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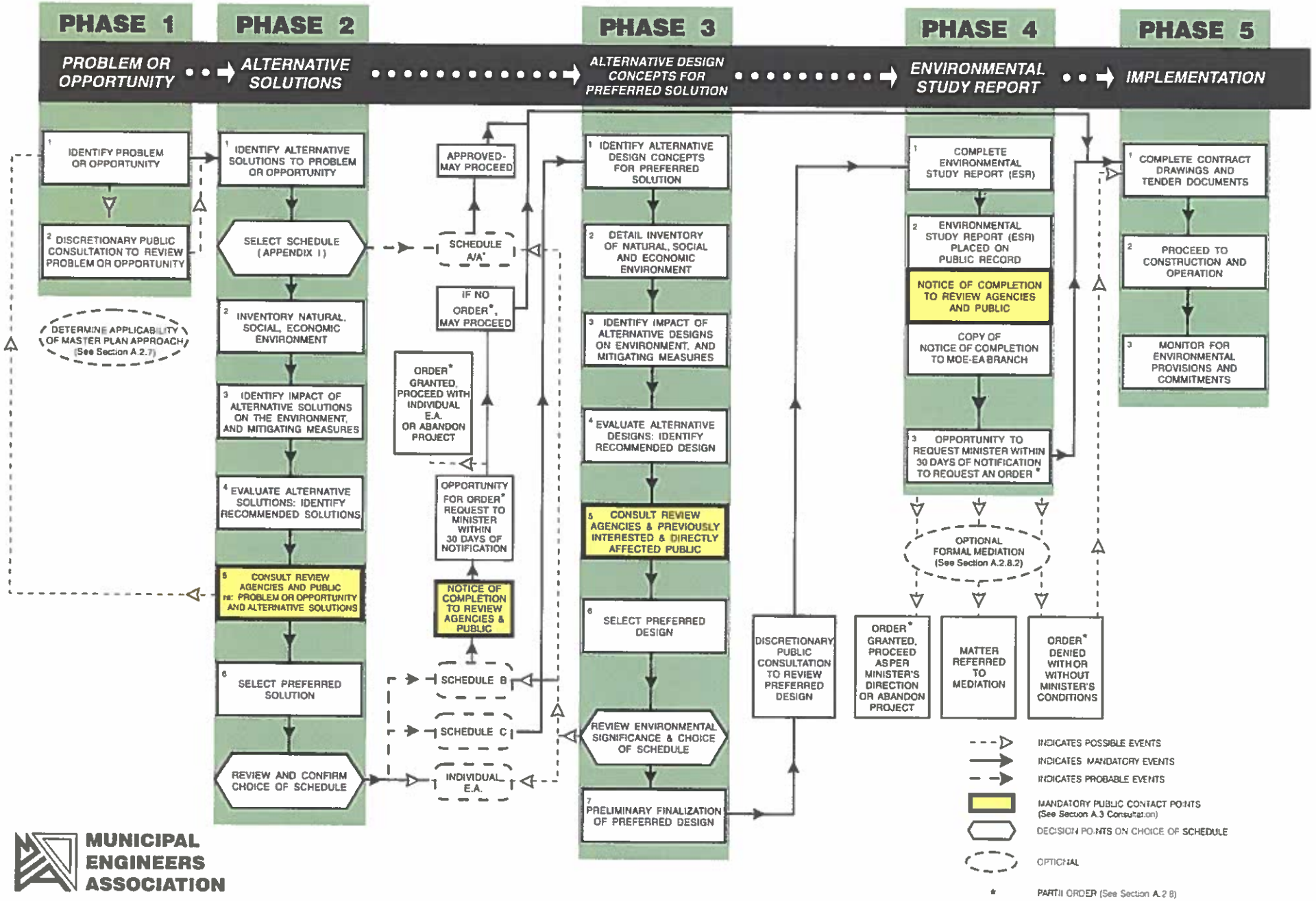
Appendix A

Overview of the Municipal Class Environmental Assessment Planning Process

EXHIBIT A.2 MUNICIPAL CLASS EA PLANNING AND DESIGN PROCESS

NOTE: This flow chart is to be read in conjunction with Part A of the Municipal Class EA



MUNICIPAL ENGINEERS ASSOCIATION

Appendix B

Traffic Impact Study and Sightline Review

Transportation AECOM

City of Port Colborne

Site Servicing of the East Side Employment Lands
FINAL TRAFFIC IMPACT STUDY

Prepared by:

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Project Number:

60322620

Date:

March 2015

Statement of Qualifications and Limitations

The attached Report (the "Report") has been prepared by AECOM Canada Ltd. ("Consultant") for the benefit of the client ("Client") in accordance with the agreement between Consultant and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations and conclusions contained in the Report (collectively, the "Information"):

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- represents Consultant's professional judgement in light of the Limitations and industry standards for the preparation of similar reports;
- may be based on information provided to Consultant which has not been independently verified;
- has not been updated since the date of issuance of the Report and its accuracy is limited to the time period and circumstances in which it was collected, processed, made or issued;
- must be read as a whole and sections thereof should not be read out of such context;
- was prepared for the specific purposes described in the Report and the Agreement; and
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March 20, 2015

Jim Huppunen
Manager of Engineering Services
66 Charlotte Street
Port Colborne, ON L3K 3C8

Dear Mr. Huppunen,

Project No: **60322620**
Regarding: **Site Servicing of the East Side Employment Lands – Traffic Impact Study**

Please find attached a copy of the revised final Traffic Impact Study prepared for the above noted project in the City of Port Colborne.

The study reviewed predicted traffic operations at the intersection of Highway 140 and Third Concession Road as a result of the proposed light industrial development of the ESEL. The analysis showed that opening year volumes warrant a northbound left turn lane with a storage length of 30 m to accommodate site generated traffic.

Horizon years 2025 and 2030 analysis indicates that all movements on Highway 140 operate well with westbound approach on Third Concession Road is expected to operate at a LOS E and F with delay of approximately one minute. The forecasted westbound volume total is less than 10 vehicles in the peak hours. The sensitivity analysis suggests that by removing eastbound right turn vehicles from an opposing conflicting movement via channelization, westbound vehicles can be benefitted with marginally reduced delays. However, it is not advisable to provide roadway improvements to alleviate delay concerns for less than 10 vehicles.

It should also be noted that the southbound right turn lane on Highway 140 should be brought up to MTO standards during the detailed design phase.
If you have any questions or comments regarding this report, please do not hesitate to contact the undersigned at (905) 938-7657.

Sincerely,
AECOM Canada Ltd.

Ian Izzard, P. Eng., M.A.Sc., PMP.
Senior Project Manager – Community Infrastructure
Ian.izzard@aecom.com
Encl.

cc: Michael Tracey, Pranav Dave (AECOM)

MTO Comments	AECOM Responses
Page 7, How will the proposed water main be built along Highway 140?	See Page 9, The watermain and forcemain will be installed on west side of the MTO Highway 140 Right-of-Way. AECOM will ensure that the construction process does not interfere with traffic operation and that backfill, compaction and restoration will have no adverse effects on the highway.
Page 10, section 3.1, Table 2, 500 Employees and only 200 peak hour trips. This would suggest that everyone would car pool as vehicle occupancy would be more than 2/veh. We would be more comfortable with a 90/10 in/out split for AM and 10/90 for PM.	The 200 peak hour trips formulated from the ITE Trip Generation manual implies that not all 500 employees will arrive during the peak hour for this land use type. Therefore, trip generation will remain unchanged throughout this report. In/out splits have been updated to as suggested to 90/10 in/out split for AM and 10/90 for PM.
Page 11, Table 4, We are okay with the trip distribution.	Trip distribution proportions will be consistent with the December 2014 submission.
Page 11 Section 3.2, MTO will not accept a 1 % growth rate. Historical 10 year growth has been 21.3% South of Concession 3 and 35% bout 3 km North of Third Concession. Truck % is 10.1%.	Growth rates have been updated to 21.3% South and 35% North of Third Concession Road. All figures and summary tables have been updated to reflect this change.
Page 11, We are okay with Table 5.	Table 5 will remain consistent with the December 2014 submission.
Page 12, section 4.1, Sat flow of 1750 must be used and 10% commercial must be used. All background traffic must be grown from 2012 volumes, not 2014 as has been used.	Sat. flow and commercial vehicle parameters have been updated accordingly and traffic volumes have been grown from 2012 (Raw Data) to 2014 (Base Data). Please see Figures 4 and 5 for further detail.
Page 16, section 4 4.2, text under Table 9, MTO does not use TAC standards for roadway design. This is mentioned numerous times in the TIS. Wherever it is mentioned, the reference to TAC should be changed to the Ministry's Geometric Design Manual.	All references to TAC guidelines have been updated to reflect information standards outlined in the Ministry's Geometric Design Manual.
Page 21, section 5, the TIS should state that due to the additional traffic volumes turning left onto Concession 3, the proponent is responsible for the full cost of all design work and construction costs related to intersection improvements related to the development including the SB right turn lane.	The report has been updated to indicate that the proponent is responsible for the full cost of all design and construction work related to intersection improvements.
Appendix B, Please rerun all Synchro analysis using appropriate traffic volumes, sat flow, commercial percentage and growth rates.	All Synchro reports and analysis have been updated to include appropriate traffic volumes, sat flow, commercial percentage and growth rates.
Appendix C, Please rerun all signal warrants under free flow conditions.	All warrant assessment have been updated accordingly.

Distribution List

		Association / Company Name

Revision Log

Revision #	Revised By	Date	Issue / Revision Description
1	MT/PD	03/16/2015	MTO Comments - March 4, 2015

AECOM Signatures

Report Prepared By:

Michael Tracey, B.A., C.E.T
Transportation Planner

Report Reviewed By:

Pranav Dave, P. Eng., PTOE
Senior Traffic Engineer

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1. Introduction

AECOM has been retained by the City of Port Colborne to carry out a Traffic Impact Study (TIS) as part of the Municipal Class Environmental Assessment (EA) for the proposed development of the East Side Employment Lands (ESEL) in the City of Port Colborne, the Regional Municipality of Niagara. The subject site for this TIS is located west of Ontario Highway 140 on Third Concession Road. **Figure 1** shows the study area in a municipal context and **Figure 2** provides detail on the study area road network.

1.1 Study Scope

The study is in support of the Site Servicing of the East Side Employment Lands (SSESEL) in order to attract development to the proposed industrial area. The ESEL form part of Niagara Region's Niagara Gateway Economic Zone and Centre, which was first identified in the Provincial Growth Plan for the Greater Horseshoe. The ESEL have been identified by the City as a priority for investment to enable and support development of these lands. Key components of this work include completion of a Schedule B Class EA Study and all sanitary gravity main, pump station and forcemain, storm, water, electrical and roadwork design required to service the Phase 1 area west of Ramey Road and South of Third Concession Road. The study area presented in **Figure 2** shows the development site (Lot 25, Concession 3) and the Highway 140-Third Concession Road intersection which was evaluated as part of this TIS.

The TIS scope was developed in accordance with the Ministry of Transportation (MTO) Traffic Impact Study Guidelines and through consultation with both City of Port Colborne and MTO staff. The scope and key tasks of the TIS can be summarized as follows:

- The impacts of the proposed development on the existing road transportation network, adjacent roadways, accesses and known future developments were identified.
- 24 hour mainline movement counts (AADT) capturing morning (AM), mid-day and afternoon (PM) peak periods at the following check points along Highway 140 formed the foundation of the traffic analysis:
    - Highway 140 – 0.5 km north of Highway 3;
    - Highway 140 – 1.5 km north of Forks Road; and
    - Highway 140 – Third Concession Road.
- Turning Movement Counts (TMC) at the Highway 140-Third Concession Road intersection were based on review of the Highway 140 AADT volumes and TMCs obtained from the recently approved "*Nyon Fuelling Corporation Traffic Impact Study (Nyon TIS)*" report, completed in September 2013. Accordingly, thru northbound/southbound (NB/SB) volumes at the intersection are based on the MTO mainline volumes, while turning volumes to and from Third Concession Road are based on the Nyon TIS.
- Niagara Navigator was used to validate base conditions and record geometric information pertaining to intersection lane arrangements, storage lengths and general driver/road network operations during the AM and PM peak periods.
- The Transportation Tomorrow Survey (TTS) was used to develop trip distribution patterns from the proposed development lands.
- Complete intersection analyses for the AM and PM operations were performed using Synchro, identifying the delay, level of service, volume to capacity (v/c) ratios, and queue and blocking.
- The Institute of Transportation Engineers (ITE) Handbook was used to forecast the number of trips generated by the proposed industrial development.

Figure 1: Study Area in Municipal Context

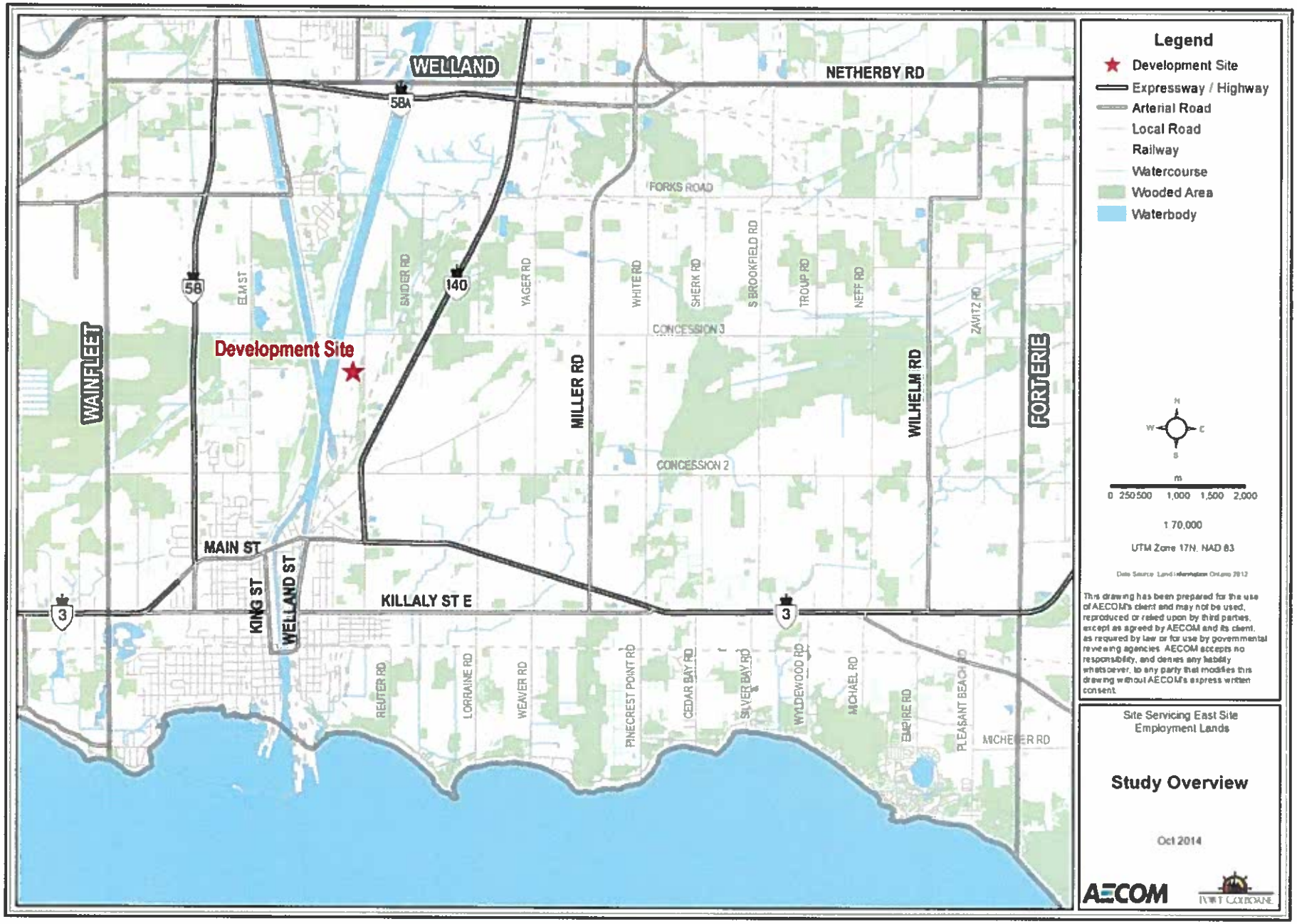
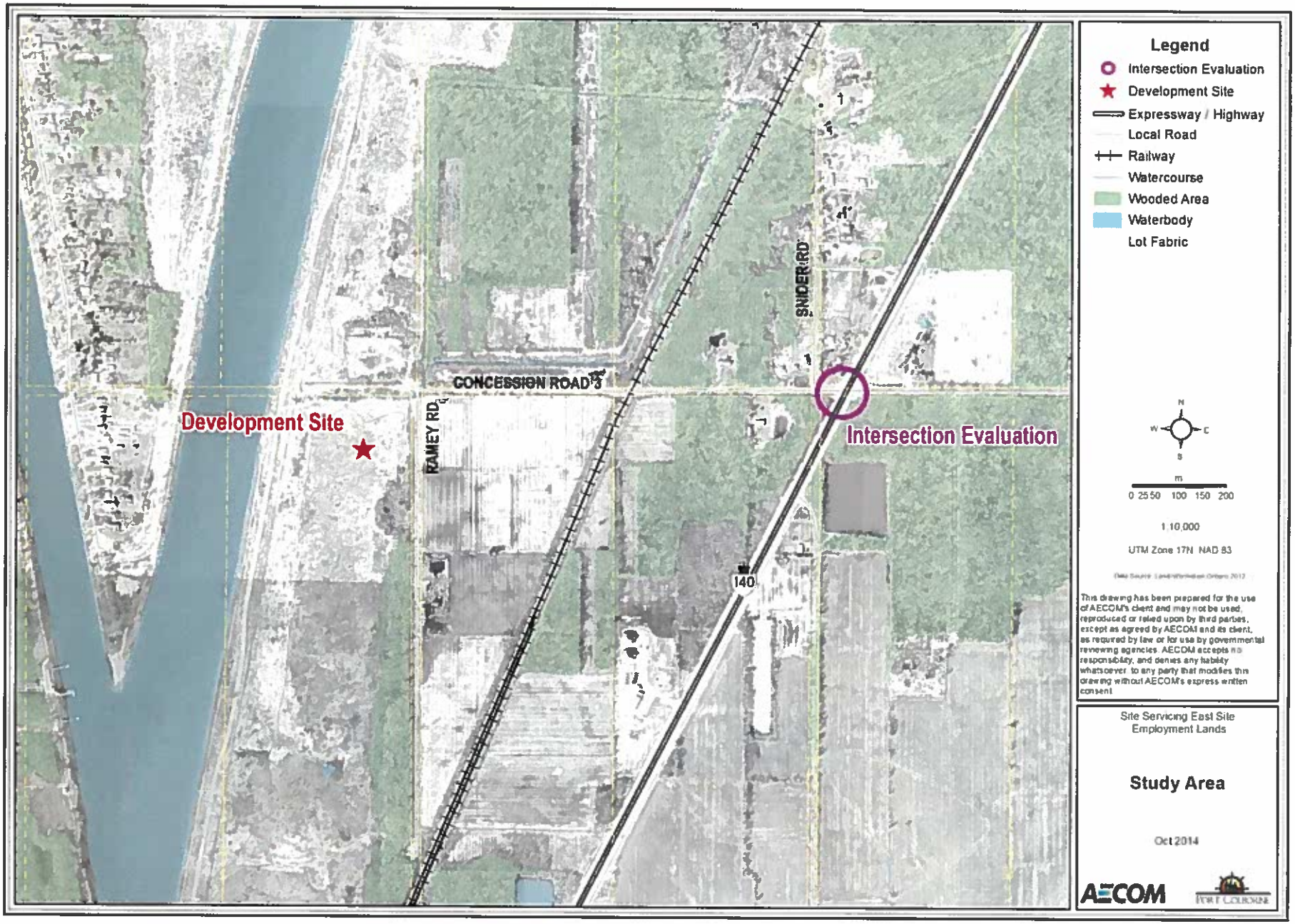


Figure 2: Study Area



1.2 Study Assumptions

The TIS adopted the following key assumptions:

- The '*Base Year*' for existing traffic operations analysis will be represented by 2014.
- The proposed industrial development '*Opening Year*' will be considered to be 2020.
- As determined by the City of Port Colborne, a total of 500 jobs will be generated through development of the ESEL, which are anticipated to use Third Concession Road for driveways access.
- The post five and ten year horizon traffic conditions will be represented by the horizon year 2025 and 2030.
- The study is based on the proposed development of 58 acres of industrial land as shown on **Figure 3**, the Site Plan entitled '*Site Four – Phase 1 Servicing Proposal (Plan 'A') June 12, 2013*' provided by the City of Port Colborne as part of the Request for Proposal (RFP).

2. Existing Conditions

The proposed development is located in the City of Port Colborne east of the Welland Canal, approximately 4 km north of Lake Erie. The property is accessed via Third Concession Road, approximately 1 km west of Highway 140.

The Regional Official Plan, as amended by ROPA 2-2009, designates the site a Greenfield Area within the Port Colborne Urban Area and it is zoned for industrial development. The present zoning permits a range of light and heavy industrial uses, and the existing properties conform to the minimum lot standards of the zone. Currently, the planning policy and regulatory frameworks are already in place to facilitate industrial development. Land uses surrounding the study area are predominantly agricultural and light industrial.

2.1 Existing Road Network

This TIS has considered the intersection of Highway 140 and Third Concession Road as the primary junction in accessing the ESEL area. Each roadway is further described in the sub-sections below.

2.1.1 Highway 140

Highway 140 is a provincially maintained, two-lane limited access highway with a posted speed limit of 80 km/hr. The highway is approximately 14 km long, extending from Highway 3 in the south to East Main Street in the north. The highway is designed to accommodate both neighbourhood (municipal) trips and act as a connection to other provincial highways for intra-regional trips.

2.1.2 Third Concession Road

Third Concession Road is under jurisdiction of the City of Port Colborne. This two-lane local road has a posted speed limit of 60 km/hr and supports rural residential trips. Currently, vehicles travelling in the both the east and west directions are controlled by a two-way stop at the intersection of Highway 140 and Third Concession Road.

2.2 Existing Traffic Volumes

Twenty-four hour mainline volumes were provided by the MTO along Highway 140. The data was collected between 2010 and 2012 and is summarized hourly at each offset. To develop TMCs, the mainline Highway 140 AADT just north of Highway 3 were used.

TMCs at the Highway 140 and Third Concession Road intersection were based on review of the Highway 140 AADT volumes and TMCs obtained from the recently approved "Nyon Fuelling Corporation Traffic Impact Study (Nyon TIS)" report, completed in September 2013. Accordingly, thru NB/SB volumes at the intersection are based on the MTO mainline volumes, while turning volumes to and from Third Concession Road are based on the Nyon TIS.

Table 1 summarizes the source of the traffic counts and **Figure 3** illustrates the existing raw weekday AM and PM peak hour movement volumes and existing lane configuration. See **Appendix A** for further details.

Table 1: Summary of Traffic Data

Intersection/Offset	Count Type	Control Type	Count Data	Source
Highway 140 & Third Concession Road	TMC	Stop Control on Third Concession Road	January 2012	Port Colborne
Highway 140 – 0.5 km north of Highway 3	24 Hour AADT	Free Flow	August 2012	MTO
Highway 140 – 1.5 km north of Forks Road	24 Hour AADT	Free Flow	August 2011	MTO
Highway 140 – Third Concession Road	24 Hour AADT	Free Flow	November 2010	MTO

For the purposes of this study, data collected on Highway 140 – 0.5 km north of Highway 3 is most pertinent and is used for further evaluation. **Figure 4** provides the traffic volumes for the '*Base Year*' 2014.

Figure 3: Existing Lane and Link Configuration and Raw Traffic Volumes

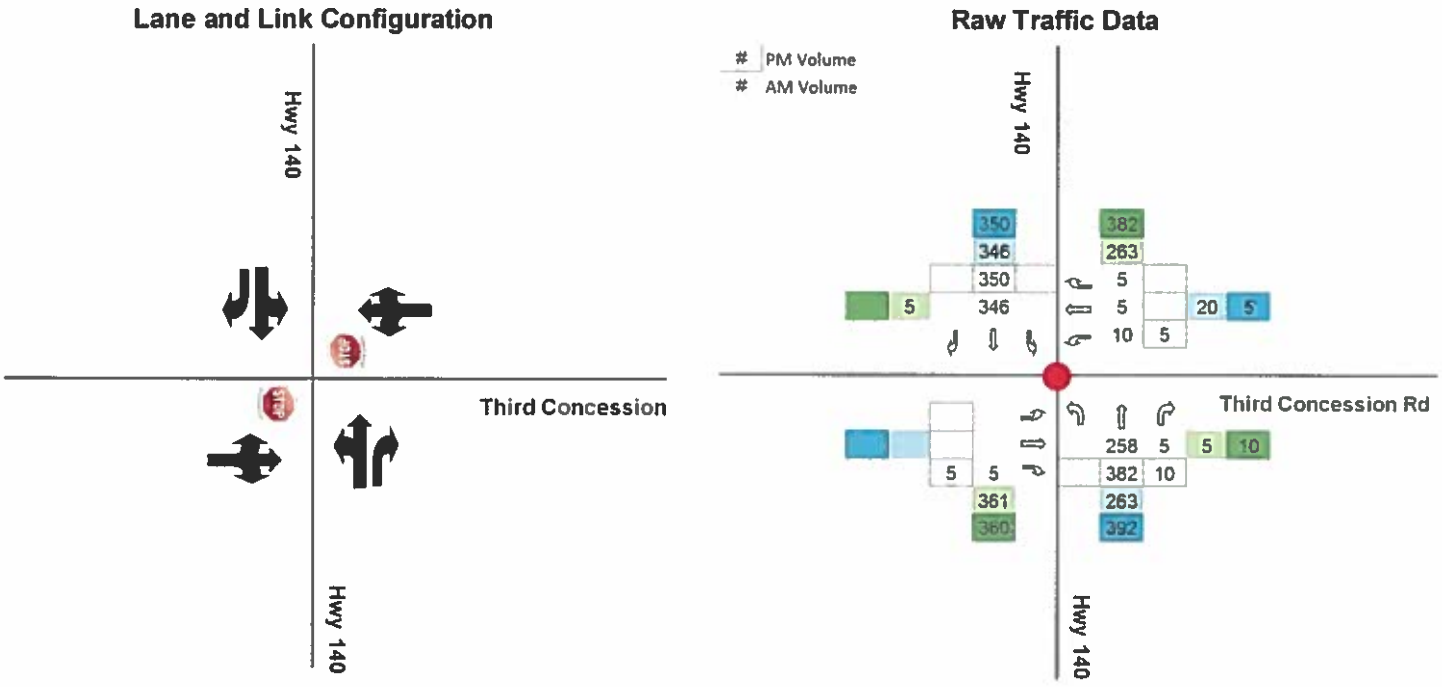
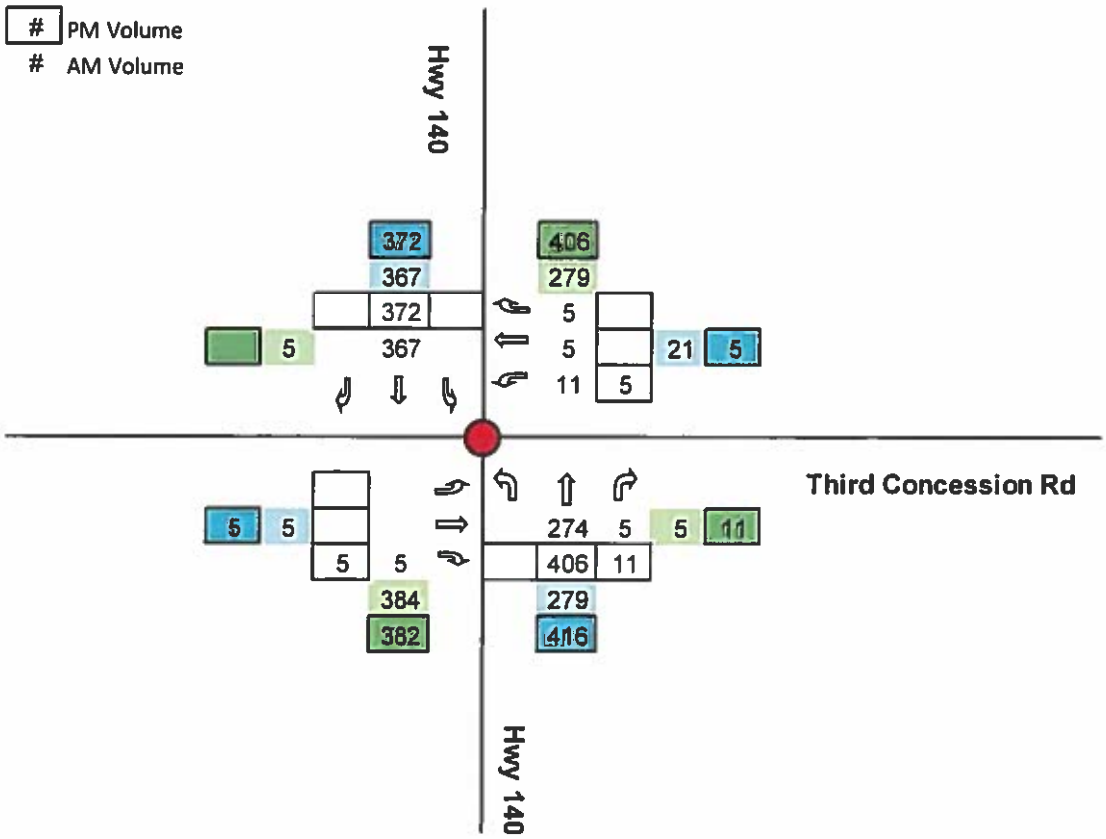


Figure 4: Base Year (2014) Weekday AM (PM) Peak Hour Traffic Turn Movement Volume



2.3 Transit, Cycling and Pedestrians

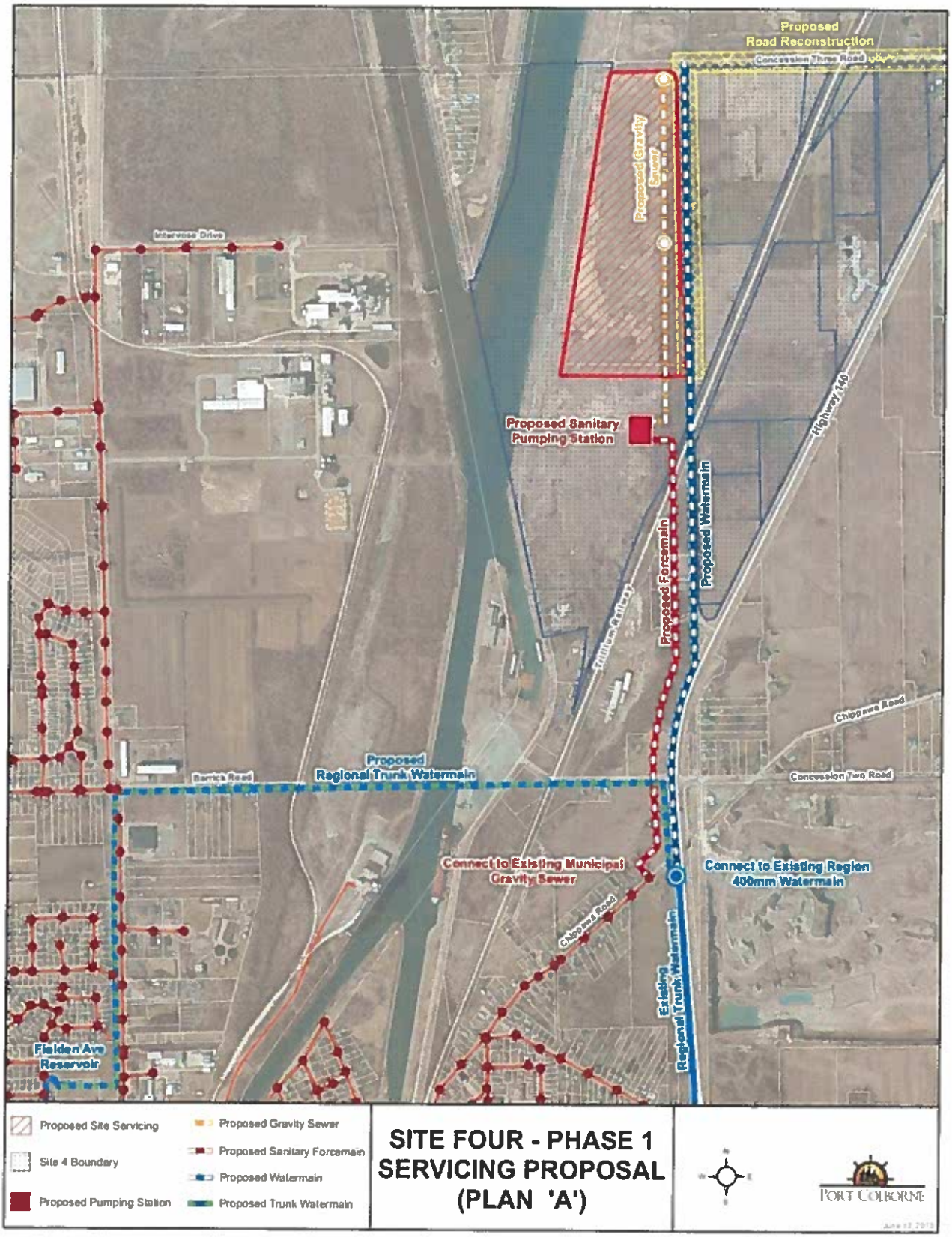
Currently, no bus routes immediately service the study area. Niagara Regional Transit Route 60/65 traverses Highway 140 north of the study area using East Main Street through the City of Welland. The route originates at the Welland Terminal and travels easterly towards Fort Erie, where it then proceeds northbound on Montrose Road into the City of Niagara Falls. No sidewalks or pathways have been identified surrounding the development site.

3. Future Conditions

3.1 Proposed Watermain

The watermain and forcemain will be installed on west side of the MTO Highway 140 Right-of-Way. AECOM will ensure that the construction process does not interfere with traffic operation and that backfill, compaction and restoration will have no adverse effects on the highway. See **Figure 5** for further details.

Figure 5: Site Plan



3.2 Trip Generation, Distribution and Assignment

Trips generated by the proposed industrial development were determined using the ITE Trip Generation Manual 9th Edition. Land use code 110 (Light Industrial) was used to generate the projected trips using a total of 500 employees and a fitted curve equation. **Table 2** summarizes the net trips generated by the development based on 500 employees.

Table 2: Summary of Site Trips Generated by Development

		AM	PM
Land Use	**No. of Employees**	**Fitted Curve Equation***	**Fitted Curve Equation***
Light Industrial Development	500	*T = 0.27(X) + 70.47	*T = 0.29(X) + 58.03
		205	**203**

In addition to the above table, the assumed distributions of trips are based on comments provided by MTO March 4, 2015.: 90% entering and 10% exiting during the AM Peak; and, 10% entering and 90% exiting during the PM Peak.

Site generated traffic has two primary route choices, being either north or southbound on Highway 140. In summary, nominal trips were assigned in both the AM and PM peak hours using Third Concession Road in the westbound direction. A significant percentage of trips based on the above were assigned in the southbound direction on Highway 140, which would further divide at Highway 3. The remaining trips utilized Highway 140 northbound heading towards Highway 406.

The above trip characteristics were applied to the volumes entering and exiting the proposed development. **Table 3** identifies the percentage of generated traffic from the development and **Table 4** illustrates trip distribution results using extracts from the 2006 TTS as identified in the *Nyon Marine Fuelling Corporation TIS.*

Table 3: Trip Generation and Direction

Direction	Percentage-AM (PM)	AM	PM
Inbound	90% (10%)	0.90 * 205 = **185**	0.10 * 203 = **20**
Outbound	10% (90%)	0.10 * 205 = **21**	0.90 * 203 = **183**
Total	100% (100%)	**205**	**203**

Table 4: Estimated Employee Distribution

Travel Origin/Destination	Percentage	Route	Summary
St. Catharines	7%	North Via Highway 140	25% - Northbound
Thorold	2%	North Via Highway 140	
Niagara Falls	6%	North Via Highway 140	
Welland	10%	North Via Highway 140	
	6%	South Via Highway 140	75% - Southbound
Port Colborne	50%	South Via Highway 140	
Wainfleet	6%	South Via Highway 140	
Fort Erie	10%	South Via Highway 140	
Pelham	3%	South Via Highway 140	
(Nyon Fuelling Corporation Traffic Impact Study – September 5, 2013)			

3.3 Forecast Growth Rates

In order to obtain **Background (2014) TMCs**, the *Nyon Marine Fuelling Corporation TIS* was consulted where a growth factor of 1% was applied to approaches on Third Concession Road.

As provided by the Ministry of Transportation on March 4, 2015, historical 10 year growth on Highway 140 north of Third Concession Road is **35%** and **21.3%** to the south. This growth translates to an annual compounded growth rate of **3.05%** and **2.01%** which is used for background 2014 and all other horizon year background volumes. See **Appendix A** for further details.

Additional traffic generated by the pending/approved Chippawa Estates Subdivision was included in future scenarios. The subdivision is expected to contain 19 single family residential units and is located west of Hubbard Drive. The ITE Manual was consulted using land use code 210 to develop the following trip generation table from background development.

Table 5: Chippawa Estates Development

		AM				PM			
Land Use	**No. of Units**	**Rate**	**In**	**Out**	**Total**	**Rate**	**In**	**Out**	**Total**
Single Family Detached	**19**	0.77	4	11	**15**	1.02	12	7	**19**
Chippawa Estates Total		-	4	11	**15**	-	12	7	**19**
(Nyon Fuelling Corporation Traffic Impact Study – September 5, 2013)									

Traffic generated by the Chippawa Estates Subdivision is anticipated to follow the same route and distribution patterns as outlined in **Table 4.** Since the development is located south of the study area, only northbound trips which total 25% of site generated traffic will impact horizon years 2020, 2025 and 2030 volumes on Highway 140.

4. Traffic Impact Analysis

4.1 Analysis Methodology

Existing, projected and proposed traffic volumes were analysed using the procedures of the '*Highway Capacity Manual 2000*' as employed by Synchro/SimTraffic (version 9) software. The software has been used to model traffic conditions and ascertain overall intersection Level of Service (LOS), individual movement delays and volume to capacity (v/c) ratios for the key study area intersections.

The operational performance of an intersection is typically measured in terms of LOS. The LOS is assigned on the basis of average delay per vehicle. It takes into account deceleration delay, queue move-up time, stopped delay, and final acceleration delay. In general terms, for signalized intersections, LOS ranges from A for 10 seconds or less average delay, to LOS F for delays greater than 80 seconds. For un-signalized intersections, the LOS ranges from 10 seconds or less for LOS A to delays greater than 50 seconds for LOS F. Acceptable operations are generally considered to be LOS D or better; however, during peak hours, a LOS E may be considered acceptable for critical movements in urban areas.

In this study, critical movements were considered to be LOS E, with a v/c ratio equal to or greater than 0.9 and LOS F. The key parameters used in the analyses included:

- Analysis period = 15 minutes;
- Existing geometry was taken from Niagara Navigator aerial imagery to calculate storage and taper lengths;
- A default Saturated Flow Rate of 1750 vphpl was used;
- A default Heavy vehicle percentage of 10% was used; and
- Default Synchro values were used for all other inputs.

4.1.1 Critical Scenario Selection

Traffic impacts from the proposed industrial development were modelled according to trip generation figures developed through site statistics provided by the City of Port Colborne. To retain clarity and consistency throughout this report, the following were determined as the peak periods for a typical weekday:

AM Peak hour: 07:00 to 08:00; and **PM Peak** hour: 16:00 to 17:00.

Weekend analysis was not considered as critical given the assumption that any industrial developments will most likely be closed on the weekend. This study therefore evaluated the impacts of the proposed development based on weekday AM and PM peak hour conditions.

4.1.2 Study Horizons and Scenarios

The selected study horizons are based on MTO traffic impact study guidelines. The horizon year and scenarios for this study are noted below:

- **Scenario 1: Base Year 2014 (Existing Conditions)**
- **Scenario 2: Open Year 2020**

- Scenario 2.1: Background
- Scenario 2.2: Total, Background plus Industrial Development
- Scenario 2.3: Scenario 2 plus Improvements (if required)

- **Scenario 3: Five Years post Open Year (2025)**
  - Scenario 3.1: Background
  - Scenario 3.2: Total, Background plus Industrial Development
  - Scenario 3.3: Scenario 2 plus Improvements (if required)
- **Scenario 4: Ten Years post Open Year (2030)**
  - Scenario 3.1: Background
  - Scenario 3.2: Total, Background plus Industrial Development
  - Scenario 3.3: Scenario 3 plus Improvements (if required)

4.2 Existing Conditions 'Base Year' 2014

The previous **Figure 5** and **Table 6** below shows the 'Base Year' peak hour traffic volumes and provides a summary of the intersection Level of Service results. Detailed HCM reports from the Synchro model are provided in **Appendix B.**

The analysis shows that all turn movements operate at an acceptable LOS during the AM and PM peak hour with stop controlled east-west movements operating at a good level of service (LOS C or better) with ample residual capacity available.

Table 6: Existing Conditions Base Year (2014) Traffic Analysis Results

Intersection		Approach Movement	
Highway 140 & Third Concession Road		EB	WB
		Left/Thru/Right	Left/Thru/Right
AM	Delay	10.6	14.4
	LOS	B	B
	v/c	0.01	0.06
PM	Delay	10.8	18.7
	LOS	B	C
	v/c	0.01	0.02

4.3 Projected 2020 Background

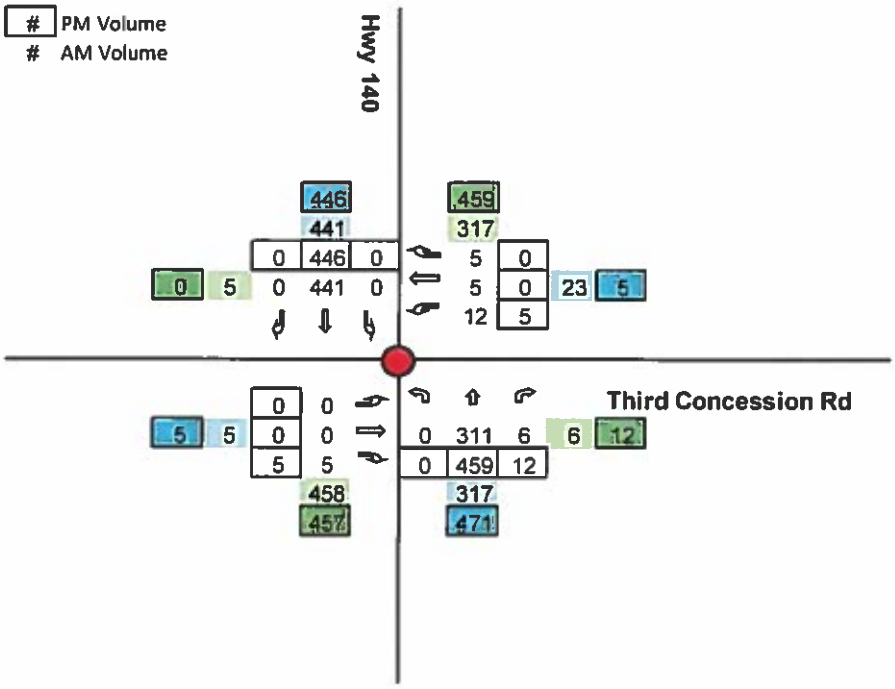
Using the growth rates determined in section 3.2 future background volumes were calculated for horizon year 2020. . **Figure 6** shows the projected peak hour volumes for the AM and PM peak hours on the study area road network and **Table 7** provides a summary of the intersection LOS, v/c ratios and delay for the intersection controlled movements. Detailed HCM reports are provided in **Appendix B.**

The analysis shows that all stop controlled movements are predicted to operate at a good level of service (LOS C or better). No significant changes occur to the intersection performance during the addition of horizon year traffic volumes.

Table 7: Future Background (2020) Traffic Analysis Results

Intersection		Approach Movement	
Highway 140 & Third Concession Road		EB	WB
		Left/Thru/Right	Left/Thru/Right
AM	Delay	11.4	16.7
	LOS	B	C
	v/c	0.01	0.07
PM	Delay	11.4	22.1
	LOS	B	C
	v/c	0.01	0.03

Figure 6: Future Background (2020) Volumes



4.4 Projected Total Open Year (2020)

Using the information listed in Section3.1, trips generated from the proposed development were applied to the road network in addition to background 2020 volumes. **Figure 7** shows the projected peak hour volumes for the AM and

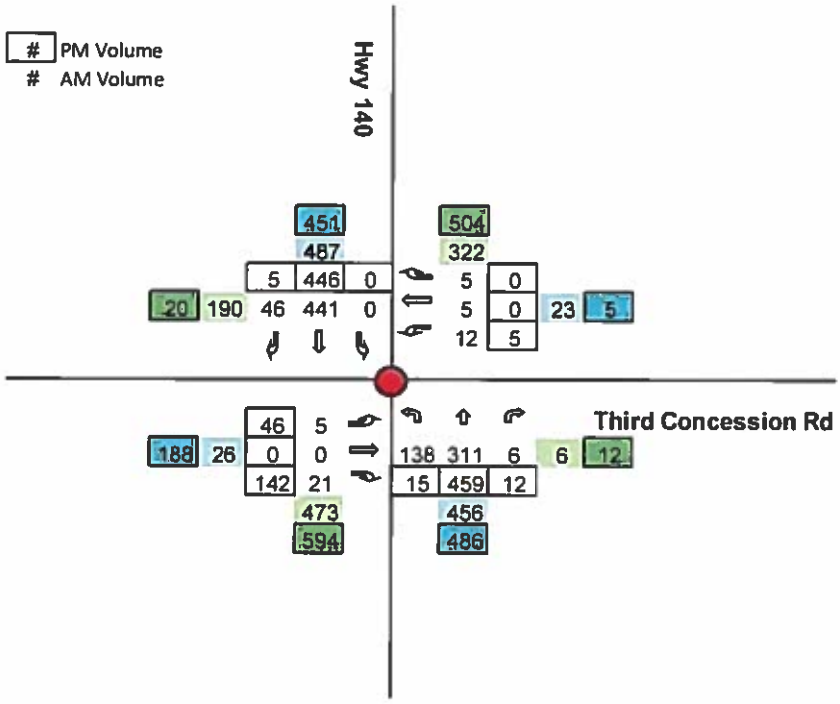
PM peak hours and **Table 8** provides a summary of the intersection LOS, v/c ratios and delay for each of the intersection controlled movements. Detailed HCM reports are provided in **Appendix B.**

The analysis shows that all movements operate at an acceptable level of service (LOS D or better), with the exception of the westbound left/through/right movement during the PM peak which is predicted to operate with a LOS E. However, the overall delay is less than 40 seconds and a surplus of capacity exist, as the v/c ratio only reaches 0.05.

Table 8: Projected Total Open Year (2020) Traffic Analysis Results

Intersection		Approach Movement		
Highway 140 & Third Concession Road		EB Left/Thru/ Right	WB Left/Thru/ Right	NB Left/Thru
AM	Delay	15.5	27.8	4.0
	LOS	C	D	A
	v/c	0.08	0.13	0.15
PM	Delay	23.3	37.1	0.5
	LOS	C	E	A
	v/c	0.51	0.05	0.02

Figure 7: Projected Total Open Year (2020) Volumes



4.4.1 Signal Warrants

An analysis was conducted to determine whether traffic signals would be warranted for projected 2020 full build-out traffic conditions at the intersection of Highway 140 and Third Concession Road. The results indicate that traffic signals are not justified at this intersection since the traffic volumes and delays do not meet the justification threshold of the Ontario Traffic Manual (OTM) Book 12. See **Appendix C** for further details.

4.4.2 Left Turn Lane Warrants

A left turn lane warrant assessment was completed for all approaching movements using the Geometric Design Standards for Ontario Highways. When opposing traffic volumes are such that left turning vehicles must wait for a gap, it interferes with through traffic. Left turn lanes are warranted when advancing volumes, opposing volumes and the percentage of left turning vehicles meet the threshold outlined in Appendix EA of the Geometric Design Standards. Further detail is provided in **Table 9** and **Appendix D.**

Table 9: Left Turn Lane Warrants

Highway 140 & Third Concession Road (Port Colborne)				
Direction of Travel	**NB**	**SB**	**EB**	**WB**
Design Speed	100 km/hr	100 km/hr	80 km/hr	80 km/hr
Advancing Traffic Volumes	456	487	26	23
Opposing Traffic Volumes	487	456	23	26
Left Turn Traffic Volume	138	0	5	12
Percentage Left Turning Volume	30.03%	0.00%	19.23%	52.17%
Warranted	Yes	No	No	No
Storage Length	30m	-	-	-

Table 9 suggests a northbound left turn lane with a storage length of 30 metres is required to accommodate traffic generated by development of the ESEL. Based on the design speed of 100 km/hr for the Highway 140, a parallel lane length of 70 metres and a taper length of 160 metres for a total deceleration lane length of 230 metre is recommended as per the Geometric Design Standard for Ontario Highways (Table E9-1-Left Turn Lanes At-Grade Intersections).

4.4.3 Right Turn Lane Improvements

It is noted that there is currently a southbound right turn lane along Highway 140 and Third Concession Road. Based on the amount of projected southbound right turning traffic, of less than 50 vehicles during the peak periods, the current length provided is expected to be adequate. However, taper and deceleration length should be brought up to MTO standards using the Geometric Design Standards for Ontario Highways. The updated southbound right parameters will be provided on drawings during the detailed design phase.

4.5 Projected Total Open Year (2020) Improvements

The preceding analysis suggests that no major roadway improvements are required on the opening day to accommodate site generated traffic except an introduction of a 30 metre northbound left lane with 230 metre decelerations lane is recommended at Highway 140/Third Concession Road to serve new site traffic accessing from Highway 140 south. This improvement was implemented for all future total scenarios evaluated below.

4.6 Projected 2025 Background

Figure 8 shows the future background 2025 volumes that were analyzed for the AM and PM peak hour conditions. **Table 10** provides a summary of the intersection level of service, v/c ratios and delay for each of the intersection controlled movements. Detailed HCM reports are provided in **Appendix B.**

The analysis shows that all stop controlled movements operate at an acceptable level of service (LOS D or better). No significant changes occur to the intersection performance during the addition of horizon year traffic volumes.

Figure 8: Future Background (2025) Volumes

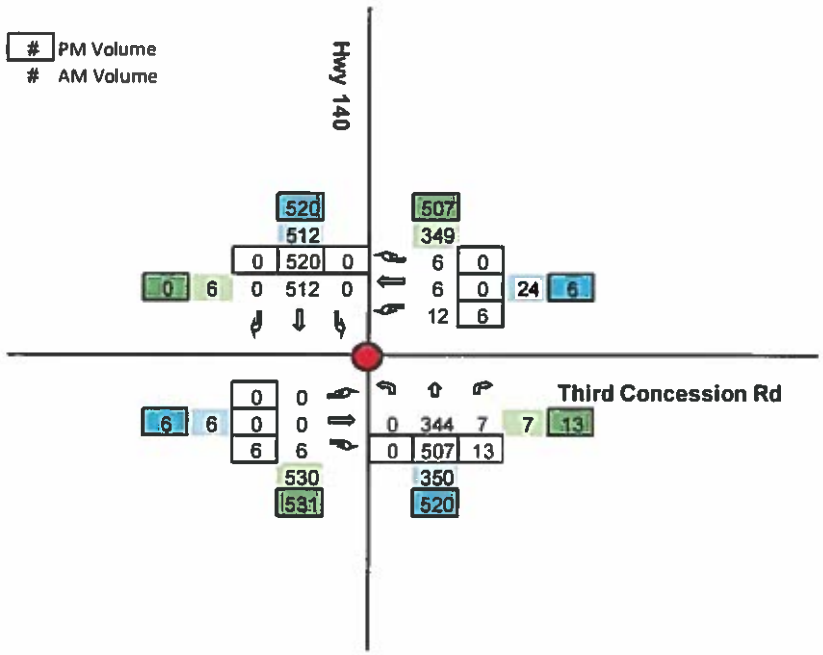


Table 10: Future Background (2025) Traffic Analysis

Intersection		Approach Movement	
Highway 140 & Third Concession Road		EB	WB
		Left/Thru/Right	Left/Thru/Right
AM	Delay	12.1	18.8
	LOS	B	C
	v/c	0.01	0.09
PM	Delay	12.2	26.5
	LOS	B	D
	v/c	0.01	0.04

4.7 Projected Total (2025) East Side Employment Lands

Future background volumes for horizon year 2025 were analyzed in conjunction with expected site generated traffic from the ESEL. **Figure 9** shows the projected peak hour volumes for the AM and PM peak hours and **Table 11** provides a summary of the intersection level of service, v/c ratios and delay for each of the intersection movements. Detailed HCM reports are provided in **Appendix B.**

The analysis shows that all movements operate at an acceptable level of service (LOS D or better), with the exception of the westbound left/through movement during the PM peak which is predicted to operate with a LOS E. However, the overall delay is less than 50 seconds and a surplus of capacity exists, as the v/c ratio only reaches 0.07. It should also be noted that only a total of less than 10 vehicles are expected to access this approach during the PM peak which does not justify any intersection improvements for this horizon year.

Figure 9: Projected Total Volumes (2025) ESEL

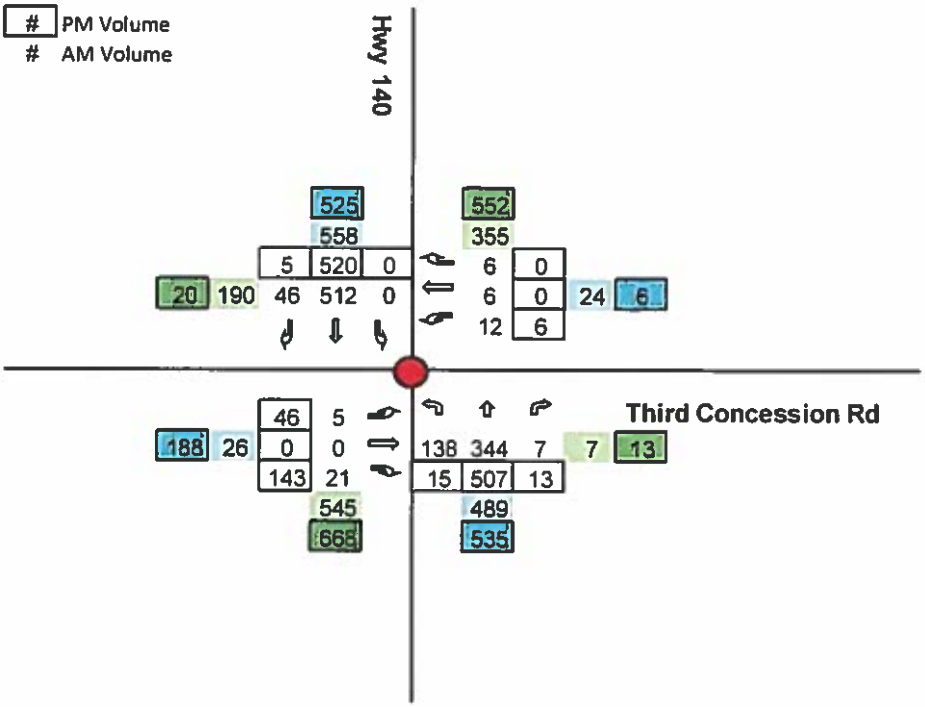


Table 11 - Projected Total (2025) and Proposed Development

Intersection		Approach Movement		
Highway 140 & Third Concession Road		EB Left/Thru/ Right	WB Left/Thru/ Right	NB Left/Thru
AM	Delay	17.4	32.7	9.6
	LOS	C	D	A
	v/c	0.09	0.17	0.16
PM	Delay	30.5	47.8	8.8
	LOS	D	E	A
	v/c	0.6	0.07	0.02

4.7.1 Signal Warrants

An analysis was conducted to determine whether traffic signals would be warranted for projected 2025 full build-out traffic conditions at the intersection of Highway 140 and Third Concession Road. The results indicate that traffic signals are not justified at this intersection since the traffic volumes and delays do not meet the justification threshold of the Ontario Traffic Manual (OTM) Book 12. See **Appendix C** for further details.

4.8 Projected Total (2025) Improvements

The preceding analyses suggest that no mitigation scenario is required. The addition of the ESEL has a nominal impact to traffic operations at the intersection of Highway 140 and Third Concession Road within the horizon year 2025 scenario. As previously noted, a left turn lane was added to the modelled scenario to reflect opening year improvements.

4.9 Projected Background 2030

Figure 10 shows the future background 2030 volumes that were analyzed for the AM and PM peak hour conditions. **Table 12** provides a summary of the intersection level of service, v/c ratios and delay for each of the intersection controlled movements. Detailed HCM reports are provided in **Appendix B.**

The analysis shows that all stop controlled movements operate at an acceptable level of service (LOS D). No significant changes occur to the intersection performance during the addition of horizon year traffic volumes.

Figure 10: Future Background (2030) Volumes

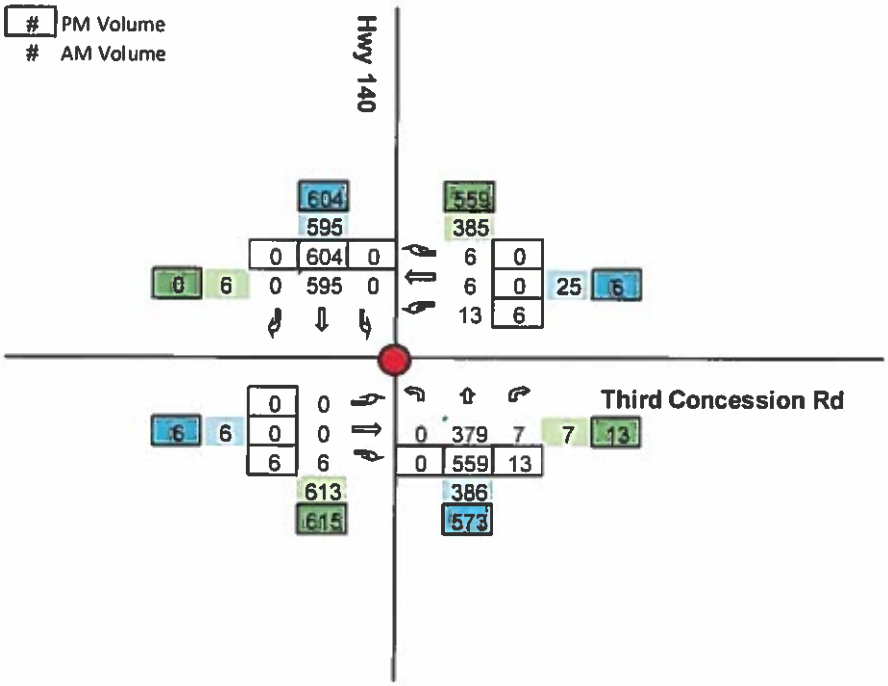


Table 12: Future Background (2030) Traffic Analysis

Intersection		Approach Movement	
Highway 140 & Third Concession Road		EB	WB
		Left/Thru/Right	Left/Thru/Right
AM	Delay	13.0	22.1
	LOS	B	C
	v/c	0.01	0.11
PM	Delay	13.1	32.5
	LOS	B	D
	v/c	0.01	0.05

4.10 Projected Total (2030)

Future background volumes for horizon year 2030 were analyzed in conjunction with expected site generated traffic from the ESEL. **Figure 11** shows the projected peak hour volumes for the AM and PM peak hours and **Table 13** provides a summary of the intersection level of service, v/c ratios and delay for each of the intersection movements. Detailed HCM reports are provided in **Appendix B.**

The analysis shows that multiple movements operate below an acceptable level of service (LOS E or worse) including the eastbound movement in the PM peak hour and the westbound movement in the AM and PM peak hours. The projected delay for vehicles accessing Highway 140 from the ESEL at Third Concession Road is approximately 20 seconds in the AM peak and 45 seconds in the PM peak. Despite the poor level of service, v/c ratios indicate that there is reserve capacity available on these approaches on Third Concession Road. Since the peak hour volumes are very minimal, particularly for the east approach on Third Concession Road, it is not advisable to provide exclusive turn lanes. However, for comparison purposes, a potential improvement of a right turn channelization on west approach on Third Concessions Road is discussed in more details under the Section 4.10.1.

Figure 11: Projected Total Volumes (2030) ESEL

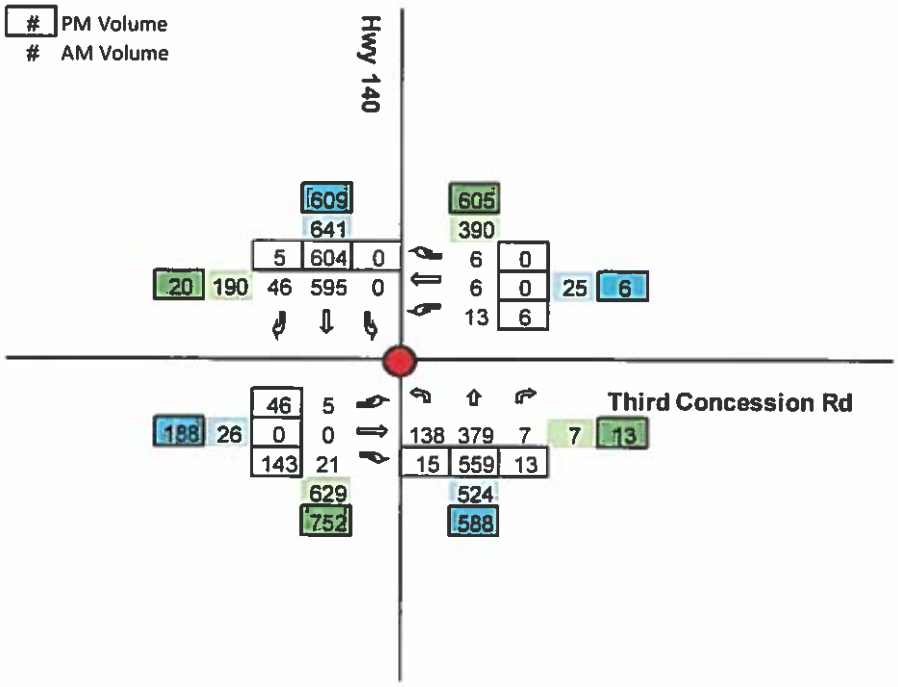


Table 13: Projected Total (2030) and Proposed Development

Intersection		Approach Movement		
		EB	WB	NB
Highway 140 & Third Concession Road		Left/Thru/ Right	Left/Thru/ Right	Left/Thru
AM	Delay	20	41.5	10.0
	LOS	C	E	A
	v/c	0.11	0.22	0.17
PM	Delay	45 (45)	64.2 (50.1)	9.1 (9.1)
	LOS	E (E)	F (F)	A (A)
	v/c	0.72 (0.72)	0.10 (0.08)	0.02 (0.02)
(#) Indicates performance under potential improvement scenario				

4.10.1 Potential Improvements to Concession Road Three (West Approach)

An analysis was conducted using Synchro 9.0 software to determine the effects of a channelized right turn lane for eastbound (west approach) on Concession Road Three. The analysis was conducted during the key PM peak with projected total 2030 volumes and assuming that the channelized right turn lane would be a stop controlled. It was determined that the addition of a channelized right turn lane would reduce the delay for westbound vehicles by less than 15 seconds with the similar LOS F and would have no effect on other turning movements at the Highway 140/Third Concession Road intersection. This analysis suggests that by removing eastbound right turn vehicles from an opposing conflicting movement, westbound vehicles can be benefitted with marginally reduced delays. However,

this potential improvement scenario analysis was only conducted for comparison purposes as it is not advisable to provide roadway improvements to alleviate delay concerns for less than 10 vehicles.

4.10.2 Signal Warrants

An analysis was conducted to determine whether traffic signals would be warranted for projected 2030 full build-out traffic conditions at the intersection of Highway 140 and Third Concession Road. The results indicate that traffic signals are not justified at this intersection since the traffic volumes and delays do not meet the justification threshold of the Ontario Traffic Manual (OTM) Book 12. See **Appendix C** for further details.

5. Conclusions and Recommendations

This TIS was completed in support of the proposed development of the ESEL in the City of Port Colborne west of Highway 140. The proposed industrial development is anticipated to generate 500 jobs and approximately 200 trips in the peak periods. This report has summarized the traffic results for existing conditions, opening year 2020 and horizon years 2025 and 2030, measuring level of service, delay, and v/c ratios at the intersection of Highway 140 and Third Concession Road. Existing conditions analysis has indicated that the stop controlled side street operates at a good level of service (LOS C) or better with minimal delays.

Future conditions analysis for opening year, using a growth rates suggested by the MTO (March 2015) for Highway 140 corridor, shows that the opening year warrants a northbound left turn lane on Highway 140 at Third Concession Road, due to a high level of opposing traffic volumes. MTO Geometric Design Standards indicate that the new northbound left land should have a storage length of 30m and a total deceleration length of 230m. It is noted that the current right turn lane can adequately accommodate the projected right turn volumes at the Highway 140/Third Concession Road intersection. However, the lane should be brought up to MTO standards during the detailed design phase.

The future horizon years 2025 and 2030, with the addition of site generated traffic, have illustrated similar results. The analysis indicates that westbound vehicles will experience a LOS F with delay of approximately a minute and eastbound vehicles a LOS E in the Future Total 2030 scenario. The forecasted westbound volume total is less than 10 vehicles in the peak hours. The sensitivity analysis suggests that by removing eastbound right turn vehicles from an opposing conflicting movement via channelization, westbound vehicles can be benefitted with marginally reduced delays with similar LOS. However, it is not advisable to provide roadway improvements to alleviate delay concerns for less than 10 vehicles.

Due to the additional traffic volumes from the ESEL the proponent is responsible for the full cost of all design work of the northbound left turn lane and standardization of southbound right turn lane at Highway 140 and Third Concession Road intersection.

Appendix A

Traffic Data

Traffic Engineering Software

Weekly Volume Summary

Wed, Sep 12, 2012

Location: H140 0.5km N of H3

LHRS/Offset: 45700 / 0.50 **Region:** Central

Pattern Type: Urban Commuter **PCS#:** 34 **Hwy. TVIS#:** 140005

Count Direction: NB **Report Dates:** Aug 13, 2012 to Aug 19, 2012

Hour Interval	Mon 12/08/13	Tue 14	Wed 15	Thu 16	Fri 17	Sat 18	Sun 19	Mon 20
0:00- 1:00		30	35	25	45	66	72	28
1:00- 2:00		15	26	26	23	37	31	16
2:00- 3:00		13	11	16	20	35	34	18
3:00- 4:00		11	11	17	14	10	16	8
4:00- 5:00		16	20	21	25	10	13	23
5:00- 6:00		79	83	67	85	31	27	78
6:00- 7:00		203	199	184	196	78	66	179
7:00- 8:00		172	206	199	178	91	68	173
8:00- 9:00		211	232	238	192	148	86	177
9:00-10:00		198	189	210	180	176	140	163
10:00-11:00		188	210	202	204	211	168	187
11:00-12:00		199	194	241	199	258	207	194
AM Total	0	1,335	1,416	1,446	1,361	1,151	928	1,244
12:00-13:00		229	225	235	222	255	230	248
13:00-14:00	239	196	234	249	256	250	270	
14:00-15:00	264	250	261	257	278	295	262	
15:00-16:00	304	318	313	322	326	266	192	
16:00-17:00	368	356	374	372	368	242	169	
17:00-18:00	301	327	315	304	382	198	174	
18:00-19:00	194	194	212	243	325	190	179	
19:00-20:00	150	143	151	172	243	164	161	
20:00-21:00	150	172	180	183	190	149	120	
21:00-22:00	127	170	112	142	159	119	111	
22:00-23:00	84	79	90	110	117	109	95	
23:00-24:00	67	68	71	86	91	92	51	
PM Total	2,248	2,502	2,538	2,675	2,957	2,329	2,014	248
24 Hr. Total	2,248	3,837	3,954	4,121	4,318	3,480	2,942	1,492
Noon - Noon		3,583	3,918	3,984	4,036	4,108	3,257	3,258

Traffic Engineering Software

Weekly Volume Summary

Wed, Sep 12, 2012

Location: H140 0.5km N of H3

LHRS/Offset: 45700 / 0.50 **Region:** Central

Pattern Type: Urban Commuter **PCS#:** 34 **Hwy. TVIS#:** 140005

Count Direction: SB **Report Dates:** Aug 13, 2012 to Aug 19, 2012

Hour Interval	Mon 12/08/13	Tue 14	Wed 15	Thu 16	Fri 17	Sat 18	Sun 19	Mon 20
0:00- 1:00		14	20	22	35	93	43	21
1:00- 2:00		11	21	16	19	24	32	18
2:00- 3:00		7	8	11	19	12	29	13
3:00- 4:00		22	20	23	20	9	21	26
4:00- 5:00		57	52	54	57	37	25	50
5:00- 6:00		153	164	151	146	55	44	172
6:00- 7:00		268	260	255	216	93	70	260
7:00- 8:00		316	327	346	319	158	100	308
8:00- 9:00		270	293	241	251	207	126	246
9:00-10:00		241	220	256	239	239	192	245
10:00-11:00		238	234	228	289	212	192	235
11:00-12:00		242	265	224	297	232	241	239
AM Total	0	1,839	1,884	1,827	1,907	1,371	1,115	1,833
12:00-13:00		242	211	263	304	257	254	241
13:00-14:00	237	251	226	232	262	240	270	
14:00-15:00	263	294	304	278	263	229	237	
15:00-16:00	321	319	265	350	302	201	238	
16:00-17:00	279	286	300	315	268	235	254	
17:00-18:00	238	205	254	250	246	202	237	
18:00-19:00	177	156	182	189	160	163	244	
19:00-20:00	117	159	172	149	212	177	211	
20:00-21:00	141	132	148	136	141	196	207	
21:00-22:00	75	92	100	121	148	134	94	
22:00-23:00	55	61	54	92	123	106	69	
23:00-24:00	26	33	41	29	113	65	27	
PM Total	1,929	2,230	2,257	2,404	2,542	2,205	2,342	241
24 Hr. Total	1,929	4,069	4,141	4,231	4,449	3,576	3,457	2,074
Noon - Noon		3,768	4,114	4,084	4,311	3,913	3,320	4,175

Traffic Engineering Software

Weekly Volume Summary

Wed, Sep 12, 2012

Location: H140 0.5km N of H3

LHRS/Offset: 45700 / 0.50 **Region:** Central

Pattern Type: Urban Commuter **PCS#:** 34 **Hwy. TVIS#:** 140005

Count Direction: NB/SB **Report Dates:** Aug 13, 2012 to Aug 19, 2012

Hour Interval	Mon 12/08/13	Tue 14	Wed 15	Thu 16	Fri 17	Sat 18	Sun 19	Mon 20
0:00- 1:00		44	55	47	80	159	115	49
1:00- 2:00		26	47	42	42	61	63	34
2:00- 3:00		20	19	27	39	47	63	31
3:00- 4:00		33	31	40	34	19	37	34
4:00- 5:00		73	72	75	82	47	38	73
5:00- 6:00		232	247	218	231	86	71	250
6:00- 7:00		471	459	439	412	171	136	439
7:00- 8:00		488	533	645	497	249	168	481
8:00- 9:00		481	525	479	443	355	212	423
9:00-10:00		439	409	466	419	415	332	408
10:00-11:00		426	444	430	493	423	360	422
11:00-12:00		441	459	465	496	490	448	433
AM Total	0	3,174	3,300	3,273	3,268	2,522	2,043	3,077
12:00-13:00		471	436	498	526	512	484	489
13:00-14:00	476	447	460	481	518	490	540	
14:00-15:00	527	544	565	535	541	524	499	
15:00-16:00	625	637	578	672	628	467	430	
16:00-17:00	647	642	674	687	636	477	423	
17:00-18:00	539	532	569	554	628	400	411	
18:00-19:00	371	350	394	432	485	353	423	
19:00-20:00	267	302	323	321	455	341	372	
20:00-21:00	291	304	328	319	331	345	327	
21:00-22:00	202	262	212	263	307	253	205	
22:00-23:00	139	140	144	202	240	215	164	
23:00-24:00	93	101	112	115	204	157	78	
PM Total	4,177	4,732	4,795	5,079	5,499	4,534	4,356	489
24 Hr. Total	4,177	7,906	8,095	8,352	8,767	7,056	6,399	3,566
Noon - Noon	7,351	8,032	8,068	8,347	8,021	6,577	7,433	

ADT	AWD	AADT	AAWD	SADT	SAWDT	WADT	DHV
7,760	8,081	7,390	7,198	7,833	7,126	6,947	754

Traffic Engineering Software

Weekly Volume Summary

Fri, Dec 16, 2011

Location: Hwy 140 1.5km N of Niagara Rd 23- Forks Rd

LHRS/Offset: 45710 / 0.0 1.5 **Region:** Central

Pattern Type: Urban Commuter **PCS#:** 34 **Hwy. TVIS#:** 140012

Count Direction: NB **Report Dates:** Aug 15, 2011 to Aug 21, 2011

Hour Interval	Mon 11/08/15	Tue 16	Wed 17	Thu 18	Fri 19	Sat 20	Sun 21	Mon 22
0:00- 1:00		18	13	20	9	51	41	15
1:00- 2:00		14	26	15	14	22	47	8
2:00- 3:00		15	9	9	8	26	14	12
3:00- 4:00		6	13	11	16	10	25	9
4:00- 5:00		29	27	26	27	15	10	39
5:00- 6:00		103	84	117	103	50	28	106
6:00- 7:00		286	274	290	240	95	60	271
7:00- 8:00		366	400	347	328	141	75	370
8:00- 9:00		324	314	330	328	183	112	322
9:00-10:00		276	241	257	240	213	141	230
10:00-11:00		228	244	244	283	242	227	266
11:00-12:00		283	279	281	275	227	249	277
AM Total	0	1,948	1,924	1,947	1,871	1,275	1,029	1,925
12:00-13:00		285	281	285	285	246	257	269
13:00-14:00	265	289	276	278	280	253	269	
14:00-15:00	305	301	260	296	315	229	270	
15:00-16:00	319	342	308	315	309	229	250	
16:00-17:00	310	323	301	308	281	248	225	
17:00-18:00	249	276	259	248	234	261	199	
18:00-19:00	156	218	216	223	254	236	205	
19:00-20:00	173	177	197	191	200	191	238	
20:00-21:00	139	169	189	154	167	182	171	
21:00-22:00	97	134	152	173	143	150	125	
22:00-23:00	62	78	96	93	155	103	65	
23:00-24:00	29	54	43	43	106	69	33	
PM Total	2,104	2,646	2,578	2,607	2,729	2,397	2,307	269
24 Hr. Total	2,104	4,594	4,502	4,554	4,600	3,672	3,336	2,194
Noon - Noon		4,052	4,570	4,525	4,478	4,004	3,426	4,232

Traffic Engineering Software

Weekly Volume Summary

Fri, Dec 16, 2011

Location: Hwy 140 1.5km N of Niagara Rd 23- Forks Rd

LHRS/Offset: 45710 / 0.0 1.5 **Region:** Central

Pattern Type: Urban Commuter **PCS#:** 34 **Hwy. TVIS#:** 140012

Count Direction: SB **Report Dates:** Aug 15, 2011 to Aug 21, 2011

Hour Interval	Mon 11/08/15	Tue 16	Wed 17	Thu 18	Fri 19	Sat 20	Sun 21	Mon 22
0:00- 1:00		49	65	46	61	81	76	39
1:00- 2:00		33	32	24	31	47	33	10
2:00- 3:00		17	15	15	15	24	35	15
3:00- 4:00		11	11	9	19	17	19	6
4:00- 5:00		10	8	16	17	10	15	20
5:00- 6:00		35	33	39	45	29	7	37
6:00- 7:00		173	176	154	147	60	39	167
7:00- 8:00		195	191	196	168	82	44	201
8:00- 9:00		231	226	192	196	106	64	219
9:00-10:00		221	182	203	186	142	89	203
10:00-11:00		230	214	209	245	208	109	193
11:00-12:00		250	216	186	228	242	143	212
AM Total	0	1,455	1,369	1,289	1,358	1,048	673	1,322
12:00-13:00		262	215	233	250	288	182	212
13:00-14:00	254	248	220	223	278	269	211	
14:00-15:00	297	270	245	279	295	313	209	
15:00-16:00	318	362	356	346	382	304	230	
16:00-17:00	393	416	402	392	357	265	234	
17:00-18:00	373	377	398	369	421	229	207	
18:00-19:00	235	250	227	275	336	206	170	
19:00-20:00	157	163	172	230	247	147	159	
20:00-21:00	127	162	162	195	203	141	136	
21:00-22:00	147	177	171	141	203	131	103	
22:00-23:00	98	119	102	113	137	132	90	
23:00-24:00	78	102	107	101	126	83	65	
PM Total	2,477	2,908	2,777	2,897	3,235	2,508	1,996	212
24 Hr. Total	2,477	4,363	4,146	4,186	4,593	3,556	2,669	1,534
Noon - Noon		3,932	4,277	4,066	4,255	4,283	3,181	3,318

Traffic Engineering Software

Weekly Volume Summary

Fri, Dec 16, 2011

Location: Hwy 140 1.5km N of Niagara Rd 23- Forks Rd

LHRS/Offset: 45710 / 0.0 1.5 **Region:** Central

Pattern Type: Urban Commuter **PCS#:** 34 **Hwy. TVIS#:** 140012

Count Direction: NB/SB **Report Dates:** Aug 15, 2011 to Aug 21, 2011

Hour Interval	Mon 11/08/15	Tue 16	Wed 17	Thu 18	Fri 19	Sat 20	Sun 21	Mon 22
0:00- 1:00		67	78	66	70	132	117	54
1:00- 2:00		47	58	39	45	69	80	18
2:00- 3:00		32	24	24	23	50	49	27
3:00- 4:00		17	24	20	35	27	44	15
4:00- 5:00		39	35	42	44	25	25	59
5:00- 6:00		138	117	156	148	79	35	143
6:00- 7:00		459	450	444	387	155	99	438
7:00- 8:00		561	591	543	496	223	119	571
8:00- 9:00		555	540	522	524	289	176	541
9:00-10:00		497	423	460	426	355	230	433
10:00-11:00		458	458	453	528	450	336	459
11:00-12:00		533	495	467	503	469	392	489
AM Total	0	3,403	3,293	3,236	3,229	2,323	1,702	3,247
12:00-13:00		547	496	518	535	534	439	481
13:00-14:00	519	537	496	501	558	522	480	
14:00-15:00	602	571	505	575	610	542	479	
15:00-16:00	637	704	664	661	691	533	480	
16:00-17:00	703	739	703	700	638	513	459	
17:00-18:00	622	653	657	617	655	490	406	
18:00-19:00	391	468	443	498	590	442	375	
19:00-20:00	330	340	369	421	447	338	397	
20:00-21:00	266	331	351	349	370	323	307	
21:00-22:00	244	311	323	314	346	281	228	
22:00-23:00	160	197	198	206	292	235	155	
23:00-24:00	107	156	150	144	232	152	98	
PM Total	4,581	5,554	5,355	5,504	5,964	4,905	4,303	481
24 Hr. Total	4,581	8,957	8,648	8,740	9,193	7,228	6,005	3,728
Noon - Noon	7,984	8,847	8,591	8,733	8,287	6,607	7,550	

ADT	AWD	AADT	AAWD	SADT	SAWDT	WADT	DHV
8,154	8,673	7,641	7,438	8,099	8,703	7,182	779

Traffic Engineering Software

Weekly Volume Summary

Thu, Apr 21, 2011

Location: HAUNS RD-CONCESSION 3(E) Sideroad Count East Approach

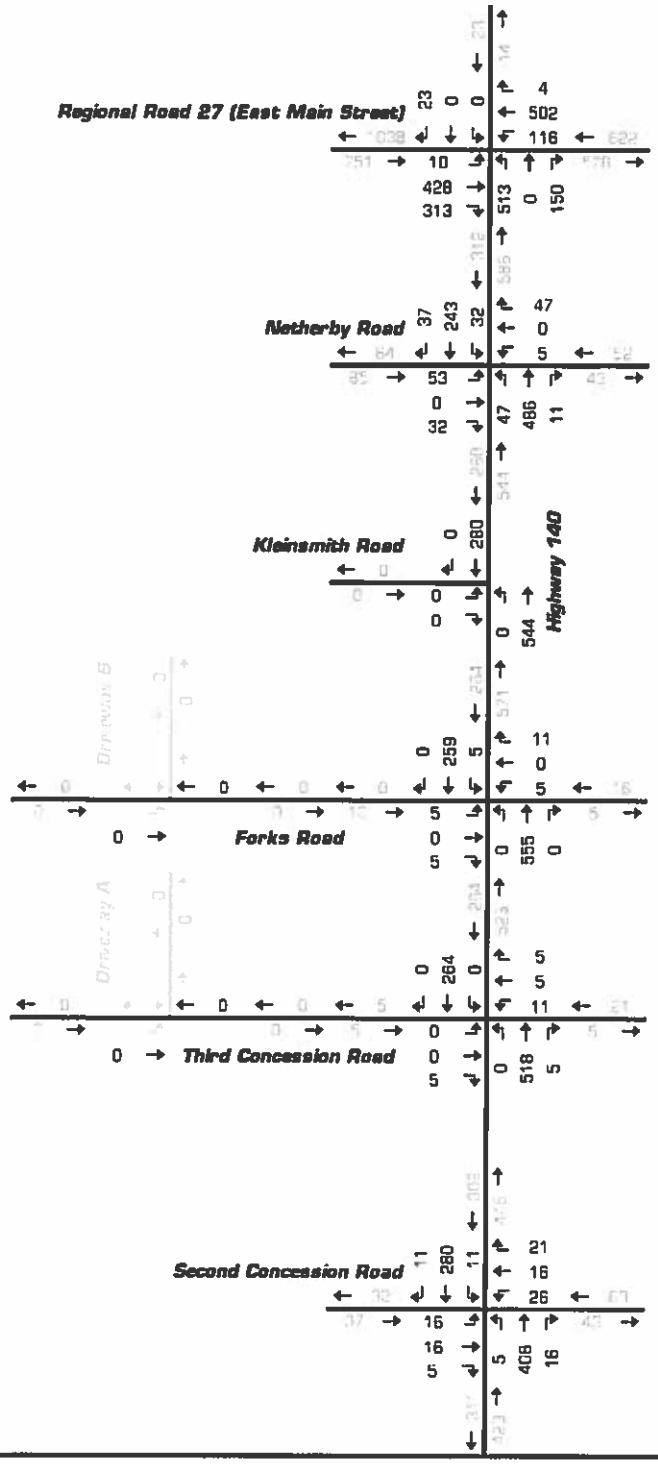
LHRS/Offset: 45700 / 3.32 **Region:** Central

Pattern Type: n/a **PCS#:** n/a **Hwy. TVIS#:** E457000330

Count Direction: EB **Report Dates:** Nov 11, 2010 **to** Nov 17, 2010

Hour Interval	Thu 10/11/11	Fri 12	Sat 13	Sun 14	Mon 15	Tue 16	Wed 17	Thu 18
0:00- 1:00		4	2	5	1	4	2	2
1:00- 2:00		1	3	0	0	1	0	0
2:00- 3:00		0	2	2	0	0	0	0
3:00- 4:00		0	0	0	0	0	0	0
4:00- 5:00		0	0	2	0	0	0	0
5:00- 6:00		1	0	0	0	0	0	0
6:00- 7:00		4	3	4	7	5	6	5
7:00- 8:00		13	3	9	24	14	14	18
8:00- 9:00		23	19	9	15	14	32	17
9:00-10:00		23	17	7	18	19	19	29
10:00-11:00		20	28	22	13	14	17	18
11:00-12:00		15	20	15	20	17	14	10
AM Total	0	104	97	75	98	88	104	99
12:00-13:00	15	13	29	26	14	14	17	
13:00-14:00	19	18	23	17	10	21	6	
14:00-15:00	23	24	18	20	15	18	24	
15:00-16:00	22	23	23	17	25	14	21	
16:00-17:00	20	26	27	6	29	16	29	
17:00-18:00	29	18	12	8	28	18	28	
18:00-19:00	23	15	13	12	16	15	10	
19:00-20:00	15	15	12	11	11	15	12	
20:00-21:00	7	10	6	5	5	9	9	
21:00-22:00	7	12	9	9	8	6	3	
22:00-23:00	5	5	6	3	3	2	3	
23:00-24:00	3	6	9	5	3	6	2	
PM Total	188	185	187	139	167	154	164	0
24 Hr. Total	188	289	284	214	265	242	268	99
Noon - Noon		292	282	262	237	255	258	263

ADT	AWD	AADT	AAWD	SADT	SAWDT	WADT	DHV
264	267						



Project North

Nyon Marine Fuelling Corporation
Traffic Impact Study

Figure 4.1A

2014 Background AM Peak Hour Traffic Volumes

Paradigm
www.ptsl.com

Appendix B

HCM Reports

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	5	11	5	5	0	274	5	0	367	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	5	12	5	5	0	298	5	0	399	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	705	702	399	702	697	298	399			303		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	705	702	399	702	697	298	399			303		
tC, single (s)	7.1	6.5	6.2	7.1	6.5	6.2	4.1			4.1		
tC, 2 stage (s)												
tF (s)	3.5	4.0	3.3	3.5	4.0	3.3	2.2			2.2		
p0 queue free %	100	100	99	97	99	99	100			100		
cM capacity (veh/h)	345	362	651	350	365	742	1160			1258		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	5	23	298	5	399	0
Volume Left	0	12	0	0	0	0
Volume Right	5	5	0	5	0	0
cSH	651	405	1160	1700	1258	1700
Volume to Capacity	0.01	0.06	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.2	1.4	0.0	0.0	0.0	0.0
Control Delay (s)	10.6	14.4	0.0	0.0	0.0	0.0
Lane LOS	B	B				
Approach Delay (s)	10.6	14.4	0.0		0.0	
Approach LOS	B	B				

Intersection Summary				
Average Delay	0.5			
Intersection Capacity Utilization	36.0%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	5	5	0	0	0	406	11	0	372	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	5	5	0	0	0	441	12	0	404	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	846	858	404	851	846	441	404			453		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	846	858	404	851	846	441	404			453		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	100	100	99	98	100	100	100			100		
cM capacity (veh/h)	274	286	629	269	291	600	1112			1066		

Direction, Lane#	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	5	5	441	12	404	0
Volume Left	0	5	0	0	0	0
Volume Right	5	0	0	12	0	0
cSH	629	269	1112	1700	1066	1700
Volume to Capacity	0.01	0.02	0.00	0.01	0.00	0.00
Queue Length 95th (m)	0.2	0.5	0.0	0.0	0.0	0.0
Control Delay (s)	10.8	18.7	0.0	0.0	0.0	0.0
Lane LOS	B	C				
Approach Delay (s)	10.8	18.7	0.0		0.0	
Approach LOS	B	C				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	37.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	5	12	5	5	0	311	6	0	441	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	5	13	5	5	0	338	7	0	479	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	826	824	479	823	817	338	479			345		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	826	824	479	823	817	338	479			345		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	100	100	99	95	98	99	100			100		
cM capacity (veh/h)	276	299	570	281	302	686	1043			1171		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	5	24	338	7	479	0
Volume Left	0	13	0	0	0	0
Volume Right	5	5	0	7	0	0
cSH	570	330	1043	1700	1171	1700
Volume to Capacity	0.01	0.07	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.2	1.8	0.0	0.0	0.0	0.0
Control Delay (s)	11.4	16.7	0.0	0.0	0.0	0.0
Lane LOS	B	C				
Approach Delay (s)	11.4	16.7	0.0		0.0	
Approach LOS	B	C				

Intersection Summary			
Average Delay	0.5		
Intersection Capacity Utilization	41.9%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	5	5	0	0	0	459	12	0	446	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	5	5	0	0	0	499	13	0	485	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	984	997	485	989	984	499	485			512		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	984	997	485	989	984	499	485			512		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	100	100	99	97	100	100	100			100		
cM capacity (veh/h)	220	237	566	216	241	556	1038			1014		

Direction, Lane#	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	5	5	499	13	485	0
Volume Left	0	5	0	0	0	0
Volume Right	5	0	0	13	0	0
cSH	566	216	1038	1700	1014	1700
Volume to Capacity	0.01	0.03	0.00	0.01	0.00	0.00
Queue Length 95th (m)	0.2	0.6	0.0	0.0	0.0	0.0
Control Delay (s)	11.4	22.1	0.0	0.0	0.0	0.0
Lane LOS	B	C				
Approach Delay (s)	11.4	22.1	0.0		0.0	
Approach LOS	B	C				

Intersection Summary			
Average Delay	0.2		
Intersection Capacity Utilization	42.2%	ICU Level of Service	A
Analysis Period (min)	15		

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	0	21	12	5	5	138	311	6	0	441	46
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	23	13	5	5	150	338	7	0	479	50
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1126	1124	479	1140	1167	338	529			345		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1126	1124	479	1140	1167	338	529			345		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	96	100	96	91	97	99	85			100		
cM capacity (veh/h)	150	169	570	146	159	686	998			1171		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	28	24	488	7	479	50
Volume Left	5	13	150	0	0	0
Volume Right	23	5	0	7	0	50
cSH	371	182	998	1700	1171	1700
Volume to Capacity	0.08	0.13	0.15	0.00	0.00	0.03
Queue Length 95th (m)	1.9	3.4	4.0	0.0	0.0	0.0
Control Delay (s)	15.5	27.8	4.0	0.0	0.0	0.0
Lane LOS	C	D	A			
Approach Delay (s)	15.5	27.8	4.0		0.0	
Approach LOS	C	D				

Intersection Summary				
Average Delay	2.9			
Intersection Capacity Utilization	64.6%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	46	0	142	5	0	0	15	459	12	0	446	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	50	0	154	5	0	0	16	499	13	0	485	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1016	1029	485	1171	1022	499	490			512		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1016	1029	485	1171	1022	499	490			512		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	76	100	73	95	100	100	98			100		
cM capacity (veh/h)	206	223	566	117	225	556	1033			1014		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	204	5	515	13	485	5
Volume Left	50	5	16	0	0	0
Volume Right	154	0	0	13	0	5
cSH	397	117	1033	1700	1014	1700
Volume to Capacity	0.51	0.05	0.02	0.01	0.00	0.00
Queue Length 95th (m)	21.6	1.1	0.4	0.0	0.0	0.0
Control Delay (s)	23.3	37.1	0.5	0.0	0.0	0.0
Lane LOS	C	E	A			
Approach Delay (s)	23.3	37.1	0.4		0.0	
Approach LOS	C	E				

Intersection Summary				
Average Delay	4.2			
Intersection Capacity Utilization	57.3%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	6	12	6	6	0	344	7	0	512	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	7	13	7	7	0	374	8	0	557	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	940	938	557	937	930	374	557			382		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	940	938	557	937	930	374	557			382		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	100	100	99	94	97	99	100			100		
cM capacity (veh/h)	229	256	515	234	259	655	975			1134		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	7	26	374	8	557	0
Volume Left	0	13	0	0	0	0
Volume Right	7	7	0	8	0	0
cSH	515	287	975	1700	1134	1700
Volume to Capacity	0.01	0.09	0.00	0.00	0.00	0.00
Queue Length 95th (m)	0.3	2.3	0.0	0.0	0.0	0.0
Control Delay (s)	12.1	18.8	0.0	0.0	0.0	0.0
Lane LOS	B	C				
Approach Delay (s)	12.1	18.8	0.0		0.0	
Approach LOS	B	C				

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	45.9%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	6	6	0	0	0	507	13	0	520	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	7	7	0	0	0	551	14	0	565	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1116	1130	565	1123	1116	551	565			565		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1116	1130	565	1123	1116	551	565			565		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	100	100	99	96	100	100	100			100		
cM capacity (veh/h)	178	197	509	174	201	519	968			968		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	SB 1	SB 2
Volume Total	7	7	551	14	565	0
Volume Left	0	7	0	0	0	0
Volume Right	7	0	0	14	0	0
cSH	509	174	968	1700	968	1700
Volume to Capacity	0.01	0.04	0.00	0.01	0.00	0.00
Queue Length 95th (m)	0.3	0.9	0.0	0.0	0.0	0.0
Control Delay (s)	12.2	26.5	0.0	0.0	0.0	0.0
Lane LOS	B	D				
Approach Delay (s)	12.2	26.5	0.0		0.0	
Approach LOS	B	D				

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	46.4%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	0	21	12	6	6	138	344	7	0	512	46
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	23	13	7	7	150	374	8	0	557	50
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1240	1238	557	1253	1280	374	607			382		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1240	1238	557	1253	1280	374	607			382		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	96	100	96	89	95	99	84			100		
cM capacity (veh/h)	122	142	515	120	134	655	934			1134		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	28	26	150	374	8	557	50
Volume Left	5	13	150	0	0	0	0
Volume Right	23	7	0	0	8	0	50
cSH	319	156	934	1700	1700	1134	1700
Volume to Capacity	0.09	0.17	0.16	0.22	0.00	0.00	0.03
Queue Length 95th (m)	2.2	4.4	4.3	0.0	0.0	0.0	0.0
Control Delay (s)	17.4	32.7	9.6	0.0	0.0	0.0	0.0
Lane LOS	C	D	A				
Approach Delay (s)	17.4	32.7	2.7			0.0	
Approach LOS	C	D					

Intersection Summary				
Average Delay	2.3			
Intersection Capacity Utilization	62.2%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	46	0	143	6	0	0	15	507	13	0	520	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	50	0	155	7	0	0	16	551	14	0	565	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1149	1163	565	1304	1154	551	571			565		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1149	1163	565	1304	1154	551	571			565		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	70	100	69	93	100	100	98			100		
cM capacity (veh/h)	167	185	509	91	187	519	963			968		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	205	7	16	551	14	565	5
Volume Left	50	7	16	0	0	0	0
Volume Right	155	0	0	0	14	0	5
cSH	340	91	963	1700	1700	968	1700
Volume to Capacity	0.60	0.07	0.02	0.32	0.01	0.00	0.00
Queue Length 95th (m)	28.5	1.7	0.4	0.0	0.0	0.0	0.0
Control Delay (s)	30.5	47.8	8.8	0.0	0.0	0.0	0.0
Lane LOS	D	E	A				
Approach Delay (s)	30.5	47.8	0.2			0.0	
Approach LOS	D	E					

Intersection Summary				
Average Delay	4.9			
Intersection Capacity Utilization	54.3%	ICU Level of Service		A
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	6	13	6	6	0	379	7	0	595	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	7	14	7	7	0	412	8	0	647	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1068	1066	647	1065	1059	412	647			420		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1068	1066	647	1065	1059	412	647			420		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	100	100	99	93	97	99	100			100		
cM capacity (veh/h)	186	215	457	191	217	623	902			1098		

Direction, Lane#	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	7	27	0	412	8	647	0
Volume Left	0	14	0	0	0	0	0
Volume Right	7	7	0	0	8	0	0
cSH	457	237	1700	1700	1700	1098	1700
Volume to Capacity	0.01	0.11	0.00	0.24	0.00	0.00	0.00
Queue Length 95th (m)	0.3	2.9	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	13.0	22.1	0.0	0.0	0.0	0.0	0.0
Lane LOS	B	C					
Approach Delay (s)	13.0	22.1	0.0			0.0	
Approach LOS	B	C					

Intersection Summary				
Average Delay	0.6			
Intersection Capacity Utilization	50.7%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	0	0	6	6	0	0	0	559	13	0	604	0
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	0	0	7	7	0	0	0	608	14	0	657	0
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1264	1278	657	1271	1264	608	657			622		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1264	1278	657	1271	1264	608	657			622		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	100	100	99	95	100	100	100			100		
cM capacity (veh/h)	141	160	451	137	163	482	894			922		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	7	7	0	608	14	657	0
Volume Left	0	7	0	0	0	0	0
Volume Right	7	0	0	0	14	0	0
cSH	451	137	1700	1700	1700	922	1700
Volume to Capacity	0.01	0.05	0.00	0.36	0.01	0.00	0.00
Queue Length 95th (m)	0.3	1.1	0.0	0.0	0.0	0.0	0.0
Control Delay (s)	13.1	32.5	0.0	0.0	0.0	0.0	0.0
Lane LOS	B	D					
Approach Delay (s)	13.1	32.5	0.0			0.0	
Approach LOS	B	D					

Intersection Summary				
Average Delay	0.2			
Intersection Capacity Utilization	51.2%	ICU Level of Service	A	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	5	0	21	13	6	6	138	379	7	0	595	46
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	5	0	23	14	7	7	150	412	8	0	647	50
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1368	1366	647	1382	1409	412	697			420		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1368	1366	647	1382	1409	412	697			420		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	94	100	95	85	94	99	83			100		
cM capacity (veh/h)	98	117	457	96	110	623	863			1098		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	28	27	150	412	8	647	50
Volume Left	5	14	150	0	0	0	0
Volume Right	23	7	0	0	8	0	50
cSH	268	125	863	1700	1700	1098	1700
Volume to Capacity	0.11	0.22	0.17	0.24	0.00	0.00	0.03
Queue Length 95th (m)	2.7	5.9	4.8	0.0	0.0	0.0	0.0
Control Delay (s)	20.0	41.5	10.0	0.0	0.0	0.0	0.0
Lane LOS	C	E	B				
Approach Delay (s)	20.0	41.5	2.6			0.0	
Approach LOS	C	E					

Intersection Summary				
Average Delay	2.4			
Intersection Capacity Utilization	69.1%	ICU Level of Service	C	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	46	0	143	6	0	0	15	559	13	0	604	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	50	0	155	7	0	0	16	608	14	0	657	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1297	1311	657	1452	1302	608	662			622		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1297	1311	657	1452	1302	608	662			622		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	62	100	66	90	100	100	98			100		
cM capacity (veh/h)	132	150	451	67	152	482	890			922		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	205	7	16	608	14	657	5
Volume Left	50	7	16	0	0	0	0
Volume Right	155	0	0	0	14	0	5
cSH	284	67	890	1700	1700	922	1700
Volume to Capacity	0.72	0.10	0.02	0.36	0.01	0.00	0.00
Queue Length 95th (m)	39.2	2.4	0.4	0.0	0.0	0.0	0.0
Control Delay (s)	45.0	64.2	9.1	0.0	0.0	0.0	0.0
Lane LOS	E	F	A				
Approach Delay (s)	45.0	64.2	0.2			0.0	
Approach LOS	E	F					

Intersection Summary				
Average Delay	6.5			
Intersection Capacity Utilization	59.1%	ICU Level of Service	B	
Analysis Period (min)	15			

Movement	EBL	EBT	EBR	WBL	WBT	WBR	NBL	NBT	NBR	SBL	SBT	SBR
Lane Configurations												
Volume (veh/h)	46	0	143	6	0	0	15	559	13	0	604	5
Sign Control		Stop			Stop			Free			Free	
Grade		0%			0%			0%			0%	
Peak Hour Factor	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92
Hourly flow rate (vph)	50	0	155	7	0	0	16	608	14	0	657	5
Pedestrians												
Lane Width (m)												
Walking Speed (m/s)												
Percent Blockage												
Right turn flare (veh)												
Median type								None			None	
Median storage veh)												
Upstream signal (m)												
pX, platoon unblocked												
vC, conflicting volume	1297	1311	657	1297	1302	608	662			622		
vC1, stage 1 conf vol												
vC2, stage 2 conf vol												
vCu, unblocked vol	1297	1311	657	1297	1302	608	662			622		
tC, single (s)	7.2	6.6	6.3	7.2	6.6	6.3	4.2			4.2		
tC, 2 stage (s)												
tF (s)	3.6	4.1	3.4	3.6	4.1	3.4	2.3			2.3		
p0 queue free %	62	100	66	92	100	100	98			100		
cM capacity (veh/h)	132	150	451	86	152	482	890			922		

Direction, Lane #	EB 1	WB 1	NB 1	NB 2	NB 3	SB 1	SB 2
Volume Total	205	7	16	608	14	657	5
Volume Left	50	7	16	0	0	0	0
Volume Right	155	0	0	0	14	0	5
cSH	284	86	890	1700	1700	922	1700
Volume to Capacity	0.72	0.08	0.02	0.36	0.01	0.00	0.00
Queue Length 95th (m)	39.2	1.8	0.4	0.0	0.0	0.0	0.0
Control Delay (s)	45.0	50.1	9.1	0.0	0.0	0.0	0.0
Lane LOS	E	F	A				
Approach Delay (s)	45.0	50.1	0.2			0.0	
Approach LOS	E	F					

Intersection Summary				
Average Delay	6.4			
Intersection Capacity Utilization	59.1%	ICU Level of Service	B	
Analysis Period (min)	15			

Appendix C
Signal Warrants

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision | GO TO Justification

What are the intersecting roadways? Highway 140 and Concession Road Three

What is the direction of the Main Road street? North-South

When was the data collected? 2020

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 4

d.- What is the operating environment? Rural Population < 10,000 AND Speed >= 70 km/hr

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Northbound Approach			Minor Eastbound Approach			Main Southbound Approach			Minor Westbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
7:00	138	311	6	5	0	21	0	441	46	12	5	5	
8:00	0	193	5	0	0	3	0	222	0	4	1	1	
9:00	0	193	5	0	0	3	0	222	0	4	1	1	
12:30	0	193	5	0	0	3	0	222	0	4	1	1	
13:30	0	193	5	0	0	3	0	222	0	4	1	1	
16:00	0	193	5	0	0	3	0	222	0	4	1	1	
17:00	0	193	5	0	0	3	0	222	0	4	1	1	
18:00	15	459	12	46	0	142	0	446	5	5	0	0	
Total	153	1,928	48	51	0	181	0	2,219	51	41	11	11	0

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	0
13-24	0
25-36	0

* Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Factored 8 hour pedestrian volume	0		0		0		0		
% Assigned to crossing rate	23%		34%		30%		100%		
Net 8 Hour Pedestrian Volume at Crossing									0
Net 8 Hour Vehicular Volume on Street Being Crossed									2,000

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds	0	0	0	0	0	0	0	0	
Factored volume of total pedestrians	0		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	23%		34%		30%		100%		
Net 8 Hour Volume of Total Pedestrians									0
Net 8 Hour Volume of Delayed Pedestrians									0

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision | GO TO Justification:

Intersection: Highway 140 and Concession Road Three Count Date: 2020

Justification 1: Minimum Vehicle Volumes

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☑	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	12:30	13:30	16:00	17:00	18:00		
1A	480	720	600	900	990	429	429	429	429	429	429	1,130		
	COMPLIANCE %				100	89	89	89	89	89	89	100	736	92
1B	120	170	120	170	48	9	9	9	9	9	9	193		
	COMPLIANCE %				40	8	8	8	8	8	8	100	185	23

Free Flow Signal Justification 1:

Both 1A and 1B 100% Fulfilled each of 8 hours — Yes ☐ No ☑

Lesser of 1A or 1B at least 80% fulfilled each of 8 hours — Yes ☐ No ☑

Justification 2: Delay to Cross Traffic

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☑	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	12:30	13:30	16:00	17:00	18:00		
2A	480	720	600	900	942	420	420	420	420	420	420	937		
	COMPLIANCE %				100	88	88	88	88	88	88	100	725	91
2B	50	75	50	75	22	5	5	5	5	5	5	51		
	COMPLIANCE %				44	10	10	10	10	10	10	100	204	26

Free Flow Signal Justification 2:

Both 2A and 2B 100% Fulfilled each of 8 hours — Yes ☐ No ☑

Lesser of 2A or 2B at least 80% fulfilled each of 8 hours — Yes ☐ No ☑

Justification 3: Combination

Combination Justification 1 and 2

	Justification Satisfied 80% or More			Two Justifications Satisfied 80% or More	
Justification 1	Minimun Vehicular Volume	YES ☐	NO ☑	YES ☐	NO ☑
Justification 2	Delay Cross Traffic	YES ☐	NO ☑		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main) X	Heaviest Minor Approach Y (actual)	Required Value Y (warrant threshold)	Average % Compliance	Overall % Compliance
Justification 4	7:00	942	26	131	20 %	31 %
	8:00	420	6	328	2 %	
	9:00	420	6	328	2 %	
	18:00	937	188	132	100 %	

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision | GO TO Justification:

Intersection: Highway 140 and Concession Road Three Count Date: 2020

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

	8 Hour Vehicular Volume V_8	Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440	Not Justified				
	1440 - 2600					
	2601 - 7000					
	> 7000					

Pedestrian Delay Analysis

	Net Total 8 Hour Volume of Total Pedestrians	Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision | GO TO Justification:

Intersection: Highway 140 and Concession Road Three Count Date: 2020

Summary Results

Justification			Compliance		Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	92	%	☐	☑
	B	Crossing Volume	23	%		
2. Delay to Cross Traffic	A	Main Road	91	%	☐	☑
	B	Crossing Road	26	%		
3. Combination	A	Justificaton 1	23	%	☐	☑
	B	Justification 2	26	%		
4. 4-Hr Volume			31	%	☐	☑
5. Collision Experience			0	%	☐	☑
6. Pedestrians	A	Volume	Justification not met		☐	☑
	B	Delay	Justification not met			

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision | GO TO Justification:

What are the intersecting roadways? Highway 140 and Concession Road Three

What is the direction of the Main Road street? North-South

When was the data collected? 2025

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 4

d.- What is the operating environment? Rural Population < 10,000 AND Speed >= 70 km/hr

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Northbound Approach			Minor Eastbound Approach			Main Southbound Approach			Minor Westbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
7:00	138	344	7	5	0	21	0	512	46	12	6	6	
8:00	0	213	5	0	0	3	0	258	0	4	1	1	
9:00	0	213	5	0	0	3	0	258	0	4	1	1	
12:30	0	213	5	0	0	3	0	258	0	4	1	1	
13:30	0	213	5	0	0	3	0	258	0	4	1	1	
16:00	0	213	5	0	0	3	0	258	0	4	1	1	
17:00	0	213	5	0	0	3	0	258	0	4	1	1	
18:00	15	507	13	46	0	143	0	520	5	6	0	0	
Total	153	2,129	50	51	0	182	0	2,580	51	42	12	12	0

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	0
13-24	0
25-36	0

* Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Factored 8 hour pedestrian volume	0		0		0		0		
% Assigned to crossing rate	23%		34%		30%		100%		
Net 8 Hour Pedestrian Volume at Crossing									0
Net 8 Hour Vehicular Volume on Street Being Crossed									2,000

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds	0	0	0	0	0	0	0	0	
Factored volume of total pedestrians	0		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	23%		34%		30%		100%		
Net 8 Hour Volume of Total Pedestrians									0
Net 8 Hour Volume of Delayed Pedestrians									0

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision | GO TO Justification:

Intersection: Highway 140 and Concession Road Three Count Date: 2025

Justification 1: Minimum Vehicle Volumes

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☑	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	12:30	13:30	16:00	17:00	18:00		
1A	480	720	600	900	1,097	485	485	485	485	485	485	1,255		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100
1B	120	170	120	170	50	9	9	9	9	9	9	195		
	COMPLIANCE %				42	8	8	8	8	8	8	100	187	23
Free Flow Signal Justification 1:					Both 1A and 1B 100% Fulfilled each of 8 hours								Yes ☐	No ☑
					Lesser of 1A or 1B at least 80% fulfilled each of 8 hours								Yes ☐	No ☑

Justification 2: Delay to Cross Traffic

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☑	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	12:30	13:30	16:00	17:00	18:00		
2A	480	720	600	900	1,047	476	476	476	476	476	476	1,060		
	COMPLIANCE %				100	99	99	99	99	99	99	100	795	99
2B	50	75	50	75	23	5	5	5	5	5	5	52		
	COMPLIANCE %				46	10	10	10	10	10	10	100	206	26
Free Flow Signal Justification 2:					Both 2A and 2B 100% Fulfilled each of 8 hours								Yes ☐	No ☑
					Lesser of 2A or 2B at least 80% fulfilled each of 8 hours								Yes ☐	No ☑

Justification 3: Combination

Combination Justification 1 and 2

	Justification Satisfied 80% or More			Two Justifications Satisfied 80% or More	
Justification 1	Minimun Vehicular Volume	YES ☐	NO ☑	YES ☐	NO ☑
Justification 2	Delay Cross Traffic	YES ☐	NO ☑		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main) X	Heaviest Minor Approach Y (actual)	Required Value Y (warrant threshold)	Average % Compliance	Overall % Compliance
Justification 4	7:00	1,047	26	107	24 %	32 %
	8:00	476	6	301	2 %	
	9:00	476	6	301	2 %	
	18:00	1,060	189	104	100 %	

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision | GO TO Justification:

Intersection: Highway 140 and Concession Road Three Count Date: 2025

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440	Not Justified				
	1440 - 2600					
	2601 - 7000					
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision | GO TO Justification:

Intersection: Highway 140 and Concession Road Three Count Date: 2025

Summary Results

Justification			Compliance		Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	100	%	☐	☑
	B	Crossing Volume	23	%		
2. Delay to Cross Traffic	A	Main Road	99	%	☐	☑
	B	Crossing Road	26	%		
3. Combination	A	Justificaton 1	23	%	☐	☑
	B	Justification 2	26	%		
4. 4-Hr Volume			32	%	☐	☑
5. Collision Experience			0	%	☐	☑
6. Pedestrians	A	Volume	Justification not met		☐	☑
	B	Delay	Justification not met			

Input Data Sheet

Analysis Sheet | Results Sheet | Proposed Collision

GO TO Justification:

What are the intersecting roadways? Highway 140 and Concession Road Three

What is the direction of the Main Road street? North-South

When was the data collected? 2030

Justification 1 - 4: Volume Warrants

a.- Number of lanes on the Main Road? 1

b.- Number of lanes on the Minor Road? 1

c.- How many approaches? 4

d.- What is the operating environment? Rural Population < 10,000 AND Speed >= 70 km/hr

e.- What is the eight hour vehicle volume at the intersection? (Please fill in table below)

Hour Ending	Main Northbound Approach			Minor Eastbound Approach			Main Southbound Approach			Minor Westbound Approach			Pedestrians Crossing Main Road
	LT	TH	RT	LT	TH	RT	LT	TH	RT	LT	TH	RT	
7:00	138	379	7	5	0	21	0	595	46	13	6	6	
8:00	0	235	5	0	0	3	0	300	0	5	1	1	
9:00	0	235	5	0	0	3	0	300	0	5	1	1	
12:30	0	235	5	0	0	3	0	300	0	5	1	1	
13:30	0	235	5	0	0	3	0	300	0	5	1	1	
16:00	0	235	5	0	0	3	0	300	0	5	1	1	
17:00	0	235	5	0	0	3	0	300	0	5	1	1	
18:00	15	559	13	46	0	143	0	604	5	6	0	0	
Total	153	2,348	50	51	0	182	0	2,999	51	49	12	12	0

Justification 5: Collision Experience

Preceding Months	Number of Collisions*
1-12	0
13-24	0
25-36	0

* Include only collisions that are susceptable to correction through the installation of traffic signal control

Justification 6: Pedestrian Volume

a.- Please fill in table below summarizing total pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Factored 8 hour pedestrian volume	0		0		0		0		
% Assigned to crossing rate	23%		34%		30%		100%		
Net 8 Hour Pedestrian Volume at Crossing									0
Net 8 Hour Vehicular Volume on Street Being Crossed									2,000

b.- Please fill in table below summarizing delay to pedestrians crossing major roadway at the intersection or in proximity to the intersection (zones). Please reference Section 4.8 of the Manual for further explanation and graphical representation.

