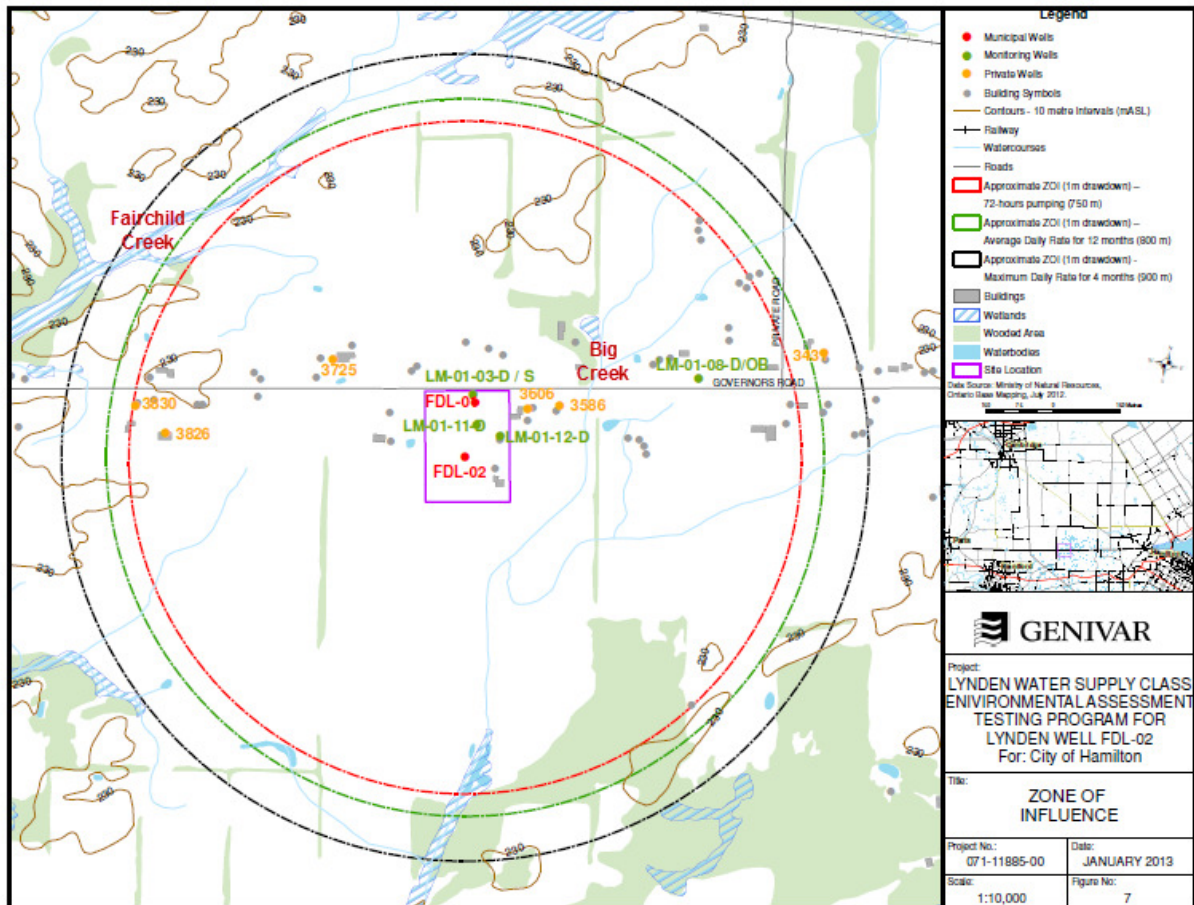


Figure 1: Study area and location of Lynden Water Supply ZOI.

## Dana Summach

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**From:** Norminton, Lorraine (MNR) <lorraine.norminton@ontario.ca>  
**Sent:** May-24-13 8:46 AM  
**To:** Dana Summach  
**Subject:** TA8270 Lynden Water Supply EA  
**Attachments:** CityofHamilton.xls

**Subject:** RE: TA8270 Lynden Water Supply EA

Hi Dana,

Ministry staff have had an opportunity to review the natural heritage records and information available at the MNR Guelph District Office, for the Lynden Water Supply EA. Please see below for the following information and comments to address your questions.

### Areas of Natural Scientific Interest

Ministry staff notes that there are no Earth Science or Life Science ANSIs identified by MNR.