	Zone 1		Zone 2		Zone 3 (if needed)		Zone 4 (if needed)		Total
	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	Assisted	Unassisted	
Total 8 hour pedestrian volume	0	0	0	0	0	0	0	0	
Total 8 hour pedestrians delayed greater than 10 seconds	0	0	0	0	0	0	0	0	
Factored volume of total pedestrians	0		0		0		0		
Factored volume of delayed pedestrians	0		0		0		0		
% Assigned to Crossing Rate	23%		34%		30%		100%		
Net 8 Hour Volume of Total Pedestrians									0
Net 8 Hour Volume of Delayed Pedestrians									0

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision | GO TO Justification:

Intersection: Highway 140 and Concession Road Three Count Date: 2030

Justification 1: Minimum Vehicle Volumes

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 Lanes		2 or More Lanes		Hour Ending									
Flow Condition	FREE FLOW ☑	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	12:30	13:30	16:00	17:00	18:00		
1A	480	720	600	900	1,216	550	550	550	550	550	550	1,391		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100
1B	120	170	120	170	51	10	10	10	10	10	10	195		
	COMPLIANCE %				43	8	8	8	8	8	8	100	193	24
Free Flow Signal Justification 1:					Both 1A and 1B 100% Fulfilled each of 8 hours								Yes ☐	No ☑
					Lesser of 1A or 1B at least 80% fulfilled each of 8 hours								Yes ☐	No ☑

Justification 2: Delay to Cross Traffic

Free Flow Rural Conditions

Justification	Guidance Approach Lanes				Percentage Warrant								Total Across	Section Percent
	1 lanes		2 or More lanes		Hour Ending									
Flow Condition	FREE FLOW ☑	RESTR. FLOW ☐	FREE FLOW ☐	RESTR. FLOW ☐	7:00	8:00	9:00	12:30	13:30	16:00	17:00	18:00		
2A	480	720	600	900	1,165	540	540	540	540	540	540	1,196		
	COMPLIANCE %				100	100	100	100	100	100	100	100	800	100
2B	50	75	50	75	93	6	6	6	6	6	6	52		
	COMPLIANCE %				100	12	12	12	12	12	12	100	272	34
Free Flow Signal Justification 2:					Both 2A and 2B 100% Fulfilled each of 8 hours								Yes ☐	No ☑
					Lesser of 2A or 2B at least 80% fulfilled each of 8 hours								Yes ☐	No ☑

Justification 3: Combination

Combination Justification 1 and 2

	Justification Satisfied 80% or More			Two Justifications Satisfied 80% or More	
Justification 1	Minimun Vehicular Volume	YES ☐	NO ☑	YES ☐	NO ☑
Justification 2	Delay Cross Traffic	YES ☐	NO ☑		NOT JUSTIFIED

Justification 4: Four Hour Volume

Justification	Time Period	Total Volume of Both Approaches (Main) X	Heaviest Minor Approach Y (actual)	Required Value Y (warrant threshold)	Average % Compliance	Overall % Compliance
Justification 4	7:00	1,165	26	85	30 %	34 %
	8:00	540	7	271	3 %	
	9:00	540	7	271	3 %	
	18:00	1,196	189	81	100 %	

Analysis Sheet

Input Sheet | Results Sheet | Proposed Collision | GO TO Justification:

Intersection: Highway 140 and Concession Road Three Count Date: 2030

Justification 5: Collision Experience

Justification	Preceding Months	% Fulfillment	Overall % Compliance
Justification 5	1-12	0 %	0 %
	13-24	0 %	
	25-36	0 %	

Justification 6: Pedestrian Volume

Pedestrian Volume Analysis

8 Hour Vehicular Volume V_8		Net 8 Hour Pedestrian Volume				
		< 200	200 - 275	276 - 475	476 - 1000	>1000
Justification 6A	< 1440	Not Justified				
	1440 - 2600					
	2601 - 7000					
	> 7000					

Pedestrian Delay Analysis

Net Total 8 Hour Volume of Total Pedestrians		Net Total 8 Hour Volume of Delayed Pedestrians		
		< 75	75 - 130	> 130
Justification 6B	< 200	Not Justified		
	200 - 300			
	> 300			

Results Sheet

Input Sheet | Analysis Sheet | Proposed Collision | GO TO Justification:

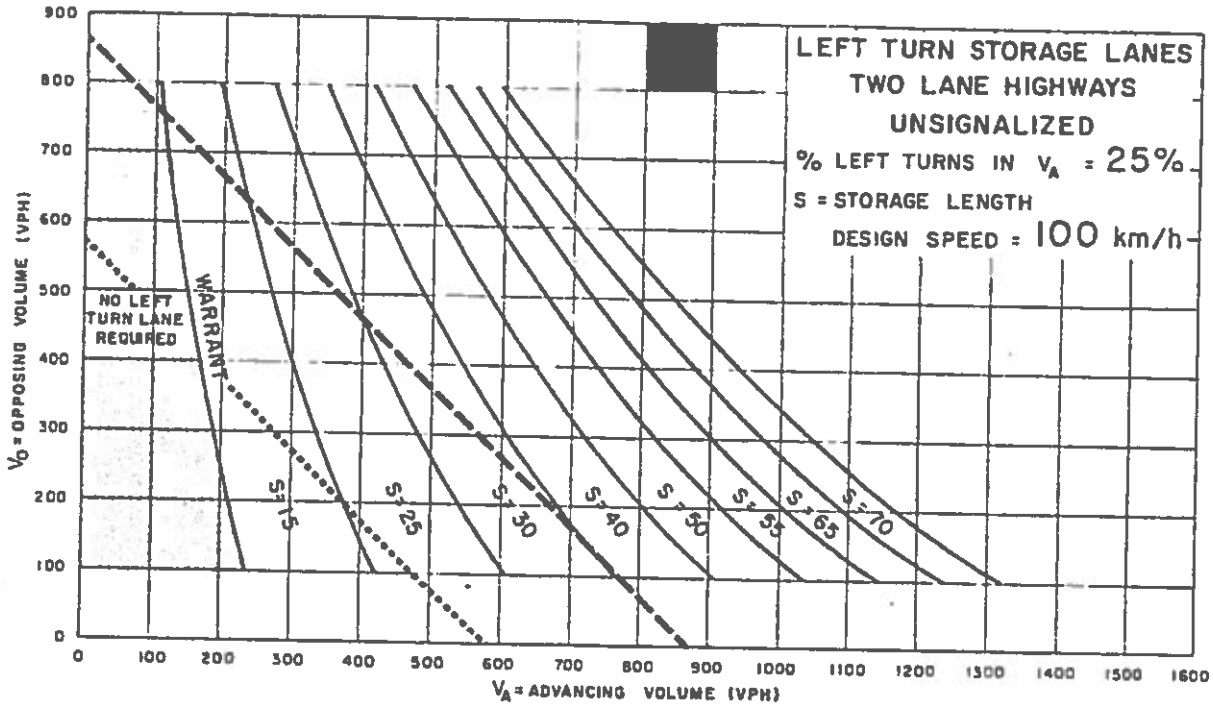
Intersection: Highway 140 and Concession Road Three Count Date: 2030

Summary Results

Justification			Compliance		Signal Justified? YES	Signal Justified? NO
1. Minimum Vehicular Volume	A	Total Volume	100	%	☐	☑
	B	Crossing Volume	24	%		
2. Delay to Cross Traffic	A	Main Road	100	%	☐	☑
	B	Crossing Road	34	%		
3. Combination	A	Justificaton 1	24	%	☐	☑
	B	Justification 2	34	%		
4. 4-Hr Volume			34	%	☐	☑
5. Collision Experience			0	%	☐	☑
6. Pedestrians	A	Volume	Justification not met		☐	☑
	B	Delay	Justification not met			

Appendix D

Left Turn Lane Warrants



TRAFFIC SIGNALS MAY BE WARRANTED IN RURAL AREAS OR URBAN AREAS WITH RESTRICTED FLOW

TRAFFIC SIGNALS MAY BE WARRANTED IN "FREE FLOW" URBAN AREAS

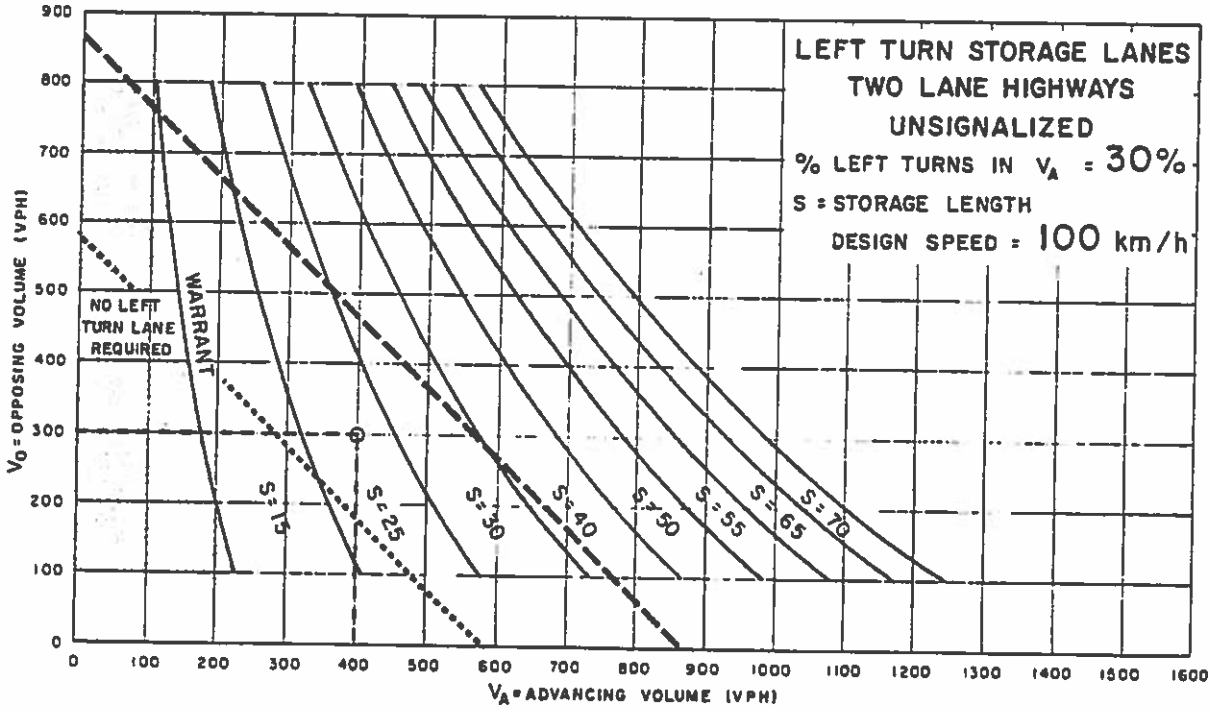


Figure EA-24

Appendix C

Natural Environment Technical Memorandum

AECOM
50 Sportsworld Crossing Road, Suite 290
Kitchener, ON, Canada N2P 0A4
www.aecom.com

519.650.5313 tel
519.650.3424 fax

Memorandum

To	Karl Grueneis	Page	1
CC	Ian Izzard, Jessica Mollo		
Subject	Natural Heritage Review: City of Port Colborne Site Servicing of the East Side Employment Lands		
From	Michael Godard, Kasey McKenzie and Jill deMan, AECOM		
Date	January 13, 2016	Project Number	60322620

1. Introduction

AECOM was retained by the City of Port Colborne (hereafter referred to as the City) to complete a Municipal Class Environmental Assessment (Class EA) Study for site servicing of the East Side Employment Lands (ESEL) Phase 1 area. The ESEL have been identified by the City as a priority for investment to enable and support development of these lands. Key components of the Class EA Study include the provision of municipal water and sanitary sewer systems, stormwater management, and road network improvements. The study area can be seen on **Figure 1 in Attachment 'A'**.

As part of the Class EA Study, AECOM Ecologists conducted an initial assessment of natural heritage features for the purpose of determining natural heritage constraints which will be considered in the evaluation of alternatives. The following technical memorandum (TM) provides a description of the existing natural features, their assessment and recommendations with respect to environmental management within the study area.

The following attachments are also included in support of this TM:

- Attachment A – Figures
- Attachment B – Aquatic Representative Photographs
- Attachment C – Floral Species List
- Attachment D – Species at Risk Screening
- Attachment E – City of Port Colborne's EIS Requirements
- Attachment F – NPCA Correspondence
- Attachment G – Tall Boneset Memo

1.1 Background Review

A background review of available resources regarding natural heritage and environmental features was completed to provide details on existing conditions within the study area. Background sources included a Class EA completed by AECOM in 2011 for a new hydro transmission line and transformer substation undertaken by Jungbunzlauer, Canada. In support of the City's Port Colborne Industrial Park Development Study, a "Natural Environmental Site Review" was also completed by Warmé Engineering and Biological Services in October 2008. These documents, along with data obtained from the Niagara Peninsula Conservation Authority (NPCA), were reviewed prior to undertaking field investigations for an understanding of the data gaps. The following natural heritage features were identified during the background review and can be seen on **Figure 1** in **Attachment 'A'**:

Significant natural heritage features identified within the vicinity of the study area include:

Wainfleet Bog – A provincially significant wetland (PSW) located west of Welland Canal. This wetland is part of the largest, least disturbed peatland in Southern Ontario. Near the centre of the wetland, sphagnum moss occurs and is covered by shrubs and plants. Forest communities with sphagnum outline this central bog system. This wetland is known for numerous rare plant and animal species, especially the Massassauga Rattlesnake.

Mud Lake PSW - Mud Lake PSW consists of approximately 69 hectares of swamp and marsh. The wetland is isolated by man-made berms that prevent water from naturally entering and exiting the wetland. Six distinct vegetation communities are in the wetland: emergent aquatic plants; submerged and free floating aquatic plants; wetland mixed hardwoods; mixed hardwoods; reforested areas; and scrubland. Approximately 63 hectares of Mud Lake is protected and owned by the Niagara Peninsula Conservation Authority (NPCA, 2010). This wetland also occurs west of the Welland Canal.

Seaway Non-provincially Significant Wetland Complex - A Non-PSW comprised of swamp and marsh communities. This patch is also considered a significant woodland as per the City of Port Colborne's Official Plan Schedule B2 and is located immediately west of the main Welland Canal channel.

Significant natural heritage features identified within the study area include:

Babion Woods PSW Complex - This wetland community is a large swamp consisting of 13 distinct wetland units, with a total area of approximately 188 ha. Dominant canopy species include Freeman's maple (*Acer freemani*), pin oak (*Quercus palustris*) and green ash (*Fraxinus pennsylvanica*) with grey dogwood (*Cornus racemosa*), red-osier dogwood (*Cornus sericea*), narrow-leaved meadowsweet (*Spirea alba*) and buttonbush (*Cephalanthus occidentalis*) in the understory. The Babion Woods PSW is noted for its hydrological function (i.e. flood attenuation) and presence of species of conservation concern. This PSW is located along the southern edge of Third Concession Road, west of Highway 140.

Ramey Road Evaluated Wetland – A Non-PSW comprised of swamp and marsh communities. This patch is also considered a significant woodland as per the City of Port Colborne's Official Plan Schedule B2 and is located within the crux of Ramey Road and Highway 140.

Significant Woodland – There are three patches of significant woodlands identified within the study area as per the City of Port Colborne's Official Plan Schedule B2. One is along the western side of Ramey Road, the other coincides with Ramey Road Evaluated Wetland as described above and the third coincides with Babion Woods PSW, also described above.

Welland Canal – a wide straightened system which contains warmwater fish habitat and communities. It connects Lake Erie and Lake Ontario.

Attachment 'A', Figure 1 displays the study area, as well as natural features identified during the background review.

2. Existing Natural Heritage Conditions

AECOM Ecologists conducted site visits on September 25th, 2014 and October 2nd, 2015. On site, prior to September 2014 field investigations being conducted, Henri Bennemeer, Drainage Superintendent for Port Colborne, met with AECOM's ecologists on site. Mr. Bennemeer described his understanding of the site conditions as summarized below:

- Lyon's Creek was the original water body in which Indian Creek outletted to;
- In 1833, lands within the study area were drained for the Welland Canal;
- The drainage system within the study area was constructed in the late 1800s;
- Water in the drainage system is influenced by the canal;
- A maintenance plan of the drains is currently being developed; and
- Ash (*Fraxinus* sp.) trees within the study area have been dying off.

On September 25, 2014, aquatic and terrestrial investigations were completed within areas where land access permission was obtained. Weather conditions during the investigations included an air temperature of 16 degrees Celsius in the morning and 20 degrees Celsius in the afternoon; wind was slightly breezy (up to Beaufort 2); and cloud cover was approximately 10%.

Aquatic habitat investigations were undertaken in four locations: Indian Creek Drain (Haun Drain); the drainage ditch on the south and north sides of Third Concession Road; the drainage ditch along both sides of Ramey Road; the upstream section of Indian Creek on the north side of Third Concession Road; and the unnamed watercourse running under the railway line within the southern portions of the study area. Terrestrial assessments focused on identifying and describing vegetation communities, determination/confirmation of wetland/woodland areas and the understanding of the overall habitat.

Attachment 'B' presents the aquatic representative photographs including location of where the photos were taken.

On October 2, 2015, terrestrial investigations were completed along the Trillium Railway corridor from Ramey Road to Second Concession Road. Land access into the natural features was not granted, so the investigation was completed from the path along the railway corridor. Weather conditions during the investigations were as follows: air temperature was 5 degrees Celsius in the morning and 11 degrees Celsius in the afternoon; wind was a strong breeze (up to Beaufort 6); and cloud cover was approximately 90%. Terrestrial assessments focused on identifying and describing vegetation

communities, determination/confirmation of wetland/woodland areas and identifying overall habitat availability.

2.1 *Aquatic Investigations*

The area of investigation for each of the watercourse crossing assessments consisted of the entire reach within the study area; with in-field recorded criteria including:

- Surrounding natural features and land uses (i.e., wetland, agriculture, etc.);
- Channel dimensions, substrate composition, channel morphology and bank stability
- Stream morphology dimensions:
  - Runs- typically deep, fast moving water with little to no turbulence of water;
  - Riffles- shallow, fast moving water typically running over rocks; riffles provide areas of high oxygenated waters;
  - Flats- low flowing water with a smooth un-agitated surface;
  - Pools- are described as deep pockets of slow moving water that provide ideal habitat for fish;
- Substrate composition (e.g., clay, silt, sand, gravel, cobble, rock, boulder, muck and detritus);
- Indicators of water quality; water clarity, water colour, presence and type of macrophytes and algal growth, evidence of runoff; and
- Basic field parameters such as pollution sources (i.e. tile drain discharges, other piped discharges and road runoff).

Representative photos and site sketches are included to illustrate the general site layout of each water crossing (refer to **Attachment 'B'**).

2.1.1 *Indian Creek Drain (Haun Drain)*

The Indian Creek Drain connects to the Third Concession road drainage ditch, as well as the North section of Indian Creek. The assessed section includes the bridge crossing at Ramey Road to the Welland Canal. At the time of the assessment the watercourse had an average wetted width of 5.8 m and an average depth of 0.6 m. The substrate closest to the Welland Canal, as shown in the Aquatic Photolog (refer to **Attachment B**, photograph 1), was a mixture of cobbles, gravel and muck. This is likely due to the fluctuations in water level in the Canal with water flowing in and out of the watercourse in this area. Zebra mussels (*Dreissena polymorpha*), cyprinids and centrarchids were observed within this section. As the drain moves away from the Canal (photographs 2-5), the turbidity within the water column as well as the muck within the substrate increased, with substrate consisting of predominantly muck within the remaining area. As illustrated in photographs 1-3, canopy cover was low with willow shrubs and cattails providing cover along the banks. Instream cover was provided by cobble and submergent aquatic vegetation (i.e. water weed, milfoil, algae etc.) which was heavy throughout this section. Canopy cover increased (refer to photographs 4 and 5), with dogwood and ash lining the banks. Milfoil and algae were present within this section providing the majority of instream cover. Within PC6 (refer to **Figure 1** for location), the canopy cover was lower than the previous section with mainly shrubs and cattails lining the banks. No aquatic submergent vegetation was identified. Watercress was identified along the banks between photographs 4 and 5. Based on direct observations of cyprinids and centrarchids during the assessment as well as the connectivity to the Welland Canal, this area is considered as fish habitat.

2.1.2 Third Concession Road South Side Drainage Ditch

This watercourse was assessed from the confluence of all three watercourses (Indian Creek, Haun Drain and the Third Concession Road south side drainage ditch) at the intersection of Third Concession Road south side ditch and Ramey Road to the culvert running under Highway 140. This roadside drainage ditch has been crossed a number of times, with residential properties as well as the Trillium Railway corridor. At the time of assessment, sporadic pockets of water were observed but, the watercourse appears to transport road runoff through Haun Drain into the Welland Canal (PC6-PC8). The drainage ditch had an average width of 2 m, with pools of water observed in the areas surrounding the culverts. The substrate throughout appeared to be a mixture of silt, sediment and muck with areas heavily overgrown with vegetation species such as reed canary grass (*Phalaris arundinacea*) and purple loosestrife (*Lythrum salicaria*). As this ditch was predominately dry at the time of assessment, it appears to be intermittent in nature and functions primarily for drainage conveyance. As such, this watercourse appears to have limited capabilities with regards to fish habitat.

2.1.3 Third Concession Road North Side Drainage Ditch

Starting at its intersection with Highway 140 and heading west, the grass within the right-of-way (ROW) was mowed. There was no drainage function observed within these ditches. The further west the assessment went, the more defined the ditch became; however, no water or defined channel was identified during the assessment, as such this drainage ditch appeared to provide a drainage conveyance function only.

2.1.4 Indian Creek (north side of Third Concession Road)

Indian Creek was assessed in two separate locations: one in the vicinity of the culvert which runs under Third Concession Road south and connects to the drainage ditch and the other approximately 550 m upstream. Within the vicinity of the road crossing, the watercourse at the time of the assessment had an average wetted width of 3.5 m with an average wetted depth of approximately 0.45 m. The substrate consisted of cobble and gravel with some sediment and sand. Numerous shrubs were observed providing shade to the watercourse. This section appears to be affected by levels in the Welland Canal as water was observed flowing upstream. The area 550 m upstream was dry and heavily overgrown during the assessment. No water was observed in this section; however, the watercourse had a defined channel which was 8 m in width. Two corrugated steel pipe (CSP) culverts were previously installed to transport water downstream. As the downstream portion of this watercourse was dry at the time of assessment, it appears to be of an intermittent nature and provides a drainage conveyance function only. As such, this watercourse appears to have limited capabilities with regards to fish habitat except for the areas around the intersection of Third Concession Road and Ramey Road where connectivity to the Welland Canal was observed.

2.1.5 Ramey Road Drainage Ditch

Ramey Drain appears to be an intermittent watercourse which was assessed from Highway 140 to the confluence of all three watercourses (Indian Creek, Haun Drain and the Third Concession Road south sided drainage ditch) at the intersection of Third Concession Road South and Ramey Road. This watercourse appears to transport water from the surrounding areas (e.g. agriculture and roadside drainage) to Haun Drain where it ultimately drains into the Welland Canal. At the time of assessment the entire watercourse was heavily overgrown with a mixture of reed canary grass and cattails. Very limited water was observed; however, the water identified was stagnant and mostly within pools in the vicinity of culverts. As this ditch was mostly dry at the time of assessment, it

appears to be of an intermittent nature with limited downstream connectivity. As such, it appears to have a drainage conveyance function only with limited capabilities with regards to fish habitat.

2.1.6 Railway Drainage Ditch

This unnamed drainage ditch was assessed at the culvert crossing within the Railway ROW. Property access restrictions prevented any further investigations. Based on observations of green algae mats and duckweed (Lemna sp); this is likely an intermittent watercourse conveying flows in a west – east direction during periods of precipitation. Available imagery identified two holding ponds on the west side of the railway tracks on private property. The purpose of these ponds is unknown. The assessed area includes 25 m on either side of the culvert which encompasses a small patch of wetland at the culvert on the east side of the tracks however; no flows were observed on either side of the culvert at the time of assessment. Additionally, at the time of assessment the western portion of the watercourse had an average wetted width of approximately 2.5 m, with an average depth of approximately 15-20 cm. The substrate consisted of a mix of silt and detritus. As such, this watercourse appears to have very limited capabilities with regards to fish habitat.

2.2 Terrestrial Investigations

Terrestrial investigations were conducted along the roadside along Third Concession Road, Ramey Road, Trillium Railway corridor and Highway 140. Investigations included: designation of vegetation communities as per the Ministry of Natural Resources and Forestry's (MNRF) Ecological Land Classification (ELC) protocols (Lee *et al.*, 1998); wetland communities definition in accordance with MNRF's Ontario Wetland Evaluation Guidelines for Southern Ontario (MNRF 3rd edition, 2013)' floral species inventory; and incidental wildlife observations.

2.2.1 East of Welland Canal

The topography in this area is a result of the historical excavation of the Welland Canal. Overburden material has been piled along the eastern side of the canal, resulting in a significant increase in elevation in relation to the overall landscape. Meadow dominated by grasses with scattered juniper (*Juniperus sp*) and clumps of gray dogwood (*Cornus racemose*) dominate the area. The percentage of overall shrub cover was between 5% and 10%. Within low-lying areas, stands of common reed grass (*Phragmites australis*), were observed. Common reed grass is an invasive plant that occurs within wetland areas. The common reed grass communities were not considered part of the overall designated wetland communities within the landscape due to their invasive nature and small size.

The above area was designated into the following ELC communities:

- CUM1-1: Dry-Moist Old Field Meadow Type; and
- MAM2: Mineral Meadow Marsh Ecosite

2.2.2 Ramey Road

A swath of deciduous swamp and forest occurs along the western side of Ramey Road for almost the entire length of the road from Third Concession Road to Second Concession Road. This treed feature is considered a Significant Woodland as per the City of Port Colborne's Official Plan Schedule B2. Water inputs to this wetland consist of overland flow from the west over meadow and exposed soils and from the east where water percolates through roadside ditches. Dominant trees include a mixture of Freeman's maple, green ash and black ash (*Fraxinus nigra*). The dominant tree species

within the canopy tree varies between maple and ash species along the entire swath. In the areas where ash trees are dominant, between 60% and 70% of all ash are dead or dying. Overall average diameter at breast height (dbh) is approximately 20 cm to 40 cm. Shrub layer species include virginia creeper (*Parthenocissus inserta*), poison ivy (*Toxicodendron radicans*) and gray dogwood. Groundcover species include broad-leaved sedge (*Carex sp*) and calico aster (*Symphyotrichum lateriflorum*).

The above areas were designated into the following ELC code:

- SWD2-1: Black Ash Mineral Deciduous Swamp Type; and
- SWD3-3: Swamp Maple Mineral Deciduous Swamp Type

The east side of Ramey Road consists of agricultural field along the majority of its length. The most southern portion, closest to the rail includes a small cultural thicket. Trees within this area are largely comprised of deceased or nearly deceased green ash. Shrub species include staghorn sumac (*Rhus typhina*), silky dogwood (*Cornus amomum*), glossy buckthorn (*Rhamnus frangula*), red-osier dogwood (*Cornus sericea*) and hawthorn species (Crataegus sp.?). Herbaceous plants include New England aster *(Symphyotrichum novae-angliae)*, teasel (*Dipsacus fullonum*), Canada goldenrod (*Solidago canadensis*), common burdock *(Arctium minus)* and white sweet clover (*Melilotus albus*). Along the ditch and at the culvert of Ramey Drain, common reed grass occurs.

The above area was designated into the following ELC code:

- CUT1: Mineral Cultural Thicket

2.2.3 Third Concession Road

Along Third Concession Road, identified natural heritage features include Babion Woods Provincially Significant Wetland and significant woodland associated with these wetland patches. Investigations along Third Concession Road identified species near the road right-of-way. Babion Woods PSW occurs along the south side of Third Concession Road between Highway 140 and the Trillium Railway corridor. A patch of this wetland also occurs to the north, west of the rail line. Species identified within the wetland swamp along the south side of Third Concession Road include; pin oak, hophorn beam (*Ostrya virginiana*), bur oak (*Quercus macrocarpa*), silver maple (*Acer saccharinum*), pignut hickory (*Carya glabra*), gray dogwood and spicebush (*Lindera benzoin*). Both pin oak and pignut hickory are considered provincially uncommon (S3). Tree locations are provided below and can be found on **Figure 1**:

- Pignut hickory (*Carya glabra*) – 17T 0644867 475426
- Pin oak (*Quercus palustris*) – 17T 0644867 475426

A significant woodland patch occurs both north and south of Third Concession Road between Highway 140 and the rail line. To the south, this significant woodland coincides with Babion Woods Provincially Significant Wetland. Species observed within the upland areas of these patches include white elm (*Ulmus americana*), basswood *(Tilia americana)*, black walnut *(Juglans nigra)*, bur oak, pin oak and deceased ash. Two pin oak specimens were observed north of Third Concession Road. The following provides the geo-referenced co-ordinates of the pin oak specimens:

- Pin oak (*Quercus palustris*) – 17T 0644752 4754427; 17T 0644634 4754423

These individuals can be found on **Figure 2**. The remainder of the natural features along Third Concession Road consists of cultural thicket and swamp thicket. These communities occur along Haun Drain and comprise of gray dogwood, common buckthorn *(Rhamnus cathartica)*, white elm, trembling aspen *(Populus trembuloides)*, Freeman's maple and silky dogwood (*Cornus amomum*). This thicket community occurs along the immediate edge of Third Concession Road, the remainder of the land is comprised of row crop.

The above areas were designated into the following ELC code:

- CUT1: Mineral Cultural Thicket;
- SWT1: Mineral Cultural Swamp Thicket;
- SWD1: Oak Mineral Deciduous Swamp Ecosite; and
- FOD9: Fresh-Moist Oak-Maple-Hickory Deciduous Forest Ecosite.

2.2.4 Highway 140

Between Highway 140 and the Trillium Railway corridor, an evaluated wetland referred to as the Ramey Road Non-Provincially Significant wetland occurs along with Babion Woods PSW coinciding woodland patches. The woodland patches are considered significant according to the City of Port Colborne's Official Plan Schedule B2. This community consists of deciduous swamp comprised of predominately silver maple, bur oak, trembling aspen and willow species (*Salix sp*).

The above community was designated into the following ELC code:

- SWD3-3: Maple Mineral Deciduous Swamp

2.2.5 Trillium Railway Line

Vegetation communities were delineated along the Trillium Railway corridor and associated gravel trail which runs along each side of the railway line. Shallow marsh was identified immediately adjacent to both sides of the railway corridor. This community is comprised of mainly broadleaf cattail (*Typha latifolia*), gray dogwood, staghorn sumac and aster species (*Aster sp*). A swamp community is present adjacent to the shallow marsh communities and are comprised of Freeman's maple, green Ash (*Fraxinus pennsylvanica*) and black Ash. The Ash species are dominant, however most are dead. This swamp community covers most of the east side of the railway line and extends south surrounding existing industrial development. A cultural thicket was also identified west of Ramey Road Wetland. This cultural thicket community is present along historical hydro line cut. This community consists of staghorn sumac, gray dogwood, common milkweed *(Asclepias syriaca)*, goldenrod and some broadleaf cattails.

The above communities were designated into the following ELC codes:

- MAS2-1: Cattail Mineral Shallow Marsh Type;
- SWD2-1: Black Ash Mineral Deciduous Swamp Type; and
- CUT1-4: Gray Dogwood Cultural Thicket.

The south east section of the Trillium Railway corridor is largely developed with a treed swamp continuing on the east side of this developed area. Between this developed land and the railway

corridor, a linear strip of natural communities is present including a mixture of shallow marsh, meadow marsh, thicket swamp and shallow aquatic communities. Species common throughout these communities include staghorn sumac, trembling aspen, common milkweed, aster species, red osier dogwood and smooth serviceberry (*Amelanchier* laevis). In the cultural meadow community in particular, over one hundred individual tall boneset (*Eupatorium altissimum*) specimens were discovered. The occurrences of this rare aster species are throughout the cultural meadow, which is located adjacent to the gravel area within the developed land. Tall boneset is considered a provincially critically imperiled (S1) species.

The following provides the geo-referenced co-ordinates of the tall boneset specimens:

- Tall Boneset (*Eupatorium altissimum*) – 17T 643905 4752889
- Tall Boneset (*Eupatorium altissimum*) – 17T 644074 4753319

Refer to **Attachment 'G'** for more details regarding this species.

The above areas were designated into the following ELC codes:

- MAS2-1: Cattail Mineral Shallow Marsh Type;
- SWT2: Mineral Thicket Swamp;
- CUM1-1: Cultural Meadow;
- SA: Shallow Aquatic;
- MAM2: Mineral Meadow Marsh; and
- SWD4: Mineral Deciduous Swamp.

Significant woodland is present along the west side of the railway corridor. This natural heritage feature, identified during the background review, stretches from Ramey Road to Second Concession Road. Starting in the northwest section, where Ramey Road meets the railway corridor, the significant woodland feature includes a treed swamp community. The dominant species in the swamp include Freeman's maple, green ash and black ash (continuous of the swamp located on the North East side of the railway). Similar to the east side of the railway, there is a narrow shallow marsh community that divides the treed swamp and the railway line.

The above was designated into the following ELC code:

- MAS2-1: Cattail Mineral Shallow Marsh Type; and
- SWD2-1: Black Ash Mineral Deciduous Swamp Type.

Further south, along the west side of the railway corridor, the significant woodland feature transitions into a cultural woodland. Species that dominate this community include trembling aspen, staghorn sumac, gray dogwood, buckthorn (*Rhamnus sp*) and swamp milkweed (*Asclepias incarnate*). This natural feature extends to the southwest section (just before Second Concession Road), where the land has been developed. The linear strip of communities between the railway corridor and the significant woodland remains mainly shallow marsh from Ramey Road to Second Concession Road (as described above) and throughout the developed lands. However, this linear feature also includes small patches of cultural meadow, meadow marsh and thicket swamp.

The above was designated into the following ELC code:

- MAS2-1: Cattail Mineral Shallow Marsh Type;

- SWT2: Mineral Thicket Swamp;
- CUM1-1: Cultural Meadow;
- MAM2: Mineral Meadow Marsh; and
- CUW1: Mineral Cultural Woodland.

Refer to **Attachment 'A'** Vegetation Communities and **Attachment 'C'** Floral Species List.

2.3 *Incidental Wildlife*

During investigations, evidence of wildlife was recorded. Incidental wildlife species observed during field investigations are listed in **Table 1**.

Table 1: Incidental Wildlife

Group	Species	Scientific Name
Bird	Red-tailed Hawk	*Buteo jamaicensis*
	Black-capped Chickadee	*Poecile atricapillus*
	Great Blue Heron	*Ardea herodias*
	Mourning Dove	*Zenaida macroura*
	Blue Jay	*Cyanocitta cristata*
	Brown-headed Cowbird	*Molothrus ater*
	Willow Flycatcher	*Empidonax traillii*
	Northern Harrier	*Circus cyaneus*
	Mallard	*Anas platyrhynchos*
	Barn Swallow	*Hirundo rustica*
	Gray Catbird	*Dumetella carolinensis*
	American Robin	*Turdus migratorius*
	Turkey Vulture	*Cathartes aura*
Insect	Honey Bee	*Apis sp.*
	Clouded Sulphur	*Colias philodice*
	Grasshopper species	
	Cricket species	
	Cabbage White Butterfly	*Pieris rapae*
	Crescent Species	*Phyciodes sp.*
	Large milkweed bug	*Oncopeltus fasciatus*
	Yellow Bear Caterpiller	*Spilosoma virginica*
	Polygonia Species	*Polygonia sp.*
	Monarch Butterfly	*Danaus plexippus*
Mammal	White Tailed Deer (Tracks)	*Odocoileus virginianus*
	Raccoon (Tracks and scat)	*Procyon lotor*
	Groundhog	*Marmota monax*
	Pygmy Shrew	*Sorex minutus*
Amphibian	Green Frog	*Lithobates clamitans*

Most species observed are considered common in Ontario; however a few provincially rare species were recorded. Monarch is designated as Special Concern provincially. Habitat for this species is considered significant wildlife habitat. Similarly, Barn Swallow is listed as Threatened in Ontario and is afforded protection under the *Endangered Species Act* (*ESA*). Eight (8) individuals were observed within the cultural meadow community along the Welland Canal in the Phase 1 Development Area.

2.4 *Species at Risk Screening*

A Species at Risk (SAR) screening was completed for the study area and neighbouring lands. With respect to SAR within the study area, background information was collected from the following resources: the Natural Heritage Information Centre (NHIC) (NHIC online web tool, 2015, the Atlas of the Breeding Birds of Ontario (2005), the Ontario Reptile and Amphibian Atlas (2013), the Ministry of Natural Resources and Forestry's Niagara Region SAR list (2015) and the Atlas of the Mammals of Ontario (1994). The province has not been surveyed comprehensively for the presence of SAR. As such, the absence in the NHIC database in a particular area does not indicate the absence of the species within the study area. **Table 2** provides a summary of species that could potentially occur within the Region of Niagara which were identified through the SAR screening undertaken on December 3, 2015. The full SAR screening for the study area and neighbouring lands is presented within **Attachment 'D'**.

Table 2. Species at Risk Identified as Potentially Occurring within the Region of Niagara

Special Concern (SC)	Threatened (THR)	Endangered (END)
Bald Eagle	Bank Swallow	Allegheny Mountain Dusky Salamander (Carolinian Population)
Black Tern	Barn Swallow	Fowler's Toad
Louisiana Waterthrush	Bobolink	Jefferson Salamander
West Virginia White	Cerulean Warbler	Northern Dusky Salamander (Carolinian Population)
Peregrine Falcon	Chimney swift	Acadian Flycatcher
Red-headed Woodpecker	Eastern Meadowlark	Spotted Turtle
Wood Thrush	Eastern Whip-poor-will	Henslow's Sparrow
Woodland Vole	Least Bittern	Piping Plover
Broad Beech Fern	Lake Chubsucker	Prothonotary Warbler
Green Dragon	American Water-willow	Yellow-breasted Chat
Shumard Oak	Common Hoptree	Redside Dace
Swamp Rose-mallow	Deerberry	Rusty-patched Bumble Bee
Eastern Ribbonsnake	Dwarf Hackberry	Little Brown Myotis (Bat)
Monarch Butterfly	Mapleleaf (mussel)	Northern Myotis (Bat)
Milksnake	Round-leaved Greenbrier	Eastern Pondmussel
Northern Map Turtle	White Wood Aster	Kidneyshell
Snapping Turtle	Blanding's Turtle	Round Pigtoe
Canada Warbler	Eastern Hog-Nosed Snake	Snuffbox
Common Nighthawk	Eastern Musk Turtle (Stinkpot)	Spoon-leaved Moss
Golden-winged Warbler	Massasauga	American Chestnut
Grass Pickerel	Spiny Softshell	American Columbo
	Lake Sturgeon	Cherry Birch
	Grey Fox	Cucumber Tree

Special Concern (SC)	Threatened (THR)	Endangered (END)
	Kentucky Coffee-tree	Eastern Flowering Dogwood
		Red Mulberry
		Spotted Wintergreen
		Virginia Mallow
		Common Five-lined Skink (Carolinian population)
		Gray Ratsnake (Carolinian population)
		Northern Bobwhite
		American Eel
		American Ginseng
		Bird's-foot Violet
		Butternut
		Drooping Trillium

The following provides a description of the identified SAR species that have suitable habitat within the study area.

Barn Swallow *(Hirundo rustica)*, THR: Barn Swallows often live in close association with humans, building their cup-shaped mud nests almost exclusively on human-made structures such as open barns, under bridges and in culverts. The species is attracted to open structures that include ledges where they can build their nests, which are often re-used from year to year. They prefer unpainted, rough-cut wood, since the mud does not adhere as well to smooth surfaces.

Bobolink (*Dolichonyx oryzivorus*), THR: Historically, Bobolinks lived in North American tallgrass prairie and other open meadows. With the clearing of native prairies, Bobolinks moved to living in hayfields. Bobolinks often build their small nests on the ground in dense grasses. Both parents usually tend to their young, sometimes with a third Bobolink helping.

Canada Warbler (*Wilsonia Canadensis)*, SC: The Canada Warbler breeds in a range of deciduous and coniferous, usually wet forest types, all with a well- developed, dense shrub layer. Dense shrub and understory vegetation help conceal Canada Warbler nests that are usually located on or near the ground on mossy logs or roots, along stream banks or on hummocks.

Chimney Swift *(Chaetura pelagica)*, THR: Before European settlement Chimney Swifts mainly nested on cave walls and in hollow trees or tree cavities in old growth forests. Today, they are more likely to be found in and around urban settlements where they nest and roost (rest or sleep) in chimneys and other manmade structures. They also tend to stay close to water as this is where the flying insects they eat congregate.

Eastern Meadowlark *(Sturnella magna)*, THR: Eastern Meadowlarks breed primarily in moderately tall grasslands, such as pastures and hayfields, but are also found in alfalfa fields, weedy borders of croplands, roadsides, orchards, airports, shrubby overgrown fields, or other open areas. Small trees, shrubs or fence posts are used as elevated song perches.

Eastern Wood-Pewee *(Contopus virens)*, SC: The Eastern Wood-Pewee can be found in every type of wooded community in eastern North America. The size of the forest does not appear to be an

important factor in habitat selection as this species has been found in both small fragmented forests and larger forest tracks.

Golden-winged Warbler (*Vermivora chrysoptera*), SC: Golden-winged Warblers prefer to nest in areas with young shrubs surrounded by mature forest – locations that have recently been disturbed, such as field edges, hydro or utility right-of-ways, or logged areas.

Northern Bobwhite (*Colinus virginianus*), END: Northern Bobwhites live in savannahs, grasslands, around abandoned farm fields, along brushy fencerows and other similar sites. Grasslands that are occasionally burned are particularly important because the fires help keep the habitat from becoming too forested. In such places, bobwhites can find most of their needs such as food, nesting cover, and places to hide and rest throughout the year. In severe winter conditions bobwhites sometimes need to move into small forest areas to find snow-free areas for foraging.

Prothonotary Warbler (*Protonotaria citrea*), END: In Ontario, the Prothonotary Warbler is found in the warmer climate of the Carolinian deciduous forests. It nests in small, shallow holes, found low in the trunks of dead or dying trees standing in or near flooded woodlands or swamps. They will also readily use properly placed artificial nest boxes. Silver maple, ash, and yellow birch are common trees in these habitats. The Prothonotary is the only warbler in eastern North America that nests in tree cavities, where it typically lays four to six eggs on a cushion of moss, leaves and plant fibres.

Red-headed Woodpecker (*Melanerpes erythrocephalus*) SC: The Red-headed Woodpecker lives in open woodland and woodland edges, and is often found in parks, golf courses and cemeteries. These areas typically have many dead trees, which the bird uses for nesting and perching. This woodpecker regularly winters in the United States, moving to locations where it can find sufficient acorns and beechnuts to eat. A few of these birds will stay the winter in woodlands in southern Ontario if there are adequate supplies of nuts.

Wood Thrush (*Hylocichla mustelina*), SC: The Wood Thrush can typically be found in the interior and along the edges of well-developed upland deciduous and mixed forests. Key elements of these forests include trees that are greater than 16 m in height, high variety of deciduous tree species, moderate sub canopy and shrub density, shade, fairly open forest floor, moist soils and decaying leaf litter. Wood Thrush is more likely to occur in larger forests but may also nest in 1 ha fragments and semi-wooded residential areas and parks. Smaller habitat fragments have lower fecundity when compared to larger fragments.

Monarch (*Danaus plexippus*), SC: Throughout their life cycle, Monarchs use three different types of habitat. Only the caterpillars feed on milkweed plants and are confined to meadows and open areas where milkweed grows. Adult butterflies can be found in more diverse habitats where they feed on nectar from a variety of wildflowers. Monarchs spend the winter in Oyamel Fir forests found in central Mexico. This species can typically be associated with the following ELC communities: AI, TP and CUM where milkweed plants are present.

Little Brown Myotis (Bat) (*Myotis lucifugus*), END: Bats are Nocturnal. During the day they roost in trees and buildings. They often select attics, abandoned buildings and barns for summer colonies where they can raise their young. Bats can squeeze through very tiny spaces (as small as six millimetres across) and this is how they access many roosting areas. Little brown bats hibernate from October or November to March or April, most often in caves or abandoned mines that are humid and

remain above freezing. This species can typically be associated with any community where suitable roosting (i.e. cavity trees, houses, abandoned buildings, barns, etc.) habitat is available.

Woodland Vole (*Microtus pinetorum*), SC: In Ontario, the Woodland Vole lives in mature deciduous forest in the Carolinian region where there is a deep litter layer that allows it to burrow. This species can typically be associated with the following ELC communities: FOD with a deep leaf litter and loose soils.

Spoon-leaved Moss (*Bryoandersonia illecebra*), END: Spoon-leaved Moss grows in a range of habitat types but most Canadian populations are located on soil in low-lying areas that are seasonally flooded under trees or shrub thickets. It is often found in close proximity to a species of moss called narrow-leaved wetland plume moss, which is associated with swamps, marshes, and wet meadows.

American Water-willow (*Justicia Americana*), THR: The American Water-willow grows along the shores and in the waters of streams, rivers, lakes, ditches and occasionally wetlands. It can grow on wet soil and in up to 1.2 metres of water, but appears to require periodic flooding and wave action to reduce competition from other aquatic plants. The underlying subsoil on which it grows is usually gravel, sand or organic matter.

Eastern Flowering Dogwood (*Cornus florida*), END: Eastern Flowering Dogwood grows under taller trees in mid-age to mature deciduous or mixed forests. It most commonly grows on floodplains, slopes, bluffs and in ravines, and is also sometimes found along roadsides and fencerows.

Round-leaved Greenbrier (*Smilax rotundifolia*), THR: In Ontario, Round-leaved greenbrier is found mainly in the warmer climate of the Carolinian Forest. It prefers open moist to wet woodlands, often growing on sandy soil.

Shumard Oak (*Quercus shumardii*), SC: Shumard Oaks prefer moist soils, and can grow close to water and in swampy areas. It typically grows in deciduous forest or along fencerows.

Virginia Mallow (*Sida hermaphrodita*), END: Virginia mallow grows in riparian habitats that are flooded in most years. It benefits from this moist environment and is usually found in sunny or partly shaded areas with sandy soils. Loose sandy or rocky soils of scoured riversides and floodplains, and disturbed areas along roadsides and railroad banks are its preferred habitats.

Eastern Ribbonsnake (*Thamnophis sauritus*), SC: The Eastern Ribbonsnake is usually found close to water, especially in marshes, where it hunts for frogs and small fish. A good swimmer, it will dive in shallow water, especially if it is fleeing from a potential predator. At the onset of cold weather, these snakes congregate in underground burrows or rock crevices to hibernate together.

Milksnake (*Lampropeltis triangulum*), SC: The Milksnake can be found in a range of habitats including rocky outcrops, fields and forest edges. In southern Ontario, it is often found in old farm fields and farm buildings where there is an abundance of mice. The Milksnake hibernates underground, in rotting logs or in the foundations of old buildings.

Snapping Turtle (*Chelydra serpentine*), SC: Snapping Turtles spend most of their lives in water. They prefer shallow waters so they can hide under the soft mud and leaf litter, with only their Noses exposed to the surface to breathe. During the nesting season, from early to mid-summer, females travel overland in search of a suitable nesting site, usually gravelly or sandy areas along streams.

Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits areas.

3. Constraints and Recommendations

The constraints for the study area consider the review of background information and field investigations conducted in September 2014 and October 2015 preliminary alternative servicing strategies. Should future development occur adjacent to these areas, further work is recommended as per **Table 3** below.

Table 3: Constraints and Recommendations for Further Study

Feature	Location	Recommendation	Further Study for Development Proposals Adjacent to or Within Features
Babion Woods PSW	South of Third Concession Road between Highway 140 and Trillium Railway corridor	Protect	**For Land Development** ▪ Boundary confirmation/delineation ▪ Buffer recommendations ▪ Update Wetland Evaluation ▪ Wetland Boundary confirmation/ delineation according to provincial protocols ▪ Habitat enhancement and restoration ▪ Construction mitigation ▪ Future monitoring recommendations ▪ Species at Risk Habitat Assessment
Ramey Road Non-Provincially Significant Wetland	Between Highway 140 and Trillium Railway corridor, south of the study area.	Protect	**For Land Development** ▪ Boundary confirmation/delineation according to provincial protocols ▪ Buffer recommendations ▪ Update Wetland Evaluation ▪ Wetland Boundary confirmation/delineation according to provincial standards ▪ Habitat enhancement and restoration ▪ Species at Risk Habitat Assessment ▪ Construction mitigation ▪ Future monitoring recommendations
Significant Woodland	Along west side of Ramey Road	Protect and enhance. This wooded area has wetland communities that could be complexed by MNRF with Babion Woods PSW to the north. This community has been affected significantly by the emerald ash borer where most of the dominant ash canopy trees are dead	**For Land Development** ▪ Boundary confirmation/revision ▪ Survey of confirmed woodland boundary from edge tree dripline ▪ Species at Risk Habitat Assessment ▪ Buffer recommendations ▪ Assess enhancement opportunities

Feature	Location	Recommendation	Further Study for Development Proposals Adjacent to or Within Features
		or dying. Enhancement opportunities exist for this area.	
Other vegetated patches and vegetation	Between Highway 140 and Trillium Railway corridor Location of Rare Trees: Refer to **Figure 2 in Attachment 'A'** Location of Tall Boneset: **Figure 2 in Attachment 'A'**	Further study is required to determine significance	**For Land Development** ▪ Completion of woodland or wetland evaluation where appropriate utilizing provincial standards ▪ Boundary confirmation/delineation utilizing provincial standards ▪ 3 – season vegetation survey ▪ Avifaunal survey according to Environment Canada and Bird Studies Canada protocols ▪ Amphibian survey according to the Great Lakes Marsh Monitoring protocols ▪ Species at Risk Habitat Assessment ▪ Transplant Plant for Provincially Rare herbaceous specimens (i.e. Tall Boneset) ▪ Buffer recommendations ▪ Construction mitigation ▪ Future monitoring recommendations
Drainage systems	Along Third Concession Road, Ramey Road (Indian Creek Drain).	Maintain drainage through ditch relocation and redesign (demonstrate not losing fish habitat). Construction to take place outside of fish spawning timing window (i.e. no construction between March 30 and June 1).	**Road Design and Stormwater Management** ▪ Completion of DFO Self-Assessment as per discussion below

Figure 1 & 2 in Attachment A presents the location of the above features.

In accordance with the requirements of the City of Port Colborne's Official Plan (Section 4) lands adjacent to areas identified as natural heritage on Schedules B, B1 and B2 require the completion of an Environmental Impact Study (EIS) prior to the approval of future development. The intent of these EISs is to determine the extent to which development may be permitted adjacent to a protected feature and to determine avoidance, mitigation and compensation requirements.

Section 4.1.2.2 of the City of Port Colborne's Official Plan provides an outline of the general requirements for an EIS and should be referred to when conducting an EIS within the study area. Note that an EIS is not required for uses authorized under an Environmental Assessment process. Requirements for an EIS are presented in **Attachment 'E'**.

3.1 *DFO Self-Assessment*

The federal *Fisheries Act* was amended on June 29, 2012 to focus on protecting the productivity of recreational, commercial and Aboriginal fisheries. On November 25, 2013, the new fisheries protection program provisions came into force. The Fisheries Protection Program contains a new prohibition that combines the previous section 32 (killing of fish by means other than fishing) and section 35 (harmful alteration, disruption or destruction of fish habitat). The new prohibition is focused on protecting 'serious harm to fish', which is the death of fish or any permanent alteration to, or destruction of, fish habitat.

As part of the changes and streamlining of the approvals process, a project screening is required to be conducted by a qualified environmental professional to determine whether the works require DFO review. The screening will be based on the preliminary design and field investigation findings. Measures to avoid serious harm to fish will be outlined to ensure compliance with the Act. If project activities do not meet the associated criteria, Project Review by DFO will determine whether or not the works can avoid serious harm to fish that are part of, or that support a commercial, recreational or Aboriginal fishery. DFO may issue a letter that outlines the implementation of mitigation measures to avoid and mitigate serious harm to fish; or request an Authorization under Paragraph 35(2)(b) of the *Fisheries Act.*

The criteria provided by DFO on the Projects Near Water website (http://www.dfo-mpo.gc.ca/pnw-ppe/index-eng.html) to determine the need for DFO review includes the following:

Types of waterbodies where DFO review is not required

If your project is taking place in one of the following existing waterbody types, **you do not need** to submit your project for review to DFO. You are still required to avoid causing serious harm to fish by following best practices such as those described in the measures to avoid harm.

- Approved marine disposal or dumping sites that have been used in the past 10 years;
- Tailings Impoundment Areas (as listed in Schedule 2 of the Metal Mining Effluent Regulations);
- Artificial waterbodies that are not connected to a waterbody that contains fish at any time during any given year, such as:
    - Private ponds;
    - Commercial ponds (e.g., golf course ponds, stocked fishing ponds);
    - Stormwater management ponds;
    - Irrigation ponds or channels;
    - Agricultural drains and drainage ditches;
    - **Roadside drainage ditches; and**
    - Quarries and aggregate pits.
- Any other waterbody that does not contain fish at any time during any given year, and is not connected to a waterbody that contains fish at any time during any given year.

Project activities and criteria where DFO review is not required

If your project meets the criteria listed below, your project **does not require DFO review**. You are still required to avoid causing serious harm to fish by following best practices such as those described in the measures to avoid harm.

Bridges, Causeways and Culverts

- **Culverts**
  - Debris removal:
    - Gradual removal such that flooding downstream, extreme flows downstream, release of suspended sediment and fish stranding can be avoided.
  - Repairs or replacements:
    - No temporary or permanent increase in existing footprint below the High Water Mark;
    - No new temporary or permanent fill placed below the High Water Mark;
    - Channel realignment is not required;
    - No narrowing of the channel;
    - Any obstruction to fish passage will respect timing windows;
    - Provides for fish passage; and
    - Work can be done in isolation of flowing water.
  - Removal:
    - Work can be done in isolation of flowing water; and
    - Any obstruction to fish passage will respect timing windows.

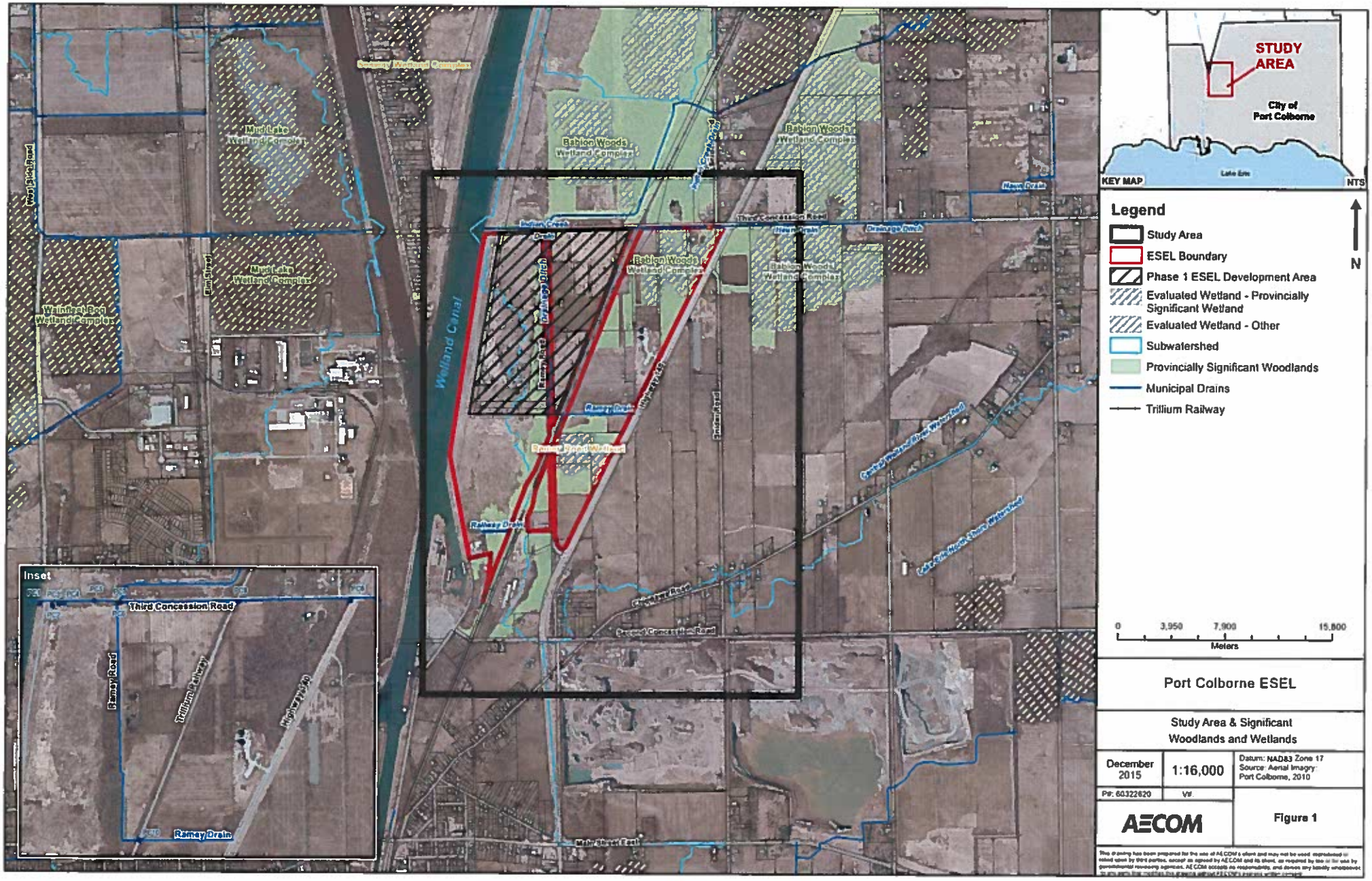
The relocation of the culvert and the realignment of Indian Drain do NOT meet the criteria outlined above, and will not require submission of a Request for Review to DFO.

3.2 NPCA Considerations

In response to the Notice of Study Commencement, NPCA responded by email (see **Attachment F**) on August 21, 2014 and noted that the study area is constrained by several minor watercourses and one watercourse with an upstream drainage area greater than 125ha. NPCA further stated that these watercourses are afforded 15m buffer zones that should be maintained in a naturalized state.

Recognizing that the subject watercourses in many cases form part of the study area road side ditch system, it is likely that the suggested 15m buffer zone is applicable to land development proposals (i.e. development setback) and does not apply to the proposed road improvements. NPCA's comments will be clarified once they review and comment on this TM, DFO self-assessment and recommended road improvement conceptual design including new road platform, culvert replacements and approach to stormwater management (road side ditches).

ATTACHMENT A – FIGURES



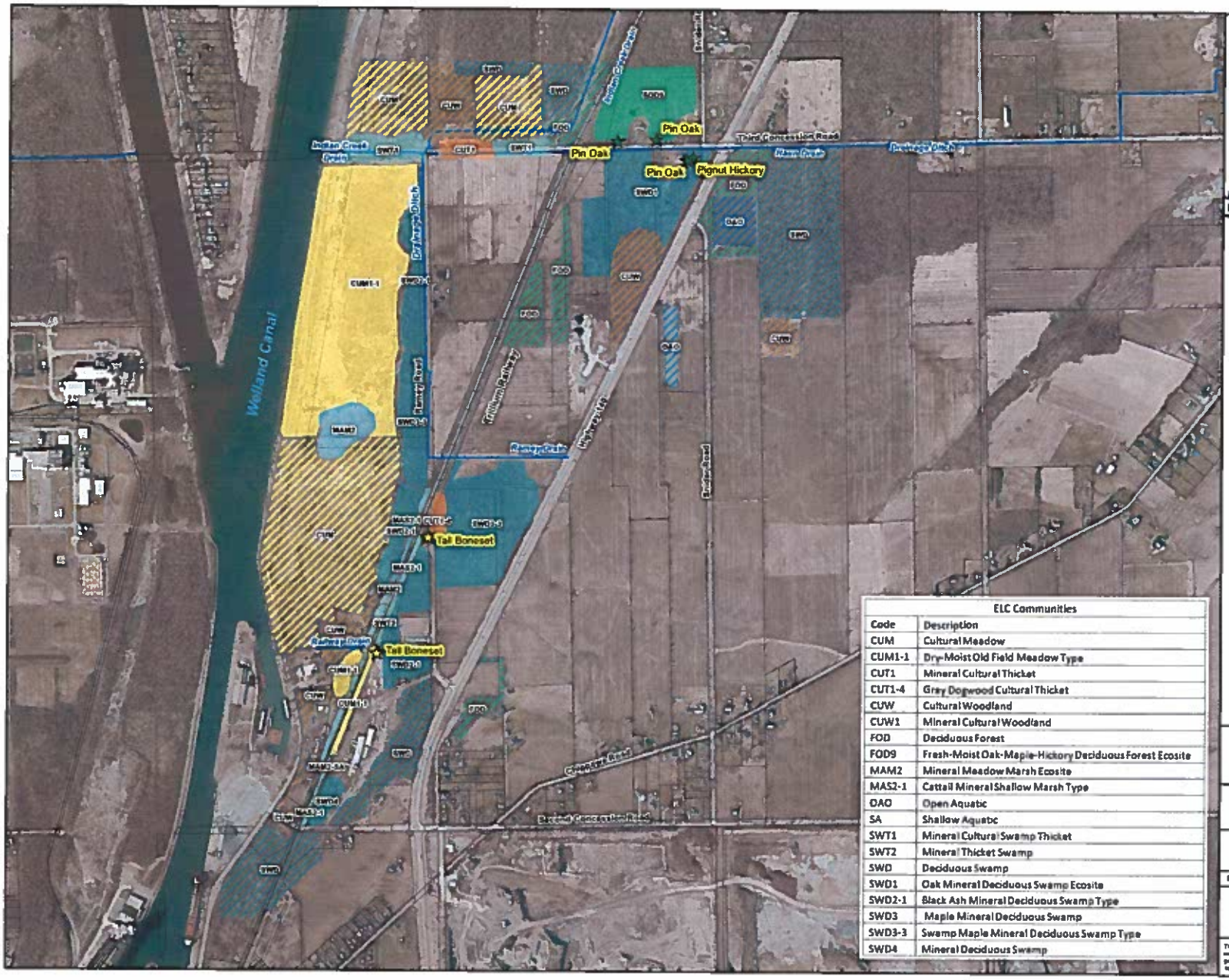
Port Colborne ESEL

Study Area & Significant Woodlands and Wetlands

December 2015	1:16,000	Datum: NAD83 Zone 17 Source: Aerial Imagery: Port Colborne, 2010
Pr#: 60322620	Vs:	

AECOM

Figure 1



Legend

- Study Area
- Municipal Drains
- Railway
- Tall Boneset
- Rare Tree Locations

Ecological Land Classification Vegitation Communities

Field Investigations	*Air-Photo Interpretation*
CUM	CUM
CUT	CUW
CUW	FOD
FOD	OAO
MAM	SWD
MAS	
SWD	
SWT	

N

0 187.5 375 750
Meters

ELC Communities	
Code	Description
CUM	Cultural Meadow
CUM1-1	Dry-Moist Old Field Meadow Type
CUT1	Mineral Cultural Thicket
CUT1-4	Grey Dogwood Cultural Thicket
CUW	Cultural Woodland
CUW1	Mineral Cultural Woodland
FOD	Deciduous Forest
FOD9	Fresh-Moist Oak-Maple-Hickory Deciduous Forest Ecosite
MAM2	Mineral Meadow Marsh Ecosite
MAS2-1	Cattail Mineral Shallow Marsh Type
OAO	Open Aquatic
SA	Shallow Aquatic
SWT1	Mineral Cultural Swamp Thicket
SWT2	Mineral Thicket Swamp
SWD	Deciduous Swamp
SWD1	Oak Mineral Deciduous Swamp Ecosite
SWD2-1	Black Ash Mineral Deciduous Swamp Type
SWD3	Maple Mineral Deciduous Swamp
SWD3-3	Swamp Maple Mineral Deciduous Swamp Type
SWD4	Mineral Deciduous Swamp

Port Colborne ESEL

Vegetation Communities

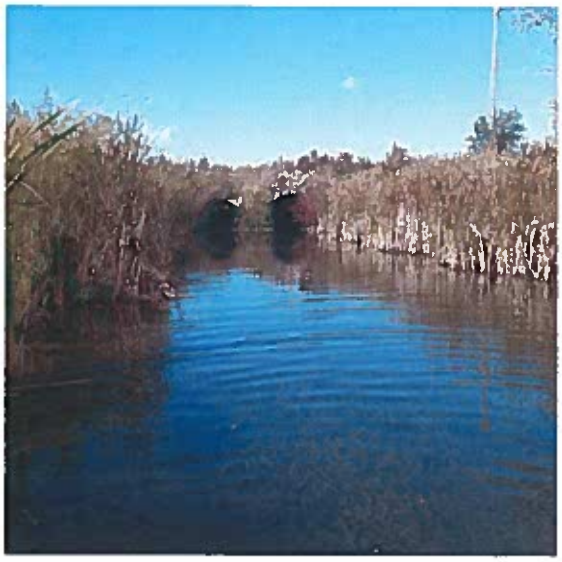
December 2015	1:11,000	Datum: NAD83 Zone 17 Source: Port Colborne, 2010
P# 60322620	VF	

AECOM

Figure 2

ATTACHMENT B – AQUATIC REPRESENTATIVE PHOTOGRAPHS

Photograph 1. ↑
Start of assessment area in Haun Drain



Photograph 2. ↑
Start of assessment area in Haun Drain looking downstream

Photograph 3. ↑
Haun Drain upstream overview

Photograph 4. ↑
Submergent vegetation within Haun Drain

Photograph 5. ↑
Increased canopy cover through Haun Drain

Photograph 6. ↑
Watercress in Haun Drain

Photograph 7. ↑
Downstream overview at end of site of Haun Drain

Photograph 8. ↑
Third Concession Road Drainage Ditch at Highway 140

Photograph 9. ↑
Third Concession Road Drainage Ditch

Photograph 10. ↑
Third Concession Road Drainage Ditch culvert at CN crossing

Photograph 11. ↑
Indian Creek upstream of proposed works

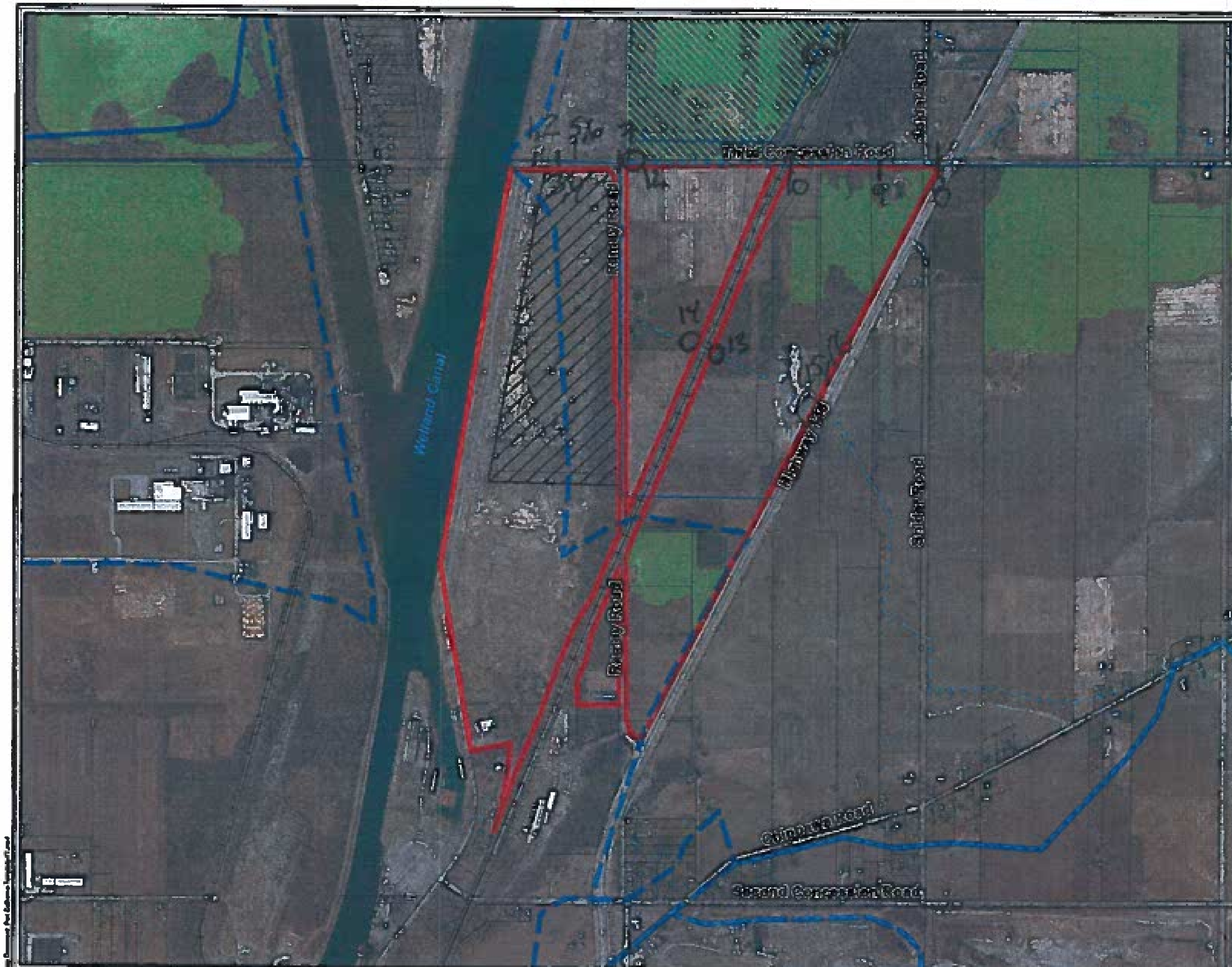
Photograph 12. ↑
Indian Creek at intersection of Ramey Road and Third Concession Road

Photograph 13. ↑
Ramey Drain

Photograph 14. ↑
Ramey Drain

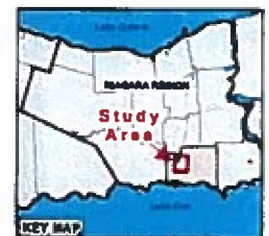
Photograph 15. ↑
Ramey Drain culvert at Highway 140

Photograph 16. ↑
Ramey Drain at Highway 140



Legend

- East Side Employment Lands (ESEL)
- Property Boundary
- Railway
- Drainage Area
- Sub-Drainage Area
- Municipal Drain
- Minor Watercourse
- Wetland
- Environmental Protection Area
- Phase 1 Area



Basemapping: City of Port Colborne, 2014
Orthophotography: City of Port Colborne, 2010

UTM Zone 17N, NAD 83

City of Port Colborne
Site Servicing of East Side Employment Lands (SSESEL) Municipal Class Environmental Assessment

Figure 1:
Natural Environmental Features

PORT COLBORNE AECOM

ATTACHMENT C – FLORAL SPECIES LIST

BOTANICAL NAME		COMMON NAME	COEFFICIENT OF CONSERVATISM	WETNESS INDEX	WEEDINESS INDEX	PROVINCIAL STATUS	OMNR STATUS	COSEWIC STATUS	GLOBAL STATUS	LOCAL STATUS NIAG
GYMNOSPERMS		**CONIFERS**								
Cupressaceae		**Cedar Family**								
Juniperus	*communis*	Common Juniper	4	3		S5			G5	
DICOTYLEDONS		**DICOTS**								
Aceraceae		**Maple Family**								
Acer	*saccharinum*	Silver Maple	5	-3		S5			G5	X
Acer X	*freemanii*	Freeman's Maple								X
Anacardiaceae		**Sumac or Cashew Family**								
Toxicodendron	*radicans ssp. negundo*	Poison-ivy	5	-1		S5			G5T	X
Rhus	*hirta*	Staghorn Sumac	1	5		S5			G5	X
Apiaceae		**Carrot or Parsley Family**								
Daucus	*carota*	Wild Carrot		5	-2	SE5			G?	I
Asclepiadaceae		**Milkweed Family**								
Asclepias	*incarnata ssp. incarnata*	Swamp Milkweed	6	-5		S5			G5T5	X
Asclepias	*syriaca*	Common Milkweed	0	5		S5			G5	X
Asteraceae		**Composite or Aster Family**								
Ambrosia	*artemisiifolia*	Common Ragweed	0	3		S5			G5	X
Ambrosia	*trifida*	Giant Ragweed	0	-1		S5			G5	X
Arctium	*minus*	Common Burdock		5	-2	SE5			G?T?	I
Aster	*ericoides*	White Heath Aster	4	4		S5			G5T?	X
Symphyotrichum	*lateriflorum*	Calico Aster	3	-2		S5			G5T5	X
Symphyotrichum	*novae-angliae*	New England Aster	2	-3		S5			G5	X
Bidens	*cernua*	Stick-tight	2	-5		S5			G5	X
Cichorium	*intybus*	Chicory		5	-1	SE5			G?	I
Cirsium	*arvense*	Canada Thistle		3	-1	SE5			G?	I
Cirsium	*vulgare*	Bull Thistle		4	-1	SE5			G5	I
Erigeron	*philadelphicus ssp. philadelphicus*	Philadelphia Fleabane	1	-3		S5			G5T?	X
Eupatorium	*altissimum*	Tall Boneset	3	3		S1			G5	
Euthamia	*graminifolia*	Flat-topped Bushy Goldenrod	2	-2		S5			G5	X
Solidago	*canadensis*	Canada Goldenrod	1	3		S5			G5	X

Solidago	*nemoralis ssp. nemoralis*	Gray Goldenrod	2	5		S5			G5T?	X
Taraxacum	*officinale*	Common Dandelion		3	-2	SE5			G5	I
Tussilago	*farfara*	Coltsfoot		3	-2	SE5			G?	I
Xanthium	*spinosum*	Spiny Cocklebur		3	-1	SE2?			G?	
Betulaceae		**Birch Family**								
Ostrya	*virginiana*	Hop Hornbeam - Ironwood	4	4		S5			G5	X
Celastraceae		**Staff-tree Family**								
Euonymus	*obovata*	Running Strawberry-bush	6	5		S5			G5	X
Cornaceae		**Dogwood Family**								
Cornus	*alternifolia*	Alternate-leaved Dogwood	6	5		S5			G5	X
Cornus	*amomum*	Silky Dogwood	5	-4		S5			G5T?	X
Cornus	*racemosa*	Red Panicled Dogwood/Gray dogwood	2	-2		S5			G5?	X
Cornus	*sericea*	Red-osier Dogwood	2	-3		S5			G5	X
Dipsacaceae		**Teasel Family**								
Dipsacus	*fullonum ssp. sylvestris*	Wild Teasel		5	-1	SE5			G?T?	I
Fabaceae		**Pea Family**								
Lotus	*corniculatus*	Bird's-foot Trefoil		1	-2	SE5			G?	I
Medicago	*lupulina*	Black Medick		1	-1	SE5			G?	I
Melilotus	*alba*	White Sweet-clover		3	-3	SE5			G?	I
Trifolium	*pratense*	Red Clover		2	-2	SE5			G?	I
Fagaceae		**Beech Family**								
Quercus	*alba*	White Oak	6	3		S5			G5	X
Quercus	*macrocarpa*	Bur Oak	5	1		S5			G5	X
Quercus	*palustris*	Pin Oak	9	-3		S3			G5	X
Quercus	*rubra*	Red Oak	6	3		S5			G5	X
Juglandaceae		**Walnut Family**								
Carya	*glabra*	Pignut Hickory	9	3		S3			G5	X
Juglans	*nigra*	Black Walnut	5	3		S4			G5	X
Lamiaceae		**Mint Family**								
Lycopus	*uniflorus*	Northern Water-horehound	5	-5		S5			G5	X
Mentha	*arvensis*	American Wild Mint	3	-3		S5				X
Lauraceae		**Laurel Family**								
Lindera	*benzoin*	Spicebush	6	-2		S5			G5	X
Lythraceae		**Loosestrife Family**								
Lythrum	*salicaria*	Purple Loosestrife		-5	-3	SE5			G5	X
Morus	*alba*	White Mulberry		0	-3	SE5			G?	I
Oleaceae		**Olive Family**								
Fraxinus	*pennsylvanica*	Red Ash	3	-3		S5			G5	X
Onagraceae		**Evening-primrose Family**								
Oenothera	*biennis*	Common Evening-primrose	0	3		S5			G5	X

Polygonaceae		**Smartweed Family**								
Polygonum	*persicaria*	Lady's-thumb		-3	-1	SE5			G?	I
Ranunculaceae		**Buttercup Family**								
Caltha	*palustris*	Marsh-marigold	5	-5		S5			G5	X
Rhamnaceae		**Buckthorn Family**								
Rhamnus	*cathartica*	Common Buckthorn		3	-3	SE5			G?	I
Frangula	*alnus*	Glossy Buckthorn		-1	-3	SE5			G?	I
Rosaceae		**Rose Family**								
Crataegus	*species*	Hawthorn species								
Fragaria	*virginiana*	Virginia Strawberry	2	1		SU			G5T?	X
Malus	*pumila*	Common Crabapple		5	-1	SE5			G5	I
Prunus	*serotina*	Black Cherry	3	3		S5			G5	X
Salicaceae		**Willow Family**								
Populus	*deltoides ssp. deltoides*	Eastern Cottonwood	4	-1		SU			G5T?	X
Populus	*tremuloides*	Trembling Aspen	2	0		S5			G5	X
Salix	*species*	Willow species								
Salix	*bebbiana*	Long-beaked Willow	4	-4		S5			G5	X
Salix	*eriocephala*	Missouri Willow	4	-3		S5			G5	X
Salix	*exigua*	Sandbar Willow	3	-5		S5			G5	X
Tiliaceae		**Linden Family**								
Tilia	*americana*	American Basswood	4	3		S5			G5	X
Ulmaceae		**Elm Family**								
Ulmus	*americana*	White Elm	3	-2		S5			G5?	X
Ulmus	*pumila*	Siberian Elm		5	-1	SE3			G?	I
Verbenaceae		**Vervain Family**								
Verbena	*hastata*	Blue Vervain	4	-4		S5			G5	X
Vitaceae		**Grape Family**								
Parthenocissus	*inserta*	Inserted Virginia-creeper	3	3		S5			G5	X
Parthenocissus	*quinquefolia*	Five-leaved Virginia-creeper	6	1		S4?			G5	X
Vitis	*riparia*	Riverbank Grape	0	-2		S5			G5	X
MONOCOTYLEDONS		**MONOCOTS**								
Cyperaceae		**Sedge Family**								
Carex	*platyphylla*	Broad-leaved Sedge	7	5		S5			G5	X
Scirpus	*atrovirens*	Dark-green Bulrush	3	-5		S5			G5?	X
Poaceae		**Grass Family**								
Bromus	*inermis ssp. inermis*	Awnless Brome		5	-3	SE5			G4G5T?	I
Elymus	*lanceolatus ssp. lanceolatus*	Wild Rye				SEH			G5T?	
Elymus	*repens*	Quack Grass		3	-3	SE5			G?	I
Phalaris	*arundinacea*	Reed Canary Grass	0	-4		S5			G5	X
Phragmites	*australis*	Common Reed	0	-4		S5			G5	X

Typhaceae		**Cattail Family**								
Typha	*latifolia*	Broad-leaved Cattail	3	-5		S5			G5	X

FLORISTIC SUMMARY & ASSESSMENT

Species Diversity			
Total Species:		**74**	
Native Species:		**52**	70.27%
Exotic Species		**22**	29.73%
Total Taxa in Region (List Region, Source)		10000	
% Regional Taxa Recorded		0.74%	
Regionally Significant Species		enter manually	
S1-S3 Species		enter manually	
S4 Species		1	
S5 Species		46	
Co-efficient of Conservatism and Floral Quality Index			
Co-efficient of Conservatism (CC) (average)		**3.46**	
CC 0 to 3	*lowest sensitivity*	27	51.92%
CC 4 to 6	*moderate sensitivity*	22	42.31%
CC 7 to 8	*high sensitivity*	1	1.92%
CC 9 to 10	*highest sensitivity*	2	3.85%
Floral Quality Index (FQI)		**24.96**	
Presence of Weedy & Invasive Species			
mean weediness		**-1.91**	
weediness = -1	*low potential invasiveness*	9	40.91%
weediness = -2	*moderate potential invasiveness*	6	27.27%
weediness = -3	*high potential invasiveness*	7	31.82%
Presence of Wetland Species			
average wetness value		**0.58**	
upland		13	17.57%
facultative upland		23	31.08%
facultative		11	14.86%
facultative wetland		20	27.03%
obligate wetland		7	9.46%

ATTACHMENT D – SPECIES AT RISK SCREENING

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1,2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Amphibians	Allegheny Mountain Dusky Salamander *Desmognathus ochrophaeus* (Carolinian Population)	END	END Schedule 1	END	Allegheny Mountain Dusky Salamanders are found most often in or near forested small streams, springs, or seeps (areas where water in the ground oozes to the surface to form a pool). They typically nest in underground cavities close to seeps, or in shallow depressions in moist soil beneath logs, stones, moss, leaf litter or stumps. They are usually absent from larger streams where predatory fish occur. Other predators include watersnakes and birds.	The Allegheny Mountain Dusky Salamander is widely distributed in eastern North America. In Canada, it is found in two isolated locations: in southwestern Quebec and in the Niagara Gorge in southern Ontario. In Ontario, this species is found in a groundwater seep area within the Niagara Peninsula.	MNRF Niagara Region SAR List Niagara Upper Tier SAR List	No There may be seeps and springs present however; the study area is not near the Niagara Escarpment where this species is known to occur.	No Suitable habitat was not observed during site investigation. No The species was not observed during field investigation. However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Amphibians	Fowler's Toad *Anaxyrus fowleri*	END	END Schedule 1	END	In Ontario, Fowler's Toads inhabit open beaches, dunes, sandy shorelines, rocky pools, creek and stream mouths, backshore wetlands, and marshes along the Northern shore of Lake Erie.	Fowler's Toad is found throughout much of eastern North America, from the Gulf Coast North to the Great Lakes. In Canada, Fowler's Toad is restricted to only three localities: Rondeau, Long Point and Niagara.	MNRF Niagara Region SAR List Niagara Upper Tier SAR List	No Study area is not close enough to the shores of Lake Erie	No Suitable habitat was not observed during site investigation. No The species was not observed during field investigation. However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Amphibians	Jefferson Salamander *Ambystoma jeffersonianum*	END	THR Schedule 1	END	Adults live in moist, loose soil, under logs or in leaf litter. Your best chance of spotting a Jefferson salamander is in early spring when they travel to woodland ponds to breed. They lay their eggs in clumps attached to underwater vegetation. By midsummer, the larvae lose their gills and leave the pond and head into the surrounding forest. Once in the forest, Jefferson salamanders spend much of their time underground in rodent burrows, and under rocks and stumps. They feed primarily on insects and worms. This species can be associated with the following ELC code: FOD where permanent or temporary ponds or pools are present.	In Canada, it is found only in southern Ontario, mainly along the Niagara Escarpment.	MNRF Niagara Region SAR List Niagara Upper Tier SAR List	No Deciduous forest is present however; the study area is not near the Niagara Escarpment where this species is known to occur.	No Suitable habitat was not observed during site investigation. No The species was not observed during field investigation. However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1,2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Amphibians	*Northern Dusky Salamander Desmognathus fuscus (Carolinian Population)*	END	END Schedule 1	No Status	Northern dusky salamander adults are mainly found on land, but are always close to small groundwater fed streams, seeps (areas where water in the ground ozzes to the surface to form a pool) and springs, where they live under rocks, logs or leaf litter within or near water.	The Northern dusky salamander is widely distributed in eastern North America, including Quebec and New Brunswick. In Ontario, it is restricted to a small area of the Niagara Peninsula.	MNRF Niagra Region SAR List Niagara Upper Tier SAR List	No There may be seeps and springs present however, the study area is not near the Niagara Escarpment where this species is known to occur.	No Suitable habitat was not observed during site investigation. No The species was not observed during field investigation. However, species specific surveys were not completed.	Suitabe habitat was not confirmed during site investigation. No further action required.
Birds	Acadian Flycatcher *Empidonax virescens*	END	END Schedule 1	END	In Ontario, the Acadian Flycatcher primarily lives in the warmer climate of southern Ontario's Carolinian forests. It needs large, undisturbed forests, often more than 40 hectares in size. It is typically found in mature, shady forests with ravines, or in forested swamps with lots of maple and beech trees. The nest is placed near the tip of a lower limb on a tree, and is loosely woven, with strands of plant material hanging down. This species can typically be associated with the following ELC communities: SWD, FOD communities that are mature, have a closed canopy and are of sufficient size.	In Canada, the Acadian Flycatcher nests only in southwestern Ontario, mostly in large forests and forested ravines near the shore of Lake Erie. It has also been known to nest at a few sites in the Greater Toronto Area but this is unusual. The Acadian Flycatcher population in Ontario is very small, with 25 to 75 breeding pairs recorded in 2010.	OBBA Square 17PH45 MNRF Niagra Region SAR List Niagara Upper Tier SAR List	No Deciduous forest and swamp communities are not large enough to provide suitable habitat for this species.	No Suitable habitat was not observed during site investigation. No The species was not observed during field investigation. However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Birds	Bald Eagle *Haliaeetus leucocephalus*	SC	No Status	Not at Risk	Bald Eagles nest in a variety of habitats and forest types, almost always near a major lake or river where they do most of their hunting. While fish are their main source of food, Bald Eagles can easily catch prey up to the size of ducks, and frequently feed on dead animals, including White-tailed Deer. They usually nest in large trees such as pine and poplar. During the winter, Bald Eagles sometimes congregate near open water such as the St. Lawrence River, or in places with a high deer population where carcasses might be found. This species can typically be associated with the following ELC communities: FOC, FOM, FOD, SWC, SWM and SWD. Nests typically located near major bodies of water.	Bald Eagles are widely distributed throughout North America. In Ontario, they nest throughout the North, with the highest density in the Northwest, near Lake of the Woods. Historically they were also relatively common in southern Ontario, especially along the shore of Lake Erie, but this population was all but wiped out 50 years ago. After an intensive re-introduction program and environmental clean-up efforts, the species has rebounded and can once again be seen in much of its former southern Ontario range.	MNRF Niagra Region SAR List Niagara Upper Tier SAR List	Yes Deciduous forest and swamp is present within the study area and adjacent to the Welland Canal.	No Suitable habitat was not observed during site investigation. The land adjacent to the Welland Canal is mainly disturbed and developed. No The species was not observed during field investigation. However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Birds	Bank Swallow *Riparia riparia*	THR	No Status	THR	Bank swallows nest in burrows in natural and human-made settings where there are vertical faces in silt and sand deposits. Many nests are on banks of rivers and lakes, but they are also found in active sand and gravel pits or former ones where the banks remain suitable. The birds breed in colonies ranging from several to a few thousand pairs.	The bank swallow is found all across southern Ontario, with sparser populations scattered across Northern Ontario. The largest populations are found along the Lake Erie and Lake Ontario shorelines, and the Saugeen River (which flows into Lake Huron).	OBBA Square 17PH45	Yes Suitable nesting habitat may be present throughout the developed areas at the south end on the railway line	No Suitable habitat was not observed during site investigation. However, not all human-made settings within the study area were investigated. No The species was not observed during field investigation. However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Birds	Barn Owl *Tyto alba*	END	END Schedule 1	END	In southern Ontario, this adaptable owl nests and roosts in barns and abandoned buildings. It may also use natural cavities in trees or holes in cliff faces, as it did before the arrival of Europeans in North America. It lives year round at its nest site and hunts for rodents over orchards, and grasslands such as farmlands, fallow fields and meadows. This species can typically be associated with the following ELC communities: TPO, TPS, CUM, CUS and CUW where suitable nesting habitat is present.	In Canada, Barn Owl breeds only in extreme southern Ontario and British Columbia. The Barn Owl cannot tolerate severe winter temperatures, and southern Ontario is the Northern limit of its range. Breeding sites in Ontario seem to be restricted to areas with the moderating effects of the Great Lakes (within 50 kilometres of the lakes) The Barn Owl is endangered (No longer found) in Michigan and has declined in other parts of the Northeastern and midwestern parts of the United States. Today, there are fewer than five pairs of Barn Owls in Ontario.	MNRF Niagra Region SAR List Niagara Upper Tier SAR List	Yes Suitable nesting and roosting habitat may be present within the barns and other buildings located within the study area. Foraging habitat may also be present within the cultural meadows and farm land.	No No suitable habitat was identified during site investigation. No The species was not observed during field investigation. However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Birds	Barn Swallow *Hirundo rustica*	THR	No Status	THR	Barn Swallows often live in close association with humans, building their cup-shaped mud nests almost exclusively on human-made structures such as open barns, under bridges and in culverts. The species is attracted to open structures that include ledges where they can build their nests, which are often re-used from year to year. They prefer unpainted, rough-cut wood, since the mud does not adhere as well to smooth surfaces. This species can typically be associated with the following ELC communities: TPO, CUM1, MAM, MAS, OAO, SAS1, SAM1, SAF1; containing or adjacent structures that are suitable for nesting.	The Barn Swallow may be found throughout southern Ontario and can range as far North as Hudson Bay, wherever suitable locations for nests exist.	OBBA Square 17PH45 MNRF Niagra Region SAR List Niagara Upper Tier SAR List	Yes Suitable nesting habitat may be present within the barns and other buildings located within the study area.	Yes Suitable habitat was identified during site investigation within the cultural meadows, meadow marsh and human-made structures. Yes 8 Barn Swallows were observed incidentally during site investigation in 2014.	This species was observed in the cultural meadow along the Welland Canal which is within the Phase 1 development footprint. Any vegetation and building removal should be completed outside of the breeding bird period (April 15th to August 15th).

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range1, 2	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Birds	Black Tern *Chlidonias niger*	SC	No Status	Not at Risk	Black Terns build floating nests in loose colonies in shallow marshes, especially in cattails. In winter they migrate to the coast of Northern South America. Nesting habitat for this species can be associated with the following ELC communities: MAS2-1 and OAO. These two communities must be present immediately adjacent each other and with sufficient water to provide suitable habitat.	In Ontario, Black Terns are found scattered throughout the province, but breed mainly in the marshes along the edges of the Great Lakes.	MNRF Niagra Region SAR List Niagara Upper Tier SAR List	No There are no suitable nesting areas within the study area	No No suitable open water or marshes were identified during site investigation. No The species was not observed during field investigation. However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Birds	Bobolink *Dolichonyx oryzivorus*	THR	No Status	THR	Historically, Bobolinks lived in North American tallgrass prairie and other open meadows. With the clearing of native prairies, Bobolinks moved to living in hayfields. Bobolinks often build their small nests on the ground in dense grasses. Both parents usually tend to their young, sometimes with a third Bobolink helping. This species can typically be associated with the following ELC communities: TPO, TPS, CUM1 and MAM2.	The Bobolink breeds across North America. In Ontario, it is widely distributed throughout most of the province south of the boreal forest, although it may be found in the North where suitable habitat exists.	OBBA Square 17PH45 MNRF Niagra Region SAR List Niagara Upper Tier SAR List	Yes Cultural meadows, meadow marshes and agricultural lands are present within the study area.	Yes Suitable meadows, marshes and agricultural fields were indentified during site investigation. No The species was not observed during field investigation. However, species specific surveys were not completed.	Though this species was not observed, it could potentially be found within the cultural meadow and meadow marsh located in the Phase 1 development footprint. Species specific surveys are suggested prior to any vegetation removal or construction. Any vegetation and building removal should be completed outside of the breeding bird period (April 15th to August 15th).
Birds	Canada Warbler *Wilsonia canadensis*	SC	THR Schedule 1	THR	The Canada Warbler breeds in a range of deciduous and coniferous, usually wet forest types, all with a well- developed dense shrub layer. Dense shrub and understory vegetation help conceal Canada Warbler nests that are usually located on or near the ground on mossy logs or roots, along stream banks or on hummocks. This species can typically be associated with the following ELC communities: FOC3, FOC4, FOM6, FOM7, FOM8, FOD6, FOD7, FOD8, FOD9, SWC, SWM and SWD with a well-developed shrub layer.	The Canada Warbler only breeds in North America and 80 per cent of its known breeding range is in Canada. Its primary breeding range is in the Boreal Shield, extending north into the Hudson Plains and south into the Muredwood Plains. Although the Canada Warbler breeds at low densities across its range, in Ontario, it is most abundant along the Southern Shield.	Niagara Upper Tier SAR List	Yes Deciduous forests and swamps are present within the study area.	Yes The deciduous forest and treed swamps indentified during site investigation may be suitable habitat. No The species was not observed during field investigation. However, species specific surveys were not completed.	Though this species was not observed, it could potentially be found within the deciduous swamps located in the Phase 1 development footprint. Species specific surveys are suggested prior to any vegetation removal or construction. Any vegetation and building removal should be completed outside of the breeding bird period (April 15th to August 15th)

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1,2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Birds	Cerulean Warbler *Dendroica cerulea*	THR	SC Schedule 1	END	Cerulean Warblers spend their summers (breeding seasons) in mature, deciduous forests with large, tall trees and an open under storey. In late summer, they begin their long migration to wintering grounds in the Andes Mountains in South America. This species can typically be associated with the following ELC communities: FOD and SWD that are mature and contain an open understory.	The Cerulean Warbler's breeding range extends from extreme southwestern Quebec and southern Ontario west to Minnesota and Nebraska and south to Texas and other Gulf states across to North Carolina. In southern Ontario, populations appear to be separated into two distinct bands: one from southern Lake Huron to western Lake Ontario, and further North, the other from the Bruce Peninsula and Georgian Bay area to the Ottawa River.	MNRC Online Web Tool 17PH45 MNRF Niagra Region SAR List Niagara Upper Tier SAR List	Yes Deciduous forests and swamps are present within the study area.	No The deciduous forest and treed swamps indentified during site investigation do not look like they have an open understory. However, access to natural features was limited. No The species was not observed during field investigation. However, species specific surveys were not completed.	Though this species was not observed, it could potentially be found within the deciduous swamps located in the Phase 1 development footprint. Species specific surveys are suggested prior to any vegetation removal or construction. Any vegetation and building removal should be completed outside of the breeding bird period (April 15th to August 15th).
Birds	Chimney swift *Chaetura pelagica*	THR	THR Schedule 1	THR	Before European settlement Chimney Swifts mainly nested on cave walls and in hollow trees or tree cavities in old growth forests. Today, they are more likely to be found in and around urban settlements where they nest and roost (rest or sleep) in chimneys and other manmade structures. They also tend to stay close to water as this is where the flying insects they eat congregate Foraging habitat for this species can be associated with the following ELC codes: TPO, CUM1, MAM, MAS, OAO, SAS1, SAM1, SAF1 containing or adjacent structures with suitable nesting habitat (i.e. chimnies).	The Chimney Swift breeds in eastern North America, possibly as far North as southern Newfoundland. In Ontario, it is most widely distributed in the Carolinian zone in the south and southwest of the province, but has been detected throughout most of the province south of the 49th parallel. It winters in Northwestern South America.	OBBA Square 17PH45 Niagara Upper Tier SAR List	Yes Suitable nesting areas may be present within the study area with older houses in the study area and the Welland Canal adjacent.	Yes The cultural meadow and meadow marsh adjacent to the Welland Canal indentified during site investigation may be suitable foraging habitat. No The species was not observed during field investigation. However, species specific surveys were not completed.	Though the species was not observed, it could potentially be found nesting throughout the urban settlements in the study area, as well as foraging in the meadow and marsh within the Phase 1 development footprint. Any vegetation removal within the above communities should be conducted outside of the breeding bird period (April 15th to August 15th) Nesting habitat was not observed during site investigations however, should the urban settlement features require alteration or removal, Cimney Swift surveys should be completed to confirm presence/absence

Taxanomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1,3]	Known Species Range1, 2	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Birds	Common Nighthawk *Chordeiles minor*	SC	THR Schedule 1	THR	Traditional Common Nighthawk habitat consists of open areas with little to no ground vegetation, such as logged or burned-over areas, forest clearings, rock barrens, peat bogs, lakeshores, and mine tailings. Although the species also nests in cultivated fields, orchards, urban parks, mine tailings and along gravel roads and railways, they tend to occupy natural sites. This species can typically be associated with the following ELC communities: SD, BS, RB, CUM, BO, FOM, FOC and FOD with openings with little vegetation.	The range of the Common Nighthawk spans most of North and Central America. In Canada, the species is found in all provinces and territories except Nunavut. In Ontario, the Common Nighthawk occurs throughout the province except for the coastal regions of James Bay and Hudson Bay. It winters in South America where it is concentrated in Peru, Ecuador and Brazil.	Niagara Upper Tier SAR List	Yes Deciduous forest, cultural meadow, fields and a railway are present within the study area.	Yes The deciduous forest, cultural meadow and fields indentified during site investigation may be suitable habitat. No The species was not observed during field investigation. However, species specific surveys were not completed.	Though this species was not observed, it could potentially be found within the cultural meadows and farm fields located in the Phase 1 development footprint. Species specific surveys are suggested prior to any vegetation removal or construction. Any vegetation and building removal should be completed outside of the breeding bird period (April 15th to August 15th).
Birds	Eastern Meadowlark *Sturnella magna*	THR	No Status	THR	Eastern Meadowlarks breed primarily in moderately tall grasslands, such as pastures and hayfields, but are also found in alfalfa fields, weedy borders of croplands, roadsides, orchards, airports, shrubby overgrown fields, or other open areas. Small trees, shrubs or fence posts are used as elevated song perches. This species can typically be associated with the following ELC communities: TPO, TPS, CUM1, CUS, and MAM2 with elevated song perches.	In Ontario, the Eastern Meadowlark is primarily found south of the Canadian Shield but it also inhabits the Lake Nipissing, Timiskaming and Lake of the Woods areas.	OBBA Square 17PH45 MNRF Niagra Region SAR List Niagara Upper Tier SAR List	Yes Cultural meadows and agricultural lands are present within the study area	Yes Suitable meadows, marshes and agricultural fields were indentified during site investigation. No The species was not observed during field investigation. However, species specific surveys were not completed	Though this species was not observed, it could potentially be found within the cultural meadow and meadow marsh located in the Phase 1 development footprint. Species specific surveys are suggested prior to any vegetation removal or construction. Any vegetation and building removal should be completed outside of the breeding bird period (April 15th to August 15th)

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 3]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Birds	Eastern Whip-poor-will *Caprimulgus vociferus*	THR	THR Schedule 1	THR	The Eastern Whip-poor-will is usually found in areas with a mix of open and forested areas, such as savannahs, open woodlands or openings in more mature, deciduous, coniferous and mixed forests. It forages in these open areas and uses forested areas for roosting (resting and sleeping) and nesting. It lays its eggs directly on the forest floor, where its colouring means it will easily remain undetected by visual predators. This species can typically be associated with the following ELC communities: TPS, TPW, CUW, FOD, FOC and FOM where open areas are present.	The Eastern Whip-poor-will's breeding range includes two widely separate areas. It breeds throughout much of eastern North America, reaching as far North as southern Canada and also from the southwest United States to Honduras. In Canada, the Whip-poor-will can be found from east-central Saskatchewan to central Nova Scotia and in Ontario they breed as far North as the shore of Lake Superior. Although Eastern Whip-poor-wills were once widespread throughout the central Great Lakes region of Ontario, their distribution in this area is now fragmented. The Whip-poor-will migrates to Mexico and Central America, where it stays throughout the cold Canadian winter.	OBBA Square 17PH45 Niagara Upper Tier SAR List	Yes Cultural woodlands and a deciduous forest are present within the study area.	No No suitable habitat was identified during site investigation. No The species was not observed during field investigation. However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Birds	Eastern Wood-Pewee *Contopus virens*	SC	No Status	SC	The Eastern Wood-Pewee can be found in every type of wooded community in eastern North America. The size of the forest does not appear to be an important factor in habitat selection as this species has been found in both small fragmented forests and larger forest tracts. 4 This species can typically be associated with the following ELC communities: FOC, FOM, FOD, SWD, SWM and CUW	The Eastern Wood-Pewee Breed throughout central and eastern North America from Saskatchewan to Nova Scotia south along the Atlantic Coast to North Florida and the Gulf Coast. 4	OBBA Square 17PH45	Yes Cultural woodlands, deciduous forests and swamps are present within the study area.	Yes The deciduous forest, cultural woodland and treed swamps indentified during site investigation may be suitable habitat. No The species was not observed during field investigation. However, species specific surveys were not completed.	Though this species was not observed, it could potentially be found within the deciduous swamps located in the Phase 1 development footprint. Species specific surveys are suggested prior to any vegetation removal or construction. Any vegetation and building removal should be completed outside of the breeding bird period (April 15th to August 15th)

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1,2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Birds	Golden-winged Warbler *Vermivora chrysoptera*	SC	THR Schedule 1	THR	Golden-winged Warblers prefer to nest in areas with young shrubs surrounded by mature forest – locations that have recently been disturbed, such as field edges, hydro or utility right-of-ways, or logged areas.	The Golden-winged Warbler is found in southern Saskatchewan, Manitoba, Ontario, and Quebec, as well as the north-eastern United States. In Ontario, these birds breed in central-eastern Ontario, as far south as Lake Ontario and the St. Lawrence River, and as far north as the northern edge of Georgian Bay. Golden-winged Warblers have also been found in the Lake of the Woods area near the Manitoba border, and around Long Point on Lake Erie. Golden-winged Warblers spend the winter in Central America, some Caribbean islands, and the northern part of South America.	Niagara Upper Tier SAR List	Yes There is a mixture of forest, fields and meadows in the study area.	Yes The mix of thickets, meadows and forested areas indentified during site investigation may provide suitable habitat. No The species was not observed during field investigation. However, species specific surveys were not completed.	Though this species was not observed, it could potentially use the deciduous swamps, meadow and thicket located in the Phase 1 development footprint. Species specific surveys are suggested prior to any vegetation removal or construction. Any vegetation and building removal should be completed outside of the breeding bird period (April 15th to August 15th).
Birds	Henslow's Sparrow *Ammodramus henslowii*	END	END Schedule 1	END	In Ontario, the Henslow's Sparrow lives in open fields with tall grasses, flowering plants, and a few scattered shrubs. It has also been found in abandoned farm fields, pastures, and wet meadows. It tends to avoid fields that have been grazed or are crowded with trees and shrubs. It prefers extensive, dense, tall grasslands where it can more easily conceal its small ground nest. This species can typically be associated with the following ELC communities: TPO, CUM, and MAM that are a minimum of 30 ha in size with vegetation that is over 30cm in height with a thick thatch layer and a lack of emergent woody vegetation.	The Henslow's Sparrow breeds in the Northeastern and east-central United States, and reaches its Northeastern limit in Ontario. It was once fairly common in scattered areas of suitable habitat south of the Canadian Shield. However, steep declines since the 1960s have all but wiped this bird out as a breeding species in Ontario. A few are still seen each spring at migration hotspots such as Point Pelee National Park, and a few may breed at selected locations.	OBBA Square 17PH45 Niagara Upper Tier SAR List	No Cultural meadows and meadow marsh communities are not large enough to provide suitable habitat for this species.	No Suitable habitat was not observed during site investigation. No The species was not observed during field investigation. However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Birds	Least Bittern *Ixobrychus exilis*	THR	THR Schedule 1	THR	In Ontario, the Least Bittern is found in a variety of wetland habitats, but strongly prefers cattail marshes with a mix of open pools and channels. This bird builds its nest above the marsh water in stands of dense vegetation, hidden among the cattails. The nests are almost always built near open water, which is needed for foraging. This species eats mostly frogs, small fish, and aquatic insects. This specie can typically be associated with the following ELC communities: MAS3-1, MAS3-1, SA and OAO.	In Ontario, the Least Bittern is mostly found south of the Canadian Shield, especially in the central and eastern part of the province. Small numbers also breed occasionally in Northwest Ontario. This species has disappeared from much of its former range, especially in southwestern Ontario, where wetland loss has been most severe. In winter, Least Bitterns migrate to the southern United States, Mexico and Central America.	MNRF Niagara Region SAR List Niagara Upper Tier SAR List	No There are no marshes with a mix of open pools and channels within the study area.	No Suitable habitat was not observed during site investigation. No The species was not observed during field investigation. However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1,2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Birds	Louisiana Waterthrush Parkesia motacilla	SC	SC Schedule 1	SC	The Louisiana Waterthrush is usually found in steep, forested ravines with fast-flowing streams. Although it prefers running water, especially clear, coldwater streams, it also less frequently inhabits heavily wooded, deciduous swamps having large pools of open water. It nests among the roots of fallen trees, in niches of stream banks, and in or under mossy logs This species can typically be associated with the following ELC communities: FOD, FOM and SWD with fast flowing coldwater streams or large pools of open water.	In Canada, the Louisiana Waterthrush breeds only in southern Ontario, along the Niagara Escarpment, in woodlands along Lake Erie and scattered locations elsewhere. It probably nests sporadically in southwestern Quebec, but breeding there has never been confirmed. The Canadian breeding population is estimated to be between 105 and 195 pairs, which represents less than one per cent of the total continental population. Although the species has declined locally in some parts of its breeding range, due to habitat loss and degradation, overall population levels have been relatively stable in both Canada and much of the United States over the past 20 years.	MNRF Niagra Region SAR List Niagara Upper Tier SAR List	Yes Suitable habitat may be present within deciduous swamp communities in the study area.	No Suitable habitat was not observed during site investigation. There are no streams or large pools in the deciduous swamp communities. No The species was not observed during field investigation. However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Birds	Northern Bobwhite Colinus virginianus	END	END Schedule 1	END	Northern Bobwhites live in savannahs, grasslands, around abandoned farm fields, along brushy fencerows and other similar sites. Grasslands that are occasionally burned are particularly important because the fires help keep the habitat from becoming too forested. In such places, bobwhites can find most of their needs such as food, nesting cover, and places to hide and rest throughout the year. In severe winter conditions bobwhites sometimes need to move into small forest areas to find snow-free areas for foraging. Bobwhites lay up to 16 eggs in a shallow natural depression that they line with plant material and conceal with grasses and vines. The species can typically be associated with the following ELC communities: TPO, TPS, CUM, CUT, CUS and CUW.	The Northern Bobwhite is near its northern range limit in southern Ontario. This bird benefited greatly when the original forests were cleared and it expanded its range significantly in Ontario. At its peak over a century ago, its range in Ontario extended north to Georgian Bay and east to Kingston. This range has steadily retracted and now includes only the southwest corner of the province, mostly on Walpole Island, and possibly a few scattered locations nearby. Isolated sightings away from this area are usually a result of introductions or birds escaping from captivity.	Niagara Upper Tier SAR List	Yes Cultural meadows and agricultural lands are present within the study area.	Yes Suitable meadows, and agricultural fields for nesting were indentified during site investigation, as well as small forested areas for winter foraging. No The species was not observed during field investigation. However, species specific surveys were not completed.	Though this species was not observed, it could potentially be found within the cultural meadow and fields located in the Phase 1 development footprint. Species specific surveys are suggested prior to any vegetation removal or construction. Any vegetation and building removal should be completed outside of the breeding bird period (April 15th to August 15th).
Birds	Peregrine Falcon Falco peregrinus	SC	SC Schedule 1	SC	Peregrine Falcons usually nest on tall, steep cliff ledges close to large bodies of water. Although most people associate Peregrine Falcons with rugged wilderness, some of these birds have adapted well to city life. Urban peregrines raise their young on ledges of tall buildings, even in busy downtown areas. Cities offer peregrines a good year-round supply of pigeons and starlings to feed on. This species can be associated with the following ELC communities: CLO.	Although Peregrine Falcons now nest in and around Toronto and several other southern Ontario cities, the majority of Ontario's breeding population is found around Lake Superior in Northwestern Ontario.	MNRF Niagra Region SAR List Niagara Upper Tier SAR List	No There are no suitable nesting areas within the study area.	No Suitable habitat was not observed during site investigation. No The species was not observed during field investigation. However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1,2]	Known Species Range1, 2	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Birds	Piping Plover *Charadrius melodus*	END	END Schedule 1	END	Piping Plovers nest exclusively on dry sandy or gravelly beaches just above the reach of high water and waves. When not migrating, this bird spends virtually all of its time between the water's edge and the back of the beach. It pecks the sand and searches small pools of water for food - mostly insects and small crustaceans. This species can typically be associated with the following ELC communities: BBO.	In North America, the Piping Plover primarily breeds along the Atlantic coast, the western Great Lakes and along wetlands, rivers and lakes in the Northern Great Plains. In Ontario, although never common, they breed along the shores of the Great Lakes, and at Lake of the Woods in Northwestern Ontario.	MNRF Niagara Region SAR List	No There are no suitable nesting areas within the study area.	No Suitable habitat was not observed during site investigation. No The species was not observed during field investigation. However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Birds	*Prothonotary Warbler* *Protonotaria citrea*	END	END Schedule 1	END	In Ontario, the Prothonotary Warbler is found in the warmer climate of the Carolinian deciduous forests. It nests in small, shallow holes, found low in the trunks of dead or dying trees standing in or near flooded woodlands or swamps. They will also readily use properly placed artificial nest boxes. Silver maple, ash, and yellow birch are common trees in these habitats. The Prothonotary is the only warbler in eastern North America that nests in tree cavities, where it typically lays four to six eggs on a cushion of moss, leaves and plant fibres. This species can typically be associated with the following ELC communities: FOD and SWD with standing water	In Canada, the Prothonotary Warbler is only known to nest in southwestern Ontario, primarily along the North shore of Lake Erie. Over half of the small and declining population is found in Rondeau Provincial Park. In 2005, it was estimated that there were only between 28-34 individuals in Ontario.	MNRF Niagara Region SAR List Niagara Upper Tier SAR List	Yes Deciduous forest is present within the study area.	Yes The deciduous forest and deciduous swamps indentified during site investigation may be suitable habitat. No The species was not observed during field investigation. However, species specific surveys were not completed.	Though this species was not observed, it could potentially be found within the deciduous swamps located in the Phase 1 development footprint. Species specific surveys are suggested prior to any vegetation removal or construction. Any vegetation and building removal should be completed outside of the breeding bird period (April 15th to August 15th)
Birds	Red-headed Woodpecker *Melanerpes erythrocephalus*	SC	THR Schedule 1	THR	The Red-headed Woodpecker lives in open woodland and woodland edges, and is often found in parks, golf courses and cemeteries. These areas typically have many dead trees, which the bird uses for nesting and perching. This woodpecker regularly wanders in the United States, moving to locations where it can find sufficient acorns and beechnuts to eat. A few of these birds will stay the winter in woodlands in southern Ontario if there are adequate supplies of nuts. This species can typically be associated with the following ELC communities: TPS, TPW, CUW, FOD1, FOD2, FOD4-1, FOD6, FOD7, and FOD9 that are open and have an abundance of dead trees.	The Red-headed Woodpecker is found across southern Ontario, where it is widespread but rare. Outside Ontario, it lives in Alberta, Saskatchewan, Manitoba and Quebec, and is relatively common in the United States.	OBBA Square 17PH45 Niagara Upper Tier SAR List	Yes Suitable habitat may be present in the deciduous forests with dying ash trees within the study area.	Yes The deciduous forest and deciduous swamps indentified during site investigation may be suitable habitat. No The species was not observed during field investigation. However, species specific surveys were not completed.	Though this species was not observed, it could potentially be found within the deciduous swamps located in the Phase 1 development footprint. Species specific surveys are suggested prior to any vegetation removal or construction. Any vegetation and building removal should be completed outside of the breeding bird period (April 15th to August 15th).

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range1, 2	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Birds	Wood Thrush *Hylocichla mustelina*	SC	No Status	THR	The Wood Thrush can typically be found in the interior and along the edges of well-developed upland deciduous and mixed forests. Key elements of these forests include trees that are greater than 16 m in height, high variety of deciduous tree species, moderate subcanopy and shrub density, shade, fairly open forest floor, moist soils and decaying leaf litter. Wood Thrush is more likely to occur in larger forests but may also nest in 1 ha fragments and semi-wooded residential areas and parks. Smaller habitat fragments have lower fecundity when compared to larger fragments. 3 This species can typically be associated with the following ELC communities: FOD and FOM that are greater than 1 ha in size.	The Wood Thrush ranges across central and southern Ontario, southern Quebec, New Brunswick and southern Nova Scotia and the majority of the eastern United States. It winters in Central American between southern Mexico and Panama. 3	OBBA Square 17PH45	Yes Deciduous forest is present within the study area	Yes The deciduous forest identified during site investigation may be suitable habitat. No The species was not observed during field investigation. However, species specific surveys were not completed.	Suitable habitat may be present within the deciduous forest identified during site investigation; however this habitat is outside of the Phase 1 development footprint. No action is required at this time.
Birds	Yellow-breasted Chat *Icteria virens*	END	SC Schedule 1	END	The Yellow-breasted Chat lives in thickets and scrub, especially locations where clearings have become overgrown. These birds spend their winters in coastal marshes. This species can typically be associated with the following ELC communities: CUT and SWT.	The Yellow-breasted Chat is found in much of the United States. In Canada, it lives in southern British Columbia, the Prairies, and southwestern Ontario, where it is concentrated in Point Pelee National Park and Pelee Island in Lake Erie.	MNRF Niagara Region SAR List Niagara Upper Tier SAR List	Yes Cultural and swamp thickets are present within the study area.	No Thickets were observed during site investigation, however they would be likely too small to support this species. No The species was not observed during field investigation. However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Fish	American Eel *Anguilla rostrata*	END	No Status	THR	Over the course of its life, the American Eel can be found in both salt and fresh water. In fact, some scientists consider the American Eel to have the broadest diversity of habitats of any fish species in the world. This species can typically be associated with the following ELC communities:	The American Eel starts life in the Sargasso Sea in the North Atlantic Ocean and migrates along the east coast of North America. In Canada, it is found in fresh water and salt water areas that are accessible from the Atlantic Ocean. This area extends from Niagara Falls in the Great Lakes up to the mid-Labrador coast. In Ontario, American Eels can be found as far inland as Algonquin Park. Once the eels mature (10-25 years) they return to the Sargasso Sea to spawn.	Niagara Upper Tier SAR List	Yes The Welland Canal, which has connectivity to Lake Ontario and Lake Erie is present within the study area.	No Suitable habitat was not observed during site investigations. No This species was not observed during field investigations; However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.

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Fish	Grass Pickerel *Esox americanus vermiculatus*	SC	SC Schedule 1	SC	Grass Pickerel are found in wetlands, ponds, slow-moving streams and shallow bays of larger lakes with warm, shallow, clear water and an abundance of aquatic plants. This species can typically be associated with the following ELC communities: OAO, SAS, SAM and SAF with warm, shallow, clear water and an abundance of aquatic plants.	In Ontario, Grass Pickerel is found in coastal wetlands in the Great Lakes and tributaries of Lake St. Clair, Lake Erie, Lake Huron, the Niagara River, Lake Ontario and the St. Lawrence River, and inland in the Severn River system.	Niagara Upper Tier SAR List	Yes The Welland Canal, which connects Lake Ontario and Lake Erie is present within the study area.	No Suitable habitat was not observed during site investigations. No The species was not observed during field investigation; However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Fish	Lake Chubsucker *Erimyzon sucetta*	THR	END Schedule 1	END	In Ontario, the Lake Chubsucker lives in marshes and lakes with clear, still, warmer water and plenty of aquatic plants. This habitat is found in bays, channels, ponds, and coastal wetlands. During the breeding season, from April to early June in Ontario, adults move into marshes where eggs are laid among vegetation in shallower water. The chubsucker eats algae, plankton, molluscs, and aquatic insects. This species can typically be associated with the following ELC communities: OAO, SAS, SAM, and SAF with clear, still warm water and an abundance of aquatic plants.	In Canada, the Lake Chubsucker is found at several sites in the Ausable River, Lake St. Clair, Lake Erie and the Niagara river drainage in southern Ontario	MNRF Niagra Region SAR List Niagara Upper Tier SAR List	Yes The Welland Canal, which connects Lake Ontario and Lake Erie is present within the study area	No Suitable habitat was not observed during site investigations. No The species was not observed during field investigation; However, species specific surveys were not completed	Suitable habitat was not confirmed during site investigation. No further action required.
Fish	Lake Sturgeon (Great Lakes-Upper St. Lawrence River population) *Acipenser fulvescens*	THR	No Status	THR	The Lake Sturgeon lives almost exclusively in freshwater lakes and rivers with soft bottoms of mud, sand or gravel. They are usually found at depths of five to 20 metres. They spawn in relatively shallow, fast-flowing water (usually below waterfalls, rapids, or dams) with gravel and boulders at the bottom. However, they will spawn in deeper water where habitat is available. They also are known to spawn on open shoals in large rivers with strong currents. This species can be associated with the following ELC communities: OAO. Large lakes/rivers > 20m deep with soft mud, sand or gravel bottoms required.	In Ontario, the Lake Sturgeon is found in the rivers of the Hudson Bay basin, the Great Lakes basin and their major connecting waterways, including the St. Lawrence River. There are three distinct populations in Ontario: Great Lakes - Upper St. Lawrence River, Northwestern Ontario, and Southern Hudson Bay - James Bay.	Niagara Upper Tier SAR List	Yes A few small stream like features that empty into Lake Ontario are present within the study area may provide suitable habitat.	No Suitable habitat was not confirmed during field investigations. Most stream like features within the study area are drainage ditches. No The species was not observed during field investigation; However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Fish	*Redside Dace* *Clinostomus elongatus*	END	SC Schedule 3	END	The Redside Dace is found in pools and slow-moving areas of small streams and headwaters with a gravel bottom. They are generally found in areas with overhanging grasses and shrubs, and can leap up to 10 cm out of the water to catch insects. During spawning, they can be found in shallow parts of streams, which are also popular spawning areas for other minNow species. This species can be associated with the following ELC communities: OAO, SA stream communities with gravel substrates and overhanging grasses and shrubs.	In Canada, Redside Dace are found in a few tributaries of Lake Huron, in streams flowing into western Lake Ontario, the Holland River (which flows into Lake Simcoe), and Irvine Creek of the Grand River system (which flows into Lake Erie)	MNRF Niagra Region SAR List Niagara Upper Tier SAR List	Yes A few small stream like features that empty into Lake Ontario are present within the study area may provide suitable habitat.	No Suitable habitat was not confirmed during field investigations. No The species was not observed during field investigation; However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Insects	Monarch *Danaus plexippus*	SC	No Status	SC	Throughout their life cycle, Monarchs use three different types of habitat. Only the caterpillars feed on milkweed plants and are confined to meadows and open areas where milkweed grows. Adult butterflies can be found in more diverse habitats where they feed on nectar from a variety of wildflowers. Monarchs spend the winter in Oyamel Fir forests found in central Mexico. This species can typically be associated with the following ELC communities: AI, TP and CUM where milkweed plants are present.	The Monarch's range extends from Central America to southern Canada. In Canada, Monarchs are most abundant in southern Ontario and Quebec where milkweed plants and breeding habitat are widespread. During late summer and fall, Monarchs from Ontario migrate to central Mexico where they spend the winter months. During migration, groups of Monarchs numbering in the thousands can be seen along the north shores of Lake Ontario and Lake Erie.	Niagara Upper Tier SAR List	Yes Cultural meadows are present within the study area.	Yes The cultural meadows indentified during site investigation may be suitable habitat. Yes The species was observed incidentally during field investigation in 2014 within the cultural meadow.	This species was observed within a cultural meadow that is located in the Phase 1 development footprint. However, this individual was observed during Monarch fall migration and may not be using the meadow as breeding habitat (significant habitat). Any vegetation should be completed outside of their breeding period (March to August), as Monarchs are lay their eggs on milkweed, which is present within the meadow.
Insects	Rusty-patched Bumble Bee *Bombus affinis*	END	END Schedule 1	END	This species, like other bumble bees, can be found in open habitat such as mixed farmland, urban settings, savannah, open woods and sand dunes. The most recent sightings have been in oak savannah, which contains both woodland and grassland flora and fauna. This species can typically be associated with the following ELC communities: CUM, TPO, TPS, TPW, CUS, SDO, SDS and SDT.	The Rusty-patched Bumble Bee was once widespread and common in eastern North America, found from southern Ontario south to Georgia and west to the Dakotas. The species has suffered rapid, severe decline throughout its entire range since the 1970s with only a handful of specimens collected in recent years in Ontario. The only sightings of this bee in Canada since 2002 have been at The Pinery Provincial Park on Lake Huron.	MNRF Niagra Region SAR List Niagara Upper Tier SAR List	Yes Cultural meadows and farmland are present within the study area	No Suitable habitat was not observed during site investigation. This species is only present in one location in Ontario. No The species was not observed during field investigation. However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.

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Insects	West Virginia White Pieris virginiensis	SC	N/A	N/A	The West Virginia White lives in moist, deciduous woodlots. This butterfly requires a supply of toothwort, a small, spring-blooming plant that is a member of the mustard family, since it is the only food source for larvae.	The West Virginia White is found from Quebec and Ontario south through New England and the Appalachian region to Georgia. Although common in parts of the United States, this butterfly is rare in Ontario, where it has been seen at about 50 sites. The majority of sites in the province are in central and southern Ontario, but it also extends north to Manitoulin and St. Joseph Islands. The largest populations are in the western Lake Ontario region.	Niagara Upper Tier SAR List	Yes Deciduous forests are present within the study area.	Yes The deciduous forest community identified during site investigation may be suitable habitat. However, a floral inventory was not completed. No The species was not observed during field investigation. However, species specific surveys were not completed.	Suitable habitat may be present within the deciduous forest identified during site investigation; however this habitat is outside of the Phase 1 development footprint. No action is required at this time.
Mammals	Little Brown Myotis (Bat) Myotis lucifugus	END	No Status	END	Bats are Nocturnal. During the day they roost in trees and buildings. They often select attics, abandoned buildings and barns for summer colonies where they can raise their young. Bats can squeeze through very tiny spaces (as small as 38 millimetres across) and this is how they access many roosting areas Little brown bats hibernate from October or November to March or April, most often in caves or abandoned mines that are humid and remain above freezing. This species can typically be associated with any community where suitable roosting (i.e. cavity trees, houses, abandoned buildings, barns, etc.) habitat is available.	The little brown bat is widespread in southern Ontario and found as far North as Moose Factory and Fawourable Lake. Outside Ontario, this bat is found across Canada (except in Nunavut) and most of the United States.	Mammals of Ontario Atlas Niagara Upper Tier SAR List	Yes Suitable roosting habitat may be present in the woodlands, barns and houses within the study area.	Yes The forests, barns and other buildings in the study area may be suitable habitat. No The species was not observed during field investigation. Species specific surveys were not completed.	Though this species was not observed, it could potentially be found within the forested areas and barn that are located within the Phase 1 development footprint. Species specific surveys are suggested, such as a bat cavity assessment prior to any tree removal.
Mammals	Northern (Long-eared) Myotis (Bat) Myotis septentrionalis	END	No Status	END	Northern long-eared bats are associated with boreal forests, choosing to roost under loose bark and in the cavities of trees. These bats hibernate from October or November to March or April, most often in caves or abandoned mines. This species can typically be associated with the following ELC communities: FOC, FOM, FOD, SWC, SWM and SWD where suitable roosting (i.e. cavity trees and trees with loose bark) habitat is available.	The northern long-eared bat is found throughout forested areas in southern Ontario, to the north shore of Lake Superior and occasionally as far north as Moosonee, and west to Lake Nipigon. This bat is found in all Canadian provinces as well as the Yukon and Northwest Territories.	Niagara Upper Tier SAR List	No No boreal forest communities are present within the study area.	No Suitable habitat was not observed during site investigations. No The species was not observed during field investigation. Species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.

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Molluscs	Eastern Pondmussel *Ligumia nasuta*	END	END Schedule 1	END	The Eastern Pondmussel is typically found in sheltered areas of lakes and in slow-moving areas of rivers and canals with sand or mud bottoms. All mussels filter water to find food, such as bacteria and algae. Mussel larvae must attach to a fish (called a "host"), where they consume nutrients from the fish body until they transform into juvenile mussels and drop off the fish host. It is Not kNown which species of fish act as hosts for the Eastern Pondmussel This species can typically be associated with the following ELC communities: OAO	In North America, the Eastern Pondmussel was once one of the most common mussels in the lower Great Lakes. In Canada, there are Now only two kNown populations: one in the delta area of Lake St. Clair and the second in Lyn Creek, a small tributary of the upper St. Lawrence River.	MNRF Niagra Region SAR List	No The study area is well outside of the known range of this species which is the Lake St. Clair delta and Lyn Creek, a tributary of the St.Lawrence River.	No Suitable habitat was not observed during site investigations completed in 2015. No The species was not observed during site investigation. Species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required
Molluscs	Kidneyshell *Ptychobranchus fasciolaris*	END	END Schedule 1	END	The Kidneyshell is typically found in small to medium sized rivers. It prefers shallow, clear, swift-moving water with gravel and sand. It also used to occur on gravel shoals in the Great Lakes. All mussels filter water to find food, such as bacteria and algae. Mussel larvae are parasitic and must attach to a fish host, where they consume nutrients from the fish body until they transform into juvenile mussels that drop off of the fish. The Kidneyshell has three kNown fish hosts in Canada: Blackside Darter, Fantail Darter, and Johnny Darter. The presence of fish hosts is one of the key features for an area to support a healthy mussel population. This species can typically be associated with the following ELC communities: OAO with shallow, clear, swift flowing water with a gravel and sand substrate.	In Canada, the Kidneyshell is currently found in four areas in southwestern Ontario. There are reproducing populations in the East Sydenham River and in the Ausable River. Small populations are also found in St. Clair River delta in Lake St. Clair and a tributary of the Thames River. The species No longer occurs in Lake Erie or the Detroit, Thames, Grand, Welland or Niagara rivers.	MNRF Niagra Region SAR List	No The Welland Canal is present within the study area. However, the species no longer occurs in this area.	No Suitable habitat was not observed during site investigations completed in 2015. No The species was not observed during site investigation. Species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Molluscs	Mapleleaf Mussel Quadrula quadrula	THR	THR Schedule 1	THR	The Mapleleaf mussel is usually found in medium to large rivers with slow to moderate currents and firmly packed sand, gravel, or clay and mud bottoms. It also lives in lakes and reservoirs. Mussels filter water to find food, such as bacteria and algae. Mussel larvae must attach to a fish, called a host, where they consume nutrients from the fish body until they transform into juvenile mussels and then drop off. In Canada, the fish host of the Mapleleaf Mussel is the Channel catfish. Presence of the fish host is one of the key features determining whether the body of water can support a healthy mussel population.	In Canada, the Mapleleaf mussel is found in Manitoba and in southwestern Ontario. In Ontario, this species is found in several large rivers that drain into Lake St. Clair and Lake Erie including the Sydenham, Ausable, Grand, and Thames and Welland rivers. The species has disappeared from Lake Erie and the Detroit and Niagara rivers.	Niagara Upper Tier SAR List	Yes The Welland Canal, which has connectivity to Lake Erie is present within the study area.	No Suitable habitat was not observed during site investigations completed in 2015. No The species was not observed during site investigation. Species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.

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Molluscs	Round Pigtoe *Pleurobema sintoxia*	END	END Schedule 1	END	The Round Pigtoe is usually found in rivers of various sizes with deep water and sandy, rocky, or mud bottoms. Like all freshwater mussels, this species feeds on algae and bacteria that it filters out of the water. Mussel larvae are parasitic and must attach to a fish host, where they consume nutrients from the fish body until they transform into juvenile mussels and drop off. Known fish hosts of the Round Pigtoe include: Bluegill, Spotfin Shiner, BluntNose MinNow, and Northern Redbelly Dace. The presence of fish hosts is one of the key features for an area to support a healthy mussel population. This species can typically be associated with the following ELC communities: OAO rivers with deep water and sandy, rocky or mud substrates.	In Canada, Round Pigtoe are found only in southwestern Ontario, mainly in the St. Clair River delta and the Sydenham River but small populations still exist in the Grand and Thames rivers and in shallow areas near the shorelines of Lake Erie and Lake St. Clair.	MNRF Niagara Region SAR List	Yes The Welland Canal, which has connectivity to Lake Erie is present within the study area.	No Suitable habitat was not observed during site investigations. No The species was not observed during site investigation. Species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Molluscs	Snuffbox *Epioblasma triquetra*	END	END Schedule 1	END	The Snuffbox is typically found in small to medium-sized rivers in shallow rifle areas. They prefer clean, clear, swift-flowing water and firm rocky, gravel or sand river bottoms. Mussel larvae are parasitic and must attach to a fish host, where they consume nutrients from the fish body until they transform into juvenile mussels and drop off. In Ontario, the main fish host for Snuffbox is the Logperch but other host fish may include various darter species, Largemouth Bass, Mottled Sculpin and Brook Stickleback. Like all freshwater mussels, the Snuffbox feeds on algae and bacteria that it filters out of the water. This species can typically be associated with the following ELC communities: OAO characterized as small to medium sized rivers with clear, clear, swift flowing water and firm rocky, gravel or sandy substrates.	In Canada, the Snuffbox is Now only found in the East Sydenham River and the Ausable River in southwest Ontario. The total population size is very small. Historically, the species was also found in Lake Erie, Lake St. Clair, and the Thames, Detroit, Grand, and Niagara rivers.	NHIC Online Web Tool 17PH45 MNRF Niagara Region SAR List Niagara Upper Tier SAR List	No The East Sydenham River and the Ausable River, which are the only two watercourses with a known presence of this species are not located within the study area	No Suitable habitat was not observed during site investigations No The species was not observed during site investigation. Species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Mosses	Spoon-leaved Moss *Bryoandersonia illecebra*	END	END Schedule 1	END	Spoon-leaved Moss grows in a range of habitat types but most Canadian populations are located on soil in low-lying areas that are seasonally flooded under trees or shrub thickets. It is often found in close proximity to a species of moss called narrow-leaved wetland plume moss, which is associated with swamps, marshes, and wet meadows. This species can typically be associated with the following ELC communities: SWD, SWT, MAS and MAM that are seasonally flooded.	Spoon-leaved Moss is found only in eastern North America, from southern Ontario south to Texas and Florida. In Canada, it is restricted to a few sites in southern Ontario – Elgin, Essex and Welland counties, and the Niagara Region.	MNRF Niagara Region SAR List Niagara Upper Tier SAR List	Yes Deciduous and thicket swamps, as well as meadows and shallow marshes are present within the study area.	Yes All four associated ELC communities were observed during site investigation. No The species was not observed during field investigation. Species specific surveys were not completed.	Though this species was not observed, it could potentially be found within the swamps, thickets and meadow marsh located within the Phase 1 development footprint. Species specific surveys are suggested prior to any vegetation removal.

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Plants	American Chestnut *Castanea dentata*	END	END Schedule 1	END	The American Chestnut prefers dryer upland deciduous forests with sandy, acidic to neutral soils. In Ontario, it is only found in the Carolinian Zone between Lake Erie and Lake Huron. The species grows alongside Red Oak, Black Cherry, Sugar Maple, American Beech and other deciduous tree species. This species can typically be associated with the following ELC communities: FOD with dry sandy soil.	The American Chestnut has almost disappeared from eastern North America due to an epidemic caused by a fungal disease called the chestnut blight (Cryphonectria parasitica). In Canada, the American Chestnut is restricted primarily to southwestern Ontario. Based on information available in 2004, it was estimated that there are 120 to 150 mature trees and 1,000 or more small, young trees in the province.	MNRF Niagara Region SAR List Niagara Upper Tier SAR List	Yes Deciduous forest communities are present within the study area.	No The deciduous forest observed during site investigation is too wet to support this species. No The species was not observed during site investigation. However, no were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Plants	American Columbo *Frasera caroliniensis*	END	END Schedule 1	END	American Columbo grows primarily in open deciduous forests, and to a lesser extent along open forest edges and dense shrub thickets in Ontario. It is most commonly found in dry upland woods, but in parts of its range it has been found in grasslands, moist woods and swampy habitats. This species can typically be associated with the following ELC communities: FOD, CUM1 and SWD.	American Columbo is widely distributed in eastern North America, ranging from southern Ontario west to Illinois and south to eastern Oklahoma, Northern Mississippi,and western South Carolina. In Canada, American Columbo is only found in the Carolinian forest region of southern Ontario. There have been 22 populations recorded in Ontario. Based on field surveys in 2004 and 2005, 13 populations are currently believed to exist.	MNRF Niagra Region SAR List Niagara Upper Tier SAR List	Yes Deciduous forest, swamps and cultural meadow communities are present within the study area.	Yes Suitable habitat may be present within the cultural meadows, deciduous forest and swamps identified during site investigation. No The species was not observed during site investigation. However, species specific surveys were not completed.	Though this species was not observed, it could potentially be found within the meadow and swamp communities located in the Phase 1 development footprint. Species specific surveys are suggested prior to any vegetation removal.
Plants	American Ginseng *Panax quinquefolius*	END	END Schedule 1	END	In Ontario, American Ginseng typically grows in rich, moist, but well-drained, and relatively mature, deciduous woods dominated by Sugar Maple (Acer saccharum), White Ash (Fraxinus americana) and American Basswood (Tilia americana). It usually grows in deep, nutrient rich soil over limestone or marble bedrock.	American Ginseng ranges from Louisiana and Georgia north to New England and Minnesota. In Canada, it is found in southwestern Quebec and southern Ontario.	Niagara Upper Tier SAR List	Yes Deciduous forest communities are present within the study area.	No Deciduous forest within the study area does not meet to habitat requirements. No The species was not observed during site investigation. However, floral surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1,2]	Known Species Range1, 2	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Plants	American Water -willow *Justicia americana*	THR	THR Schedule 1	THR	The American Water-willow grows along the shores and in the waters of streams, rivers, lakes, ditches and occasionally wetlands. It can grow on wet soil and in up to 1.2 metres of water, but appears to require periodic flooding and wave action to reduce competition from other aquatic plants. The underlying subsoil on which it grows is usually gravel, sand or organic matter.	The range of the American Water-willow is limited to east central North America from Georgia and Texas North to New York, Michigan, southern Ontario and Quebec. In Ontario, it grows along the North shore of Lake Erie and in the Thousand Island region. There are only 10 locations in Canada where the plant is known to occur, and seven of these are in Ontario. Previously, 17 occurrences were known from Ontario and 11 from Quebec.	MNRF Niagara Region SAR List Niagara Upper Tier SAR List	Yes Swamp, wet ditch, stream and river communities are all present within the study area.	Yes Suitable habitat may be present along the drainage ditches and within the swamp communities identified during site investigation. No The species was not observed during site investigation. However, floral surveys were not completed.	Though this species was not observed, it could potentially be found within the ditches and swamp communities located in the Phase 1 development footprint. Floral surveys are suggested prior to any vegetation removal.
Plants	Bird's-foot Violet *Viola pedata*	END	END Schedule 1	END	In Ontario, Bird's-foot Violet is found only in black oak savanna, a very rare vegetation type having widely spaced open-grown trees with an understorey of tallgrass prairie herbs. Natural disturbances caused by drought or fire are important for removing trees and shrubs that would otherwise shade out the tiny Bird's-foot Violet. This species can typically be associated with the following ELC communities: TPS1-1 and TPW1-1.	In Canada, Bird's-foot Violet is found only in southern Ontario at a handful of sites. In 2001, the population was estimated to be fewer than 7,000 plants at only five locations.	Niagara Upper Tier SAR List	No Savanna communities are not present within the study area.	No No savanna communities were identified during site investigation. No The species was not observed during site investigation. However, floral surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Plants	Butternut *Juglans cinerea*	END	END Schedule 1	END	In Ontario, Butternut usually grows alone or in small groups in deciduous forests. It prefers moist, well-drained soil and is often found along streams. It is also found on well-drained gravel sites and rarely on dry rocky soil. This species does not do well in the shade, and often grows in sunny openings and near forest edges. This species can typically be associated with the following ELC communities: FOD and mature hedgerows; Soil: dry rocky or moist (4, 5, 6) to fresh (2, 3).	Butternut can be found throughout central and eastern North America. In Canada, Butternut occurs in Ontario, Quebec and New Brunswick. In Ontario, this species is found throughout the southwest, north to the Bruce Peninsula, and south of the Canadian Shield.	Niagara Upper Tier SAR List	Yes Deciduous forest present may provide suitable habitat for this species.	Yes The deciduous forest identified during site investigation may be suitable habitat. No The species was not observed during site investigation. However, floral surveys were not completed.	Suitable habitat may be present within the deciduous forest identified during site investigation; however this habitat is outside of the Phase 1 development footprint. No action is required at this time.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1,2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Plants	*Broad Beech Fern* *Phegopteris hexagoNoptera*	SC	SC Schedule 3	SC	The Broad Beech Fern prefers to grow in rich soils in deciduous forests, often in areas dominated by maple and beech trees. It requires moist soil and usually grows in full shade. This species can typically be associated with the following ELC communities: FOD5 and FOD6 with moist soils and closed caNopies	The Broad Beech Fern grows in eastern North America from the southern Great Lakes region west to southeast Kansas and Northeast Oklahoma, south to Northeast Texas and the Gulf Coast and east to the Atlantic coast. In Ontario, the species is found in forest remnants in southern Muskoka, along Lake Erie, and in the eastern Lake Ontario-St. Lawrence River region.	MNRF Niagra Region SAR List Niagara Upper Tier SAR List	Yes Deciduous forest present may provide suitable habitat for this species.	No Deciduous forest within the study area does not meet to habitat requirements. No The species was not observed during site investigation. However, floral surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Plants	Cherry Birch *Betula lenta*	END	END Schedule 1	END	In Ontario, the Cherry Birch is found on moist, well-drained clay loam soil over limestone bedrock with White Oak, Red Oak, Eastern Hemlock, Sugar Maple and other deciduous trees.	The single population of Cherry Birch in Canada is isolated at two sites on the Niagara peninsula in southern Ontario. A survey of the two sites in 2010, found only 17 trees out of the 50 trees that were originally identified in 1967.	MNRF Niagra Region SAR List Niagara Upper Tier SAR List	No Deciduous forest is present within the study area.	No Deciduous forest within the study area does not meet to habitat requirements. No The species was not observed during site investigation. However, floral surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Plants	Common Hoptree *Ptelea trifoliata*	THR	THR Schedule 1	THR	In Canada, Common Hoptree is found often along shorelines in areas of nutrient poor sandy soils, although it is sometimes found on thin soils overlying limestone. It does best in full sun and is intolerant of shade. This species can typically be associated with the following ELC communities: BBO2, BBS1, BBT1, SDO, SDS, SDT, SBO, SBS, SBT, ALO, ALS and ALT typically in fairly open areas near water.	Common Hoptree ranges from the lower Great Lakes south to Texas, and from eastern Pennsylvania to Northern Florida. In Canada, Common Hoptree is found only in southwestern Ontario along the Lake Erie and Lake St. Clair shorelines, on Lake Erie islands and near Lake Ontario in the Niagara Region.	MNRF Niagra Region SAR List Niagara Upper Tier SAR List	No Suitable habitat is not present within the study area.	No Suitable habitat was not identified within the study area. No The species was not observed during site investigation. However, floral surveys were not completed	Suitable habitat was not confirmed during site investigation. No further action required.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Plants	Cucumber Tree *Magnolia acuminata*	END	END Schedule 1	END	Cucumber trees prefer moist to wet, protected sites with deep, rich soils.	The cucumber tree is rare in Ontario, confined to only a few locations in Norfolk County and the Niagara Region. It is the only species of magnolia native to Canada.	MNRF Niagara Region SAR List Niagara Upper Tier SAR List	Yes Suitable habitat may be present within the study area	No Suitable habitat was not identified within the study area. No The species was not observed during site investigation. However, floral surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Plants	Deerberry *Vaccinium stamineum*	THR	THR Schedule 1	THR	In Canada, Deerberry is found in habitats where the climate is moderated by their proximity to large bodies of water such as the Niagara and St. Lawrence rivers and to Lake Ontario. Within Ontario, Deerberry is found predominately in dry open woods on sandy and well-drained soils growing under oaks, Pitch Pine or White Pine	Deerberry ranges from New York State, Ohio, and Missouri south to Florida and eastern Texas. In Canada, it only occurs in two areas in Ontario – the Niagara region and the Thousand Islands region. There are six extant populations of Deerberry in Ontario, five of them in the Thousand Islands region.	MNRF Niagara Region SAR List Niagara Upper Tier SAR List	No There are no dry open woods present within the study area	No Suitable habitat was not identified within the study area. No The species was not observed during site investigation. However, floral surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Plants	Drooping Trillium *Trillium flexipes*	END	END Schedule 1	END	Drooping Trillium grows on damp sandy soil in mature, deciduous forests that are usually close to a river or stream. It is found in Carolinian forests with Maple, White Ash, Basswood, Hackberry, White Elm, and Blue Ash trees. It shares the forest floor with other native plants including Ostrich Fern, Wild Ginger and Jack-in-the-pulpit. This species can typically be associated with the following ELC communities: FOD4-2, FOD4-3, FOD5, FOD6 and FOD7 that are mature and have sandy soils, typically near a river or stream with the associate species listed above.	In Canada, Drooping Trillium only grows in southwestern Ontario in the warmer climate of the Carolinian forest. There were once six known locations in the province, but today there are only two. A total of 1465 flower stems were reported in 2007. Both populations along the Sydenham River in Middlesex County and along the Thames River in Elgin County are believed to be reproducing successfully.	Niagara Upper Tier SAR List	Yes Deciduous forest is present within the study area.	No Suitable habitat, our ELC communities were identified within the study area. No The species was not observed during site investigation. However, floral surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Plants	Dwarf Hackberry *Celtis tenuifolia*	THR	THR Schedule 1	THR	Dwarf Hackberry grows in several different habitats. These include dry, sandy areas near lakeshores, inland dunes, ridge tops and limestone alvars. Several plant communities in which Dwarf Hackberry occurs are considered rare to extremely rare, such as shrub and treed sand dunes, oak savannas, and red cedar-treed alvars. Dwarf Hackberry is a sun-loving tree that does best in areas where it will not be shaded-out by other trees and vegetation This species can typically be associated with the following ELC communities: SDO, SDS, SDT, SBO, SBS, SBT, RBO, RBS, RBT, ALO, ALS, ALT and TPS.	The species reaches the Northern limits of its distribution in southern Ontario, over 1,000 kilometres North of the geographical centre of its range in the United States. In Canada, there are six known locations in southern Ontario: Port Franks area, Point Pelee, Pelee Island, Point Anne, and two sites near Belleville. The Canadian population is estimated to be more than 14 000 plants	MNRF Niagara Region SAR List	No There are no communities within the study area that would support this species.	No Suitable habitat was not identified within the study area No The species was not observed during site investigation. However, floral surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Plants	Eastern Flowering Dogwood *Cornus florida*	END	END Schedule 1	END	Eastern Flowering Dogwood grows under taller trees in mid-age to mature deciduous or mixed forests. It most commonly grows on floodplains, slopes, bluffs and in ravines, and is also sometimes found along roadsides and fencerows. This species can typically be associated with the following ELC communities: FOD and FOM.	In Canada, it can only be found in southern Ontario in the Carolinian Zone (the small area of Ontario southwest of Toronto to Sarnia down to the shores of Lake Erie).	MNRF Niagara Region SAR List Niagara Upper Tier SAR List	Yes Deciduous forest is present within the study area.	Yes Suitable habitat was identified during site investigation. No The species was not observed during site investigation. However, floral surveys were not completed.	Suitable habitat may be present within the deciduous forest identified during site investigation; however this habitat is outside of the Phase 1 development footprint. No action is required at this time.
Plants	Green Dragon *Arisaema dracontium*	SC	SC Schedule 3	SC	The Green Dragon grows in somewhat wet to wet deciduous forests along streams, particularly maple forest and forest dominated by Red Ash and White Elm trees. This species can typically be associated with the following ELC communities: FOD6, FOD7, FOD8, FOD9 and SWD with moist soils.	Primarily a plant of the southern United States, the Green Dragon is found from the Great Lakes region and southern Quebec east to the Atlantic coast, south to Florida and the Gulf coast, and west to Texas and Nebraska. In Ontario, it is believed to still occur at about 30 to 35 sites in the southwestern part of the province.	MNRF Niagara Region SAR List Niagara Upper Tier SAR List	Yes Deciduous forest and swamp are present within the study area	No Suitable habitat was not identified within the study area. No The species was not observed during site investigation. However, floral surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Plants	Kentucky Coffee-tree *Gymnocladus dioicus*	THR	THR Schedule 1	THR	Kentucky Coffee-tree is found in a variety of habitats, but grows best on moist rich soil. Consequently, it is often found in floodplains, though it will tolerate shallow rocky or sandy soils. It is shade-intolerant, and therefore grows along the edges of woodlot or relies on canopy openings in forests and woodlots. This species can typically be associated with the following ELC communities: FOD typically on moist rich soils along forest edges or in forest openings.	The Kentucky Coffee-tree is rare throughout its range, which extends from the southern Great Lakes region east to New York in scattered localities, south to Oklahoma and Arkansas, and west to Kansas and Nebraska. In Canada, it is only found in southwest Ontario where it was documented at 20 locations in 2000.	Niagara Upper Tier SAR List	Yes Deciduous forest is present within the study area	Yes The edge of the deciduous forest identified during site investigation may be suitable habitat. No The species was not observed during site investigation. However, floral surveys were not completed.	Suitable habitat may be present within the deciduous forest identified during site investigation; however this habitat is outside of the Phase 1 development footprint. No action is required at this time.
Plants	Red Mulberry *Morus rubra*	END	END Schedule 1	END	In Ontario, Red Mulberry grows in moist, forested habitats and on both sandy and limestone-based loamy soils. It is often found in areas where the forest canopy is quite open and allows lots of sunlight to reach the forest floor, but it will tolerate some shade. This species can typically be associated with the following ELC communities: FOD6, FOD7, FOD9 and FOD9	Red Mulberry occurs in eastern North American forests. In Canada, it is only found in the Carolinian Zone (the small area of Ontario southwest of Toronto to Sarnia down to the shores of Lake Erie) near rivers, the shores of Lake Erie, and the slopes of the Niagara Escarpment.	MNRF Niagra Region SAR List Niagara Upper Tier SAR List	No Deciduous forest is present however, the study area is not near the Niagara Escarpment where the species is known to occur	No Suitable habitat was not identified within the study area. No The species was not observed during site investigation. However, floral surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Plants	Round-leaved Greenbrier *Smilax rotundifolia*	THR	THR Schedule 1	THR	In Ontario, Round-leaved greenbrier is found mainly in the warmer climate of the Carolinian Forest. It prefers open moist to wet woodlands, often growing on sandy soil.	The species is found across much of eastern North America from southwestern Nova Scotia to Northern Florida, eastern Texas and North to eastern Michigan and southwestern Ontario. As of 2007, thirteen populations were known in Ontario.	MNRF Niagra Region SAR List Niagara Upper Tier SAR List	Yes Suitable habitats may be present within the study area.	Yes Suitable habitat may be present within the moist deciduous forest and swamps identified during site investigation. No The species was not observed during site investigation. However, no floral inventories were completed.	Suitable habitat may be present within the swamp communities in the Phase 1 development footprint. A floral inventory is suggested prior to vegetation removal.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1,2]	Known Species Range1, 2	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Plants	Shumard Oak Quercus shumardii	SC	SC Schedule 3	SC	Shumard Oaks prefer moist soils, and can grow close to water and in swampy areas. It typically grows in deciduous forest or along fencerows. This species can typically be associated with the following ELC communities: FOD6, FOD7, FOD9 with moist soils.	The Shumard Oak is found primarily in the south-central United States, from Indiana and Ohio west to Kansas, Oklahoma and Texas, south to the Gulf coast and Northern Florida, and east to North Carolina. Separate populations are found in Pennsylvania and Maryland. In Ontario, it grows in Essex, Kent, Elgin and Lambton counties in the southwestern part of the province, and in the Niagara Regional Municipality.	MNRF Niagra Region SAR List Niagara Upper Tier SAR List	Yes Deciduous forest is present within the study area	Yes A suitable deciduous forest was identified during site investigation. No The species was not observed during site investigation. However, floral inventories were not completed.	Suitable habitat may be present within the deciduous forest identified during site investigation, however this habitat is outside of the Phase 1 development footprint. No action is required at this time.
Plants	Spotted Wintergreen *Chimaphila maculata*	END	END Schedule 1	END	In Ontario, Spotted Wintergreen occurs in dry oak-pine woodland habitats with sandy soils. Typically, dominant tree species include White Pine, Red Oak, Black Oak, and American Beech. The species does best in semi-open habitats. The species can be associated with the following ELC communities: FOC1, FOM1, FOM2-1, FOD1 and FOD3 that are semi-open and have sandy soils.	Spotted Wintergreen ranges from New England and Michigan south to Georgia. It also occurs in Mexico and Central America. In Canada, it is only found in a few locations in southern Ontario in Norfolk County and the Niagara Region. It is believed to have been extirpated from Simcoe Kent, Middlesex and York Counties, Hamilton-Wentworth Region and the District of Muskoka. There is a record for Spotted Wintergreen in Quebec but it is believed to have been introduced and now no longer persists.	MNRF Niagra Region SAR List Niagara Upper Tier SAR List	Yes Deciduous forest is present within the study area.	No Suitable habitat was not identified within the study area. No The species was not observed during site investigation. However, floral inventories were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Plants	Swamp Rose-mallow Hibiscus moscheutos	SC	SC Schedule 1	SC	In Ontario, Swamp Rose-mallow is restricted to shoreline marshes, in the Carolinian and Great Lakes - St. Lawrence forest regions, associated with lakes Erie, Ontario or St. Clair. Swamp Rose-mallow is most commonly found in deep-water cattail marshes and in meadow marshes. It reaches its greatest numbers in dyked wetlands, where competition from other plants is controlled and the open habitat is maintained by periodic flooding. It is also found in open wet woods, thickets, spoil banks, and drainage ditches This species can typically be associated with the following ELC communities: MAS2-1 and MAM.	The Swamp Rose-mallow range in North America extends from the lower Great Lakes region south to Florida and west to New Mexico. It may be adventive (introduced and locally common) farther west. In Ontario, it has been found at approximately 60 to 70 sites and is believed to currently occur at about 50 sites. Most sites are in coastal marshes of Lake Erie and Lake St. Clair. However, in the last 15 years, plants have colonized sites on the shores of Lake Ontario, expanding the distributon Northwards. The species has also been introduced to Europe where it is locally common.	NHIC Online Web Tool 17PH45 MNRF Niagra Region SAR List Niagara Upper Tier SAR List	No No coastal marshes are present within the study area.	No Suitable habitat was not identified within the study area No The species was not observed during site investigation. However, floral inventories were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1,2]	Known Species Range1, 2	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Plants	Virginia Mallow *Sida hermaphrodita*	END	END Schedule 1	END	Virginia mallow grows in riparian habitats that are flooded in most years. It benefits from this moist environment and is usually found in sunny or partly shaded areas with sandy soils. Loose sandy or rocky soils of scoured diversions and floodplains, and disturbed areas along roadsides and railroad banks are its preferred habitats.	Virginia mallow is found from the Appalachian Mountains to the Mississippi and Atlantic watersheds. In Ontario, it is found in only two sites, in Haldimand County, and the Niagara Region.	MNRF Niagara Region SAR List Niagara Upper Tier SAR List	Yes The Welland Canal is present within the study area.	Yes Suitable habitat may be present along the flooded railway line and roadside banks. No The species was not observed during site investigation. However, floral inventories were not completed.	Suitable habitat may be present along the railway line ditch and banks of the Indian Creek Drain within the Phase 1 development footprint. A floral inventory is suggested prior to vegetation removal.
Plants	White Wood Aster *Eurybia divaricata*	THR	THR Schedule 1	THR	White wood aster grows in open, dry deciduous forests that are dominated by Sugar maple and American beech trees. It is often found mixed in with other asters. The plant does best in well-drained soils and it may prefer a low level of disturbance, as it has been found to grow along trails. It does well in partial to full shade.	White wood aster ranges from New England south to Georgia and Alabama. In Canada, it is restricted to a relatively small number of sites in the Niagara region and a few woodlots in southwestern Quebec.	MNRF Niagara Region SAR List Niagara Upper Tier SAR List	Yes Deciduous forest is present within the study area	No Suitable habitat was not identified within the study area. The deciduous forest present is likely too wet to support the species. No The species was not observed during site investigation. However, floral inventories were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Reptiles	Blanding's Turtle *Emydoidea blandingii*	THR	THR Schedule 1	THR	Blanding's Turtles live in shallow water, usually in large wetlands and shallow lakes with lots of water plants. It is not unusual, though, to find them hundreds of metres from the nearest water body, especially while they are searching for a mate or traveling to a nesting site. Blanding's Turtles hibernate in the mud at the bottom of permanent water bodies from late October until the end of April. This species can typically be associated with the following ELC communities: SWT2, SWT3, SWD, SWM, MAS2, SAS1, SAM1, where open water is present.	The Blanding's Turtle is found in and around the Great Lakes Basin, with isolated populations elsewhere in the United States and Canada. In Canada, the Blanding's Turtle is separated into the Great Lakes-St. Lawrence population and the Nova Scotia population. Blanding's Turtles can be found throughout southern, central and eastern Ontario.	MNRF Niagara Region SAR List Niagara Upper Tier SAR List	Yes Provincially significant wetlands are located within the study area.	No Wetlands within the study area are all small treed swamps with little to No open water. No significant wetlands adjacent to the study area. No The species was not observed during site investigation. However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Reptiles	Common Five-lined Skink (Carolinian population) *Plestiodon fasciatus*	END	END Schedule 1	END	Common Five-lined Skinks like to bask on sunny rocks and logs to maintain a preferred body temperature (28-36°C). During the winter, they hibernate in crevices among rocks or buried in the soil. There are two populations of Common Five-lined Skink in Ontario and they each occupy different types of habitat. The Carolinian population can be found under woody debris in clearings with sand dunes, open forested areas, and wetlands This species can typically be associated with the following ELC communities: SDO, SDS, SDT, TPS, CUS, CUW, FOM, FOD and MAM where suitable cover and basking habitat is present.	In Canada, the species is limited to two distinct areas, along the southern margin of the Canadian Shield, and in the Carolinian Zone where it is found near the shores of Lakes Erie, St. Clair and Huron.	MNRF Niagara Region SAR List Niagara Upper Tier SAR List	Yes Cultural woodland, deciduous forest and meadow marsh are present within the study area.	No Suitable habitat was not identified within the study area No The species was not observed during site investigation. However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Reptiles	*Eastern Hog-Nosed Snake* *Heterodon platirhinos*	THR	THR Schedule 1	THR	The Eastern Hog-Nosed Snake specializes in hunting and eating toads, and usually only occurs where toads can be found. Eastern Hog-Nosed Snakes prefersandy, well-drained habitats such as beaches and dry forests where they can lay their eggs and hibernate. They use their up-turned snout to dig burrows below the frost line in the sand where eggs are deposited. This species can be associated with the following ELC codes: BBO and FOD. Sandy soils required.	The Eastern Hog-Nosed Snake is only found in eastern North America, with about ten per cent of its range occurring in Canada. The Canadian population is limited to Ontario where it can be found in two areas: The Carolinian Region and Great Lakes-St. Lawrence Region.	Ontario Nature Reptile and Amphibian Atlas Niagara Upper Tier SAR List	Yes Deciduous forest is present within the study area.	Yes Suitable habitat may be present within the deciduous forest. No The species was not observed during site investigation. However, species specific surveys were not completed.	Suitable habitat may be present within the FOD community identified during site investigation; however this habitat is outside of the Phase 1 development footprint. No futher action required at this time.
Reptiles	*Eastern Musk Turtle (Stinkpot)* *Sternotherus odoratus*	THR	THR Schedule 1	SC	Eastern Musk Turtles are found in ponds, lakes, marshes and rivers that are generally slow-moving have abundant emergent vegetation and muddy bottoms that they burrow into for winter hibernation. Nesting habitat is variable, but it must be close to the water and exposed to direct sunlight. Nesting females dig shallow excavations in soil, decaying vegetation and rotting wood or lay eggs in mustrat lodges, on the open ground or in rock crevices. This species can typically be associated with the following ELC communities: MAS, OAO, SAS, SAM and SAF. Nesting habitat can be any upland areas adjacent these area that are exposed to direct sunlight.	In Canada, the Eastern Musk Turtle is found mostly along the southern edge of the Canadian Shield in Ontario and Quebec. In Ontario, it also occurs at various locations throughout southwestern and eastern Ontario. The limited data available indicate that the stinkpot has disappeared from much of its original range in southwestern Ontario.	Ontario Nature Reptile and Amphibian Atlas MNRF Niagara Region SAR List	No The Welland Canal is present within the study area; however it does not provide an abundance of vegetation that this species requires	No No suitable habitat was observed during site investigation. No The species was not observed during site investigation. However, species specific surveys were not completed	Suitable habitat was not confirmed during site investigation. No further action required.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1,3]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Reptiles	*Eastern Ribbonsnake* *Thamnophis sauritus*	SC	SC Schedule 1	SC	The Eastern Ribbonsnake is usually found close to water, especially in marshes, where it hunts for frogs and small fish. A good swimmer, it will dive in shallow water, especially if it is fleeing from a potential predator. At the onset of cold weather, these snakes congregate in underground burrows or rock crevices to hibernate together. This species can typically be associated with the following ELC communities: FOC, FOM, FOD, SWC, SWM, SWD, MAM, MAS, OAO, SAS, SAM and SAF containing or near year round standing or flowing water.	The Eastern Ribbon Snake is found from southern Ontario west to Michigan and Wisconsin (isolated pockets), south to Illinois and Ohio, and east to New York State and Nova Scotia, where there is an isolated population. In Ontario, this snake occurs throughout southern and eastern Ontario and is locally common in parts of the Bruce Peninsula, Georgian Bay and eastern Ontario.	MNRF Niagara Region SAR List Niagara Upper Tier SAR List	No Neither of the two known populations of this species are near the study area.	Yes Suitable habitat may be present within the swamp and marsh communities identified during site investigation. No The species was not observed during site investigation. However, species specific surveys were not completed.	Suitable habitat may be present in the deciduous swamps and meadow marsh in the Phase 1 development footprint. It is recommended to complete species specific surveys to ensure No snakes are present or snake hibernaculum prior to vegetation removal and construction within the footprint.
Reptiles	Gray Ratsnake *(Carolinian population)* *Pantherophis spiloides*	END	END Schedule 1	END	The two populations of Gray Ratsnake in Ontario can be found in different types of habitat. The Frontenac Axis population requires a variety of habitat types including deciduous forests, wetlands, lakes, rocky outcrops and agricultural fields. The Carolinian population is found in a mix of agricultural land and deciduous forest, preferring habitat where forest meets more open environments. Adults are strongly attached to their home ranges and often return to the same nesting and hibernation sites. They often lay eggs in logs or compost piles that serve as incubators. Sometimes several females will use the same site to deposit eggs.	Gray Ratsnakes are widely distributed throughout the eastern and central United States, extending as far North as southern Ontario. There are two widely separated populations in Ontario: the Carolinian in southwestern Ontario and the Frontenac Axis in southeastern Ontario.	Ontario Nature Reptile and Amphibian Atlas MNRF Niagra Region SAR List Niagara Upper Tier SAR List	Yes Deciduous forest, wetlands and agricultural fields are present within the study area	No No suitable habitat was observed during site investigation. No The species was not observed during site investigation. However, no species specific surveys were completed.	Suitable habitat may be present within the cultural meadow, deciduous swamps and agricultural fields in the Phase 1 development footprint. It is recommended to complete species specific surveys to ensure No snakes are present or snake hibernaculum prior to vegetation removal and construction within the footprint.
Reptiles	Massasauga *Sistrurus catenatus*	THR	No Status	THR	Massasaugas live in different types of habitats throughout Ontario, including tall grass prairie, bogs, marshes, shorelines, forests and rivers. Within all of these habitats, Massasaugas require open areas to warm themselves in the sun. Pregnant females are most often found in open, dry habitats such as rock barrens or forest clearings where they can more easily maintain the body temperature required for the development of their offspring. Non-pregnant females and males forage and mate in lowland habitats such as grasslands, wetlands, bogs and the shorelines of lakes and rivers. Massasaugas hibernate underground in crevices in bedrock, sphagnum swamps, tree root cavities and animal burrows where they can get below the frost line but stay above the water table. This species can be associated with the following ELC communities: TP, BO, MA, FO, AL, RB, and CUM with open areas.	In Canada, the Massasauga is found only in Ontario, primarily along the eastern side of Georgian Bay and on the Bruce Peninsula. Two small populations are also found in the Wainfleet Bog on the Northeast shore of Lake Erie and near Windsor. The Massasauga was once more widespread in southwestern Ontario, especially along the shores of the Great Lakes.	Ontario Nature Reptile and Amphibian Atlas MNRF Niagra Region SAR List Niagara Upper Tier SAR List	Yes Wainfleet Bog, which has a known population of this species is located west of the Welland Canal.	No No suitable habitat was observed during site investigation. No The species was not observed during site investigation. However, no species specific surveys were completed.	Suitable habitat was not confirmed during site investigation. The known population of Massasaugas and it's habitat are located on the opposite side of the Welland Canal from the study area. No further action required.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1,2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Reptiles	Milksnake Lampropeltis triangulum	SC	SC Schedule 1	SC	The Milksnake can be found in a range of habitats including rocky outcrops, fields and forest edges. In southern Ontario, it is often found in old farm fields and farm buildings where there is an abundance of mice. The Milksnake hibernates underground, in rotting logs or in the foundations of old buildings. This species can be associated with the following ELC communities: BL, TA, AL, RB, TP, CUM, FOC, FOM and FOD.	The Milksnake range extends from Quebec and Maine south to Alabama and Georgia, and west to Minnesota and Iowa. In Ontario, it is widespread and locally common in southern Ontario, and can be found as far North as Lake Nipissing and Sault Ste. Marie	Ontario Nature Reptile and Amphibian Atlas NHIC Online Web Tool 17PH45 MNRF Niagra Region SAR List Niagara Upper Tier SAR List	Yes Cultural meadow and deciduous forest are present within the study area.	Yes Suitable habitat may be present within the meadows and farmland identified during site investigation. No The species was not observed during site investigation. However, no species specific surveys were completed.	Suitable habitat may be present within the Phase 1 development footprint as it contains fields, forest edges, meadows and farm buildings. It is recommended to complete species specific surveys to ensure No snakes are present or snake hibernaculum prior to vegetation removal and construction within the footprint.
Reptiles	*Northern Map Turtle* *Graptemys geographica*	SC	SC Schedule 1	SC	The Northern Map Turtle inhabits rivers and lakeshores where it basks on emergent rocks and fallen trees throughout the spring and summer. In winter, the turtles hibernate on the bottom of deep, slow-moving sections of river. They require high-quality water that supports the female's molluse prey. Their habitat must contain suitable basking sites, such as rocks and deadheads, with an unobstructed view from which a turtle can drop immediately into the water if startled. This species can typically be associated with the following ELC communities: OAO, SA with emergent rocks and fallen trees suitable habitat for prey.	The Northern Map Turtle's range extends from the Great Lakes region west to Oklahoma and Kansas, south to Louisiana and east to the Adirondack and Appalachian mountain barrier. There are isolated populations in New Jersey and New York states. In Canada, it is found in southwestern Quebec and southern Ontario. In southern Ontario, it lives primarily on the shores of Georgian Bay, Lake St. Clair, Lake Erie and Lake Ontario, and along larger rivers including the Thames, Grand and Ottawa.	MNRF Niagra Region SAR List Niagara Upper Tier SAR List	No The Welland Canal is present within the study area; however it does not provide adequate vegetation and basking habitat for this species.	No Suitable habitat was not identified within the study area. No The species was not observed during site investigation. However, species specific surveys were not completed.	Suitable habitat may be present within the Welland Canal. This is directly adjacent to the Phase 1 development footprint. Species specific surveys are suggested prior to construction.
Reptiles	Snapping Turtle Chelydra serpentina	SC	SC Schedule 1	SC	Snapping Turtles spend most of their lives in water. They prefer shallow waters so they can hide under the soft mud and leaf litter, with only their noses exposed to the surface to breathe. During the nesting season, from early to mid summer females travel overland in search of a suitable nesting site, usually gravelly or sandy areas along streams. Snapping Turtles often take advantage of man-made structures for nest sites, including roads (especially gravel shoulders), dams and aggregate pits. This species can typically be associated with the following ELC communities: OAO, SA near gravelly or sandy areas.	The Snapping Turtle's range extends from Ecuador to Canada. In Canada this turtle can be found from Saskatchewan to Nova Scotia. It is primarily limited to the southern part of Ontario. The Snapping Turtle's range is contracting.	Ontario Nature Reptile and Amphibian Atlas MNRF Niagra Region SAR List Niagara Upper Tier SAR List	Yes Suitable habitat may be present within a few small open water areas within the study area	Yes The pond located in Ramey Road Wetland may be suitable habitat. No The species was not observed during site investigation. However, species specific surveys were not completed	Suitable habitat may be present within the study area, however this habitat is outside of the Phase 1 development footprint. No futher action required at this time.

Taxonomy	Species	ESA Status	SARA Status	COSEWIC Status	Preferred Habitat[1, 2]	Known Species Range[1, 2]	Source Identifying Species Record	Suitable Habitat Identified During Background Review	Species/Habitat Observed During Field Investigations	Conclusions/ Recommendations
Reptiles	Spiny Softshell *Apalone spinifera*	THR	THR Schedule 1	THR	Spiny Softshells are highly aquatic turtles that rarely travel far from water. They are found primarily in rivers and lakes but also in creeks and even ditches and ponds near rivers. Key habitat requirements are open sand or gravel nesting areas, shallow muddy or sandy areas to bury in, deep pools for hibernation, areas for basking, and suitable habitat for crayfish and other food species. These habitat features may be distributed over an extensive area, as long as the intervening habitat doesn't prevent the turtles from traveling between them. This species can typically be associated with the following ELC communities: OAO characterized as rivers with nearby open sand or gravel nesting areas, shallow muddy or sandy substrates, deep pools, basking areas and suitable habitat for food species.	In Canada, the Spiny Softshell is found only in Quebec and southwestern Ontario in the Lake St. Clair, Lake Erie and western Lake Ontario watersheds. The majority of Spiny Softshells in Ontario are found in the Thames and Sydenham rivers and at two sites in Lake Erie. The size of the home range of this turtle depends on availability of habitat features such as nesting and hibernation sites. Some turtles travel up to 30 kilometres in a year from one part of their home range to another.	MNRF Niagara Region SAR List	Yes The Welland Canal is present within the study area.	No Suitable habitat was not identified within the study area. The Welland Canal does not provide suitable basking and nesting habitat. No The species was not observed during site investigation. However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.
Reptiles	Spotted Turtle *Clemmys guttata*	END	END Schedule 1	END	The Spotted turtle is semi-aquatic and prefers ponds, marshes, bogs and even ditches with slow-moving, unpolluted water and an abundant supply of aquatic vegetation. They are found in different types of wetlands throughout the province, depending on the types of habitats that are available. Females dig their nests in sunny locations where there is not a lot of woody vegetation. This species usually hibernates in wetlands or seasonally wet areas associated with structures including overhanging banks, hummocks, tree roots, or aquatic animal burrows.	In Canada, the Spotted turtle is found primarily in Ontario along the north shore of Lake Erie, in the Georgian Bay area and in scattered locations throughout southern and eastern Ontario. Over the last 30 to 40 years, Spotted turtles have declined significantly and are no longer found at several sites in southern Ontario. It is difficult to estimate the Ontario population size, but recent data suggests there are approximately 2000 individual Spotted turtles spread throughout several small, scattered populations. Of the handful of known populations, only a few are large enough to ensure long-term survival.	Niagara Upper Tier SAR List	No Suitable wetlands are not present within the study area.	No No suitable wetland habitat was not identified within the study area. Wetlands present are small and disturbed. No The species was not observed during site investigation. However, species specific surveys were not completed.	Suitable habitat was not confirmed during site investigation. No further action required.

ATTACHMENT E – CITY OF PORT COLBORNE EIS REQUIREMENTS

4.1.2 Plans and Studies

4.1.2.1 General

Where a *significant development* such as a golf course, residential subdivision or a large commercial, or industrial *development* is proposed that requires a number of different environmental studies, an integrated review of the environmental issues and the interrelationships among them shall be submitted with the application. Such a review shall not be required where an equivalent review has been prepared for the proposal under Federal or Provincial legislation such as the *Environmental Assessment Act* or the *Aggregate Resources Act* review.

4.1.2.2 Environmental Impact Study

a) An Environmental Impact Study shall be carried out by professionals qualified in the field of environmental sciences and acceptable to the City, the Regional Municipality of Niagara, and the Niagara Peninsula Conservation Authority, as required. Prior to the commencement of the Study, Terms of Reference, prepared by the applicant, or consultant acting on behalf of the applicant, acceptable to the City of Port Colborne shall be prepared in consultation with the Niagara Peninsula Conservation Authority, the Region and any other applicable agencies.

b) In general the Environmental Impact Study (EIS) shall include:

   i) A description of and statement of the rationale for the proposal and alternatives to the proposal;

   ii) A description of adjacent land use and the existing regulations affecting the proposal and *adjacent lands*;

   iii) A description of the proposed undertaking, including a location map showing proposed buildings, existing land uses and buildings, existing vegetation, fauna, site topography, drainage, hydrology, soils and habitat areas;

   iv) A description of all natural features and functions, including hydrologic, surface and ground water functions, on site and on *adjacent lands* that might directly or indirectly be affected by the proposal;

   v) A description of alternate forms that the proposal could take including an assessment of the advantages and disadvantages of each;

   vi) An assessment of the impacts that might reasonably be caused to the natural features and functions by the proposal including the cumulative effect of the impacts;

vii) An identification and evaluation of the actions necessary to prevent, change, mitigate or remedy any assessed impacts upon natural heritage features and functions and the alternative methods of protecting the functions and values of the areas affected;

viii) A concluding statement that the policy objectives of the Environmental Protection Area or Environmental Conservation Area designation are being complied with;

ix) The required scope and/or content of an EIS may be reduced in consultation with the appropriate agencies where;

a) The environmental impacts of the *development* are thought to be limited; or
b) Other environmental studies fulfil all or some of the requirements

x) Any other information required by the City, the Ministry of Natural Resources, the Niagara Peninsula Conservation Authority, or the Region that is deemed necessary to evaluate the proposal in relation to the Natural Heritage Feature identified; and

xi) For *development* or *site alteration* within or adjacent to an Environmental Conservation Area within the Urban Area Boundary, an EIS shall be prepared to the satisfaction of the Region and in consultation with the City and the Niagara Peninsula Conservation Authority. *Development* or *site alteration* within or adjacent to Environmental Conservation Areas outside the Urban Area Boundary, as well as adjacent to Environmental Protection Areas requires the preparation of an EIS to the satisfaction of the Region in consultation with the City, the Niagara Peninsula Conservation Authority and the Ministry of Natural Resources, as required.

xii) An EIS is not required for uses authorized under an Environmental Assessment process, carried out in accordance with Provincial and/or Federal legislation.

4.1.2.3 Watershed Plans

a) The City shall participate with the Region and Niagara Peninsula Conservation Authority, landowners and community groups in ensuring *watershed* plans are prepared for major *watersheds* at the broad landscape level that include;

i) An inventory and assessment of ecological features and functions in the *watershed*;

ii) Identification of key issues and objectives;

ATTACHMENT F – NPCA CORRESPONDENCE

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 0A1
www.aecom.com

905 682 0212 tel
905 682 4495 fax

August 8, 2014

Project # 60322620

SENT VIA E-MAIL

Ms. Suzanne McInnes
Manager, Planning Review & Regulations
Niagara Peninsula Conservation Authority
250 Thorold Road West, 3rd Floor
Welland, Ontario L3C 3W2

Subject: Site Servicing of the East Side Employment Lands
NOTICE OF STUDY COMMENCEMENT & REQUEST FOR INFORMATION

Dear Ms. McInnes:

Please find attached the Notice of Study Commencement for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Municipal Class Environmental Assessment* (Class EA). This public notice was recently published on the City's website and in local newspapers and is now being sent to you because we would like NPCA comments regarding this important infrastructure project. Further information is provided below.

Study Background

This Class EA study is being completed under the Municipal Engineers Association Master Planning Process and was initiated by the City of Port Colborne to allow for future industrial park development of the East Side Employment Lands (see map in attached notice). Key components of the EA study include the provision of municipal water and sanitary sewer systems, stormwater management and road network improvements. The project team will examine a full range of alternatives and improvements to identify a preferred municipal servicing strategy that could be implemented in phases as development proposals come forward.

Request for Information

In order to evaluate the design alternatives through the Class EA process, we would appreciate receiving the following digital information, if available:

- Stormwater management design standards;
- Floodplain data, including watercourses and NPCA regulated-areas, if applicable;
- Mapping of natural heritage features including ANSIs, ESAs and wetlands;
- Mapping of any known species of concern or species at risk (flora/fauna);
- Woodlots and any other natural areas of significance;

- ELC vegetation/community series mapping;
- Fish collection record summaries; and
- NPCA property boundaries, if applicable.

For your use we have attached a shapefile which shows the area for which we are requesting the above data (includes study area and surrounding lands). Should you require any further information regarding this information request, please do not hesitate to contact me.

Next Steps

Recognizing that NPCA will be a key stakeholder in this important project, we will continue to keep you informed of study progress, including an upcoming Public Information Centre and study recommendations, tentatively scheduled for early 2015. Information will also be posted on the City's website as it becomes available (www.portcolborne.ca > City Services > Engineering > Current Studies).

In the meantime, if you have any questions or comments or would like to arrange an introductory meeting, please do not hesitate to contact me at the number provided below. Alternatively, you may also send comments to the project email address at SSESEL@portcolborne.ca or contact the City's Manager of Engineering Services, Jim Huppunen, at 905-835-2900 ext. 221.

Sincerely,

AECOM Canada Ltd.

Jennifer Whittard, B.E.S., PMP
Assistant Project Manager
jennifer.whittard@aecom.com
905-346-3744

Encl.

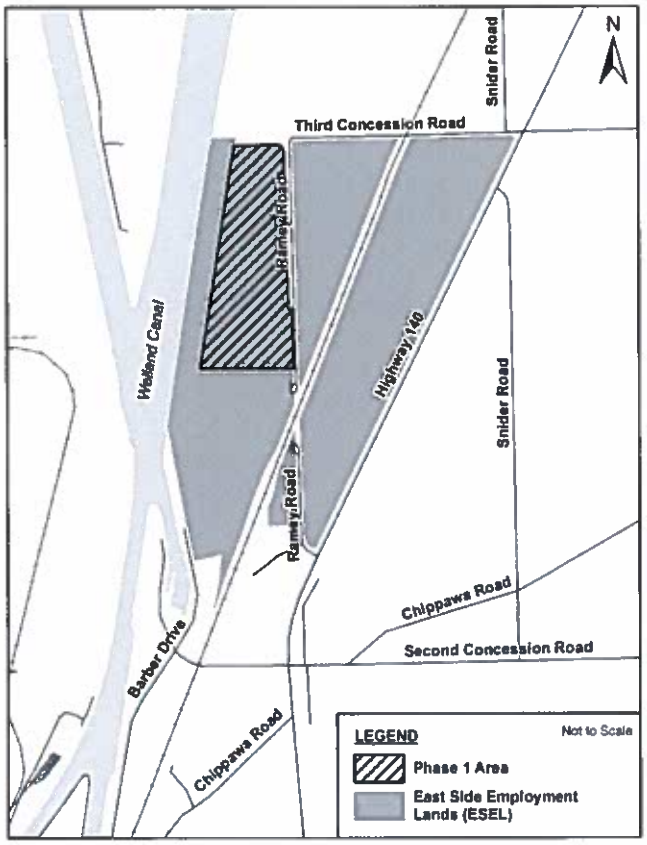
cc: Cam D'Angelo, CAO, NPAC
Steve Miller, Supervisor, Water Resources, NPCA
Jim Huppunen, City of Port Colborne
Mark Swan/Karl Grueneis, AECOM
SSESEL@portcolborne.ca

NOTICE OF STUDY COMMENCEMENT
SITE SERVICING OF THE EAST SIDE EMPLOYMENT LANDS
CLASS ENVIRONMENTAL ASSESSMENT STUDY
CITY OF PORT COLBORNE

PORT COLBORNE

THE STUDY

To allow for future industrial park development, the City of Port Colborne is starting a Municipal Class Environmental Assessment (EA) Study for site servicing of the East Side Employment Lands (ESEL) Phase 1 area (see map). The ESEL form part of Niagara Region's Niagara Gateway Economic Zone and Centre, which was first identified in the Provincial Growth Plan for the Greater Golden Horseshoe. The ESEL have been identified by the City as a priority for investment to enable and support development of these lands. Key components of the EA Study include the provision of municipal water and sanitary sewer systems, stormwater management, and road network improvements.



THE PROCESS

The EA Study will be completed in keeping with the Ontario *Environmental Assessment Act*, and will follow the Master Planning Process of the Municipal Engineers Association. The Master Plan follows Approach #2 which will fulfill the requirements for Schedule A, A+, and Schedule B projects. The project team will examine a full range of alternatives and improvements and identify a preferred municipal servicing strategy for the ESEL that could be implemented in phases as development proposals come forward.

HOW TO GET INVOLVED

The City of Port Colborne wants anyone with an interest in the study to have an opportunity to provide input, which will help the project team in the decision-making process. A Public Information Centre (PIC) will be held in early 2015 to present the problem/opportunity statement and recommended servicing strategy. Advanced notification of the PIC will be advertised on the City of Port Colborne website and in similar newspaper advertisements. Comments from review agencies and members of the public are encouraged now and throughout the study. Information regarding this study will be posted on the City's website as it becomes available (www.portcolborne.ca > City Services > Engineering > Current Studies). In addition, a project email address has been established: SSESEL@portcolborne.ca. Comments and requests to be added to the study mailing list can be sent to the project email address or you can contact:

Mr. Jim Huppunen, A.Sc.T.
Manager of Engineering Services
City of Port Colborne
66 Charlotte Street
Port Colborne, Ontario, L3K 3C8
Tel: (905) 835-2900 ext. 221
Fax: (905) 835-2939

Under the Freedom of Information and Protection of Privacy Act and the Environmental Assessment Act, unless otherwise stated in the submission, any personal information such as name, address, telephone number and property location included in a submission will become part of the public record files for this matter and may be released, if requested, to any person.

This notice issued July 25, 2014
www.portcolborne.ca

Mollo, Jessica

Subject: RE: Notice of Study Commencement - Site Servicing of the East Side Employment Lands, Port Colborne

---

From: Widdifield, Lara [mailto:
Sent: Thursday, August 21, 2014 12:59 PM
To: Whittard, Jennifer
Subject: FW: Notice of Study Commencement - Site Servicing of the East Side Employment Lands, Port Colborne

Hi Jennifer,

Thank you for circulating us on the above study notice. Please add me to the contact list as the contact person from the NPCA for this file.

The study area is constrained by several minor watercourses and one watercourse with an upstream drainage area greater than 125ha. These watercourses are afforded 15m buffer zones that should be maintained in a naturalized state.

The study area lies within two sub-watersheds tributary to the Central Welland River: the CWR Welland Canal South, which drains to the west to the Canal, and CWR Indian Creek, which discharges toward the east.

I have attached a map of NPCA Regulated Areas (which also shows the subwatershed Boundary), for your reference. The NPCA would appreciate being circulated on the study documents as they become available.

I trust the above is sufficient for your needs at this time, however should you have any questions or concerns, please contact the undersigned.

Regards,

Lara Widdifield, C.E.T.
Supervisor, Construction Permit Approvals
Niagara Peninsula Conservation Authority
250 Thorold Road West, 3rd Floor
Welland, ON, L3C 3W2
Phone: 905-788-3135 ext. 229
Fax: 905-788-1121
Email:
Website: www.npca.ca

From: McInnes, Suzanne
Sent: August 11, 2014 8:35 AM
To: Widdifield, Lara
Cc: Miller, Steve; D'Angelo, Carmen; Graham, Peter
Subject: FW: Notice of Study Commencement - Site Servicing of the East Side Employment Lands, Port Colborne

Hi Lara, can you take the lead on this file please.

Thanks.

Suzanne McInnes, MCIP, RPP
Manager, Plan Review and Regulation
Niagara Peninsula Conservation Authority
250 Thorold Road West, 3rd Floor
Welland, Ontario L3C 3W2
phone: (905) 788-3135 ext. 235
fax: (905) 788-1121

www.npca.ca

From: Whittard, Jennifer [mailto:Jennifer.Whittard@aecom.com]
Sent: Friday, August 08, 2014 5:48 PM
To: McInnes, Suzanne
Cc: D'Angelo, Carmen; Miller, Steve; 'ssesel@portcolborne.ca'
Subject: Notice of Study Commencement - Site Servicing of the East Side Employment Lands, Port Colborne

Hi Suzanne,

On behalf of the City of Port Colborne, please find attached the Notice of Study Commencement for the City's **Site Servicing of the East Side Employment Lands Municipal Class Environmental Assessment**. Also attached is a covering letter which provides additional information and a GIS shapefile to facilitate our information request.

We will continue to keep you informed as the project progresses, but in the meantime, please let us know if you have any questions or comments or require further information.

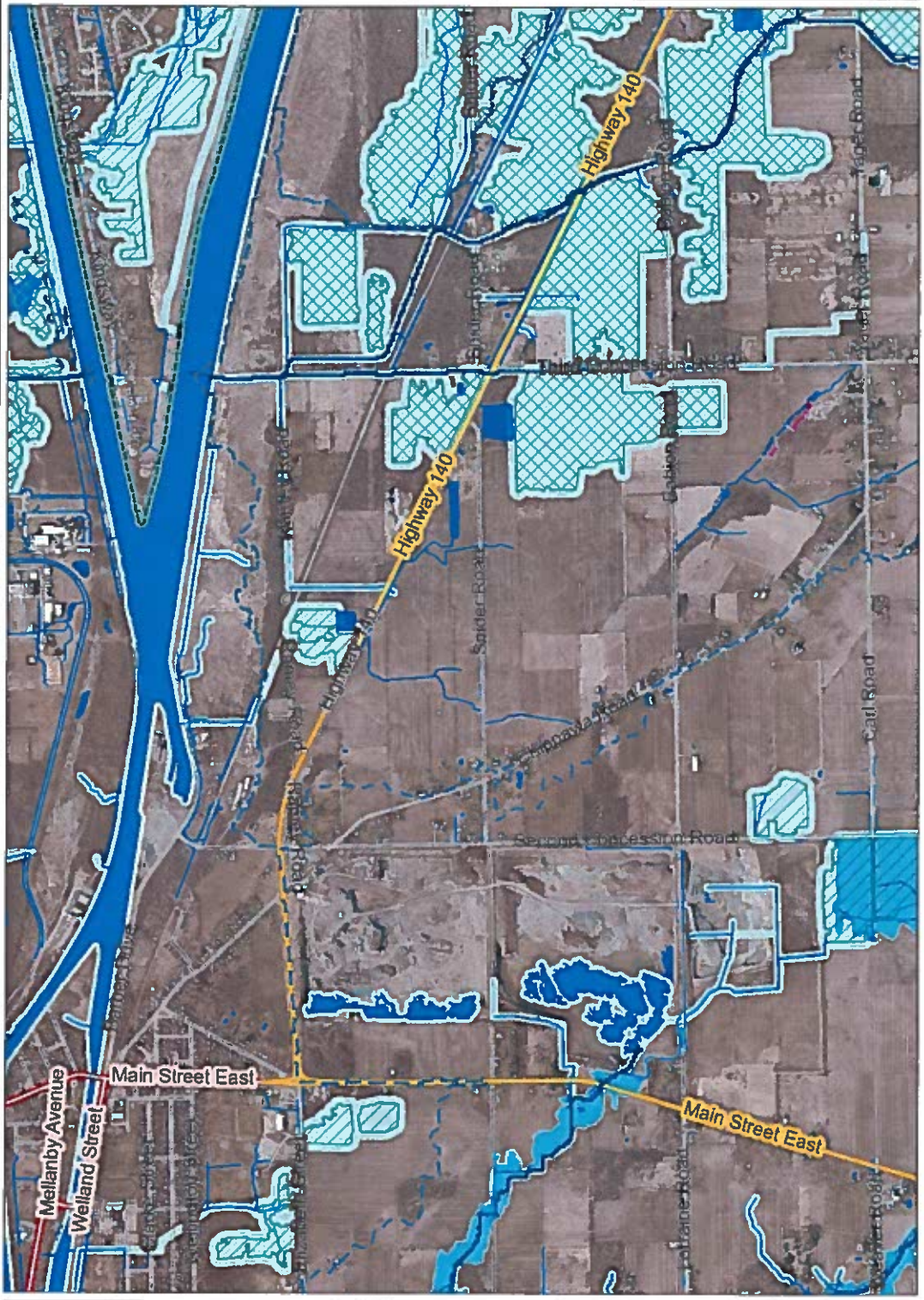
Thanks,
Jen

Jennifer Whittard, B.E.S., PMP
Assistant Project Manager, Water
905.346.3744
jennifer.whittard@aecom.com

AECOM
30 Hannover Drive, St. Catharines, ON L2W 1A3
T 905.682.0212 F 905.682.4495
www.aecom.com

NIAGARA PENINSULA CONSERVATION AUTHORITY

Site Servicing East Side Employment Lands EA, PC



Legend

- Subwatersheds (2K)
- NPCA APPROXIMATE REGUL
- Regulated Floodplain Extent
  - Advisory (CWR)
  - Regulated
- Reaches Draining 125ha Requi
- DRAFT Slope Features
  - Connectors
  - Top of Slope
  - Toe of Slope
  - Watercourse As Toe of Slope
  - Watercourse Centerline
- OWES WETLANDS
  - Non-Provincially Significant Wetland
  - Provincially Significant Wetland
- RMN Streets
  - Provincial
  - Regional
  - Municipal Other
- MEMBER MUNICIPALITY Labe
- Member Municipal Boundary Li
- 2K HydroPoly
- 2K Hydrography
- NPCA Watershed Municipalities
- 2010 Niagara Air Photos

1: 26,144
8/21/2014

Notes

Showing NPCA Regulated areas and Sub-Watershed Boundaries

1.3 0 0.66 1.3 Kilometers

ATTACHMENT G – TALL BONESET MEMO

AECOM
50 Sportsworld Crossing Road, Suite 290
Kitchener, ON, Canada N2P 0A4
www.aecom.com

519.650.5313 tel
519.650.3424 fax

Memorandum

To	File	Page	1-3
CC			
Subject	Tall Boneset Relocation: City of Port Colborne Site Servicing of the East Side Employment Lands		
From	Kasey McKenzie and Jill DeMan, AECOM		
Date	January 13, 2015	60322620	

Introduction

On October 2nd 2015, tall boneset (*Eupatorium altissimum*) was observed along Trillium Railway corridor in the City of Port Colborne. Tall boneset is ranked as S1 Critically Imperiled, in the province of Ontario. As such, the following technical memo has been prepared in response to the proposed development of the East Side Employment Lands and to accompany the Natural Heritage Review Memo. This will require the relocation of the observed tall boneset specimens.

Habitat

Tall boneset's most prominent population is on Pelee Island in the Province of Ontario, but is frequently being found along railway corridors (OMNRF, 2009). This is a perennial plant which can be found in habitats including mesic to slightly dry black soil prairies, clay prairies, gravel prairies, savannas, thickets, openings in upland forests, dry banks of lakes, limestone glades, pastures and abandoned fields, fence rows, vacant lots, and areas along railroads. Tall boneset favors disturbed areas, where it has been known to form large colonies (Hilty, J. 2002).

Identification

Leaves and stem

This perennial plant is typically 90 centimetres (cm) in height but can exceed 1 metre (m). The stem is covered with white hairs. The opposite leaves can grow up to 18 cm long and 2 cm wide (Hilty, J. 2002). The upper half of each leaf is typically toothed along the edges and usually dark green in color, lanceolate to narrowly ovate, and pubescent. There are three conspicuous veins that run along the length of each leaf (Ladd, D & Oberle, F. 2005).

Flowers

The rather flat inflorescence consists of numerous heads of small white flowers and their buds. These flowers are dull white and individually only 3 millimetres (mm) across. There is little or no floral scent. The blooming period occurs from late summer to early fall, and lasts about 1-1½ months (Hilty, J. 2002).

Reproduction

Tall boneset reproduces the following two ways: produces small dark seeds called achenes. These achenes have a tuft of white or light brown hair to carry them off in the wind. Also it can spread vegetatively through rhizomes.

Wildlife Associations

Several species of insects are attracted to this plant as a result of the nectar in the flowers. Generally, long-tongue bees, short-tongued bees, wasps, flies, butterflies, skippers and beetles are regular visitors of this plant. The bitter tasting leaves typically do not appeal to mammals of Ontario.

Provincial Rank (SRANK)

Tall boneset has been designated as S1 status within the Province of Ontario by the Ministry of Natural Resources (MNR). S1 – Critically Imperiled is described as being extremely rare (fewer than 5 occurrences) which makes this species vulnerable to extirpation throughout the province (OMNR, 2009).

Relocation

Several relocation/transplanting techniques are available when transplanting Prairie forbs such as tall boneset (*Eupatorium altissimum*). Methods include root-pruning prior to transplanting, transplanting without root-pruning, potting the plant prior to transplanting and seed collection. Through review of *A Comparison of Transplanting Times and Methods for Salvaging Prairie Forbs and Grasses* by S. Kelly Kearns (1983), it was concluded that time of day and weather conditions played a larger role than the method of transplanting. Success was at its highest when transplanting activities occurred during cool, cloudy and humid conditions (spring or fall).

Seed collection is another method which could be used to promote species reproduction. The seeds should be collected from high quality specimens and would require a stratification period (cold, damp storage) in order to succeed. The most appropriate time to collect tall boneset seeds are early October. This procedure should be undertaken by a skilled botanist to determine the ripeness of the chosen seed.

Relocation areas should be considered and evaluated during Detailed Design.

References

Iowa State University Entomology. Bugguide. 2014. Available at: http://bugguide.net/node/view/15740.

Hilty, J. (2002). Prairie Wildflowers of Illinois. Available at: http://www.illinoiswildflowers.info/prairie/plant_index.htm#tall_boneset. Date accessed August 8, 2014.

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Appendix D

Geotechnical Reports

- Geotechnical Investigation
- Preliminary Subsurface Soil Investigations
- Supplemental Geotechnical Investigation

Geotechnical Investigation

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Geotechnical Investigation
External Servicing for Proposed East Side Employment Lands
City of Port Colborne, Region of Niagara, Ontario

Prepared for:

AECOM Canada Ltd.
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St. Catharines, Ontario
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Landtek File: 14150
December 19, 2014

EXECUTIVE SUMMARY

Landtek Limited is pleased to submit the geotechnical investigation report on the proposed external servicing for the proposed east side employment lands industrial park (Site 4) in Port Colborne, Ontario. The work was authorized under a consultant agreement with AECOM and was initiated following the receipt of the authorization to proceed in July, 2014. The scope of the project includes the following:

- Forcemain installation for a distance of ±1600 m between Chippawa Road and a proposed sanitary pumping station on the west side of Ramey Road between 2nd Concession Road and 3rd Concession Road;
- Gravity sanitary sewer on Ramey Road for a distance of ±1,000 m from 3rd Concession Road southerly to the Trillium railway crossing;
- Watermain installation for a distance of ±2600 m between Chippawa Road and 3rd Concession Road;
- Reconstruction of 3rd Concession Road for a distance of ±900 m from Ramey Road to Highway 140;
- Reconstruction of Ramey Road for a distance of ±1,000 m from 3rd Concession Road southerly to the Trillium railway crossing;
- Reconstruction of two drainage structures at the Indian Creek Drain at the intersection of Ramey Road and 3rd Concession Road;

Eighteen boreholes were drilled and sampled on September 3 and 4, 2014 and November 16 and 17, 2014. Rock coring was completed at boreholes 12 and 13 to depths of 3.1 m and 1.5 m into the bedrock formation respectively. The borehole locations are shown on the site plan, Drawing 1, in Appendix C. The borehole and rock core logs are also provided in Appendix C. The distribution of the boreholes is as follows:

Boreholes 1 to 8 inclusive	Ramey Road, including borehole 4 at intersection of Ramey Road and 3rd Concession Road and borehole 7 for pumping station on Ramey Road
Boreholes 9, 10, and 11	3rd Concession Road, in sequence from west to east
Borehole 12	Chippawa Road, just west of Highway 140
Borehole 13	west side of Highway 140, just north of Chippawa Road
Boreholes 14, 15, and 16	west side of Highway 140 between 2nd Concession Road and Ramey Road
Borehole 17	west side of Highway 140, just north of 3rd Concession Road
Borehole 18	west side of Highway 140, just south of 3rd Concession Road

The ground surface elevations at the boreholes are referenced to the geodetic datum and were determined using centreline road grade elevations on base plans provided by AECOM.

SITE AND SUBSURFACE CONDITIONS

The borehole information is summarized in Table 3.1 of the report text and indicates the following;

1. Bedrock was encountered at 0.9 m depth in borehole 12 on Chippawa Road, just west of Highway 140 as well as at depths of 0.7 m, 1.1 m, 1.0 m, and 3.4 m at boreholes 13, 14, 15, and 16 respectively on the west side of Highway 140, between 2nd Concession Road and Ramey Road.
2. The predominant native overburden soil is layered silty clay that typically is stiff to very stiff in the upper 3.0 m to 3.5 m and becomes very soft and wet below these depths.
3. At borehole 7 for the proposed pumping station on Ramey Road the hole was advanced to 14.2 m and bedrock was not encountered. Dense to very dense glacial silty sand till was encountered below 11.9 m depth and the borehole was terminated in the glacial till stratum.
4. The bedrock contact information at boreholes 12 to 16 inclusive is consistent with the location of the Onondaga Bedrock Escarpment that crosses Highway 140 and defines the areas of shallow bedrock contact to the south and increasing depths to bedrock to the north.

Standpipe piezometers were installed in boreholes 2, 6, and 7 to assess groundwater conditions and piezometer water levels were taken on October 20 and 22, 2014. The water level information is summarized in Table 3.3 and indicates that the ground water table is between depths of 0.8 m to 2.0 m which relate to between elevations 174.3 m and 175.3 m.

SITE SERVICING CONSIDERATIONS

Site servicing work is expected to include watermains, gravity sewers, and forcemain installations as well as pumping station construction on Ramey Road and culvert construction at Ramey Road and 3rd Concession Road. Sections 4.1, 4.2, and 4.3 address the issues related to the pumping station, drainage structures, and excavations and ground water control.

Pumping Station

Deep excavations into very soft clay soil are subject to base heave shear failures and for a 8 m deep excavation, as an example, the information indicates that the safety factor against base heave (FS_b) is less than 1.0 such that substantial ground movement and deformation is likely to occur and an engineered ground support system that extends below the excavation base will be required for the pumping station construction. Steel sheet piling is an option however a caisson wall may be required to address the significant depth of very soft silty clay below the excavation base level.

The native silty clay below approximately 3.0 m to 3.5 m has negligible bearing strength and structural support of the pumping station will require deep foundations using either drilled caissons or driven piles. Borehole 7 indicates that potential end bearing conditions can be achieved in the dense to very dense silty sand till below 11.9 m. Based on the site conditions the following options are recommended for the sanitary pumping station:

1. Investigate an alternative pumping station site location with more favourable subsurface conditions;
2. If the proposed site at borehole 7 is to be used it is recommended that at least one additional borehole be advanced to verify the deep foundation bearing conditions with the intent of determining bedrock contact and whether the depth to bedrock provides a viable and cost-effective bearing stratum for deep foundations.

CULVERT STRUCTURES – RAMEY ROAD AT 3RD CONCESSION ROAD

Boreholes 4 and 9 were drilled at the Indian Creek Drain at the intersection of Ramey Road and 3rd Concession Road for proposed new drainage structures. Native silty clay is present to the full depth drilled of 5.0 m at both borehole locations. The bearing strength of the silty clay decreases abruptly below elevation 172.9 m with the soil being very soft and wet below about 4.0 m depth or elevation 172.0 m. The soil support conditions are not favourable for a footing supported open bottom concrete structure. A precast concrete box culvert should be a more favourable option since the structure loading can be distributed over a wide base. Preliminary information indicates the underside of the box culvert will be at about 2.5 m depth. Settlements under the box culvert should be minimal if the average loading on the soil is comparable to the existing weight of the soil to be removed. For design purposes the average loading across the bottom of the precast box structure should not exceed 55 kPa (1,150 psf) and the support of the box structure should be as indicated in Figure 4.

PRE-BID/PRE-DESIGN TEST PITS

Excavation base stability and groundwater control will be key design and construction issues and it is recommended that investigative test pits be excavated in areas of very soft silty clay overburden soils where deep sewer trench work is proposed or where the sanitary pumping station is proposed.

EXECUTIVE SUMMARY

Watermain and forcemain trenches are not expected to exceed about 3 m in depth and should not present a high risk of either groundwater infiltration or excavation base heave.

Investigative pre-bid test pits should be mandatory viewing for contractors at the time of tender in order that they can make their own assessment of how the ground conditions will impact their operation and productivity. If pre-design test pits are carried out the conditions should be documented as supplementary information to this geotechnical report and should be provided to all bidders. The pre-design test pits will help determine whether pay items should be setup to address dewatering or ground support systems.

The full text of the report provides additional details and recommendations with respect to soils and groundwater, excavations, backfill, and pipe bedding, and asphalt pavement restoration. The full report should be reviewed in conjunction with the Executive Summary.

TABLE OF CONTENTS

1.0 INTRODUCTION

Landtek Limited is pleased to submit the geotechnical investigation report on the proposed external servicing for the proposed east side employment lands industrial park (Site 4) in Port Colborne, Ontario. The work was authorized under a consultant agreement with AECOM and was initiated following the receipt of the authorization to proceed in July, 2014. The work was carried out in accordance with the Landtek proposal (number P14039) dated February 20, 2014.

The scope of the project includes the following:

- Forcemain installation for a distance of ±1600 m between Chippawa Road and a proposed sanitary pumping station on the west side of Ramey Road between 2nd Concession Road and 3rd Concession Road;
- Gravity sanitary sewer on Ramey Road for a distance of ±1,000 m from 3rd Concession Road southerly to the Trillium railway crossing;
- Watermain installation for a distance of ±2600 m between Chippawa Road and 3rd Concession Road;
- Reconstruction of 3rd Concession Road for a distance of ±900 m from Ramey Road to Highway 140;
- Reconstruction of Ramey Road for a distance of ±1,000 m from 3rd Concession Road southerly to the Trillium railway crossing;
- Reconstruction of two drainage structures at the Indian Creek Drain at the intersection of Ramey Road and 3rd Concession Road;

This geotechnical investigation was completed for final design and the primary objectives of the investigation were: (1) determine the subsurface conditions along the servicing alignments on Ramey Road, 3rd Concession Road, and Highway 140 with particular focus on bedrock contact levels; (2) identify the foundation soil conditions for new drainage structures on Indian Creek at Ramey Road and 3rd Concession Road; (3) identify the existing road structure conditions to be encountered during construction and restoration; (4) provide design and construction recommendations with regards to sewer and watermain pipe installations, rock excavation, trench wall stability and backfill, and road restoration; and, (5) assess the chemical characteristics of the soils to be excavated with regard to corrosion potential and environmental land uses and/or off-site disposal.