Digital mapping for ANSIs can be obtained from Land Information Ontario (LIO). The Warehouse Dataset Name is "ANSI" within LIO. LIO manages key provincial datasets, and is responsible for housing most of the Ministry's digital natural heritage and resource data. The LIO Warehouse also includes spatial data from a variety of other sources and agencies, including federal ministries and conservation authorities. The LIO website provides instructions on how to request/obtain data, and a full listing of all data in the Warehouse. The link to the LIO website is as follows: <http://www.mnr.gov.on.ca/en/Business/LIO/index.html>. In addition, LIO staff can be contacted at [lio@ontario.ca](mailto:lio@ontario.ca) or at (705) 755-1878.

### Wetlands

Ministry staff also note that there are no wetlands identified by MNR as having provincial significance. The Upper Twenty Mile Creek Wetland Complex is within the study area. Please note that digital mapping for Wetlands can be obtained from LIO as stated above. The Warehouse Dataset Name is "Wetland Unit" within LIO.

### Species at Risk

Ministry staff notes that there are no known records of species at risk immediately within or adjacent to the subject properties. However, there is Jefferson Salamander ESA Habitat approximately 2.6 km to the southwest of the confluence of Big Creek. We were not able to specifically identify the exact areas as the map and location provided was not very clear.

The Natural Heritage Information Centre (NHIC) is responsible for maintaining a central repository of data and information on rare species in the province of Ontario. This data can be searched via the Biodiversity Explorer internet tool available at [www.biodiversityexplorer.mnr.gov.on.ca](http://www.biodiversityexplorer.mnr.gov.on.ca). The Biodiversity Explorer can be used to find locations of species at risk (referred to as Element Occurrences (EO)) in any part of the province. MNR's Guelph District forwards its EO data to the NHIC at regular intervals in support of the NHIC's mandate.

Please be advised that because the province has not been surveyed comprehensively for the presence of listed species, the absence of records is not an indicator for the absence of species at risk from an area. The presence of an EO is useful to flag the presence of the species in the area, but is not an appropriate tool to determine whether a species is absent from the area, or whether it should be surveyed for.

To determine the presence of species at risk for a given study area, the Ministry's recommended approach includes:

#### I. Habitat Inventory



Ministry staff recommends undertaking a comprehensive botanical inventory of the entire area that may be subject to direct and indirect impacts from the proposed activity. The vegetation communities should be classified as per the "Ecological Land Classification (ELC) for Southern Ontario" system, to either the "Ecosite" or "Vegetation Type" level. With respect to aquatic habitats in the study area, we recommend you collect data on the physical characteristics of the waterbodies and inventory the riparian zone vegetation, so that these habitats can be classified as per the Aquatic Ecosites described in the ELC manual.

## II. Potential Species at Risk within the Study Area

A list of species at risk that have the potential to occur in the area can be produced by cross-referencing the ecosites described during the habitat inventory with the habitat descriptions of species at risk known to occur within the planning area. The list of species at risk known to occur in the City of Hamilton is attached. The species-specific COSEWIC status reports ([www.cosewic.gc.ca](http://www.cosewic.gc.ca)) are a good source of information on species at risk habitat needs and will be helpful in determining the suitability of the study areas ecosites for a given species.

Please note that the Species at Risk in Ontario list (SARO) is a living document and is amended periodically as a result of species assessment and re-assessments conducted by the Committee on the Status of Species at Risk in Ontario (COSSARO). The SARO list can be accessed on the webpage <http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/276722.html>.

COSSARO also maintains a list of species to be assessed in the future. It is recommended to take COSSARO's list of anticipated assessments into consideration, especially when the proposed start date of the activity is more than 6 months away, or the project will be undertaken over a period greater than 6 months. The list can be viewed by going to <http://www.mnr.gov.on.ca/en/Business/Species/2ColumnSubPage/244543.html> and clicking on the link Priority List of Species to be Assessed and Classified by COSSARO.

Species at risk habitat prescribed under regulation can be accessed on the Environmental Registry and searching for postings related to Ontario Regulation 242/08 under the *Endangered Species Act*.

## III. Species at Risk Surveys

Ministry staff are of the opinion that each species at risk identified under Step II should be surveyed for, regardless of whether or not the species has been previously recorded in the area. The survey report should describe how each species at risk was surveyed for, and provide a rationale for why, if any, certain species appearing on the attached list were not afforded a survey (e.g. habitat within the study area is not suitable for a specific species at risk). Some species at risk surveys require an authorization under the *Endangered Species Act* (permit) and/or a Scientific Collector's Permit. Please contact Graham Buck (MNR Species at Risk Biologist) at 519-826-4505, for a copy of a permit application or for further information on the implications on the legislation.

### **Lorraine Norminton**

District Planner  
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**From:** Dana Summach [<mailto:DSummach@lglcambridge.com>]  
**Sent:** Thursday, May 23, 2013 11:28 AM