2.0 METHODOLOGY

Fieldwork at the site by Landtek Limited included clearance of underground services, borehole drilling and soil sampling, rock coring, piezometer installations and water level readings, and field supervision. Layout of boreholes in the field was completed by a representative of Landtek in consultation with AECOM. Boreholes along the Highway 140 right-of-way were completed under MTO encroachment permit number EC-2014-20T-360 that was received on November 12, 2014.

Eighteen boreholes were drilled and sampled on September 3 and 4, 2014 and November 16 and 17, 2014. Rock coring was completed at boreholes 12 and 13 to depths of 3.1 m and 1.5 m into the bedrock formation respectively. The borehole locations are shown on the site plan, Drawing 1, in Appendix C. The borehole and rock core logs are also provided in Appendix C. The distribution of the boreholes is as follows:

Boreholes 1 to 8 inclusive	Ramey Road, including borehole 4 at intersection of Ramey Road and 3rd Concession Road and borehole 7 for pumping station on Ramey Road
Boreholes 9, 10, and 11	3rd Concession Road, in sequence from west to east
Borehole 12	Chippawa Road, just west of Highway 140
Borehole 13	west side of Highway 140, just north of Chippawa Road
Boreholes 14, 15, and 16	west side of Highway 140 between 2nd Concession Road and Ramey Road
Borehole 17	west side of Highway 140, just North of 3rd Concession Road
Borehole 18	west side of Highway 140, just south of 3rd Concession Road

The boreholes were drilled using a specialist soil-drilling contractor equipped with continuous flight, solid stem augers. Standard Penetration Tests (SPT's) and split spoon samples were taken during drilling at selected depths. Full time supervision of drilling and soil sampling, and rock coring operations was carried out by a representative of Landtek Limited and all boreholes were restored to meet existing ground surface conditions.

Standpipe piezometers (25 mm diameter PVC) were installed with flush mount covers in boreholes 2, 6, and 7 and water level readings were taken on October 20 and 22, 2014.

The soil samples were transported to the Landtek Limited laboratory and visually examined in the laboratory to determine their textural classification. Moisture contents were carried out on all samples. The rock cores (52 mm diameter) were examined in the laboratory to determine the RQD (Rock Quality Designation) values, stratification, and overall quality. Selected sections of the rock core were tested for BRD (Bulk Relative Density) and unconfined compressive strength.

Soil samples were selected for chemical testing to determine metals and inorganic properties against MOE land use soil quality criteria as per Ontario Regulation 511/09. As well, samples were selected for testing to determine pH and soluble sulphate characteristics and corrosivity parameters. The chemical testing was completed by AGAT Laboratories Ltd. for Landtek and the results are provided in Appendix D.

The ground surface elevations at the boreholes are referenced to the geodetic datum and were determined using centreline road grade elevations on base plans provided by AECOM.

3.0 SITE AND SUBSURFACE CONDITIONS

The limits of the study site are indicated on Figure 1. Photographs of typical site conditions are provided in Appendix E.

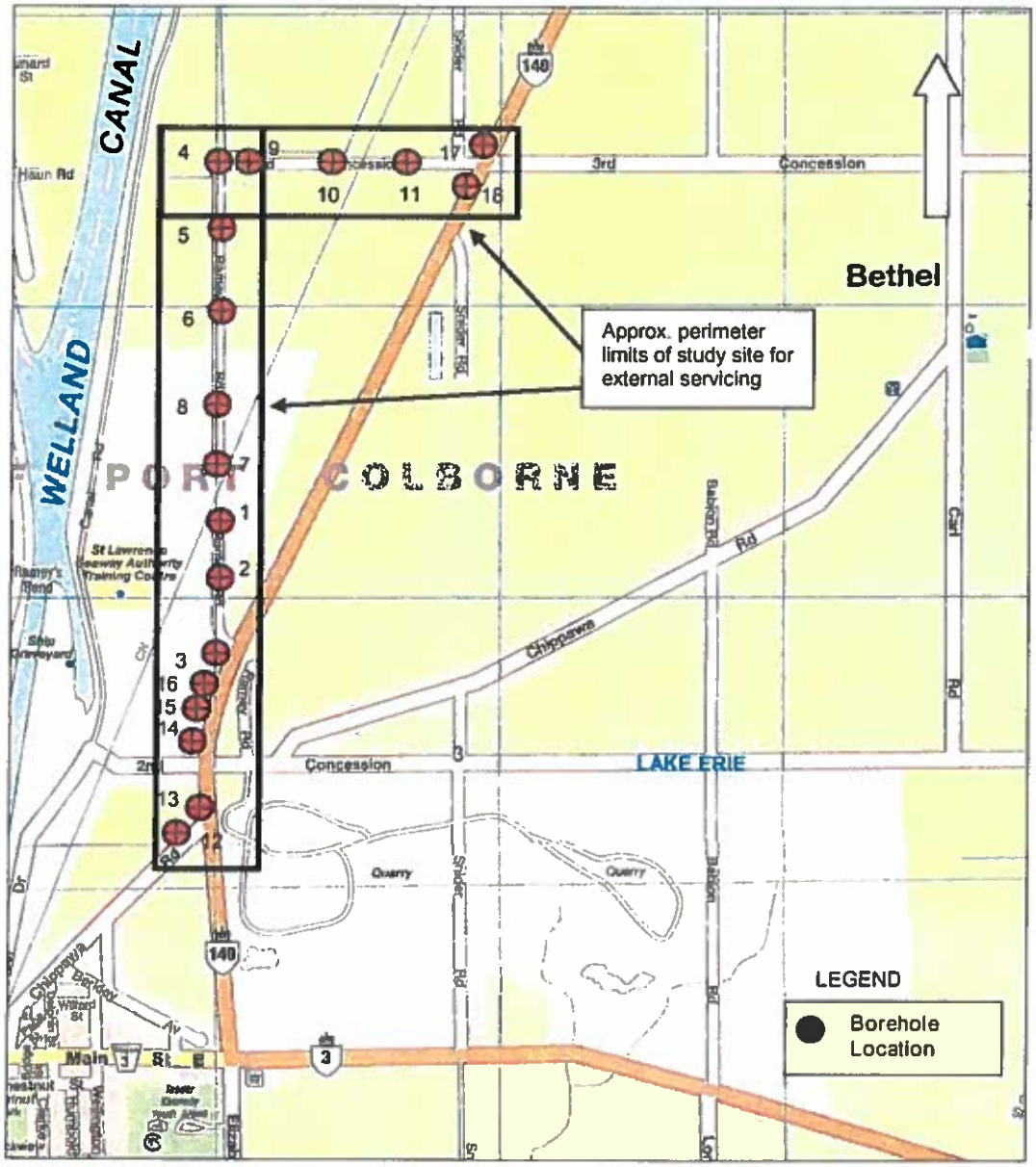


Figure 1 – Key Location Plan of Subject Site and Borehole Locations

Available geologic data [1, 2, 3, and 4] and background geotechnical information [5] indicate that the subject site in Port Colborne crosses the Onondaga Escarpment and is characterized by abrupt increases in the depths to bedrock contact in the south to north direction. The depths to bedrock (in feet) are illustrated in Figure 2 from drift thickness mapping [4]. The bedrock is identified as cherty limestone of the Bois Blanc or Onondaga formation and is at shallow depths of less than about 3.0 m in the area of Chippawa Road and Highway 140 and is at depths of 23 m or more near the intersection of Ramey Road and the 3rd Concession Road. Native overburden soils in the area are identified as glaciolacustrine clay and silt.

The borehole information is summarized in Table 3.1 and is consistent with the background data. The borehole information indicates the following;

1. Bedrock was encountered at 0.9 m depth in borehole 12 on Chippawa Road, just west of Highway 140 as well as at depths of 0.7 m, 1.1 m, 1.0 m, and 3.4 m at boreholes 13, 14, 15, and 16 respectively on the west side of Highway 140, between 2nd Concession Road and Ramey Road.
2. The predominant native overburden soil is layered silty clay that typically is stiff to very stiff in the upper 3.0 m to 3.5 m and becomes very soft and wet below these depths.
3. At borehole 7 for the proposed pumping station on Ramey Road the hole was advanced to 14.2 m and bedrock was not encountered. Dense to very dense glacial silty sand till was encountered below 11.9 m depth and the borehole was terminated in the glacial till stratum.
4. The bedrock contact information at boreholes 12 to 16 inclusive is consistent with the location of the Onondaga Bedrock Escarpment that crosses Highway 140 and defines the areas of shallow bedrock contact to the south and increasing depths to bedrock to the north.

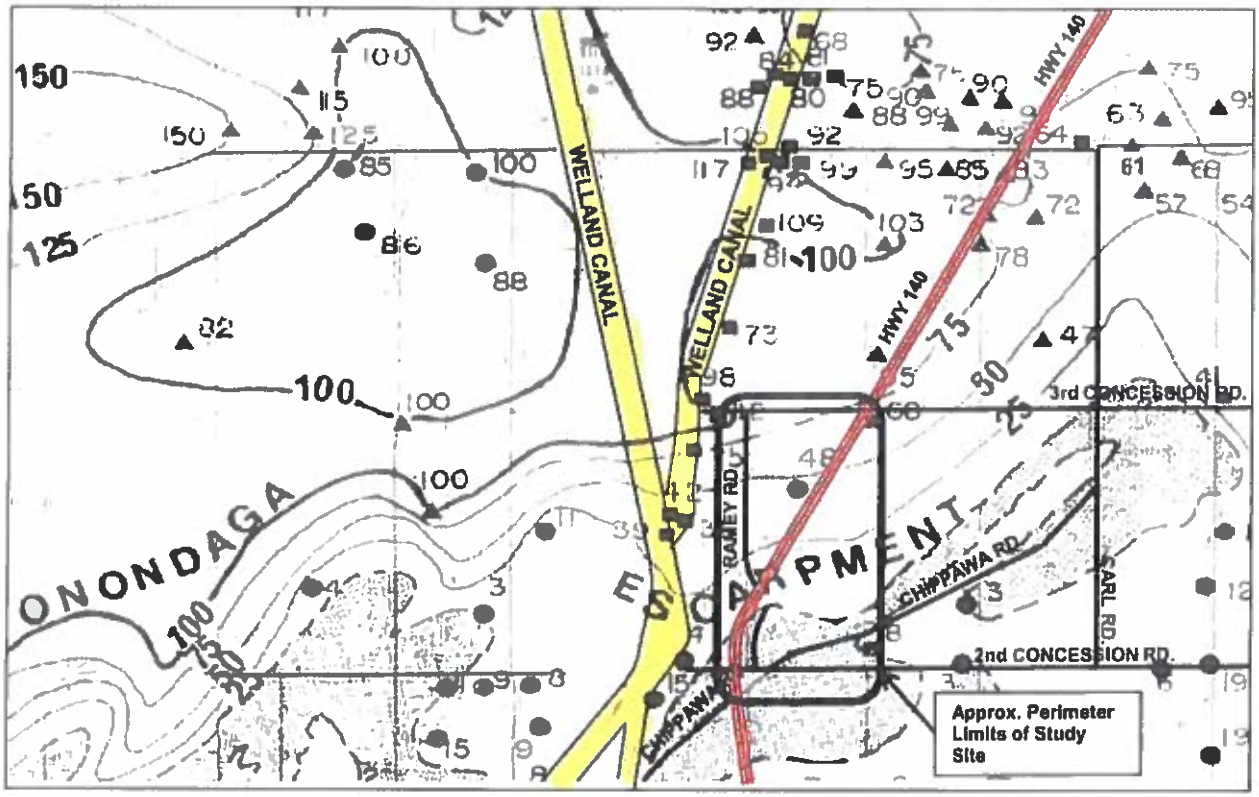


Figure 2 – Depths to Bedrock (in feet)

EXISTING PAVEMENT/GROUND SURFACE CONDITIONS

Boreholes 1, 2, and 4 to 8 inclusive were drilled on the gravel surfaced portions of Ramey Road. The granular base thickness ranged from 240 mm to 480 mm.

Boreholes 9, 10, and 11 were drilled on 3rd Concession Road and the existing road is gravel surfaced from Ramey Road to about the railway crossing with a bituminous surface to the east of the railway crossing toward Highway 140. The granular road structure thickness was 300 mm

and 380 mm at boreholes 9 and 10 respectively and at borehole 11 the road structure consists of 100 mm of bituminous material over 380 mm of granular base.

Borehole 12 was drilled on Chippawa Road and the pavement structure was 100 mm of bituminous material over approximately 600 mm of granular base.

Boreholes 17 and 18 were drilled just off the west edge of pavement on Highway 140 and the granular shoulder thickness was 600 mm and 460 mm respectively.

Table 3.1 – Summary of Borehole Information

BOREHOLE NO. & LOCATION	SURFACE ELEVATION (m)	SURFACE CONDITIONS	REFUSAL ON ASSUMED BEDROCK		SUBSURFACE CONDITIONS
			DEPTH TO REFUSAL (m)	REFUSAL ELEVATION (m)	
RAMEY ROAD					
1, sta. 4+490	176.3	480 mm GB	----------	----------	Silty Clay to EOH @ 3.7 m
2, sta. 4+195	176.1	250 mm GB 80 mm Topsoil	----------	----------	Silty Clay to EOH @ 3.7 m
3, sta. 1+750 (off the gravel surface)	177.1	600 mm Topsoil	----------	----------	Silty Clay to EOH @ 3.7 m
4, sta. 5+680 At intersection with 3rd Concession Rd.	175.9	430 mm GB	----------	----------	Silty Clay to EOH @ 3.7 m
5, sta. 5+525	175.7	250 mm GB 760 mm Topsoil	----------	----------	Silty Clay to EOH @ 3.7 m
6, sta. 5+200	175.9	350 mm GB	----------	----------	Silty Clay to EOH @ 3.7 m
7, sta. 4+700	176.3	250 mm GB	----------	----------	Clay fill to 1.1 m Silty Clay to 11.9 m Silty Sand Till to EOH @ 14.2 m
8, sta. 4+920	175.9	350 mm GB	----------	----------	Silty Clay to EOH @ 3.7 m
3rd CONCESSION ROAD					
9, sta. 6+052	175.9	380 mm GB 420 mm Topsoil	----------	----------	Silty Clay to EOH @ 5.0 m
10, sta. 6+240	175.8	300 mm GB 600 mm Topsoil	----------	----------	Silty Clay to EOH @ 2.1 m
11, sta. 6+640	176.5	100 mm Bituminous 380 mm GB 270 mm Topsoil	----------	----------	Silty Clay to EOH @ 2.1 m
CHIPPAWA ROAD					
12, sta. 0+070	184.5	100 mm Bituminous 600 mm GB	0.9	183.6	Broken rock to Refusal @ 0.9 m; Rock coring to 4.0 m
WEST SIDE OF HIGHWAY 140					
13, sta. 1+155 7 m w. of w. PE	185.2	130 mm topsoil	0.7	184.5	Fill (silty clay) to 0.7 m; Rock coring to 2.2 m
14, sta. 1+360 10 m w. of w. PE	184.8	100 mm topsoil	1.1	183.7	Fill (sand & gravel) to Refusal @ 1.1 m;
15, sta. 1+460 10 m w. of w. PE	183.8	100 mm topsoil	1.0	182.8	Fill (sand & gravel) to Refusal @ 1.0 m;
16, sta. 1+620 10 m w. of w. PE	179.4	80 mm topsoil	3.4	176.0	Silty Clay to EOH @ 3.4 m
17,sta. 3+610 0.5 m w. of w. PE	177.4	600 mm GB	----------	----------	Silty Clay to EOH @ 2.9 m
18, sta. 3+525 2.5 m w. of w. PE	177.2	460 mm GB	----------	----------	Silty Clay to EOH @ 2.9 m

Notes: 1. GB means Granular Base; EOH means End of Hole; PE means Pavement Edge;

FILL

Fill was encountered in borehole 7 to 1.1 m depth on Ramey Road and is a mottled mix of clay with organic matter, gravel and some sand. It is generally brown to grey and moist to very moist.

ORGANIC SILTY CLAY (TOPSOIL)

Organic silty clay (topsoil) is present outside of the travelled road areas and also was found below the granular road base in some boreholes on Ramey Road and 3rd Concession Road. The organic layer is black with roots and the thickness ranges from about 80 mm to 600 mm.

SILTY CLAY

The predominant native soil is silty clay that has a layered and fissured structure and contains scattered sand pockets, red shale fragments, and gravel inclusions. The silty clay is generally stiff to very stiff in consistency in the upper few metres with SPT values of between 8 and 24 blows for the full penetration of the sampler and becomes very soft and very moist to wet at lower depths below typically 3.0 m to 3.5 m.

The soil is classified as a CL type material according to the Unified Soil Classification System which relates to the soil group of fine grained inorganic clays of low to medium plasticity with more than 50 % by mass of the soil particles being silt and clay and passing the 0.075 mm sieve.

SILTY SAND TILL

A glacial deposit of silty sand till was encountered in borehole 7 at a depth of 11.9 m below the silty clay deposit. The glacial silty sand till was gravelly with broken rock pieces and was very dense to very dense with SPT values in the order of 47 to 50 blows for less than full penetration of the sampler.

BEDROCK

The bedrock is a sedimentary cherty limestone deposit that typically contains shaley layers and seams. The bedrock formation was cored at boreholes 12 and 13 and the core data is summarized in Table 3.2. Photographs 1 and 2 on page 7 show typical rock core sections.

The overall bedrock can be classified as having a grade of R3 to R4 which represents rock that is "medium strong" to "strong" with unconfined compression strengths in the range of 25 MPa to 100 MPa. Unconfined uniaxial compression tests on core samples indicated strengths of 78 MPa to 120 MPa. The RQD values generally indicate that the bedrock is of "very poor" to "poor" quality and the upper 0.6 m to 0.7 m of the formation is severely fractured and shattered.

GROUNDWATER

Groundwater seepage was generally not encountered in the open boreholes on completion of drilling. Standpipe piezometers were installed in boreholes 2, 6, and 7 to assess groundwater conditions and piezometer water levels were taken on October 20 and 22, 2014. The water level information is summarized in Table 3.3 and indicates that the ground water table is between depths of 0.8 m to 2.0 m which relate to between elevations 174.3 m and 175.3 m. The groundwater conditions are expected to vary according to the time of the year and seasonal changes in precipitation.

Table 3.2 – Summary of Rock Core Data

BOREHOLE NO. & CORE RUN	% RECOVERY	ROCK QUALITY DESIGNATION (RQD) (Note 2)	OVERALL ROCK QUALITY (Note 3)	BEDROCK DESCRIPTION (Note 1)
Borehole 12 Run # 1: 0.9 m – 2.5 m	93.3	20.0	VERY POOR	• thinly bedded grey limestone; • severely fractured in the upper 0.7 m of the formation
Borehole 12 Run # 2: 2.5 m – 4.0 m	100	27.5	POOR	• thinly bedded grey limestone; • UCS's = 120.3 MPa, 78.7 MPa, & 83.7 MPa at 3.4 m, 3.6 m, & 3.9 m
Borehole 13 Run # 1: 0.7 m – 2.2 m	100	37.5	POOR	• thinly bedded grey limestone; • severely fractured in the upper 0.6 m of the formation; • UCS = 99.2 MPa at 2.1 m

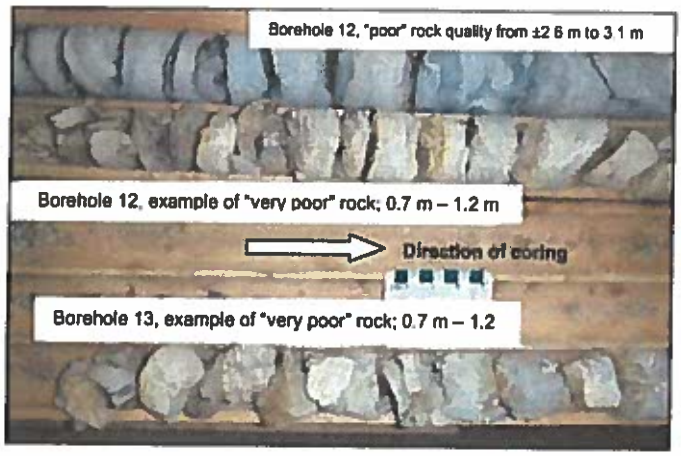
Note 1: UCS means Unconfined Compressive Strength

Note 2. RQD (Rock Quality Designation) is an indirect measure of the number of fractures and the amount of softening or alteration in a rock mass. For a given core run length, it is the summation of recovered sound core pieces that are more than 100 mm in length.

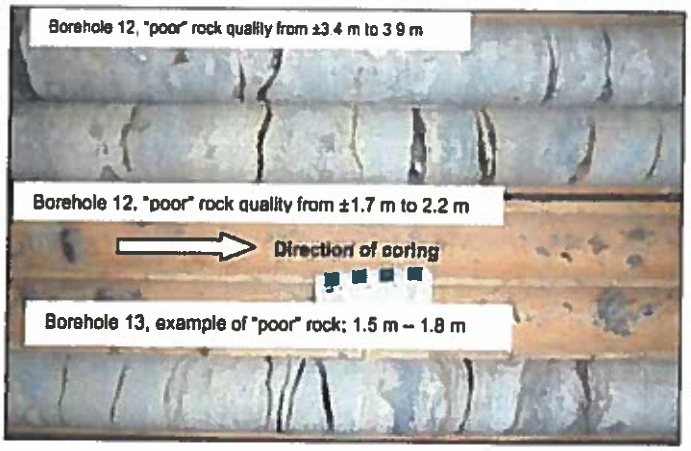
Note 3. Rock Quality Classification based on RQD values as follows: Very Poor is < 25 %; Poor is 25 – 50 %; Fair is 50 % - 75 %; Good is 75 % - 90 %; Excellent is 90 % - 100 %

Table 3.3 – Summary of Standpipe Piezometer Data

Piezometer Location	Ground Elevation	Piezometer Details		Water level Readings		
		Date Installed	Depth Installed	Date	Depth to Water	Water Elevation
Borehole 2	176.1 m	Sept. 3, 2014	3.0 m	Oct. 20, 2014	0.8 m	175.3 m
Borehole 6	175.9 m	Sept. 3, 2014	2.6 m	Oct. 20, 2014	1.4 m	174.5 m
Borehole 7	176.3 m	Sept. 3, 2014	9.1 m	Oct. 22, 2014	2.0 m	174.3 m



Photograph 1



Photograph 2

4.0 SITE SERVICING CONSIDERATIONS

Site servicing work is expected to include watermains, gravity sewers, and forcemain installations as well as pumping station construction on Ramey Road and culvert construction at Ramey Road and 3rd Concession Road. The following sections address issues related to drainage structures and pumping station construction, excavations, pipe bedding, ground water control, backfill, management of excavated materials, and subsurface concrete.

4.1 SANITARY PUMPING STATION

Borehole 7 was drilled in the area of the proposed sanitary pumping station on Ramey Road and was drilled to 14.2 m depth without contacting bedrock. The soils consist of an upper stiff to very stiff crust of silty clay that extends to between about 3.0 m and 3.5 m depth (approximately elevation 173.0 m) and below that level the silty clay is very soft and wet with negligible internal strength to a depth of about 11.9 m or elevation 164.4 m. Below 11.9 m depth there is dense to very dense silty sand till to the end of the hole at 14.2 m or elevation 162.1 m.

Deep excavations into very soft clay soil are subject to base heave shear failures, as illustrated in Figure 3. The factor of safety against base shear failure (FS_b) is determined using the following relationship provided in the Canadian Foundation Engineering Manual, 4th edition:

$$FS_b = \frac{N_b s_u}{\sigma_z} \quad (1)$$

where;

N_b = stability factor dependent upon the excavation geometry
= ±7, for a square/circular excavation with the depth twice the width of the excavation

s_u = undrained shear strength of the soil below the excavation base
= 5 kPa (±100 psf) for the site conditions at borehole 7

σ_z = total overburden at the excavation base
= 168 kPa (3,500 psf) for an 8 m excavation and the water table at 2.0 m; (ground surface surcharge load, if present, would have to be added to determine the total overburden load at the excavation level)

For the above example the safety factor against base heave (FS_b) is less than 1.0 and indicates that substantial ground movement and deformation is likely to occur and an engineered ground support system that extends below the excavation base will be required for the pumping station construction. Steel sheet piling is an option however a caisson wall may be required to address the significant depth of very soft silty clay below the excavation base level.

The native silty clay below approximately 3.0 m to 3.5 m has negligible bearing strength and structural support of the pumping station will require deep foundations using either drilled caissons or driven piles. Borehole 7 indicates that potential end bearing conditions can be achieved in the dense to very dense silty sand till below 11.9 m. Based on the site conditions the following options are recommended for the sanitary pumping station:

1. Investigate an alternative pumping station site location with more favourable subsurface conditions;
2. If the proposed site at borehole 7 is to be used it is recommended that at least one additional borehole be advanced to verify the deep foundation bearing conditions with the intent of determining bedrock contact and whether the depth to bedrock provides a viable and cost-effective bearing stratum for deep foundations.

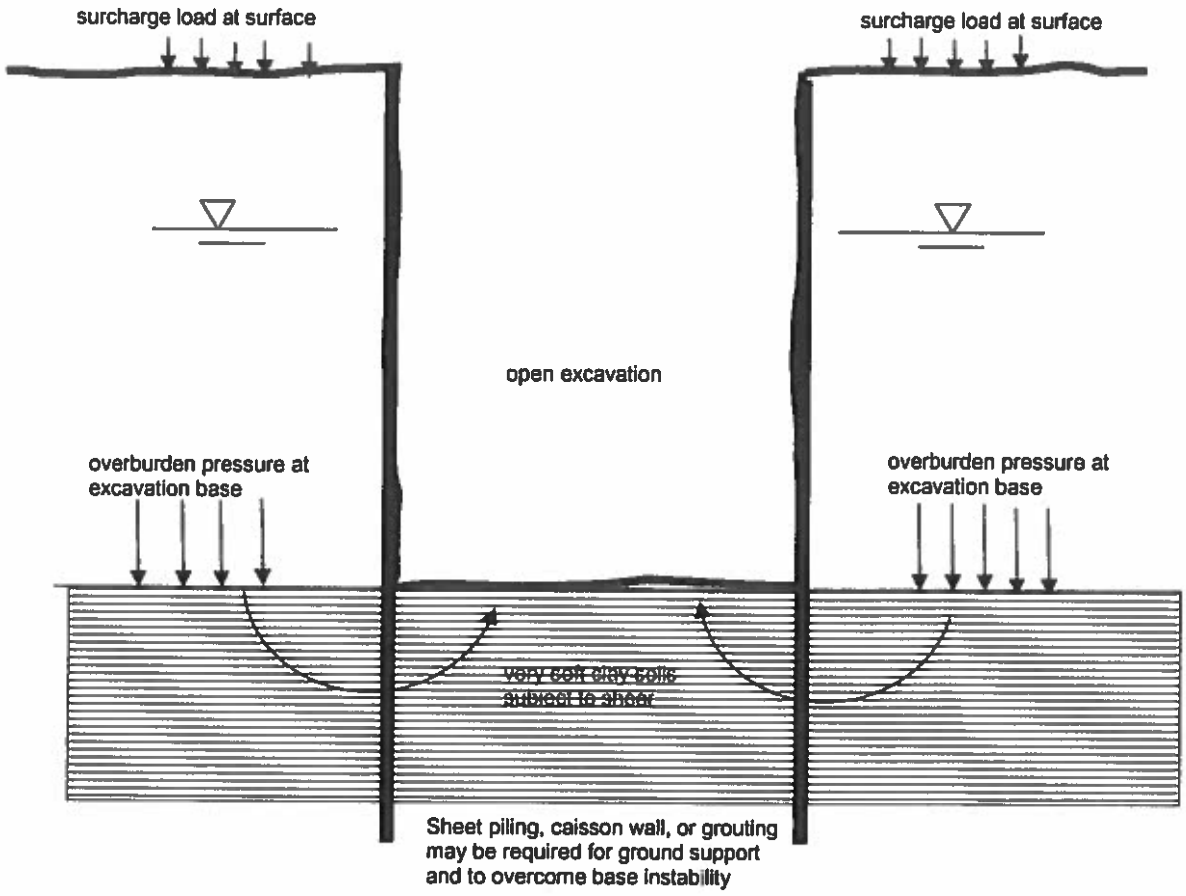


Figure 3 – Illustration of Potential Excavation Base Heave Shear Failure

4.2 SANITARY SEWER

The proposed sanitary sewer on Ramey Road will be installed to a depth in the order of 7 m. The excavation base will be in very soft silty clay and will have the same high risk of base heave as is the case for the pumping station construction. Potential construction options to steel sheet piling to address the base heave issue are; (1) slope back or step back the trench side walls and reduce the effective soil loading at the excavation base; (2) use blast rock ballast material to counteract the tendency for the soils to push up into the sewer trench excavation; and, (3) complete ground stabilization/improvement work ahead of excavation using grouting methods. In order to assess the need for these construction measures it is recommended that a pre-design/pre-construction test pit dig be completed to the design depth of the sanitary sewer.

The silty clay stratum has an estimated horizontal and vertical permeability coefficient of 1×10^{-6} cm/sec or lower and is not expected to release water freely. Gravity drainage systems and well points are not expected to be a benefit to sewer construction. It should be possible to handle the volume of seepage water that occurs at the excavation level from soil seams and fissures by pumping from sumps at the excavation base.

4.3 CULVERT STRUCTURES – RAMEY ROAD AT 3RD CONCESSION ROAD

Boreholes 4 and 9 were drilled at the Indian Creek Drain at the intersection of Ramey Road and 3rd Concession Road for proposed new drainage structures. Native silty clay is present to the full depth drilled of 5.0 m at both borehole locations. The bearing strength of the silty clay decreases abruptly below about 3.0 m depth or elevation 172.9 m with the soil being very soft and wet below about 4.0 m depth or elevation 172.0 m. The soil support conditions are not favourable for a footing supported open bottom concrete structure given the restrictions that would have to be placed on design bearing pressures and footing sizes to avoid over-stressing the underlying very soft soils. A precast concrete box culvert should be a more favourable option since the structure loading can be distributed over a wide base.

Preliminary information indicates the underside of the box culvert will be at about 2.5 m depth. Settlements under the box culvert should be minimal if the average loading on the soil is comparable to the existing weight of the soil to be removed. For design purposes the average loading across the bottom of the precast box structure should not exceed 55 kPa (1,150 psf) and the support of the box structure should be as indicated in Figure 4.

The box culvert should be supported on a minimum of 300 mm of crushed quarried stone granular base and it is recommended that 19 mm Type II clear stone as per OPSS 1004 be used. If organic soils or disturbed soils are encountered at the design underside of the box culvert the soil should be removed and replaced with engineered fill. The engineered fill should be placed in dry conditions and can consist of OPSS 1010 Granular A or Granular B Type II material that is compacted to 100 % of the Standard Proctor Maximum Dry Density, OPSS 1359 unshrinkable backfill, or low strength concrete (15 MPa at 28 days). If suitable dry conditions cannot be achieved for placement of compacted Granular A or Granular B Type II an alternative is to use clear stone fill that meet the requirements of OPSS 1004 for Type II 19 mm clear stone. The granular fill will provide a uniform bearing material and levelling platform for the box structure, and if clear stone is used as per 19 mm Type II material in OPSS 1004, it will also allow for water drainage through the construction area.

The clear stone fill layer should receive mechanical compaction however the compaction of clear stone cannot be reliably measured with conventional nuclear density testing equipment such that the required amount of compaction effort will be a field judgment based on the compaction equipment used, the lift thickness, and the type of clear stone material.

4.3.1 SEISMIC DESIGN CONSIDERATIONS

In accordance with Table 4.1.8.4.A. of the current Ontario Building Code the subject site is considered to be a "E" Site Class. The acceleration and velocity-based site coefficients, F_a and F_v, should be determined from CAN/CSA S6 -06 Canadian Highway Bridge Design Code, 4.4.5.2 single span bridges and 4.4.5.2.1 analysis requirements.

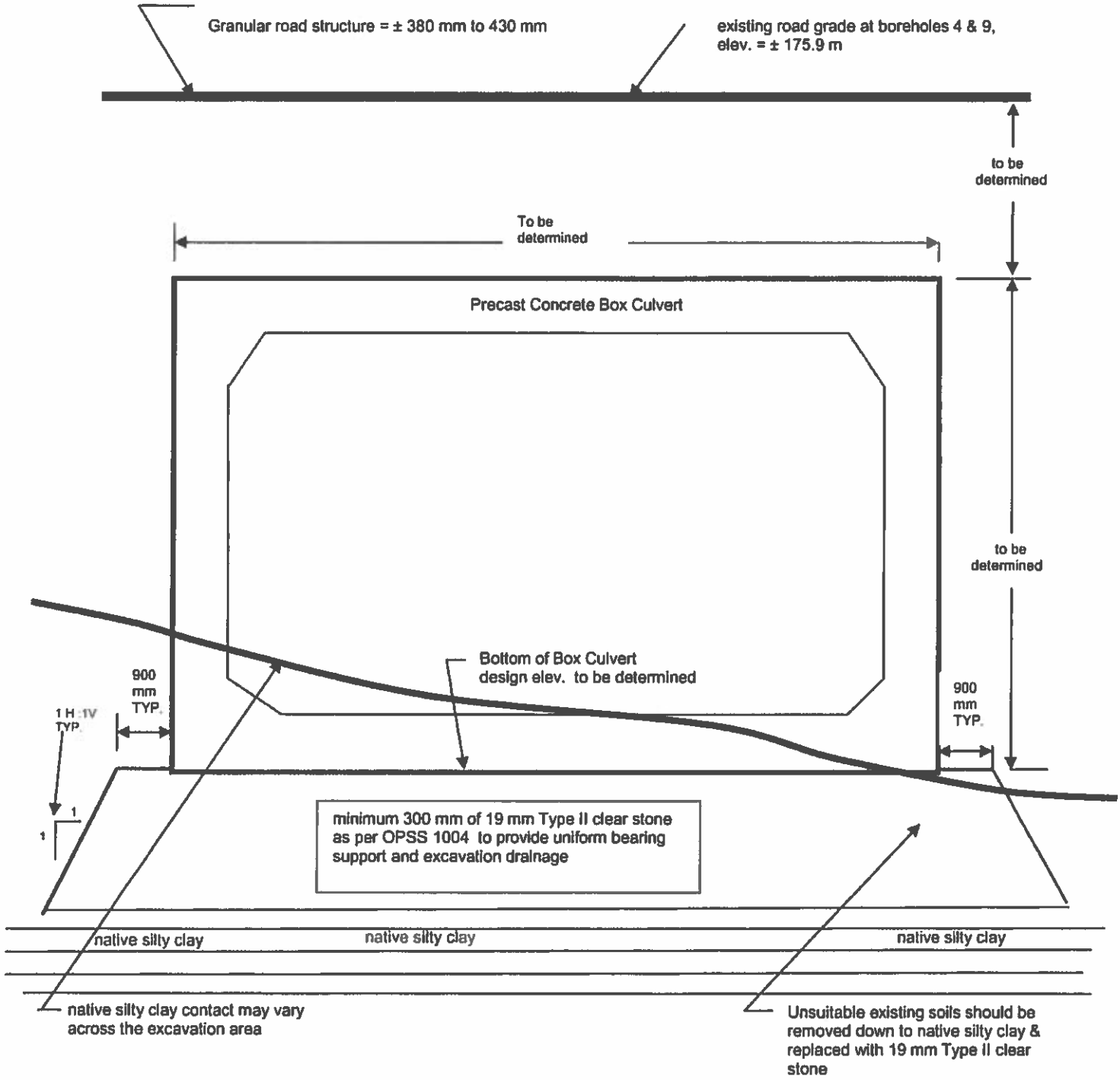


Figure 4 (NTS)
Illustration of Support Conditions for Precast Concrete Box Culvert

4.3.2 LATERAL EARTH PRESSURES AND BACKFILL

The earth pressure, p, acting on the culvert section walls at any depth, h, in metres below the ground surface assumes an equivalent triangular fluid pressure distribution and may be calculated using expression (1) below. It is assumed that granular material is used as backfill in the road. Allowances for pressure due to compaction operations should be included in the earth pressure determinations as per CHBDC Commentary clause C6.9.3. A value of 16 kPa is applicable for a vibratory compactor and granular material.

If the structure retaining soil can move slightly, the active earth pressure case can be used in determining the lateral earth pressure. For restrained structures and no yielding an "at rest" earth pressure condition should be used. The determination of the earth pressures should be based on the following expression:

$$p = K (\delta h + q) \qquad (1)$$

where:

p = the pressure in kPa acting against any subsurface wall at depth, h, in metres (feet) below the ground surface;

K = the at rest earth pressure coefficient considered appropriate for subsurface walls; OPSS 1010 Granular B Type 1 (pit-run sand and gravel) material has an effective angle of friction estimated to be 32 ° with a corresponding at rest earth pressure coefficient, K_o, of 0.50; this complies with the maximum horizontal earth pressure load criteria given in CHBDC section 7.8.5.3.2

δ = the moist bulk unit weight of the retained backfill; 22 kN/m^3

and,

q = the value for any adjacent surcharge in kPa which may be acting close to the wall

h = the depth, in m, at which the pressure is calculated

Granular B backfill should meet OPSS 1010 Type I or Type II material specifications. Granular B material complies with the classification of Soil Group I given in the CHBDC, Table 7.8.3.1 regarding precast buried concrete structures. The granular fill should be compacted to a minimum of 97 % Standard Proctor Maximum Dry Density, or to the levels and backfilling procedures specified for the type of culvert.

4.4 TRENCH EXCAVATIONS, PIPE INSTALLATIONS, AND BACKFILL

All temporary excavations and unbraced side slopes in the overburden soils should conform to standards set out in the Occupational Health and Safety Act (OHSA). Trench excavation work south of the Onondaga bedrock escarpment will encounter limestone bedrock at shallow depths and north of the escarpment the predominant subsurface stratum is layered silty clay. The native silty clay is typically stiff to very stiff in the upper 3.0 m to 3.5 m and should be characteristic of a Type 2 soil according to OHSA. North of the Onondaga bedrock escarpment the native silty clay below a depth of about 3.5 m is commonly very soft and wet with negligible internal strength and is considered to be characteristic of Type 4 soils. The limestone bedrock that is expected to be encountered in trench excavations south of the Onondaga bedrock escarpment is the most competent stratum and exceeds the strength properties of Type 1 soil. The bedrock formation may exhibit water seepage through fissures and fractured seams where the excavations proceed below the ground water table.

It should be possible to excavate the overburden soils with a hydraulic backhoe. The stability of unbraced excavation walls is expected to be variable due to changes in soil density, soil composition, water seepage, and adjacent fill in utility trenches. Native soils that appear stable could suddenly slough or collapse due to backfill material immediately behind the excavation wall. Consequently, for trench conditions which cannot satisfy the Occupational Health and Safety Act requirements for unbraced 1 horizontal to 1 vertical side slopes, a trench box system should be used, or temporary shoring should be installed to maintain safe working conditions.

The limestone bedrock is a relatively hard deposit and excavation and removal typically requires a backhoe mounted hoe-ram impact breaker to remove the rock. Drilling and blasting is not anticipated for this project.

Groundwater seepage is expected to be variable and will depend upon the depth of the excavations, the time of year, and precipitation levels preceding construction. In general it is anticipated that for open cut watermain and forcemain excavations that proceed to depths up to about 3.0 m it should be possible to control water seepage into excavations by pumping from sumps at the base of the excavations. Sewer trenches that extend into the very soft silty clay may be subject to base heave failure as discussed in Section 4.2 and illustrated in Figure 3.

Pumping quantities of up to 50,000 litres per day do not require an MOE permit to take water. Where water inflow and pumping quantities exceed 50,000 litres per day a minimum Category 2 permit to take water is required. The Category 2 permit is granted only for a 30 day pumping period. If severe groundwater seepage occurs that requires in excess of 400,000 litres per day an MOE Category 3 permit to take water will be required and will be subject to hydrogeological field studies and engineering analysis. Excavations into the bedrock may encounter fracture zones and pervious seams where significant water inflow could occur.

Ontario Provincial Standard drawings for watermains in section 1100 indicates that the pipe bedding should be "as specified". The bedding material and thicknesses should meet the pipe manufacturer's requirements and/or the municipal standards for the area. However, in bedrock it is recommended that granular bedding material be used and should have a minimum thickness of 200 mm on the bottom and sides and a minimum 300 mm over the pipe. It is recommended that OPSS 1010 Granular A material be used for granular bedding and should be compacted to at least 97 % Standard Proctor Maximum Dry Density. Where groundwater seepage is occurring with water flow along the trench bottom it is recommended that OPSS 1004 Type II 19 mm clear stone be substituted for Granular A bedding material.

Watermain trench backfill within existing roads or road areas that are scheduled for asphalt surfacing as part of the external site servicing work should be readily compactable in narrow excavation conditions in order to avoid the risk of future settlements. The existing silty clay is typically at moisture contents above the optimum moisture content of the soil and reuse of the excavated silty clay as trench backfill within roadway areas is not recommended. Within roadway areas it is recommended that commercial grade backfill be used and the minimum specification for granular backfill should be OPSS 1010 Granular B Type I material. The target compaction specification for trench backfill in roadway areas or where the risk of significant settlement is not acceptable should be 97 percent Standard Proctor Maximum Dry Density (SPMDD) with no individual test below 95 percent SPMDD. In embankment and landscaping areas or where settlements are not critical the compaction specification can be 92 percent Standard Proctor Maximum Dry Density (SPMDD) with no individual test below 88 percent SPMDD.

4.4.1 PRE-BID/PRE-DESIGN TEST PITS

Excavation base stability and groundwater control will be key design and construction issues and it is recommended that investigative test pits be excavated in areas of very soft silty clay overburden soils where deep sewer trench work is proposed or where the sanitary pumping station is proposed. Watermain and forcemain trenches are not expected to exceed about 3 m in depth and should not present a high risk of either groundwater infiltration or excavation base heave.

Investigative pre-bid test pits should be mandatory viewing for contractors at the time of tender in order that they can make their own assessment of how the ground conditions will impact their operation and productivity. If pre-design test pits are carried out the conditions should be documented as supplementary information to this geotechnical report and should be provided to all bidders. The pre-design test pits will help determine whether pay items should be setup to address dewatering or ground support systems.

5.0 CORROSION POTENTIAL AND THRUST BLOCK DESIGN

Buried metal pipes are exposed to the potential corrosive effects of the soil-moisture environment. Dissolved salts in the groundwater, and soils or ashes containing sulphates (especially calcium sulphate, or gypsum) can be severely corrosive. Bacterial corrosion has a characteristic "worm eaten" appearance and is prevalent where the soils contain sulphate-reducing bacteria in a non-oxygen condition below the water table.

Electrolytic corrosion occurs between dissimilar metals in the presence of a soil-moisture environment. The conductivity of the soil-moisture environment, as measured by the resistivity, is recognized as a major factor in assessing the corrosion potential of the subsurface ground conditions.

5.1 CORROSION POTENTIAL

A methodology to assess the bacterial and electrolytic corrosiveness of the soil-moisture environment has been developed based on a weighted rating system [7] which evaluates resistivity, pH, Redox Potential, chloride concentration, and moisture content of the soil. The soil-moisture system evaluation considers each parameter individually, as well as in combination, to determine the potential corrosiveness of the site conditions.

Electrical Resistivity values below 2,000 ohm-cm are considered corrosive with the corrosive severity increasing as the value of resistivity becomes lower. The typical range of corrosive severity based on soil resistivity is given in Table 5.1.

Table - 5.1
Soil Resistivity Classifications

RESISTIVITY RANGE (ohm-cm)	CORROSIVITY RATING
0 - 1,000	Very Severe
1,001 - 2,000	Severe
2,001 - 5,000	Moderate
5,001 - 10,000	Mild
> 10,000	Very Mild

Deviations in the pH of the soil-moisture system above or below the neutral value of 7.0 will increase the corrosion potential. An acidic environment with a pH below 4.0, and an alkaline environment with a pH above 8.5, is potentially corrosive.

The Redox Potential (Oxidation Reduction Potential) is a measure of the soil-moisture environment to support sulphate reducing bacteria. The Redox Potential is an important evaluation parameter since the most common sulphate-reducing bacteria thrive under anaerobic conditions. Redox Potential above 100 mV indicates increasing soil aeration and reduced ability to support bacterial action. Redox Potential below 100 mV, as well as negative values, indicate anaerobic conditions favouring sulphate-reducing bacterial growth.

The presence of chlorides and/or sulphides is a contributing factor to increasing the corrosion potential of the soil-moisture environment.

Corrosivity testing was completed on selected soil samples in the study, and the results are summarized in Table 5.2.

Table - 5.2
Summary of Test Results to Assess Corrosion Potential

PARAMETERS	Borehole 8 SS1	Borehole 14 SS1	Borehole 16 SS1
Resistivity (ohm-cm)	2150	5590	2070
Chloride (µg/g)	103	19	101
Sulphate (µg/g)	143	22	143
Sulphide (µg/g)	0.05	0.07	0.06
Redox Potential (mV)	272	254	270
pH	8.25	7.91	8.26
Electrical Conductivity	0.465	0.179	0.484
OVERALL CORROSION POTENTIAL	Moderate	Mild	Moderate

The test information indicates that there is a mild to moderate corrosion potential. It is recommended that the maintenance history for iron pipe repairs be reviewed to assist in the assessment of the corrosion environment and the impact on the corrosion design requirements for watermain pipe installations. At this stage it is prudent to assume that there is no elevated corrosion potential for metal buried pipe along watermain route that would warrant corrosion protection measures to be included in the design.

5.2 THRUST BLOCK DESIGN

The native layered silty clay presents favourable support conditions for thrust block design and construction. For design purposes, thrust blocks can be designed for an average allowable bearing pressure of 144 kPa (3,000 psf) when poured in direct contact with undisturbed soil.

The fill, organic silty clay, and any disturbed trench backfill materials do not present favourable thrust block support conditions and are expected to all behave as previously disturbed soil and be subject to distortion and movement. In these conditions alternative pipe restraint methods should be considered such as mechanical joint pipe.

5.3 SUBSURFACE CONCRETE

The requirements for subsurface concrete subject to a sulphate environment are presented in Canadian Standards Association (CSA) specification CAN/CSA-A3000-03. The test data (see Appendix D) indicates that the subsurface strata generally have a mild sulphate environment and are not aggressive to concrete (CSA criteria of less than 0.2 percent water soluble sulphate in the soils). It is recommended that, as a minimum, subsurface poured in-place concrete for thrust blocks and valve chambers have the following characteristics:

- minimum 28-day compressive strength = 25 MPa;
- maximum water to cementing materials ratio = 0.50;
- cementing materials; GU (general use hydraulic cement) or GUb (blended general use)
- air content; as per CSA A23.1-04 Table 4, air content category 2

Methods of Supplying Concrete

Alternative methods of specifying concrete for a project are outlined in CSA A23.1-09 and allow for "Performance" or "Prescription" based methods. Each method attaches different levels of responsibility to the owner, the contractor, and the concrete supplier. The pros and cons of each method should be examined prior to completion of the specifications for the project.

Regardless of the methodology selected for supplying ready mix concrete it is recommended that the Quality Assurance testing firm for the project be involved in the early discussions on the concrete supply and placement.

6.0 MANAGEMENT OF EXCAVATED SOILS

Analytical chemical tests on soil samples were undertaken by AGAT Laboratories Ltd. for Landtek Limited and the results are provided in Appendix D in relation to the Table 3 soil quality criteria for Industrial/Commercial/Community (ICC) land use in a non-potable groundwater situation given in the MOE document "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011". The results of the analytical testing are summarized in Table 7.1. The test results are also compared to the soil standards for Table 3 Residential/Parkland/Institutional property use.

The test data generally meets the soil quality standards for MOE Table 3 Industrial/Commercial/Community property use with the exception that the Electrical Conductivity (EC) for the samples from boreholes 3, 4, 17, and 18 exceed the standard of 1.4 mS/cm. When the results are compared to the Table 3 standards for Residential/Parkland/Institutional (RPI) property use the EC results for the samples from boreholes 3, 4, 5, 8, 9, 10, 11, 17, and 18 exceed the RPI standard of 0.7 mS/cm. As well, the SAR (Sodium Adsorption Ratio) standard is exceeded for boreholes 17 and 18.

Elevated EC (and SAR) values are commonly associated with impacted conditions from long term use of road salt. Ontario Regulation 153 indicates that elevated residual road salt parameters in soils within the road allowance that result from winter salting that was placed to address safety issues are not regarded as an environmental problem that requires remediation.

The chemical test data indicates that there is no requirement to dispose of the excavated soils as a waste material at a registered landfill site. In the event that excess excavated soils are to be disposed of off-site the contractor may be required to carry out additional chemical testing to address the soil quality criteria that were established for the site receiving the materials.

Table 6.1 – Summary of Analytical Test Data

SAMPLE IDENTIFICATION	COMPARISON TO TABLE 3 CRITERIA (Industrial/Commercial/Community Property Use)		COMPARISON TO TABLE 3 CRITERIA (Residential/Parkland/Institutional Property Use)	
	Meets Criteria	Does Not Meet Criteria	Meets Criteria	Does Not Meet Criteria
RAMEY ROAD				
Borehole 1, Sample SS2, 0.8 m to 1.2 m	√		√	
Borehole 3, Sample SS2, 0.8 m to 1.2 m		EC = 4.69 > std. of 1.4		EC = 4.69 > std. of 0.7
Borehole 4, Sample SS2, 1.5 m to 2.0 m		EC = 2.29 > std. of 1.4		EC = 2.29 > std. of 0.7
Borehole 5, Sample SS1, 0.8 m to 1.2 m	√			EC = 0.761 > std. of 0.7
Borehole 6, Sample SS1, 0.8 m to 1.2 m	√		√	
Borehole 7, Sample SS2, 1.5 m to 2.0 m	√		√	
Borehole 8, Sample SS2, 1.5 m to 2.0 m	√		√	EC = 0.712 > std. of 0.7
3rd CONCESSION ROAD				
Borehole 9, Sample SS1, 0.8 m to 1.2 m	√			EC = 0.848 > std. of 0.7
Borehole 10, Sample SS2, 1.5 m to 2.0 m	√			EC = 0.787 > std. of 0.7
Borehole 11, Sample SS3, 1.5 m to 2.1 m	√			EC = 1.11 > std. of 0.7
CHIPPAWA ROAD				
Borehole 12, Sample SS3, 2.4 m to 2.7 m	√		√	
HIGHWAY 140				
Borehole 13, Sample SS1, 0.8 m to 1.4 m	√		√	
Borehole 14, Sample SS2, 1.5 m to 2.0 m	√		√	
Borehole 17, Sample SS1, 0.8 m to 1.2 m		EC = 1.64 > std. of 1.4		EC = 1.64 > std. of 0.7 SAR = 9.16 > std. of 5
Borehole18, Sample SS1, 0.8 m to 1.2 m		EC = 2.48 > std. of 1.4		EC = 2.48 > std. of 0.7 SAR = 6.19 > std. of 5

7.0 PAVEMENT RESTORATION AND /OR NEW CONSTRUCTION

Recommendations for the restoration or new reconstruction of the existing roads are provided in Table 8.1 and are intended to provide a pavement section with a 20 year design life. City of Port Colborne municipal road requirements may override the recommendations of this report. Detailed traffic data was not available and the recommendations for pavement reconstruction on Ramey Road and 3rd Concession Road were based on best design practice for environmental factors (i.e. pavement thickness at least one-half the depth of frost penetration) and anticipated classes of traffic and road use.

Table 7.1 – Recommended Pavement Structure Layer Thicknesses

Pavement Layer	Road Section			
	Restoration of Chippawa Rd (Low Volume Traffic with Cars and some Commercial Trucks)	Reconstruction of 3rd Concession Rd. (Connector Road with Mixed Traffic Including Heavy Commercial Trucks & Cars)	Ramey Rd (Local Access Road)	
			Restoration of Granular Surfaced Section	Asphalt Paved Reconstruction Section
Surface Asphalt	40 mm OPSS HL3	50 mm OPSS HL3 HS	nil	50 mm OPSS HL3 HS
Binder Asphalt	60 mm OPSS HL8	120 mm OPSS HL8 HS (2 x 60 mm lifts)	nil	100 mm OPSS HL8 HS (2 x 50 mm lifts)
OPSS Granular A Base	500 mm	150 mm	400 mm	500 mm
OPSS Granular B Type II Subbase	Nil	450 mm	nil	nil
TOTAL THICKNESS	600 mm	770 mm	400 mm	650 mm

Granular Basecourse and Subbase

The granular base course and subbase course materials should meet OPSS 1010 Granular A and Granular B Type II specifications respectively. Quarried limestone, crushed to Granular "A" and Granular B Type II gradation specifications, is recommended. Granular base and subbase course fill material should be compacted to 100 percent of the Standard Proctor Maximum Dry Density.

Hot Mix Asphalt

The binder course asphalt for Chippawa Road restoration should meet Ontario Provincial Standard Specifications (OPSS) Form 1150 for HL8 material, or alternatively Niagara Peninsula Contract specifications for HL 8 material. For the roads to be reconstructed that will accommodate heavy truck traffic it is recommended that the binder asphalt be OPSS 1150 HL8 HS with 100 % crushed quarried aggregate, or alternatively Niagara Peninsula Contract HL 8 HS.

The surface course asphalt for roads with mainly cars and light trucks should meet OPSS specifications for HL3 material and have a minimum compacted thickness of 40 mm. The HL3 HS mix should meet Niagara Peninsula Contract specifications for HL 3 HS.

Asphalt cement should meet the requirements of performance graded asphalt, and should be PG 58-28 for both the binder and surface course mixes. Specific traffic data was not available for the road sections however it is anticipated that there is no requirement to "bump up" the asphalt cement grade to PG 64-28.

8.0 CLOSURE

The Limitations of Report, as stated in Appendix A, are an integral part of this report.

Soil samples will be retained and stored by Landtek for a period of three months after the report is issued. The samples will be disposed of at the end of the three month period unless a written request from the client to extend the storage period is received.

I trust this report will be of assistance with the design and construction of the proposed development. Should you have any questions, please do not hesitate to contact our office.

Yours very truly,

LANDTEK LIMITED

Paul Anderson, P. Eng., QP_{ESA}

Ralph Di Cienzo, P. Eng., QP_{ESA}

REFERENCES

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[2] Paleozoic Geology of the Welland-Fort Erie Area, Map P989. Ontario Division of Mines, Ministry of Natural Resources, 1974

[3] Bedrock Topography Series of the Welland-Fort Erie Area, Map P2403. Ontario Division of Mines, Ministry of Natural Resources, 1981

[4] Drift Thickness Series of the Welland-Fort Erie Area, Map P2486. Ministry of Natural Resources, 1982

[5] Geotechnical Investigation for Proposed Watermain Installations on Cement Plant Road, Lakeshore Road West, & Bayview Lane, Port Colborne, Landtek report #14180, dated October, 2014

[6] Soil Resistivity – Measurement and Analysis, J. D. Palmer, J. D. Palmer Associates, 1974

APPENDIX A
LIMITATIONS OF REPORT

The conclusions and recommendations given in this report are based on information determined at the borehole locations. Subsurface and ground water conditions between and beyond the boreholes may be different from those encountered at the borehole locations, and conditions may become apparent during construction that could not be detected or anticipated at the time of the geotechnical investigation. It is recommended practice that Landtek be retained during construction to confirm that the subsurface conditions throughout the site are consistent with the conditions encountered in the boreholes.

The comments made in this report on potential construction problems and possible remedial methods are intended only for the guidance of the designer. The number of boreholes may not be sufficient to determine all the factors that may influence construction methods and costs. For example, the thickness and quality of surficial topsoil or fill layers may vary markedly and unpredictably. Additionally, bedrock contact depths throughout the site may vary significantly from what was encountered at the exact borehole locations. Contractors bidding on the project, or undertaking construction on the site should make their own interpretation of the factual borehole information, and establish their own conclusions as to how the subsurface conditions may affect their work.

The survey elevations in the report were obtained by Landtek Limited or others, and are strictly for use by Landtek in the preparation of the geotechnical report. The elevations should not be used by any other parties for any other purpose.

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

This report does not reflect environmental issues or concerns related to the property unless otherwise stated in the report. The design recommendations given in the report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report. Since all details of the design may not be known, it is recommended that Landtek Limited be retained during the final design stage to verify that the design is consistent with the report recommendations, and that the assumptions made in the report are still valid.

APPENDIX B
SYMBOLS AND TERMS USED IN THE REPORT

RELATIVE PROPORTIONS

Term	Range
Trace	0 - 5%
A Little	5 – 15%
Some	15 – 30%
With	30 – 50%

CLASSIFICATION BY PARTICLE SIZE

Boulder	> 200 mm
Cobble	80 mm – 200 mm
Gravel -	
Coarse	19 mm – 80 mm
Fine	4.75 mm – 19 mm
Sand -	
Coarse	4.75 mm – 2 mm
Medium	2 mm – 0.425 mm
Fine	0.425 mm – 0.75 mm
Silt	0.075 mm – 0.002 mm
Clay	< 0.002 mm

DENSITY OF NON-COHESIVE SOILS

Descriptive Term	Relative Density	Standard Penetration Test
Very Loose	0 – 15%	0 – 4 Blows Per 300 mm Penetration
Loose	15 – 35%	4 – 10 Blows Per 300 mm Penetration
Compact	35 – 65%	10 – 30 Blows Per 300 mm Penetration
Dense	65 – 85%	30 – 50 Blows Per 300 mm Penetration
Very Dense	85 – 100%	Over 50 Blows Per 300 mm Penetration

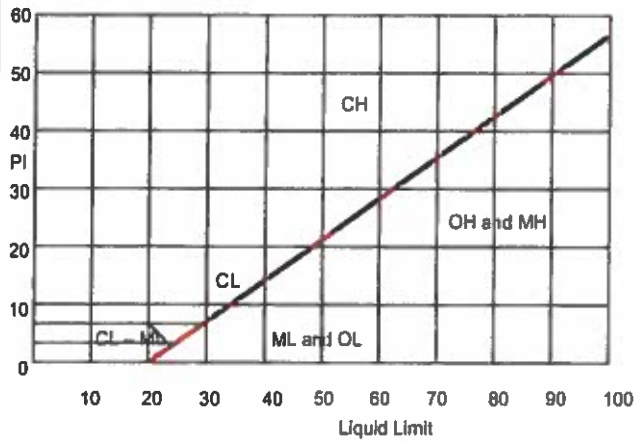
CONSISTENCY OF COHESIVE SOILS

Descriptive Term	Undrained Shear Strength kPa (psf)	N Value Standard Penetration Test	Remarks
Very Soft	< 12 (< 250)	< 2	Can penetrate with fist
Soft	12 – 25 (250 – 500)	2 – 4	Can indent with fist
Firm	25 – 50 (500 –1000)	4 – 8	Can penetrate with thumb
Stiff	50 – 100 (1000 – 2000)	8 – 15	Can indent with thumb
Very Stiff	100 – 200 (2000 – 4000)	15 – 30	Can indent with thumb-nail
Hard	> 200 (> 4000)	> 30	Can indent with thumb-nail

Notes: 1. Relative density determined by standard laboratory tests.
2. N value – blows/300 mm penetration of a 623 N (140 Lb.) hammer falling 760 mm (30 in.) on a 50 mm O.D. split spoon soil sampler. The split spoon sampler is driven 450 mm (18 in.) or 610 mm (24 in.). The "N" value is the Standard Penetration Test (SPT) value and is normally taken as the number of blows to advance the sampler the last 300 mm.

APPENDIX B CONTINUED
CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES
ASTM Designation: D 2487 - 69 AND D 2488 – 69
(Unified Soil Classification System)

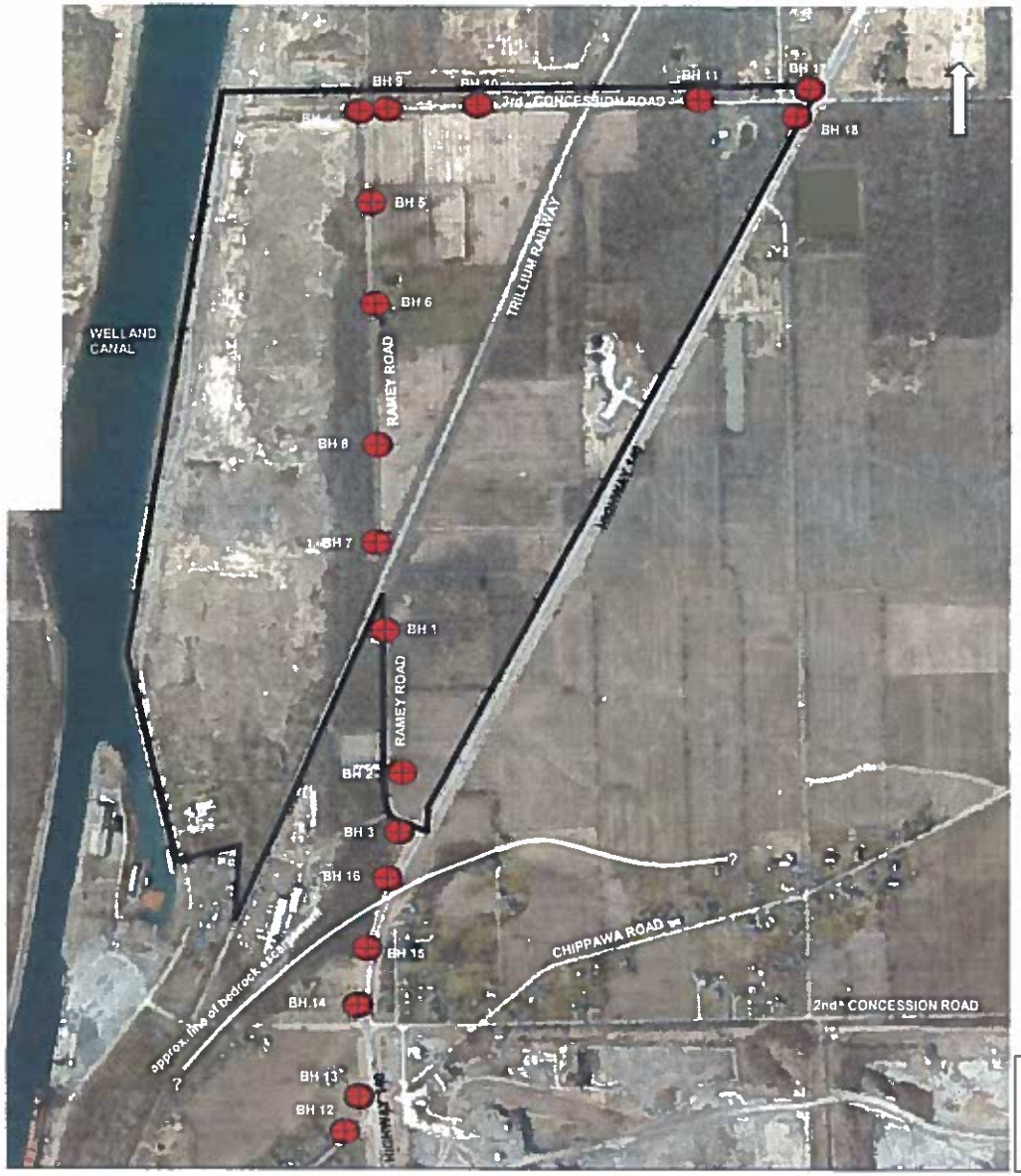
Major Divisions			Group Symbols	Typical Names	Classification Criteria		
Coarse-grained soils More than 50% retained on No. 200 sieve *	Gravels 50% or more of coarse fraction retained on No. 4 sieve	Clean gravels	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	Classification on basis of percentage of fines Less than 5% pass No. 200 sieve . . . . . GW, GP, SW, SP More than 12% pass No. 200 sieve . . . . . GM, GC, SM, SC 5 to 12% pass No.200 sieve . . . . . Borderline classifications requiring use of dual symbols	C_u=D60/D10 greater than 4; $C_z = (D30)^2/(D10xD60)$ between 1 and 3	
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines		Not meeting both criteria for GW	
		Gravels with fines	GM	Silty gravels, gravel-sand-silt mixtures		Atterberg limits below "A" line or P.I. less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
			GC	Clayey gravels, gravel-sand-clay mixtures		Atterberg limits above "A" line with P.I. greater than 7	
	Sands More than 50% of coarse fraction passes No. 4 sieve	Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines		C_u=D60/D10 greater than 6; $C_z = (D30)^2/(D10xD60)$ between 1 and 3	
			SP	Poorly graded sands and gravelly sands, little or no fines		Not meeting both criteria for SW	
		Sands with fines	SM	Silty sands, sand-silt mixtures		Atterberg limits below "A" line or P.I. less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
			SC	Clayey sands, sand-clay mixtures		Atterberg limits above "A" line with P.I. greater than 7	
Fine-grained soils 50% or more passes No. 200 sieve *	Silts and clays Liquid limit 50% or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands	Plasticity Chart For classification of fine-grained soils and fine fraction of coarse-grained soils. Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols. Equation of A-line: PI=0.73 (LL-20)		
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silts			
			OL	Organic silts and organic silts of low plasticity			
	Silts and clays Liquid limit greater than 50%		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts			
			CH	Inorganic clays of high plasticity, fat clays			
			OH	Organic clays of medium to high plasticity			
	Highly organic soils		Pt	Peat, much and other highly organic soils	* Based on the material passing the 3 in. (76mm) sieve.		



APPENDIX C

DRAWING 1 - SITE PLAN SHOWING BOREHOLE LOCATIONS

LOGS OF BOREHOLES



Key Plan of Site Location

BOREHOLE NO & LOCATION	SURFACE ELEVATION (m)	SURFACE CONDITIONS	REFUSAL ON ASSUMED BEDROCK		SUBSURFACE CONDITIONS
			DEPTH TO REFUSAL (m)	REFUSAL ELEVATION (m)	
RAMEY ROAD					
3rd CONCESSION ROAD					
CHIPPAWA ROAD					
WEST SIDE OF HIGHWAY 140					

Notes:

LEGEND

- Approximate locations of boreholes drilled by Landtek on Sept. 3, 4, & November 16 & 17 2014
- Approximate perimeter limits of Site 4, East Side Employment Lands

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Date:	Dec., 2014	Project No 14150
Project	Site & Borehole Location Plan East Side Employment Lands External Servicing, Port Colborne, Ont.	
Title	Drawing 1 (NTS)	

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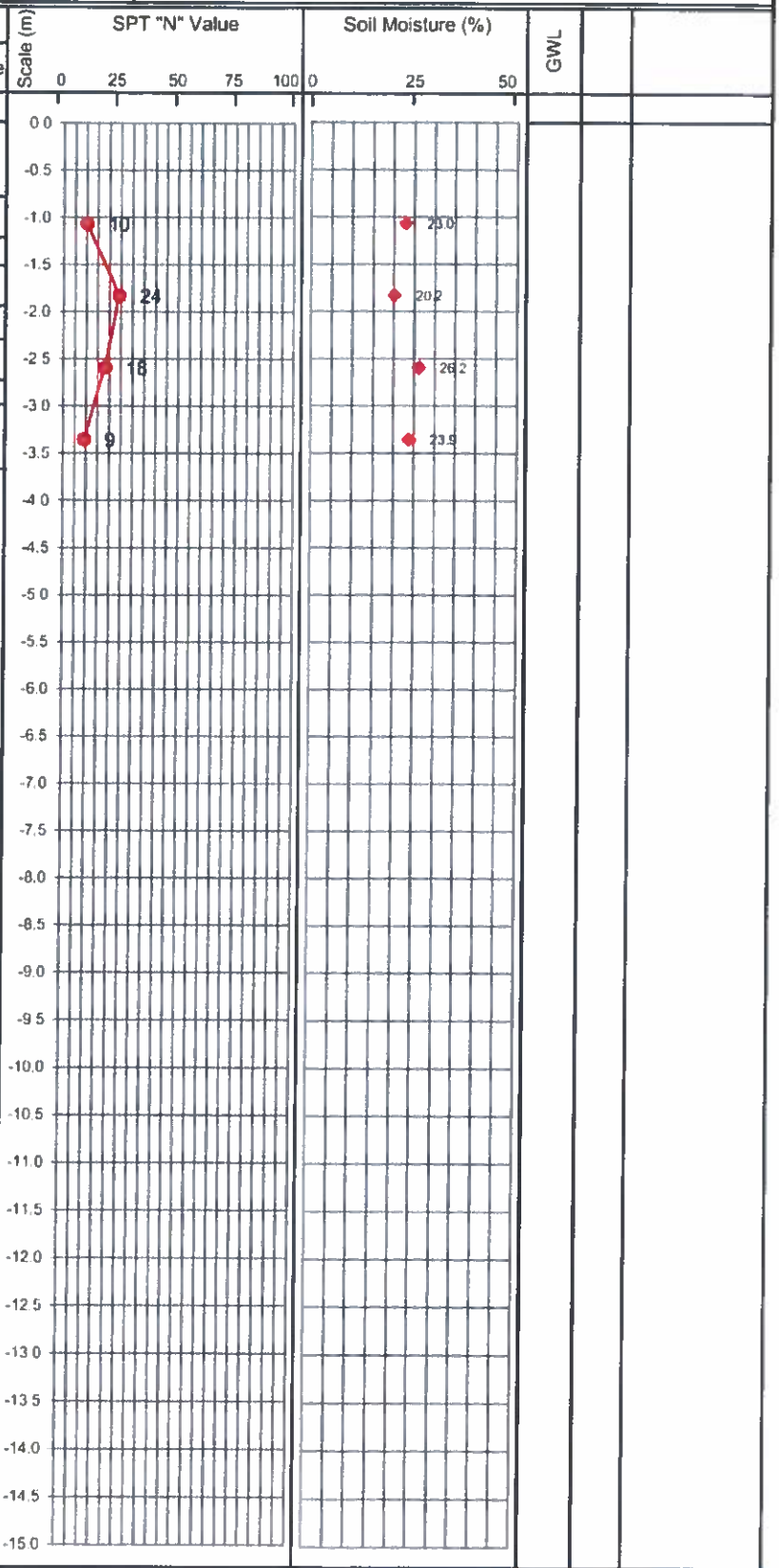
LOG OF BOREHOLE NO. 1

Project No.:	14150	Drill Date:	September 3, 2014
Project:	External Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	Ramey Rd., S. of railway crossing, Port Colborne	Datum:	Geodetic

Material Description	Symbol	Elev. Depth	Samples No.	Samples Type
Ground Surface		176.3		
±480 mm Granular Base		0.0		
SILTY CLAY layered & fissured structure, silt partings, some sand, red shale pieces, gravel, moist to very moist, brown, (Stiff to Very Stiff)			1	SS
			2	SS
reddish-brown & very moist below ±2.8 m			3	SS
		172.6	4	SS
BOREHOLE TERMINATED		3.7		



Notes: 1. On completion, borehole open to 3.0 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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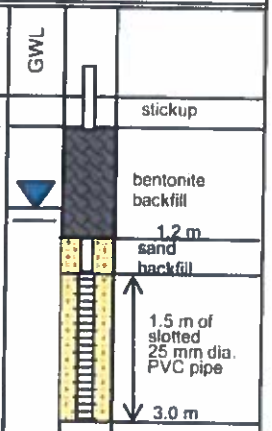
LOG OF BOREHOLE NO. 2

Project No.:	14150	Drill Date:	September 3, 2014
Project:	External Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	Ramey Rd., ±3.0 m S. of driveway to #2250, Port Colborne	Datum:	Geodetic

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type	SPT "N" Value	Soil Moisture (%)	GWL
Ground Surface		176.1					
±250 mm Granular over 80 mm Topsoil		0.0					
SILTY CLAY layered & fissured structure, silt partings, some sand, red shale & gravel, very moist, brown to red-brown, (Stiff)			1	SS	9	26.6	
			2	SS	14	29.5	
			3	SS	13	29.6	
grey, wet, & soft below ±3.0 m			4	SS	5	31.7	
		172.4					
BOREHOLE TERMINATED		3.7					

SPT "N" Value: 0 25 50 75 100 | Soil Moisture (%): 0 25 50 | Scale (m): 0.0 -0.5 -1.0 -1.5 -2.0 -2.5 -3.0 -3.5 -4.0 -4.5 -5.0 -5.5 -6.0 -6.5 -7.0 -7.5 -8.0 -8.5 -9.0 -9.5 -10.0 -10.5 -11.0 -11.5 -12.0 -12.5 -13.0 -13.5 -14.0 -14.5 -15.0



Notes:
1. On completion, borehole open to 3.0 m and dry. Piezometer installed.
2. Piez. W.L. = 0.8 m depth on October 20, 2014.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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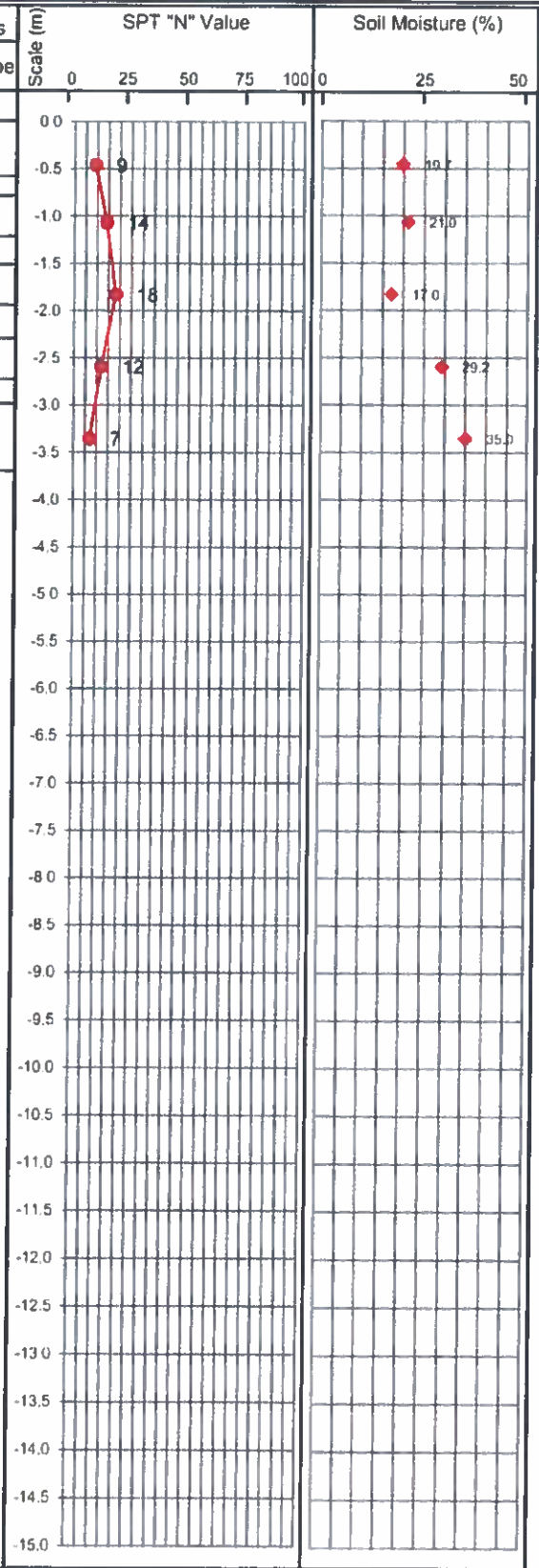
LOG OF BOREHOLE NO. 3

Project No.:	14150	Drill Date:	September 3, 2014
Project:	External Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	Ramey Rd., ±10.0 m W. of WE of Hwy 140, Port Colborne	Datum:	Geodetic

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type
Ground Surface		177.1		
±600 mm Clayey Silt Topsoil		0.0	1	SS
SILTY CLAY layered & fissured structure, silt partings, some sand, red shale & gravel, moist to very moist, brown, (Stiff to Very Stiff)			2	SS
			3	SS
			4	SS
very moist to wet, reddish-brown, & firm below ±3.0 m			5	SS
		173.4		
BOREHOLE TERMINATED		3.7		



Notes: 1. On completion, borehole open to 3.0 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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LOG OF BOREHOLE NO. 4

Project No.:	14150	Drill Date:	September 3, 2014
Project:	External Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	Ramey Rd. @ 3rd Concession Rd., Port Colborne	Datum:	Geodetic

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type	SPT "N" Value	Soil Moisture (%)	GWL
Ground Surface		175.9					
±430 mm Granular Base		0.0					
SILTY CLAY layered & fissured structure, silt partings, some sand, red shale & gravel, moist to very moist to wet, brown to red-brown, (Firm to Stiff)			1	SS	7	30.2	
			2	SS	12	23.5	
			3	SS	13	26.4	
			4	SS	8	30.8	
very moist to wet, grey, & very soft below ±4.0 m		170.9	5	SS	2	36.1	
BOREHOLE TERMINATED		5.0					

Scale (m): 0.0, -0.5, -1.0, -1.5, -2.0, -2.5, -3.0, -3.5, -4.0, -4.5, -5.0, -5.5, -6.0, -6.5, -7.0, -7.5, -8.0, -8.5, -9.0, -9.5, -10.0, -10.5, -11.0, -11.5, -12.0, -12.5, -13.0, -13.5, -14.0, -14.5, -15.0

SPT "N" Value: 0, 25, 50, 75, 100

Soil Moisture (%): 0, 25, 50

Notes: 1. On completion, borehole open to 4.6 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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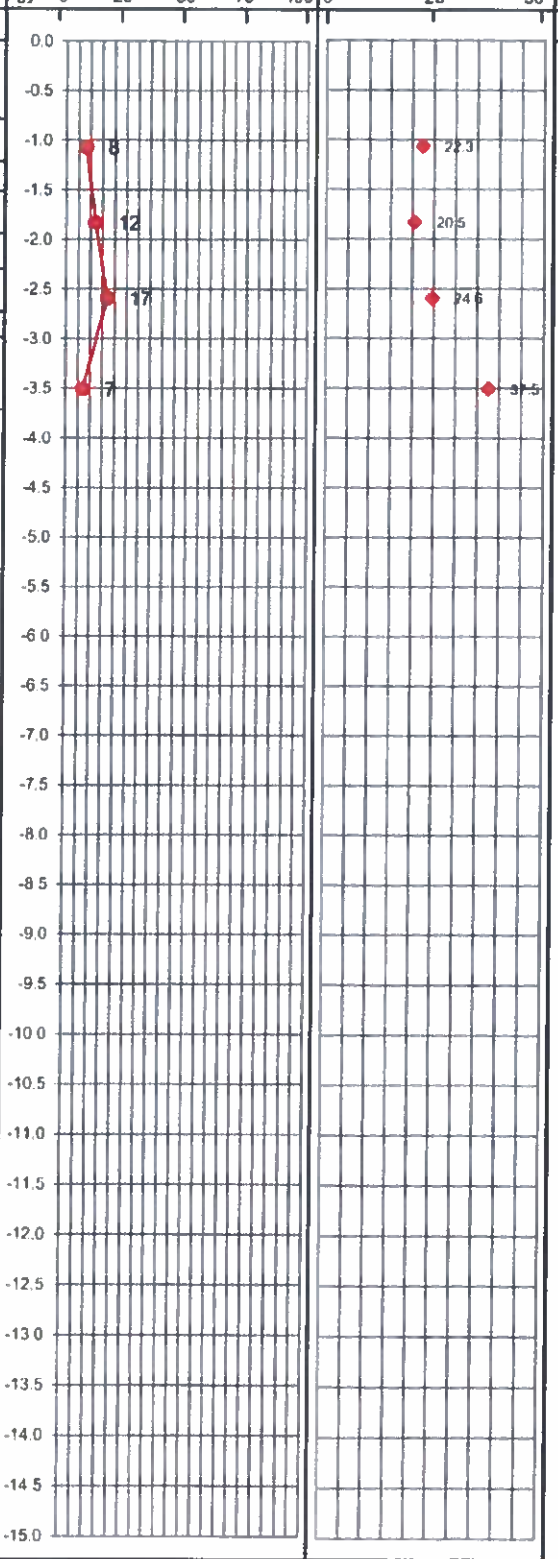
LOG OF BOREHOLE NO. 5

Project No.:	14150	Drill Date:	September 3, 2014
Project:	External Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	Ramey Rd.,±150 m S. of 3rd Concession Rd., Port Colborne	Datum:	Geodetic

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type	SPT "N" Value
Ground Surface		175.7			
±240 mm Granular Base		0.0			
ORGANIC SILTY CLAY, black, wood, moist		174.7			
SILTY CLAY layered & fissured structure, silt partings, some sand, red shale & gravel, moist to very moist, brown, (Stiff to Very Stiff)		1.0	1	SS	8
			2	SS	12
			3	SS	17
very moist to wet & firm below ±3.0 m			4	SS	7
		172.0			
BOREHOLE TERMINATED		3.7			



GWL

Notes: 1. On completion, borehole open to 3.0 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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LOG OF BOREHOLE NO. 6

Project No.:	14150	Drill Date:	September 3, 2014
Project:	External Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	Ramey Rd., S. of 3rd Concession Rd., Port Colborne	Datum:	Geodetic

Material Description	Symbol	Elev. Depth	Samples No.	Samples Type
Ground Surface		175.9		
±350 mm Granular		0.0		
SILTY CLAY layered & fissured structure, silt partings, some sand, red shale & gravel, moist to very moist, brown to red-brown, (Firm to Very Stiff) grey & very moist to wet below ±2.1 m firm in consistency below ±3.0 m			1 2 3 4	SS SS SS SS
		172.2		
BOREHOLE TERMINATED		3.7		

SPT "N" Value: 6, 12, 15, 8

Soil Moisture (%): 15.4, 19.8, 23.1, 24.0

GWL

stickup
bentonite backfill
0.76m
sand backfill
1.5 m of slotted 25 mm dia. PVC pipe
2.6 m

Notes:
1. On completion, borehole open to 2.6 m and dry. Piezometer installed.
2. Piez. W.L. = 1.4 m depth on October 20, 2014.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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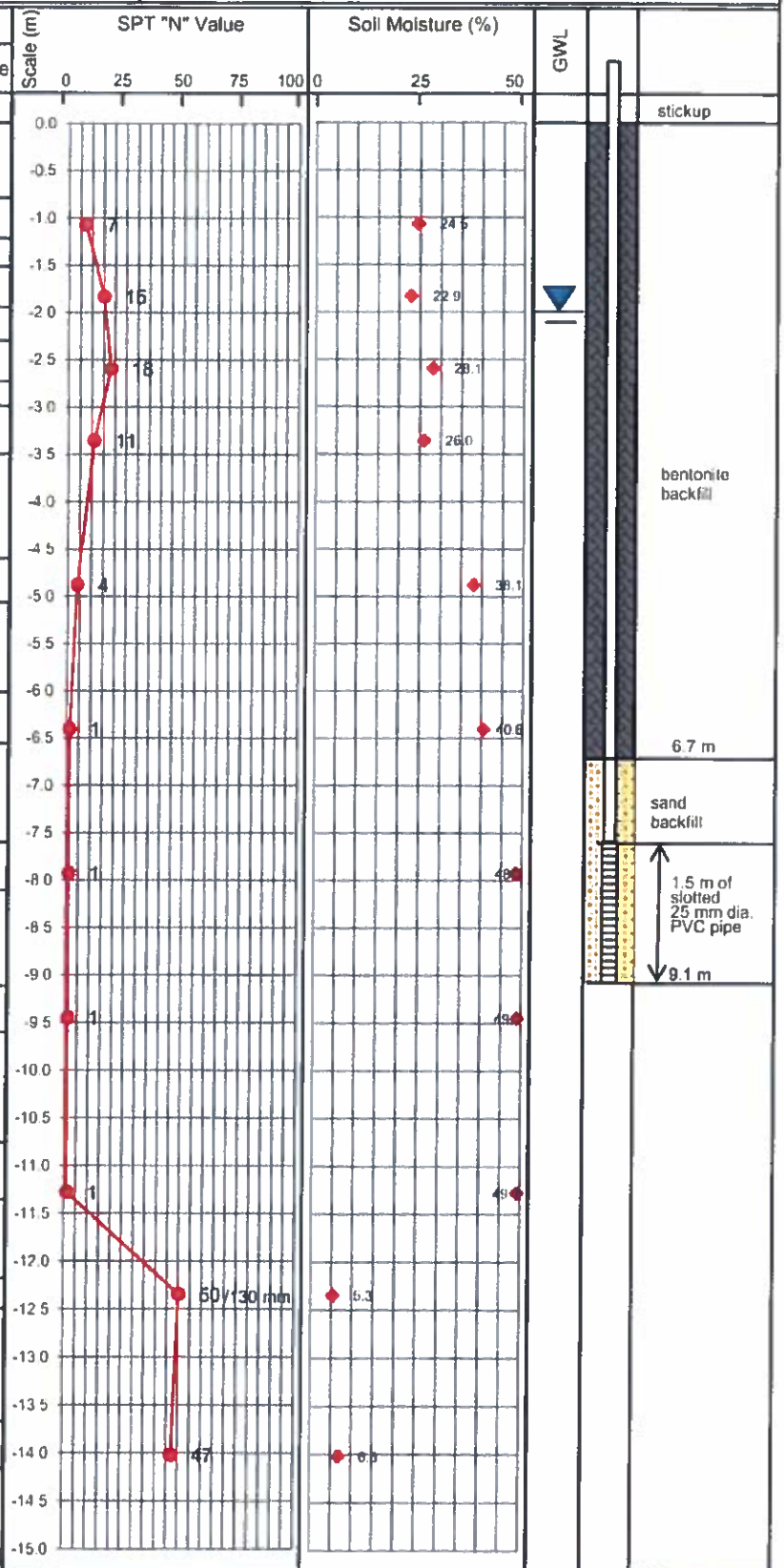
LOG OF BOREHOLE NO. 7

Project No.:	14150	Drill Date:	September 3 & 4, 2014
Project:	External Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	Ramey Rd., Pumping Station Site, Port Colborne, Ont.	Datum:	Geodetic

Material Description	Symbol	Elev. Depth	Samples No.	Samples Type
Ground Surface		176.3		
±250 mm Granular Base		0.0		
FILL mottled silty clay with gravel, some sand, brown, moist, (Firm)		175.2	1	SS
		1.1	2	SS
SILTY CLAY layered & fissured structure, silt partings, some sand & scattered gravel, moist to moist, brown to dark brown, (Very Stiff)			3	SS
			4	SS
wet, very soft, & reddish-brown below ±4.5 m			5	SS
			6	SS
			7	SS
			8	SS
			9	SS
		164.4		
SILTY SAND TILL fine to medium sand, fractured structure, gravel & rock fragments, brown/grey, moist, (Dense to Very Dense)		11.9	10	SS
			11	SS
BOREHOLE TERMINATED		162.1 14.2		

Borehole 7 initially advanced to 12.2 m on Sept. 3/2014 & piezometer installed.
On September 4/2014 borehole drilled to 12.2 m adjacent to original borehole location and hole advanced to 14.2 m.



Notes:
1. On completion, borehole open to 9.1 m and dry. Piezometer installed on 9/03/14.
2. Piez. W.L. = 2.0 m depth on October 22, 2014.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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LOG OF BOREHOLE NO. 8

Project No.:	14150	Drill Date:	September 4, 2014
Project:	External Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	Ramey Rd., N. of railway crossing, Port Colborne	Datum:	Geodetic

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type	SPT "N" Value	Soil Moisture (%)	GWL
Ground Surface		175.9					
±350 mm Granular Base		0.0					
SILTY CLAY layered & fissured structure, silt partings, some sand, red shale & gravel, moist to very moist, brown, (Stiff to Very Stiff)			1	SS	12	25.9	
			2	SS	23	22.5	
			3	SS	17	20.2	
			4	SS	16	25.0	
		172.2					
BOREHOLE TERMINATED		3.7					

SPT "N" Value: Scale (m) 0 25 50 75 100 | Soil Moisture (%): 0 25 50

0.0 -0.5 -1.0 -1.5 -2.0 -2.5 -3.0 -3.5 -4.0 -4.5 -5.0 -5.5 -6.0 -6.5 -7.0 -7.5 -8.0 -8.5 -9.0 -9.5 -10.0 -10.5 -11.0 -11.5 -12.0 -12.5 -13.0 -13.5 -14.0 -14.5 -15.0

Notes: 1. On completion, borehole open to 3.0 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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LOG OF BOREHOLE NO. 9

Project No.:	14150	Drill Date:	September 4, 2014
Project:	External Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	3rd Concession Rd., 25 m E. of Ramey Rd., Port Colborne	Datum:	Geodetic

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type	SPT "N" Value	Soil Moisture (%)	GWL
Ground Surface		175.9					
±380mm Granular Base		0.0					
ORGANIC SILTY CLAY, black, roots,		175.1					
SILTY CLAY layered & fissured structure, silt partings, some sand, red shale & gravel, moist to very moist, brown to grey below ±2.1 m, (Stiff to Very Stiff)		0.8	1	SS	12	23.2	
			2	SS	16	27.2	
			3	SS	23	24.8	
very moist below ±3.0 m			4	SS	11	29.3	
wet & very soft below ±4.0 m		170.9	5	SS	2	39.6	
BOREHOLE TERMINATED		5.0					

Scale (m): 0.0, -0.5, -1.0, -1.5, -2.0, -2.5, -3.0, -3.5, -4.0, -4.5, -5.0, -5.5, -6.0, -6.5, -7.0, -7.5, -8.0, -8.5, -9.0, -9.5, -10.0, -10.5, -11.0, -11.5, -12.0, -12.5, -13.0, -13.5, -14.0, -14.5, -15.0

SPT "N" Value: 0, 25, 50, 75, 100

Soil Moisture (%): 0, 25, 50

Notes: 1. On completion, borehole open to 4.6 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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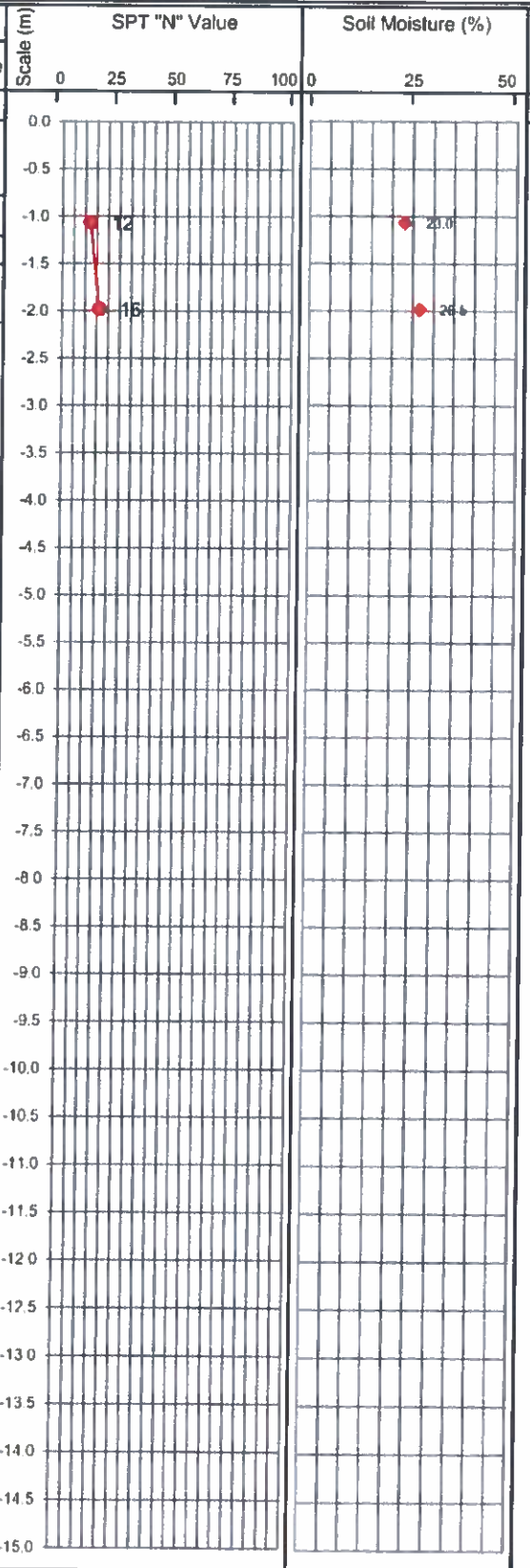
LOG OF BOREHOLE NO. 10

Project No.:	14150	Drill Date:	September 4, 2014
Project:	External Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	3rd Concession Rd., 125 m W. of Ramey Rd., Port Colborne	Datum:	Geodetic

Material Description	Symbol	Elev. Depth	Samples No.	Samples Type
Ground Surface		175.8		
±300mm Granular Base		0.0		
ORGANIC SILTY CLAY, black, roots,		174.9		
SILTY CLAY layered & fissured structure, silt partings, some sand, red shale & gravel, moist to very moist, brown, (Stiff to Very Stiff)		0.9	1	SS
			2	SS
		173.7		
BOREHOLE TERMINATED		2.1		



Notes: 1. On completion, borehole open to 1.5 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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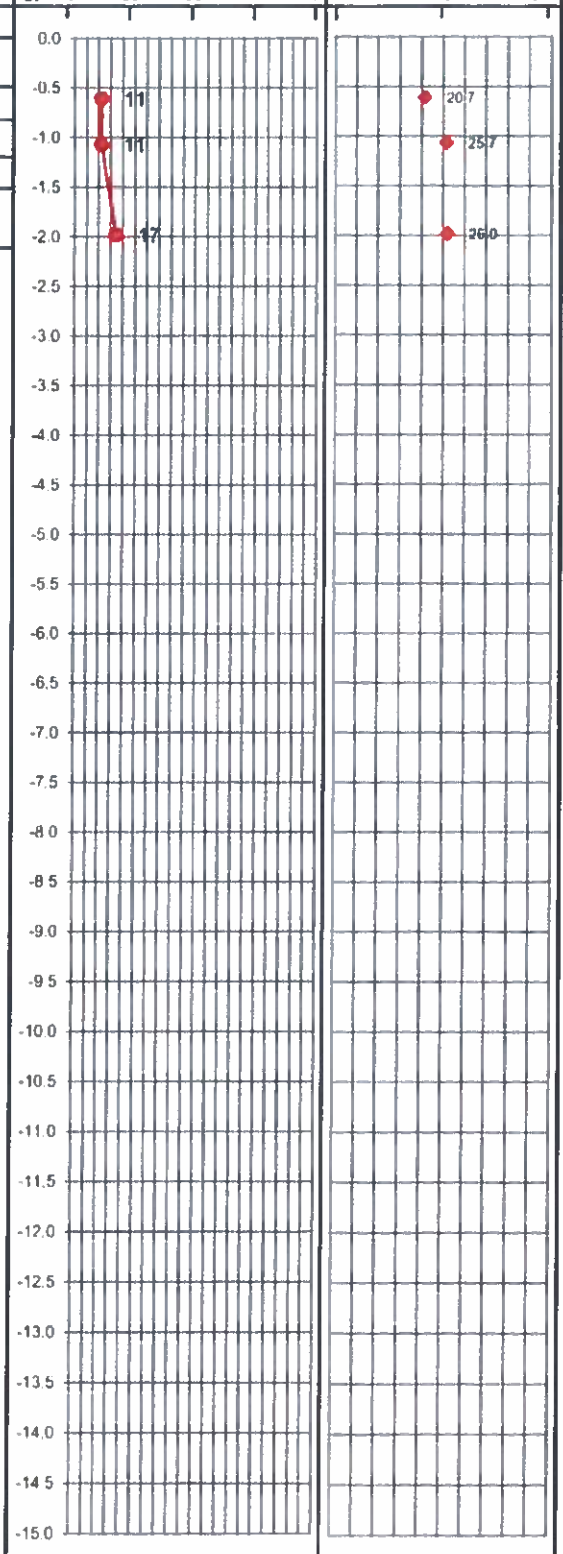
LOG OF BOREHOLE NO. 11

Project No.:	14150	Drill Date:	September 4, 2014
Project:	External Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	3rd Concession Rd.,100 m E. of railway crossing., Port Colb	Datum:	Geodetic

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type	SPT "N" Value	Soil Moisture (%)	GWL
Ground Surface		176.5					
100 mm Bituminous Material 380 mm Granular Base		0.0					
ORGANIC SILTY CLAY, black, moist		175.9	1	SS	11	20.7	
SILTY CLAY layered & fissured structure, silt partings, some sand, red shale & gravel, moist to very moist, brown, (Stiff to Very Stiff)		0.6	2	SS	11	25.7	
			3	SS	17	26.0	
BOREHOLE TERMINATED		174.4 2.1					



Notes: 1. On completion, borehole open to 1.5 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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LOG OF BOREHOLE NO. 12

Project No.:	14150	Drill Date:	September 4, 2014 & November 17, 2014
Project:	External Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	Chippawa Rd., W. of Hwy 140, Port Colborne	Datum:	Geodetic

Material Description	Symbol	Elev. Depth	Samples No.	Samples Type	Scale (m)	SPT "N" Value 0 25 50 75 100	Soil Moisture (%) 0 25 50	GWL
Ground Surface		184.5			0.0			
100 mm Bituminous Material 600 mm Granular Base		0.0			-0.5			
±200 mm broken rock & limestone pieces		183.6	1	SS	-1.0	50/130 mm	5.3	
REFUSAL TO BOREHOLE ADVANCEMENT ON BEDROCK Limestone: Bois Blanc/Onondaga recovery = 93.3 % RQD = 20.0 %		0.9	CORE RUN #1	52 mm Dia.	-1.5			
					-2.0			
					-2.5			
Limestone: Bois Blanc/Onondaga recovery = 100 % RQD = 27.5 %		2.5 181.2	RUN #2	52 mm Dia.	-3.0			
					-3.5			
ROCK CORING TERMINATED		3.3			-4.0			
					-4.5			
					-5.0			
					-5.5			
					-6.0			
					-6.5			
					-7.0			
					-7.5			
					-8.0			
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					-9.0			
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					-11.0			
					-11.5			
					-12.0			
					-12.5			
					-13.0			
					-13.5			
					-14.0			
					-14.5			
					-15.0			

Notes: 1. On completion, borehole open to 0.9 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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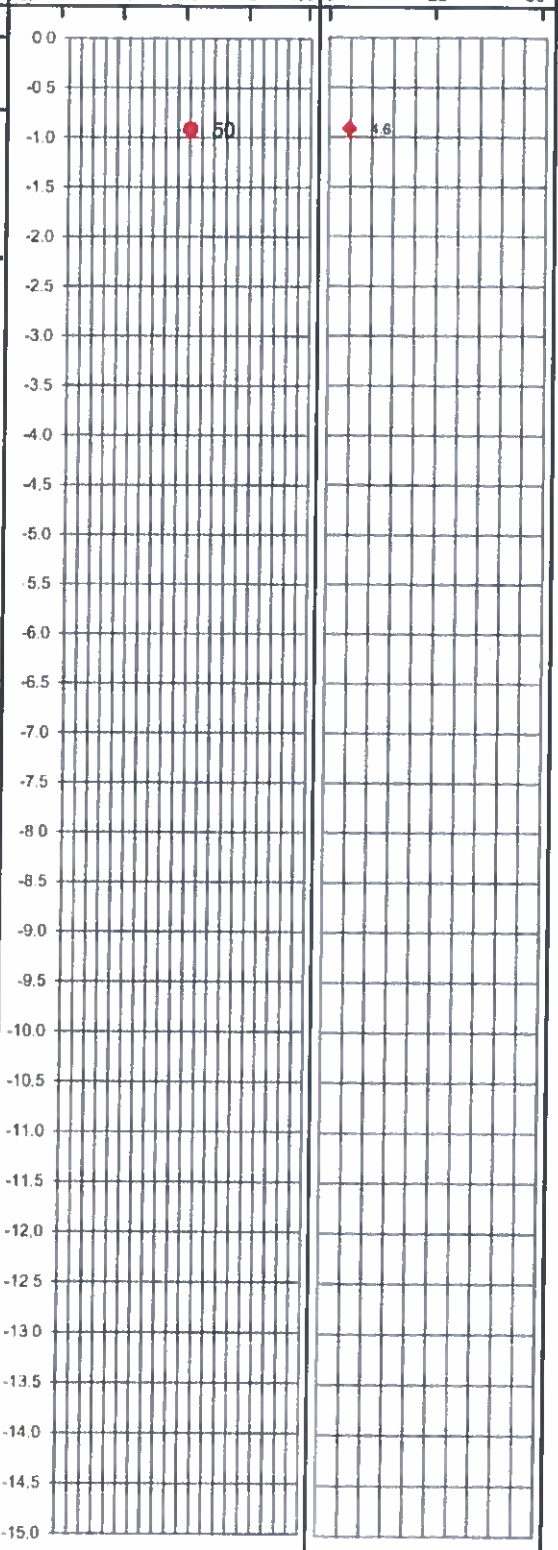
LOG OF BOREHOLE NO. 13

Project No.:	14150	Drill Date:	November 17, 2014
Project:	External Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	W. Side of Hwy 140, N. of Chippawa Rd., Port Colborne	Datum:	Geodetic

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type	Scale (m)	SPT "N" Value	Soil Moisture (%)	GWL
Ground Surface		185.2						
130 mm Topsoil		0.0						
FILL silty clay, mottled, brown, very moist		184.5						
REFUSAL TO BOREHOLE ADVANCEMENT ON BEDROCK Limestone: Bois Blanc/Onondaga recovery = 100 % RQD = 37.5 %		0.7 183.0	RUN #1	52 mm Dia.				
ROCK CORING TERMINATED		2.2						

SPT "N" Value: 0 25 50 75 100 — Soil Moisture (%): 0 25 50



Notes: 1. On completion, borehole open to 0.9 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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LANDTEK LIMITED

LOG OF BOREHOLE NO. 14

Project No.:	14150	Drill Date:	November 17, 2014
Project:	External Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	W. Side of Hwy 140, N. of Chippawa Rd., Port Colborne	Datum:	Geodetic

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type	Scale (m)	SPT "N" Value	Soil Moisture (%)	GWL
Ground Surface		184.8						
100 mm Topsoil		0.0						
FILL sand & gravel, brown, moist		183.7	1	SS		50 / 50 mm	18	
REFUSAL TO BOREHOLE ADVANCEMENT ON ASSUMED BEDROCK		1.1						

SPT "N" Value: 0 25 50 75 100

Soil Moisture (%): 0 25 50

Scale (m): 0.0, -0.5, -1.0, -1.5, -2.0, -2.5, -3.0, -3.5, -4.0, -4.5, -5.0, -5.5, -6.0, -6.5, -7.0, -7.5, -8.0, -8.5, -9.0, -9.5, -10.0, -10.5, -11.0, -11.5, -12.0, -12.5, -13.0, -13.5, -14.0, -14.5, -15.0

Notes: 1. On completion, borehole open to 0.9 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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LOG OF BOREHOLE NO. 15

Project No.:	14150	Drill Date:	November 17, 2014
Project:	External Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	W. Side of Hwy 140, N. of Chippawa Rd., Port Colborne	Datum:	Geodetic

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type	Scale (m)	SPT "N" Value	Soil Moisture (%)	GWL
Ground Surface		183.8						
100 mm Topsoil		0.0						
FILL silty sand & gravel, light brown, moist		182.8	1	SS		50 / 50 mm	6.6	
REFUSAL TO BOREHOLE ADVANCEMENT ON ASSUMED BEDROCK		1.0						

SPT "N" Value: 0, 25, 50, 75, 100

Soil Moisture (%): 0, 25, 50

Scale (m): 0.0, -0.5, -1.0, -1.5, -2.0, -2.5, -3.0, -3.5, -4.0, -4.5, -5.0, -5.5, -6.0, -6.5, -7.0, -7.5, -8.0, -8.5, -9.0, -9.5, -10.0, -10.5, -11.0, -11.5, -12.0, -12.5, -13.0, -13.5, -14.0, -14.5, -15.0

Notes: 1. On completion, borehole open to 0.9 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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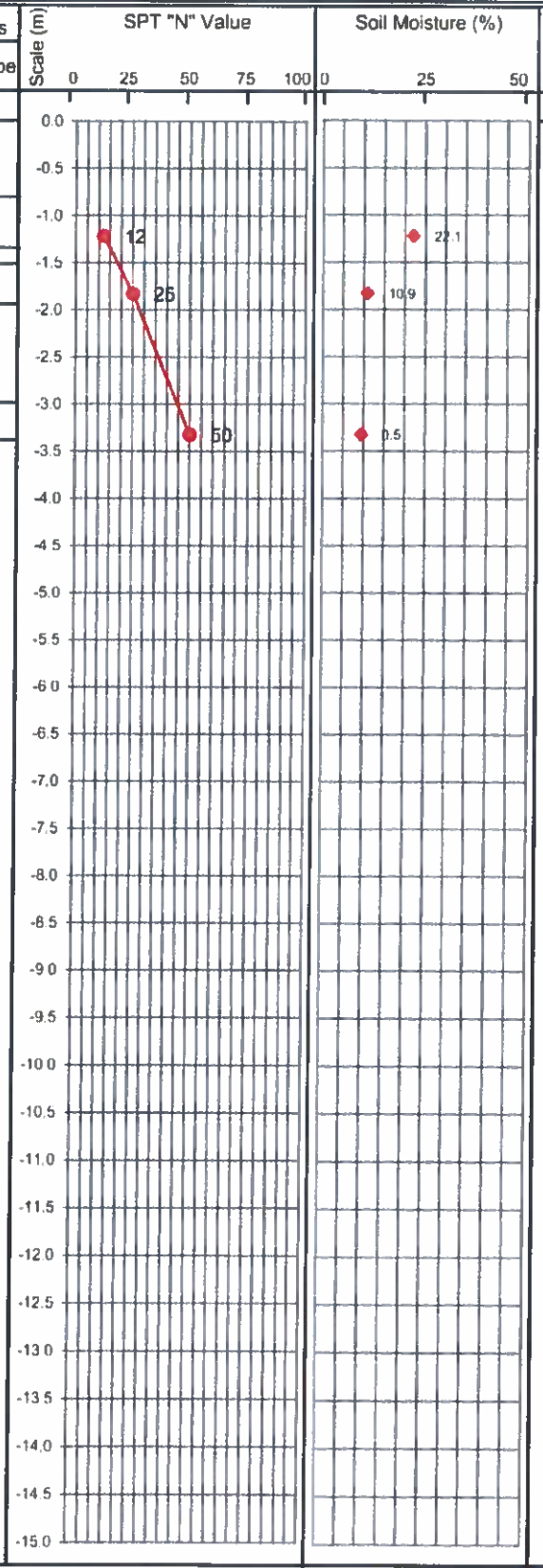
LANDTEK LIMITED

LOG OF BOREHOLE NO. 16

Project No.:	14150	Drill Date:	November 16, 2014
Project:	External Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	W. Side of Hwy 140, N. of Chippawa Rd., Port Colborne	Datum:	Geodetic

Material Description	Symbol	Elev. Depth	Samples No.	Samples Type
Ground Surface		179.4		
±80 mm Topsoil		0.0		
SILTY CLAY layered & fissured structure, silt partings, some sand, red shale pieces, gravel, moist to very moist, brown, (Stiff to Very Stiff)			1	SS
			2	SS
		176.0	3	SS
REFUSAL TO BOREHOLE ADVANCEMENT ON ASSUMED BEDROCK		3.4		



Notes: 1. On completion, borehole open to 3.0 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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LANDTEK LIMITED

LOG OF BOREHOLE NO. 17

Project No.:	14150	Drill Date:	November 17, 2014
Project:	External Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	W. Side of Hwy 140, N. of 3rd Concession, Port Colborne	Datum:	Geodetic

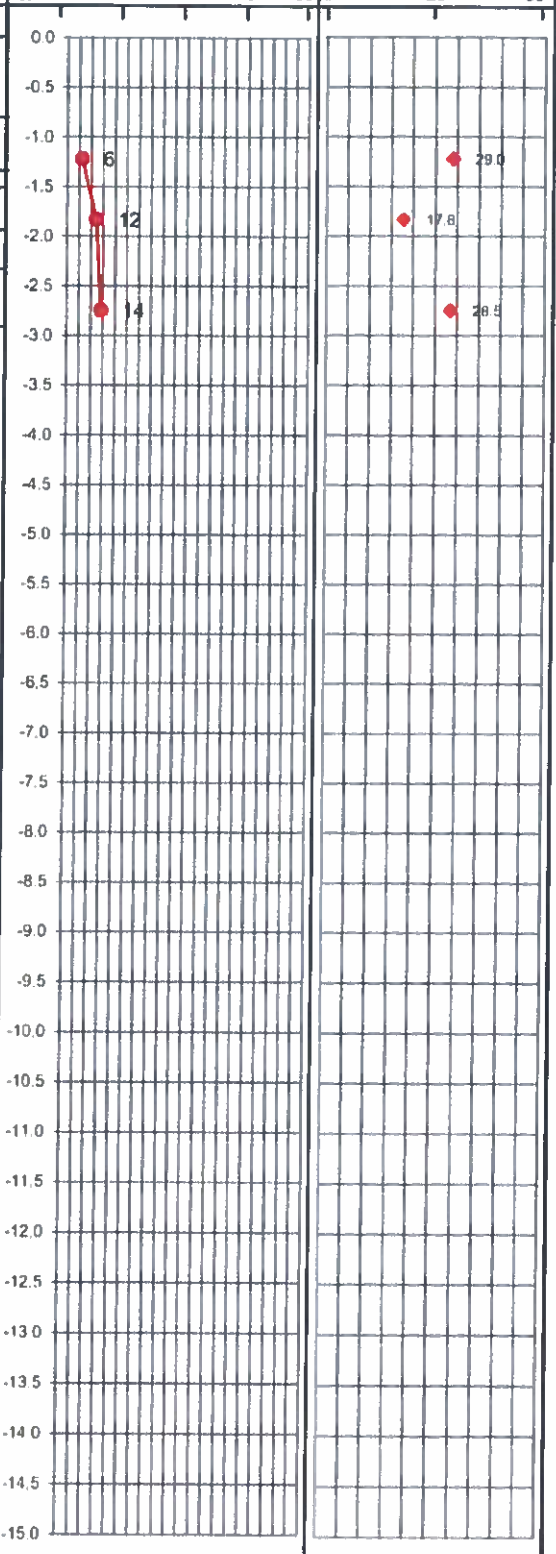
Material Description	Symbol	Elev. Depth	Samples No.	Samples Type
Ground Surface		177.4		
±600 mm Granular		0.0		
SILTY CLAY layered & fissured structure, silt partings, some sand, red shale pieces, gravel, moist to very moist, brown, (Firm to Stiff)			1	SS
			2	SS
		174.5	3	SS
BOREHOLE TERMINATED		2.9		

Scale (m)

SPT "N" Value: 0 25 50 75 100

Soil Moisture (%): 0 25 50

GWL



Notes: 1. On completion, borehole open to 2.3 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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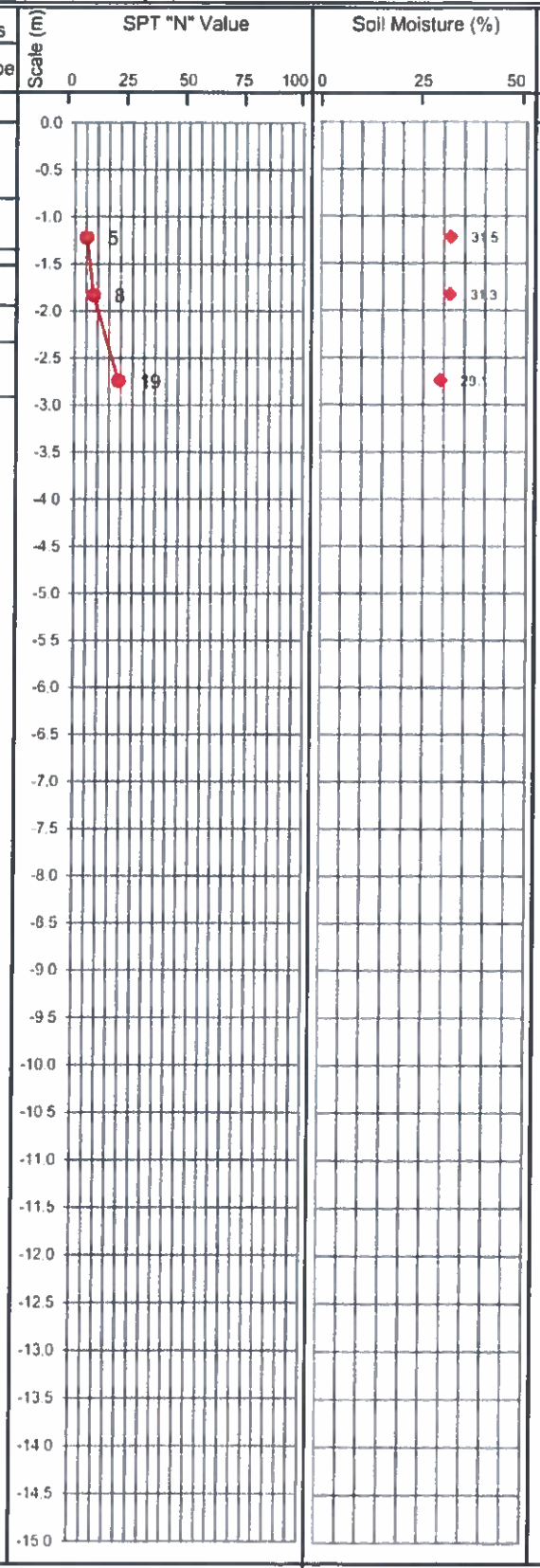
LANDTEK LIMITED

LOG OF BOREHOLE NO. 18

Project No.:	14150	Drill Date:	November 17, 2014
Project:	External Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	W. Side of Hwy 140, S. of 3rd Concession, Port Colborne	Datum:	Geodetic

Material Description	Symbol	Elev. Depth	Samples No.	Samples Type
Ground Surface		177.2		
±460 mm Granular		0.0		
SILTY CLAY layered & fissured structure, silt partings, some sand, red shale pieces, gravel, moist to very moist, brown, (Firm to Very Stiff)			1	SS
			2	SS
		174.3	3	SS
BOREHOLE TERMINATED		2.9		



Notes: 1. On completion, borehole open to 2.3 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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APPENDIX D

RESULTS OF CHEMICAL ANALYSES BY AGAT LABORATORIES LTD.

AGAT Laboratories

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CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 14H891175

PROJECT: 14150

CLIENT NAME: LANDTEK LTD.

SAMPLING SITE:

ATTENTION TO: Cory Zanatta

SAMPLED BY:

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2014-09-19

DATE REPORTED: 2014-09-26

SAMPLE DESCRIPTION:				BH6 SS1	BH3 SS2	BH1 SS2	BH11 SS3	BH7 SS2	BH10 SS2	BH8 SS2	BH5 SS1
SAMPLE TYPE:				Soil	Soil	Soil	Soil	Soil	Soil	Soil	Soil
DATE SAMPLED:				9/3/2014	9/3/2014	9/3/2014	9/3/2014	9/3/2014	9/3/2014	9/3/2014	9/3/2014
Parameter	Unit	G / S	RDL	5828930	5828961	5828962	5828963	5828965	5828966	5828969	5828971
Antimony	µg/g	50	0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	4	5	4	5	4	4	4	4
Barium	µg/g	670	2	147	154	142	152	148	167	129	109
Beryllium	µg/g	10	0.5	1.4	1.1	1.1	1.2	1.2	1.4	1.3	1.2
Boron	µg/g	120	5	8	15	16	16	16	19	15	10
Boron (Hot Water Soluble)	µg/g	2	0.10	0.35	0.92	0.51	0.55	0.62	0.74	0.45	0.45
Cadmium	µg/g	1.9	0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5	<0.5
Chromium	µg/g	160	2	32	31	33	36	36	39	37	36
Cobalt	µg/g	100	0.5	15.2	14.8	15.0	16.9	16.3	18.3	17.4	16.4
Copper	µg/g	300	1	27	24	24	24	28	26	27	27
Lead	µg/g	120	1	14	11	13	13	14	13	14	17
Molybdenum	µg/g	40	0.5	<0.5	<0.5	0.5	<0.5	0.5	<0.5	0.5	0.5
Nickel	µg/g	340	1	36	32	33	35	35	40	36	35
Selenium	µg/g	5.5	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Silver	µg/g	50	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Thallium	µg/g	3.3	0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4	<0.4
Uranium	µg/g	33	0.5	0.7	1.3	1.1	1.1	1.2	1.1	1.3	0.9
Vanadium	µg/g	86	1	47	39	39	44	43	49	47	47
Zinc	µg/g	340	5	66	67	71	74	73	82	74	76
Chromium VI	µg/g	10	0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2	<0.2
Cyanide	µg/g	0.051	0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	20	0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity (2:1)	mS/cm	1.4	0.005	0.533	4.69	0.658	1.11	0.646	0.787	0.712	0.761
Sodium Adsorption Ratio (2:1)	NA	12	NA	0.459	1.47	0.340	0.214	0.338	0.399	0.410	0.462
pH, 2:1 CaCl2 Extraction	pH Units		NA	6.77	7.80	7.80	7.72	7.75	7.77	7.70	6.47

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to T3(ICC,MFT) Current

5828930-5828971 EC & SAR were determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio.

Certified By:

AGAT Laboratories

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Guideline Violation

AGAT WORK ORDER: 14H891175

PROJECT: 14150

CLIENT NAME: LANDTEK LTD.

ATTENTION TO: Cory Zanatta

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	GUIDEVALUE	RESULT
5828961	BH3 SS2	T3(ICC,MFT) Current	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity (2:1)	1.4	4.69

AGAT Laboratories

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Quality Assurance

CLIENT NAME: LANDTEK LTD

PROJECT: 14150

SAMPLING SITE:

AGAT WORK ORDER: 14H891175

ATTENTION TO: Cory Zanatta

SAMPLED BY:

Soil Analysis

RPT Date: Sep 26, 2014

PARAMETER	Batch	Sample Id	DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
			Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Soil)															
Antimony	5835775		< 0.8	< 0.8	0.0%	< 0.8	94%	70%	130%	98%	80%	120%	97%	70%	130%
Arsenic	5835775		4	4	0.0%	< 1	111%	70%	130%	105%	80%	120%	104%	70%	130%
Barium	5835775		31	30	3.3%	< 2	105%	70%	130%	102%	80%	120%	102%	70%	130%
Beryllium	5835775		< 0.5	< 0.5	0.0%	< 0.5	102%	70%	130%	105%	80%	120%	106%	70%	130%
Boron	5835775		< 5	< 5	0.0%	< 5	104%	70%	130%	105%	80%	120%	104%	70%	130%
Boron (Hot Water Soluble)	5844669		0.38	0.39	2.6%	< 0.10	132%	60%	140%	105%	70%	130%	108%	60%	140%
Cadmium	5835775		< 0.5	< 0.5	0.0%	< 0.5	99%	70%	130%	111%	80%	120%	102%	70%	130%
Chromium	5835775		13	13	0.0%	< 2	99%	70%	130%	111%	80%	120%	113%	70%	130%
Cobalt	5835775		6.8	6.7	1.5%	< 0.5	99%	70%	130%	103%	80%	120%	100%	70%	130%
Copper	5835775		36	37	2.7%	< 1	101%	70%	130%	110%	80%	120%	103%	70%	130%
Lead	5835775		14	13	7.4%	< 1	113%	70%	130%	106%	80%	120%	105%	70%	130%
Molybdenum	5835775		< 0.5	< 0.5	0.0%	< 0.5	102%	70%	130%	99%	80%	120%	107%	70%	130%
Nickel	5835775		13	14	7.4%	< 1	100%	70%	130%	103%	80%	120%	99%	70%	130%
Selenium	5835775		< 0.4	< 0.4	0.0%	< 0.4	84%	70%	130%	102%	80%	120%	100%	70%	130%
Silver	5835775		< 0.2	< 0.2	0.0%	< 0.2	70%	70%	130%	103%	80%	120%	105%	70%	130%
Thallium	5835775		< 0.4	< 0.4	0.0%	< 0.4	100%	70%	130%	99%	80%	120%	99%	70%	130%
Uranium	5835775		< 0.5	< 0.5	0.0%	< 0.5	119%	70%	130%	107%	80%	120%	113%	70%	130%
Vanadium	5835775		20	20	0.0%	< 1	101%	70%	130%	106%	80%	120%	105%	70%	130%
Zinc	5835775		57	55	3.6%	< 5	105%	70%	130%	107%	80%	120%	105%	70%	130%
Chromium VI	5829411		<0.4	<0.4	0.0%	< 0.2	96%	70%	130%	98%	80%	120%	94%	70%	130%
Cyanide	5828930	5828930	<0.040	<0.040	0.0%	< 0.040	108%	70%	130%	107%	80%	120%	103%	70%	130%
Mercury	5835775		< 0.10	< 0.10	0.0%	< 0.10	119%	70%	130%	103%	80%	120%	103%	70%	130%
Electrical Conductivity (2:1)	5841521		1.16	1.16	0.0%	< 0.005	106%	90%	110%	NA			NA		
Sodium Adsorption Ratio (2:1)	5841521		2.95	2.98	0.3%	NA	NA			NA			NA		
pH, 2:1 CaCl2 Extraction	5828971	5828971	6.47	6.90	6.4%	NA	100%	80%	120%	NA			NA		

Comments: NA signifies Not Applicable

Certified By:

AGAT Laboratories

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http://www.agatlabs.com

Method Summary

CLIENT NAME: LANDTEK LTD.

AGAT WORK ORDER: 14H891175

PROJECT: 14150

ATTENTION TO: Cory Zanatta

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Barium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	EPA SW 846 6010C, MSA, Part 3, Ch 21	ICP/OES
Cadmium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Copper	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Lead	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Molybdenum	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Nickel	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Selenium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Silver	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Thallium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Uranium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Zinc	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium VI	INOR-93-6029	SM 3500 B; MSA Part 3, Ch. 25	SPECTROPHOTOMETER
Cyanide	INOR-93-6052	MOE CN-3015 & E 3009 A,SM 4500 CN	TECHNICON AUTO ANALYZER
Mercury	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Electrical Conductivity (2:1)	INOR-93-6036	McKeague 4.12, SM 2510 B	EC METER
Sodium Adsorption Ratio (2:1)	INOR-93-6007	McKeague 4.12 & 3.26 & EPA SW-846 6010B	ICP/OES
pH, 2:1 CaCl2 Extraction	INOR-93-6031	MSA part 3 & SM 4500-H+ B	PH METER

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 14T919316

PROJECT: 14150

CLIENT NAME: LANDTEK LTD.

ATTENTION TO: Cory Zanatta

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2014-11-21

DATE REPORTED: 2014-12-01

		SAMPLE DESCRIPTION:		BH4 SS2	BH9 SS1	BH17 SS1	BH18 SS1
		SAMPLE TYPE:		Soil	Soil	Soil	Soil
		DATE SAMPLED:		11/9/2014	11/9/2014	11/11/2014	11/11/2014
Parameter	Unit	G / S	RDL	6106356	6106364	6106369	6106370
Antimony	µg/g	50	0.8	<0.8	<0.8	<0.8	<0.8
Arsenic	µg/g	18	1	5	6	5	4
Barium	µg/g	670	2	213	115	157	123
Beryllium	µg/g	10	0.5	1.2	1.5	0.9	1.0
Boron	µg/g	120	5	12	6	10	12
Boron (Hot Water Soluble)	µg/g	2	0.10	0.48	0.49	0.43	0.41
Cadmium	µg/g	1.9	0.5	<0.5	<0.5	<0.5	<0.5
Chromium	µg/g	160	2	30	31	24	28
Cobalt	µg/g	100	0.5	15.5	16.4	12.0	14.6
Copper	µg/g	300	1	24	23	22	26
Lead	µg/g	120	1	11	15	11	12
Molybdenum	µg/g	40	0.5	0.6	1.2	0.7	<0.5
Nickel	µg/g	340	1	34	32	27	32
Selenium	µg/g	5.5	0.4	<0.4	<0.4	<0.4	<0.4
Silver	µg/g	50	0.2	<0.2	<0.2	<0.2	<0.2
Thallium	µg/g	3.3	0.4	<0.4	<0.4	<0.4	<0.4
Uranium	µg/g	33	0.5	0.9	0.6	0.8	0.7
Vanadium	µg/g	86	1	39	43	32	35
Zinc	µg/g	340	5	72	78	67	70
Chromium VI	µg/g	10	0.2	<0.2	<0.2	<0.2	<0.2
Cyanide	µg/g	0.051	0.040	<0.040	<0.040	<0.040	<0.040
Mercury	µg/g	20	0.10	<0.10	<0.10	<0.10	<0.10
Electrical Conductivity	mS/cm	1.4	0.005	2.29	0.848	1.64	2.48
Sodium Adsorption Ratio	NA	12	NA	0.205	0.701	9.16	0.19
pH, 2:1 CaCl2 Extraction	pH Units		NA	8.01	6.86	7.83	7.81

Comments: RDL - Reported Detection Limit; **G / S - Guideline / Standard**; Refers to T3(ICC,MFT) Current
6106356-6106370 EC & SAR were determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water 1 part soil); pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio.

Certified By:

AGAT Laboratories

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http://www.agatlabs.com

Certificate of Analysis

AGAT WORK ORDER: 14T919316

PROJECT: 14150

CLIENT NAME: LANDTEK LTD.

ATTENTION TO: Cory Zanatta

SAMPLING SITE:

SAMPLED BY:

Corrosivity Package

DATE RECEIVED: 2014-11-21

DATE REPORTED: 2014-12-01

		SAMPLE DESCRIPTION:		BH8 SS1	BH14 SS1	BH16 SS1
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		11/9/2014	11/11/2014	11/11/2014
Parameter	Unit	G / S	RDL	6106358	6106365	6106367
Sulfide	%		0.01			
Chloride (2:1)	µg/g	NA	2	103	19	101
Sulphate (2:1)	µg/g		2	143	22	143
pH (2:1)	pH Units		NA	8.25	7.91	8.28
Electrical Conductivity (2:1)	mS/cm	1.4	0.005	0.465	0.179	0.464
Resistivity (2:1)	ohm.cm		1	2150	5590	2070
Redox Potential (2:1)	mV		5	272	254	270

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: Refers to T3(ICC,MFT) Current
6106358-6106367 * Analyses were performed at AGAT Laboratories Vancouver.

EC/Resistivity, pH, Chloride, Sulphate and Redox Potential were determined on the extract obtained from the 2:1 leaching procedure (2 parts DI water: 1 part soil).

Certified By:

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 14T919316

PROJECT: 14150

CLIENT NAME: LANDTEK LTD.

ATTENTION TO: Cory Zanatta

SAMPLING SITE:

SAMPLED BY:

Sulphide in Soil - Mississauga

DATE RECEIVED: 2014-11-21

DATE REPORTED: 2014-12-01

		SAMPLE DESCRIPTION:		BH8 SS1	BH14 SS1	BH16 SS1
		SAMPLE TYPE:		Soil	Soil	Soil
		DATE SAMPLED:		11/6/2014	11/11/2014	11/11/2014
Parameter	Unit	G / S	RDL	6106366	6106365	6106367
Sulphur - Total	%		0.01			
Sulphate	%		0.01	0.02	<0.01	0.01

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard
6106366-6106367 Analysis performed by AGAT Burnaby

Certified By:

AGAT Laboratories

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Guideline Violation

AGAT WORK ORDER: 14T919316

PROJECT: 14150

CLIENT NAME: LANDTEK LTD.

ATTENTION TO: Cory Zanatta

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	GUIDEVALUE	RESULT
6106368	BH4 SS2	T3(ICC MFT) Current	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity	1.4	2.29
6106369	BH17 SS1	T3(ICC MFT) Current	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity	1.4	1.64
6106370	BH18 SS1	T3(ICC MFT) Current	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity	1.4	2.48

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Quality Assurance

CLIENT NAME: LANDTEK LTD.

AGAT WORK ORDER: 14T919316

PROJECT: 14150

ATTENTION TO: Cory Zanatta

SAMPLING SITE:

SAMPLED BY:

Soil Analysis

RPT Date: Dec 01, 2014			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Soil)															
Antimony	6106356 6106356		<0.8	<0.8	0.0%	< 0.8	93%	70%	130%	100%	80%	120%	103%	70%	130%
Arsenic	6106356 6106356		5	5	0.0%	< 1	104%	70%	130%	99%	80%	120%	102%	70%	130%
Barium	6106356 6106356		213	214	0.5%	< 2	101%	70%	130%	98%	80%	120%	110%	70%	130%
Beryllium	6106356 6106356		1.2	1.2	0.0%	< 0.5	101%	70%	130%	119%	80%	120%	104%	70%	130%
Boron	6106356 6106356		12	12	0.0%	< 5	80%	70%	130%	115%	80%	120%	97%	70%	130%
Boron (Hot Water Soluble)	6105595		0.45	0.46	2.2%	< 0.10	118%	60%	140%	103%	70%	130%	101%	60%	140%
Cadmium	6106356 6106356		<0.5	<0.5	0.0%	< 0.5	99%	70%	130%	98%	80%	120%	98%	70%	130%
Chromium	6106356 6106356		30	30	0.0%	< 2	78%	70%	130%	102%	80%	120%	106%	70%	130%
Cobalt	6106356 6106356		15.5	15.3	1.3%	< 0.5	88%	70%	130%	101%	80%	120%	95%	70%	130%
Copper	6106356 6106356		24	24	0.0%	< 1	90%	70%	130%	104%	80%	120%	95%	70%	130%
Lead	6106356 6106356		11	11	0.0%	< 1	91%	70%	130%	103%	80%	120%	96%	70%	130%
Molybdenum	6106356 6106356		0.6	0.7	15.4%	< 0.5	95%	70%	130%	102%	80%	120%	105%	70%	130%
Nickel	6106356 6106356		34	33	3.0%	< 1	87%	70%	130%	98%	80%	120%	92%	70%	130%
Selenium	6106356 6106356		<0.4	<0.4	0.0%	< 0.4	89%	70%	130%	100%	80%	120%	99%	70%	130%
Silver	6106356 6106356		<0.2	<0.2	0.0%	< 0.2	79%	70%	130%	102%	80%	120%	96%	70%	130%
Thallium	6106356 6106356		<0.4	<0.4	0.0%	< 0.4	92%	70%	130%	98%	80%	120%	91%	70%	130%
Uranium	6106356 6106356		0.9	0.9	0.0%	< 0.5	94%	70%	130%	99%	80%	120%	101%	70%	130%
Vanadium	6106356 6106356		39	39	0.0%	< 1	82%	70%	130%	95%	80%	120%	94%	70%	130%
Zinc	6106356 6106356		72	72	0.0%	< 5	100%	70%	130%	106%	80%	120%	110%	70%	130%
Chromium VI	6113240		<0.2	<0.2	0.0%	< 0.2	95%	70%	130%	98%	80%	120%	95%	70%	130%
Cyanide	6106602		<0.040	<0.040	0.0%	< 0.040	97%	70%	130%	105%	80%	120%	88%	70%	130%
Mercury	6106356 6106356		<0.10	<0.10	0.0%	< 0.10	105%	70%	130%	100%	80%	120%	97%	70%	130%
Electrical Conductivity	6105595		0.261	0.258	1.2%	< 0.005	105%	90%	110%	NA			NA		
Sodium Adsorption Ratio	6105141		0.224	0.226	0.9%	NA	NA			NA			NA		
pH, 2:1 CaCl2 Extraction	6106364 6106364		6.86	6.83	0.4%	NA	100%	80%	120%	NA			NA		
Comments: NA signifies Not Applicable.															
Corrosivity Package															
Chloride (2:1)	6113499		161	166	3.1%	< 2	93%	80%	120%	105%	80%	120%	104%	70%	130%
Sulphate (2:1)	6113499		18	18	0.0%	< 2	104%	80%	120%	102%	80%	120%	111%	70%	130%
pH (2:1)	6106650		8.03	8.07	0.5%	NA	100%	90%	110%	NA			NA		
Redox Potential (2:1)	6106650		290	288	0.7%	< 5	97%	70%	130%	NA			NA		
Comments: NA signifies Not Applicable.															
Sulphide in Soil - Mississauga															
Sulphate	6106358		0.02	0.01	NA	< 0.01	92%	80%	120%	109%	90%	110%			

Comments: RPDs are calculated using raw analytical data and not the rounded duplicate values reported.

AGAT Laboratories

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Quality Assurance

CLIENT NAME: LANDTEK LTD.

PROJECT: 14150

SAMPLING SITE:

AGAT WORK ORDER: 14T919316

ATTENTION TO: Cory Zanatta

SAMPLED BY:

Soil Analysis (Continued)

RPT Date: Dec 01, 2014			DUPLICATE			Method Blank	REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD		Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper

Certified By:

AGAT Laboratories

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Method Summary

CLIENT NAME: LANDTEK LTD.

AGAT WORK ORDER: 14T919316

PROJECT: 14150

ATTENTION TO: Cory Zanatta

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Sulfide			GRAVIMETRIC
Chloride (2:1)	INOR-93-6004	McKeague 4.12 & SM 4110 B	ION CHROMATOGRAPH
Sulphate (2:1)	INOR-93-6004	McKeague 4.12 & SM 4110 B	ION CHROMATOGRAPH
pH (2:1)	INOR 93-6031	MSA part 3 & SM 4500-H+ B	PH METER
Electrical Conductivity (2:1)	INOR-93-6036	McKeague 4.12, SM 2510 B	EC METER
Resistivity (2:1)	INOR-93-6036		CALCULATION
Redox Potential (2:1)		McKeague 4.12 & SM 2510 B	REDOX POTENTIAL ELECTRODE
Antimony	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Barium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	EPA SW 846 6010C; MSA, Part 3, Ch.21	ICP/OES
Cadmium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Copper	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Lead	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Molybdenum	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Nickel	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Selenium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Silver	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Thallium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Uranium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Zinc	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium VI	INOR-93-6029	SM 3500 B; MSA Part 3, Ch. 25	SPECTROPHOTOMETER
Cyanide	INOR-93-6052	MOE CN-3015 & E 3009 A;SM 4500 CN	TECHNICON AUTO ANALYZER
Mercury	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Electrical Conductivity	INOR-93-6036	McKeague 4.12, SM 2510 B	EC METER
Sodium Adsorption Ratio	INOR-93-6007	McKeague 4.12 & 3.26 & EPA SW-846 6010B	ICP/OES
pH, 2:1 CaCl2 Extraction	INOR-93-6031	MSA part 3 & SM 4500-H+ B	PH METER
Sulphur - Total	INOR-181-6027	Modified from ASTM E1915-11	COMBUSTION
Sulphate	INOR-181-6028	Modified from SM 4500-SO4 E	SPECTROPHOTOMETER

APPENDIX E

PHOTOGRAPHS OF TYPICAL SITE CONDITIONS

Photograph 1
view looking north at drainage structure across 3rd Concession Rd., just east of Ramey Rd.

Photograph 2
view looking west at Indian Creek Drain on west side of Ramey Rd. just south of 3rd Concession Rd.

Photograph 3
view looking east along 3rd Concession Rd., from intersection with Ramey Rd.

Photograph 4
view looking south along Ramey Rd. from intersection with 3rd Concession Rd.

LANDTEK LIMITED

Date: November, 2014	
Project:	East Side Employment Lands External Servicing Port Colborne, Ontario
Title:	Photographs of Typical Site Conditions
Project No.	14150

Photograph 5
view looking south along Highway 140 at location of borehole 16

Photograph 6
view looking west along paved section of 3rd Concession Rd.

Photograph 7
view looking east along 3rd Concession Rd., just west of CN rail crossing and asphalt paved section

Photograph 8
view looking along Ramey Rd. toward intersection with Highway 140

Photograph 9
view looking north along Ramey Rd. from south end

LANDTEK LIMITED

Date: November, 2014	
Project	East Side Employment Lands External Servicing Port Colborne, Ontario
Title:	Photographs of Typical Site Conditions
Project No.	14150

Preliminary Subsurface Soil Investigation

LANDTEK LIMITED
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Preliminary Subsurface Soil Investigation
Proposed East Side Employment Lands
City of Port Colborne, Region of Niagara, Ontario

Prepared for:

AECOM Canada Ltd.
3-30 Hannover Drive
St. Catharines, Ontario
L2W 1A3

Landtek File: 14314
February 6, 2015

EXECUTIVE SUMMARY

Landtek Limited is pleased to submit this preliminary subsurface soils investigation report on the proposed east side employment lands industrial park in Port Colborne, Ontario. The work was authorized under a consultant agreement with AECOM and was initiated following the receipt of the authorization to proceed on November 26, 2014. The work was carried out in accordance with the Landtek proposal (number P14039) dated April 17, 2014.

This report is being issued as a companion to Landtek Limited report 14150, *Geotechnical Investigation External Servicing for Proposed East Side Employment Lands* dated December 19, 2014. That report and this report should be read in conjunction.

This preliminary subsurface soils investigation was completed to provide the general subsurface soil conditions for future land purchasers, builders, and developers. The proposed building designs were unknown at the time of completion of this report.

The primary objectives of the investigation were to:

(1) Determine the subsurface soil and groundwater conditions to be encountered during building construction, and

(2) Provide preliminary general design and construction recommendations with regards to possible future building foundations.

SITE AND SUBSURFACE CONDITIONS

The limits of the study site are indicated on Figure 1. Photographs of typical site conditions are provided in Appendix E.

Available geologic data [1, 2, 3, and 4] and background geotechnical information indicate that the subject site in Port Colborne crosses the Onondaga Escarpment and is characterized by abrupt increases in the depths to bedrock contact in the south to north direction. The depths to bedrock (in feet) are illustrated in Figure 2 from drift thickness mapping [4]. The bedrock is identified as cherty limestone of the Bois Blanc or Onondaga formation and is at shallow depths of less than about 3.0 m in the area of Chippawa Road and Highway 140 and is at depths of 23 m or more near the intersection of Ramey Road and the 3rd Concession Road. Native overburden soils in the area are identified as glaciolacustrine clay and silt.

BUILDING FOUNDATION DESIGN CONSIDERATIONS

Considerably different subsoil conditions were encounter in the lands lying west of the Ramey Road Allowance, boreholes 1, 2, 3, 6, and 7, than those encountered on the east side of the road allowance, boreholes 4, 5, 8, 9, and 10, consequently each of the two areas has been addressed separately below.

Foundations Considerations For Lands East of Ramey Road

The proposed building designs were unknown at the time of preparing this report consequently the comments and recommendations below are of a general nature. Once actual building designs and intended loads are known, this office should be contacted to provide additional geotechnical recommendations relative to the established building designs.

The lands lying east of Ramey Road indicated no fill at the location of boreholes 4, 5, 8, 9, and 10.

The upper 3 to 3.5 m layer of native silty clay present on this site is competent bearing strata for concrete footing foundations. However, below 3 to 3.5 m the soils become very soft and wet and are generally too weak or variable in load bearing capacity to provide consistent foundation support.

EXECUTIVE SUMMARY

For preliminary considerations, Table 4.1.1 provides Limit State design parameters for footings founded on the competent native silty clay in the upper 3 meters below existing ground elevation.

Foundations Considerations For Lands West of Ramey Road

The soils conditions encountered in the area west of Ramey Road, at the location of boreholes 1, 2, 3, 6, and 7, was found to have significant layers of fill. The fill thicknesses ranged from 1.4 m to 9.5 m. These lands are directly adjacent to the Welland Canal and the fill is suspected to be spoil from the excavation of the canal. Two of the boreholes, borehole 6 and 7, had highly organic layers of soils at depths of 9.5 m and 6.4 m, respectively. These organic layers are suspected to be the original native topsoil/vegetative surface prior to been buried by the overlying canal spoil fill.

The fill materials encountered are generally too variable in load bearing capacity to provide consistent foundation support. Conventional strip footings founded on this fill would be subject to deferential settlement.

Proposed building designs were unknown at the time of preparing this report however, due to the presence of deep fill layers, buildings to be located in this area will most likely have to utilize deep foundations such as drilled concrete caisson piles or driven steel piles. The use of piles will require additional geotechnical investigation to verify bedrock depths and rock quality. Alternately, concrete raft foundation designs may also be considered suitable and possibly more economical depending on loadings.

The full text of the report provides additional details and recommendations with respect to soils and groundwater, excavations, backfill, and pipe bedding, and asphalt pavement restoration. The full report should be reviewed in conjunction with the Executive Summary.

TABLE OF CONTENTS

1.0 INTRODUCTION

Landtek Limited is pleased to submit this preliminary geotechnical investigation report on the proposed east side employment lands industrial park in Port Colborne, Ontario. The work was authorized under a consultant agreement with AECOM and was initiated following the receipt of the authorization to proceed on November 26, 2014. The work was carried out in accordance with the Landtek proposal (number P14039) dated April 17, 2014.

This report is being issued as a companion to Landtek Limited report 14150, *Geotechnical Investigation External Servicing for Proposed East Side Employment Lands* dated December 19, 2014. The two reports should be read in conjunction with each other.

This preliminary subsurface soils investigation was completed to provide the general subsurface soil conditions for future land purchasers, builders, and developers. The proposed building designs were unknown at the time of completion of this report however, given that the lands are intended to be used as an industrial park, standard industrial and/or commercial type buildings are anticipated to be constructed.

The primary objectives of the investigation were to:

1) Determine the subsurface soil and groundwater conditions to be encountered during building construction, and

2) Provide preliminary general design and construction recommendations with regards to possible future building foundations.

2.0 METHODOLOGY

Fieldwork at the site by Landtek Limited included clearance of underground services, borehole drilling and soil sampling, and field supervision. Layout of boreholes in the field was completed by a representative of Landtek in consultation with AECOM.

Ten boreholes were drilled and sampled on January 9, 12, and 13, 2015 to a depth of approximately 9.8 meters below existing ground elevation or to auger refusal, whichever occurred first. The borehole locations are shown on the site plan, Drawing 1, in Appendix C. The borehole logs are also provided in Appendix C.

The boreholes were drilled using a specialist soil-drilling contractor equipped with continuous flight, solid stem augers. Standard Penetration Tests (SPT's) and split spoon samples were taken during drilling at selected depths. Full time supervision of drilling and soil sampling operations was carried out by a representative of Landtek Limited and all boreholes were restored to meet existing ground surface conditions.

The soil samples were transported to the Landtek Limited laboratory and visually examined in the laboratory to determine their textural classification. Moisture contents were carried out on all samples.

For the lands lying east of Ramey Road, the ground surface elevations at the boreholes (boreholes 4, 5, 8, 9, and 10) was referenced to the geodetic datum on the base plans provided by AECOM. For the lands lying west of Ramey Road, no elevation information was provided.

3.0 SITE AND SUBSURFACE CONDITIONS

The limits of the study site are indicated on Figure 1. Photographs of typical site conditions are provided in Appendix E.

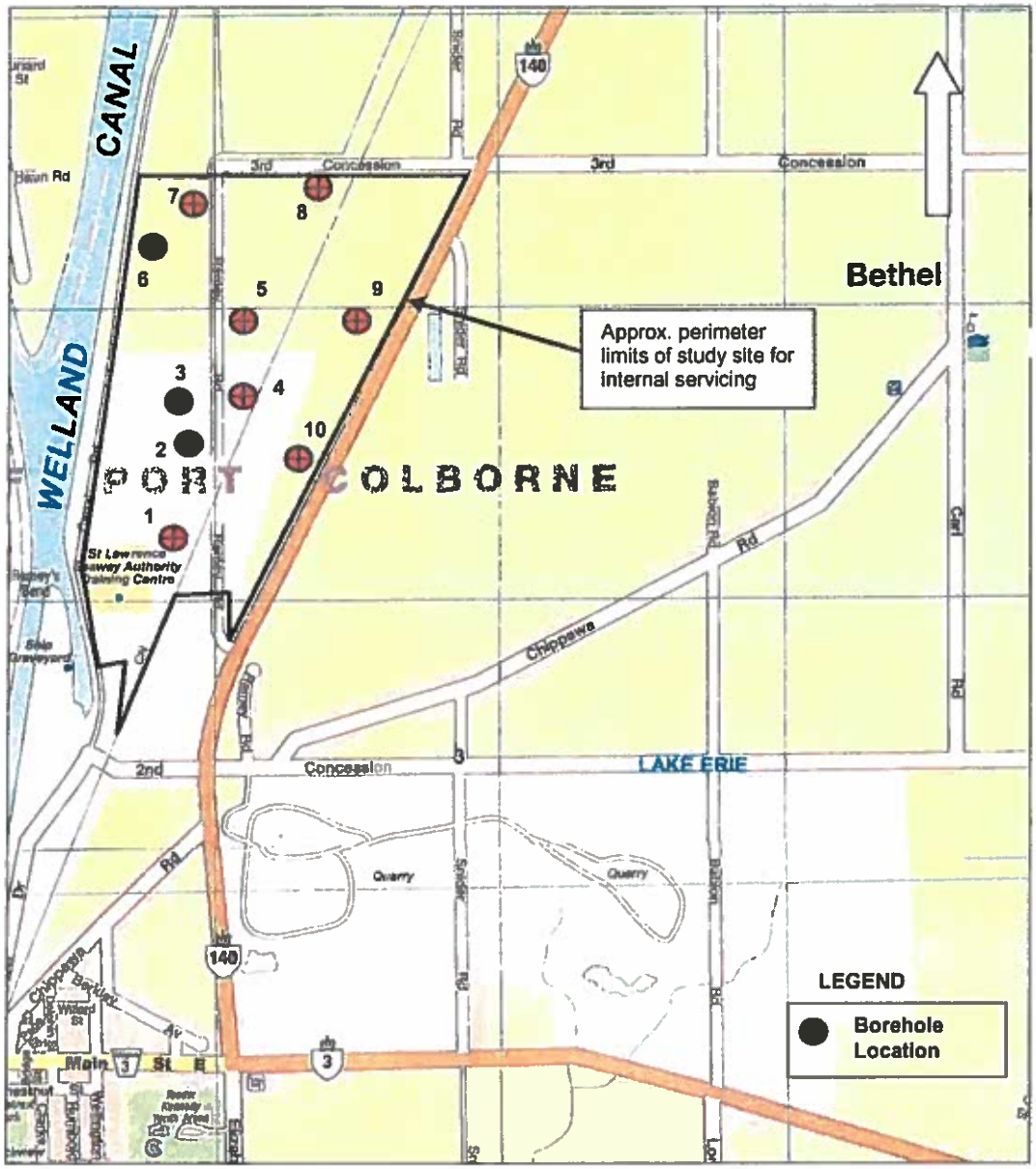


Figure 1 – Key Location Plan of Subject Site and Borehole Locations

Available geologic data [1, 2, 3, and 4] and background geotechnical information indicate that the subject site in Port Colborne crosses the Onondaga Escarpment and is characterized by abrupt increases in the depths to bedrock contact in the south to north direction. The depths to bedrock (in feet) are illustrated in Figure 2 from drift thickness mapping [4]. The bedrock is identified as cherty limestone of the Bois Blanc or Onondaga formation and is at shallow depths of less than about 3.0 m in the area of Chippawa Road and Highway 140 and is at depths of 23 m or more near the intersection of Ramey Road and the 3rd Concession Road. Native overburden soils in the area are identified as glaciolacustrine clay and silt.

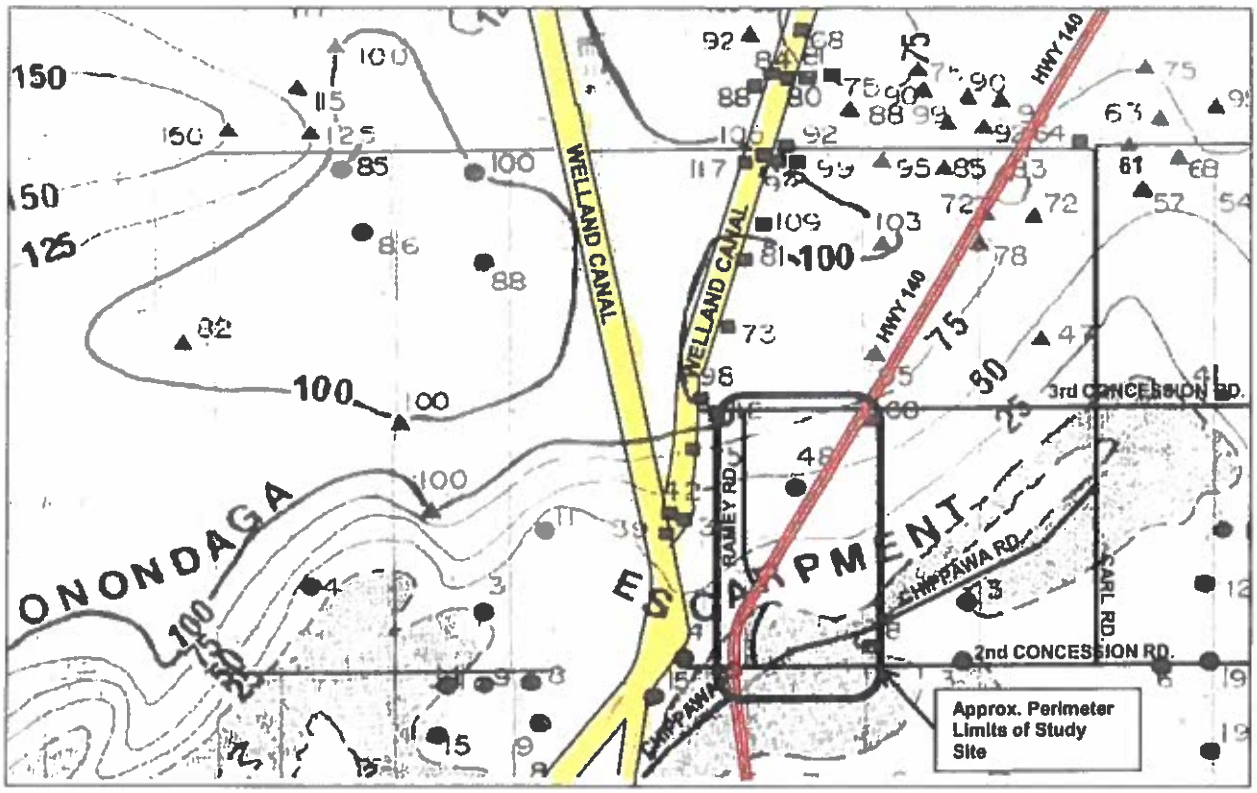


Figure 2 – Depths to Bedrock (in feet)

SURFACE SOILS

Organic soils were encountered at the surface of Boreholes 3 to 10 inclusive. This layer varied in thickness from 100 mm to 200 mm.

FILL

Fill was encountered at the surface of Boreholes 1 and 2 and underlying the organic soils in boreholes 3, 6, and 7 to depths ranging from 1.4 m to 9.5 m below existing ground elevation. The fill was generally a heterogeneous mottled mix of silty clay with organic matter, gravel and some sand. It is generally brown to grey and moist to very moist.

Due to its proximity to the Welland Canal, the origin of the fill is speculated to be spoil from the excavation of the canal.

ORGANIC SILTY CLAY (TOPSOIL)

An organic silty clay (topsoil) layer was encountered in boreholes 6 and 7 at depths of 9.5 m and 6.4 m, respectively. These organic layers are suspected to be the original native topsoil/vegetative surface prior to placement of the overlying fill.

The organic layer is black with roots and contained plant materials. The thickness in Borehole 7 was approximately 600 mm. In Borehole 6 this layer was encountered in the final 300 mm of the borehole and therefore the total thickness is unknown.

SILTY CLAY

The predominant native soil is silty clay that has a layered and fissured structure and contains scattered sand pockets, red shale fragments, and gravel inclusions. The silty clay is generally stiff to very stiff in consistency in the upper few metres with SPT values of between 11 and 24 blows for the full penetration of the sampler and becomes very soft and very moist to wet at lower depths below typically 3.0 m to 3.5 m.

The soil is classified as a CL type material according to the Unified Soil Classification System which relates to the soil group of fine grained inorganic clays of low to medium plasticity with more than 50 % by mass of the soil particles being silt and clay and passing the 0.075 mm sieve.

AUGER REFUSAL

All boreholes terminated within the Silty Clay except borehole 1. Auger refusal was encountered at borehole 1 at a depth of 2.6 at the initial location. The borehole was then relocated 5 m south and encountered auger refusal at 5.3 m below existing ground elevation at this new location. It was relocated a third time to 3 m north of the original location and encountered refusal at 5.1 m below existing ground elevation at the third location.

Although not confirmed, as confirmation was not part of the scope of this investigation, the auger refusal at all three attempted borehole 1 locations is assumed to be boulders or rock rubble fill. The existence of rock rubble fill was observed on the surface at various locations throughout the site.

GROUNDWATER

Groundwater seepage was generally not encountered in the open boreholes on completion of drilling. Installation of standpipe piezometers was not part of the scope of this investigation.

The groundwater conditions are expected to vary according to the time of the year and seasonal changes in precipitation.

Table 3.1 – Summary of Borehole Information

BOREHOLE NO. & LOCATION	SURFACE ELEVATION (m)	SURFACE CONDITIONS	SUBSURFACE CONDITIONS
1	Not provided	Fill at surface	Fill to EOH @ 5.3m
2	Not provided	Fill at surface	Fill to 1.4 m Silty Clay to EOH @ 9.8 m
3	Not provided	125 mm organic soil	Fill to 7.9 m Silty Clay to EOH @ 9.8 m
4	175.6	200 mm organic soil	Silty Clay to EOH @ 9.8 m
5	175.5	200 mm organic soil	Silty Clay to EOH @ 9.8 m
6	Not provided	100 mm organic soil	Fill to 9.5 m Organic soil to EOH @ 9.8m
7	Not provided	100 mm organic soil	Fill to 6.4 m Organic soils to 7.0 m Silty Clay to EOH @ 9.8 m
8	175.4	150 mm organic soil	Silty Clay to EOH @ 9.8 m
9	176.3	150 mm organic soil	Silty Clay to EOH @ 9.8 m
10	175.9	150 mm organic soil	Silty Clay to EOH @ 9.8 m

Notes: EOH means End of Hole

4.0 BUILDING FOUNDATION DESIGN CONSIDERATIONS

Considerably different subsoil conditions were encountered in the lands lying west of the Ramey Road Allowance, boreholes 1, 2, 3, 6, and 7, than those encountered on the east side of the road allowance, boreholes 4, 5, 8, 9, and 10. Consequently, each of the two areas has been addressed separately below in sections 4.1.1 and 4.1.2.

4.1 Foundations Considerations

4.1.1 Foundations Considerations For Lands East of Ramey Road

The proposed building designs were unknown at the time of preparing this report consequently the comments and recommendations below are of a general nature. Once actual building designs and intended loads are known, this office should be contacted to provide additional geotechnical recommendations relative to the established building designs.

The lands lying east of Ramey Road indicated no fill at the location of boreholes 4, 5, 8, 9, and 10.

The upper 2.5 m layer (measured from the existing ground surface) of native silty clay on this site presents a competent bearing stratum for concrete footing foundations. However, below 3 m the soils become very soft and wet and are generally too weak or variable in load bearing capacity to provide consistent foundation support. In this regard, limitations on footing widths may also be applicable to prevent overstressing the weaker underlying soils. Such limitations should be determined on a site specific basis.

Should the proposed building design include a deep basement or lower grades and consequently not be able to utilize the stiff to very stiff native sitly clay layers found in the upper few meters, then deep foundations such as drilled concrete caisson piles or driven steel piles should be considered. The use of piles will require additional geotechnical investigation to verify bedrock depths and rock quality. Alternately, a concrete raft foundation design may also be suitable depending on loadings and building configuration.

For preliminary considerations, Table 4.1.1 provides Limit State design parameters for footings founded on the competent native silty clay in the upper 2.5 meters below existing ground elevation.

TABLE 4.1.1
Preliminary Recommended Foundation Design Parameters (East of Ramey Road only)

TYPE OF FOUNDATION	RECOMMENDED SERVICEABILITY LIMIT STATE (SLS) DESIGN VALUE	RECOMMENDED ULTIMATE LIMIT STATE (ULS) DESIGN VALUE
Footings on native competent silty clay (confirmed by Landtek staff field monitoring)	150 kPa (3,100 psf)	225 kPa (4,700 psf)

Note 1. The SLS values are based on the normally tolerated maximum anticipated settlements of 25 mm total and 20 mm differential movement. Shale bedrock is essentially unyielding and SLS design should be the critical consideration with settlements well below the normally tolerated limits and expected to be negligible.

In conformance with field review requirements in Clause 4.2.2.3. of Volume 1 of the National Building Code, a geotechnical engineer representative from Landtek should inspect the foundation soil conditions to verify that the bearing conditions are consistent with this report and

all footing bases are in competent native undisturbed soil.Where the bearing levels of the footings are at different design elevations, the footing base levels should be stepped along a line of 7 vertical to 10 horizontal, drawn upwards from the lowest footing, to avoid overlapping stresses. Exterior footings should have a minimum of 1.2 m of soil cover, or equivalent suitable insulation, for frost protection.

4.1.2 Foundations Considerations For Lands West of Ramey Road

The soils conditions encountered in the area west of Ramey Road, at the location of boreholes 1, 2, 3, 6, and 7, was found to have significant layers of fill. The fill thicknesses ranged from 1.4 m to 9.5 m. These lands are directly adjacent to the Welland Canal and the fill is suspected to be spoil from the excavation of the canal. Two of the boreholes, borehole 6 and 7, had highly organic layers of soils at depths of 9.5 m and 6.4 m, respectively. These organic layers are suspected to be the original native topsoil/vegetative surface prior to been buried by the overlying fill.

The existing fill materials encountered are generally too variable in load bearing capacity to be considered suitable to provide foundation support due to the risk of unacceptable differential settlement.

Proposed building designs were unknown at the time of preparing this report however, due to the presence of deep fill layers, buildings to be located in this area will most likely have to utilize deep foundations such as drilled concrete caisson piles or driven steel piles. The use of piles will require additional geotechnical investigation to verify bedrock depths and rock quality. Alternately, concrete raft foundation designs may also be considered suitable and possibly more economical depending on loadings.

The layer of buried organic materials encounter in borehole 6 and 7 at depths of 9.5 m and 6.4 m, respectively, is a potential source of trapped methane gas. Precautionary measures may be required if constructing within or through this layer. Potential migration of methane gases through the adjacent soils should also be investigated.

4.2 Floor Slab Considerations

Remedial work may be required in fill areas in order to provide satisfactory floor slab support. Remedial work may include proofrolling of exposed subgrade areas or complete replacement of unsuitable fill.

As an alternative to remedial work, it may be possible to utilize a structural floor slab support system designed by a structural engineer according to the floor loading requirements.

4.3 Preliminary Seismic Design Considerations

In accordance with Table 4.1.8.4.A. of the current Ontario Building Code the subject property is considered to be a "E" Site Class. The acceleration and velocity-based site coefficients, F_a and F_v, should be determined from Tables 4.1.8.4.B. and 4.1.8.4.C. respectively of the Building Code for the above recommended Site Class. The seismic design data given in Table 1.2 of Supplementary Standard SB-1 in Volume 2 of the Ontario Building Code, for selected Municipal locations, should be used to complete the seismic analysis.

5.0 SITE SERVICING CONSIDERATIONS

Site servicing work is expected to include watermains, gravity sewers, and forcemain installations. Site servicing considerations was not part of the scope of this investigation however, the previously completed Landtek Limited report 14150, *Geotechnical Investigation External Servicing for Proposed East Side Employment Lands* dated December 19, 2014, has addressed this topic for the subject lands.

6.0 EXCAVATION AND BACKFILL CONSIDERATIONS

All temporary excavations and unbraced side slopes in the soils should conform to standards set out in the Occupational Health and Safety Act. The predominant soils to be encountered during excavation are expected to be a Type "2" and type "3" soils depending on depth according to the Occupational Health and Safety Act classification in Part III. Type 3 soils are characterized as behaving as "previously excavated soils". The native upper silty clay strata are expected to behave as a Type "2" soil which has a low to medium natural moisture content and a medium to high degree of internal strength".

It should be possible to excavate the overburden soils with a hydraulic backhoe. The stability of unbraced excavation walls is expected to be variable due to the presence of overlying fill throughout the site. Moist Type 3 soils are expected to be stable for short construction periods at slopes of about 45 degrees to the horizontal. The presence of random deposits of fill directly behind cut slopes that appear stable can result in sudden sloughing or collapse. Consequently, for trench conditions which cannot satisfy the Occupational Health and Safety Act requirements for unbraced 1 horizontal to 1 vertical side slopes, a trench box system should be used, or temporary shoring should be installed to maintain safe working conditions.

Groundwater seepage should be expected in the overlying fill materials but will depend upon the depth of the excavations, the time of year, and precipitation levels preceding construction. There may be water perched in the fill deposits.

7.0 SOIL MANAGEMENT CONSIDERATIONS

Construction will involve cut and fill operations. In order to optimize the use of the on-site soils a material management plan should be established. The plan objective should be to achieve a self-sustainable development with respect to excavated materials, and control the placement of organic soils so that there is negligible impact on the settlement performance of the compacted fill material.

The soil management criteria should be as follows:

1. Surface vegetation, topsoil and organic soils should not be placed within the proposed roadways, below finished subgrade level for pavement construction or building limits. These materials should be placed in landscaped areas where settlements are not critical.

2. Excavated soils for structural fill in pavement areas and building floor slab areas, which does not have topsoil or organic matter and are compactable with moisture contents within 2 % to 3 % of the optimum value, should be placed and compacted to a target density of 97 percent of the Standard Proctor Maximum Dry Density (SPMDD) with no individual test result below 95 % SPMDD; if engineered fill is required to support building foundations, the engineered fill should be placed and compacted in lifts to a target density of 100 % SPMDD with no individual tests below 98 % SPMDD; the soil should be placed in a loose lift thickness not exceeding 250 mm and should be compacted using a large (10 ton or larger) pad-foot type roller with vibratory capability; if engineered fill to support building foundations is being considered it is recommended that a pre-construction meeting be scheduled to review the proposed fill materials, fill placement and compaction procedures, and the testing and inspection requirements.

3. Soils to be placed in landscaped areas where settlements are not critical should receive nominal compaction effort in order to achieve at least 90 percent of the Standard Proctor Maximum Dry Density.

4. Prior to the placement of underfloor granular fill or pavement granular fill, the exposed subgrade soil should be inspected and proof-rolled using a loaded tandem axle truck and traversing the exposed subgrade for full coverage; the proof-rolling should be monitored by a geotechnical representative of this office to delineate any soft areas which may require repair.

7.1 Environmental Considerations

Chemical analysis of soil samples was not part of the scope of work for this investigation however, each soil sample obtained was inspected in the field and laboratory for visual and olfactory evidence of possible contamination. No obvious visual or olfactory evidence of potential impacts was noted on any of the samples obtained as part of this investigation.

Visual and olfactory evidence are considered indicators of potential contamination however, the absence of such indicators does not conclusively imply that contaminants are not present. Although chemical analysis of the soils samples was not part of the scope of this investigation it is recommended that future site development plans include provisions for completion of environmental site assessments in order to confirm the presence or absence of potential impacts.

8.0 CLOSURE

The Limitations of Report, as stated in Appendix A, are an integral part of this report.

Soil samples will be retained and stored by Landtek for a period of three months after the report is issued. The samples will be disposed of at the end of the three month period unless a written request from the client to extend the storage period is received.

This preliminary subsurface soil investigation was completed to provide general soils conditions for future land purchasers, builders, and developers. The proposed building designs were unknown at the time of completion of this report. Once actual building designs and intended loads are known, this office should be contacted to provide additional geotechnical recommendations relative to the established building designs.

I trust this report will be of assistance, should you have any questions, please do not hesitate to contact our office.

Yours very truly,

LANDTEK LIMITED

Greg Wuisman, P. Eng.

Ralph Di Cienzo, P. Eng., QP_{ESA}

REFERENCES

[1] Quaternary Geology of the Welland Area, Map P796. Ontario Division of Mines, Ministry of Natural Resources, 1972

[2] Paleozoic Geology of the Welland-Fort Erie Area, Map P989. Ontario Division of Mines, Ministry of Natural Resources, 1974

[3] Bedrock Topography Series of the Welland-Fort Erie Area, Map P2403. Ontario Division of Mines, Ministry of Natural Resources, 1981

[4] Drift Thickness Series of the Welland-Fort Erie Area, Map P2486. Ministry of Natural Resources, 1982

APPENDIX A
LIMITATIONS OF REPORT

The conclusions and recommendations given in this report are based on information determined at the borehole locations. Subsurface and ground water conditions between and beyond the boreholes may be different from those encountered at the borehole locations, and conditions may become apparent during construction that could not be detected or anticipated at the time of the geotechnical investigation. It is recommended practice that Landtek be retained during construction to confirm that the subsurface conditions throughout the site are consistent with the conditions encountered in the boreholes.

The comments made in this report on potential construction problems and possible remedial methods are intended only for the guidance of the designer. The number of boreholes may not be sufficient to determine all the factors that may influence construction methods and costs. For example, the thickness and quality of surficial topsoil or fill layers may vary markedly and unpredictably. Additionally, bedrock contact depths throughout the site may vary significantly from what was encountered at the exact borehole locations. Contractors bidding on the project, or undertaking construction on the site should make their own interpretation of the factual borehole information, and establish their own conclusions as to how the subsurface conditions may affect their work.

The survey elevations in the report were obtained by Landtek Limited or others, and are strictly for use by Landtek in the preparation of the geotechnical report. The elevations should not be used by any other parties for any other purpose.

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

This report does not reflect environmental issues or concerns related to the property unless otherwise stated in the report. The design recommendations given in the report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report. Since all details of the design may not be known, it is recommended that Landtek Limited be retained during the final design stage to verify that the design is consistent with the report recommendations, and that the assumptions made in the report are still valid.

APPENDIX B
SYMBOLS AND TERMS USED IN THE REPORT

RELATIVE PROPORTIONS

Term	Range
Trace	0 - 5%
A Little	5 – 15%
Some	15 – 30%
With	30 – 50%

CLASSIFICATION BY PARTICLE SIZE

Boulder	> 200 mm
Cobble	80 mm – 200 mm
Gravel -	
Coarse	19 mm – 80 mm
Fine	4.75 mm – 19 mm
Sand -	
Coarse	4.75 mm – 2 mm
Medium	2 mm – 0.425 mm
Fine	0.425 mm – 0.75 mm
Silt	0.075 mm – 0.002 mm
Clay	< 0.002 mm

DENSITY OF NON-COHESIVE SOILS

Descriptive Term	Relative Density	Standard Penetration Test
Very Loose	0 – 15%	0 – 4 Blows Per 300 mm Penetration
Loose	15 – 35%	4 – 10 Blows Per 300 mm Penetration
Compact	35 – 65%	10 – 30 Blows Per 300 mm Penetration
Dense	65 – 85%	30 – 50 Blows Per 300 mm Penetration
Very Dense	85 – 100%	Over 50 Blows Per 300 mm Penetration

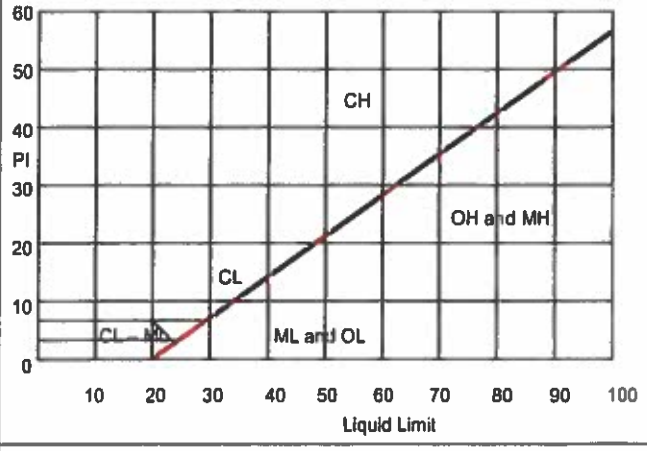
CONSISTENCY OF COHESIVE SOILS

Descriptive Term	Undrained Shear Strength kPa (psf)	N Value Standard Penetration Test	Remarks
Very Soft	< 12 (< 250)	< 2	Can penetrate with fist
Soft	12 – 25 (250 – 500)	2 – 4	Can indent with fist
Firm	25 – 50 (500 –1000)	4 – 8	Can penetrate with thumb
Stiff	50 – 100 (1000 – 2000)	8 – 15	Can indent with thumb
Very Stiff	100 – 200 (2000 – 4000)	15 – 30	Can indent with thumb-nail
Hard	> 200 (> 4000)	> 30	Can indent with thumb-nail

Notes: 1. Relative density determined by standard laboratory tests.
2. N value – blows/300 mm penetration of a 623 N (140 Lb.) hammer falling 760 mm (30 in.) on a 50 mm O.D. split spoon soil sampler. The split spoon sampler is driven 450 mm (18 in.) or 610 mm (24 in.). The "N" value is the Standard Penetration Test (SPT) value and is normally taken as the number of blows to advance the sampler the last 300 mm.

APPENDIX B CONTINUED
CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES
ASTM Designation: D 2487 - 69 AND D 2488 – 69
(Unified Soil Classification System)

Major Divisions			Group Symbols	Typical Names	Classification Criteria		
Coarse-grained soils More than 50% retained on No. 200 sieve *	Gravels 50% or more of coarse fraction retained on No. 4 sieve	Clean gravels	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	Classification on basis of percentage of fines Less than 5% pass No. 200 sieve . . . . . GW, GP, SW, SP More than 12% pass No. 200 sieve . . . . . GM, GC, SM, SC 5 to 12% pass No.200 sieve . . . . . Borderline classifications requiring use of dual symbols	C_u=D60/D10 greater than 4; C_z = $(D30)^2$/(D10xD60) between 1 and 3	
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines		Not meeting both criteria for GW	
		Gravels with fines	GM	Silty gravels, gravel-sand-silt mixtures		Atterberg limits below "A" line or P.I. less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
			GC	Clayey gravels, gravel-sand-clay mixtures		Atterberg limits above "A" line with P.I. greater than 7	
	Sands More than 50% of coarse fraction passes No. 4 sieve	Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines		C_u=D60/D10 greater than 6; C_z = $(D30)^2$/ (D10xD60) between 1 and 3	
			SP	Poorly graded sands and gravelly sands, little or no fines		Not meeting both criteria for SW	
		Sands with fines	SM	Silty sands, sand-silt mixtures		Atterberg limits below "A" line or P.I. less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
			SC	Clayey sands, sand-clay mixtures		Atterberg limits above "A" line with P.I. greater than 7	
Fine-grained soils 50% or more passes No. 200 sieve *	Silts and clays Liquid limit 50% or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands	Plasticity Chart For classification of fine-grained soils and fine fraction of coarse-grained soils. Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols. Equation of A-line: PI=0.73 (LL-20)		
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silts			
			OL	Organic silts and organic silts of low plasticity			
	Silts and clays Liquid limit greater than 50%		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts			
			CH	Inorganic clays of high plasticity, fat clays			
			OH	Organic clays of medium to high plasticity			
	Highly organic soils		Pt	Peat, much and other highly organic soils	* Based on the material passing the 3 in. (76mm) sieve.		



APPENDIX C

DRAWING 1 - SITE PLAN SHOWING BOREHOLE LOCATIONS

LOGS OF BOREHOLES

Environment AECOM

City of Port Colborne

Stage 1 Archaeological Assessment

Port Colborne Site Servicing of East Side Employment Lands (SSESEL)

Part of Lots 22, 23, 24 & 25, Concession 3, Geographical Township of Humberstone, Municipality of Niagara, City of Port Colborne, Welland County, Ontario

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Revised Report

Distribution List

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	yes	City of Port Colborne
	yes	Ontario Ministry of Tourism, Culture and Sport
	yes	AECOM

Revision Log

Revision #	Revised By	Date	Issue / Revision Description
1	Samantha Markham	January 30, 2015	MTCS edits

AECOM Signatures

Report Prepared By:

Samantha Markham, MES
Project Archaeologist

Report Reviewed By:

Adria Grant, BA, CAHP
Senior Archaeologist, Archaeology Practice Lead

Executive Summary

AECOM Canada Ltd. (AECOM) was contracted by the City of Port Colborne to conduct a Stage 1 archaeological assessment for the Port Colborne Site Servicing of the East Side Employment Lands (SSESEL). The study area consists of a triangular plot of land bordered by the Second Concession Road to the south and the Third Concession Road to the north, extending from the Welland Canal east to Highway 140. The study area is legally described as part of Lots 22, 23, 24 & 25, Concession 3, Geographical Township of Humberstone, now Municipality of Niagara, City of Port Colborne, Welland County, Ontario (Figure 1 and Figure 2).

This assessment was conducted to meet the requirements of Section 2 (1) of the *Environmental Assessment Act* (Ontario Government 1990a) and in accordance with subsection 11(1) was conducted during the planning stage of the project. This project is also subject to the *Ontario Heritage Act* (Ontario Government 1990b) and the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011)

The evaluation of archaeological potential has resulted in the determination that there is a high potential for both Aboriginal and Euro-Canadian archaeological resources to be present in the general region surrounding the Port Colborne SSESEL. Due to the construction of the Welland Canal, the majority of land to the west of Ramey Road has been extensively and intensively disturbed and consists of fill and spoil piles. However, deeply buried archaeological sites have been noted on properties adjacent to the study area (Golder 2012). Therefore, should any archaeological remains be encountered during construction, all work must stop immediately and a licensed archaeologist must be contacted. There are areas where archaeological integrity remains to the east of Ramey Road and the potential for archaeological resources here is high. Stage 2 archaeological assessment is recommended for any undisturbed areas prior to any ground disturbance activities as follows:

- A Stage 2 archaeological assessment will be conducted by a licenced archaeologist using the pedestrian survey method at 5 m intervals where ploughing is possible (e.g., agricultural fields). This assessment will occur when the agricultural fields have been recently ploughed, weathered, and exhibit at least 80% surface visibility

- A Stage 2 archaeological assessment will be conducted by a licenced archaeologist using the test pit survey method at 5 m intervals in all areas that will be impacted by the project and where ploughing is not possible (e.g., woodlots, overgrown areas, manicured lawns);

- Poorly drained areas, areas of steep slope and areas of previous disturbance (e.g., pipelines, railways, road ROWs, buildings) identified within all areas that will be impacted by the project are to be mapped and photo-documented, but are not recommended for Stage 2 survey as they possess low to no archaeological potential.

- The Stage 2 archaeological assessment will follow the requirements set out in the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011).

Should deeply buried sites be discovered, a Stage 2 assessment will be conducted according to the standards appropriate for survey in deeply buried conditions as per Section 2.1.7 in the Ministry of Tourism, Culture and Sport's *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011).

The Ministry of Tourism, Culture and Sport is asked to accept this report into the Ontario Public Register of Archaeological Reports and issue a letter of concurrence with the recommendations presented herein. As further archaeological assessments are required, archaeological concerns under land use planning and development processes have not fully been addressed.

Project Personnel

Project Director	Karl Grueneis, Senior Environmental Planner
Project Manager	Jennifer Whittard BES, PMP, Assistant Project Manager, Water
Technical Lead	Adria Grant, BA, CAHP (R131)
Licensed Archaeologist	Samantha Markham, MES (P438)
Report Composition	Samantha Markham, MES (P438), Jennifer Morgan, PhD
GIS Analyst	Adam Spargo, BSc
Office Assistance	Chantelle Mills

Acknowledgements

Proponent Contact	Jim Huppunen A.Sc.T., City of Port Colborne
Approval Authority	Barb Slattery, Ministry of the Environment and Climate Change
Ministry of Tourism, Culture and Sport	Robert von Bitter, Archaeological Data Coordinator

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1. Project Context

1.1 Development Context

AECOM Canada Ltd. (AECOM) was contracted by the City of Port Colborne to conduct a Stage 1 archaeological assessment for the Port Colborne Site Servicing of the East Side Employment Lands (SSESEL). The study area consists of a triangular plot of land bordered by the Second Concession Road to the south and the Third Concession Road to the north, extending from the Welland Canal east to Highway 140. The study area is legally described as part of Lots 22, 23, 24 & 25, Concession 3, Geographical Township of Humberstone, now Municipality of Niagara, City of Port Colborne, Welland County, Ontario (Figure 1 and Figure 2).

This assessment was conducted to meet the requirements of Section 2 (1) of the *Environmental Assessment Act* (Ontario Government 1990a) and in accordance with subsection 11(1) was conducted during the planning stage of the project. This project is also subject to the *Ontario Heritage Act* (Ontario Government 1990b) and the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011).

Permission to conduct the Stage 1 archaeological assessment was provided by Jim Huppunen on behalf of the City of Port Colborne. The Stage 1 archaeological assessment was conducted under PIF number P438-0009-2014, issued to Samantha Markham of AECOM.

1.1.1 Objectives

The Stage 1 archaeological assessment has been conducted to meet the requirements of the Ministry of Tourism, Culture and Sport's (MTCS') *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011). The objective of the Stage 1 background study is to document the archaeological and land use history and present conditions of the study area. This information will be used to support recommendations regarding cultural heritage value or interest as well as assessment and mitigation strategies. The Stage 1 research information will be drawn from:

- MTCS' Archaeological Sites Database (ASDB) for a listing of registered archaeological sites within a 1 kilometre (km) radius of the study area;
- Reports of previous archaeological assessment within 50 metres (m) of the study area;
- Recent and historical maps of the study areas;
- Archaeological management plans or other archaeological potential mapping when available;
- Commemorative plaques or monuments; and
- Visual inspection of the project area.

1.2 Historical Context

Years of archaeological research assessments in southern Ontario have resulted in a well-developed understanding of the historic use of land in the Niagara area from the earliest Aboriginal people to the most recent Euro-Canadian settlers and farmers. The following sections provide a detailed summary of the archaeological cultures that have settled in the vicinity of the study area over the past 11,000 years.

1.2.1 Pre-Contact Aboriginal Settlement

Welland County has been extensively utilized by pre-contact Aboriginal people who began occupying southwestern Ontario as the glaciers receded from the land, as early as 11,000 B.C. Table 1 provides a breakdown of the cultural and temporal history of past occupations in Welland County.

Table 1: Cultural Chronology for Welland County

Archaeological Period	Characteristics	Time Period	Comments
Early Paleo-Indian	Fluted Points	9000-8400 BC	Arctic tundra and spruce parkland, caribou hunters
Late Paleo-Indian	Holcombe, Hi-Lo and Lanceolate Points	8400-8000 BC	Slight reduction in territory size
Early Archaic	Notched and Bifurcate base Points	8000-6000 BC	Growing populations
Middle Archaic	Stemmed and Brewerton Points, Laurentian Development	6000-2500 BC	Increasing regionalization
Late Archaic	Narrow Point	2000-1800 BC	Environment similar to present
	Broad Point	1800-1500 BC	Large lithic tools
	Small Point	1500-1100 BC	Introduction of bow
Terminal Archaic	Hind Points, Glacial Kame Complex	1100-950 BC	Earliest true cemeteries
Early Woodland	Meadowood Points	950-400 BC	Introduction of pottery
Middle Woodland	Dentate/Pseudo-scallop Ceramics	400 BC – AD 500	Increased sedentism
Late Woodland	Princess Point	AD 550-900	Introduction of corn horticulture
	Early Ontario Iroquoian	AD 900-1300	Agricultural villages
	Middle Ontario Iroquoian	AD 1300-1400	Increased longhouse sizes
	Late Ontario Iroquoian	AD 1400-1650	Early written records and treaties
Contact Aboriginal	Various Algonkian and Iroquoian Groups	AD 1600-1875	Early written records and treaties

Note: taken Ellis and Ferris, 1990

As Chapman and Putnam (1984) illustrate, the modern physiography of southern Ontario is largely a product of events of the last major glacial stage and the landscape is a complex mosaic of features and deposits produced during the last series of glacial retreats and advances prior to the withdrawal of the continental glaciers from the area. Southwestern Ontario was finally ice free by 12,500 years ago. With continuing ice retreat and lake regressions the land area of southern Ontario progressively increased while barriers to the influx of plants and animals steadily diminished (Karrow and Warner 1990).

The first human settlement can be traced back 11,000 years; these earliest well-documented groups are referred to as Paleo-Indians which literally means old or ancient Indians. Paleo-Indian people were non-agriculturalists who depended on hunting and gathering of wild food stuffs, they would have moved their encampments on a regular basis to be in the locations where these resources naturally became available and the size of the groups occupying any particular location would vary depending on the nature and size of the available food resources (Ellis and Deller 1990). The picture that has emerged for early and late Paleo-Indian people is of groups at low population densities who were residentially mobile and made use of large territories during annual cycles of resource exploitation (Ellis and Deller 1990).

The next major cultural period following the Paleo-Indian is termed the Archaic, which is broken temporally into the Early, Middle and Late. There is much debate on how the term Archaic is employed; general practice bases the designation off assemblage content as there are marked differences in artifact suites from the preceding Paleo-

Indian and subsequent Woodland periods. As Ellis et al (1990) note, from an artifact and site characteristic perspective the Archaic is simply used to refer to non-Paleo-Indian manifestations that pre-date the introduction of ceramics. Throughout the Archaic period the natural environment warmed and vegetation changed from closed conifer-dominated vegetation cover, to mixed coniferous and deciduous forest to the mixed coniferous and deciduous forest in the north and deciduous vegetation in the south we see in Ontario today (Ellis et al 1900). During the Archaic period there are indications of increasing populations and decreasing size of territories exploited during annual rounds; fewer moves of residential camps throughout the year and longer occupations at seasonal campsites; continuous use of certain locations on a seasonal basis over many years; increasing attention to ritual associated with the deceased; and, long range exchange and trade systems for the purpose of obtaining valued and geographically localized resources (Ellis et al 1990).

In the 17th century two major language families, Algonquian and Iroquoian were represented by the diverse people of North America. Iroquoian speaking people were found in southern Ontario and New York State, with related dialects spoken in the mid-Atlantic and interior North Carolina, while Algonquian speaking peoples were located along the mid-Atlantic coast into the Maritimes, throughout the Canadian Shield of Ontario and Quebec and much of the central Great Lakes region (Ellis et al 1990). Linguists and anthropologists have attempted to trace the origin and development of these two language groups and usually place their genesis during the Archaic (Ellis et al 1990).

The Early Woodland period is distinguished from the Late Archaic period primarily by the addition of ceramic technology, which provides a useful demarcation point for archaeologists but is expected to have made less difference in the lives of the Early Woodland peoples. The settlement and subsistence patterns of Early Woodland people shows much continuity with the earlier Archaic with seasonal camps occupied to exploit specific natural resources (Spence et al 1990). During the Middle Woodland well-defined territories containing several key environmental zones were exploited over the yearly subsistence cycle. Large sites with structures and substantial middens appear in the Middle Woodland associated with spring macro-band occupations focussed on utilizing fish resources and created by consistent returns to the same site (Spence et al 1990). Groups would come together into large macro-bands during the spring-summer at lakeshore or marshland areas to take advantage of spawning fish; in the fall inland sand plains and river valleys were occupied for deer and nut harvesting and groups split into small micro-bands for winter survival (Spence et al 1990). This is a departure from earlier Woodland times when macro-band aggregation is thought to have taken place in the winter (Ellis et al 1988; Granger 1978).

The period between the Middle and Late Woodland period was both technically and socially transitional for the ethnically diverse populations of southern Ontario and these developments laid the basis for the emergence of settled villages and agriculturally based lifestyles (Fox 1990). The Late Woodland period began with a shift in settlement and subsistence patterns involving an increasing reliance on corn horticulture. Corn may have been introduced into Southwestern Ontario from the American Midwest as early as 600 A.D. However, it did not become a dietary staple until at least three to four hundred years later. The first agricultural villages in southwestern Ontario date to the 10th century A.D. Unlike the riverine base camps of the Middle Woodland period, these sites are located in the uplands, on well-drained sandy soils. Categorized as "Early Ontario Iroquoian" (900-1300 A.D.), many archaeologists believe that it is possible to trace a direct line from the Iroquoian groups which inhabited Southwestern Ontario at the time of first European contact, to these early villagers.

Village sites dating between 900 and 1300 A.D., share many attributes with the historically reported Iroquoian sites, including the presence of longhouses and sometimes palisades. However, these early longhouses were actually not all that large, averaging only 12.4 m in length. It is also quite common to find the outlines of overlapping house structures, suggesting that these villages were occupied long enough to necessitate re-building. The Jesuits reported that the Huron moved their villages once every 10-15 years, when the nearby soils had been depleted by farming and conveniently collected firewood grew scarce. It seems likely that Early Ontario Iroquoians occupied

their villages for considerably longer, as they relied less heavily on corn than did later groups, and their villages were much smaller, placing less demand on nearby resources.

Judging by the presence of carbonized corn kernels and cob fragments recovered from sub-floor storage pits, agriculture was becoming a vital part of the Early Ontario Iroquoian economy. However, it had not reached the level of importance it would in the Middle and Late Ontario Iroquoian periods. There is ample evidence to suggest that more traditional resources continued to be exploited, and comprised a large part of the subsistence economy. Seasonally occupied special purpose sites relating to deer procurement, nut collection, and fishing activities, have all been identified. While beans are known to have been cultivated later in the Late Woodland period, they have yet to be identified on Early Ontario Iroquoian sites. The Middle Ontario Iroquoian period (1300-1400 A.D.) witnessed several interesting developments in terms of settlement patterns and artifact assemblages. Changes in ceramic styles have been carefully documented, allowing the placement of sites in the first or second half of this 100-year period. Moreover, villages, which averaged approximately 0.6 hectares in extent during the Early Ontario Iroquoian period, now consistently range between one and two hectares.

House lengths also change dramatically, more than doubling to an average of 30 m, while houses of up to 45 m have been documented. This radical increase in longhouse length has been variously interpreted. The simplest possibility is that increased house length is the result of a gradual, natural increase in population. However, this does not account for the sudden shift in longhouse lengths around 1300 A.D. Other possible explanations involve changes in economic and socio-political organization. One suggestion is that during the Middle Ontario Iroquoian period small villages were amalgamating to form larger communities for mutual defense. If this was the case, the more successful military leaders may have been able to absorb some of the smaller family groups into their households, thereby requiring longer structures. This hypothesis draws support from the fact that some sites had up to seven rows of palisades, indicating at least an occasional need for strong defensive measures. There are, however, other Middle Ontario Iroquoian villages which had no palisades present. Another researcher has suggested that the longest houses may be associated with families that were more successful in trade and other forms of economic activity. More research is required to evaluate these competing interpretations.

The lay-out of houses within villages also changes dramatically by 1300 A.D. During the Early Ontario Iroquoian period villages were haphazardly planned at best, with houses oriented in various directions. During the Middle Ontario Iroquoian period villages are organized into two or more discrete groups of tightly spaced, parallel aligned, longhouses. It has been suggested that this change in village organization may indicate the initial development of the clans which were a characteristic of the historically known Iroquoian peoples.

Initially at least, the Late Ontario Iroquoian period (1400-1650 A.D.) continues many of the trends which have been documented for the proceeding century. For instance, between 1400 and 1450 A.D. house lengths continue to grow, reaching an average length of 62 m. One longhouse excavated on a site southwest of Kitchener stretched an incredible 123 m. After 1450 A.D., house lengths begin to decrease, with houses dating between 1500-1580 A.D. averaging only 30 m in length. Why house lengths decrease after 1450 A.D. is poorly understood, although it is believed that the even shorter houses witnessed on historic period sites can be at least partially attributed to the population reductions associated with the introduction of European diseases such as smallpox.

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

Archaeologists are able to trace archaeologically known groups from this time period to the historically documented people identified when French fur traders first arrived (Wright 1994). The Ontario Iroquois from southern Ontario gave rise to the Huron, Petun, Neutral and Erie; the St. Lawrence Iroquois, a distinct population encountered by Jaques Cartier in 1535 that had disappeared by the time Samuel de Champlain returned to the same area in 1603; and from Northern Ontario the groups that gave rise to the Algonquian speaking Cree, Ojibwa and Algonquin people (Wright 1994).

1.2.2 Post-Contact Aboriginal Settlement

The post-contact Aboriginal occupation of southern Ontario was heavily influenced by the dispersal of Iroquoian speaking peoples, such as the Huron, Petun and Neutral by the New York State Confederacy of Iroquois, followed by the arrival of Algonkian speaking groups from northern Ontario. The Ojibwa of southern Ontario date from about 1701 and occupied the territory between Lakes Huron, Erie and Ontario (Schmalz 1991). This is also the period in which the Mississaugas are known to have moved into southern Ontario and the Great Lakes watersheds (Konrad 1981) while at the same time the members of the Three Fires Confederacy, the Chippewa, Ottawa and Potawatomi were immigrating from Ohio and Michigan (Feest and Feest 1978). As European settlers encroached on their territory the nature of Aboriginal population distribution, settlement size and material culture changed. Despite these changes it is possible to correlate historically recorded villages with archaeological manifestations and the similarity of those sites to more ancient sites reveals an antiquity to documented cultural expressions that confirms a long historical continuity to Iroquoian systems of ideology and thought (Ferris 2009). First Nations people of southern Ontario have left behind archaeological resources throughout the Great Lakes region that show continuity with past peoples even if this was not recorded in Euro-Canadian documentation.

The study area first enters historic documentation as part of Treaty Number 3 which was made with the Mississagua First Nation in 1784. Treaty Number 3:

> ...was made with the Mississa[ug]a Indians 7th December, 1792, though purchased as early as 1784. This purchase in 1784 was to procure for that part of the Six Nation Indians coming into Canada a permanent abode. The area included in this Treaty is, Lincoln County excepting Niagara Township; Saltfleet, Binbrook, Barton, Glanford and Ancaster Townships, in Wentworth County; Brantford, Onondaga, Tusc[a]r[o]ra, Oakland and Burford Townships in Brant County; East and West Oxford, North and South Norwich, and Dereham Townships in Oxford County; North Dorchester Township in Middlesex County; South Dorchester, Malahide and Bayham Township in Elgin County; all Norfolk and Haldimand Counties; Pelham, Wainfleet, Thorold, Cumberland and Humberstone Townships in Welland County ...
>
> Morris 1943:17-18

The treaty was signed by twelve people: six people representing the King, including, John Butter, R. Hamilton, Roberter Kerr, Peter Russell, John McGill and David William Smith; five Chiefs representing the Mississagues, Wabukanyne, Wabanip, Kautubus, Wabaninship and Mattatow; and J. Groves Simcoe (Morris 1943: 18). The purchase was to procure that tract of land for the Six Nations Indians coming into Canada (Morris 1943: 17). While it is difficult to know the exact boundaries of Treaty No. 3, Figure 3 provides an approximate outline with the location of the current study area limits illustrated.

1.2.3 Euro-Canadian Settlement

The study area falls within the Geographic Township of Humberstone, Welland County. Following the American Revolution, United Empire Loyalists began settling in the Township of Humberstone during the early 1780's. First settlers into the area included Christian Stoner, Abraham Neff, Christian Knisley and

William Steele (Welland Tribune Printing House 1887). It wasn't until the completion of the Welland Canal that the population of the area began to increase.

The village of Port Colborne, originally known as Gravelly Bay, suffered a slow population increase until the construction of the Welland Canal began, which included clearing the dense forest, thereby making the area more conducive to farmers. Settlement initially occurred near the southern terminus of the Welland Canal when it was extended to reach Lake Erie in 1833 (Welland Tribune Printing House 1887). The small settlement on Gravelly Bay was named a port-of-entry in 1834 and given its present name in honour of Upper Canada's then Lieutenant-Governor Sir John Colborne. The area was first surveyed and split into village lots by Hon. William Merritt in 1834. In the 1850's Port Colborne became the southern terminus of the Welland Railway that passed through the western portion of the township. The Grand Trunk Railway's Buffalo and Goderich Division was also constructed through this area. Port Colborne developed into a business community serving the trade of produce and marine goods along the Welland Canal. By 1870, the population of Port Colborne had grown to 1,030, prompting the citizens to incorporate the village. The discovery in the late 1880's of significant amounts of natural gas in the area led to the rapid industrialization of Port Colborne and the surrounding area as companies such as the Erie and Foster glass companies and the Ontario Silver Company situated here to utilize the new source of fuel. In 1918, Port Colborne was officially declared a town with a population of 2,837. The steady growth of both Port Colborne and the Village of Humberstone resulted in the amalgamation of the towns in 1952 (City of Port Colborne 2014).

Before the digging of the Welland Canal, shipping traffic between Lake Ontario and Lake Erie used a portage road between Chippawa, Ontario, and Queenston, Ontario, located on the Niagara River, above and below Niagara Falls, respectively. The Welland Canal project began in 1824 by William Hamilton Merritt, initially utilizing a combination of natural waterways and deep cuts through the western side of the township to reach the Welland River (Page 1876: 11). The First Canal was extended from Port Robinson south to Port Colborne in 1833. The canal was purchased by the government in 1841, and the Second Canal was constructed in 1842 after considerable deterioration of the wood and the need to increase the size of the canal to accommodate larger ships. With the development of the Welland Railway, the canal would need to be enlarged again in order to facilitate the transfer of loads from lake ships and rail cars, which was completed in 1881. The Third Canal was built using stone and was intended to straighten, and therefore shorten, the shipping time. This configuration remained in use until it was decommissioned in 1932 (Westwater 2010). The Fourth Welland Canal's Welland By-Pass was constructed between 1967 and 1973. This By-Pass was constructed between Port Robinson and Port Colborne to reduce the number of locks and bridges on the canal system, increase capacity and decrease travel time for shipping by going around downtown Welland (Westwater 2010).

The 1876 *Illustrated Historical Atlas of Welland County*, Township of Humberstone, lists several landowners within the study area including Peter Greedy as owner of the western third of Lot 22 and Herman (*illegible last name*) listed on the eastern quarter of Lot 23. W.A. Ball is listed as owner of the northern half of Lot 24 and John Lirdy on the southern half. Finally, the Ontario Peat Company is listed as owning the northeast corner of Lot 25. No other owners are listed for the remaining portions of the lots included within the study area. The historic mapping also demonstrates multiple structures outside of the study area boundaries to the south; however, no structures are noted within the study area. The Welland Railway is depicted as running directly through the study parallel to the Second Canal, while the Grand Trunk Railway runs through the village of Port Colborne, south of the study area. The Second and Third Concession Roads are depicted on the 1876 map as they exist today (Figure 4).

1.2.4 Reports with Relevant Background Information

The background research conducted as part of the Stage 1 archaeological assessment determined that lands within 50 m of the current study area have previously been subject to archaeological assessments by Amick Consultants

Ltd. (Amick), Archaeological Assessments Ltd., and Golder Associates Ltd (Golder). A list of the archaeological assessment reports relevant to the study area is provided in Table 2.

Table 2: Related Archaeological Assessment Reports

Year	Title	Author	PIF
2008	*Stage 1 Archaeological Background Research and Reconnaissance of the Proposed Port Colborne Wind Farm 1, Part of Lot 25, Concession 3 (Geo. Twp of Humberstone), City of Port Colborne, R.M of Niagara.*	Amick	N/A
2011a	*The Stage 1 Archaeological Assessment of the Proposed Jungbunzlauer Canada Transformer Substation and Transmission Line, City of Port Colborne, Regional Municipality of Niagara.*	Archaeological Assessments Ltd.	P013-582-2011
2011b	*The Stage 2 Archaeological Assessment of the Proposed Jungbunzlauer Canada Transformer Substation and Transmission Line, City of Port Colborne, Regional Municipality of Niagara.*	Archaeological Assessments Ltd.	P013-587-2011
2012	*Revised Stage 1 Archaeological Assessment of the Nyon Energy Park, Part of Lots 23, 24 and 25, Concession 4 and Part of Lots 16, 17 18 and 19, Concession 5, City of Port Colborne, R.M. of Niagara, Ontario.*	Golder	P218-188-2011

The majority of the reports listed above provide details on the archaeological assessments that have been conducted on study areas in the vicinity of the Port Colborne SSESEL study area. The Stage 1 archaeological assessment conducted by Golder (2012) included land on parts of Lots 23, 24, and 25, Concession 4, located adjacent to the current study area on the north side of Third Concession Road. Golder (2012) determined that the subject property had been partially impacted by 20th century disturbance and modification, specifically the construction of the Third Canal and Welland By-pass, and that much of the study area adjacent to the Canal no longer retained archaeological potential. Despite this disturbance, portions of the study area such as agricultural fields and bushlots remained intact and have retained moderate archaeological potential. Archaeological potential also remained where buildings were present on the 1876 *Illustrated Historical Atlas of the Counties of Lincoln and Welland*. It was determined that these foundations would likely be present at a depth of 15m below the surface, in which case the Stage 2 would be conducted according to the standards appropriate for survey in deeply buried conditions as per Section 2.1.7 of the *Standards and Guidelines for Consultant Archaeologists* (Golder 2012). Stage 2 archaeological assessment was recommended for the high potential areas, which included a section of land adjacent to the current Port Colborne SSESEL study area to the north (Golder 2012).

Amick (2008) also conducted a previous Stage 1 archaeological assessment for part of Lot 25, Concession 3, specifically, and Archaeological Assessments Ltd. (AAL 2011a,b) conducted Stage 1 and 2 assessments within a portion of the Port Colborne SSESEL study area. The Stage 1 report by AAL (2011a) indicated the majority of the lands associated with the proposed Transmission Line development had been "disturbed by the construction of the canal, the existing Jungbunzlauer Plant, the East Service Road and Ramey Road" (2011a: 8), therefore retaining no archaeological potential. They recommended further Stage 2 investigation in potentially undisturbed areas located immediately east of the East Service Road and west of Ramey Road. The area on the east side of the canal demonstrated areas of visible fill on the surface, and the upon test pitting, it was discovered that there was subsurface disturbance evident in the topsoil horizon (~15cm) that was heavily mottled with grey/red/brown clay subsoil (AAL 2011b: 2). This area had also been subjected to recent clearing activities by heavy machinery.

1.3 Archaeological Context

1.3.1 Natural Environment

The study area is located within the Halidmand Clay Plain physiographic region (Chapman and Putnam 1984: 156-159), and is described as:

> Lying between the Niagara Escarpment and Lake Erie, thus occupying all of the Niagara Penninsula except the fruit belt below the escarpment, the Haldimand clay plain has an area of about 1,350 square miles. Although it was all submerged in Lake Warren, the till is not all buried by stratified clay; it comes to the surface generally in low morainic ridges in the north. In fact, there is in that area a confused intermixture of stratified clay and till. The northern part has more relief than the southern part where the typically level lake plains occur.
>
> Chapman and Putnam, 1984: 255

The soils of Welland County are mainly heavy clay and the southern part of the Regional Municipality of Niagara is poorly drained and is characterized by marshes and substantial peat bogs (Chapman and Putnam 1984: 257). These extensive marshlands and bogs permitted commercial enterprise in peat cutting to be utilized by the Ontario Peat Company for fuel (Page 1876: 11). Soil types within the study area include Malton and Lincoln clays. These soil types are poorly drained and are composed of lacustrine clay over gritty clay, which can measure up to 1 m in depth. These soil types are friable, but poor drainage results in slight erosion under natural conditions. Additionally, it has been noted that the majority of the soil in the western half of the study area adjacent to the Welland Canal is listed as unclassified. This is a result of extensive 19th and 20th century disturbance and man-made deposits as a result of the construction and reconstruction of the Welland Canal (Chapman and Putnam, 1984). Figure 5 provides an illustration of the soil types and drainage within the Port Colborne SSESEL study area.

The Niagara Peninsula is dominated by the Niagara Escarpment, composed of the Lockport geological formation of Silurian age, and is similar to the Onondaga geological formation, which runs parallel to it. The Niagara Escarpment is most famous as the cliff over which the Niagara River plunges at Niagara Falls, for which it is named. The Welland Canal was constructed to facilitate shipping through the Great Lakes, providing access from Lake Erie north to Lake Ontario. The Niagara Escarpment was a difficult obstacle to overcome during design and building of the Welland Canal. The northern terminus of the Welland Canal at Port Weller is approximately 100 m lower than the southern terminus into Lake Erie at Port Colborne.

The closest source of potable water to the current study area is the Welland Canal, which runs adjacent to the study area to the west. Although the presence of the Canal may indicate high potential for Euro-Canadian resources, the Canal was artificially constructed to facilitate shipping through the Great Lakes beginning in 1824. Therefore, this water source does not directly contribute to pre-contact Aboriginal archaeological potential. Other sources of naturally occurring potable water include Indian Creek, which runs along the northern border of the study area, and Lake Erie, which is located approximately 4 km south of the study area.

1.3.2 Known Archaeological Sites and Surveys

A request was made to the MTCS Archaeological Sites Database co-ordinator, Robert von Bitter, on August 8, 2014 to consult the Archaeological Sites Database (ASDB) and determine if any registered archaeological sites were located within 1 km of the current study area boundaries. A response was received on August 26, 2014, indicating that there are 6 archaeological sites registered within 1 km of the Port Colborne SSESEL study area. A detailed list of these sites is provided in Table 3.

Table 3: Registered Archaeological Sites within 1 km of the Study Area

Borden #	Site Name	Cultural Affiliation	Site Type/Feature	Researcher
AfGt-196	Chippawa 1	Undetermined	N/A	N/A

AfGt-197	Chippawa 2	Undetermined	N/A	N/A
AfGt-26	Kikkert-Murray	Pre-Contact	Findspot	Pengelly 1984-1986
AfGt-38	Kikkert 1	Undermined	N/A	Pengelly 1984
AfGt-39	Kikkert 2	Pre-Contact	Scatter	Pengelly 1984
AfGt-40	Kikkert 3	Early Woodland	Campsite	Pengelly 1984

Information concerning specific site locations is protected by provincial policy, and is not fully subject to the Freedom of Information Act. The release of such information in the past has led to looting or various forms of illegally conducted site destruction. Confidentiality extends to all media capable of conveying location, including maps, drawings, or textual descriptions of a site location. The MTCS will provide information concerning site location to the party or an agent of the party holding title to a property, or to a licensed archaeologist with relevant cultural resource management interests.

1.3.3 Current Conditions

For the Port Colborne SSESEL Stage 1 archaeological assessment, an optional property inspection was not undertaken by the archaeological team. A visit to the property is considered optional in accordance with Section 1.2 of the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011) and was not a cost effective option for the current study. Extensive background research and on-line mapping tools were used to evaluate the history, geography, topography, and current conditions of the study area to assess and map archaeological potential.

It is important to note that the construction of the Third Canal, and the Welland By-Pass would have impacted the archaeological integrity of a majority of the study area. In an assessment conducted by Golder (2012) within Concession 4 and 5 just north of the current study area, it was indicated that extensive spoil piles from the canal and tunnel excavation exist along the edges of the Welland Canal. These massive fill events have removed any previous evidence of cultural value or interest (Golder 2012: 8). While these spoil piles are likely also present in Concession 3, the Port Colborne SSESEL study area also consists of agricultural lands, residential lands, recreational pathways, railway lines, and woodlots. These fill events were also noted by Archaeological Assessments Ltd. during an archaeological investigation for the development of a transmission line through the current study area (2011a, b). Figure 5 provides an illustration of the disturbed land, marked as "unclassified", from the Ministry of Natural Resources database on soil types. It indicates that all of the land west of Ramey Road within the study area consists of man-made deposits.

2. Analysis and Conclusions

2.1 Determination of Archaeological Potential

Archaeological potential is established by determining the likelihood that archaeological resources may be present on a subject property. Criteria commonly used by the Ontario MTCS (Ontario Government 2011) to determine areas of archaeological potential include:

- Proximity to previously identified archaeological sites;
- Distance to various types of water sources;
- Soil texture and drainage;
- Glacial geomorphology, elevated topography and the general topographic variability of the area;
- Resource areas including food or medicinal plants, scarce raw materials and early Euro-Canadian industry;
- Areas of early Euro-Canadian settlement and early transportation routes;
- Properties listed on municipal register of properties designated under the *Ontario Heritage Act* (Government of Ontario 1990b);
- Properties that local histories or informants have identified with possible archaeological sites, historical events, activities or occupants; and
- Historic landmarks or sites.

Distance to modern or ancient water sources is generally accepted as the most important element for past human settlement patterns and when considered alone may result in a determination of archaeological potential. In addition any combination of two or more of the criteria listed above, such as well drained soils or topographic variability, may indicate archaeological potential.

Certain features indicate that archaeological potential has been removed, such as land that has been subject to extensive and intensive deep land alterations that have severely damaged the integrity of any archaeological resources. This includes landscaping that involves grading below the topsoil level, building footprints, quarrying and sewage, and infrastructure development (Ontario Government 2011).

2.1.1 Conclusions

The evaluation of archaeological potential for the study area has resulted in the determination that there is moderate to high potential for the recovery of pre-contact and contact period Aboriginal archaeological resources based on the proximity to known archaeological sites and potable water sources, such as the Indian Creek and Lake Erie. In addition, the historical documentary evidence from the first European settlers and surveyors to the area indicates the long history of occupation here by First Nations people. The potential for Euro-Canadian archaeological resources is judged to be high based off of the early settlement of the area by Euro-Canadian settlers and proximity to the historic town of Port Colborne, historic roadways, the Welland Canal, and historic railways.

While it has been determined that the general region has high potential for the recovery of archaeological resources, the construction of the Third Canal and the Welland By-Pass has removed archaeological potential within a large section along the western portion of the study area. This disturbance was documented by Golder (2012) in a previous assessment north of the current study area. The disturbance was also noted by Archaeological Assessments Ltd in a Stage 2 assessment conducted within the current study area for a transmission line (2011b). The construction of the Trillium Railway that runs north-south within the study area boundary may have also

impacted the cultural heritage value of surrounding lands. However, areas of agricultural and residential land east of Ramey Road remain intact and, therefore, retain archaeological potential. The wooded area immediately to the west of Ramey Road appears to also retain archaeological potential. Any undisturbed areas to the east or west of Ramey Road will require further Stage 2 archaeological assessment prior to any ground disturbance activities. Figure 6 provides an illustration of the areas retaining archaeological potential.

Though the construction of the Welland By-Pass likely removed the archaeological potential, the possibility exists that deeply buried archaeological materials may be present (Golder 2012). Boring activities observed by Golder (2012) indicate the presence of a buried topsoil layer 5-10m beneath the current fill surface. That information, in addition to the presence of historic structures on the property, led Golder (2012) to recommend a Stage 2 strategy to address deeply buried remains, see Section 2.1.7 in the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government, 2011). Though the possibility for deeply buried archaeological materials remains for the current SSESEL study area, the lack of historic structures on the 1876 map makes the possibility of historic sites increasingly unlikely.

3. Recommendations

The evaluation of archaeological potential has resulted in the determination that there is moderate to high potential for the recovery of both Aboriginal and Euro-Canadian archaeological within part of the Port Colborne SSESEL study area. Due to the construction of the Welland Canal, land to the west of Ramey Road has been extensively and severely disturbed and consists of man-made deposits and spoil piles. However, deeply buried archaeological sites have been noted on properties adjacent to the study area (Golder 2012). Therefore, should any archaeological remains be encountered during construction, all work must stop immediately and a licensed archaeologist must be contacted. There are areas to the east of Ramey Road where archaeological integrity remains intact and the potential for the recovery of archaeological resources in these areas is high (Figure 6). Stage 2 archaeological assessment is recommended for the lands to the east of Ramey Road prior to any ground disturbance activities. The Stage 2 archaeological assessment will be conducted by a licensed archaeologist and must follow the requirements set out in the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011), including:

- Pedestrian survey investigation at 5 m intervals where ploughing is possible (e.g., agricultural fields). This assessment will occur when agricultural fields have been recently ploughed, weathered, and exhibit at least 80% surface visibility;

- Test pit survey methods at 5 m intervals in all areas that will be impacted by the project and where ploughing is not possible (e.g., woodlots, overgrown areas, manicured lawns);

- Poorly drained areas, areas of steep slope and areas of previous disturbance (e.g., pipelines, railways, road ROWs, buildings) identified within all areas that will be impacted by the project are to be mapped and photo-documented, but are not recommended for Stage 2 survey as they possess low to no archaeological potential.

Should deeply buried sites be discovered, a Stage 2 assessment will be conducted according to the standards appropriate for survey in deeply buried conditions as per Section 2.1.7 in the Ministry of Tourism, Culture and Sport's *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011).

The Ministry of Tourism, Culture and Sport is asked to accept this report into the Ontario Public Register of Archaeological Reports and issue a letter of concurrence with the recommendations presented herein. As further archaeological assessments are required, archaeological concerns under land use planning and development processes have not fully been addressed.

4. Advice on Compliance with Legislation

This report is submitted to the Ontario Minister of Tourism, Culture and Sport as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 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 fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism, Culture and Sport, 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 fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of 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 Section 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) require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ontario Ministry of Consumer Services.

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6. Figures

All figures pertaining to the Stage 1 archaeological assessment of the proposed Port Colborne SSESEL within part of Lots 22, 23, 24 and 25, Concession 3, Geographical Township of Humberstone, now Municipality of Niagara, City of Port Colborne, Welland County, Ontario are provided on the following pages.

LEGEND

Approximate location of borehole drilled by Landtek Limited on January 9, 12, and 13, 2015.

NOTES

Reference: Niagara Navigator, Regional Municipality of Niagara, 2015

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206 NEBO ROAD, HAMILTON, ONTARIO, L8W 2E1

DRAWING:	Borehole Location Plan		
PROJECT:	Proposed East Side Employment Lands - Internal Services Ramey Road, Port Colborne, Ontario		
SCALE:	NTS	PROJECT NO.	14314
DATE:	February, 2015	DRAWING NO.	1

LANDTEK LIMITED

LOG OF BOREHOLE NO. 1

Project No.:	14314	Drill Date:	January 9, 2015
Project:	Internal Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	Ramey Road, Port Colborne, Ont.	Datum:	

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type	Scale (m)	SPT "N" Value	Soil Moisture (%)	GWL
Ground Surface								
FILL mixture of silty clay with limestone pieces and cobbles, brown, moist (Stiff to Very Stiff)		0.0	1	SS		20	5.0	
			2	SS		9	14.7	
			3	SS		25	6.7	
BOREHOLE TERMINATED UPON REFUSAL ON POSSIBLE ROCK FILL		5.3						

SPT "N" Value: 0 25 50 75 100

Soil Moisture (%): 0 25 50

Scale (m): 0.0 -0.5 -1.0 -1.5 -2.0 -2.5 -3.0 -3.5 -4.0 -4.5 -5.0 -5.5 -6.0 -6.5 -7.0 -7.5 -8.0 -8.5 -9.0 -9.5 -10.0 -10.5 -11.0 -11.5 -12.0 -12.5 -13.0 -13.5 -14.0

Lots of grinding on augers suggest probable large rock fill in area. Borehole initially advanced to 2.6 m then hit refusal on possible large rock. Moved borehole 5 m south, advanced to 5.3 m then hit refusal. Moved borehole again 3 m north of original location and hit refusal at 5.1 m.

Notes: 1. On completion, borehole open to 5.3 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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LOG OF BOREHOLE NO. 2

Project No.:	14314	Drill Date:	January 13, 2015
Project:	Internal Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	Ramey Road, Port Colborne, Ont.	Datum:	

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type	SPT "N" Value
Ground Surface					
FILL silty clay with limestone gravel sizes, cobbles, brown, very moist		0.0			
SILTY CLAY trace gravel sizes, layered, brownish grey, moist, (Stiff to Very Stiff)		1.4	1	SS	12
			2	SS	15
			3	SS	17
wet to saturated, brown, soft to very soft below ±4.6 m		4.6	4	SS	4
			5	SS	1
BOREHOLE TERMINATED		9.8			

Scale (m): 0.0, -0.5, -1.0, -1.5, -2.0, -2.5, -3.0, -3.5, -4.0, -4.5, -5.0, -5.5, -6.0, -6.5, -7.0, -7.5, -8.0, -8.5, -9.0, -9.5, -10.0, -10.5, -11.0, -11.5, -12.0, -12.5, -13.0, -13.5, -14.0

SPT "N" Value: 0, 25, 50, 75, 100

Soil Moisture (%): 0, 25, 50

Soil Moisture (%) values: 28.0, 28.5, 29.5, 43.0, 58.4

GWL

Notes: 1. On completion, borehole open to 9.2 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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LOG OF BOREHOLE NO. 3

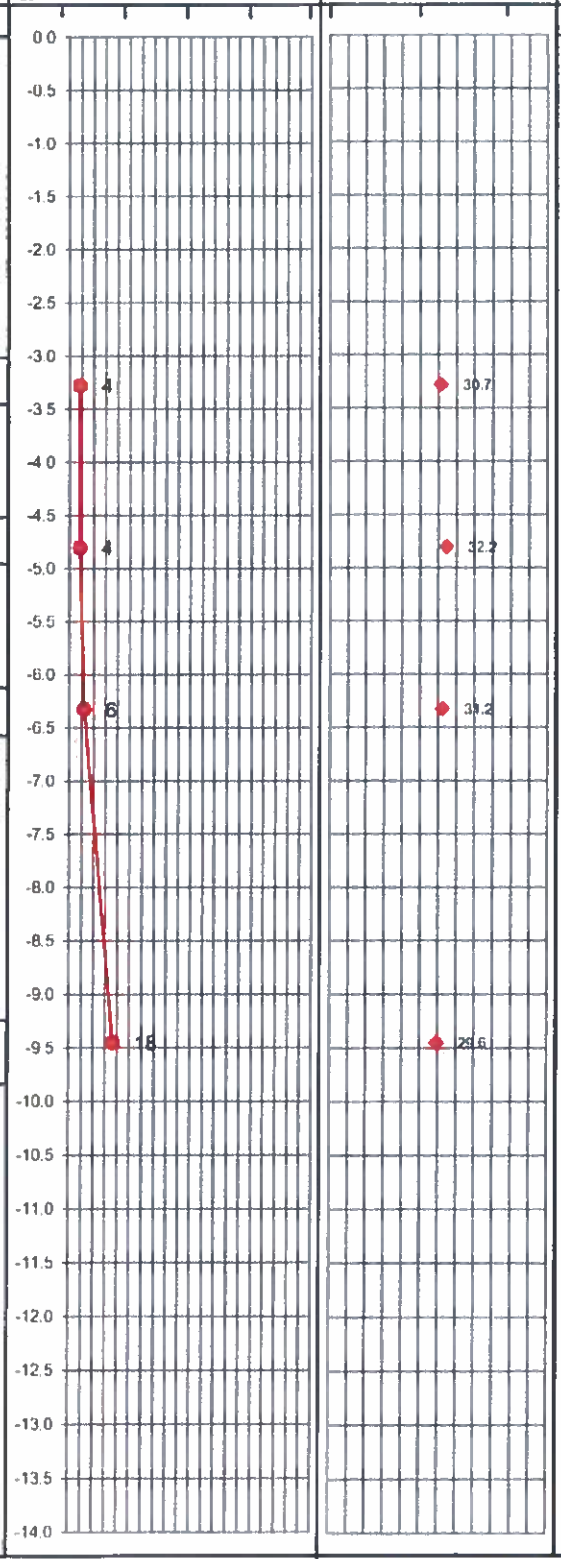
Project No.:	14314	Drill Date:	January 12, 2015
Project:	Internal Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	Ramey Road, Port Colborne, Ont.	Datum:	

Material Description	Symbol	Elev. Depth	Samples No.	Samples Type	Scale (m)
Ground Surface					
±125 mm of organic soil		0.0			
FILL mixture of silty clay and gravel sizes, cobbles, grey, black and brown, very moist, (Firm)			1	SS	
			2	SS	
less gravel sizes and cobbles below ±4.5 m			3	SS	
SILTY CLAY trace gravel sizes, layered, moist, brown to grey (Very Stiff)		7.9	4	SS	
BOREHOLE TERMINATED		9.8			

SPT "N" Value: 0, 25, 50, 75, 100

Soil Moisture (%): 0, 25, 50

GWL



Notes: 1. On completion, borehole open to 9.1 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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LOG OF BOREHOLE NO. 4

Project No.:	14314	Drill Date:	January 9, 2015
Project:	Internal Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	Ramey Road, Port Colborne, Ont.	Datum:	Geodetic

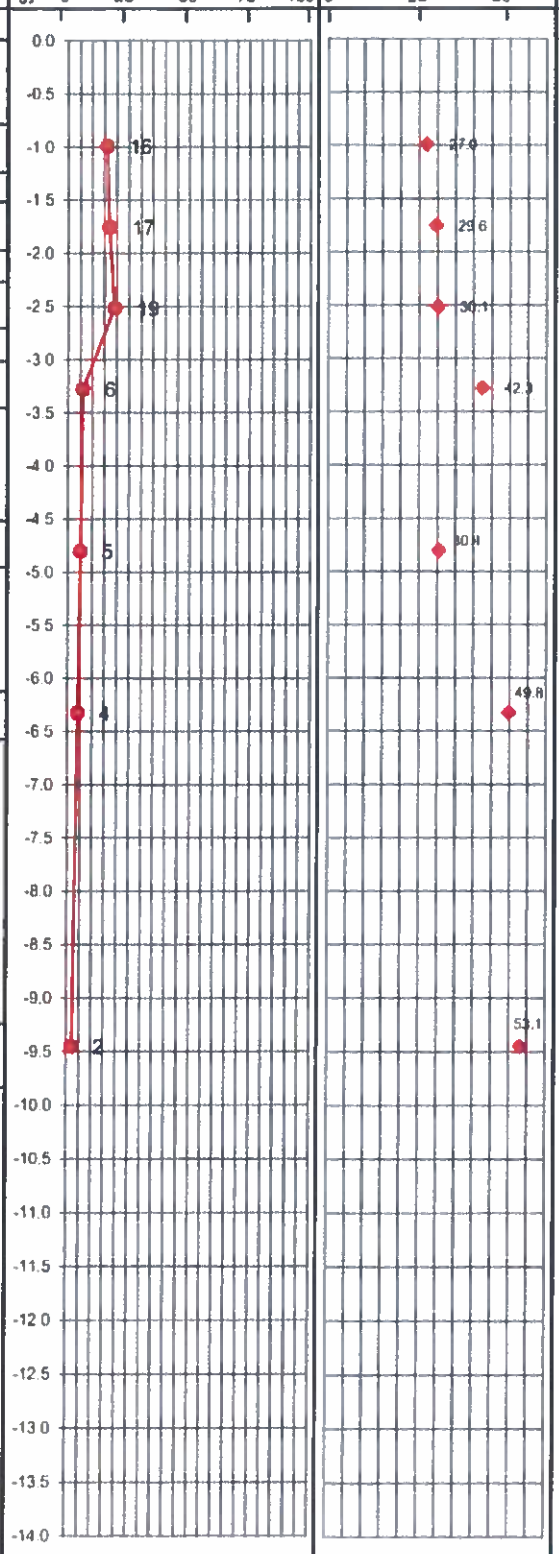
Material Description	Symbol	Elev. / Depth	Sample No.	Sample Type	Scale (m)
Ground Surface		175.6			
±200 mm of organic soil		0.0			
SILTY CLAY trace gravel sizes, layered, brown, moist, (Very Stiff)			1	SS	
			2	SS	
			3	SS	
becomes wet to saturated, firm to soft, below ±3.0 m			4	SS	
			5	SS	
			6	SS	
		165.8	7	SS	
		9.8			
BOREHOLE TERMINATED					

SPT "N" Value: 0 25 50 75 100

Soil Moisture (%): 0 25 50

GWL

Scale (m): 0.0, -0.5, -1.0, -1.5, -2.0, -2.5, -3.0, -3.5, -4.0, -4.5, -5.0, -5.5, -6.0, -6.5, -7.0, -7.5, -8.0, -8.5, -9.0, -9.5, -10.0, -10.5, -11.0, -11.5, -12.0, -12.5, -13.0, -13.5, -14.0



Notes: 1. On completion, borehole open to 9.1 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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LOG OF BOREHOLE NO. 5

Project No.:	14314	Drill Date:	January 9, 2015
Project:	Internal Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	Ramey Road, Port Colborne, Ont.	Datum:	Geodetic

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type	Scale (m)	SPT "N" Value	Soil Moisture (%)	GWL
Ground Surface		175.5						
±200 mm of organic soil		0.0						
SILTY CLAY trace gravel sizes, layered, brown, moist, (Very Stiff)			1	SS		14	27.6	
			2	SS		25	23.3	
			3	SS		18	31.1	
very moist to wet at ±3.0 m			4	SS		11	34.3	
becomes wet to saturated, firm to soft, below ±3.5 m			5	SS		6	31.9	
			6	SS		5	33.0	
		165.7	7	SS		4	46.6	
BOREHOLE TERMINATED		9.8						

SPT "N" Value: 0 25 50 75 100 | Soil Moisture (%): 0 25 50 | Scale (m): 0.0 -0.5 -1.0 -1.5 -2.0 -2.5 -3.0 -3.5 -4.0 -4.5 -5.0 -5.5 -6.0 -6.5 -7.0 -7.5 -8.0 -8.5 -9.0 -9.5 -10.0 -10.5 -11.0 -11.5 -12.0 -12.5 -13.0 -13.5 -14.0

Notes: 1. On completion, borehole open to 9.1 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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LOG OF BOREHOLE NO. 6

Project No.:	14314	Drill Date:	January 12, 2015
Project:	Internal Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	Ramey Road, Port Colborne, Ont.	Datum:	

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type	Scale (m)	SPT "N" Value	Soil Moisture (%)	GWL
Ground Surface								
±100 mm of organic soil		0.0						
FILL silty clay, trace gravel sizes, layered, brown, moist (Firm to Stiff)			1	SS		10	23.2	
			2	SS		4	31.5	
ORGANIC SILTY CLAY peat, black, very moist, (Stiff)		9.5	3	SS		10	25.7	
BOREHOLE TERMINATED		9.8						

SPT "N" Value: 0 25 50 75 100 | Soil Moisture (%): 0 25 50

Scale (m): 0.0 -0.5 -1.0 -1.5 -2.0 -2.5 -3.0 -3.5 -4.0 -4.5 -5.0 -5.5 -6.0 -6.5 -7.0 -7.5 -8.0 -8.5 -9.0 -9.5 -10.0 -10.5 -11.0 -11.5 -12.0 -12.5 -13.0 -13.5 -14.0

Notes: 1. On completion, borehole open to 9.1 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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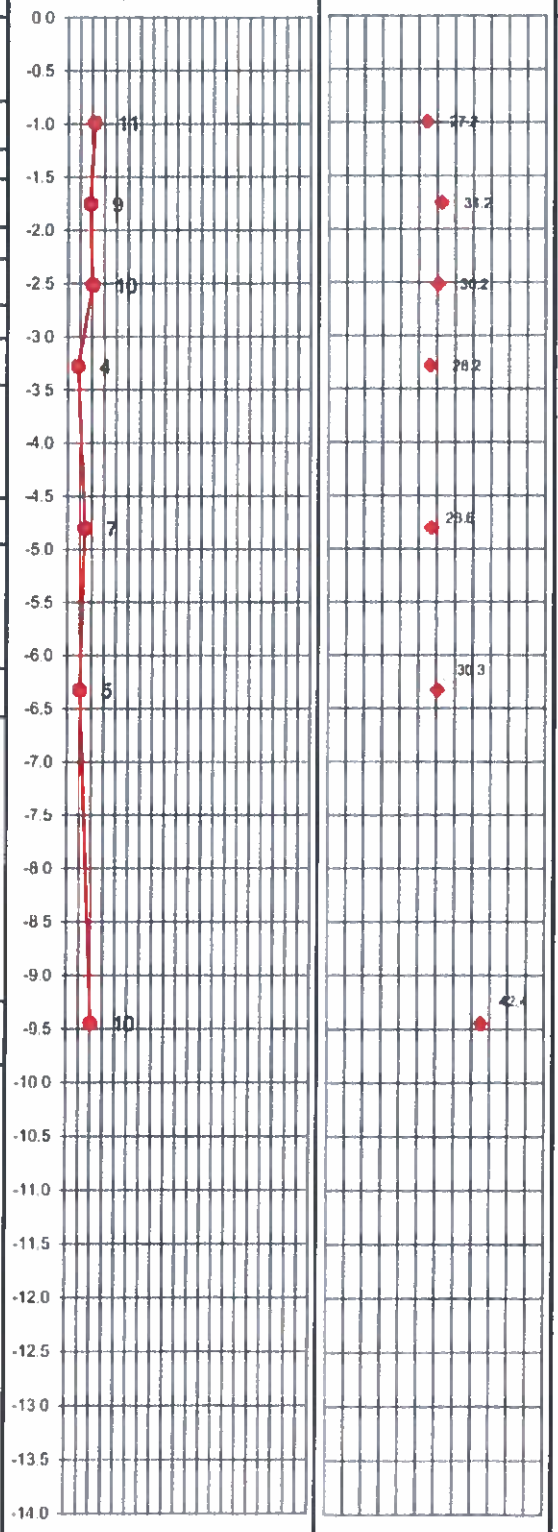
LANDTEK LIMITED — LOG OF BOREHOLE NO. 7

Project No.:	14314	Drill Date:	January 12, 2015
Project:	Internal Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	Ramey Road, Port Colborne, Ont.	Datum:	

Material Description	Symbol	Elev. Depth	Sample No.	Sample Type	Scale (m)
Ground Surface					
±100 mm of organic soil		0.0			
FILL silty clay,trace gravel sizes, layered, very moist, brown, (Stiff)			1	SS	
			2	SS	
			3	SS	
becomes wet, firm below ±3.0 m			4	SS	
			5	SS	
			6	SS	
organic silty clay, peat from ± 6.4 to 7.0 m		6.4			
SILTY CLAY trace gravel sizes, wet, (Stiff)		7.0	7	SS	
BOREHOLE TERMINATED		9.8			

SPT "N" Value: 0 25 50 75 100 — Soil Moisture (%): 0 25 50 — GWL



Notes: 1. On completion, borehole open to 9.1 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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LOG OF BOREHOLE NO. 8

Project No.:	14314	Drill Date:	January 9, 2015
Project:	Internal Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	Ramey Road, Port Colborne, Ont.	Datum:	Geodetic

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type	SPT "N" Value (Scale (m))	Soil Moisture (%)	GWL
Ground Surface		175.4					
±150 mm of organic soil		0.0					
SILTY CLAY trace gravel sizes, layered, very moist, (Stiff to Very Stiff)			1	SS	13	31.0	
			2	SS	24	25.0	
			3	SS	15	20.8	
wet to saturated below ±3.0 m			4	SS	8	40.2	
soft below ±4.5 m			5	SS	3	33.8	
			6	SS	2	33.9	
		165.6	7	SS	3	42.4	
BOREHOLE TERMINATED		9.8					

SPT "N" Value scale: 0 25 50 75 100 — Soil Moisture (%) scale: 0 25 50

Scale (m): 0.0 -0.5 -1.0 -1.5 -2.0 -2.5 -3.0 -3.5 -4.0 -4.5 -5.0 -5.5 -6.0 -6.5 -7.0 -7.5 -8.0 -8.5 -9.0 -9.5 -10.0 -10.5 -11.0 -11.5 -12.0 -12.5 -13.0 -13.5 -14.0

Notes: 1. On completion, borehole open to 9.1 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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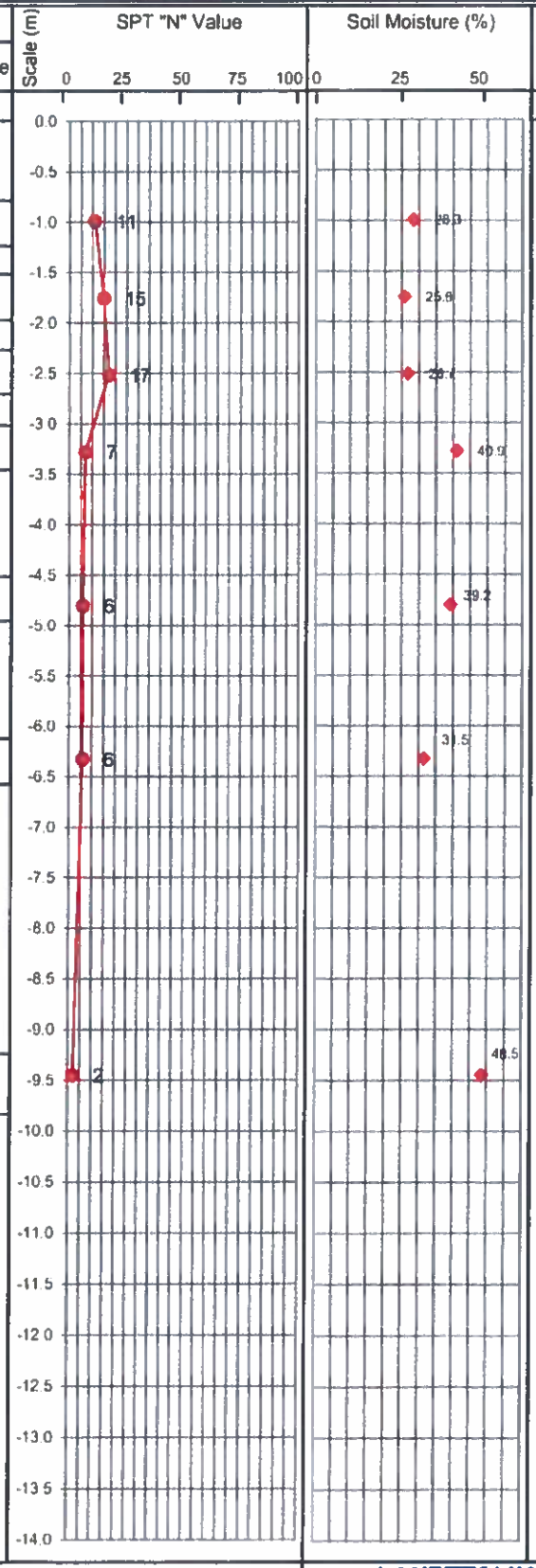
LOG OF BOREHOLE NO. 9

Project No.:	14314	Drill Date:	January 13, 2015
Project:	Internal Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	Ramey Road, Port Colborne, Ont.	Datum:	Geodetic

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type
Ground Surface		176.3		
±150 mm of organic soil		0.0		
SILTY CLAY trace gravel sizes, layered, very moist, brownish grey, (Stiff to Very Stiff)			1	SS
			2	SS
			3	SS
wet to saturated, soft to firm below ±3.0 m			4	SS
			5	SS
			6	SS
		166.5	7	SS
		9.8		
BOREHOLE TERMINATED				



Notes: 1. On completion, borehole open to 9.1 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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LOG OF BOREHOLE NO. 10

Project No.:	14314	Drill Date:	January 13, 2015
Project:	Internal Site Servicing - East Side Employment Lands	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	Ramey Road, Port Colborne, Ont.	Datum:	Geodetic

Material Description	Symbol	Elev. / Depth	Sample No.	Sample Type	Scale (m)
Ground Surface		175.9			
±150 mm of organic soil		0.0			
SILTY CLAY trace gravel sizes, layered, very moist, brownish grey, (Stiff to Very Stiff)			1	SS	
			2	SS	
			3	SS	
wet to saturated, soft to firm below ±3.0 m			4	SS	
			5	SS	
			6	SS	
		171.0			
SILTY CLAY TILL trace gravel sizes, moist, brown, (Very Stiff)		4.9			
		166.1	7	SS	
BOREHOLE TERMINATED		9.8			

SPT "N" Value: 0 25 50 75 100

Soil Moisture (%): 0 25 50

GWL

Notes: 1. On completion, borehole open to 9.1 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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APPENDIX D

PHOTOGRAPHS OF TYPICAL SITE CONDITIONS

Photograph #1
View looking east from the north west corner of the project site towards interior lands west of Ramey Road.

Photograph #2
View looking west from 50m southwest of the intersection of Ramey Road and Third Concession towards the interior lands west of Ramey Road.

Photograph #3
View looking north over the interior lands west of Ramey Road.

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Project No.: 14314	Date: February, 2015
Project:	Proposed Employment Lands Ramey Road Port Colborne, Ontario
Title:	Photographs of Typical Site Conditions

Supplemental Geotechnical Investigation

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Supplementary Geotechnical Investigation
Proposed Watermain and Forcemain Installation
Port Colborne East Side Employment Lands
City of Port Colborne, Ontario

Prepared for:
AECOM Canada Ltd.
3-30 Hannover Drive
St. Catharines, Ontario
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File: 15378
January 14, 2015

EXECUTIVE SUMMARY

Landtek Limited is pleased to submit the supplementary geotechnical investigation for the proposed watermain and forcemain installation for the Port Colborne East Side Development Lands in the City of Port Colborne, Ontario. The work was authorized to proceed by AECOM on October 21, 2015.

It is understood that the proposed work will include installation of a watermain and forcemain along the rail corridor located between Second Concession Road and Ramey Road. This geotechnical investigation is supplementary to a geotechnical investigation completed by Landtek Limited for the external servicing for the proposed East side employment lands (Landtek report number 14150).

SITE AND SUBSURFACE CONDITIONS

Available geologic data and background geotechnical information indicate that the native subsurface soil conditions in the area of the site consist of fine textured glaciolacustrine deposits of silt and clay. The site also lies adjacent to known areas of man-made deposits of fill. Generally this fill was deposited during the excavations of the Welland Canal.

Bedrock in the area of the site is identified as limestone of the Blois Blanc or Onondaga formations. Available geologic data also indicates that the site passes close to the Onondaga Escarpment which is characterized by abrupt increases in the depths to bedrock contact in the south to north direction. The subject site appears to lie just north of the Onondaga Escarpment on available geologic maps.

The borehole information is consistent with the background data and indicates that the predominant native subsurface soil is silty clay. Bedrock was not encountered in any borehole to the maximum depth drilled of 3.5 m.

EXCAVATIONS, BACKFILL, AND PIPE BEDDING CONSIDERATIONS

The subsoils should be able to be excavated with hydraulic backhoes. Any possible fill materials are expected to be stable at about 45 degrees to the horizontal. The native silty clay is expected to be stable at about 60 degrees to the horizontal. Utility trenches and installations located just behind the excavation face can be a source of water into the soils and can have a negative impact on the stability of excavation walls in seemingly stable soils. These conditions can result in sudden and abrupt loss of soil from trench walls. For this reason workmen should not be allowed in trenches without trench box protection unless the trench walls are cut back at 45 degrees to the horizontal and meet the OHSA criteria for safe trench conditions.

Generally there is no indication that special pipe bedding materials or construction is required for the majority of the site, however, where peat is encountered at the pipe invert elevation it is recommended that the peat be removed and replaced with suitable pipe bedding material. The bedding material should be graded clean 100 percent crushed quarried aggregate to provide both high permeability as well as stability for pipe support. It is recommended that 19 mm Type II stone as specified in OPSS 1004 be used for this purpose.

When trains travel on a rail track their load is transferred to the underlying soils; the area in which these soils are subjected to this loading is called the 'zone of influence'. Unsupported service trenches excavated within the zone of influence can potentially be subject to collapse or cause undermining of the rail bed. Consequently, we recommend that the two meter deep trench proposed for the installation of the watermain and forcemain on this project be:

1. located such that the centerline of the track to the closest wall of the excavation is greater than 3.7 m (12 ft), and
2. backfilled and compacted according to specification prior to allowing any train movement on the tracks.

Should the above two recommendations not be possible or practical, then engineered temporary shoring will be required.

EXECUTIVE SUMMARY

WATERMAIN/FORCEMAIN

The invert depths/elevation of the new watermain and forcemain are unknown at this time but are expected to be at about 1.5 m to 2.0 m below ground surface elevations, at that depth the inverts may be in either the fill, peat, or the native silty clay. The native silty clay generally present favorable support conditions for thrust block design and construction. It is recommended that the thrust blocks in native undisturbed silty clay.be designed for an average allowable resistance bearing pressure of 150 kPa (3,100 psf).

Where the invert elevations are in the fill material or peat, alternative pipe restraint methods should be used, such as mechanical joint pipe.

The text of the report provides additional information on the above issues as well as comments and recommendations on soil management, excavations and backfill, subsurface concrete, and groundwater. The full report text should be reviewed along with the executive summary.

TABLE OF CONTENTS

1.0 INTRODUCTION

Landtek Limited is pleased to submit the supplementary geotechnical investigation for the proposed watermain and forcemain installation for the Port Colborne East Side Development Lands in the City of Port Colborne, Ontario. The work was authorized to proceed by AECOM on October 21, 2015.

It is understood that the proposed work will include installation of a watermain and forcemain along the rail corridor located between Second Concession Road and Ramey Road. This geotechnical investigation is supplementary to a geotechnical investigation completed by Landtek Limited for the external servicing for the proposed East side employment lands (Landtek report number 14150).

The primary objectives of this investigation were: (1) determine the subsurface conditions along the railway corridor; (2) provide design and construction recommendations with regards to sewer and watermain pipe installations, trench wall stability and backfill; and, (3) assess the chemical characteristics of the soils to be excavated with regard to corrosion potential and environmental land uses and/or off-site disposal.

2.0 METHODOLOGY

Field work at the site was carried out in November 2015 and included clearance of underground utilities, borehole drilling and soil sampling, supervision and logging of the borehole conditions. Layout of boreholes in the field was completed by a representative of Landtek in consultation with AECOM. The borehole locations are shown on the site plan, drawing 1, in Appendix C.

A total of five (5) boreholes were drilled on November 23, 2015 to maximum depths of 3.5 m. Borehole drilling was carried out by a specialist soil drilling contractor using a track mounted drill rig with continuous flight, solid stem augers. Standard Penetration Tests (SPT's) and split spoon samples were taken during drilling at selected depths on all boreholes. A representative of Landtek Limited carried out full time supervision of drilling and soil sampling operations.

The soil samples were transported to the Landtek Limited laboratory and visually examined in the laboratory to determine their textural classification. Moisture contents were carried out on all samples and density determinations were completed on selected intact samples. Elevations at the borehole locations were estimated based on topographic information obtained from the Ministry of Natural Resources and Forestry.

Soil samples were selected for chemical testing to determine metals and inorganic properties against MOE land use soil quality criteria as per Ontario Regulation 511/09. The chemical testing was completed by AGAT Laboratories Ltd. for Landtek and the results are provided in Appendix D.

3.0 SITE AND SUBSURFACE CONDITIONS

The subject site for the proposed watermain and forcemain installation runs along the rail corridor extending from Concession Road 2 north to Ramey Road. Figure 1 illustrates the location of the subject site. The ground surface elevations at the borehole locations vary by approximately 0.6 m.

Available geologic data and background geotechnical information indicate that the native subsurface soil conditions in the area of the site consist of fine textured glaciolacustrine deposits of silt and clay. The site also lies adjacent to known areas of man-made deposits of fill. Generally this fill was deposited during the excavations of the Welland Canal.

Bedrock in the area of the site is identified as limestone of the Blois Blanc or Onondaga formations. Available geologic data also indicates that the site passes close to the Onondaga Escarpment which is characterized by abrupt increases in the depths to bedrock contact in the south to north direction. The subject site appears to lie just north of the Onondaga Escarpment on available geologic maps.

The borehole information is consistent with the background data and indicates that the predominant native subsurface soil is silty clay. Bedrock was not encountered in any borehole to the maximum depth drilled of 3.5 m.

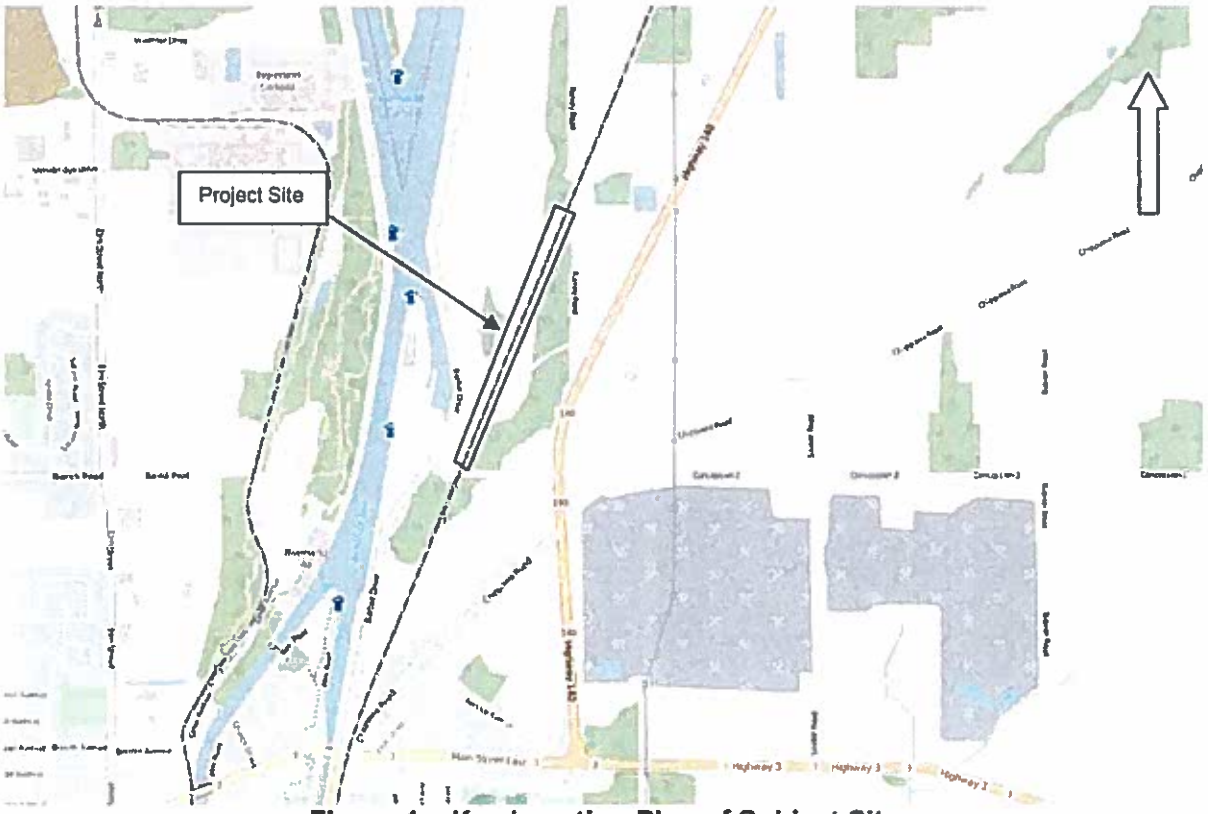


Figure 1 – Key Location Plan of Subject Site

The site plan showing borehole locations and the logs of boreholes are provided in Appendix C and a summary of the borehole conditions is provided in Table 1. The site conditions are discussed in the following sections.

Surface Materials

The proposed watermain and forcemain service alignment runs along the east side of a railway corridor. The boreholes were drilled next to the railway tracks on the raised rail bed. Surface materials generally consisted of approximately 75 mm of clear stone which overlay the track ballast.

Fill

Fill was encountered in every borehole and extended to approximately 1.0 m to 3.0 m below ground surface elevation. The fill principally consisted of crusher run limestone and contained cobble sized pieces of limestone in some areas. The fill also contained some silt and clay at depth. The fill ranges from loose to very dense with SPT values of 10 blows for 300 mm penetration of the sampler to 50 blows for 125 mm penetration of the sampler. Moisture contents in the fill range from 4 to 14 percent.

Peat

Peat was encountered in borehole 3 beneath the fill at approximately 1.8 m below ground surface elevation and extended to approximately 2.5 m below ground surface elevation. The peat is a highly organic soil.

Silty Clay

Silty Clay was encountered in every borehole beneath the fill, and beneath the peat in borehole 3, and extended to the maximum depth drilled of 3.5 m. The silty clay is generally oxidized brown, contains traces of shale and gravel sizes, is layered, fissured and fractured, and contains mineral staining. The silty clay is typically stiff to very stiff with SPT values of 9 to 22 blows for 300 mm penetration of the sampler. Moisture contents in the fill range from 18 to 31 percent.

Bedrock

Bedrock was not encountered in any borehole drilled to a maximum depth of 3.5 m. However geologic map data indicates that the bedrock contact depth decreases significantly from north to south as a result of the Onondaga Escarpment. The subject site appears to lay just north of the escarpment which indicates bedrock contact depth may rise significantly heading south from the site.

Groundwater

On completion of drilling all boreholes remained open and dry to the full depth drilled. Groundwater conditions are expected to vary according to the time of the year and seasonal precipitation levels. During wet weather water is expected to be perched in any possible fill deposits and soil fissures.

4.0 EXCAVATIONS, BACKFILL, AND PIPE BEDDING

All temporary excavations and unbraced side slopes in the soils should conform to standards set out in the Occupational Health and Safety Act. The majority of the native overburden soil to be encountered during excavation at the site is expected to be a Type "2" soil according to the Occupational Health and Safety Act classification in Part III. Type 2 soils have a low to medium natural moisture content and a medium to high degree of internal strength. The silty clay is regarded as a Type "2" soil. The existing fill and peat is generally regarded as "Type 3" soils. In accordance with the Occupational Health and Safety Act, Paragraph 227 (3), the soil influencing the excavation must be classified as the type with the highest classification number.

The subsoils should be able to be excavated with hydraulic backhoes. Any possible fill materials are expected to be stable at about 45 degrees to the horizontal. The native silty clay is expected to be stable at about 60 degrees to the horizontal. Utility trenches and installations located just behind the excavation face can be a source of water into the soils and can have a negative impact on the stability of excavation walls in seemingly stable soils. These conditions can result in sudden and abrupt loss of soil from trench walls. For this reason workmen should not be allowed in trenches without trench box protection unless the trench walls are cut back at 45 degrees to the horizontal and meet the OHSA criteria for safe trench conditions.

Groundwater seepage is expected to be variable depending upon the season of the year. Perched groundwater in fill is anticipated and control of water seepage into excavations is expected to be possible by pumping from sumps at the base of the excavations. It is not anticipated that a permit to take water will be required for excavations that extend up to 3.5 m depth.

Generally there is no indication that special pipe bedding materials or construction is required for the majority of the site, however, where peat is encountered at the pipe invert elevation it is recommended that the peat be removed and replaced with suitable pipe bedding material. The bedding material should be graded clean 100 percent crushed quarried aggregate to provide both high permeability as well as stability for pipe support. It is recommended that 19 mm Type II stone as specified in OPSS 1004 be used for this purpose.

Backfill in service trenches should be selected to be compactable in narrow trench conditions. The on-site native silty clay is generally considered to be re-usable, although variation in the native moisture contents may require selective separation of material to avoid the use of wet soil. Other excavated fill materials may be variable in organic content with high moisture contents and should be evaluated to assess if they are suitable for backfill. The peat material found in borehole 3 is not suitable for re-use as backfill.

During inclement weather the native soils may become too wet to achieve satisfactory compaction. If construction is proposed for late in the year, and a reduced level of trench compaction with a higher risk of future settlements is not acceptable, it is recommended that provisional contract quantities be established for the supply and placement of imported granular fill. The imported granular should meet the requirements of OPSS 1010 for Granular B Type I material as a minimum requirement.

Trench backfill should be uniformly compacted to a density that minimizes the risk of long-term settlements. It is recommended that the target compaction specification for trench backfill be 97% Standard Proctor Maximum Dry Density (SPMDD) with no individual test below 95 % SPMDD.

4.1 WATERMAINS/FORCEMAINS

The invert depths/elevation of the new watermain and forcemain are unknown at this time but are expected to be at about 1.5 m to 2.0 m below ground surface elevations, at that depth the inverts may be in either the fill, peat, or the native silty clay. The native silty clay generally present favorable support conditions for thrust block design and construction. It is recommended that the thrust blocks in native undisturbed silty clay be designed for an average allowable resistance bearing pressure of 150 kPa (3,100 psf).

Where the invert elevations are in the fill material or peat, alternative pipe restraint methods should be used, such as mechanical joint pipe.

4.2 EXCAVATIONS ADJACENT TO RAILROAD

When trains travel on a rail track their load is transferred to the underlying soils; the area in which these soils are subjected to this loading is called the 'zone of influence'. Unsupported service trenches excavated within the zone of influence can potentially be subject to collapse or cause undermining of the rail bed. Consequently, we recommend that the two meter deep trench proposed for the installation of the watermain and forcemain on this project be:

3. located such that the centerline of the track to the closest wall of the excavation is greater than 3.7 m (12 ft), and
4. backfilled and compacted according to specification prior to allowing any train movement on the tracks.

Should the above two recommendations not be possible or practical, then engineered temporary shoring will be required.

In addition to the above, all excavations must conform to standards set out in the Occupational Health and Safety Act, Transport Canada, and the Railway Safety Act.

5.0 EXCAVATED SOIL AND ENVIRONMENTAL CONSIDERATIONS

Analyses for metals and inorganic parameters were carried out on selected soil samples. The results were compared to the land use standards set out in Table 1 (full depth background site conditions) and Table 3 (full depth generic site condition standards for non-potable water supply) Residential/Parkland/Institutional (RPI) of the MOE document, "Soil, Ground Water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act, April 15, 2011". The AGAT test results are attached in Appendix D and are summarized below in Table 1 of this report.

The testing for metals and inorganic parameters indicate that the subgrade composite samples obtained from the boreholes generally meet the soil quality standards for Table 1 (full depth background site conditions) and Table 3 (RPI) of the MOE document with the exception of Electrical Conductivity (EC) and Sodium Absorption Ratio (SAR) in most samples.

The exceedances in SAR and EC are considered to be related to the historical use of road salts for winter de-icing operations and do not present an adverse health risk. Some variability in soil quality parameters may occur within a given sample as well as along the length of the project. It is anticipated that during the course of excavation and mixing of soils from different depths the mixed bulk soil quality will not be an issue.

Table 1 – Summary of Chemical Test Data

SAMPLE IDENTIFICATION	Parameters Analysed	Comparison to Table 1 - Full Depth Background Site Condition Standards		Comparison to Table 3 **RESIDENTIAL/PARKLAND/INSTITUIONAL** Land Use Standards for a non-potable groundwater situation	
		Meets Criteria	Does Not Meet Criteria	Meets Criteria	Does Not Meet Criteria
BH 1 SS3	Metals And Inorganics	√		√	
BH 2 SS4	Metals And Inorganics		EC		EC
BH 3 SS3	Metals And Inorganics		EC, SAR		EC, SAR
BH 4 SS2	Metals And Inorganics	√		√	
BH 5 SS 2	Metals And Inorganics		EC		EC

There is no obvious indication from visual examination or olfactory evidence of the soil samples that there are organic compounds (VOC, THM, BTEX CCME F1-4, & PAH's) present in the soils at this site consequently additional chemical testing for these parameters was not carried out.

It is anticipated that excavated soils will be disposed of off-site. The party responsible for the site receiving excavated materials may have specific soil quality criteria for acceptance of fill. The contractor may be required to complete additional testing to address a designated list of chemical parameters for the site receiving the fill.

6.0 SUBSURFACE CONCRETE

The requirements for subsurface concrete subject to a sulphate environment are presented in Canadian Standards Association (CSA) specification CAN/CSA-A3000-13. The native soils are expected to present a mild sulphate environment and not be aggressive to concrete (CSA criteria of less than 0.2 percent water soluble sulphate in the soils). It is recommended that, as a minimum, subsurface concrete have the following characteristics for an S-3 exposure class:

- minimum 28-day compressive strength = 25 MPa;
- minimum 56-day strength = 30 MPa;
- maximum water to cementing materials ratio = 0.50;
- cementing materials; GU (general use hydraulic cement) or GUb (blended general use)
- air content; as per CSA A23.1 Table 4, air content category 2

6.1 METHODS OF SPECIFYING CONCRETE

Alternative methods of specifying concrete for a project are outlined in CSA A23.1-14 and allow for "Performance" or "Prescription" based methods. Each method attaches different levels of responsibility to the owner, the contractor, and the concrete supplier. The pros and cons of each method should be examined prior to completion of the specifications for the project.

7.0 CLOSURE

The Limitations of Report, as stated in Appendix A, are an integral part of this report.

Soil samples will be retained and stored by Landtek for a period of three months after the report is issued. The samples will be disposed of at the end of the three month period unless a written request from the client to extend the storage period is received.

I trust this report will be of assistance with the design and construction of the proposed development. Should you have any questions, please do not hesitate to contact our office.

Yours very truly,

LANDTEK LIMITED

LICENSED PROFESSIONAL ENGINEER
Jan 14, 2016
G. W. WUISMAN
PROVINCE OF ONTARIO

Cory Zanatta B.A.Sc., E.I.T.

Greg Wuisman P.Eng.

REFERENCES

[1] Quaternary Geology of the Niagara-Welland Area, Ontario Division of Mines, Ministry of Natural Resources, Map 2496, 1984

[2] Paleozoic Geology of the Niagara Area, Ontario Division of Mines, Ministry of Natural Resources, Map 2344, 1976

APPENDIX A
LIMITATIONS OF REPORT

The conclusions and recommendations given in this report are based on information determined at the borehole locations. Subsurface and ground water conditions between and beyond the Boreholes may be different from those encountered at the borehole locations, and conditions may become apparent during construction that could not be detected or anticipated at the time of the geotechnical investigation. It is recommended practice that Landtek be retained during construction to confirm that the subsurface conditions throughout the site are consistent with the conditions encountered in the Boreholes.

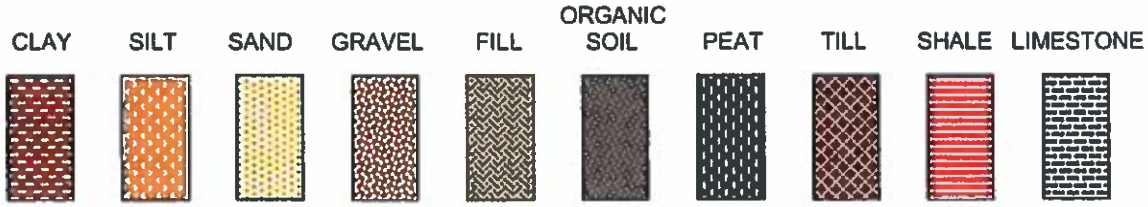
The comments made in this report on potential construction problems and possible remedial methods are intended only for the guidance of the designer. The number of Boreholes may not be sufficient to determine all the factors that may influence construction methods and costs. For example, the thickness and quality of surficial topsoil or fill layers may vary markedly and unpredictably. Contractors bidding on the project, or undertaking construction on the site should make their own interpretation of the factual borehole information, and establish their own conclusions as to how the subsurface conditions may affect their work.

The survey elevations in the report were obtained by Landtek Limited or others, and are strictly for use by Landtek in the preparation of the geotechnical report. The elevations should not be used by any other parties for any other purpose.

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

This report does not reflect environmental issues or concerns related to the property unless otherwise stated in the report. The design recommendations given in the report are applicable only to the project described in the text and then only if constructed substantially in accordance with the details stated in this report. Since all details of the design may not be known, it is recommended that Landtek Limited be retained during the final design stage to verify that the design is consistent with the report recommendations, and that the assumptions made in the report are still valid.

APPENDIX B
SYMBOLS AND TERMS USED IN THE REPORT



RELATIVE PROPORTIONS

Term	Range
Trace	0 - 5%
A Little	5 – 15%
Some	15 – 30%
With	30 – 50%

CLASSIFICATION BY PARTICLE SIZE

Boulder	> 200 mm
Cobble	80 mm – 200 mm
Gravel -	
Coarse	19 mm – 80 mm
Fine	4.75 mm – 19 mm
Sand -	
Coarse	4.75 mm – 2 mm
Medium	2 mm – 0.425 mm
Fine	0.425 mm – 0.75 mm
Silt	0.075 mm – 0.002 mm
Clay	< 0.002 mm

DENSITY OF NON-COHESIVE SOILS

Descriptive Term	Relative Density	Standard Penetration Test
Very Loose	0 – 15%	0 – 4 Blows Per 300 mm Penetration
Loose	15 – 35%	4 – 10 Blows Per 300 mm Penetration
Compact	35 – 65%	10 – 30 Blows Per 300 mm Penetration
Dense	65 – 85%	30 – 50 Blows Per 300 mm Penetration
Very Dense	85 – 100%	Over 50 Blows Per 300 mm Penetration

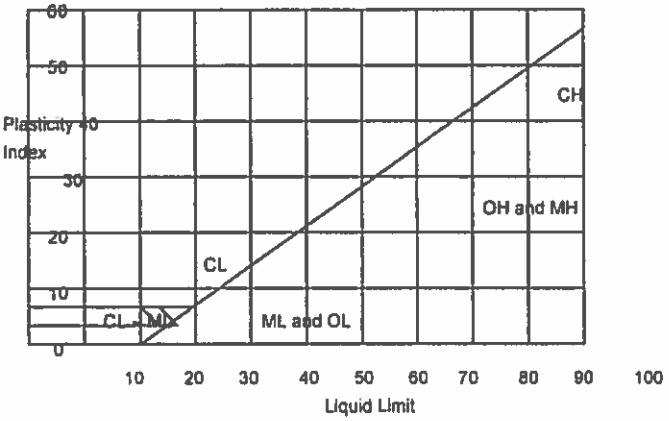
CONSISTENCY OF COHESIVE SOILS

Descriptive Term	Undrained Shear Strength kPa (psf)	N Value Standard Penetration Test	Remarks
Very Soft	< 12 (< 250)	< 2	Can penetrate with fist
Soft	12 – 25 (250 – 500)	2 – 4	Can indent with fist
Firm	25 – 50 (500 –1000)	4 – 8	Can penetrate with thumb
Stiff	50 – 100 (1000 – 2000)	8 – 15	Can indent with thumb
Very Stiff	100 – 200 (2000 – 4000)	15 – 30	Can indent with thumb-nail
Hard	> 200 (> 4000)	> 30	Can indent with thumb-nail

Notes: 1. Relative density determined by standard laboratory tests.
2. N value – blows/300 mm penetration of a 623 N (140 Lb.) hammer falling 760 mm (30 in.) on a 50 mm O.D. split spoon soil sampler. The split spoon sampler is driven 450 mm (18 in.) or 610 mm (24 in.). The "N" value is the Standard Penetration Test (SPT) value and is normally taken as the number of blows to advance the sampler the last 300 mm.

APPENDIX B CONTINUED
CLASSIFICATION OF SOILS FOR ENGINEERING PURPOSES
ASTM Designation: D 2487 - 69 AND D 2488 – 69
(Unified Soil Classification System)

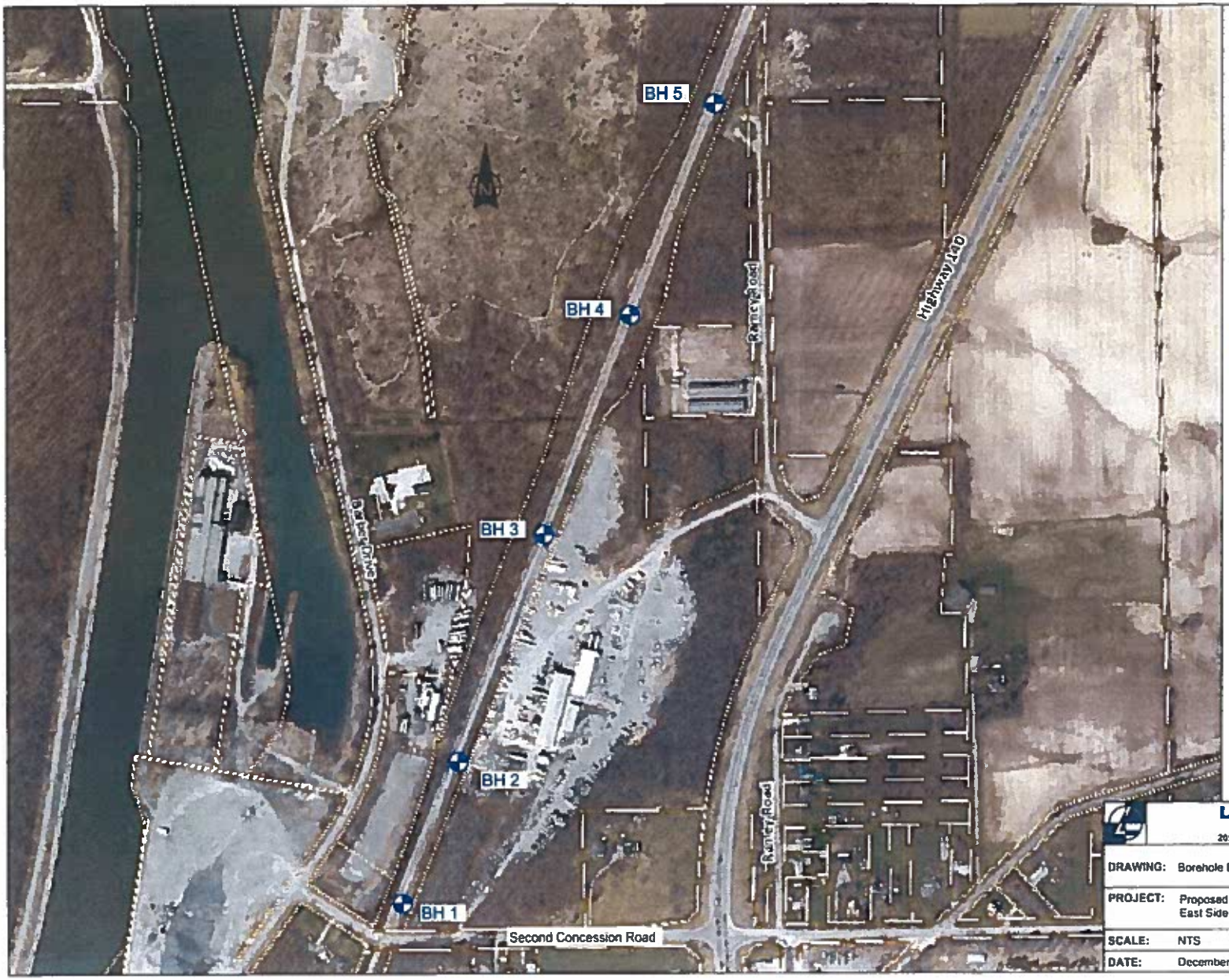
Major Divisions			Group Symbols	Typical Names	Classification Criteria		
Coarse-grained soils More than 50% retained on No. 200 sieve *	Gravels 50% or more of coarse fraction retained on No. 4 sieve	Clean gravels	GW	Well-graded gravels and gravel-sand mixtures, little or no fines	Classification on basis of percentage of fines Less than 5% pass No. 200 sieve . . . . . GW, GP, SW, SP More than 12% pass No. 200 sieve . . . . . GM, GC, SM, SC 5 to 12% pass No 200 sieve . . . . . Borderline classifications requiring use of dual symbols	C_u=D60/D10 greater than 4; C_z = (D30)^2/(D10xD60) between 1 and 3	
			GP	Poorly graded gravels and gravel-sand mixtures, little or no fines		Not meeting both criteria for GW	
		Gravels with fines	GM	Silty gravels, gravel-sand-silt mixtures		Atterberg limits below "A" line or P.I. less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
			GC	Clayey gravels, gravel-sand-clay mixtures		Atterberg limits above "A" line with P.I. greater than 7	
	Sands More than 50% of coarse fraction passes No. 4 sieve	Clean Sands	SW	Well-graded sands and gravelly sands, little or no fines		C_u=D60/D10 greater than 6; C_z = (D30)^2/ (D10xD60) between 1 and 3	
			SP	Poorly graded sands and gravelly sands, little or no fines		Not meeting both criteria for SW	
		Sands with fines	SM	Silty sands, sand-silt mixtures		Atterberg limits below "A" line or P.I. less than 4	Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols
			SC	Clayey sands, sand-clay mixtures		Atterberg limits above "A" line with P.I. greater than 7	
Fine-grained soils 50% or more passes No. 200 sieve *	Silts and clays Liquid limit 50% or less		ML	Inorganic silts, very fine sands, rock flour, silty or clayey fine sands	Plasticity Chart For classification of fine-grained soils and fine fraction of coarse-grained soils. Atterberg limits plotting in hatched area are borderline classifications requiring use of dual symbols. Equation of A-line: PI=0.73 (LL-20)		
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silts			
			OL	Organic silts and organic silts of low plasticity			
	Silts and clays Liquid limit greater than 50%		MH	Inorganic silts, micaceous or diatomaceous fine sands or silts, elastic silts			
			CH	Inorganic clays of high plasticity, fat clays			
			OH	Organic clays of medium to high plasticity			
	Highly organic soils		Pt	Peat, muck and other highly organic soils	* Based on the material passing the 3 in. (76mm) sieve		



APPENDIX C

DRAWING 1 - SITE PLAN SHOWING BOREHOLE LOCATIONS

LOGS OF BOREHOLES



LEGEND

Approximate locations of boreholes drilled by Landtek Limited on November 23, 2015.

NOTES

1. Reference: Niagara Navigator, Regional Municipality of Niagara, 2013 Aerial Imagery.

LANDTEK LIMITED
CONSULTING ENGINEERS
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DRAWING:	Borehole Location Plan		
PROJECT:	Proposed Watermain and Forcemain Installation East Side Employment Lands, Port Colborne, Ontario		
SCALE:	NTS	PROJECT NO.	15378
DATE:	December, 2015	DRAWING NO.	1

LANDTEK LIMITED

LOG OF BOREHOLE NO. 1

Project No.:	15378	Drill Date:	November 23, 2015
Project:	Proposed Watermain and Forcemain Installation	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	East Side Employment Lands, Port Colborne, Ontario	Datum:	Geodetic

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type	Scale (m)	SPT "N" Value	Soil Moisture (%)	GWL	Monitor Details	Test Data
Ground Surface		179.0								
±75mm Clear stone		0.0								
FILL crushed limestone, grey, moist (Dense)			1	SS		36	7.4			
-some clayey silt		177.3	2	SS		11	17.6			
SILTY CLAY trace shale and gravel sizes, fissured and fractured, layered, black organic staining, brown, wet (Stiff) very moist below 2.5 m		1.7	3	SS		9	21.0			
			4	SS		12	30.6			
		175.5								
BOREHOLE TERMINATED		3.5								

0.00, -0.50, -1.00, -1.50, -2.00, -2.50, -3.00, -3.50, -4.00, -4.50, -5.00, -5.50, -6.00, -6.50, -7.00, -7.50, -8.00

SPT "N" Value: 0, 25, 50, 75, 100

Soil Moisture (%): 0, 25, 50

Notes: 1. On completion, borehole open to 3.0 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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LANDTEK LIMITED

LOG OF BOREHOLE NO. 2

Project No.:	15378	Drill Date:	November 23, 2015
Project:	Proposed Watermian and Forcemain Installation	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	East Side Employment Lands, Port Colborne, Ontario	Datum:	Geodetic

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type	Scale (m)	SPT "N" Value	Soil Moisture (%)	GWL	Monitor Details	Test Data
Ground Surface		178.7								
±75mm Clear stone		0.0								
FILL crushed limestone with cobble sizes, grey, moist (Dense to Very Dense)			1	SS		68	3.8			
			2	SS		38	12.1			
some silt and clay below ±2.2 m			3	SS		50/125mm	13.5			
		175.7								
SILTY CLAY trace shale and gravel sizes, fissured and fractured, mineral staining, layered brown, very moist (Stiff)		3.0 175.2	4	SS		12	25.5			
BOREHOLE TERMINATED		3.5								

0.00, -0.50, -1.00, -1.50, -2.00, -2.50, -3.00, -3.50, -4.00, -4.50, -5.00, -5.50, -6.00, -6.50, -7.00, -7.50, -8.00

SPT "N" Value: 0, 25, 50, 75, 100

Soil Moisture (%): 0, 25, 50

Notes: 1. On completion, borehole open to 3.0 m and dry

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

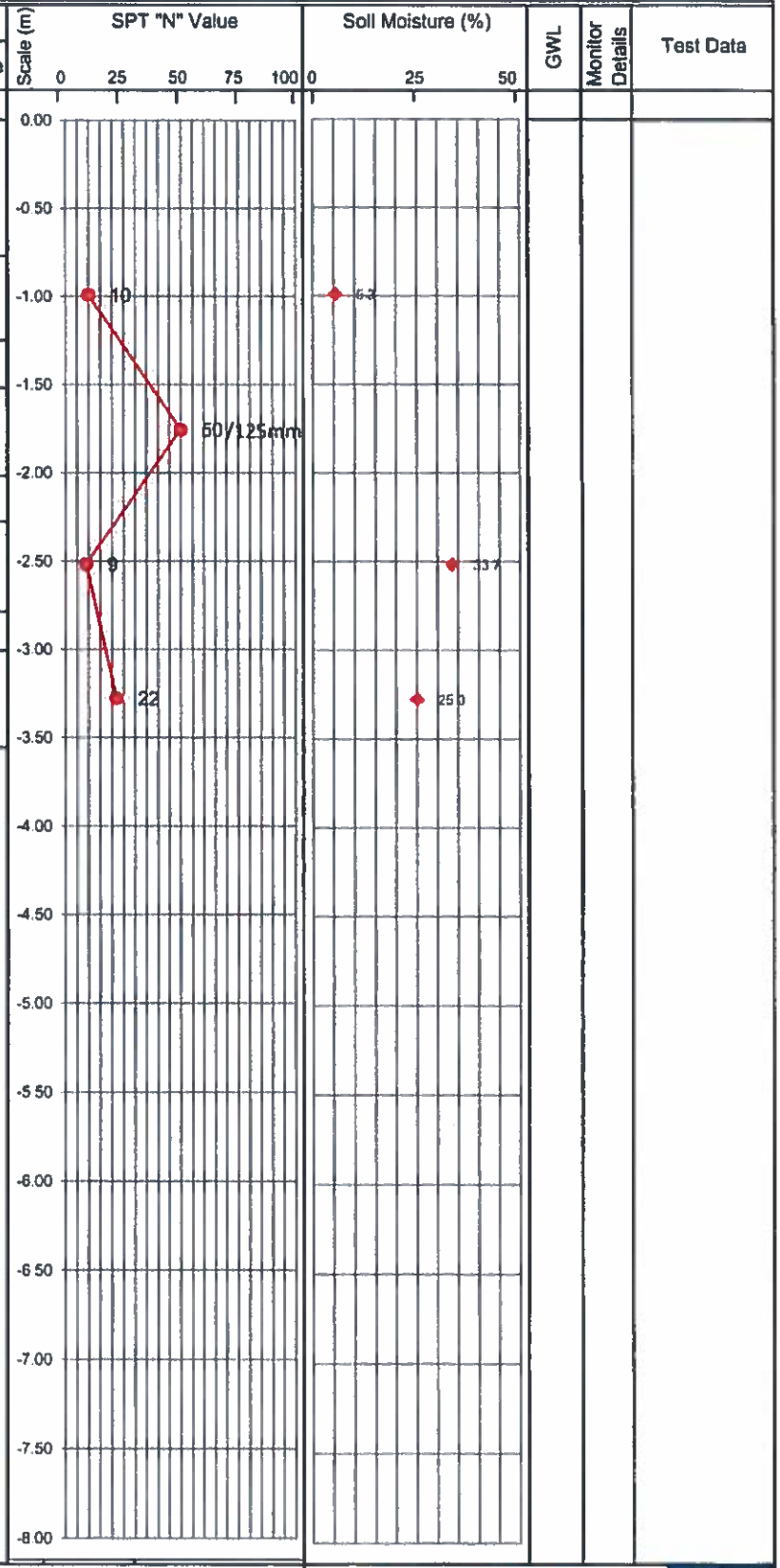
LANDTEK LIMITED
205 Nebo Road, Unit 3
Hamilton, Ontario, Canada, L8W 2E1
Ph: (905) 383-3733 Fax: (905) 383-8433
www.landteklimited.com

LANDTEK LIMITED

LOG OF BOREHOLE NO. 3

Project No.:	15378	Drill Date:	November 23, 2015
Project:	Proposed Watermian and Forcemain Installation	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	East Side Employment Lands, Port Colborne, Ontario	Datum:	Geodetic

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type	Test Data
Ground Surface		178.6			
±75mm clear stone		0.0			
FILL crushed limestone, some silt and clay, cobble sizes, grey, moist (Compact)			1	SS	
		176.8	2	SS	
PEAT organic material, black, moist		1.8			
		176.1	3	SS	
SILTY CLAY layered, fissured and fractured, mineral staining, grey, very moist (Very Stiff)		2.5	4	SS	
		175.1			
BOREHOLE TERMINATED		3.5			



Notes: 1. On completion, borehole open to 3.0m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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LANDTEK LIMITED

LOG OF BOREHOLE NO. 4

Project No.:	15378	Drill Date:	November 23, 2015
Project:	Proposed Watermain and Forcemain Installation	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	East Side Employment Lands, Port Colborne, Ontario	Datum:	Geodetic

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type	Scale (m)	SPT "N" Value	Soil Moisture (%)	GWL	Monitor Details	Test Data
Ground Surface		178.4								
FILL crushed limestone, some silt and clay, cobble sizes, grey, moist (Compact)		0.0	1	SS		15				
		176.1								
SILTY CLAY trace shale and gravel, layered, fissured and fractured, mineral staining, brown, very moist (Very Stiff)		2.3	2	SS		18	29.7			
			3	SS		17	25.4			
		174.9								
BOREHOLE TERMINATED		3.5								

SPT "N" Value: 0 25 50 75 100 | Soil Moisture (%): 0 25 50

Scale (m): 0.00, -0.50, -1.00, -1.50, -2.00, -2.50, -3.00, -3.50, -4.00, -4.50, -5.00, -5.50, -6.00, -6.50, -7.00, -7.50, -8.00

Notes: 1. On completion, borehole open to 3.0 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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LANDTEK LIMITED

LOG OF BOREHOLE NO. 5

Project No.:	15378	Drill Date:	November 23, 2015
Project:	Proposed Watermian and Forcemain Installation	Drill Method:	[x] solid stem [ ] hollow stem [ ] vibratory
Location:	East Side Employment Lands, Port Colborne, Ontario	Datum:	Geodetic

Material Description	Symbol	Elev. / Depth	Samples No.	Samples Type	Scale (m)	SPT "N" Value	Soil Moisture (%)	GWL	Monitor Details	Test Data
Ground Surface		178.4								
FILL crushed limestone, some silt and clay, grey, moist (Compact)		0.0								
		177.4	1	SS	-1.00	12	33.2			
SILTY CLAY trace shale and gravel, layered, fissured and fractured, mineral staining, brown, very moist (Stiff to Very Stiff)		1.0	2	SS	-1.50	14	26.0			
			3	SS	-2.50	22	28.6			
			4	SS	-3.00	16	25.9			
		174.9								
BOREHOLE TERMINATED		3.5								

SPT "N" Value: 0 25 50 75 100 | Soil Moisture (%): 0 25 50 | Scale (m): 0.00, -0.50, -1.00, -1.50, -2.00, -2.50, -3.00, -3.50, -4.00, -4.50, -5.00, -5.50, -6.00, -6.50, -7.00, -7.50, -8.00

Notes: 1. On completion, borehole open to 3.0 m and dry.

PP = pocket penetrometer TCV = total combustible vapour BRD = bulk relative density
PL = plastic limit LL = liquid limit PI = plasticity index FV = field vane LV = lab vane VS = vane sensitivity

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APPENDIX D

AGAT LABORATORY RESULTS

AGAT Laboratories

5835 COOPERS AVENUE
MISSISSAUGA, ONTARIO
CANADA L4Z 1Y2
TEL (905)712-5100
FAX (905)712-5122
http://www.agatlabs.com

CLIENT NAME: LANDTEK LTD.
205 NEBO ROAD, UNIT 3
HAMILTON, ON L8W2E1
(905) 383-3733

ATTENTION TO: Cory Zanatta

PROJECT: 15378

AGAT WORK ORDER: 15T054917

SOIL ANALYSIS REVIEWED BY: Amanjot Bhela, Inorganic Coordinator

DATE REPORTED: Dec 29, 2015

PAGES (INCLUDING COVER): 6

VERSION*: 1

Should you require any information regarding this analysis please contact your client services representative at (905) 712-5100

NOTES

All samples will be disposed of within 30 days following analysis. Please contact the lab if you require additional sample storage time.

AGAT Laboratories

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Certificate of Analysis

AGAT WORK ORDER: 15T054917

PROJECT: 15378

CLIENT NAME: LANDTEK LTD.

ATTENTION TO: Cory Zanatta

SAMPLING SITE:

SAMPLED BY:

O. Reg. 153(511) - Metals & Inorganics (Soil)

DATE RECEIVED: 2015-12-18 **DATE REPORTED: 2015-12-29**

					SAMPLE DESCRIPTION:	BH1 SS3	BH2 SS4	BH3 SS3	BH4 SS2	BH5 SS2
					SAMPLE TYPE:	Soil	Soil	Soil	Soil	Soil
					DATE SAMPLED:	12/16/2015	12/16/2015	12/16/2015	12/16/2015	12/16/2015
Parameter	Unit	G / S: A	G / S: B	RDL		7300088	7300103	7300104	7300105	7300106
Antimony	µg/g	1.3	7.5	0.8		<0.8[<A]	<0.8[<A]	<0.8[<A]	<0.8[<A]	<0.8[<A]
Arsenic	µg/g	18	18	1		5[<A]	5[<A]	4[<A]	5[<A]	7[<A]
Barium	µg/g	220	390	2		195[<A]	156[<A]	73[<A]	168[<A]	91[<A]
Beryllium	µg/g	2.5	5	0.5		1.0[<A]	0.9[<A]	1.0[<A]	1.1[<A]	1.3[<A]
Boron	µg/g	36	120	5		12[<A]	13[<A]	11[<A]	14[<A]	11[<A]
Boron (Hot Water Soluble)	µg/g	NA	1.5	0.10		0.51[<B]	0.58[<B]	0.40[<B]	0.60[<B]	0.41[<B]
Cadmium	µg/g	1.2	1.2	0.5		<0.5[<A]	<0.5[<A]	<0.5[<A]	<0.5[<A]	<0.5[<A]
Chromium	µg/g	70	160	2		30[<A]	30[<A]	31[<A]	34[<A]	35[<A]
Cobalt	µg/g	21	22	0.5		14.6[<A]	14.9[<A]	13.5[<A]	14.0[<A]	16.6[<A]
Copper	µg/g	92	180	1		23[<A]	25[<A]	25[<A]	25[<A]	26[<A]
Lead	µg/g	120	120	1		11[<A]	12[<A]	12[<A]	12[<A]	13[<A]
Molybdenum	µg/g	2	6.9	0.5		<0.5[<A]	0.6[<A]	0.6[<A]	0.5[<A]	0.8[<A]
Nickel	µg/g	82	130	1		36[<A]	35[<A]	34[<A]	38[<A]	40[<A]
Selenium	µg/g	1.5	2.4	0.4		<0.4[<A]	<0.4[<A]	<0.4[<A]	<0.4[<A]	<0.4[<A]
Silver	µg/g	0.5	25	0.2		<0.2[<A]	<0.2[<A]	<0.2[<A]	<0.2[<A]	<0.2[<A]
Thallium	µg/g	1	1	0.4		<0.4[<A]	<0.4[<A]	<0.4[<A]	<0.4[<A]	<0.4[<A]
Uranium	µg/g	2.5	23	0.5		0.9[<A]	1.0[<A]	0.8[<A]	0.8[<A]	1.1[<A]
Vanadium	µg/g	86	86	1		40[<A]	37[<A]	40[<A]	42[<A]	49[<A]
Zinc	µg/g	290	340	5		69[<A]	74[<A]	75[<A]	80[<A]	76[<A]
Chromium VI	µg/g	0.66	10	0.2		<0.2[<A]	<0.2[<A]	<0.2[<A]	<0.2[<A]	<0.2[<A]
Cyanide	µg/g	0.051	0.051	0.040		<0.040[<A]	<0.040[<A]	<0.040[<A]	<0.040[<A]	<0.040[<A]
Mercury	µg/g	0.27	1.8	0.10		<0.10[<A]	<0.10[<A]	<0.10[<A]	<0.10[<A]	<0.10[<A]
Electrical Conductivity	mS/cm	0.57	0.7	0.005		0.435[<A]	1.69[>B]	1.51[>B]	0.353[<A]	1.16[>B]
Sodium Adsorption Ratio	NA	2.4	5	NA		0.365[<A]	0.444[<A]	13.6[>B]	0.410[<A]	0.271[<A]
pH, 2:1 CaCl2 Extraction	pH Units			NA		7.75	7.66	7.80	7.78	7.77

Comments: RDL - Reported Detection Limit; G / S - Guideline / Standard: A Refers to Table 1: Full Depth Background Site Condition Standards - Soil - Residential/Parkland/Institutional/Industrial/Commercial/Community Property Use, B Refers to Table 3: Full Depth Generic Site Condition Standards in a Non-Potable Ground Water Condition - Soil - Residential/Parkland/Institutional Property Use - Medium and Fine Textured Soils

7300088-7300106 EC & SAR were determined on the DI water extract obtained from the 2:1 leaching procedure (2 parts DI water:1 part soil). pH was determined on the 0.01M CaCl2 extract prepared at 2:1 ratio.

Certified By: Amanjot Bhela

AGAT Laboratories

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FAX (905)712-5122
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Guideline Violation

AGAT WORK ORDER: 15T054917

PROJECT: 15378

CLIENT NAME: LANDTEK LTD.

ATTENTION TO: Cory Zanatta

SAMPLEID	SAMPLE TITLE	GUIDELINE	ANALYSIS PACKAGE	PARAMETER	GUIDEVALUE	RESULT
7300103	BH2 SS4	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity	0.57	1.69
7300103	BH2 SS4	ON T3 S RPI MFT	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity	0.7	1.69
7300104	BH3 SS3	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity	0.57	1.51
7300104	BH3 SS3	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Sodium Adsorption Ratio	2.4	13.6
7300104	BH3 SS3	ON T3 S RPI MFT	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity	0.7	1.51
7300104	BH3 SS3	ON T3 S RPI MFT	O. Reg. 153(511) - Metals & Inorganics (Soil)	Sodium Adsorption Ratio	5	13.6
7300106	BH5 SS2	ON T1 S RPI/ICC	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity	0.57	1.16
7300106	BH5 SS2	ON T3 S RPI MFT	O. Reg. 153(511) - Metals & Inorganics (Soil)	Electrical Conductivity	0.7	1.16

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Quality Assurance

CLIENT NAME: LANDTEK LTD.

PROJECT: 15378

SAMPLING SITE:

AGAT WORK ORDER: 15T054917

ATTENTION TO: Cory Zanatta

SAMPLED BY:

Soil Analysis

RPT Date: Dec 29, 2015			DUPLICATE				REFERENCE MATERIAL			METHOD BLANK SPIKE			MATRIX SPIKE		
PARAMETER	Batch	Sample Id	Dup #1	Dup #2	RPD	Method Blank	Measured Value	Acceptable Limits		Recovery	Acceptable Limits		Recovery	Acceptable Limits	
								Lower	Upper		Lower	Upper		Lower	Upper
O. Reg. 153(511) - Metals & Inorganics (Soil)															
Antimony	7303121		<0.8	<0.8	NA	< 0.8	92%	70%	130%	99%	80%	120%	99%	70%	130%
Arsenic	7303121		3	3	NA	< 1	107%	70%	130%	98%	80%	120%	101%	70%	130%
Barium	7303121		37	40	7.8%	< 2	95%	70%	130%	94%	80%	120%	90%	70%	130%
Beryllium	7303121		<0.5	<0.5	NA	< 0.5	86%	70%	130%	95%	80%	120%	90%	70%	130%
Boron	7303121		5	5	NA	< 5	92%	70%	130%	103%	80%	120%	90%	70%	130%
Boron (Hot Water Soluble)	7304183		0.20	0.20	NA	< 0.10	106%	60%	140%	90%	70%	130%	93%	60%	140%
Cadmium	7303121		<0.5	<0.5	NA	< 0.5	102%	70%	130%	98%	80%	120%	96%	70%	130%
Chromium	7303121		16	15	6.5%	< 2	93%	70%	130%	97%	80%	120%	94%	70%	130%
Cobalt	7303121		5.1	4.8	6.1%	< 0.5	89%	70%	130%	95%	80%	120%	87%	70%	130%
Copper	7303121		10	10	0.0%	< 1	89%	70%	130%	100%	80%	120%	86%	70%	130%
Lead	7303121		7	7	0.0%	< 1	100%	70%	130%	100%	80%	120%	93%	70%	130%
Molybdenum	7303121		<0.5	<0.5	NA	< 0.5	97%	70%	130%	103%	80%	120%	103%	70%	130%
Nickel	7303121		11	10	9.5%	< 1	95%	70%	130%	101%	80%	120%	95%	70%	130%
Selenium	7303121		<0.4	<0.4	NA	< 0.4	99%	70%	130%	97%	80%	120%	101%	70%	130%
Silver	7303121		<0.2	<0.2	NA	< 0.2	83%	70%	130%	105%	80%	120%	105%	70%	130%
Thallium	7303121		<0.4	<0.4	NA	< 0.4	98%	70%	130%	112%	80%	120%	106%	70%	130%
Uranium	7303121		0.5	0.5	NA	< 0.5	102%	70%	130%	99%	80%	120%	97%	70%	130%
Vanadium	7303121		22	21	4.7%	< 1	89%	70%	130%	97%	80%	120%	94%	70%	130%
Zinc	7303121		30	28	6.9%	< 5	99%	70%	130%	97%	80%	120%	93%	70%	130%
Chromium VI	7298858		<0.2	<0.2	NA	< 0.2	99%	70%	130%	98%	80%	120%	99%	70%	130%
Cyanide	7298858		<0.040	<0.040	NA	< 0.040	102%	70%	130%	98%	80%	120%	103%	70%	130%
Mercury	7303121		<0.10	<0.10	NA	< 0.10	110%	70%	130%	106%	80%	120%	101%	70%	130%
Electrical Conductivity	7298809		0.456	0.458	0.4%	< 0.005	94%	90%	110%	NA			NA		
Sodium Adsorption Ratio	7304183		0.663	0.668	0.8%	NA	NA			NA			NA		
pH, 2:1 CaCl2 Extraction	7300035		7.53	7.70	2.2%	NA	101%	80%	120%	NA			NA		

Comments: NA signifies Not Applicable.
Duplicate Qualifier: As the measured result approaches the RL, the uncertainty associated with the value increases dramatically, thus duplicate acceptance limits apply only where the average of the two duplicates is greater than five times the RL.

Certified By: Amanjot Bhela

AGAT Laboratories

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http://www.agatlabs.com

Method Summary

CLIENT NAME: LANDTEK LTD.

AGAT WORK ORDER: 15T054917

PROJECT: 15378

ATTENTION TO: Cory Zanatta

SAMPLING SITE:

SAMPLED BY:

PARAMETER	AGAT S.O.P	LITERATURE REFERENCE	ANALYTICAL TECHNIQUE
Soil Analysis			
Antimony	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Arsenic	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Barium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Beryllium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Boron (Hot Water Soluble)	MET-93-6104	EPA SW 846 6010C; MSA, Part 3, Ch.21	ICP/OES
Cadmium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Cobalt	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Copper	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Lead	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Molybdenum	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Nickel	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Selenium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Silver	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Thallium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Uranium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Vanadium	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Zinc	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Chromium VI	INOR-93-6029	SM 3500 B; MSA Part 3, Ch. 25	SPECTROPHOTOMETER
Cyanide	INOR-93-6052	MOE CN-3015 & E 3009 A;SM 4500 CN	TECHNICON AUTO ANALYZER
Mercury	MET-93-6103	EPA SW-846 3050B & 6020A	ICP-MS
Electrical Conductivity	INOR-93-6036	McKeague 4.12, SM 2510 B	EC METER
Sodium Adsorption Ratio	INOR-93-6007	McKeague 4.12 & 3.26 & EPA SW-846 6010B	ICP/OES
pH, 2:1 CaCl2 Extraction	INOR-93-6031	MSA part 3 & SM 4500-H+ B	PH METER

AGAT Laboratories
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webearth.agatlabs.com

Chain of Custody Record

If this is a Drinking Water sample, please use Drinking Water Chain of Custody Form (potable water intended for human consumption)

Report Information:

Company: Landtek Limited
Contact: Cory Zaccaria
Address: [illegible]
Hamilton, ON
Phone: 905-383-3733 Fax:
Reports to be sent to:
1. Email: Cory@landtek.limited.com
2. Email:

Project Information:

Project: 15378
Site Location: Fort Erie
Sampled By:
AGAT Quote #: PO:
Please note: If quotation number is not provided, client will be billed full price for analysis.

Invoice Information:

Bill To Same: Yes ☑ No ☐
Company:
Contact:
Address:
Email:

Regulatory Requirements:

☐ No Regulatory Requirement

☑ Regulation 153/04 Table 1 & 3
☐ Ind/Com
☑ Res/Park
☐ Agriculture
Soil Texture (Check One) ☐ Coarse ☐ Fine

☐ Sewer Use
☐ Sanitary
☐ Storm
Region: (Indicate One)

☐ Regulation 558
☐ CCME
☐ Prov. Water Quality Objectives (PWQO)
☐ Other (Indicate One)

Is this submission for a Record of Site Condition? ☐ Yes ☑ No

Report Guideline on Certificate of Analysis ☐ Yes ☐ No

Laboratory Use Only

Work Order #:
Cooler Quantity:
Arrival Temperatures: 7.9 7.9 7.9
Custody Seal Intact: ☐ Yes ☐ No ☐ N/A
Notes:

Turnaround Time (TAT) Required:

Regular TAT ☑ 5 to 7 Business Days

Rush TAT (Rush Surcharges Apply)
☐ 3 Business Days ☐ 2 Business Days ☐ 1 Business Day

OR Date Required (Rush Surcharges May Apply):

Please provide prior notification for rush TAT
*TAT is exclusive of weekends and statutory holidays

Sample Matrix Legend

B	Biota
GW	Ground Water
O	Oil
P	Paint
S	Soil
SD	Sediment
SW	Surface Water

Sample Identification	Date Sampled	Time Sampled	# of Containers	Sample Matrix	Comments/ Special Instructions	Metals and Inorganics	Metal Scan	Hydride Forming Metals	Client Custom Metals	ORPs: ☐ B-HWS ☐ Cl ☐ CN ☐ Cr⁶⁺ ☐ EC ☐ FOC ☐ NO₂/NO₃ ☐ Total N ☐ pH ☐ SAR	Nutrients: ☐ TP ☐ NH₃ ☐ TKN ☐ NO₂ ☐ NO₃ ☐ NO₂/NO₃	Volatiles: ☐ VOC ☐ BTEX ☐ THM	CCME Fractions 1 to 4	ABNs	PAHs	Chlorophenols	PCBs	Organochlorine Pesticides	TCLP Metals/Inorganics	Sewer Use
BH1 SS 3	Dec. 16		1			X														
BH2 SS 4	"		1			X														
BH3 SS 3	"		1			X														
BH4 SS 2	"		1			X														
BH5 SS 2	"		1			X														

Samples Relinquished By (Print Name and Sign): [signature] Date: Dec 18/15 Time: 12:15
Samples Received By (Print Name and Sign): [signature] Date: Dec 18/15 Time: 12:15
Samples Relinquished By (Print Name and Sign): [signature] Date: 20/12/15 Time: 3:20
Samples Received By (Print Name and Sign): Date: Time:

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Appendix E

Stage 1 and 2 Archaeological Assessment Reports

- Stage 1 Archaeological Assessment Report
- Stage 1-2 Archaeological Assessment Report

Stage 1 Archaeological Assessment Report

Environment AECOM

City of Port Colborne

Stage 1 Archaeological Assessment

Port Colborne Site Servicing of East Side Employment Lands (SSESEL)

Part of Lots 22, 23, 24 & 25, Concession 3, Geographical Township of Humberstone, Municipality of Niagara, City of Port Colborne, Welland County, Ontario

Licensee: Samantha Markham
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PIF Number: P438-0009-2014

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Date: January 30, 2015
Revised Report

Distribution List

# of Hard Copies	PDF	Association / Company Name
	yes	City of Port Colborne
	yes	Ontario Ministry of Tourism, Culture and Sport
	yes	AECOM

Revision Log

Revision #	Revised By	Date	Issue / Revision Description
1	Samantha Markham	January 30, 2015	MTCS edits

AECOM Signatures

Report Prepared By:

Samantha Markham, MES
Project Archaeologist

Report Reviewed By:

Adria Grant, BA, CAHP
Senior Archaeologist, Archaeology Practice Lead

Executive Summary

AECOM Canada Ltd. (AECOM) was contracted by the City of Port Colborne to conduct a Stage 1 archaeological assessment for the Port Colborne Site Servicing of the East Side Employment Lands (SSESEL). The study area consists of a triangular plot of land bordered by the Second Concession Road to the south and the Third Concession Road to the north, extending from the Welland Canal east to Highway 140. The study area is legally described as part of Lots 22, 23, 24 & 25, Concession 3, Geographical Township of Humberstone, now Municipality of Niagara, City of Port Colborne, Welland County, Ontario (Figure 1 and Figure 2).

This assessment was conducted to meet the requirements of Section 2 (1) of the *Environmental Assessment Act* (Ontario Government 1990a) and in accordance with subsection 11(1) was conducted during the planning stage of the project. This project is also subject to the *Ontario Heritage Act* (Ontario Government 1990b) and the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011)

The evaluation of archaeological potential has resulted in the determination that there is a high potential for both Aboriginal and Euro-Canadian archaeological resources to be present in the general region surrounding the Port Colborne SSESEL. Due to the construction of the Welland Canal, the majority of land to the west of Ramey Road has been extensively and intensively disturbed and consists of fill and spoil piles. However, deeply buried archaeological sites have been noted on properties adjacent to the study area (Golder 2012). Therefore, should any archaeological remains be encountered during construction, all work must stop immediately and a licensed archaeologist must be contacted. There are areas where archaeological integrity remains to the east of Ramey Road and the potential for archaeological resources here is high. Stage 2 archaeological assessment is recommended for any undisturbed areas prior to any ground disturbance activities as follows:

- A Stage 2 archaeological assessment will be conducted by a licenced archaeologist using the pedestrian survey method at 5 m intervals where ploughing is possible (e.g., agricultural fields). This assessment will occur when the agricultural fields have been recently ploughed, weathered, and exhibit at least 80% surface visibility

- A Stage 2 archaeological assessment will be conducted by a licenced archaeologist using the test pit survey method at 5 m intervals in all areas that will be impacted by the project and where ploughing is not possible (e.g., woodlots, overgrown areas, manicured lawns);

- Poorly drained areas, areas of steep slope and areas of previous disturbance (e.g., pipelines, railways, road ROWs, buildings) identified within all areas that will be impacted by the project are to be mapped and photo-documented, but are not recommended for Stage 2 survey as they possess low to no archaeological potential.

- The Stage 2 archaeological assessment will follow the requirements set out in the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011).

Should deeply buried sites be discovered, a Stage 2 assessment will be conducted according to the standards appropriate for survey in deeply buried conditions as per Section 2.1.7 in the Ministry of Tourism, Culture and Sport's *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011).

The Ministry of Tourism, Culture and Sport is asked to accept this report into the Ontario Public Register of Archaeological Reports and issue a letter of concurrence with the recommendations presented herein. As further archaeological assessments are required, archaeological concerns under land use planning and development processes have not fully been addressed.

Project Personnel

Project Director	Karl Grueneis, Senior Environmental Planner
Project Manager	Jennifer Whittard BES, PMP, Assistant Project Manager, Water
Technical Lead	Adria Grant, BA, CAHP (R131)
Licensed Archaeologist	Samantha Markham, MES (P438)
Report Composition	Samantha Markham, MES (P438), Jennifer Morgan, PhD
GIS Analyst	Adam Spargo, BSc
Office Assistance	Chantelle Mills

Acknowledgements

Proponent Contact	Jim Huppunen A.Sc.T., City of Port Colborne
Approval Authority	Barb Slattery, Ministry of the Environment and Climate Change
Ministry of Tourism, Culture and Sport	Robert von Bitter, Archaeological Data Coordinator

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1. Project Context

1.1 Development Context

AECOM Canada Ltd. (AECOM) was contracted by the City of Port Colborne to conduct a Stage 1 archaeological assessment for the Port Colborne Site Servicing of the East Side Employment Lands (SSESEL). The study area consists of a triangular plot of land bordered by the Second Concession Road to the south and the Third Concession Road to the north, extending from the Welland Canal east to Highway 140. The study area is legally described as part of Lots 22, 23, 24 & 25, Concession 3, Geographical Township of Humberstone, now Municipality of Niagara, City of Port Colborne, Welland County, Ontario (Figure 1 and Figure 2).

This assessment was conducted to meet the requirements of Section 2 (1) of the *Environmental Assessment Act* (Ontario Government 1990a) and in accordance with subsection 11(1) was conducted during the planning stage of the project. This project is also subject to the *Ontario Heritage Act* (Ontario Government 1990b) and the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011).

Permission to conduct the Stage 1 archaeological assessment was provided by Jim Huppunen on behalf of the City of Port Colborne. The Stage 1 archaeological assessment was conducted under PIF number P438-0009-2014, issued to Samantha Markham of AECOM.

1.1.1 Objectives

The Stage 1 archaeological assessment has been conducted to meet the requirements of the Ministry of Tourism, Culture and Sport's (MTCS') *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011). The objective of the Stage 1 background study is to document the archaeological and land use history and present conditions of the study area. This information will be used to support recommendations regarding cultural heritage value or interest as well as assessment and mitigation strategies. The Stage 1 research information will be drawn from:

- MTCS' Archaeological Sites Database (ASDB) for a listing of registered archaeological sites within a 1 kilometre (km) radius of the study area;
- Reports of previous archaeological assessment within 50 metres (m) of the study area;
- Recent and historical maps of the study areas;
- Archaeological management plans or other archaeological potential mapping when available;
- Commemorative plaques or monuments; and
- Visual inspection of the project area.

1.2 Historical Context

Years of archaeological research assessments in southern Ontario have resulted in a well-developed understanding of the historic use of land in the Niagara area from the earliest Aboriginal people to the most recent Euro-Canadian settlers and farmers. The following sections provide a detailed summary of the archaeological cultures that have settled in the vicinity of the study area over the past 11,000 years.

1.2.1 Pre-Contact Aboriginal Settlement

Welland County has been extensively utilized by pre-contact Aboriginal people who began occupying southwestern Ontario as the glaciers receded from the land, as early as 11,000 B.C. Table 1 provides a breakdown of the cultural and temporal history of past occupations in Welland County.

Table 1: Cultural Chronology for Welland County

Archaeological Period	Characteristics	Time Period	Comments
Early Paleo-Indian	Fluted Points	9000-8400 BC	Arctic tundra and spruce parkland, caribou hunters
Late Paleo-Indian	Holcombe, Hi-Lo and Lanceolate Points	8400-8000 BC	Slight reduction in territory size
Early Archaic	Notched and Bifurcate base Points	8000-6000 BC	Growing populations
Middle Archaic	Stemmed and Brewerton Points, Laurentian Development	6000-2500 BC	Increasing regionalization
Late Archaic	Narrow Point	2000-1800 BC	Environment similar to present
	Broad Point	1800-1500 BC	Large lithic tools
	Small Point	1500-1100 BC	Introduction of bow
Terminal Archaic	Hind Points, Glacial Kame Complex	1100-950 BC	Earliest true cemeteries
Early Woodland	Meadowood Points	950-400 BC	Introduction of pottery
Middle Woodland	Dentate/Pseudo-scallop Ceramics	400 BC – AD 500	Increased sedentism
Late Woodland	Princess Point	AD 550-900	Introduction of corn horticulture
	Early Ontario Iroquoian	AD 900-1300	Agricultural villages
	Middle Ontario Iroquoian	AD 1300-1400	Increased longhouse sizes
	Late Ontario Iroquoian	AD 1400-1650	Early written records and treaties
Contact Aboriginal	Various Algonkian and Iroquoian Groups	AD 1600-1875	Early written records and treaties

Note taken Ellis and Ferris, 1990

As Chapman and Putnam (1984) illustrate, the modern physiography of southern Ontario is largely a product of events of the last major glacial stage and the landscape is a complex mosaic of features and deposits produced during the last series of glacial retreats and advances prior to the withdrawal of the continental glaciers from the area. Southwestern Ontario was finally ice free by 12,500 years ago. With continuing ice retreat and lake regressions the land area of southern Ontario progressively increased while barriers to the influx of plants and animals steadily diminished (Karrow and Warner 1990).

The first human settlement can be traced back 11,000 years; these earliest well-documented groups are referred to as Paleo-Indians which literally means old or ancient Indians. Paleo-Indian people were non-agriculturalists who depended on hunting and gathering of wild food stuffs, they would have moved their encampments on a regular basis to be in the locations where these resources naturally became available and the size of the groups occupying any particular location would vary depending on the nature and size of the available food resources (Ellis and Deller 1990). The picture that has emerged for early and late Paleo-Indian people is of groups at low population densities who were residentially mobile and made use of large territories during annual cycles of resource exploitation (Ellis and Deller 1990).

The next major cultural period following the Paleo-Indian is termed the Archaic, which is broken temporally into the Early, Middle and Late. There is much debate on how the term Archaic is employed; general practice bases the designation off assemblage content as there are marked differences in artifact suites from the preceding Paleo-

Indian and subsequent Woodland periods. As Ellis et al (1990) note, from an artifact and site characteristic perspective the Archaic is simply used to refer to non-Paleo-Indian manifestations that pre-date the introduction of ceramics. Throughout the Archaic period the natural environment warmed and vegetation changed from closed conifer-dominated vegetation cover, to mixed coniferous and deciduous forest to the mixed coniferous and deciduous forest in the north and deciduous vegetation in the south we see in Ontario today (Ellis et al 1900). During the Archaic period there are indications of increasing populations and decreasing size of territories exploited during annual rounds; fewer moves of residential camps throughout the year and longer occupations at seasonal campsites; continuous use of certain locations on a seasonal basis over many years; increasing attention to ritual associated with the deceased; and, long range exchange and trade systems for the purpose of obtaining valued and geographically localized resources (Ellis et al 1990).

In the 17th century two major language families, Algonquian and Iroquoian were represented by the diverse people of North America. Iroquoian speaking people were found in southern Ontario and New York State, with related dialects spoken in the mid-Atlantic and interior North Carolina, while Algonquian speaking peoples were located along the mid-Atlantic coast into the Maritimes, throughout the Canadian Shield of Ontario and Quebec and much of the central Great Lakes region (Ellis et al 1990). Linguists and anthropologists have attempted to trace the origin and development of these two language groups and usually place their genesis during the Archaic (Ellis et al 1990).

The Early Woodland period is distinguished from the Late Archaic period primarily by the addition of ceramic technology, which provides a useful demarcation point for archaeologists but is expected to have made less difference in the lives of the Early Woodland peoples. The settlement and subsistence patterns of Early Woodland people shows much continuity with the earlier Archaic with seasonal camps occupied to exploit specific natural resources (Spence et al 1990). During the Middle Woodland well-defined territories containing several key environmental zones were exploited over the yearly subsistence cycle. Large sites with structures and substantial middens appear in the Middle Woodland associated with spring macro-band occupations focussed on utilizing fish resources and created by consistent returns to the same site (Spence et al 1990). Groups would come together into large macro-bands during the spring-summer at lakeshore or marshland areas to take advantage of spawning fish; in the fall inland sand plains and river valleys were occupied for deer and nut harvesting and groups split into small micro-bands for winter survival (Spence et al 1990). This is a departure from earlier Woodland times when macro-band aggregation is thought to have taken place in the winter (Ellis et al 1988; Granger 1978).

The period between the Middle and Late Woodland period was both technically and socially transitional for the ethnically diverse populations of southern Ontario and these developments laid the basis for the emergence of settled villages and agriculturally based lifestyles (Fox 1990). The Late Woodland period began with a shift in settlement and subsistence patterns involving an increasing reliance on corn horticulture. Corn may have been introduced into Southwestern Ontario from the American Midwest as early as 600 A.D. However, it did not become a dietary staple until at least three to four hundred years later. The first agricultural villages in southwestern Ontario date to the 10th century A.D. Unlike the riverine base camps of the Middle Woodland period, these sites are located in the uplands, on well-drained sandy soils. Categorized as "Early Ontario Iroquoian" (900-1300 A.D.), many archaeologists believe that it is possible to trace a direct line from the Iroquoian groups which inhabited Southwestern Ontario at the time of first European contact, to these early villagers.

Village sites dating between 900 and 1300 A.D., share many attributes with the historically reported Iroquoian sites, including the presence of longhouses and sometimes palisades. However, these early longhouses were actually not all that large, averaging only 12.4 m in length. It is also quite common to find the outlines of overlapping house structures, suggesting that these villages were occupied long enough to necessitate re-building. The Jesuits reported that the Huron moved their villages once every 10-15 years, when the nearby soils had been depleted by farming and conveniently collected firewood grew scarce. It seems likely that Early Ontario Iroquoians occupied

their villages for considerably longer, as they relied less heavily on corn than did later groups, and their villages were much smaller, placing less demand on nearby resources.

Judging by the presence of carbonized corn kernels and cob fragments recovered from sub-floor storage pits, agriculture was becoming a vital part of the Early Ontario Iroquoian economy. However, it had not reached the level of importance it would in the Middle and Late Ontario Iroquoian periods. There is ample evidence to suggest that more traditional resources continued to be exploited, and comprised a large part of the subsistence economy. Seasonally occupied special purpose sites relating to deer procurement, nut collection, and fishing activities, have all been identified. While beans are known to have been cultivated later in the Late Woodland period, they have yet to be identified on Early Ontario Iroquoian sites. The Middle Ontario Iroquoian period (1300-1400 A.D.) witnessed several interesting developments in terms of settlement patterns and artifact assemblages. Changes in ceramic styles have been carefully documented, allowing the placement of sites in the first or second half of this 100-year period. Moreover, villages, which averaged approximately 0.6 hectares in extent during the Early Ontario Iroquoian period, now consistently range between one and two hectares.

House lengths also change dramatically, more than doubling to an average of 30 m, while houses of up to 45 m have been documented. This radical increase in longhouse length has been variously interpreted. The simplest possibility is that increased house length is the result of a gradual, natural increase in population. However, this does not account for the sudden shift in longhouse lengths around 1300 A.D. Other possible explanations involve changes in economic and socio-political organization. One suggestion is that during the Middle Ontario Iroquoian period small villages were amalgamating to form larger communities for mutual defense. If this was the case, the more successful military leaders may have been able to absorb some of the smaller family groups into their households, thereby requiring longer structures. This hypothesis draws support from the fact that some sites had up to seven rows of palisades, indicating at least an occasional need for strong defensive measures. There are, however, other Middle Ontario Iroquoian villages which had no palisades present. Another researcher has suggested that the longest houses may be associated with families that were more successful in trade and other forms of economic activity. More research is required to evaluate these competing interpretations.

The lay-out of houses within villages also changes dramatically by 1300 A.D. During the Early Ontario Iroquoian period villages were haphazardly planned at best, with houses oriented in various directions. During the Middle Ontario Iroquoian period villages are organized into two or more discrete groups of tightly spaced, parallel aligned, longhouses. It has been suggested that this change in village organization may indicate the initial development of the clans which were a characteristic of the historically known Iroquoian peoples.

Initially at least, the Late Ontario Iroquoian period (1400-1650 A.D.) continues many of the trends which have been documented for the proceeding century. For instance, between 1400 and 1450 A.D. house lengths continue to grow, reaching an average length of 62 m. One longhouse excavated on a site southwest of Kitchener stretched an incredible 123 m. After 1450 A.D., house lengths begin to decrease, with houses dating between 1500-1580 A.D. averaging only 30 m in length. Why house lengths decrease after 1450 A.D. is poorly understood, although it is believed that the even shorter houses witnessed on historic period sites can be at least partially attributed to the population reductions associated with the introduction of European diseases such as smallpox.

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

Archaeologists are able to trace archaeologically known groups from this time period to the historically documented people identified when French fur traders first arrived (Wright 1994). The Ontario Iroquois from southern Ontario gave rise to the Huron, Petun, Neutral and Erie; the St. Lawrence Iroquois, a distinct population encountered by Jaques Cartier in 1535 that had disappeared by the time Samuel de Champlain returned to the same area in 1603; and from Northern Ontario the groups that gave rise to the Algonquian speaking Cree, Ojibwa and Algonquin people (Wright 1994).

1.2.2 Post-Contact Aboriginal Settlement

The post-contact Aboriginal occupation of southern Ontario was heavily influenced by the dispersal of Iroquoian speaking peoples, such as the Huron, Petun and Neutral by the New York State Confederacy of Iroquois, followed by the arrival of Algonkian speaking groups from northern Ontario. The Ojibwa of southern Ontario date from about 1701 and occupied the territory between Lakes Huron, Erie and Ontario (Schmalz 1991). This is also the period in which the Mississaugas are known to have moved into southern Ontario and the Great Lakes watersheds (Konrad 1981) while at the same time the members of the Three Fires Confederacy, the Chippewa, Ottawa and Potawatomi were immigrating from Ohio and Michigan (Feest and Feest 1978). As European settlers encroached on their territory the nature of Aboriginal population distribution, settlement size and material culture changed. Despite these changes it is possible to correlate historically recorded villages with archaeological manifestations and the similarity of those sites to more ancient sites reveals an antiquity to documented cultural expressions that confirms a long historical continuity to Iroquoian systems of ideology and thought (Ferris 2009). First Nations people of southern Ontario have left behind archaeological resources throughout the Great Lakes region that show continuity with past peoples even if this was not recorded in Euro-Canadian documentation.

The study area first enters historic documentation as part of Treaty Number 3 which was made with the Mississagua First Nation in 1784. Treaty Number 3:

> ...was made with the Mississa[ug]a Indians 7th December, 1792, though purchased as early as 1784. This purchase in 1784 was to procure for that part of the Six Nation Indians coming into Canada a permanent abode. The area included in this Treaty is, Lincoln County excepting Niagara Township; Saltfleet, Binbrook, Barton, Glanford and Ancaster Townships, in Wentworth County; Brantford, Onondaga, Tusc[a]r[o]ra, Oakland and Burford Townships in Brant County; East and West Oxford, North and South Norwich, and Dereham Townships in Oxford County; North Dorchester Township in Middlesex County; South Dorchester, Malahide and Bayham Township in Elgin County; all Norfolk and Haldimand Counties; Pelham, Wainfleet, Thorold, Cumberland and Humberstone Townships in Welland County ...
>
> Morris 1943:17-18

The treaty was signed by twelve people: six people representing the King, including, John Butter, R. Hamilton, Roberter Kerr, Peter Russell, John McGill and David William Smith; five Chiefs representing the Mississagues, Wabukanyne, Wabanip, Kautubus, Wabaninship and Mattatow; and J. Groves Simcoe (Morris 1943: 18). The purchase was to procure that tract of land for the Six Nations Indians coming into Canada (Morris 1943: 17). While it is difficult to know the exact boundaries of Treaty No. 3, Figure 3 provides an approximate outline with the location of the current study area limits illustrated.

1.2.3 Euro-Canadian Settlement

The study area falls within the Geographic Township of Humberstone, Welland County. Following the American Revolution, United Empire Loyalists began settling in the Township of Humberstone during the early 1780's. First settlers into the area included Christian Stoner, Abraham Neff, Christian Knisley and

William Steele (Welland Tribune Printing House 1887). It wasn't until the completion of the Welland Canal that the population of the area began to increase.

The village of Port Colborne, originally known as Gravelly Bay, suffered a slow population increase until the construction of the Welland Canal began, which included clearing the dense forest, thereby making the area more conducive to farmers. Settlement initially occurred near the southern terminus of the Welland Canal when it was extended to reach Lake Erie in 1833 (Welland Tribune Printing House 1887). The small settlement on Gravelly Bay was named a port-of-entry in 1834 and given its present name in honour of Upper Canada's then Lieutenant-Governor Sir John Colborne. The area was first surveyed and split into village lots by Hon. William Merritt in 1834. In the 1850's Port Colborne became the southern terminus of the Welland Railway that passed through the western portion of the township. The Grand Trunk Railway's Buffalo and Goderich Division was also constructed through this area. Port Colborne developed into a business community serving the trade of produce and marine goods along the Welland Canal. By 1870, the population of Port Colborne had grown to 1,030, prompting the citizens to incorporate the village. The discovery in the late 1880's of significant amounts of natural gas in the area led to the rapid industrialization of Port Colborne and the surrounding area as companies such as the Erie and Foster glass companies and the Ontario Silver Company situated here to utilize the new source of fuel. In 1918, Port Colborne was officially declared a town with a population of 2,837. The steady growth of both Port Colborne and the Village of Humberstone resulted in the amalgamation of the towns in 1952 (City of Port Colborne 2014).

Before the digging of the Welland Canal, shipping traffic between Lake Ontario and Lake Erie used a portage road between Chippawa, Ontario, and Queenston, Ontario, located on the Niagara River, above and below Niagara Falls, respectively. The Welland Canal project began in 1824 by William Hamilton Merritt, initially utilizing a combination of natural waterways and deep cuts through the western side of the township to reach the Welland River (Page 1876: 11). The First Canal was extended from Port Robinson south to Port Colborne in 1833. The canal was purchased by the government in 1841, and the Second Canal was constructed in 1842 after considerable deterioration of the wood and the need to increase the size of the canal to accommodate larger ships. With the development of the Welland Railway, the canal would need to be enlarged again in order to facilitate the transfer of loads from lake ships and rail cars, which was completed in 1881. The Third Canal was built using stone and was intended to straighten, and therefore shorten, the shipping time. This configuration remained in use until it was decommissioned in 1932 (Westwater 2010). The Fourth Welland Canal's Welland By-Pass was constructed between 1967 and 1973. This By-Pass was constructed between Port Robinson and Port Colborne to reduce the number of locks and bridges on the canal system, increase capacity and decrease travel time for shipping by going around downtown Welland (Westwater 2010).

The 1876 *Illustrated Historical Atlas of Welland County*, Township of Humberstone, lists several landowners within the study area including Peter Greedy as owner of the western third of Lot 22 and Herman (*illegible last name*) listed on the eastern quarter of Lot 23. W.A. Ball is listed as owner of the northern half of Lot 24 and John Lirdy on the southern half. Finally, the Ontario Peat Company is listed as owning the northeast corner of Lot 25. No other owners are listed for the remaining portions of the lots included within the study area. The historic mapping also demonstrates multiple structures outside of the study area boundaries to the south; however, no structures are noted within the study area. The Welland Railway is depicted as running directly through the study parallel to the Second Canal, while the Grand Trunk Railway runs through the village of Port Colborne, south of the study area. The Second and Third Concession Roads are depicted on the 1876 map as they exist today (Figure 4).

1.2.4 Reports with Relevant Background Information

The background research conducted as part of the Stage 1 archaeological assessment determined that lands within 50 m of the current study area have previously been subject to archaeological assessments by Amick Consultants

Ltd. (Amick), Archaeological Assessments Ltd., and Golder Associates Ltd (Golder). A list of the archaeological assessment reports relevant to the study area is provided in Table 2.

Table 2: Related Archaeological Assessment Reports

Year	Title	Author	PIF
2008	*Stage 1 Archaeological Background Research and Reconnaissance of the Proposed Port Colborne Wind Farm 1, Part of Lot 25, Concession 3 (Geo. Twp of Humberstone), City of Port Colborne, R.M of Niagara.*	Amick	N/A
2011a	*The Stage 1 Archaeological Assessment of the Proposed Jungbunzlauer Canada Transformer Substation and Transmission Line, City of Port Colborne, Regional Municipality of Niagara.*	Archaeological Assessments Ltd.	P013-582-2011
2011b	*The Stage 2 Archaeological Assessment of the Proposed Jungbunzlauer Canada Transformer Substation and Transmission Line, City of Port Colborne, Regional Municipality of Niagara.*	Archaeological Assessments Ltd.	P013-587-2011
2012	*Revised Stage 1 Archaeological Assessment of the Nyon Energy Park, Part of Lots 23, 24 and 25, Concession 4 and Part of Lots 16, 17 18 and 19, Concession 5, City of Port Colborne, R.M. of Niagara, Ontario.*	Golder	P218-188-2011

The majority of the reports listed above provide details on the archaeological assessments that have been conducted on study areas in the vicinity of the Port Colborne SSESEL study area. The Stage 1 archaeological assessment conducted by Golder (2012) included land on parts of Lots 23, 24, and 25, Concession 4, located adjacent to the current study area on the north side of Third Concession Road. Golder (2012) determined that the subject property had been partially impacted by 20th century disturbance and modification, specifically the construction of the Third Canal and Welland By-pass, and that much of the study area adjacent to the Canal no longer retained archaeological potential. Despite this disturbance, portions of the study area such as agricultural fields and bushlots remained intact and have retained moderate archaeological potential. Archaeological potential also remained where buildings were present on the 1876 *Illustrated Historical Atlas of the Counties of Lincoln and Welland.* It was determined that these foundations would likely be present at a depth of 15m below the surface, in which case the Stage 2 would be conducted according to the standards appropriate for survey in deeply buried conditions as per Section 2.1.7 of the *Standards and Guidelines for Consultant Archaeologists* (Golder 2012). Stage 2 archaeological assessment was recommended for the high potential areas, which included a section of land adjacent to the current Port Colborne SSESEL study area to the north (Golder 2012).

Amick (2008) also conducted a previous Stage 1 archaeological assessment for part of Lot 25, Concession 3, specifically, and Archaeological Assessments Ltd. (AAL 2011a,b) conducted Stage 1 and 2 assessments within a portion of the Port Colborne SSESEL study area. The Stage 1 report by AAL (2011a) indicated the majority of the lands associated with the proposed Transmission Line development had been "disturbed by the construction of the canal, the existing Jungbunzlauer Plant, the East Service Road and Ramey Road" (2011a: 8), therefore retaining no archaeological potential. They recommended further Stage 2 investigation in potentially undisturbed areas located immediately east of the East Service Road and west of Ramey Road. The area on the east side of the canal demonstrated areas of visible fill on the surface, and the upon test pitting, it was discovered that there was subsurface disturbance evident in the topsoil horizon (~15cm) that was heavily mottled with grey/red/brown clay subsoil (AAL 2011b: 2). This area had also been subjected to recent clearing activities by heavy machinery.

1.3 Archaeological Context

1.3.1 Natural Environment

The study area is located within the Halidmand Clay Plain physiographic region (Chapman and Putnam 1984: 156-159), and is described as:

> Lying between the Niagara Escarpment and Lake Erie, thus occupying all of the Niagara Penninsula except the fruit belt below the escarpment, the Haldimand clay plain has an area of about 1,350 square miles. Although it was all submerged in Lake Warren, the till is not all buried by stratified clay; it comes to the surface generally in low morainic ridges in the north. In fact, there is in that area a confused intermixture of stratified clay and till. The northern part has more relief than the southern part where the typically level lake plains occur.
>
> Chapman and Putnam, 1984: 255

The soils of Welland County are mainly heavy clay and the southern part of the Regional Municipality of Niagara is poorly drained and is characterized by marshes and substantial peat bogs (Chapman and Putnam 1984: 257). These extensive marshlands and bogs permitted commercial enterprise in peat cutting to be utilized by the Ontario Peat Company for fuel (Page 1876: 11). Soil types within the study area include Malton and Lincoln clays. These soil types are poorly drained and are composed of lacustrine clay over gritty clay, which can measure up to 1 m in depth. These soil types are friable, but poor drainage results in slight erosion under natural conditions. Additionally, it has been noted that the majority of the soil in the western half of the study area adjacent to the Welland Canal is listed as unclassified. This is a result of extensive 19th and 20th century disturbance and man-made deposits as a result of the construction and reconstruction of the Welland Canal (Chapman and Putnam, 1984). Figure 5 provides an illustration of the soil types and drainage within the Port Colborne SSESEL study area.

The Niagara Peninsula is dominated by the Niagara Escarpment, composed of the Lockport geological formation of Silurian age, and is similar to the Onondaga geological formation, which runs parallel to it. The Niagara Escarpment is most famous as the cliff over which the Niagara River plunges at Niagara Falls, for which it is named. The Welland Canal was constructed to facilitate shipping through the Great Lakes, providing access from Lake Erie north to Lake Ontario. The Niagara Escarpment was a difficult obstacle to overcome during design and building of the Welland Canal. The northern terminus of the Welland Canal at Port Weller is approximately 100 m lower than the southern terminus into Lake Erie at Port Colborne.

The closest source of potable water to the current study area is the Welland Canal, which runs adjacent to the study area to the west. Although the presence of the Canal may indicate high potential for Euro-Canadian resources, the Canal was artificially constructed to facilitate shipping through the Great Lakes beginning in 1824. Therefore, this water source does not directly contribute to pre-contact Aboriginal archaeological potential. Other sources of naturally occurring potable water include Indian Creek, which runs along the northern border of the study area, and Lake Erie, which is located approximately 4 km south of the study area.

1.3.2 Known Archaeological Sites and Surveys

A request was made to the MTCS Archaeological Sites Database co-ordinator, Robert von Bitter, on August 8, 2014 to consult the Archaeological Sites Database (ASDB) and determine if any registered archaeological sites were located within 1 km of the current study area boundaries. A response was received on August 26, 2014, indicating that there are 6 archaeological sites registered within 1 km of the Port Colborne SSESEL study area. A detailed list of these sites is provided in Table 3.

Table 3: Registered Archaeological Sites within 1 km of the Study Area

Borden #	Site Name	Cultural Affiliation	Site Type/Feature	Researcher
AfGt-196	Chippawa 1	Undetermined	N/A	N/A

AfGt-197	Chippawa 2	Undetermined	N/A	N/A
AfGt-26	Kikkert-Murray	Pre-Contact	Findspot	Pengelly 1984-1986
AfGt-38	Kikkert 1	Undermined	N/A	Pengelly 1984
AfGt-39	Kikkert 2	Pre-Contact	Scatter	Pengelly 1984
AfGt-40	Kikkert 3	Early Woodland	Campsite	Pengelly 1984

Information concerning specific site locations is protected by provincial policy, and is not fully subject to the Freedom of Information Act. The release of such information in the past has led to looting or various forms of illegally conducted site destruction. Confidentiality extends to all media capable of conveying location, including maps, drawings, or textual descriptions of a site location. The MTCS will provide information concerning site location to the party or an agent of the party holding title to a property, or to a licensed archaeologist with relevant cultural resource management interests.

1.3.3 Current Conditions

For the Port Colborne SSESEL Stage 1 archaeological assessment, an optional property inspection was not undertaken by the archaeological team. A visit to the property is considered optional in accordance with Section 1.2 of the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011) and was not a cost effective option for the current study. Extensive background research and on-line mapping tools were used to evaluate the history, geography, topography, and current conditions of the study area to assess and map archaeological potential.

It is important to note that the construction of the Third Canal, and the Welland By-Pass would have impacted the archaeological integrity of a majority of the study area. In an assessment conducted by Golder (2012) within Concession 4 and 5 just north of the current study area, it was indicated that extensive spoil piles from the canal and tunnel excavation exist along the edges of the Welland Canal. These massive fill events have removed any previous evidence of cultural value or interest (Golder 2012: 8). While these spoil piles are likely also present in Concession 3, the Port Colborne SSESEL study area also consists of agricultural lands, residential lands, recreational pathways, railway lines, and woodlots. These fill events were also noted by Archaeological Assessments Ltd. during an archaeological investigation for the development of a transmission line through the current study area (2011a, b). Figure 5 provides an illustration of the disturbed land, marked as "unclassified", from the Ministry of Natural Resources database on soil types. It indicates that all of the land west of Ramey Road within the study area consists of man-made deposits.

2. Analysis and Conclusions

2.1 Determination of Archaeological Potential

Archaeological potential is established by determining the likelihood that archaeological resources may be present on a subject property. Criteria commonly used by the Ontario MTCS (Ontario Government 2011) to determine areas of archaeological potential include:

- Proximity to previously identified archaeological sites;
- Distance to various types of water sources;
- Soil texture and drainage;
- Glacial geomorphology, elevated topography and the general topographic variability of the area;
- Resource areas including food or medicinal plants, scarce raw materials and early Euro-Canadian industry;
- Areas of early Euro-Canadian settlement and early transportation routes;
- Properties listed on municipal register of properties designated under the *Ontario Heritage Act* (Government of Ontario 1990b);
- Properties that local histories or informants have identified with possible archaeological sites, historical events, activities or occupants; and
- Historic landmarks or sites.

Distance to modern or ancient water sources is generally accepted as the most important element for past human settlement patterns and when considered alone may result in a determination of archaeological potential. In addition any combination of two or more of the criteria listed above, such as well drained soils or topographic variability, may indicate archaeological potential.

Certain features indicate that archaeological potential has been removed, such as land that has been subject to extensive and intensive deep land alterations that have severely damaged the integrity of any archaeological resources. This includes landscaping that involves grading below the topsoil level, building footprints, quarrying and sewage, and infrastructure development (Ontario Government 2011).

2.1.1 Conclusions

The evaluation of archaeological potential for the study area has resulted in the determination that there is moderate to high potential for the recovery of pre-contact and contact period Aboriginal archaeological resources based on the proximity to known archaeological sites and potable water sources, such as the Indian Creek and Lake Erie. In addition, the historical documentary evidence from the first European settlers and surveyors to the area indicates the long history of occupation here by First Nations people. The potential for Euro-Canadian archaeological resources is judged to be high based off of the early settlement of the area by Euro-Canadian settlers and proximity to the historic town of Port Colborne, historic roadways, the Welland Canal, and historic railways.

While it has been determined that the general region has high potential for the recovery of archaeological resources, the construction of the Third Canal and the Welland By-Pass has removed archaeological potential within a large section along the western portion of the study area. This disturbance was documented by Golder (2012) in a previous assessment north of the current study area. The disturbance was also noted by Archaeological Assessments Ltd in a Stage 2 assessment conducted within the current study area for a transmission line (2011b). The construction of the Trillium Railway that runs north-south within the study area boundary may have also

impacted the cultural heritage value of surrounding lands. However, areas of agricultural and residential land east of Ramey Road remain intact and, therefore, retain archaeological potential. The wooded area immediately to the west of Ramey Road appears to also retain archaeological potential. Any undisturbed areas to the east or west of Ramey Road will require further Stage 2 archaeological assessment prior to any ground disturbance activities. Figure 6 provides an illustration of the areas retaining archaeological potential.

Though the construction of the Welland By-Pass likely removed the archaeological potential, the possibility exists that deeply buried archaeological materials may be present (Golder 2012). Boring activities observed by Golder (2012) indicate the presence of a buried topsoil layer 5-10m beneath the current fill surface. That information, in addition to the presence of historic structures on the property, led Golder (2012) to recommend a Stage 2 strategy to address deeply buried remains, see Section 2.1.7 in the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government, 2011). Though the possibility for deeply buried archaeological materials remains for the current SSESEL study area, the lack of historic structures on the 1876 map makes the possibility of historic sites increasingly unlikely.

3. Recommendations

The evaluation of archaeological potential has resulted in the determination that there is moderate to high potential for the recovery of both Aboriginal and Euro-Canadian archaeological within part of the Port Colborne SSESEL study area. Due to the construction of the Welland Canal, land to the west of Ramey Road has been extensively and severely disturbed and consists of man-made deposits and spoil piles. However, deeply buried archaeological sites have been noted on properties adjacent to the study area (Golder 2012). Therefore, should any archaeological remains be encountered during construction, all work must stop immediately and a licensed archaeologist must be contacted. There are areas to the east of Ramey Road where archaeological integrity remains intact and the potential for the recovery of archaeological resources in these areas is high (Figure 6). Stage 2 archaeological assessment is recommended for the lands to the east of Ramey Road prior to any ground disturbance activities. The Stage 2 archaeological assessment will be conducted by a licensed archaeologist and must follow the requirements set out in the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011), including:

- Pedestrian survey investigation at 5 m intervals where ploughing is possible (e.g., agricultural fields). This assessment will occur when agricultural fields have been recently ploughed, weathered, and exhibit at least 80% surface visibility;

- Test pit survey methods at 5 m intervals in all areas that will be impacted by the project and where ploughing is not possible (e.g., woodlots, overgrown areas, manicured lawns);

- Poorly drained areas, areas of steep slope and areas of previous disturbance (e.g., pipelines, railways, road ROWs, buildings) identified within all areas that will be impacted by the project are to be mapped and photo-documented, but are not recommended for Stage 2 survey as they possess low to no archaeological potential.

Should deeply buried sites be discovered, a Stage 2 assessment will be conducted according to the standards appropriate for survey in deeply buried conditions as per Section 2.1.7 in the Ministry of Tourism, Culture and Sport's *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011).

The Ministry of Tourism, Culture and Sport is asked to accept this report into the Ontario Public Register of Archaeological Reports and issue a letter of concurrence with the recommendations presented herein. As further archaeological assessments are required, archaeological concerns under land use planning and development processes have not fully been addressed.

4. Advice on Compliance with Legislation

This report is submitted to the Ontario Minister of Tourism, Culture and Sport as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 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 fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism, Culture and Sport, 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 fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of 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 Section 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) require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ontario Ministry of Consumer Services.

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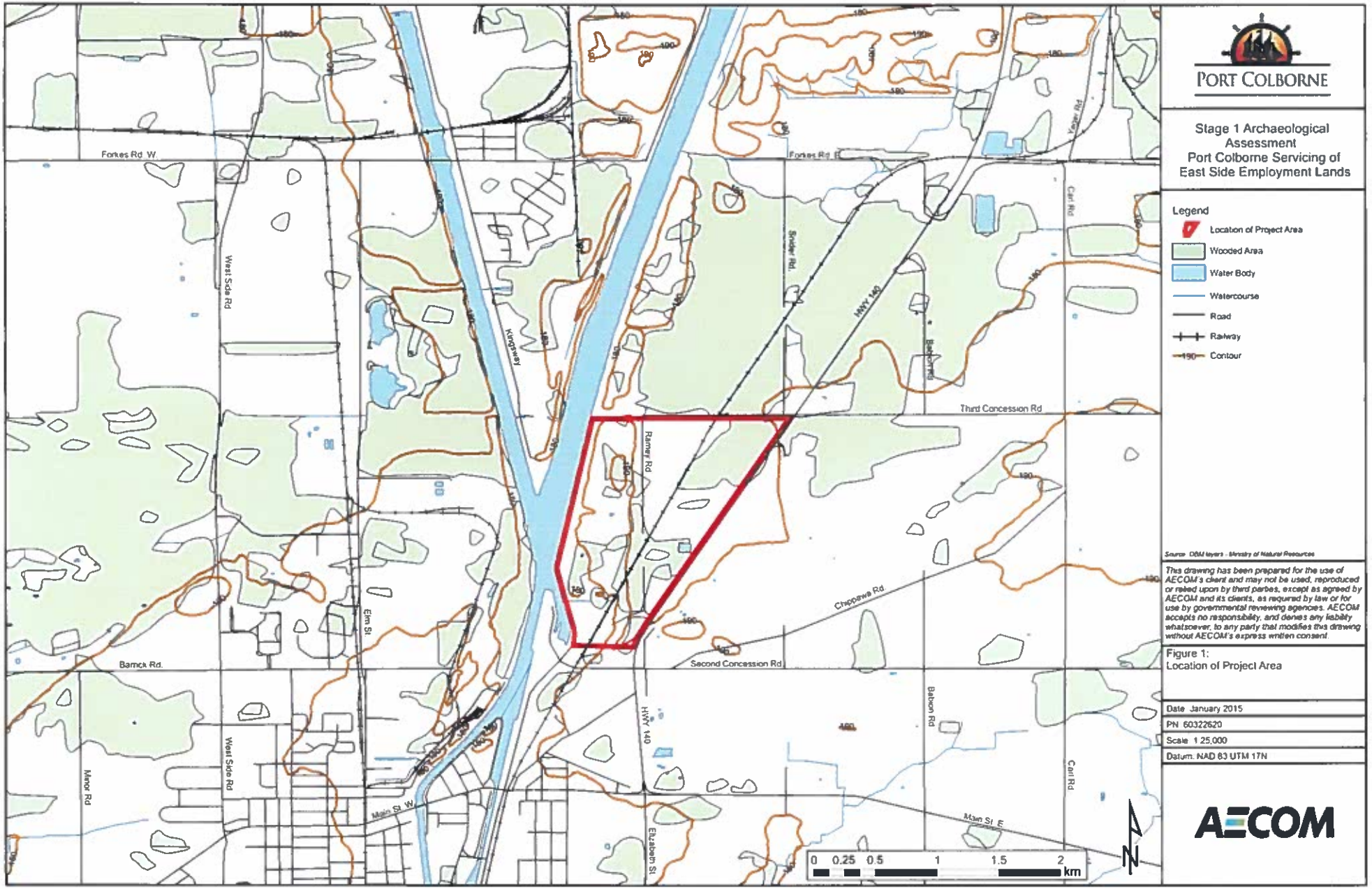
6. Figures

All figures pertaining to the Stage 1 archaeological assessment of the proposed Port Colborne SSESEL within part of Lots 22, 23, 24 and 25, Concession 3, Geographical Township of Humberstone, now Municipality of Niagara, City of Port Colborne, Welland County, Ontario are provided on the following pages.



PORT COLBORNE

Stage 1 Archaeological Assessment Port Colborne Servicing of East Side Employment Lands

Legend

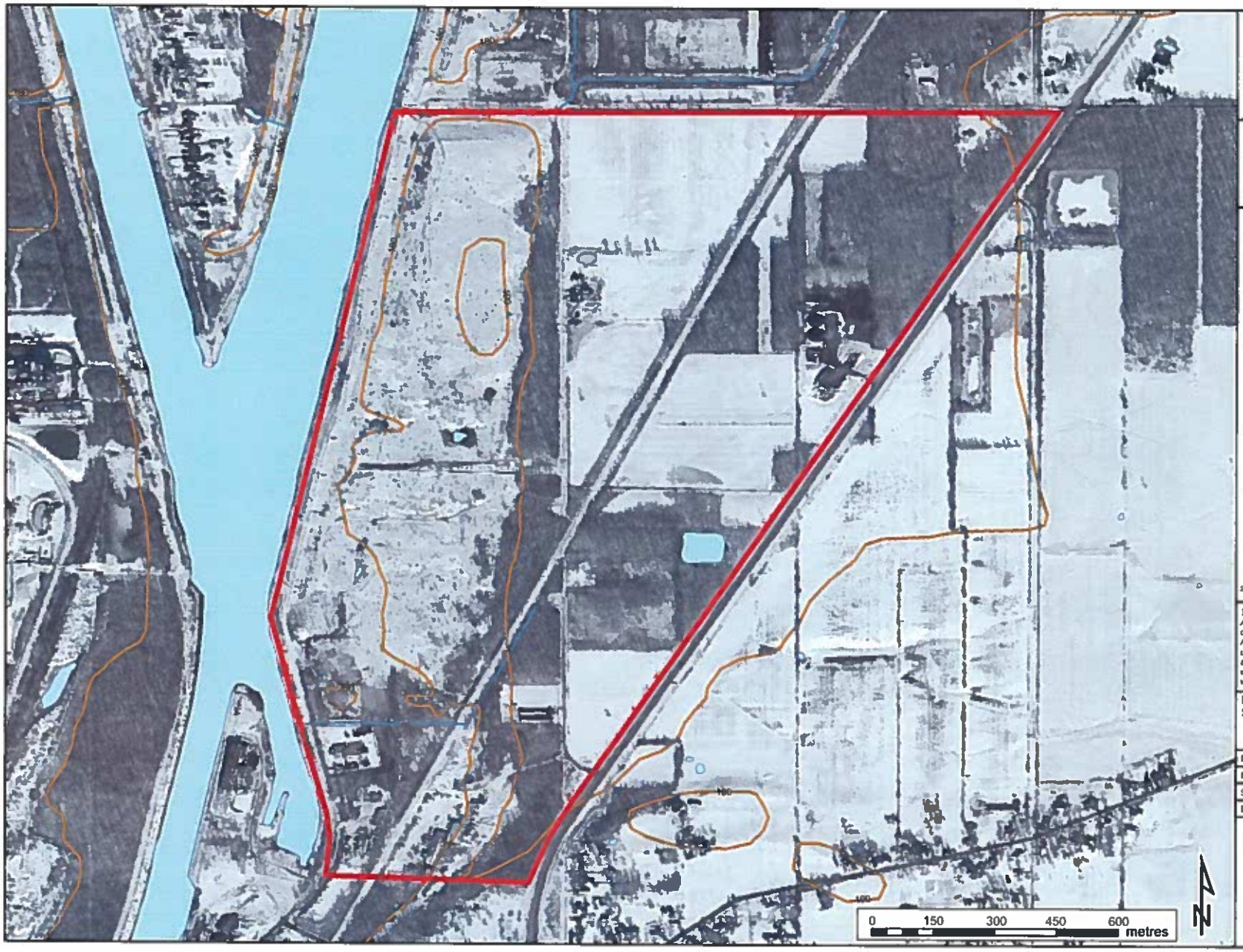
- Location of Project Area
- Wooded Area
- Water Body
- Watercourse
- Road
- Railway
- 190 Contour

Source: OBM layers - Ministry of Natural Resources

Figure 1:
Location of Project Area

Date January 2015
PN 60322620
Scale 1:25,000
Datum: NAD 83 UTM 17N

AECOM



PORT COLBORNE

Stage 1 Archaeological Assessment Port Colborne Servicing of East Side Employment Lands

Legend

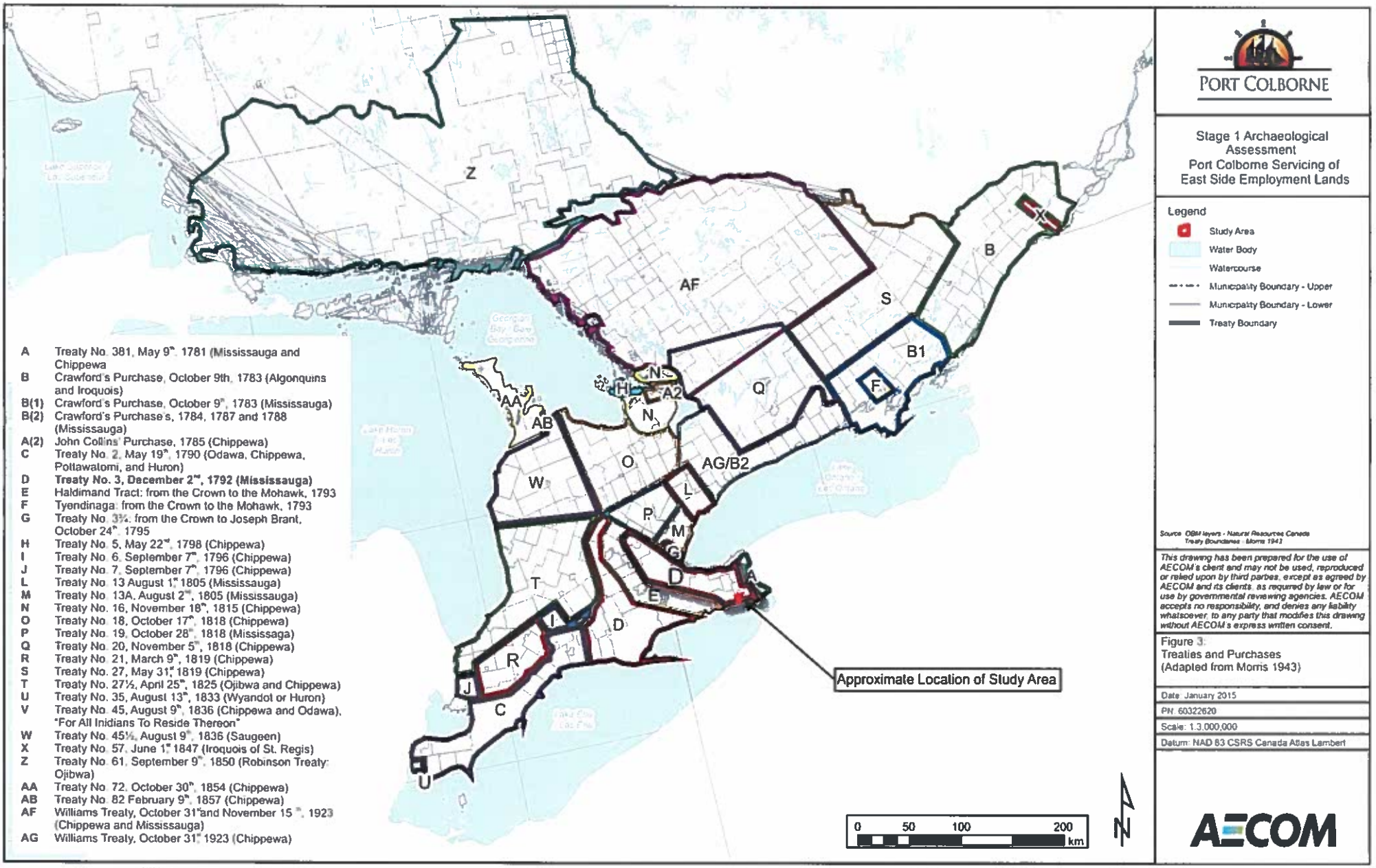
- Location of Project Area
- Water Body
- Watercourse
- 100 Contour

Source: OBM layers - Ministry of Natural Resources
Aerial Photo - Digital Globe

Figure 2:
Study Area in Detail

Date: January 2015
PN: 60322620
Scale: 1:8,000
Datum: NAD 83 UTM 17N

AECOM



PORT COLBORNE

Stage 1 Archaeological Assessment
Port Colborne Servicing of East Side Employment Lands

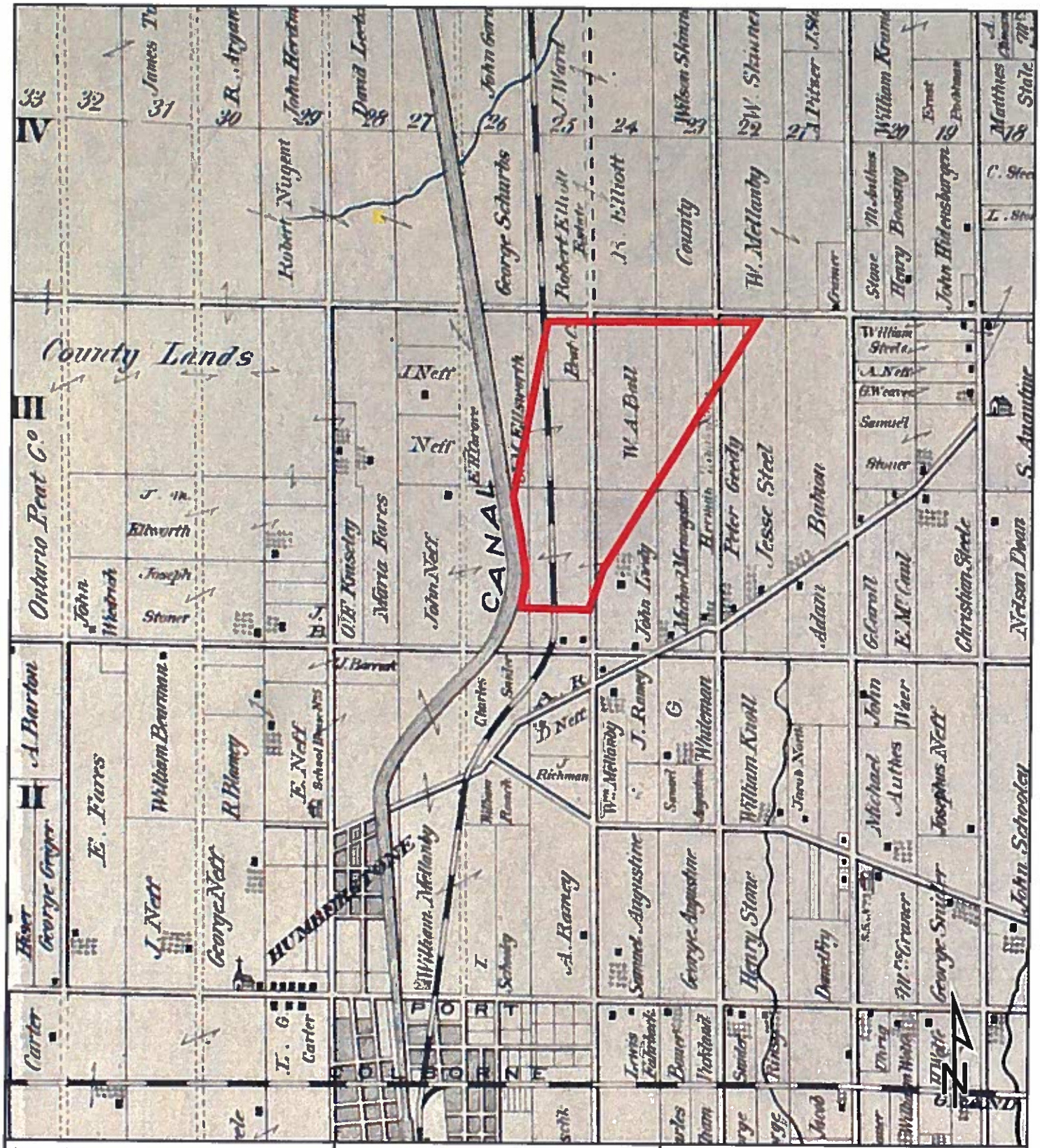
Legend
- Study Area
- Water Body
- Watercourse
- Municipality Boundary - Upper
- Municipality Boundary - Lower
- Treaty Boundary

Source: OBM layers - Natural Resources Canada
Treaty Boundaries - Morris 1943

Figure 3:
Treaties and Purchases
(Adapted from Morris 1943)

Date: January 2015
PN: 60322620
Scale: 1:3,000,000
Datum: NAD 83 CSRS Canada Atlas Lambert

AECOM



Legend

Study Area

AECOM

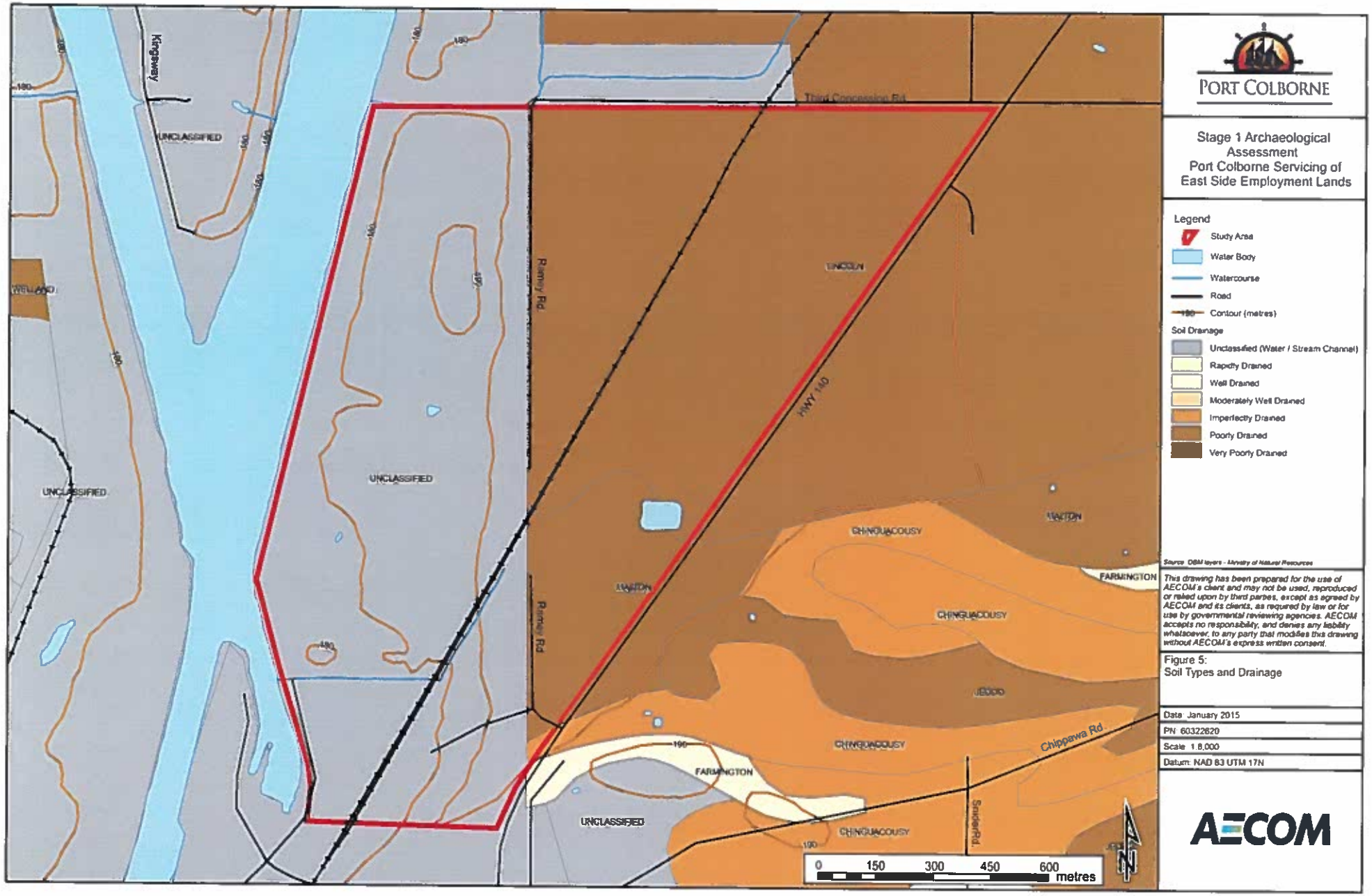
PORT COLBORNE

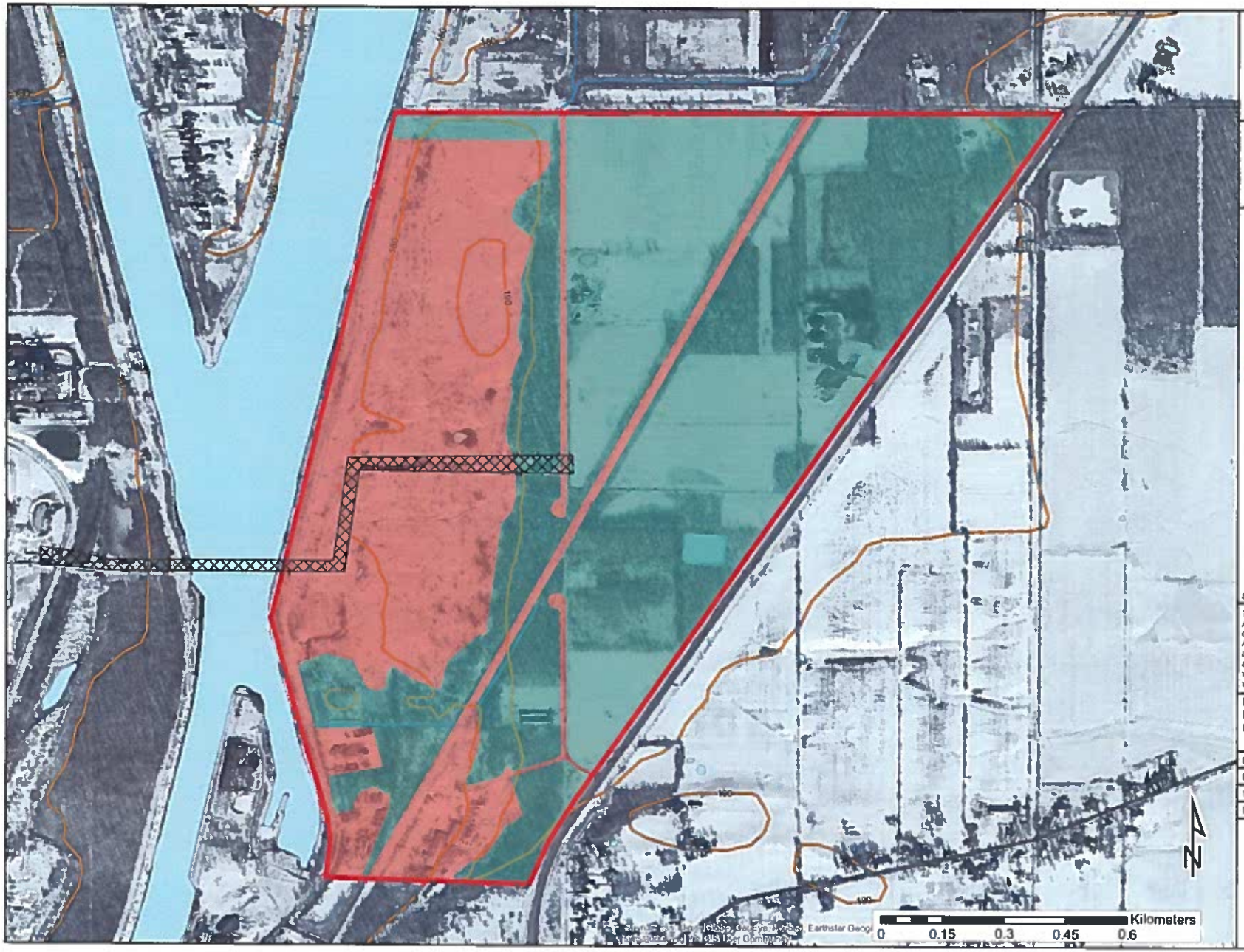
Stage 1 Archaeological Assessment
Port Colborne Servicing of East Side Employment Lands

Figure 4:
Portion of the 1876 Map of the Township of Humberstone

Source: Historic Map - H.R. Page & Co. 1876

Date: January 2015	PN: 60322620
Scale: NTS	Datum: NA


Kingsway
UNCLASSIFIED
Third Concession Rd
Ramsey Rd
LINCOLN
HWY 140
UNCLASSIFIED
UNCLASSIFIED
CHINGUACOUSY
HALTON
FARMINGTON
CHINGUACOUSY
CHINGUACOUSY
Chippawa Rd
FARMINGTON
UNCLASSIFIED
CHINGUACOUSY
Snider Rd
0 150 300 450 600
metres
PORT COLBORNE
Stage 1 Archaeological Assessment
Port Colborne Servicing of East Side Employment Lands
Legend
Study Area
Water Body
Watercourse
Road
Contour (metres)
Soil Drainage
Unclassified (Water / Stream Channel)
Rapidly Drained
Well Drained
Moderately Well Drained
Imperfectly Drained
Poorly Drained
Very Poorly Drained
Source: OBM layers - Ministry of Natural Resources
This drawing has been prepared for the use of AECOM's client and may not be used, reproduced or relied upon by third parties, except as agreed by AECOM and its clients, as required by law or for use by governmental reviewing agencies. AECOM accepts no responsibility, and denies any liability whatsoever, to any party that modifies this drawing without AECOM's express written consent.
Figure 5:
Soil Types and Drainage
Date: January 2015
PN: 60322620
Scale: 1:8,000
Datum: NAD 83 UTM 17N
AECOM



PORT COLBORNE

Stage 1 Archaeological Assessment Port Colborne Servicing of East Side Employment Lands

Legend

- Location of Project Area
- Water Body
- Watercourse
- 150 Contour (metres)
- High Archaeological Potential
- No Archaeological Potential Visibly Disturbed
- Previously Assessed Archaeological Assessments Ltd. 2011

Source: OBM layers - Ministry of Natural Resources

Figure 6.
Methods and Results of Stage 1 Investigation

Date: January 2015

PN: 60322620

Scale: 1:8,000

Datum: NAD 83 UTM 17N

AECOM

Stage 1-2 Archaeological Assessment Report

Environment AECOM

City of Port Colborne

Stage 1-2 Archaeological Assessment

Port Colborne Site Servicing of East Side Employment Lands (SSESEL)

Part of Lots 24, 25 and 26, Concessions 3 and 4, Geographical Township of Humberstone, City of Port Colborne, Municipality of Niagara, Welland County, Ontario

Licensee: Samantha Markham
License: P438
PIF Number: P438-0059-2015

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Project Number: 60322620

December, 2015
Original Report

Distribution List

Hard Copy #	PDF	Association / Company Name
0	yes	Regional Municipality of Niagara
0	yes	Ontario Ministry of Tourism, Culture and Sport
1	yes	AECOM

Revision Log

Revision #	Revised By	Date	Issue / Revision Description

AECOM Signatures

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Jennifer Morgan, Ph.D.
Archaeology Researcher and Lab Manager

Report Reviewed By:

DRAFT

Adria Grant, BA, CAHP
Senior Archaeologist

Executive Summary

AECOM Canada Ltd. (AECOM) was contracted by the City of Port Colborne to conduct a Stage 1-2 archaeological assessment for the Port Colborne Site Servicing of the East Side Employment Lands (SSESEL). The study area includes lands that extend from Second Concession Road in the south to lands immediately north of Third Concession Road. The specific study area consists of a corridor that includes the Trillium Railway right-of-way (ROW) from Second Concession Road to Ramey Road, the municipal ROW along Ramey Road as well as an additional 5 metres (m) extending from the ROW into private properties, and a parcel of land north of the intersection of Ramey Road and Third Concession Road measuring approximately 0.72 ha. The study area is legally described as parts of Lots 24-26, Concessions 3 and 4, Geographical Township of Humberstone, now Municipality of Niagara, City of Port Colborne, Welland County, Ontario (Figures 1 and 2).

This assessment was conducted to meet the requirements of Section 2 (1) of the *Environmental Assessment Act* (Ontario Government 1990a) and in accordance with subsection 11(1) was conducted during the planning stage of the project. This project is also subject to the *Ontario Heritage Act* (Ontario Government 1990b) and the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011).

The Stage 1 background research determined that there is high potential for the recovery of archaeological resources; however, the Stage 2 field investigation of the lands for the Port Colborne SSESEL did not identify any archaeological resources. As such, there are no concerns regarding the impact to archaeological sites by the Port Colborne SSESEL located on parts of Lots 24-26, Concessions 3 and 4 in the Geographic Township of Humberstone, now the City of Port Colborne, Municipality of Niagara, Welland County, Ontario.

The Stage 1-2 investigation of the lands for the Port Colborne SSESEL on parts of Lots 24-26, Concessions 3 and 4 in the Geographic Township of Humberstone, now the City of Port Colborne, Municipality of Niagara, Welland County, Ontario did not result in the identification of any archaeological resources or sites. Based on these findings, **no further archaeological assessment is recommended.**

The Ministry of Tourism, Culture and Sport is asked to accept this report into the Ontario Public Register of Archaeological Reports thereby concurring with the recommendations provided herein.

Project Personnel

Project Director	Karl Grueneis, Senior Environmental Planner
Project Manager	Ian Izzard, P.Eng., M.A.Sc., PMP
Technical Lead	Adria Grant, BA, CAHP (R131)
Licensed Archaeologist	Samantha Markham, MES (P438)
Field Director	Joseph Cull (R1061)
Field Technicians	Jordan Downey, PhD (R308), Aja Moulton, MA (R1067), Flannery Surette, PhD.
Report Production	Samantha Markham, MES (P438), Jennifer Morgan, PhD
GIS Analyst	Ben Clark, BAA
Office Assistance	Jenny Deline

Acknowledgements

Proponent Contact	Jim Huppunen A.Sc.T., City of Port Colborne
Approval Authority	Barbara Slattery, Ministry of the Environment and Climate Change
Ministry of Tourism, Culture and Sport	Robert von Bitter, Archaeological Data Coordinator

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1. Project Context

1.1 Development Context

AECOM Canada Ltd. (AECOM) was contracted by the City of Port Colborne to conduct a Stage 1-2 archaeological assessment for the Port Colborne Site Servicing of the East Side Employment Lands (SSESEL). The study area includes lands that extend from Second Concession Road in the south to lands immediately north of Third Concession Road. The specific study area consists of a corridor that includes the Trillium Railway right-of-way (ROW) from Second Concession Road to Ramey Road, the municipal ROW along Ramey Road as well as an additional 5 metres (m) extending from the ROW into private properties, and a parcel of land north of the intersection of Ramey Road and Third Concession Road measuring approximately 0.72 ha. The study area is legally described as parts of Lots 24-26, Concessions 3 and 4, Geographical Township of Humberstone, now Municipality of Niagara, City of Port Colborne, Welland County, Ontario (Figures 1 and 2).

This assessment was conducted to meet the requirements of Section 2 (1) of the *Environmental Assessment Act* (Ontario Government 1990a) and in accordance with subsection 11(1) was conducted during the planning stage of the project. This project is also subject to the *Ontario Heritage Act* (Ontario Government 1990b) and the *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011).

Permission to access the study area to conduct all required archaeological fieldwork activities was provided by Mr. Jim Huppunen on behalf of the City of Port Colborne. The Stage 1-2 archaeological assessment was conducted under PIF number P438-0059-2015, issued to Samantha Markham of AECOM.

1.1.1 Objectives

The Stage 1-2 archaeological assessment has been conducted to meet the requirements of the MTCS's *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011). The objective of the Stage 1 background study is to document the archaeological and land use history and present conditions within the study areas. This information will be used to support recommendations regarding cultural heritage value or interest as well as assessment and mitigation strategies. The Stage 1 research information is drawn from:

- MTCS's Archaeological Sites Database (ASDB) for a listing of registered archaeological sites within a 1 kilometre (km) radius of the study area;
- Reports of previous archaeological assessment within 50 m of the study area;
- Visual inspection of the subject area lands;
- Recent and historical maps of the study areas; and
- Archaeological management plans or other archaeological potential mapping, where available.

The objective of the Stage 2 property assessment is to provide an overview of archaeological resources on the property and make a determination of whether any of the resources might be artifacts or archaeological sites with cultural heritage value or interest requiring further assessment and to recommend appropriate Stage 3 assessment strategies for any archaeological sites identified.

1.2 Historical Context

Years of archaeological research assessments in southern Ontario have resulted in a well-developed understanding of the historic use of land in the Niagara area from the earliest First Nation people to the most recent Euro-Canadian

settlers and farmers. The following sections provide a detailed summary of the archaeological cultures that have settled in the vicinity of the study area over the past 11,000 years.

1.2.1 Pre-Contact First Nation Settlement

Welland County has been extensively utilized by pre-contact First Nation people who began occupying southwestern Ontario as the glaciers receded from the land, as early as 11,000 B.C. Table 1 provides a breakdown of the cultural and temporal history of past occupations in Welland County.

Table 1: Cultural Chronology for Welland County

Archaeological Period	Characteristics	Time Period	Comments
Early Paleo-Period	Fluted Points	9000-8400 BC	Arctic tundra and spruce parkland, caribou hunters
Late Paleo-Period	Holcombe, Hi-Lo and Lanceolate Points	8400-8000 BC	Slight reduction in territory size
Early Archaic	Notched and Bifurcate base Points	8000-6000 BC	Growing populations
Middle Archaic	Stemmed and Brewerton Points, Laurentian Development	6000-2500 BC	Increasing regionalization
Late Archaic	Narrow Point	2000-1800 BC	Environment similar to present
	Broad Point	1800-1500 BC	Large lithic tools
	Small Point	1500-1100 BC	Introduction of bow
Terminal Archaic	Hind Points, Glacial Kame Complex	1100-950 BC	Earliest true cemeteries
Early Woodland	Meadowood Points	950-400 BC	Introduction of pottery
Middle Woodland	Dentate/Pseudo-scallop Ceramics	400 BC – AD 500	Increased sedentism
Late Woodland	Princess Point	AD 550-900	Introduction of corn horticulture
	Early Ontario Iroquoian	AD 900-1300	Agricultural villages
	Middle Ontario Iroquoian	AD 1300-1400	Increased longhouse sizes
	Late Ontario Iroquoian	AD 1400-1650	Early written records and treaties
Contact First Nation	Various Algonkian and Iroquoian Groups	AD 1600-1875	Early written records and treaties

Note: taken Ellis and Ferris, 1990

As Chapman and Putnam (1984) illustrate, the modern physiography of southern Ontario is largely a product of events of the last major glacial stage and the landscape is a complex mosaic of features and deposits produced during the last series of glacial retreats and advances prior to the withdrawal of the continental glaciers from the area. Southwestern Ontario was finally ice free by 12,500 years ago. With continuing ice retreat and lake regressions the land area of southern Ontario progressively increased while barriers to the influx of plants and animals steadily diminished (Karrow and Warner 1990).

The first human settlement can be traced back 11,000 years; these earliest well-documented groups are referred to as Paleo which literally means old or ancient. Paleo people were non-agriculturalists who depended on hunting and gathering of wild food stuffs, they would have moved their encampments on a regular basis to be in the locations where these resources naturally became available and the size of the groups occupying any particular location would vary depending on the nature and size of the available food resources (Ellis and Deller 1990). The picture that has emerged for early and late Paleo is of groups at low population densities who were residentially mobile and made use of large territories during annual cycles of resource exploitation (Ellis and Deller 1990).

The next major cultural period following the Paleo is termed the Archaic, which is broken temporally into the Early, Middle and Late. There is much debate on how the term Archaic is employed; general practice bases the designation off assemblage content as there are marked differences in artifact suites from the preceding Paleo and subsequent Woodland periods. As Ellis et al (1990) note, from an artifact and site characteristic perspective the Archaic is simply used to refer to non-Paleo manifestations that pre-date the introduction of ceramics. Throughout the Archaic period the natural environment warmed and vegetation changed from closed conifer-dominated vegetation cover, to mixed coniferous and deciduous forest to the mixed coniferous and deciduous forest in the north and deciduous vegetation in the south we see in Ontario today (Ellis et al 1900). During the Archaic period there are indications of increasing populations and decreasing size of territories exploited during annual rounds; fewer moves of residential camps throughout the year and longer occupations at seasonal campsites; continuous use of certain locations on a seasonal basis over many years; increasing attention to ritual associated with the deceased; and, long range exchange and trade systems for the purpose of obtaining valued and geographically localized resources (Ellis et al 1990).

In the 17th century two major language families, Algonquian and Iroquoian were represented by the diverse people of North America. Iroquoian speaking people were found in southern Ontario and New York State, with related dialects spoken in the mid-Atlantic and interior North Carolina, while Algonquian speaking peoples were located along the mid-Atlantic coast into the Maritimes, throughout the Canadian Shield of Ontario and Quebec and much of the central Great Lakes region (Ellis et al 1990). Linguists and anthropologists have attempted to trace the origin and development of these two language groups and usually place their genesis during the Archaic (Ellis et al 1990).

The Early Woodland period is distinguished from the Late Archaic period primarily by the addition of ceramic technology, which provides a useful demarcation point for archaeologists but is expected to have made less difference in the lives of the Early Woodland peoples. The settlement and subsistence patterns of Early Woodland people shows much continuity with the earlier Archaic with seasonal camps occupied to exploit specific natural resources (Spence et al 1990). During the Middle Woodland well-defined territories containing several key environmental zones were exploited over the yearly subsistence cycle. Large sites with structures and substantial middens appear in the Middle Woodland associated with spring macro-band occupations focussed on utilizing fish resources and created by consistent returns to the same site (Spence et al 1990). Groups would come together into large macro-bands during the spring-summer at lakeshore or marshland areas to take advantage of spawning fish; in the fall inland sand plains and river valleys were occupied for deer and nut harvesting and groups split into small micro-bands for winter survival (Spence et al 1990). This is a departure from earlier Woodland times when macro-band aggregation is thought to have taken place in the winter (Ellis et al 1988; Granger 1978).

The period between the Middle and Late Woodland period was both technically and socially transitional for the ethnically diverse populations of southern Ontario and these developments laid the basis for the emergence of settled villages and agriculturally based lifestyles (Fox 1990). The Late Woodland period began with a shift in settlement and subsistence patterns involving an increasing reliance on corn horticulture. Corn may have been introduced into Southwestern Ontario from the American Midwest as early as 600 A.D. However, it did not become a dietary staple until at least three to four hundred years later. The first agricultural villages in southwestern Ontario date to the 10th century A.D. Unlike the riverine base camps of the Middle Woodland period, these sites are located in the uplands, on well-drained sandy soils. Categorized as "Early Ontario Iroquoian" (900-1300 A.D.), many archaeologists believe that it is possible to trace a direct line from the Iroquoian groups which inhabited Southwestern Ontario at the time of first European contact, to these early villagers.

Village sites dating between 900 and 1300 A.D., share many attributes with the historically reported Iroquoian sites, including the presence of longhouses and sometimes palisades. However, these early longhouses were actually not all that large, averaging only 12.4 m in length. It is also quite common to find the outlines of overlapping house structures, suggesting that these villages were occupied long enough to necessitate re-building. The Jesuits

reported that the Huron moved their villages once every 10-15 years, when the nearby soils had been depleted by farming and conveniently collected firewood grew scarce. It seems likely that Early Ontario Iroquoians occupied their villages for considerably longer, as they relied less heavily on corn than did later groups, and their villages were much smaller, placing less demand on nearby resources.

Judging by the presence of carbonized corn kernels and cob fragments recovered from sub-floor storage pits, agriculture was becoming a vital part of the Early Ontario Iroquoian economy. However, it had not reached the level of importance it would in the Middle and Late Ontario Iroquoian periods. There is ample evidence to suggest that more traditional resources continued to be exploited, and comprised a large part of the subsistence economy. Seasonally occupied special purpose sites relating to deer procurement, nut collection, and fishing activities, have all been identified. While beans are known to have been cultivated later in the Late Woodland period, they have yet to be identified on Early Ontario Iroquoian sites. The Middle Ontario Iroquoian period (1300-1400 A.D.) witnessed several interesting developments in terms of settlement patterns and artifact assemblages. Changes in ceramic styles have been carefully documented, allowing the placement of sites in the first or second half of this 100-year period. Moreover, villages, which averaged approximately 0.6 hectares in extent during the Early Ontario Iroquoian period, now consistently range between one and two hectares.

House lengths also change dramatically, more than doubling to an average of 30 m, while houses of up to 45 m have been documented. This radical increase in longhouse length has been variously interpreted. The simplest possibility is that increased house length is the result of a gradual, natural increase in population. However, this does not account for the sudden shift in longhouse lengths around 1300 A.D. Other possible explanations involve changes in economic and socio-political organization. One suggestion is that during the Middle Ontario Iroquoian period small villages were amalgamating to form larger communities for mutual defense. If this was the case, the more successful military leaders may have been able to absorb some of the smaller family groups into their households, thereby requiring longer structures. This hypothesis draws support from the fact that some sites had up to seven rows of palisades, indicating at least an occasional need for strong defensive measures. There are, however, other Middle Ontario Iroquoian villages which had no palisades present. Another researcher has suggested that the longest houses may be associated with families that were more successful in trade and other forms of economic activity. More research is required to evaluate these competing interpretations.

The lay-out of houses within villages also changes dramatically by 1300 A.D. During the Early Ontario Iroquoian period villages were haphazardly planned at best, with houses oriented in various directions. During the Middle Ontario Iroquoian period villages are organized into two or more discrete groups of tightly spaced, parallel aligned, longhouses. It has been suggested that this change in village organization may indicate the initial development of the clans which were a characteristic of the historically known Iroquoian peoples.

Initially at least, the Late Ontario Iroquoian period (1400-1650 A.D.) continues many of the trends which have been documented for the proceeding century. For instance, between 1400 and 1450 A.D. house lengths continue to grow, reaching an average length of 62 m. One longhouse excavated on a site southwest of Kitchener stretched an incredible 123 m. After 1450 A.D., house lengths begin to decrease, with houses dating between 1500-1580 A.D. averaging only 30 m in length. Why house lengths decrease after 1450 A.D. is poorly understood, although it is believed that the even shorter houses witnessed on historic period sites can be at least partially attributed to the population reductions associated with the introduction of European diseases such as smallpox.

Village size also continues to expand throughout the Late Ontario Iroquoian period, with many of the larger villages showing signs of periodic expansions. The Late Middle Ontario Iroquoian period and the first century of the Late Ontario Iroquoian period was a time of village amalgamation. One large village situated just north of Toronto has been shown to have expanded on no fewer than five occasions. These large villages were often heavily defended

with numerous rows of wooden palisades, suggesting that defence may have been one of the rationales for smaller groups banding together.

Archaeologists are able to trace archaeologically known groups from this time period to the historically documented people identified when French fur traders first arrived (Wright 1994). The Ontario Iroquois from southern Ontario gave rise to the Huron, Petun, Neutral and Erie; the St. Lawrence Iroquois, a distinct population encountered by Jaques Cartier in 1535 that had disappeared by the time Samuel de Champlain returned to the same area in 1603; and from Northern Ontario the groups that gave rise to the Algonquian speaking Cree, Ojibwa and Algonquin people (Wright 1994).

1.2.2 Post-Contact First Nation Settlement

The post-contact First Nation occupation of southern Ontario was heavily influenced by the dispersal of Iroquoian speaking peoples, such as the Huron, Petun and Neutral by the New York State Confederacy of Iroquois, followed by the arrival of Algonkian speaking groups from northern Ontario. The Ojibwa of southern Ontario date from about 1701 and occupied the territory between Lakes Huron, Erie and Ontario (Schmalz 1991). This is also the period in which the Mississaugas are known to have moved back into southern Ontario and the Great Lakes watersheds (Konrad 1981) while at the same time the members of the Three Fires Confederacy, the Chippewa, Ottawa and Potawatomi were immigrating back from Ohio and Michigan (Feest and Feest 1978).

As European settlers encroached on their territory the nature of First Nation population distribution, settlement size and material culture changed. Despite these changes it is possible to correlate historically recorded villages with archaeological manifestations and the similarity of those sites to more ancient sites reveals an antiquity to documented cultural expressions that confirms a long historical continuity to Iroquoian systems of ideology and thought (Ferris 2009). First Nations people of southern Ontario have left behind archaeological resources throughout the Great Lakes region that show continuity with past peoples even if this was not recorded in Euro-Canadian documentation.

The study area first enters historic documentation as part of Treaty Number 3 which was made with the Mississauga First Nation on December 7, 1792, although had been negotiated since as early as 1784. Treaty Number 3...

> ...was made with the Mississa[ug]a Peoples 7th December, 1792, though purchased as early as 1784. This purchase in 1784 was to procure for that part of the Six Nation Peoples coming into Canada a permanent abode. The area included in this Treaty is, Lincoln County excepting Niagara Township; Saltfleet, Binbrook, Barton, Glanford and Ancaster Townships, in Wentworth County; Brantford, Onondaga, Tusc[a]r[o]ra, Oakland and Burford Townships in Brant County; East and West Oxford, North and South Norwich, and Dereham Townships in Oxford County; North Dorchester Township in Middlesex County; South Dorchester, Malahide and Bayham Township in Elgin County; all Norfolk and Haldimand Counties; Pelham, Wainfleet, Thorold, Cumberland and Humberstone Townships in Welland County ...
>
> Morris 1943:17-18

The treaty was signed by twelve people: six people representing the King, including, John Butter, R. Hamilton, Robert Kerr, Peter Russell, John McGill and David William Smith; five Chiefs representing the Mississagues, Wabukanyne, Wabanip, Kautubus, Wabaninship and Mattatow; and J. Groves Simcoe (Morris 1943: 18). The purchase was to procure that tract of land for the Six Nations Peoples coming into Canada (Morris 1943: 17). While it is difficult to know the exact boundaries of Treaty No. 3, Figure 3 provides the approximate location of the study area as it relates to treaty boundaries.

1.2.3 Euro-Canadian Settlement

The study area falls within the Geographic Township of Humberstone, Welland County. Following the American Revolution, United Empire Loyalists began settling in the Township of Humberstone during the early 1780's. First settlers into the area included Christian Stone, Abraham Neff, Christian Knisley and William Steele (Welland Tribune Printing House 1887). It wasn't until the completion of the Welland Canal that the population of the area began to increase.

The village of Port Colborne, originally known as Gravelly Bay, maintained only a small population until the construction of the Welland Canal began. The construction of the canal required the clearing of large areas of dense forest, thereby making the area much more conducive to farmers. Settlement initially occurred near the southern terminus of the Welland Canal when it was extended to reach Lake Erie in 1833 (Welland Tribune Printing House 1887). The small settlement on Gravelly Bay was named a port-of-entry in 1834 and given its present name in honour of Upper Canada's then Lieutenant-Governor Sir John Colborne.

The area was first surveyed and split into village lots by Hon. William Merritt in 1834. In the 1850's Port Colborne became the southern terminus of the Welland Railway that passed through the western portion of Humberstone Township. The Grand Trunk Railway's Buffalo and Goderich Division was also constructed through this area and Port Colborne rapidly developed into a business community. By 1870, the population of Port Colborne had grown to 1,030, prompting the citizens to incorporate the settlement into a village. In 1918 Port Colborne was officially declared a town with a population of 2,837 (City of Port Colborne 2014).

The Welland Canal

Before the digging of the Welland Canal, shipping traffic between Lake Ontario and Lake Erie used a portage road between Chippawa, Ontario, and Queenston, Ontario, located on the Niagara River, above and below Niagara Falls, respectively. The Welland Canal project began in 1824 by William Hamilton Merritt, initially utilizing a combination of natural waterways and deep cuts through the western side of the township to reach the Welland River (Page 1876: 11). The first expansion of the Canal involved an extension from Port Robinson south to Port Colborne in 1833. The canal was purchased by the government in 1841, in 1842 after considerable deterioration of the wood and the need to increase the size of the canal to accommodate larger ships, the canal was reconstructed a second time. With the development of the Welland Railway, the canal would need to be enlarged again in order to facilitate the transfer of loads from lake ships and rail cars, which was completed in 1881. The third configuration of the Canal was built using stone and was intended to straighten, and therefore shorten, shipping time. This configuration remained in use until it was decommissioned in 1932 (Westwater 2010). Finally, the fourth configuration of the Welland Canal involved the Welland By-Pass, which was constructed between 1967 and 1973. This By-Pass was constructed between Port Robinson and Port Colborne to reduce the number of locks and bridges on the canal system, increase capacity and decrease travel time for shipping by going around downtown Welland (Westwater 2010).

Historic Settlement and Land Use within the Study Area

The 1876 *Illustrated Historical Atlas of Welland County* (H.R. Page 1876), Township of Humberstone, lists several landowners within the study area. On Concession 3, John Lirdy is listed as the owner of the southern portion of Lots 24 and 25 and two structures are illustrated along Second Concession line immediately east of the Grand Trunk rail line. The landowner of the northern portion of Lot 24 is listed as W.A. Ball, and on Lot 25 J.M Ellsworth is the primary landowner with a small portion of the northeast corner of the lot listed to the Ontario Peat Company. On Concession 4, the landowners of Lot 24 and 25 are listed as R. Elliott and Robert Elliott Estate, respectively. With the exception of the structures noted on the John Lirdy property at the southern end of the study area limits, there are no other visible structures on the historic mapping (Figure 4). Although there are no other structures are

depicted, historical atlases were funded by subscription fees and landowners who did not subscribe were not always listed on the maps and structures also may not have been illustrated.

The 1876 historic mapping illustrates the Welland Canal in its second construction configuration prior to becoming enlarged and long before the construction of the Welland By-Pass, visible on present-day aerial mapping. The Welland Railway is constructed and is illustrated in proximity to the study area adjacent to the Canal. The construction of the Welland By-Pass resulted in a portion of the historic railway being reconstructed to the east (present-day Trillium Railway). The southern portion of the study area follows the present-day railway route. In addition to the Welland Railway, other historic transportation routes that appear to be constructed by 1876 that are within or adjacent to the study area include Second Concession Road and Third Concession Road, which follow the historic concession lines from the original survey of Humberstone Township (Figure 4).

1.2.4 Reports with Relevant Background Information

The background research conducted as part of the Stage 1-2 archaeological assessment determined that lands within 50 m of the current study area have previously been subject to archaeological assessments by Amick Consultants Ltd. (Amick), Archaeological Assessments Ltd., Golder Associates Ltd (Golder), and AECOM. A list of the archaeological assessment reports relevant to the study area is provided in Table 2.

Table 2: Related Archaeological Assessment Reports

Year	Title	Author	PIF
2008	*Stage 1 Archaeological Background Research and Reconnaissance of the Proposed Port Colborne Wind Farm 1, Part of Lot 25, Concession 3 (Geo. Twp of Humberstone), City of Port Colborne, R.M of Niagara.*	Amick	N/A
2011a	*The Stage 1 Archaeological Assessment of the Proposed Jungbunzlauer Canada Transformer Substation and Transmission Line, City of Port Colborne, Regional Municipality of Niagara.*	Archaeological Assessments Ltd.	P013-582-2011
2011b	*The Stage 2 Archaeological Assessment of the Proposed Jungbunzlauer Canada Transformer Substation and Transmission Line, City of Port Colborne, Regional Municipality of Niagara.*	Archaeological Assessments Ltd.	P013-587-2011
2012	*Revised Stage 1 Archaeological Assessment of the Nyon Energy Park, Part of Lots 23, 24 and 25, Concession 4 and Part of Lots 16, 17 18 and 19, Concession 5, City of Port Colborne, R.M. of Niagara, Ontario.*	Golder	P218-188-2011
2015	*Stage 1 Archaeological Assessment, Port Colborne Site Servicing of East Side Employment Lands (SSESL), Part of Lots 22, 23, 24, & 25, Concession 3, Geographical Township of Humberstone, Municipality of Niagara, City of Port Colborne, Welland County, Ontario.*	AECOM	P438-0009-2014

In 2008, Amick conducted a Stage 1 archaeological assessment for part of Lot 25, Concession 3. Efforts were made to locate this report for review; however, given that the report pre-dates the current *Standards and Guidelines for Consultant Archaeologists* (Ontario Government 2011) and the lack of standardization for archaeological reporting and report preservation at the time of production, this report could not be located for review

In 2011, Archaeological Assessments Ltd. (AAL 2011a,b) conducted Stage 1 and 2 archaeological assessments within a portion of the Port Colborne SSESEL study area. The Stage 1 report by AAL (2011a) indicated that the majority of the lands associated with a proposed Transmission Line development had been "disturbed by the construction of the canal, the existing Jungbunzlauer Plant, the East Service Road and Ramey Road" (2011a: 8). AAL (2011a) concluded that the majority of the study area no longer retained archaeological potential; however, potentially undisturbed areas located immediately east of the East Service Road and west of Ramey Road retained archaeological potential and required further Stage 2 assessment. During the Stage 2 archaeological assessment, AAL (2011b) determined that the lands on the east side of the Welland Canal demonstrated areas of previous

disturbance in the form of visible fill on the surface as well as sub-surface disturbance evident in the topsoil horizon (~15cm) (AAL 2011b: 2). No further work was recommended by AAL (2011b).

The Stage 1 archaeological assessment conducted by Golder (2012) included land on parts of Lots 23, 24, and 25, Concession 4, located adjacent to the current study area on the north side of Third Concession Road. Golder (2012) determined that the subject property had been partially impacted by 20th century disturbance and modification, specifically the construction of the Welland By-pass, and that much of the study area adjacent to the Canal no longer retained archaeological potential. Despite evidence of significant disturbance, portions of the study area were determined to have remained intact and Golder (2012) concluded that these areas retained moderate archaeological potential. Stage 2 archaeological assessment was recommended for all areas retaining archaeological potential, including a section of the lands within the current Port Colborne SSESEL study area north of Third Concession Road (Golder 2012).

In 2015, AECOM completed a Stage 1 archaeological assessment for the Port Colborne SSESEL on parts of Lots 22, 23, 24, & 25, Concession 3. The majority of the current Port Colborne SSESEL study area falls within the area previously assessed during AECOM's (2015) Stage 1, with the exception of the parcel of land to the north of Third Concession Road and a small section of railway ROW to the north of Second Concession Road. AECOM (2015) determined that there is high potential for the recovery of both pre-contact First Nation and Euro-Canadian archaeological resources within portions of the Port Colborne SSESEL study area. Due to the construction of the Welland Canal, the majority of land to the west of Ramey Road was determined to be extensively and intensively disturbed and consists of fill and spoils piles. However, areas where archaeological integrity remains were identified to the east of Ramey Road and in portions of the study area along the west side of Ramey Road. AECOM (2015) recommended that Stage 2 archaeological assessment be required for any potentially undisturbed areas prior to any ground disturbance activities.

1.3 Archaeological Context

1.3.1 Natural Environment

The study area is located within the Haldimand Clay Plain physiographic region (Chapman and Putnam 1984: 156-159), and is described as:

> Lying between the Niagara Escarpment and Lake Erie, thus occupying all of the Niagara Peninsula except the fruit belt below the escarpment, the Haldimand clay plain has an area of about 1,350 square miles. Although it was all submerged in Lake Warren, the till is not all buried by stratified clay; it comes to the surface generally in low morainic ridges in the north. In fact, there is in that area a confused intermixture of stratified clay and till. The northern part has more relief than the southern part where the typically level lake plains occur.
>
> Chapman and Putnam, 1984: 255

The soils of Welland County are mainly heavy clay and the southern part of the Regional Municipality of Niagara is poorly drained and is characterized by marshes and substantial peat bogs (Chapman and Putnam 1984: 257). These extensive marshlands and bogs permitted commercial enterprise in peat cutting to be utilized by the Ontario Peat Company for fuel (Page 1876: 11). Soil types within the study area include Malton and Lincoln clays. These soil types are poorly drained and are composed of lacustrine clay over gritty clay, which can measure up to 1 m in depth. These soil types are friable, but poor drainage results in slight erosion under natural conditions. Additionally, it has been noted that the majority of the soil in the western half of the study area adjacent to the Welland Canal is listed as unclassified. This is a result of extensive 19th and 20th century disturbance and man-made deposits as a result of the construction and

reconstruction of the Welland Canal (Chapman and Putnam, 1984). Figure 5 provides an illustration of the soil types and drainage within the Port Colborne SSESEL study area.

The Niagara Peninsula is dominated by the Niagara Escarpment, composed of the Lockport geological formation of Silurian age, and is similar to the Onondaga geological formation, which runs parallel to it. The Niagara Escarpment is most famous as the cliff over which the Niagara River plunges at Niagara Falls, for which it is named. The Welland Canal was constructed to facilitate shipping through the Great Lakes, providing access from Lake Erie north to Lake Ontario. The Niagara Escarpment was a difficult obstacle to overcome during design and building of the Welland Canal. The northern terminus of the Welland Canal at Port Weller is approximately 100 m lower than the southern terminus into Lake Erie at Port Colborne.

The closest source of potable water to the current study area is the Welland Canal, which runs adjacent to the study area to the west. Although the presence of major sources of potable water generally indicates high potential for the recovery of archaeological resources, the Welland Canal is a man-made feature constructed beginning in 1824 to facilitate shipping through the Great Lakes. As such, this water source does not directly contribute to pre-contact First Nation archaeological potential. Other sources of naturally occurring potable water include People Creek, which runs along the northern border of the study area, and Lake Erie, which is located approximately 4 km south of the study area.

1.3.2 Known Archaeological Sites and Surveys

A request was made to the MTCS Archaeological Sites Database co-ordinator, Robert von Bitter on November 12, 2015 to consult the ASDB and determine if any registered archaeological sites were located within 1 km of the current study area boundaries. A response was received on November 13, 2015 indicating that there are six archaeological sites registered within 1 km of the current Port Colborne SSESEL study area. Although in close proximity, none of these sites fall within or immediately adjacent to the study area. A detailed list of these sites is provided in Table 3.

Table 3: Registered Archaeological Sites within 1 km of the Study Area

Borden #	Site Name	Cultural Affiliation	Site Type/Feature	License Year
AfGt-196	Chippawa 1	Undetermined	N/A	N/A
AfGt-197	Chippawa 2	Undetermined	N/A	N/A
AfGt-26	Kikkert-Murray	Pre-Contact	Findspot	1984-1986
AfGt-38	Kikkert 1	Undermined	N/A	1984
AfGt-39	Kikkert 2	Pre-Contact	Scatter	1984
AfGt-40	Kikkert 3	Early Woodland	Campsite	1984

Information concerning specific site locations is protected by provincial policy, and is not fully subject to the Freedom of Information Act. The release of such information in the past has led to looting or various forms of illegally conducted site destruction. Confidentiality extends to all media capable of conveying location, including maps, drawings, or textual descriptions of a site location. The MTCS will provide information concerning site location to the party or an agent of the party holding title to a property, or to a licensed archaeologist with relevant cultural resource management interests.

1.3.3 Determination of Archaeological Potential

Archaeological potential is established by determining the likelihood that archaeological resources may be present on a subject property. Criteria commonly used by the Ontario MTCS (Ontario Government 2011) to determine areas of archaeological potential include:

- Proximity to previously identified archaeological sites;
- Distance to various types of water sources;
- Soil texture and drainage;
- Glacial geomorphology, elevated topography and the general topographic variability of the area;
- Resource areas including food or medicinal plants, scarce raw materials and early Euro-Canadian industry;
- Areas of early Euro-Canadian settlement and early transportation routes;
- Properties listed on municipal register of properties designated under the *Ontario Heritage Act* (Government of Ontario 1990b);
- Properties that local histories or informants have identified with possible archaeological sites, historical events, activities or occupants; and
- Historic landmarks or sites.

Distance to modern or ancient water sources is generally accepted as the most important element for past human settlement patterns and when considered alone may result in a determination of archaeological potential. In addition any combination of two or more of the criteria listed above, such as well drained soils or topographic variability, may indicate archaeological potential.

Certain features indicate that archaeological potential has been removed, such as land that has been subject to extensive and intensive deep land alterations that have severely damaged the integrity of any archaeological resources. This includes landscaping that involves grading below the topsoil level, building footprints, quarrying and sewage, and infrastructure development (Ontario Government 2011).

1.3.4 Potential for the Recovery of Archaeological Resources

The evaluation of archaeological potential for the Port Colborne SSESEL study area has resulted in the determination that there is moderate to high potential for the recovery of pre-contact and contact period First Nation archaeological resources based on the proximity to known archaeological sites and potable water sources, such as the People Creek and Lake Erie. In addition, the historical documentary evidence from the first European settlers and surveyors to the area indicates the long history of occupation here by First Nations people.

The potential for the recovery of Euro-Canadian archaeological resources is also judged to be moderate to high based off of the early settlement of the area by Euro-Canadian settlers and the proximity of the study area to the historic town of Port Colborne. Two structures are visible on the historic mapping in proximity to the southern portion of the study area and several major historic transportation routes surround the study area including the Welland Canal, the Welland Railway, and historic concession line roadways.

It should be noted that the construction of the Welland By-Pass has removed archaeological potential within a large portion of the lands to the east of Ramey Road. This disturbance, in the form of extensive fill and spoil piles was documented by Golder (2012) and Archaeological Assessments Ltd. (2011b) in previous archaeological assessments conducted in the area. The reconstruction of the historic railway that runs adjacent to the current study

area has likely also impacted the potential for the recovery of archaeological resources. However, areas of agricultural and residential lands to the east of Ramey Road appear to remain intact and, therefore, retain archaeological potential. The wooded area immediately to the west of Ramey Road remains potentially undisturbed and also retains archaeological potential.

1.3.5 Existing Conditions

The specific study area consists of a corridor that includes a railway ROW from Second Concession Road north to Ramey Road, the municipal ROW along Ramey Road as well as an additional 5 m extending from the ROW into private properties, and a parcel of land north of the intersection of Ramey Road and Third Concession Road measuring approximately 0.72 ha. The corridor consists of areas of previous disturbance related to road and rail construction, areas of woodlot, manicured lawn, and agricultural fields. The parcel of study area north of Third Concession Road consists primarily of wooded and bushed areas.

2. Field Methods

The Stage 2 archaeological assessment was conducted on November 26, 2015 under Professional license P438 issued by the MTCS to Samantha Markham, Professional Archaeologist at AECOM, under PIF number P438-0059-2015. Joseph Cull (R1061) acted as field supervisor and the field investigation involved the physical survey of all lands to be impacted by the Port Colborne SSESEL in the City of Port Colborne, Welland County, Ontario.

The weather during the Stage 2 assessment on November 26, 2015 was sunny and clear with a high of 12° Celsius (C). There were no conditions that were detrimental to the identification and recovery of archaeological material.

Approximately 50% of the study area consists of flat sections of wooded areas (30%), agricultural field (15%), and areas of overgrowth (5%). It should be noted that since the planned project impacts occurring outside of the road ROWs are restricted to a narrow 5 m corridor, it is acceptable for test pit survey to be conducted on agricultural field (*Standards and Guidelines for Consultant Archaeologists*, Section 2.1.2, Standard 1(f); Ontario Government 2011). In accordance with the *Standards and Guidelines for Consultant Archaeologists* (Section 2.1.2, Standards 1-9, Government of Ontario 2011), the flat sections of the study area were subject to assessment by the standard shovel test pit method at an interval of 5 m in areas demonstrating no or subtle disturbance. Based on professional judgment, test pit intervals were increased to 10 m in areas that demonstrated possible substantial disturbance.

Each test pit was approximately 30 centimetres (cm) in diameter, and was excavated at least 5 cm into sterile subsoil. All test pits were examined for stratigraphy, cultural features or evidence of fill. All soil was screened though hardware mesh with an aperture of 6 millimetres (mm) to facilitate the recovery of cultural material and was then used to backfill the pit. The excavated test pits were found to be wet (60%) or showed evidence of previous disturbance (35%) with only one small area of overgrown agricultural field appearing to have intact stratum (5%).

The remaining 50% of the study area consisted of areas of visually confirmed disturbance (40%) and wet areas (10%), which were photo-documented and not subject to Stage 2 survey. Areas of visually confirmed disturbance consisted primarily of the railway ROW and the municipal road ROW for Ramey Road.

As per the *Standards and Guidelines for Consultant Archaeologists* (Section 7.8.6, Standard 1a, Ontario Government 2011), photograph locations and directions are provided on Figure 6 along with an illustration of the methods and results of the Stage 2 field investigation.

3. Record of Finds

The Stage 1-2 archaeological assessment was conducted by employing the methods outlined in Section 2 of this report. Table 4 provides a listing of the documentary record generated by the Stage 2 fieldwork and indicates the location of each document type. Any maps that show actual archaeological site locations and all UTM coordinates recorded during the assessment are provided in the supplementary documentation to this report.

Table 4: Inventory of Documentary Record

Document Type	Quantity	Location	Additional Comments
Field Notes	6 pages	AECOM London Office	In original field folder and stored digitally in project file
Hand Drawn Maps	14	AECOM London Office	In original field folder and stored digitally in project file
Proponent Maps	8	AECOM London Office	Hard copy and digital copy in project file
Digital Photographs	132	AECOM London Office	Stored digitally in project file

The Stage 1 background research determined that the potential for the recovery of archaeological resources in the area is moderate to high; however, the Stage 2 field investigation did not result in the identification of any archaeological resources.

4. Analysis and Conclusions

While the Stage 1 background research determined that there is high potential for the recovery of archaeological resources, the Stage 2 field investigation of the lands for the Port Colborne SSESEL did not identify any archaeological resources. As such, there are no concerns regarding the impact to archaeological sites by the Port Colborne SSESEL located on parts of Lots 24-26, Concessions 3 and 4 in the Geographic Township of Humberstone, now the City of Port Colborne, Municipality of Niagara, Welland County, Ontario.

5. Recommendations

The Stage 1-2 investigation of the lands for the Port Colborne SSESEL on parts of Lots 24-26, Concessions 3 and 4 in the Geographic Township of Humberstone, now the City of Port Colborne, Municipality of Niagara, Welland County, Ontario did not result in the identification of any archaeological resources or sites. Based on these findings, **no further archaeological assessment is recommended.**

The Ministry of Tourism, Culture and Sport is asked to accept this report into the Ontario Public Register of Archaeological Reports thereby concurring with the recommendations provided herein.

6. Advice on Compliance with Legislation

This report is submitted to the Ontario Minister of Tourism, Culture and Sport as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 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 fieldwork and report recommendations ensure the conservation, protection and preservation of the cultural heritage of Ontario. When all matters relating to archaeological sites within the project area of a development proposal have been addressed to the satisfaction of the Ministry of Tourism, Culture and Sport, 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 fieldwork on the site, submitted a report to the Minister stating that the site has no further cultural heritage value or interest, and the report has been filed in the Ontario Public Register of 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 Section 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) require that any person discovering human remains must notify the police or coroner and the Registrar of Cemeteries at the Ontario Ministry of Consumer Services.

7. Bibliography and Sources

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8. Images

Photo 1: Confirmed disturbance, facing northwest

Photo 2: Confirmed disturbance, facing west

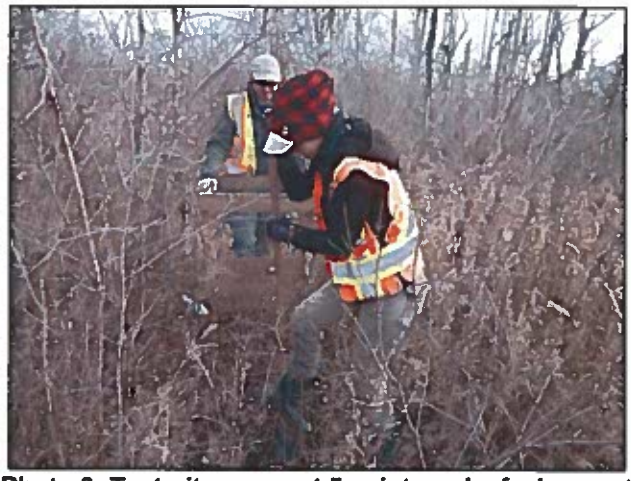


Photo 3: Test pit survey at 5 m intervals, facing east

Photo 4: Test pit with evidence of previous disturbance

Photo 5: Low-lying wet area, not assessed

Photo 6: Test pit with evidence of previous disturbance

Photo 7: Creek and sloped area, not assessed, facing northwest

Photo 8: Test pit survey at 5 m intervals, facing west

Photo 9: Test pit in agricultural field showing intact stratum

Photo 10: Test pit survey at 5 m intervals within 5 m buffer along Ramey Road, facing southwest

Photo 11: Road build up disturbance and ditch within Ramey Road ROW, not assessed, facing south

Photo 12: Typical wet test pit within 5 m buffer along Ramey Road

Photo 13: Test pit survey at 5 m intervals within 5 m buffer along Ramey Road, facing southeast

Photo 14: Road build up disturbance and ditch within Ramey Road ROW, not assessed, facing north

Photo 15: Test pit survey at 5 m intervals within 5 m

Photo 16: Test pit showing evidence of previous soil

buffer along Ramey Road, facing northeast

Photo 17: Low-lying wet lands within wooded area, facing west

disturbance, note subsoil mottling

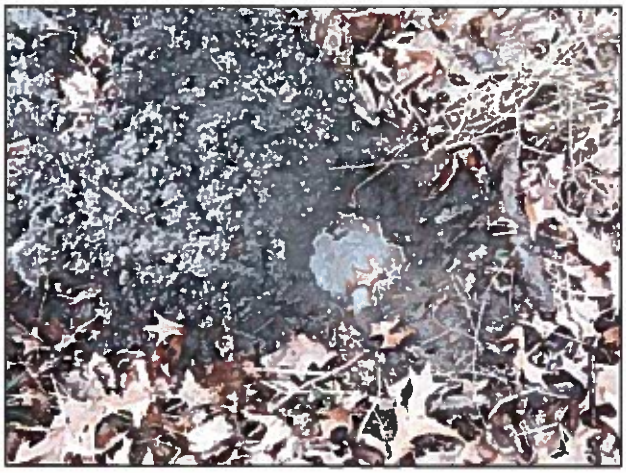


Photo 18: Test pit demonstrating wet lands in wooded area

Photo 19: Test pit at 5 m intervals in wooded area

Photo 20: Previously assessed area (AAI 2011a,b), facing southwest

Photo 21: Visually confirmed disturbance at south end of Ramey Road, facing south

Photo 22: Visually confirmed disturbance and railway ROW build up, facing south

Photo 23: Wetland area in railway ROW, not assessed, facing southwest

Photo 24: Visually confirmed disturbance along railway ROW, facing north

Photo 25: Visually confirmed disturbance along railway ROW, facing south

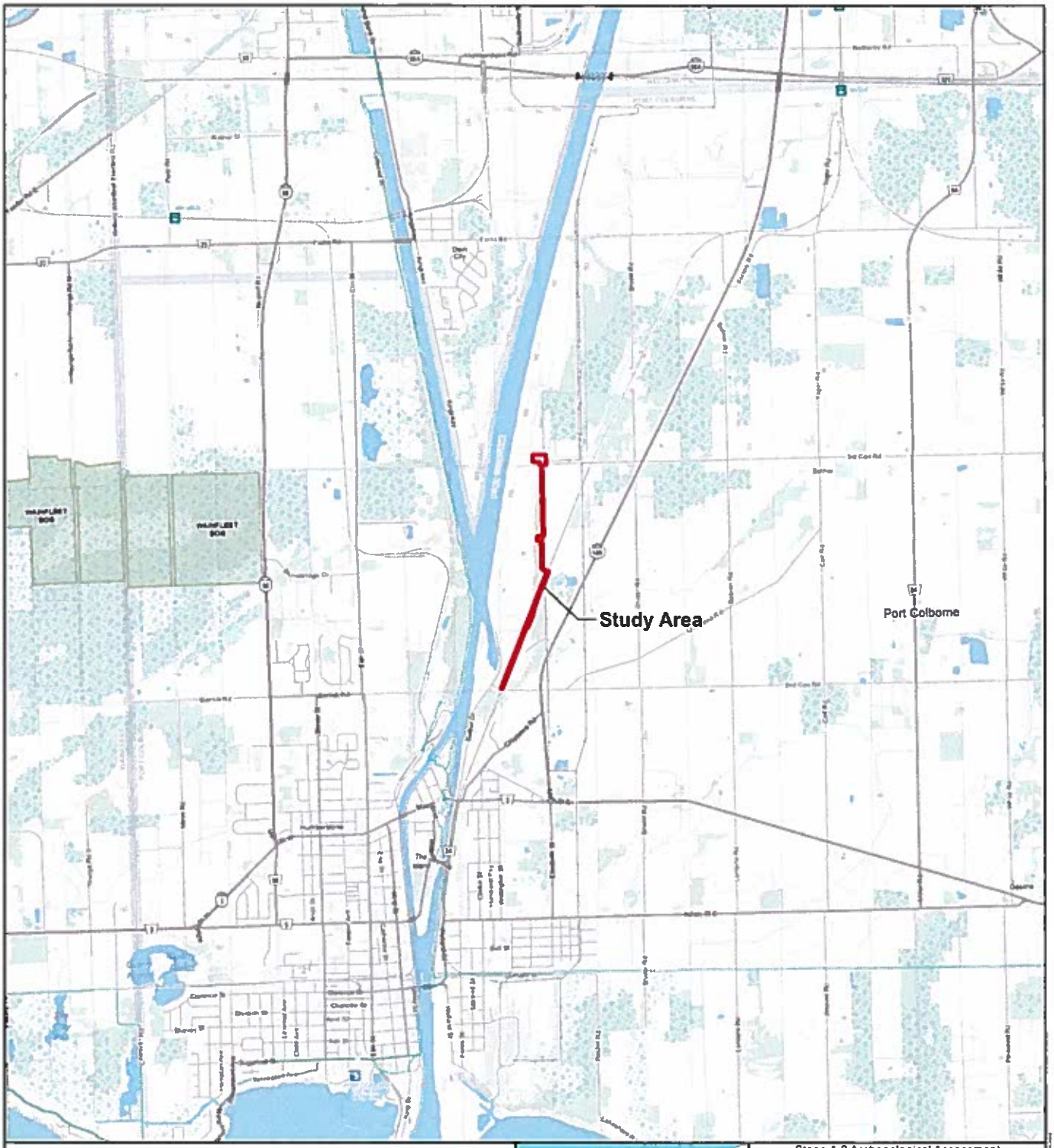
Photo 26: Visually confirmed disturbance along railway ROW, facing south

Photo 27: Visually confirmed disturbance, railway ROW build up, and wet ditch along railway ROW, facing southwest

Photo 28: Visually confirmed disturbance along railway ROW, facing southwest

9. Figures

All figures pertaining to the Stage 1-2 archaeological assessment of the proposed Port Colborne SSESEL within parts of Lots 24-26, Concessions 3 and 4 within the Geographical Township of Humberstone, now the City of Port Colborne, Municipality of Niagara, Welland County, Ontario are provided on the following pages.



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Study Area

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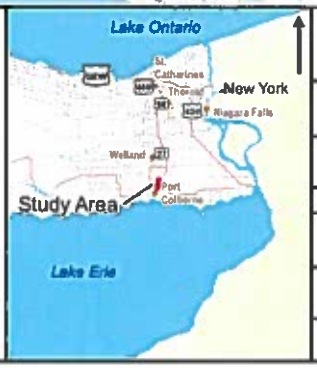

Stage 1-2 Archaeological Assessment
Port Colborne Site Servicing of
East Side Employment Lands (SSESEL)
City of Port Colborne, Welland County, Ontario

Location of Study Area

December 2015	1:50,000	Datum: NAD 83 Zone 17 Source: Web Mapping Service www.giscoecache.lrc.gov.on.ca
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Figure 1

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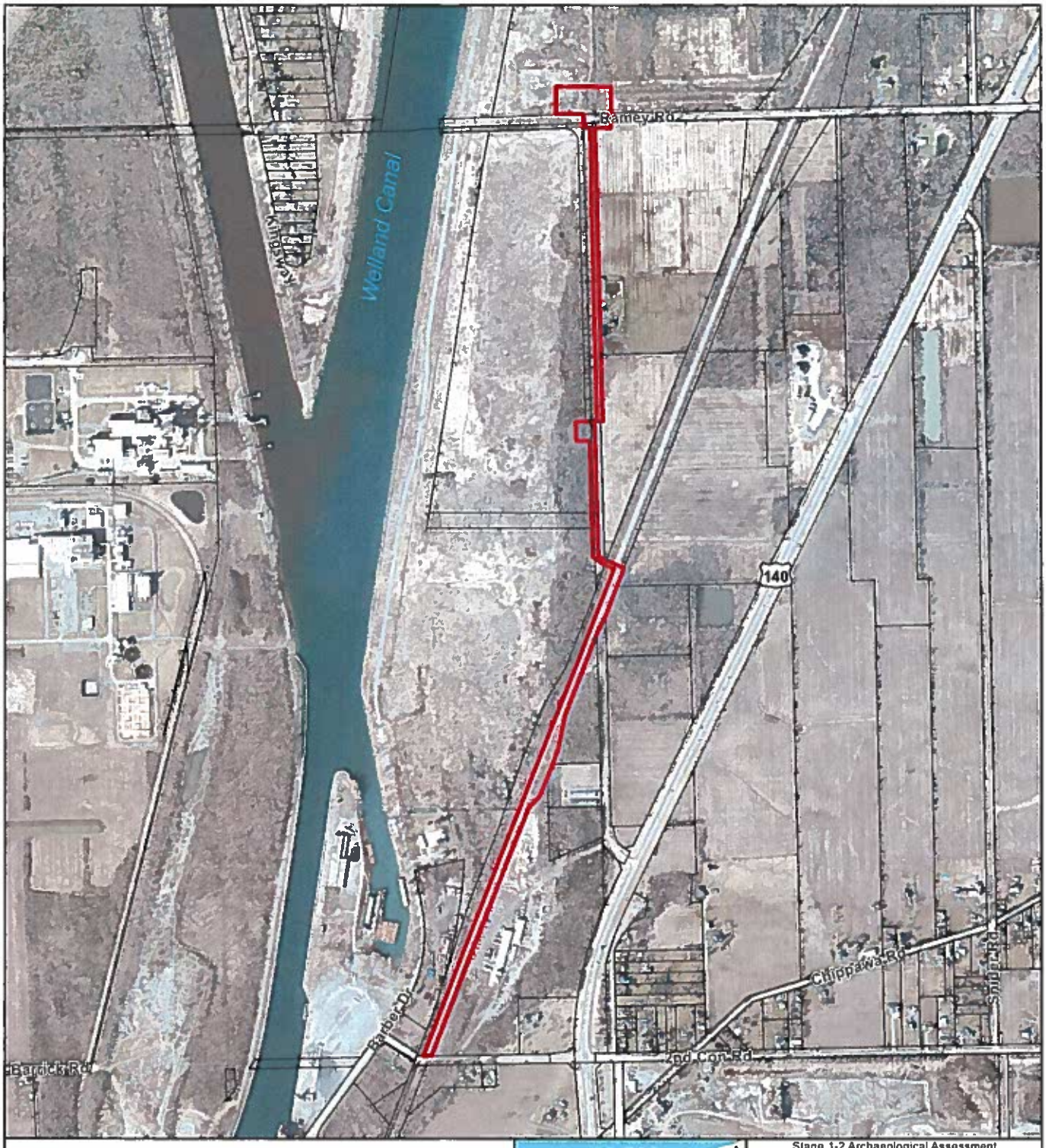

Legend

- Study Area
- Parcel Boundary

N

Stage 1-2 Archaeological Assessment
Port Colborne Site Servicing of
East Side Employment Lands (SSESEL)
City of Port Colborne, Welland County, Ontario

Study Area in Detail

December 2015	1:12,000	Datum: NAD 83 Zone 17 Source: City of Port Colborne & NPCA, 2014 Orthophotography: City of Port Colborne, 2010
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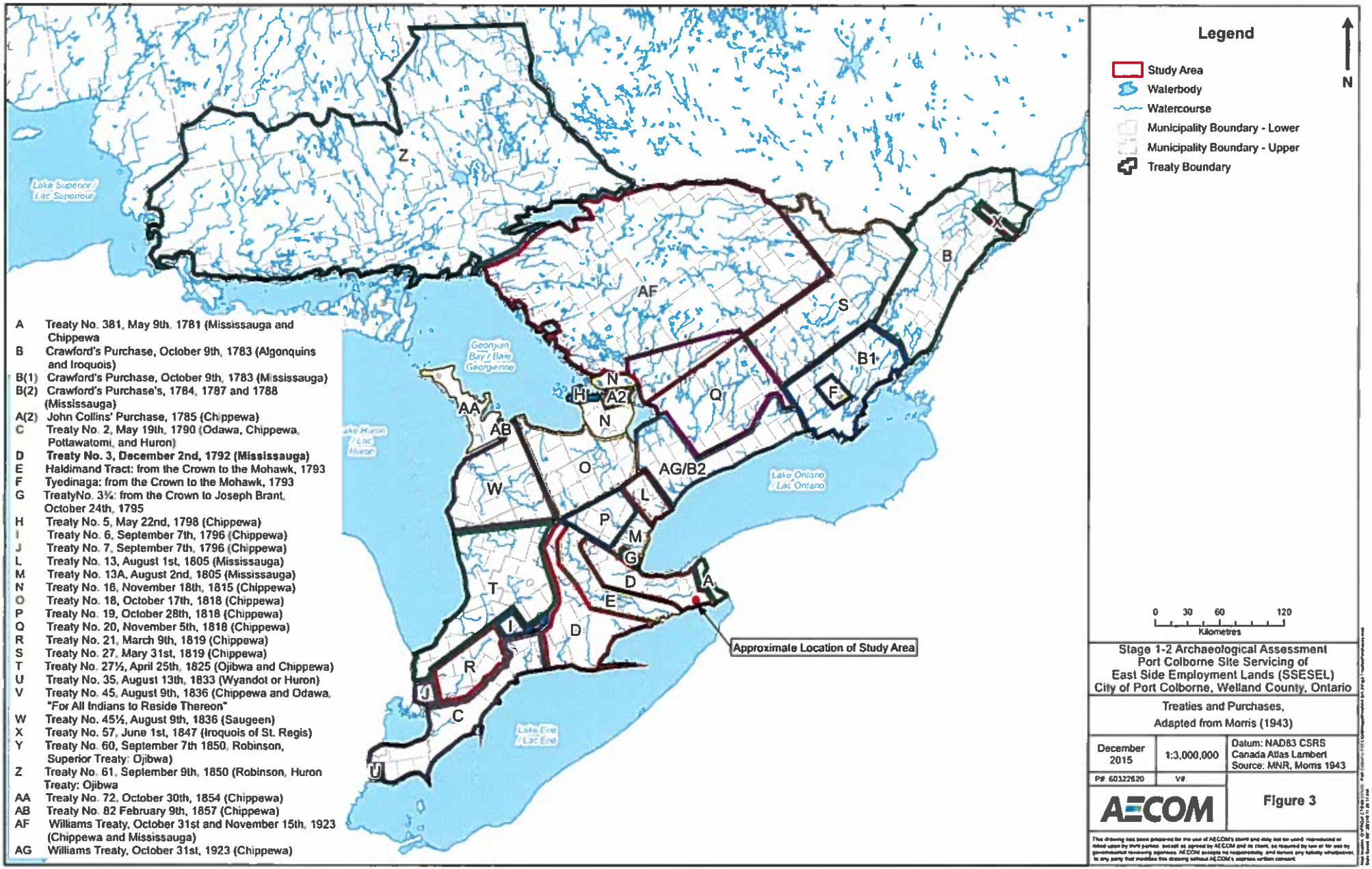

A Treaty No. 381, May 9th, 1781 (Mississauga and Chippewa)
B Crawford's Purchase, October 9th, 1783 (Algonquins and Iroquois)
B(1) Crawford's Purchase, October 9th, 1783 (Mississauga)
B(2) Crawford's Purchase's, 1784, 1787 and 1788 (Mississauga)
A(2) John Collins' Purchase, 1785 (Chippewa)
C Treaty No. 2, May 19th, 1790 (Odawa, Chippewa, Pottawatomi, and Huron)
D **Treaty No. 3, December 2nd, 1792 (Mississauga)**
E Haldimand Tract: from the Crown to the Mohawk, 1793
F Tyedinaga: from the Crown to the Mohawk, 1793
G TreatyNo. 3¼: from the Crown to Joseph Brant, October 24th, 1795
H Treaty No. 5, May 22nd, 1798 (Chippewa)
I Treaty No. 6, September 7th, 1796 (Chippewa)
J Treaty No. 7, September 7th, 1796 (Chippewa)
L Treaty No. 13, August 1st, 1805 (Mississauga)
M Treaty No. 13A, August 2nd, 1805 (Mississauga)
N Treaty No. 16, November 18th, 1815 (Chippewa)
O Treaty No. 18, October 17th, 1818 (Chippewa)
P Treaty No. 19, October 28th, 1818 (Chippewa)
Q Treaty No. 20, November 5th, 1818 (Chippewa)
R Treaty No. 21, March 9th, 1819 (Chippewa)
S Treaty No. 27, Mary 31st, 1819 (Chippewa)
T Treaty No. 27½, April 25th, 1825 (Ojibwa and Chippewa)
U Treaty No. 35, August 13th, 1833 (Wyandot or Huron)
V Treaty No. 45, August 9th, 1836 (Chippewa and Odawa, "For All Indians to Reside Thereon"
W Treaty No. 45½, August 9th, 1836 (Saugeen)
X Treaty No. 57, June 1st, 1847 (Iroquois of St. Regis)
Y Treaty No. 60, September 7th 1850, Robinson, Superior Treaty: Ojibwa)
Z Treaty No. 61, September 9th, 1850 (Robinson, Huron Treaty: Ojibwa
AA Treaty No. 72, October 30th, 1854 (Chippewa)
AB Treaty No. 82 February 9th, 1857 (Chippewa)
AF Williams Treaty, October 31st and November 15th, 1923 (Chippewa and Mississauga)
AG Williams Treaty, October 31st, 1923 (Chippewa)

Legend

- Study Area
- Waterbody
- Watercourse
- Municipality Boundary - Lower
- Municipality Boundary - Upper
- Treaty Boundary

N

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Kilometres

Stage 1-2 Archaeological Assessment
Port Colborne Site Servicing of
East Side Employment Lands (SSESEL)
City of Port Colborne, Welland County, Ontario

Treaties and Purchases,
Adapted from Morris (1943)

December 2015	1:3,000,000	Datum: NAD83 CSRS Canada Atlas Lambert Source: MNR, Morris 1943
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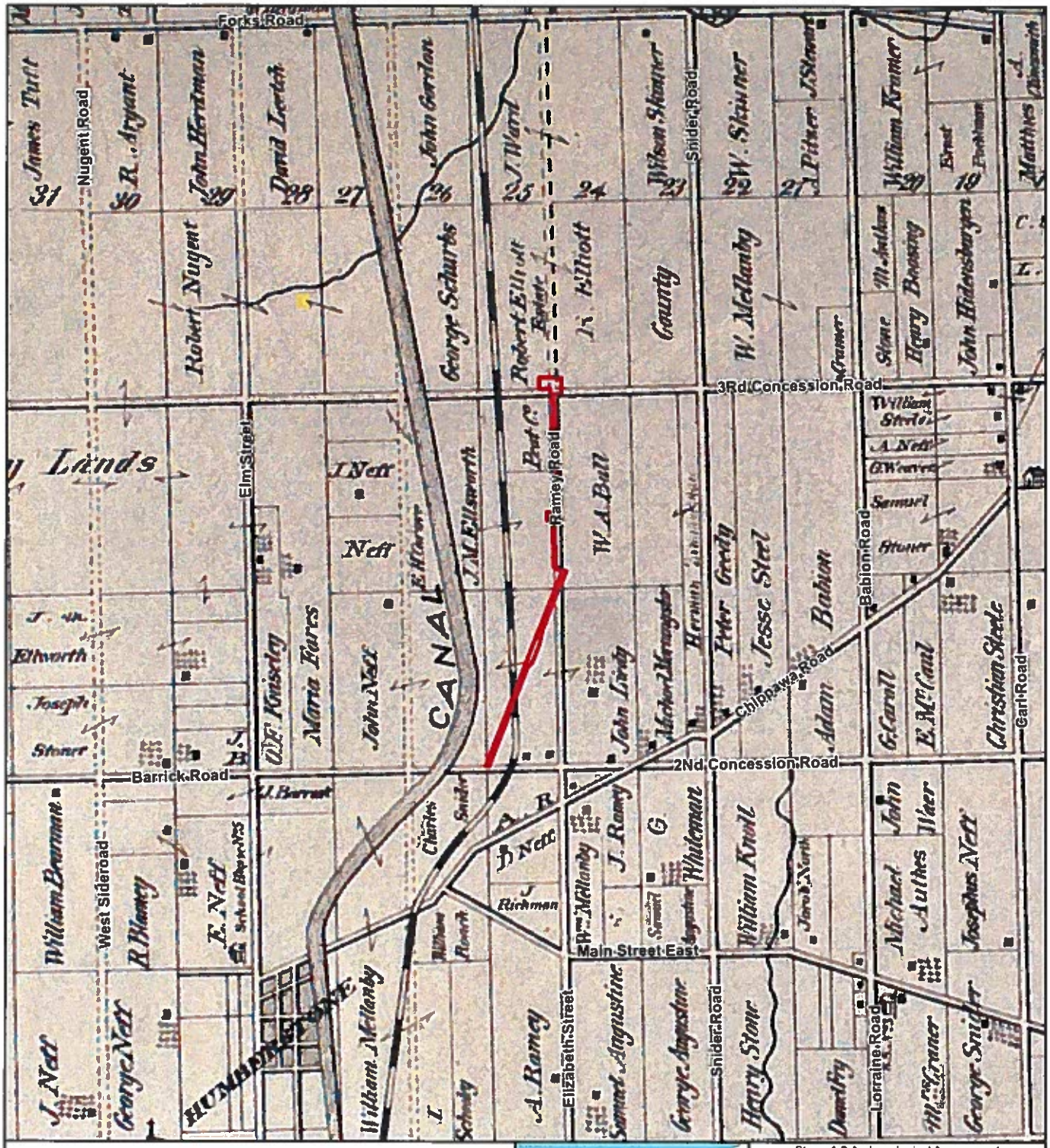
Figure 3


Forks Road
Nugent Road
Snider Road
3Rd Concession Road
Elm Street
Ramey Road
Babion Road
Chippawa Road
2Nd Concession Road
Barrick Road
West Sideroad
Main Street East
Elizabeth Street
Lorraine Road
Garl Road
CANAL
Lands
Legend
Study Area
N
Lake Ontario
New York
Study Area
Lake Erie
Stage 1-2 Archaeological Assessment
Port Colborne Site Servicing of
East Side Employment Lands (SSESEL)
City of Port Colborne, Welland County, Ontario
Portion of the 1876 Historical
map of Humberstone Township
December 2015
1:30,000
Datum: NAD 83 Zone 17
Source: Illustrated Historic Atlas of Humberstone Township (H.R. Page & Co. 1876)
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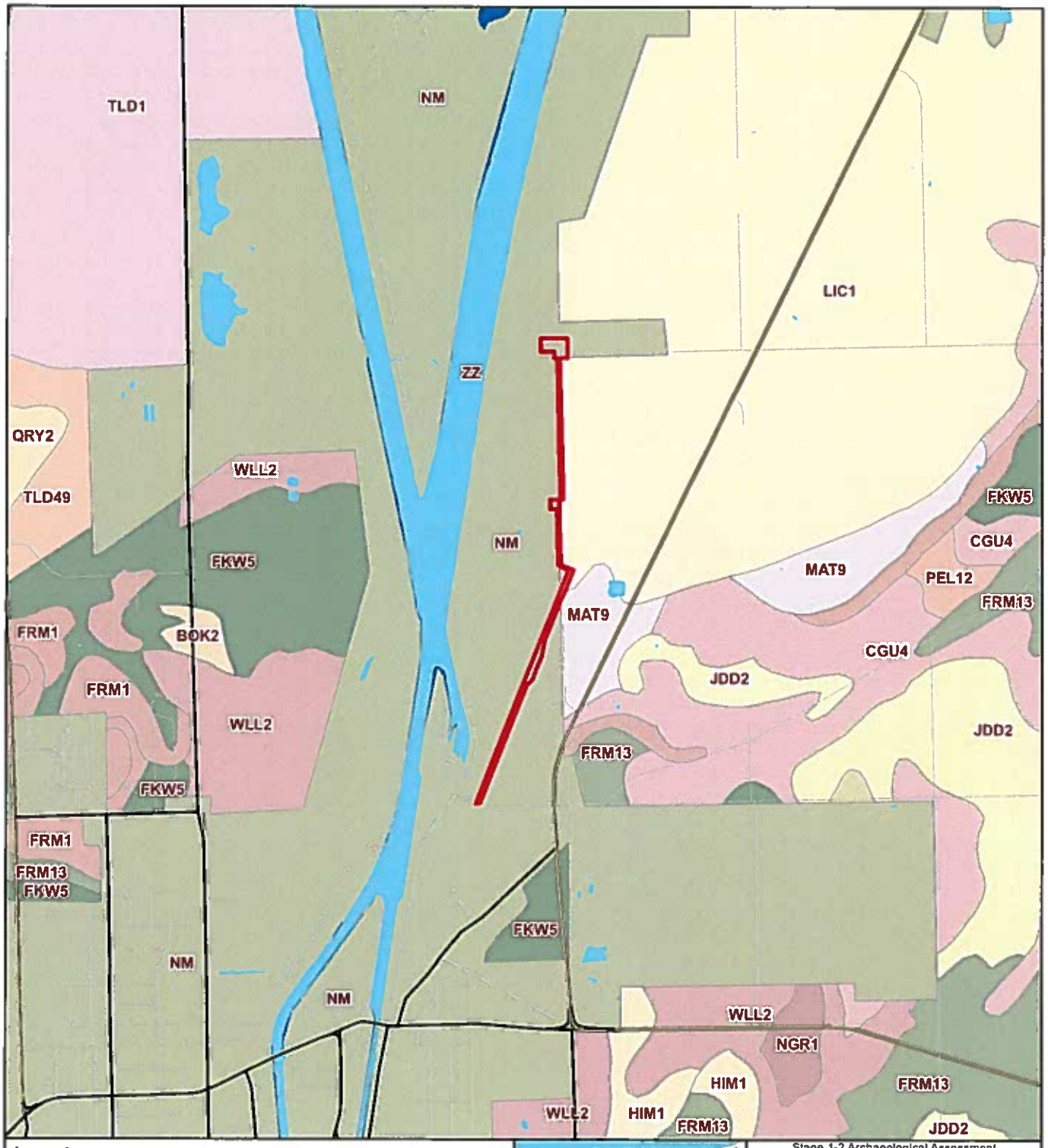

Legend

- StudyArea
- Waterbody

Roads

- Expressway / Highway
- Major Road
- Local Street

Soils

- BOK2 - Brooke, Clay Loam
- BOK3 - Brooke, Silty Clay Loam
- CGU4 - Chinguacousy, Clay Loam
- FKW5 - Franktown, Loam
- FRM1 - Farmington, Silty Clay
- FRM13 - Farmington, Loam
- HIM1 - Haldimand, Silty Clay
- JDD2 - Jeddo, Silty Clay Loam
- LIC1 - Lincoln, Clay
- MAT9 - Malton, Silty Clay Loam
- NGR1 - Niagara, Silty Clay Loam
- NM - Not Mapped
- PEL12 - Peel, Silty Clay
- QRY2 - Quarry, Organic
- TLD1 - Toledo, Silty Clay Loam
- TLD49 - Toledo, Organic
- WLL2 - Welland, Silty Clay
- ZZ - Water

N

Stage 1-2 Archaeological Assessment
Port Colborne Site Servicing of
East Side Employment Lands (SSESEL)
City of Port Colborne, Welland County, Ontario

Soil Types and Drainage

December 2015	1:25,000	Datum: NAD83 UTM17 Source: LIO (2014), Ontario Soil Report Durham County 1946
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Figure 5

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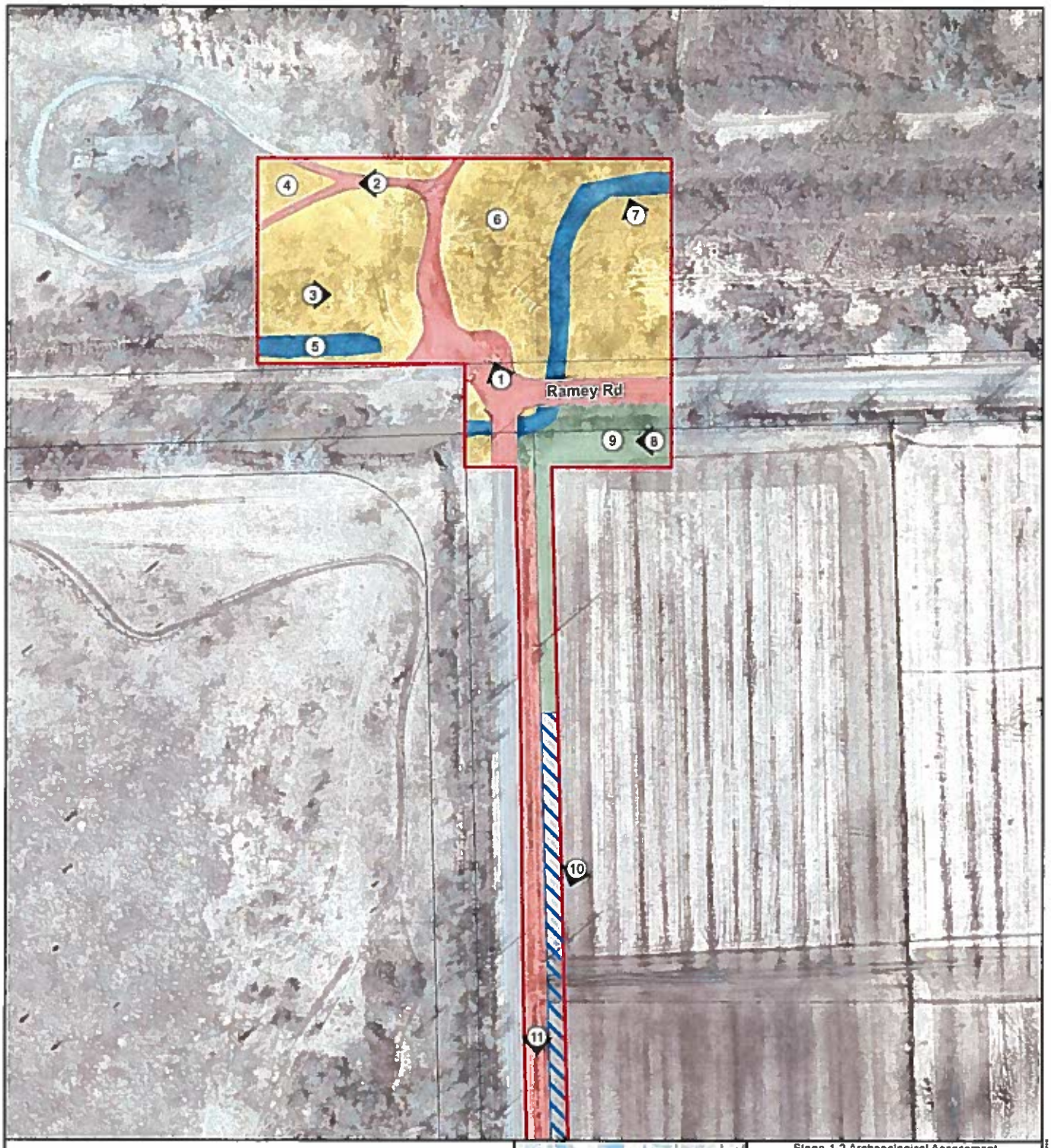


Legend

- Photo Location and Direction
- Study Area
- Parcel Boundary

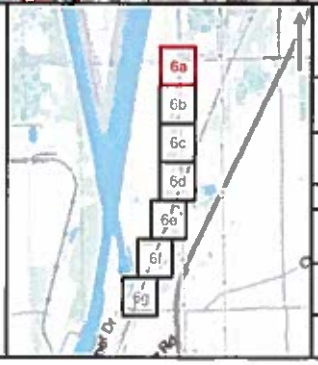
Areas of Archaeological Potential

- Test Pit Survey - Intact Stratum (5m Interval)

Areas of Low Archaeological Potential

- Visually Confirmed Disturbed (Not Assessed)
- Previously Assessed (AAL, 2011 a,b)
- Test Pit Survey - Confirmed Disturbed (10m Interval)
- Test Pit Survey - Wet/Disturbed (5m Interval)
- Wet Low-lying (Not Assessed)

N



Stage 1-2 Archaeological Assessment
Port Colborne Site Servicing of
East Side Employment Lands (SSESEL)
City of Port Colborne, Welland County, Ontario

Results of the Stage 2 Field Investigation

December 2015	1:1,600	Datum: NAD 83 Zone 17 Source: City of Port Colborne & NPCA, 2014 Orthophotography; City of Port Colborne, 2010
PW: 60322620	Vill:	

AECOM

Figure 6a

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Metres

Legend

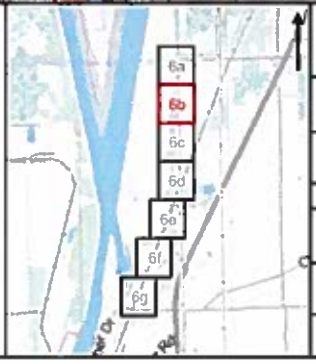
- Photo Location and Direction
- Study Area
- Parcel Boundary

Areas of Archaeological Potential

- Test Pit Survey - Intact Stratum (5m Interval)

Areas of Low Archaeological Potential

- Visually Confirmed Disturbed (Not Assessed)
- Previously Assessed (AAL, 2011 a,b)
- Test Pit Survey - Confirmed Disturbed (10m Interval)
- Test Pit Survey - Wet/Disturbed (5m Interval)
- Wet Low-lying (Not Assessed)



Stage 1-2 Archaeological Assessment
Port Colborne Site Servicing of
East Side Employment Lands (SSESEL)
City of Port Colborne, Welland County, Ontario

Results of the Stage 2 Field Investigation

December 2015	1:1,600	Datum: NAD 83 Zone 17 Source: City of Port Colborne & NPCA, 2014 Orthophotography; City of Port Colborne, 2010
Pr: 60322620	Vr:	Figure 6b

AECOM

0 15 30 60
Metres

Legend

- Photo Location and Direction
- Study Area
- Parcel Boundary

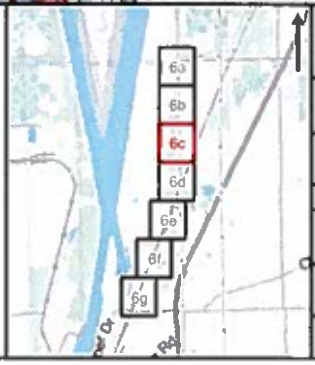
Areas of Archaeological Potential

- Test Pit Survey - Intact Stratum (5m Interval)

Areas of Low Archaeological Potential

- Visually Confirmed Disturbed (Not Assessed)
- Previously Assessed (AAL, 2011 a,b)
- Test Pit Survey - Confirmed Disturbed (10m Interval)
- Test Pit Survey - Wet/Disturbed (5m Interval)
- Wet Low-lying (Not Assessed)

N



Stage 1-2 Archaeological Assessment
Port Colborne Site Servicing of
East Side Employment Lands (SSESEL)
City of Port Colborne, Welland County, Ontario

Results of the Stage 2 Field Investigation

December 2015	1:1,600	Datum: NAD 83 Zone 17 Source: City of Port Colborne & NPCA, 2014 Orthophotography City of Port Colborne, 2015
P# 60322620	Ver.	

AECOM

Figure 6c

0 15 30 60
Metres

Legend

- Photo Location and Direction
- Study Area
- Parcel Boundary

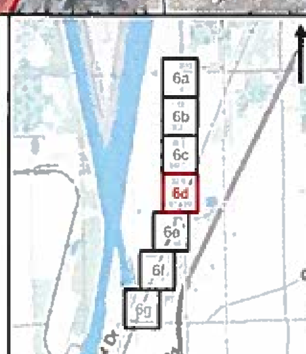
Areas of Archaeological Potential

- Test Pit Survey - Intact Stratum (5m Interval)

Areas of Low Archaeological Potential

- Visually Confirmed Disturbed (Not Assessed)
- Previously Assessed (AAL, 2011 a,b)
- Test Pit Survey - Confirmed Disturbed (10m Interval)
- Test Pit Survey - Wet/Disturbed (5m Interval)
- Wet Low-lying (Not Assessed)

N



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P#: 60322620	V#:	

AECOM

Figure 6d

0 15 30 60
Metres

Legend

- Photo Location and Direction
- Study Area
- Parcel Boundary

Areas of Archaeological Potential

- Test Pit Survey - Intact Stratum (5m Interval)

Areas of Low Archaeological Potential

- Visually Confirmed Disturbed (Not Assessed)
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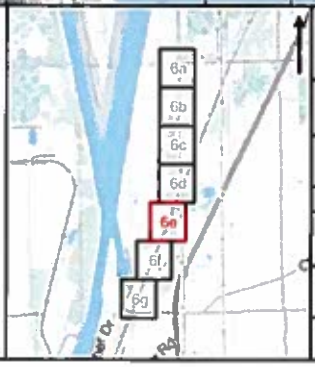
N



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P#: 60322620	V#:	
AECOM		Figure 6e

0 15 30 60
Metres

Legend

- Photo Location and Direction
- Study Area
- Parcel Boundary

Areas of Archaeological Potential

- Test Pit Survey - Intact Stratum (5m Interval)

Areas of Low Archaeological Potential

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- Test Pit Survey - Wet/Disturbed (5m Interval)
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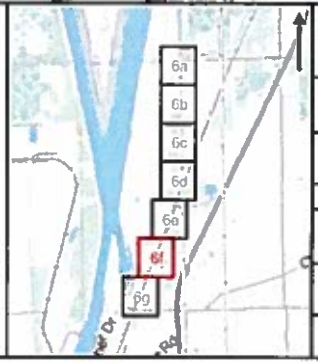

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P#: 60322620	V#:	
AECOM		Figure 6f

0 15 30 60
Metres

Legend

- Photo Location and Direction
- Study Area
- Parcel Boundary

Areas of Archaeological Potential

- Test Pit Survey - Intact Stratum (5m Interval)

Areas of Low Archaeological Potential

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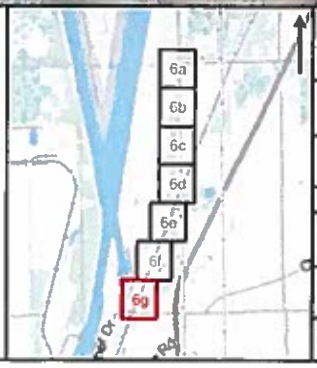

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PN: 60322620	VM	

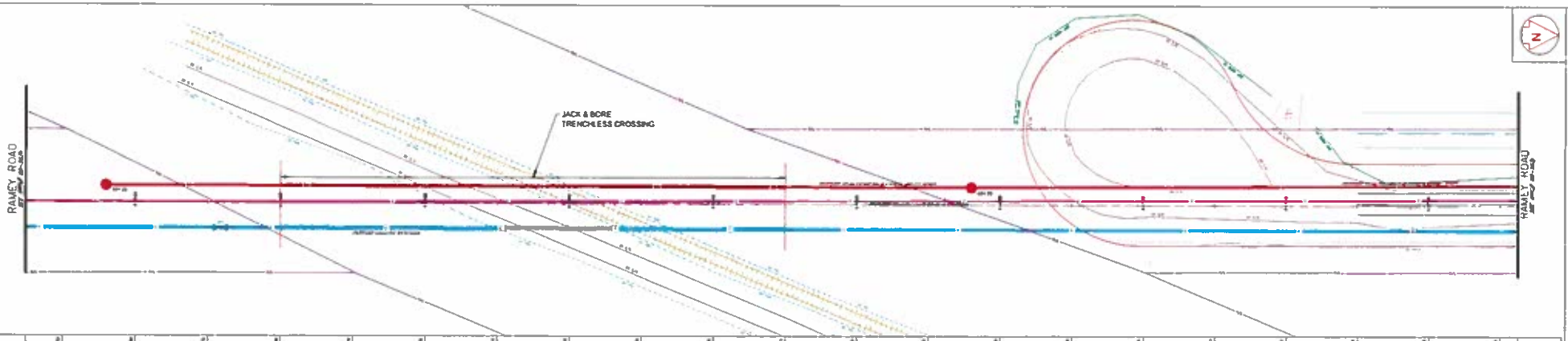
AECOM

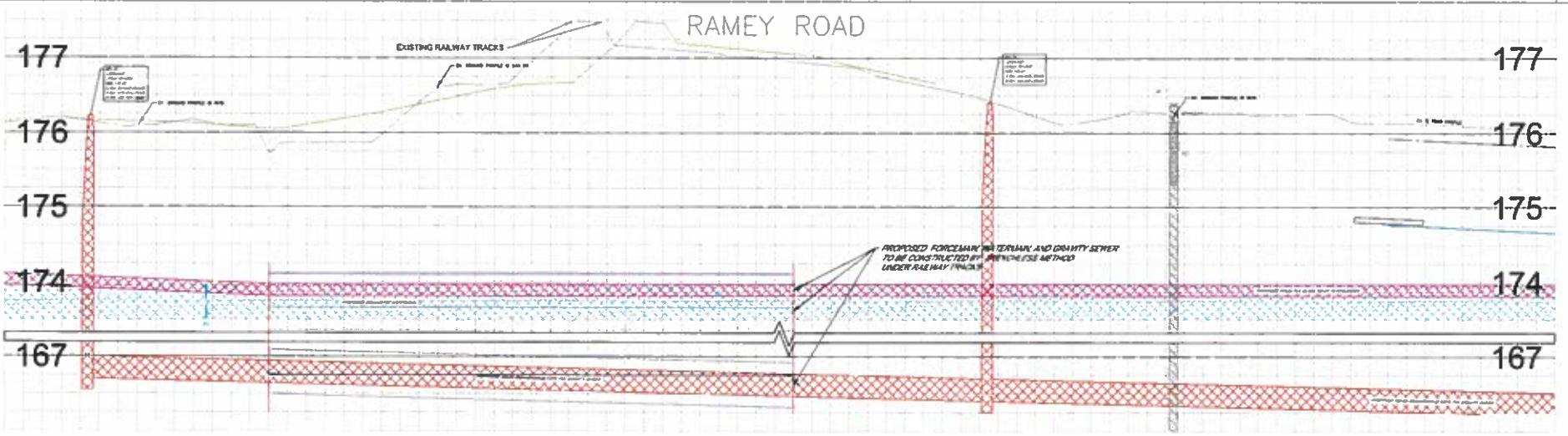
Figure 6g

0 15 30 60
Metres

Appendix F

Road Layout Plans





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SCALE	H 1:250 V 1:25
CHECKED	I.I.
DATE	DEC 3/14

CONTRACT NO.

REVISION DATE: MAR 27/2015

REVISION NUMBER: 3

PORT COLBORNE

CITY OF PORT COLBORNE

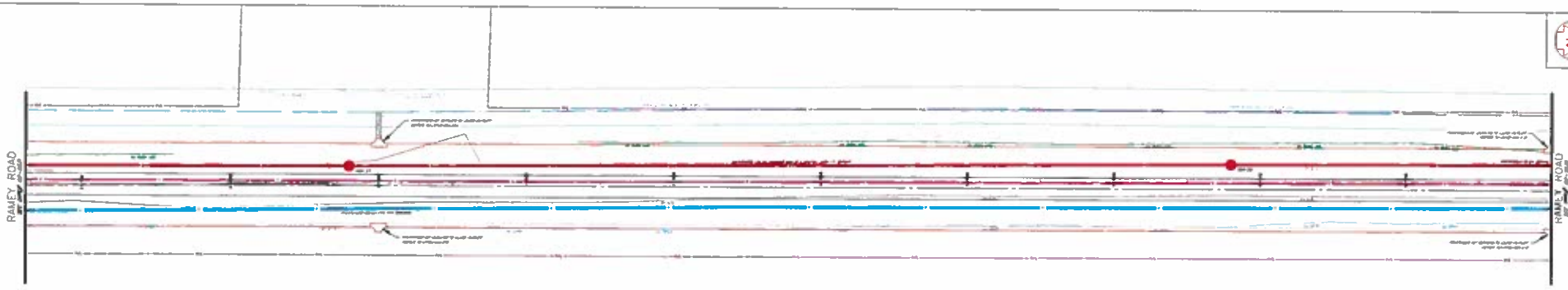
RAMEY ROAD
HIGHWAY #140 - THIRD CONC. RD

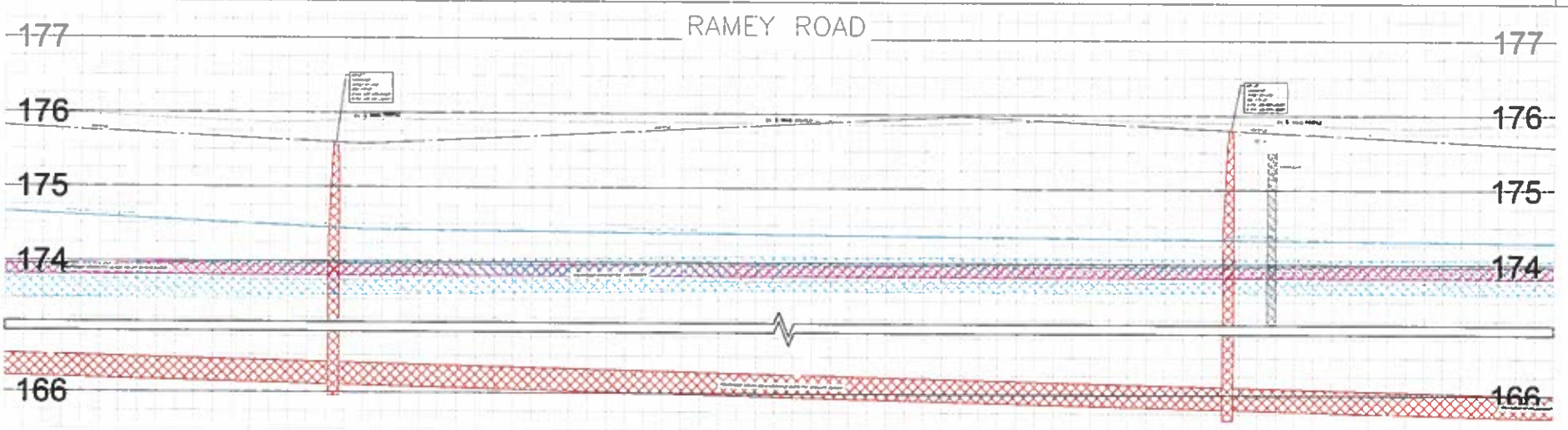
WATERMAIN/SANITARY SEWER INSTALLATION

DRAWING No.

60-562i

SITE SERVICING OF EAST SIDE EMPLOYMENT LANDS





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MAR 27/2015

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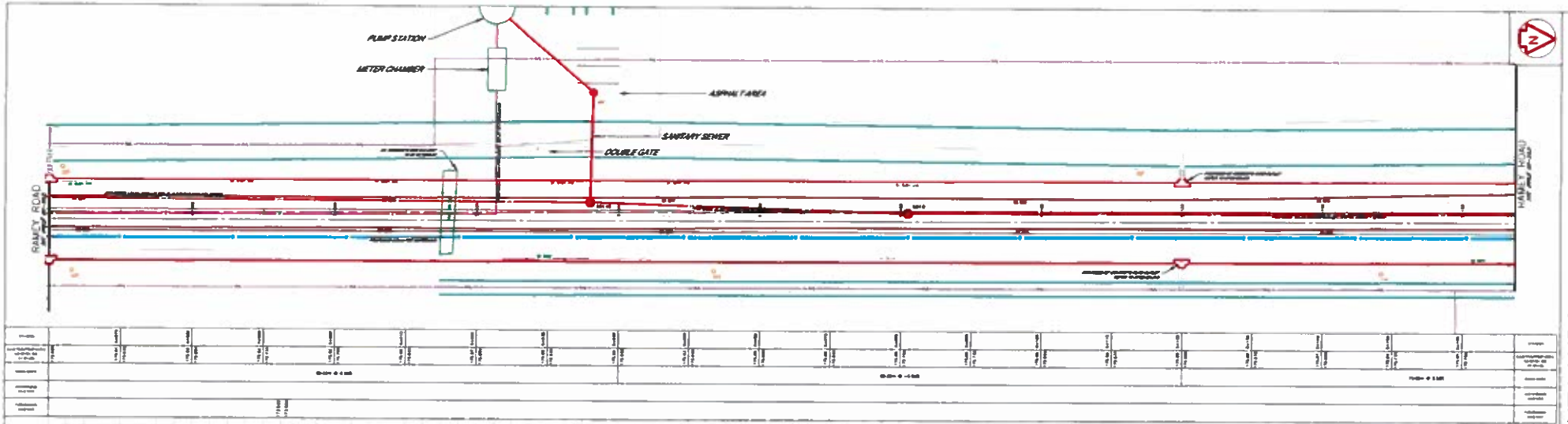
PORT COLBORNE

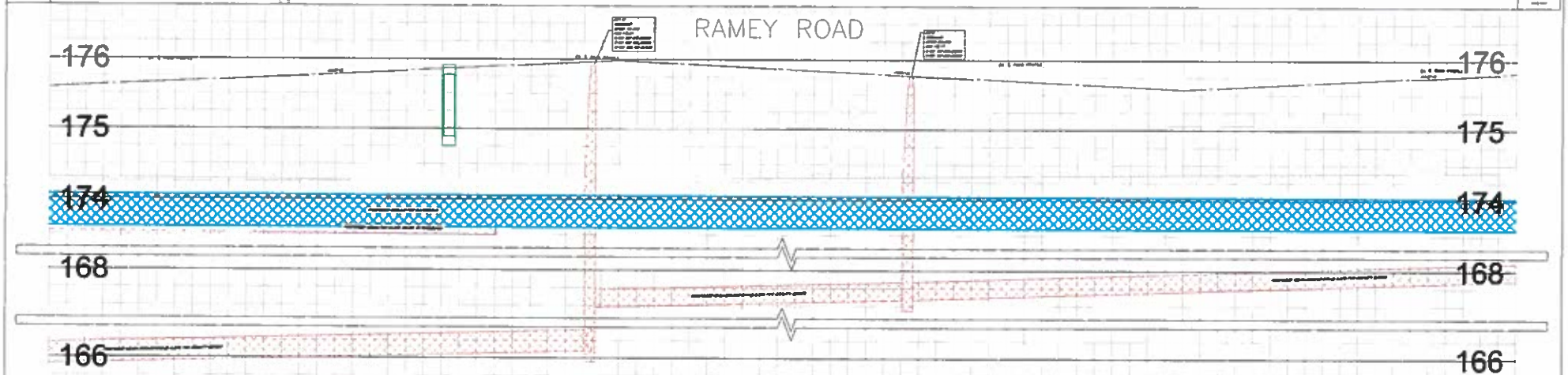
CITY OF PORT COLBORNE

RAMEY ROAD
HIGHWAY #140 - THIRD CONC. RD
WATERMAIN/SANITARY SEWER INSTALLATION

60-562j

SITE SERVICING OF EAST SIDE EMPLOYMENT LANDS





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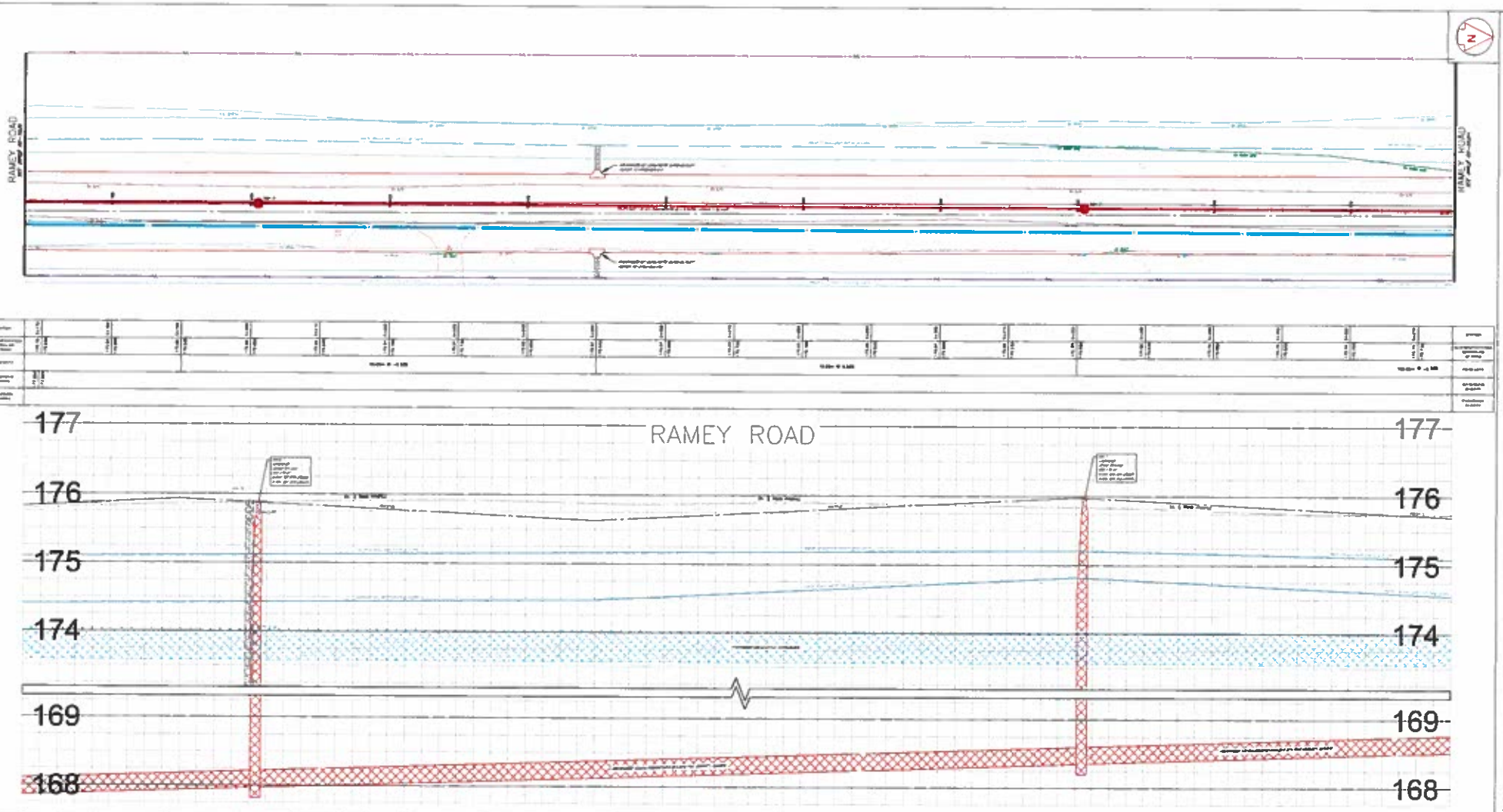
CITY OF PORT COLBORNE

RAMEY ROAD
HIGHWAY #140 - THIRD CONC. RD
WATERMAIN/SANITARY SEWER
INSTALLATION

60-562k

SITE SERVICING OF EAST SIDE EMPLOYMENT LANDS



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PORT COLBORNE

CITY OF PORT COLBORNE

RAMEY ROAD
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WATERMAIN/SANITARY SEWER INSTALLATION

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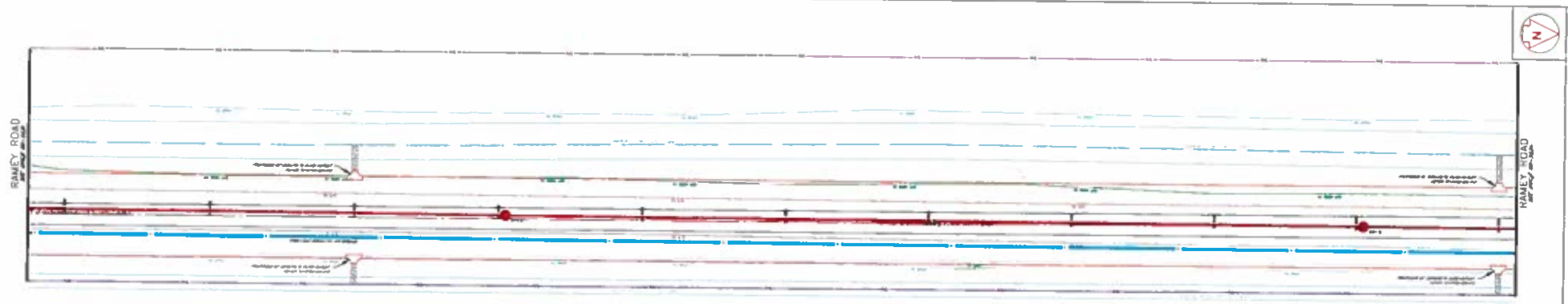

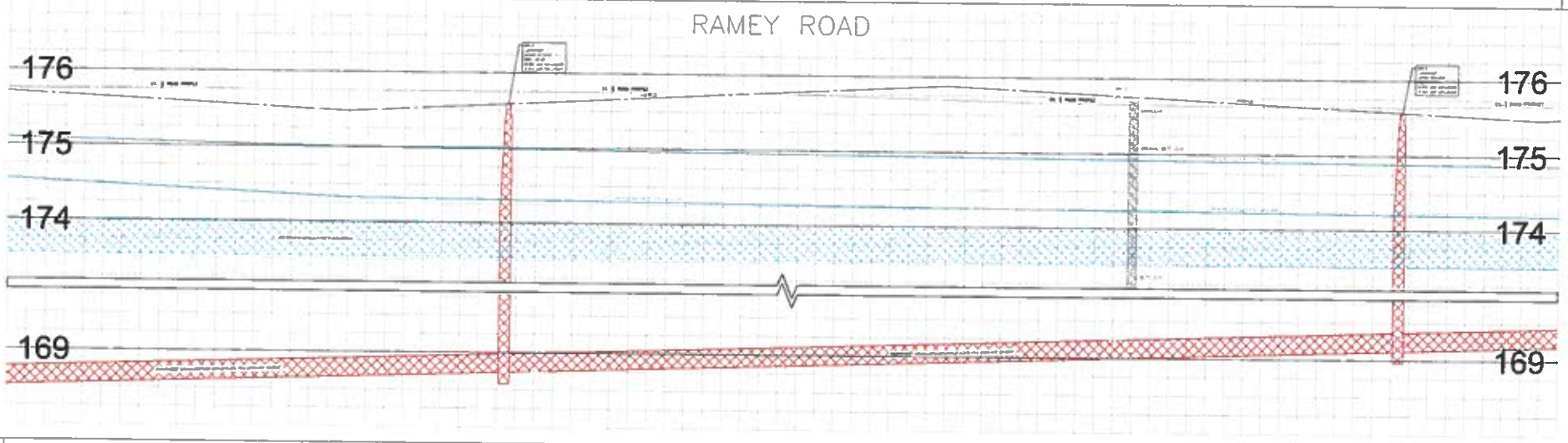

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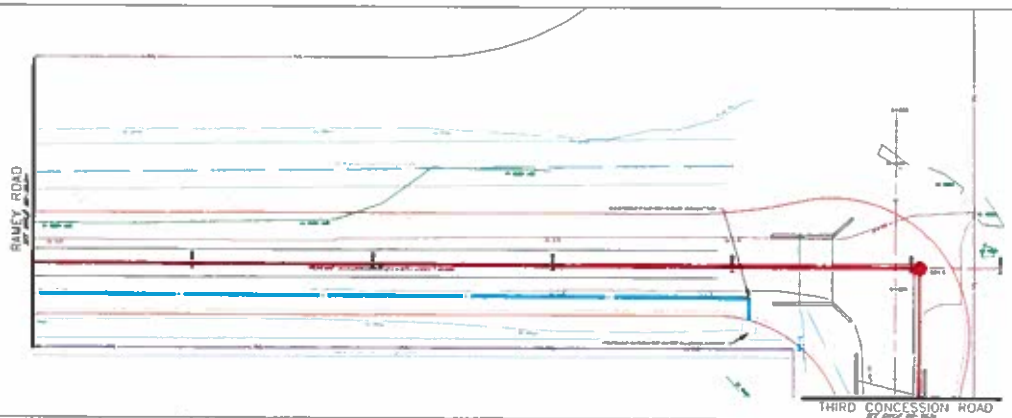

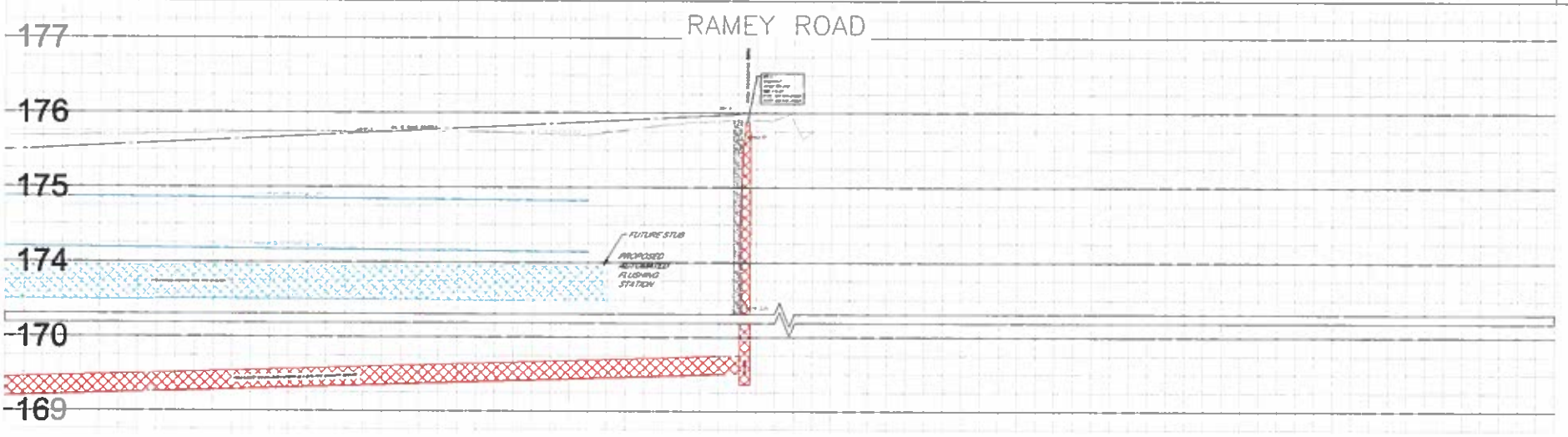

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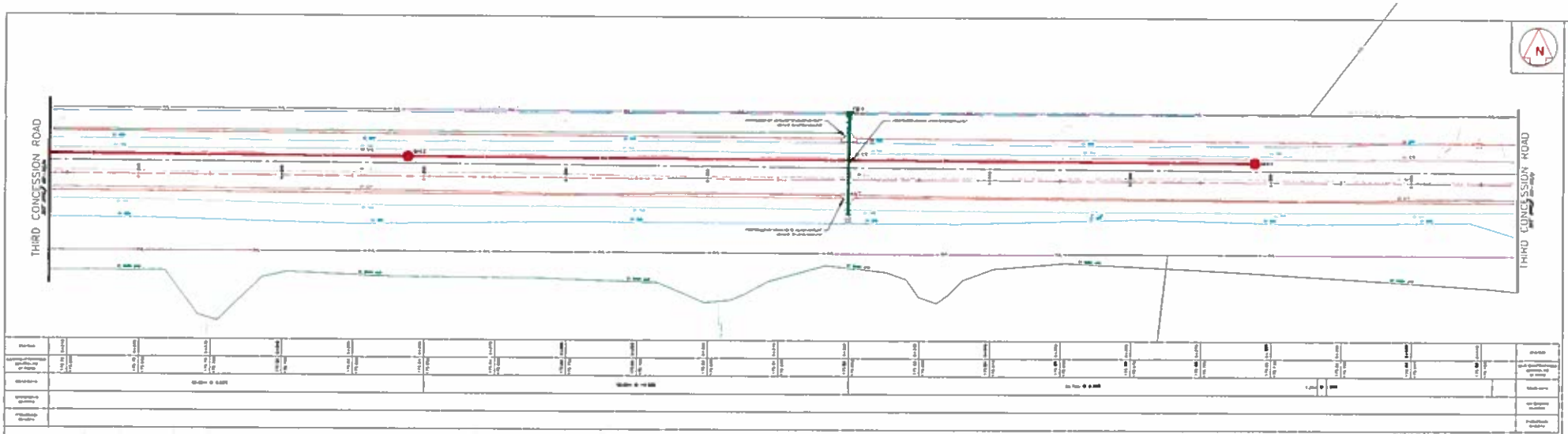

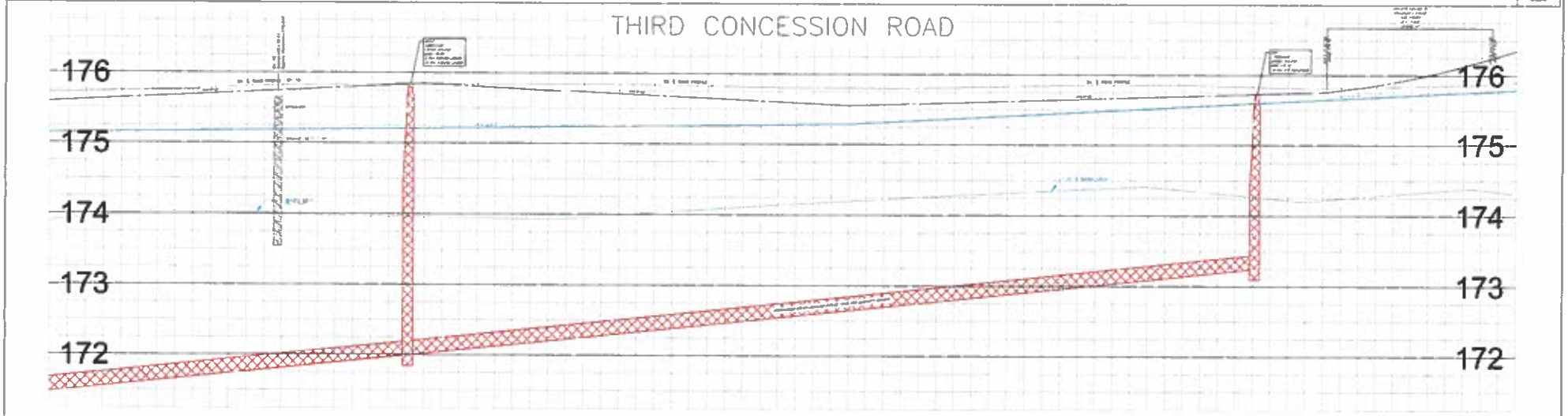

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PORT COLBORNE

CITY OF PORT COLBORNE

THIRD CONCESSION ROAD
RAMEY RD. - THIRD CONC. RD.
WATERMAIN/SANITARY SEWER INSTALLATION

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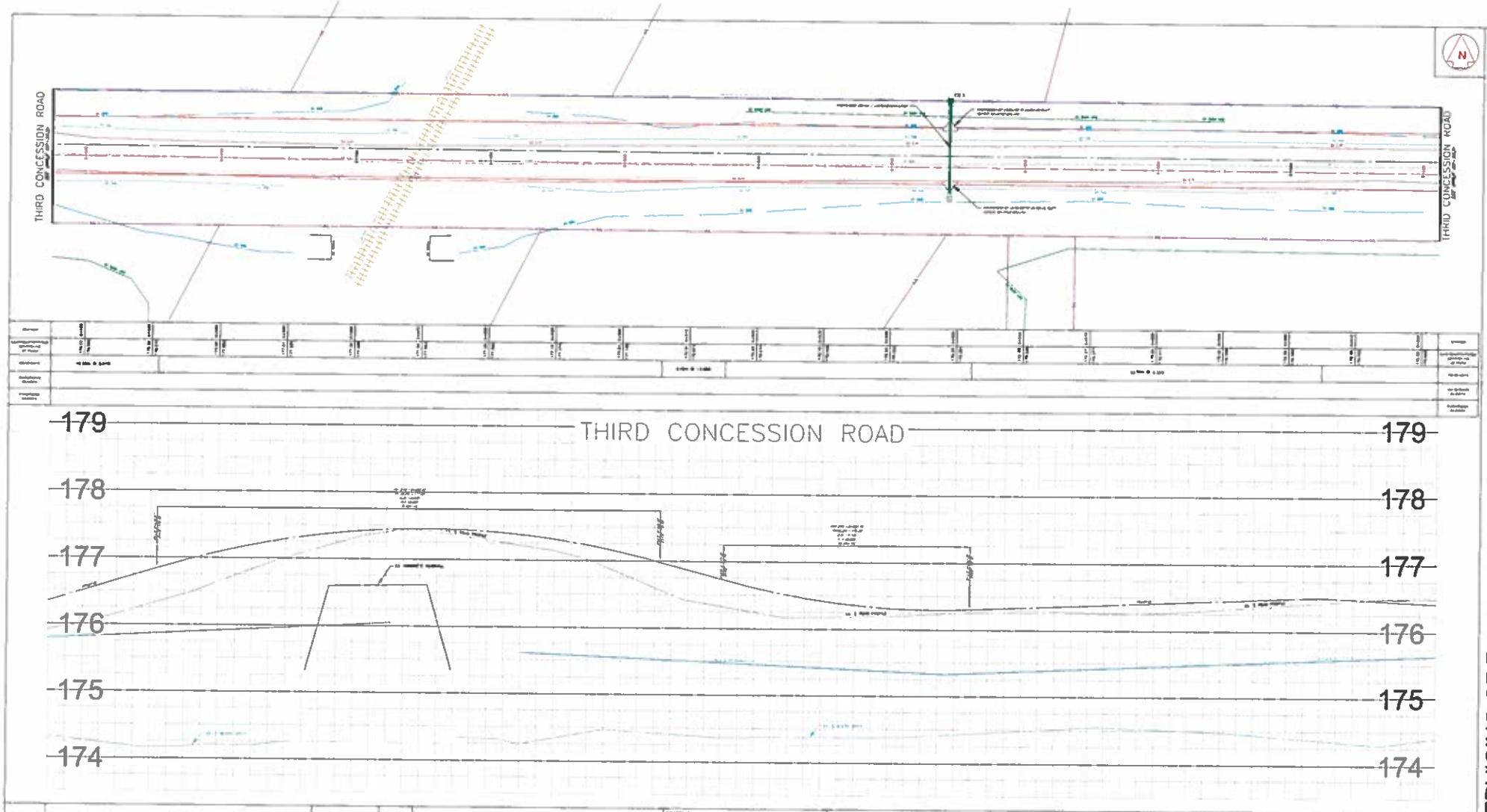
SITE SERVICING OF EAST SIDE EMPLOYMENT LANDS



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PORT COLBORNE

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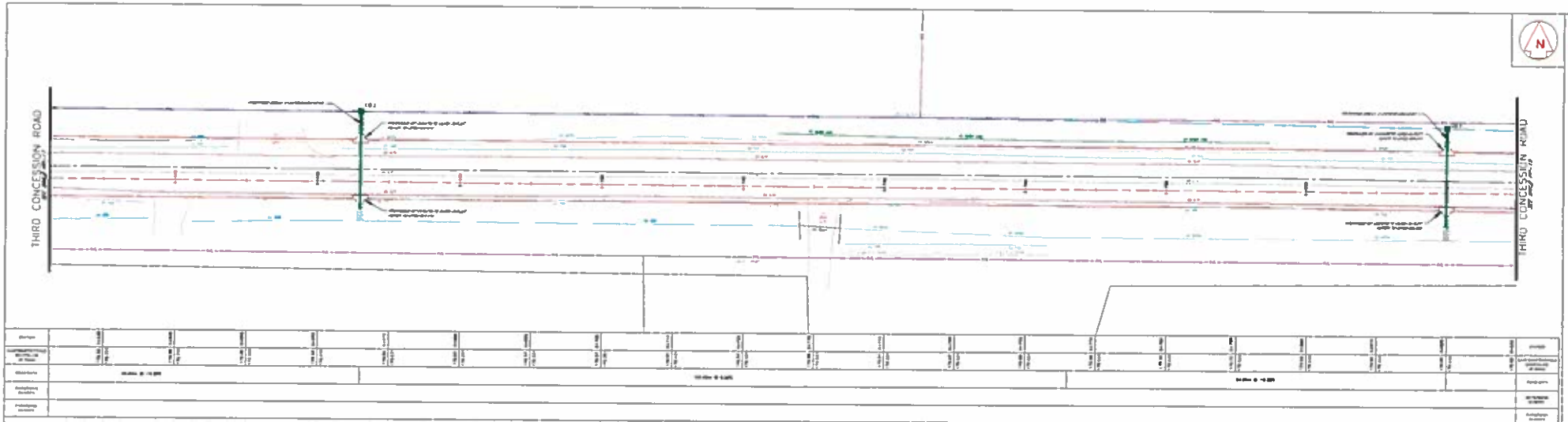
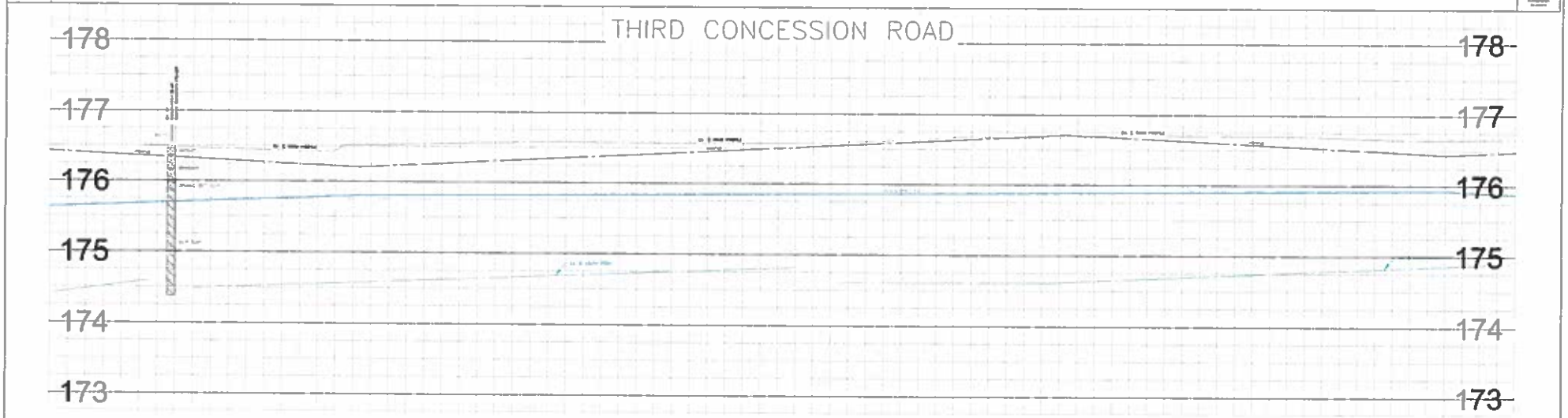
THIRD CONCESSION ROAD
RAMEY RD. - THIRD CONC. RD.

WATERMAIN/SANITARY SEWER INSTALLATION

60-562q





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RAMEY RD. - THIRD CONC. RD.

WATERMAIN/SANITARY SEWER
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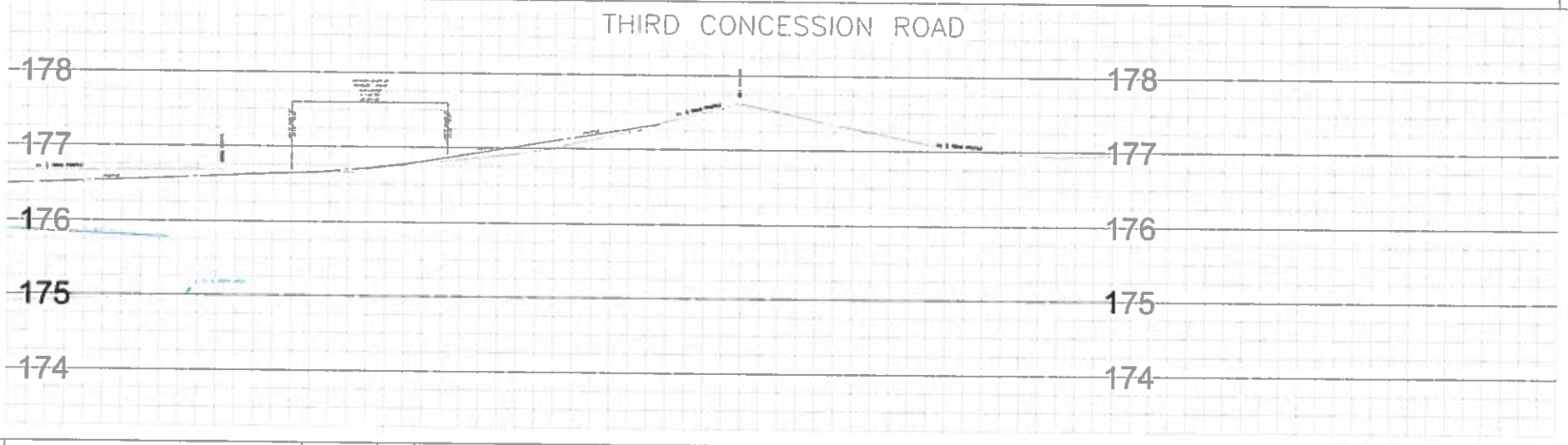
60-562r

SITE SERVICING OF EAST SIDE EMPLOYMENT LANDS



No.	REVISION	DATE	INIT.
3	50% DRAFT FOR REVIEW	MAR 27/15	I.I.
2	45% DRAFT FOR REVIEW	FEB 19/15	I.I.
1	30% DRAFT FOR REVIEW	DEC 3/14	I.I.

1) THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERGROUND UTILITIES AND STRUCTURES IS NOT NECESSARILY ON THE CONSTRUCTION DRAWINGS AND WHERE SHOWN THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED.

2) BEFORE STARTING THE WORK, THE CONTRACTOR SHALL INFORM HIMSELF OF THE EXACT LOCATION OF SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

3) HYDRO AND BELL POLES ARE TO BE ANCHORED TO THE GROUND WHERE REQUIRED SO AS TO ENSURE THE STABILITY OF THE POLE LINES.

4) THE CONTRACTOR IS TO CHECK WITH ALL THE UTILITIES INVOLVED.

5) ALL MANHOLE FRAMES , CATCH BASIN FRAMES, WATER VALVES AND GAS VALVES TO BE ADJUSTED TO FINISH GRADE.

DRAWN	A.P.
SCALE	H 1:250 V 1:25
CHECKED	I.I.
DATE	DEC 3/14

CONTRACT NO.

REVISION DATE: MAR 27/2015

REVISION NUMBER: 3

PORT COLBORNE

CITY OF PORT COLBORNE

THIRD CONCESSION ROAD
RAMEY RD. - THIRD CONC. RD.
WATERMAIN/SANITARY SEWER
INSTALLATION

60-562s

SITE SERVICING OF EAST SIDE EMPLOYMENT LANDS

Appendix G

Public Consultation

- Notice of Study Commencement
- Notice of Public Information Centre
- Public Information Centre Materials
- Other Public Consultation
- Notice of Study Completion

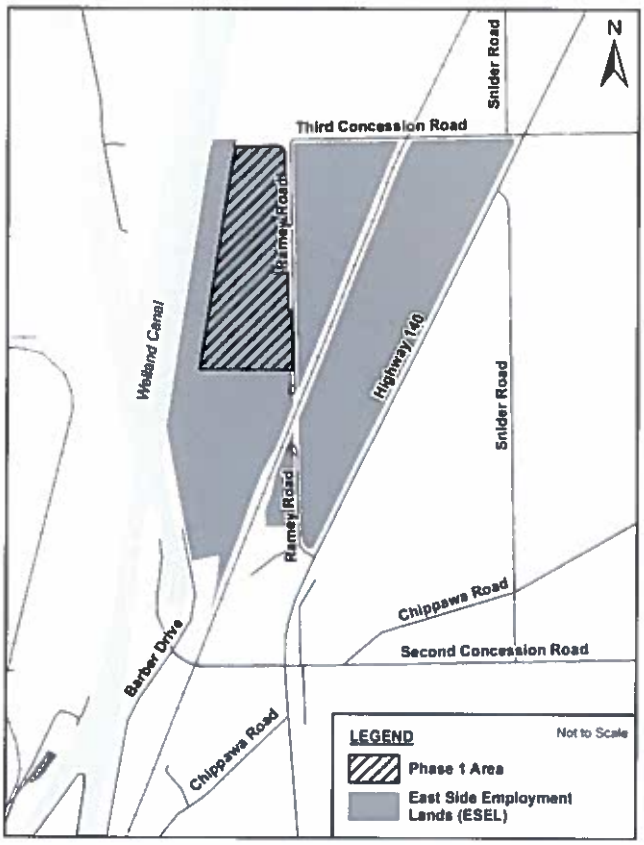
Notice of Study Commencement

NOTICE OF STUDY COMMENCEMENT
SITE SERVICING OF THE EAST SIDE EMPLOYMENT LANDS
CLASS ENVIRONMENTAL ASSESSMENT STUDY
CITY OF PORT COLBORNE

PORT COLBORNE

THE STUDY

To allow for future industrial park development, the City of Port Colborne is starting a Municipal Class Environmental Assessment (EA) Study for site servicing of the East Side Employment Lands (ESEL) Phase 1 area (see map). The ESEL form part of Niagara Region's Niagara Gateway Economic Zone and Centre, which was first identified in the Provincial Growth Plan for the Greater Golden Horseshoe. The ESEL have been identified by the City as a priority for investment to enable and support development of these lands. Key components of the EA Study include the provision of municipal water and sanitary sewer systems, stormwater management, and road network improvements.



THE PROCESS

The EA Study will be completed in keeping with the Ontario *Environmental Assessment Act*, and will follow the Master Planning Process of the Municipal Engineers Association. The Master Plan follows Approach #2 which will fulfill the requirements for Schedule A, A+, and Schedule B projects. The project team will examine a full range of alternatives and improvements and identify a preferred municipal servicing strategy for the ESEL that could be implemented in phases as development proposals come forward.

HOW TO GET INVOLVED

The City of Port Colborne wants anyone with an interest in the study to have an opportunity to provide input, which will help the project team in the decision-making process. A Public Information Centre (PIC) will be held in early 2015 to present the problem/opportunity statement and recommended servicing strategy. Advanced notification of the PIC will be advertised on the City of Port Colborne website and in similar newspaper advertisements. Comments from review agencies and members of the public are encouraged now and throughout the study. Information regarding this study will be posted on the City's website as it becomes available (www.portcolborne.ca > City Services > Engineering > Current Studies). In addition, a project email address has been established: SSESEL@portcolborne.ca. Comments and requests to be added to the study mailing list can be sent to the project email address or you can contact:

Mr. Jim Huppunen, A.Sc.T.
Manager of Engineering Services
City of Port Colborne
66 Charlotte Street
Port Colborne, Ontario, L3K 3C8
Tel: (905) 835-2900 ext. 221
Fax: (905) 835-2939

Under the Freedom of Information and Protection of Privacy Act and the Environmental Assessment Act, unless otherwise stated in the submission, any personal information such as name, address, telephone number and property location included in a submission will become part of the public record files for this matter and may be released, if requested, to any person.

This notice issued July 25, 2014
www.portcolborne.ca

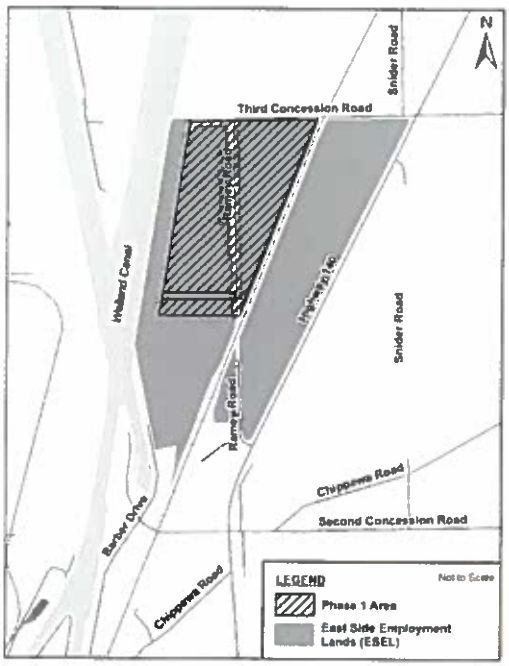
Notice of Public Information Centre

NOTICE OF PUBLIC INFORMATION CENTRE
SITE SERVICING OF THE EAST SIDE EMPLOYMENT LANDS
CLASS ENVIRONMENTAL ASSESSMENT STUDY
CITY OF PORT COLBORNE

PORT COLBORNE

THE STUDY

To allow for future industrial park development, the City of Port Colborne, in the summer of 2014, initiated a Municipal Class Environmental Assessment (EA) Study for site servicing of the East Side Employment Lands (ESEL) Phase 1 area (see map). The ESEL form part of Niagara Region's Niagara Gateway Economic Zone and Centre, which was first identified in the Provincial Growth Plan for the Greater Golden Horseshoe. The ESEL have been identified by the City as a priority for investment to enable and support development of these lands. Key components of the EA Study include the provision of municipal water and sanitary sewer systems, stormwater management, and road network improvements. The EA Study is being completed in accordance with the Ontario *Environmental Assessment Act*, and is following Approach # 2 Master Planning Process of the Municipal Engineers Association.



PUBLIC INFORMATION CENTRE

The project team has examined a full range of alternatives and improvements and identified a preferred municipal servicing strategy for the ESEL. A Public Information Centre (PIC) is being held to present the recommended municipal servicing strategy. The PIC is scheduled for:

Date:	Monday March 23, 2015
Time:	4:30 p.m. to 6:00 p.m.
Location:	Port Colborne City Hall, 66 Charlotte Street 3rd Floor Committee Room

You are invited to attend the PIC to review information about the study and speak to members of the study team who will be in attendance to discuss the project, receive comments and answer questions. The PIC will be conducted in an open house (drop-in) format, with display material and study documentation available for review.

Following the PIC, a Master Plan Project File Report will be prepared to document the planning process followed, including conclusions and recommendations, and how public input was received and considered. Notification of the locations and review period for the project file will be provided through similar newspaper advertisements and direct notifications to those on the project mailing list.

HOW TO GET INVOLVED

The City of Port Colborne wants anyone with an interest in the study to have an opportunity to provide input, which will help the project team in the decision-making process. Comments from review agencies and members of the public are encouraged now and throughout the study. Information regarding this study will be posted on the City's website as it becomes available (www.portcolborne.ca > City Hall > City Services > Engineering > Current Studies). In addition, a project email address has been established: SSESEL@portcolborne.ca. Comments and requests to be added to the study mailing list can be sent to the project email address or you can contact:

Mr. Jim Huppunen, A.Sc.T.
Manager of Engineering Services
City of Port Colborne
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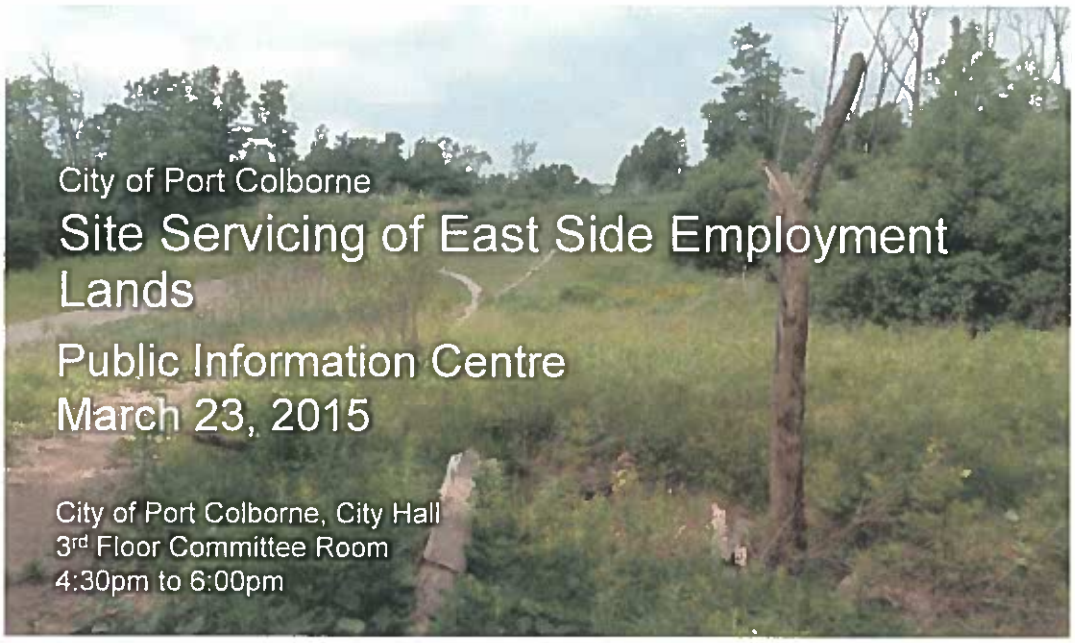
Port Colborne, Ontario, L3K 3C8
Tel: (905) 835-2900 ext. 221
Fax: (905) 835-2939

Under the Freedom of Information and Protection of Privacy Act and the Environmental Assessment Act, unless otherwise stated in the submission, any personal information such as name, address, telephone number and property location included in a submission will become part of the public record files for this matter and may be released, if requested, to any person.

This notice issued March 9, 2015
www.portcolborne.ca

AECOM

Public Information Centre Materials



PORT COLBORNE AECOM

1. Welcome!

We invite you to learn about the Municipal Class Environmental Assessment for the future servicing of the development of the East Side Employment Lands

Questions? Ask any member of the team here tonight. If we don't have an answer, we'll get it for you

This evening we will introduce you to the project, specifically:

- What this study is about
- Why this planning study is being done
- What has happened so far including recommended municipal infrastructure improvements
- What the planning process is moving forward
- How you can help plan the servicing for the future ESEL

We are looking for your feedback. Please take a sheet from the registration table and record your comments on:

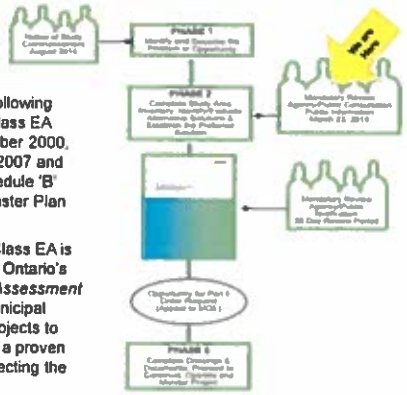
- The work we have done to date. What areas of study are important to you? The environment? The social and cultural features? Servicing the area with municipal road, water and wastewater infrastructure?
- Please submit your comment sheet here or send your feedback to the project email SSESEL@portcolborne.ca addressed to Jim Huppunen, Project Manager, City of Port Colborne

PORT COLBORNE AECOM

2. Why This Study? Why Now?

- East Side Employment Lands (ESEL) encompasses approximately 1.3 km² (320 acres)
- Location confirmed in the 2010 site selection study by AECOM and City
- These lands form part of Niagara Region's Niagara Gateway Economic Zone and centre, which was first identified in the Provincial Growth Plan for the Greater Golden Horseshoe
- The East Side Employment Lands have been identified by the City as a priority for investment to enable and support development of these lands
- The study will include municipal servicing design for sanitary sewer, watermain and road (including storm water management)
- Development phasing and preparation of the draft tender package are also included

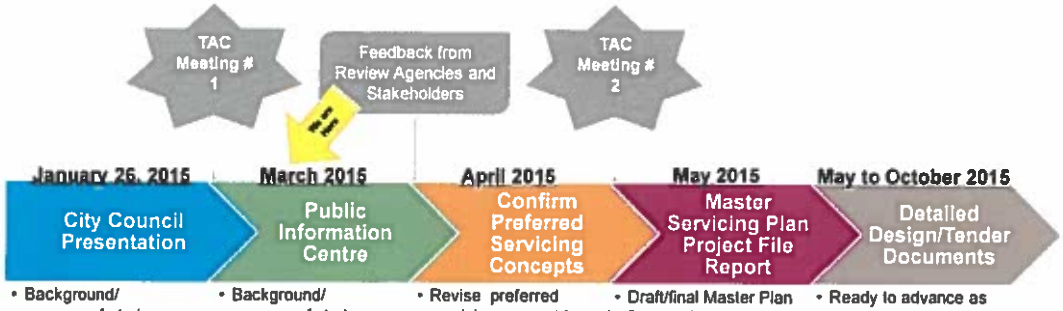
- This project is following the Municipal Class EA document (October 2000, as amended in 2007 and 2011) for a Schedule 'B' undertaking (Master Plan Approach # 2)
- The Municipal Class EA is approved under Ontario's *Environmental Assessment Act*, enables municipal infrastructure projects to be planned with a proven process for protecting the environment



- At the end of the EA process, a Master Servicing Plan Project File will be prepared for public review and comment to document the planning process followed

PORT COLBORNE AECOM

3. Project Schedule and Next Steps



- Background/ purpose of study
- Preliminary alternative servicing concepts
- Project schedule/ next steps

- Background/ purpose of study
- Problem/ opportunity statement
- Identification and evaluation of alternative servicing concepts
- Recommended servicing concepts
- Project schedule/ next steps

- Revise preferred servicing concept based on feedback from PIC and TAC-review agencies, if required

- Draft/final Master Plan Project File Report
- Notice of Study Completion
- File for 30 day public review period

- Ready to advance as development proposals come forward

PORT COLBORNE AECOM

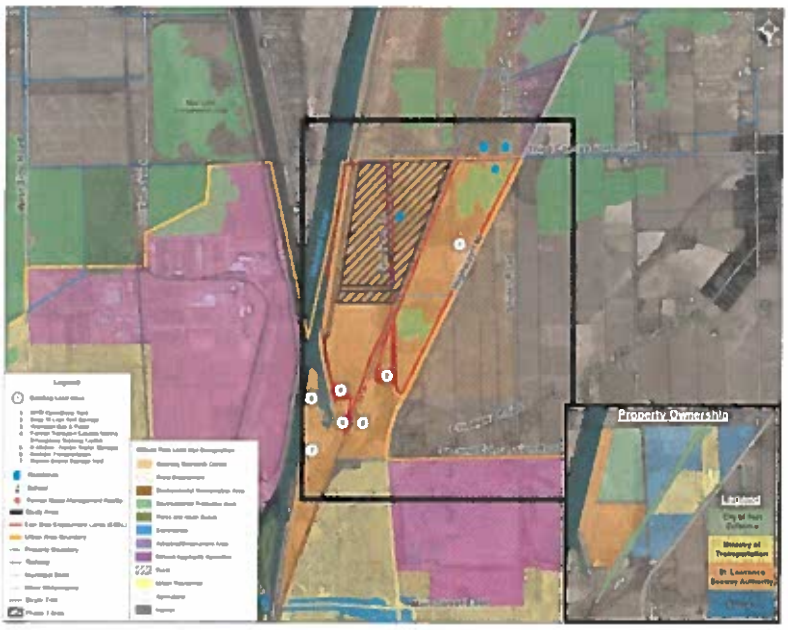
4. Summary of the Problem/Opportunity Statement

- The East Side Employment Lands have been identified as a Gateway Economic Zone/Centre and priority for investment
- The existing road network is deficient to service planned growth and meet existing municipal design standards

- Local municipal water and wastewater servicing does not currently exist within the subject lands
- In order to address the above, a Master Servicing Plan is required to:
  - Provide the necessary overall Municipal Servicing Guidelines for the East Side Employment Lands
  - Provide input to formulate the City's capital works program to service the future needs of the ESEL as development proposals come forward

PORT COLBORNE AECOM

5. Study Area Features



PORT COLBORNE AECOM

6. Summary of Natural Environment Summer/Fall 2014 Field Investigations

Aquatic:

- Four watercourses traverse the study area
  - Indian Creek (Haun Drain)
  - Third Concession Road south side drainage ditch
  - Indian Creek (north side of Third Concession)
  - Ramey Road drainage ditch

Terrestrial:

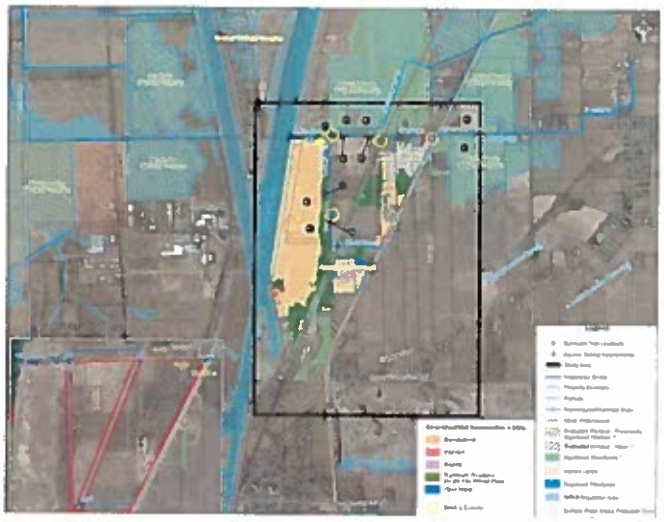
The following Ecological Land Classification Communities were found within the study area:

1. Dry-Moist Old Field Meadow Type
2. Mineral Cultural Thicket
3. Fresh-Moist Oak-Maple-Hickory Deciduous Forest Ecosite
4. Mineral Cultural Swamp Thicket
5. Oak Mineral Deciduous Swamp Type
6. Black Ash Mineral Deciduous Swamp Type
7. Swamp Maple Mineral Deciduous Swamp Type
8. Mineral Meadow Marsh Ecosite

- Three Pin-Oak trees were identified, two on the north side of Third Concession Road; 1 within the Babion Woods Provincially Significant Woodland

Species at Risk

- Study area has the potential for several Species at Risk (e.g., Milk Snake, Bobolink, Snuffbox, Cerulean Warbler, Swamp Rose-mallow)



PORT COLBORNE

AECOM

7. Archaeological and Cultural/Built Heritage Resources

Stage 1 Archaeological Assessment

- High potential for the recovery of Aboriginal and Euro-Canadian archaeological resources on the east side of Ramey Road
- Stage 2 archaeological assessment responsibility of land developer or the City (for municipal infrastructure outside of the disturbed road allowance)

Cultural and Built Heritage Resources

- Fourth and currently utilized Welland Canal (referred to as the Welland By-Pass)
- Two old farm houses and barns (east side of Ramey Road and south side of Third Concession)
- No designated historical buildings, markers, recognized historical places or Heritage Conservation Districts are located within the study area

PORT COLBORNE

AECOM

8. Municipal Wastewater Servicing Options – Sewage Pumping Station (SPS) Sites

Wastewater Servicing Options

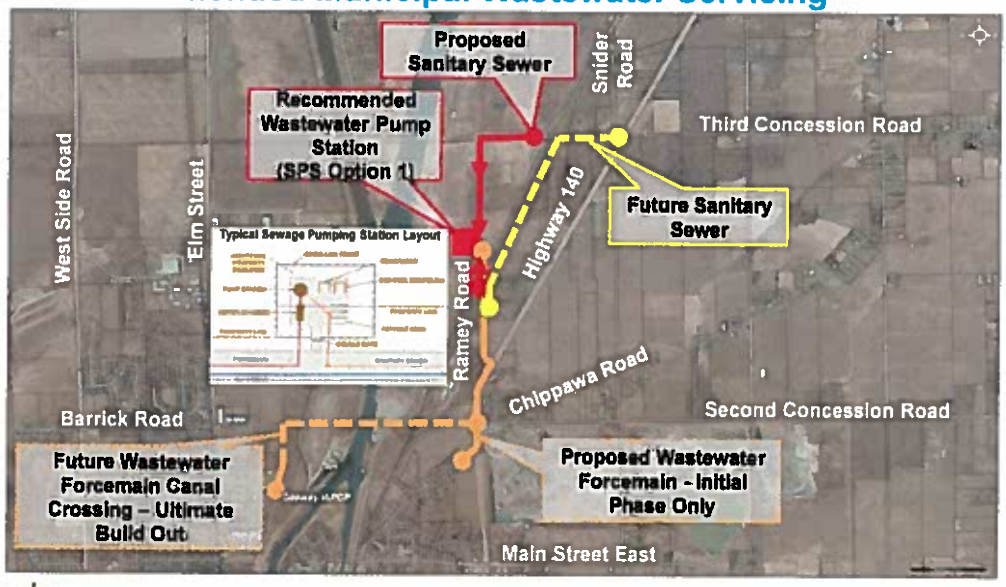
	Option 1	Option 2	Option 3	Option 4	Option 5
Natural Environment					
Social/Cultural					
Regulatory/ Legal					
Technical					
Financial					
Recommended Option					

LEGEND: GOOD | MODERATE | POOR | NO DIFFERENCE

PORT COLBORNE

AECOM

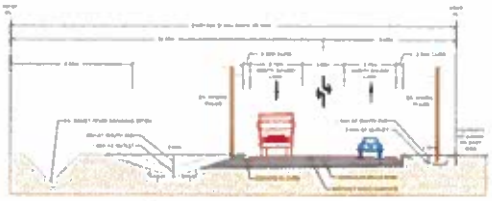
9. Recommended Municipal Wastewater Servicing



PORT COLBORNE

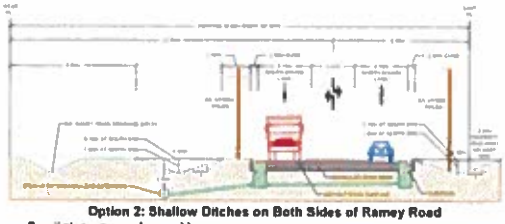
AECOM

10. Ramey Road, Road Improvement Options



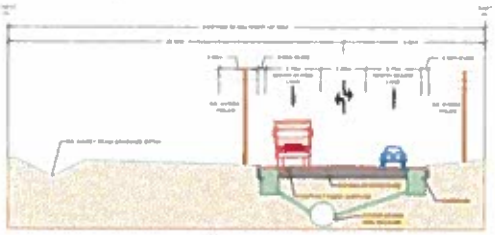
Option 1: Deep Ditch on West Side of Ramey Road

- Possible combination of deep ditch and Ramey Road drainage ditch
- Shallow ditch on east side of Ramey Road
- No catch basins or storm sewer



Option 2: Shallow Ditches on Both Sides of Ramey Road

- Small storm sewer for road base
- No affect on Ramey Road Drainage Ditch



Option 3: Storm Sewer System

- No ditches
- Large storm sewer
- No affect on Ramey Road Drainage Ditch

Road Improvement Options

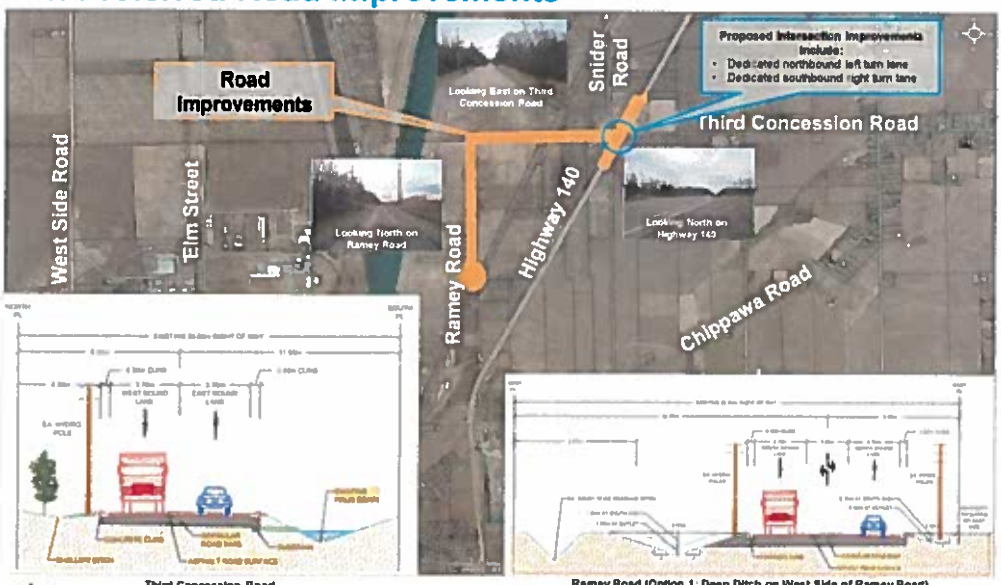
	Option 1	Option 2	Option 3
Natural Environment			
Social/Cultural			
Regulatory/Legal			
Technical			
Financial			
Recommended Option			

LEGEND: GOOD | MODERATE | POOR | NO DIFFERENCE

PORT COLBORNE

AECOM

11. Preferred Road Improvements



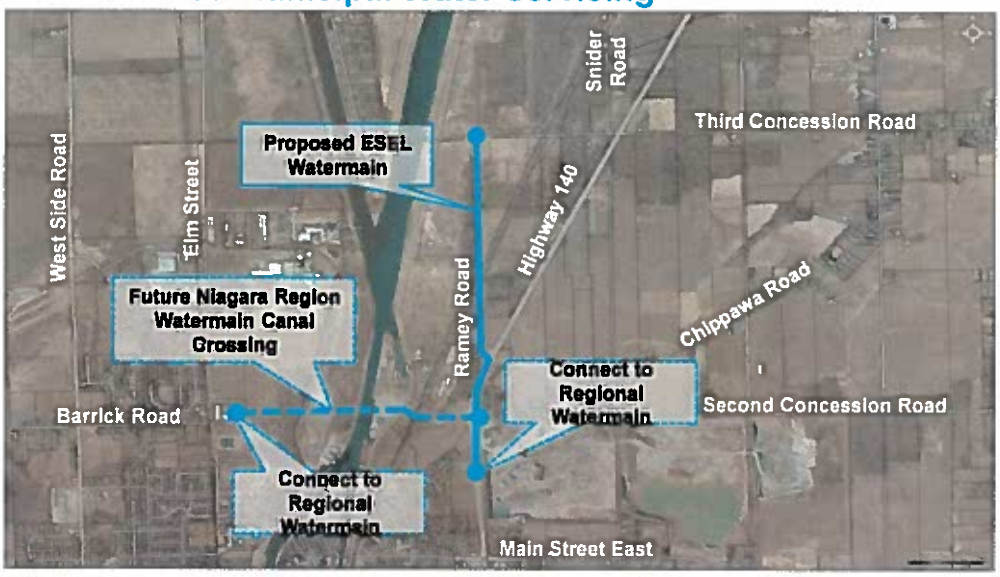
Third Concession Road

Ramey Road (Option 1: Deep Ditch on West Side of Ramey Road)

PORT COLBORNE

AECOM

12. Preferred Municipal Water Servicing



Note: 450 mm diameter watermain will be constructed in the existing road allowance-no alternatives were investigated

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AECOM

13. Existing Utilities in the East Side Employment Lands

- High pressure gas main on the north side of Third Concession Road. Study will confirm if this pipe negatively impacts the proposed road improvements
- Recommended road design does not require the relocation of hydro poles on Ramey Road or Third Concession Road
- The Trillium Railway crossing at Third Concession Road will be designed to meet current standards

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AECOM

14. Proposed Mitigation Measures

Water Crossings (Culvert Replacement and Pipes)

- Maintain drainage through ditch relocation and redesign
- Construction to take place outside of fish spawning timing window (i.e., no construction between March 30 and June 1)
- Develop comprehensive erosion/sedimentation control strategy including regular inspections

Noise/Vibration/Dust:

- Construction operations to occur during day shift
- Use of low noise equipment during construction, where possible
- Complete preconstruction condition surveys of buildings

Trees and Vegetation

- Minimize tree and vegetation removal
- Prepare Tree Protection Plan, if required
- Breeding Birds - in accordance with the *Migratory Birds Convention Act*, any tree trimming or site clearing should take place between August 1 and April 31
- Should tree or site clearing be scheduled from May 1 to July 31, comprehensive breeding bird surveys will be required

Archaeological

- Complete Stage 2 archaeological assessment based on Stage 1 archaeological assessment findings
- If any archaeological and/or historical resources are discovered during the performance of construction work, the performance of the work in the area of the discovery is to halt. The Ministry of Culture (Archaeological Unit) will be notified for an assessment of the discovery. Work in the area of the discovery would not resume until cleared to do so by the Ministry

Groundwater Management

- Implement dewatering plan based on hydrogeological assessment

Contaminated Soils

- Prepare and follow contingency plans for control and cleanup should a spill occur

Traffic Management and Access

- Prepare Traffic Management Plan including staging drawings (Highway 140)
- Maintain 1 lane of traffic and access to property at all times
- Provide advanced notification to affected property owners

PORT COLBORNE

AECOM

15. Will I Have to Connect to the New Water and Sewer System?

- No residential connection to trunk water and sanitary sewer facilities will be allowed
- Those living within the East Side Employment Lands study area will not be required to hook up to the new water and wastewater system
- The City may consider requests to connect to local water and wastewater services where they exist on a case-by-case basis

PORT COLBORNE

AECOM

16. How You Can Provide Feedback

- The City of Port Colborne appreciates and values your input in its decision making for this project
- All comments collected throughout the project will be considered in finalizing the preferred servicing option
- Please fill out a comment sheet today and leave it with our representatives, or send it to Jim Huppunen, Project Manager, by **April 10, 2015**
- Further information is available on the project website at www.portcolborne.ca > City Services > Engineering > Current Studies.
- A project email address has been established: SSESEL@portcolborne.ca
- Comments and requests to be added to the study mailing list can be sent to the project email address or you can contact:

Mr. Jim Huppunen, A.Sc.T.
Manager of Engineering Services
City of Port Colborne
66 Charlotte Street
Port Colborne, Ontario L3K 3C8
Tel: (905) 835-2900 ext. 221, Fax: (905) 835-2939

PORT COLBORNE

AECOM

AECOM

Other Public Consultation

Mollo, Jessica

From:
Sent: Wednesday, September 24, 2014 4:31 PM
To:
Cc: Whittard, Jennifer; ssesel@portcolborne.ca
Subject: SSESEL Fw: Site 18

Hi

The City's current Class Environmental Assessment (EA) study for Site Servicing of the East Side Employment Lands (ESEL) is focused on municipal infrastructure so that the lands will be "shovel-ready" for municipal servicing. The purpose of this EA study is to determine the preferred watermain and sanitary sewer routes for servicing of the ESEL (see map in the Notice of Study Commencement). The EA will also determine the preferred site for a new wastewater pumping station, as well as the preferred design concepts for upgrades to both Third Concession Road and Ramey Road (south of Third Concession) in order to accommodate industrial traffic. As part of determining the preferred routes, pumping station site and road design concepts, the EA will determine the potential impacts associated with the construction of this infrastructure.

The EA study has not been designed to go into the level of detail that a site-specific Environmental Impact Statement (EIS) would. As such, detailed inventories on your property will not be completed as part of this study. The study will however, include a high-level overview of study area environmental constraints and planning considerations based on existing published sources and confirmation fieldwork that could be used as a starting point for an EIS.

A Public Information Centre (PIC) is tentatively scheduled for March 2015 and further public information will be posted to the City's website at that time. In the meantime, we have added you to our project e-mail list so that you'll receive direct notification of the PIC from our consultant.

Thank you very much for returning the Permission to Enter agreement. Our consultant's ecologists plan to conduct their fieldwork tomorrow (Thursday, September 25th). I do not know which specific properties they plan to access in order to make their field observations, or if they will be walking your property, but I wanted to let you know that they will be in the area.

Please don't hesitate to contact me if I can be of any further assistance.

Regards,

Jim Huppunen, A.Sc.T.
Manager of Engineering Services
City of Port Colborne
66 Charlotte Street
Port Colborne, Ontario L3K 3C8
905-835-2901, Ext. 221
Fax: 905-835-2939

----- Forwarded by Jim Huppunen/Port_Notes on 09/24/14 04:32 PM -----

Project
Site Servicing East Side Employment Lands

09/23/14 11:19 AM

To"SSESEL@portcolborne.ca" <SSESEL@portcolborne.ca>

cc

SubjectSite 18

Hello Jim,

To further our conversation re: the work being done, can you provide us with some more details, for example, at the completion of this project, would we know what parts of the property can be developed. Will the Region and Conservation be satisfied or would we need to do more studies? Will this study complete the tree inventory, the snake and flower inventory, the migrating bird study, the seed dispersal and wild life corridor identification specific to our property, and all the other things they require in an environmental impact study? Is an environmental impact study the same as an environmental assessment study? Would we be provided with these reports so that we can move forward with development without further studies?

Thanks,

Mollo, Jessica

From: Whittard, Jennifer
Sent: Friday, November 14, 2014 11:35 AM
To: Mollo, Jessica
Cc: Jennifer Whittard
Subject: FW: SSESEL

Follow Up Flag: Follow up
Flag Status: Flagged

From: [redacted] [mailto:]
Sent: Thursday, September 18, 2014 11:05 AM
To:
Cc: ssesel@portcolborne.ca; Whittard, Jennifer
Subject: Re: SSESEL

Hi

The EA study will evaluate alternative routes for both the sanitary sewers and watermains, alternative sites for the SPS, as well as upgrades to both Third Concession Road and Ramey Road in order to accommodate industrial traffic. This will also include intersection improvements at Third Concession & Hwy 140. Depending on the preferred design as determined during the EA, your property may be serviced with water and/or sewer, however the construction timing is dependent on a number of factors, including Council approval.

Since this project is in the design stage, I am unable to comment on the property taxes as I am not sure if there would be any impact if you property becomes serviced. At this point in time, there are no direct costs associated with this project. If in the future, your property is able to be provided services, then there may be a connection cost at that time.

As for the electronic data for your property, plans will be presented at a Public Information Centre tentatively scheduled for March of 2015 and the public information will be posted to the City's website at that time.

We look forward to receiving your Permission to Enter form. If you have any further questions, please do not hesitate to contact me.

Regards,

Jim Huppunen, A.Sc.T.
Manager of Engineering Services
City of Port Colborne
66 Charlotte Street
Port Colborne, Ontario L3K 3C8

905-835-2901, Ext. 221
Fax: 905-835-2939

From:
To: [redacted]
Date: 09/08/14 11:06 AM
Subject: Re: SSESEL

Jim,

Sorry for the first email with no content. I received a letter in the mail with a site plan for servicing of the East Side Employment Lands and I have a few questions. This might be easier to do face-to-face, if that is more convenient for you. I understand that you are out of the office this week, so please let me know what would be better for you.

Firstly, as outlined in the Site Plan, I own property

I am curious as to how this servicing will affect my property. Will the servicing increase my property taxes? Are there any direct costs associated with it? I would like to build on this site in the future, and wonder is it would be financially beneficial to have services run to my property at the same time as they will be servicing the municipal properties.

Any information in regards to these services that you could provide me with would be greatly appreciated.

Also, would I be able to acquire copies of the associated studies including environmental assessments and topographical data associated with my parcel of land.

I will drop off the "permission to enter" forms at City Hall at my earliest convenience.

Thanks,

On Mon, Sep 8, 2014 at 10:50 AM, wrote:
Jim,

Mollo, Jessica

Subject: RE: Comments on EA PIC for East Side Employment Lands

From: Jim Huppunen/Port_Notes
To: ian.izzard@aecom.com
Cc: ssesel@Port_Notes, "Grueneis, Karl" <Karl.Grueneis@aecom.com>, "Mollo, Jessica" <Jessica.Mollo@aecom.com>
Date: 03/26/2015 01:42 PM
Subject: Fw: Comments on EA PIC for East Side Employment Lands

---

Hi Ian,

Please review the comments below from

Regards,

Jim Huppunen, A.Sc.T.
Manager of Engineering Services
City of Port Colborne
66 Charlotte Street
Port Colborne, Ontario L3K 3C8

905-835-2901, Ext. 221
Fax: 905-835-2939

----- Forwarded by Jim Huppunen/Port_Notes on 03/26/2015 01:42 PM -----

From:
To:
Cc:

Date: 03/25/2015 01:56 PM
Subject: Comments on EA PIC for East Side Employment Lands

Jim,
I was not able to access the Subject PIC comment sheets on line, so please consider the following as my comments and responses to the numbering in the handout:

1. I agree this project is important for the long-term development of an industrial tax-base for the City of Port Colborne.
2. Continuous input from NPCA should be maintained.
3. No comment on Sanitary Sewer servicing or Phasing. Maintain involvement by RMN for details of the pumping station to Regional Standards so that the Region will own and operate the pumping station as they have the knowledge and equipment to do so. Similarly for water servicing, and the involvement of the Region for construction of the trunk water facilities and storage.
No comment on road Cross-sections (road improvement alignment and phasing addressed in 4.).
4. When reviewing the servicing plans for the East Side Employment Lands, I noted that the watermains and sanitary sewers for Phase I were west of the rail ROW, and to the south to 2nd Concession. Phase I will require restoration of the lands where these services are installed.
The road improvements are proposed to be to the north, requiring significant improvement of 3rd Concession, including culvert work and rail crossing, and widening of turn lanes on Highway 140.
Would it not be advantageous to improve the south RR crossing of Ramey Road, and provide the initial road access and improvements to the south, and restoring the utility installation disturbed area with road reconstruction.
This would leave all of 3rd Concession disturbance for Phase 2, funded by the development in Phase I.
Phase 2 sanitary sewers east of the rail ROW are shown partly on 3rd Concession, (and probably watermains although not shown) possibly destroying some of the proposed Phase I road improvements on 3rd Concession.

I would also suggest a roadway connection to Barber Drive, or 2nd Concession, to provide direct access from the site to the Welland Canal (Highway H2O) and to an intersection at Hwy 140 with traffic lights, which may eliminate the need for turning lanes on Hwy 140. It may also allow elimination of the Ramey Road intersection to Hwy 140.

5. I would like to be kept informed of the progression of decisions on this project.
6. I am a member of the General Public.

Respectfully Submitted,

Mollo, Jessica

From:
Sent: Monday, August 17, 2015 2:22 PM
To:
Cc:

Grueneis, Karl; Izzard, Ian; Mollo, Jessica
Subject: Re: EA and Servicing Study - East Side Employment Lands

Follow Up Flag: Follow up
Flag Status: Flagged

Hi

The consultant has been working on drafting the Report for the Environmental Assessment. Comments from some of the agencies have taken longer than we expected. I believe the draft report should be available within the next month or so.

As for the access and connection to the Region's future canal crossing, we have been in discussions with Regional Staff to ensure that their alignment works with our design work.

Regards,

Jim Huppunen, A.Sc.T.
Manager of Engineering Services
City of Port Colborne
66 Charlotte Street
Port Colborne, Ontario L3K 3C8
905-835-2901, Ext. 221
Fax: 905-835-2939

From:
To:
Date: 2015-08-14 02:18 PM
Subject: EA and Servicing Study - East Side Employment Lands

Jim,
Can you provide me with an update on the status of the Subject project, and the assessment of the comments from the PIC?
Something additional to consider is the **access** and ROW that will be required by the Region's contractor when they get to construction of the trunk watermain canal crossing and the potable water storage, which I presume will be an elevated tank, and the east side connection to the City's distribution system.

Best Regards,

Mollo, Jessica

From:
Sent: Monday, August 17, 2015 2:23 PM
To: Mollo, Jessica
Subject: Fw: ESEL

Follow Up Flag: Follow up
Flag Status: Flagged

FYI

Regards,

Jim Huppunen, A.Sc.T.
Manager of Engineering Services
City of Port Colborne
66 Charlotte Street
Port Colborne, Ontario L3K 3C8
jimhuppunen@portcolborne.ca
905-835-2901, Ext. 221
Fax: 905-835-2939

----- Forwarded by Jim Huppunen/Port_Notes on 2015-08-17 02:23 PM -----

From: Jim Huppunen/Port_Notes
To:
Cc: ssesel@Port_Notes, "Grueneis, Karl" <Karl.Grueneis@aecom.com>, ian.izzard@aecom.com
Date: 2015-08-17 02:19 PM
Subject: Re: ESEL

Hi

The consultant has been working on drafting the Report for the Environmental Assessment. Comments from some of the agencies have taken longer than we expected. I believe the draft report should be available within the next month or so.

Regards,

Jim Huppunen, A.Sc.T.
Manager of Engineering Services
City of Port Colborne
66 Charlotte Street
Port Colborne, Ontario L3K 3C8

905-835-2901, Ext. 221
Fax: 905-835-2939

From:
To: "Huppunen, Jim" <
Date: 2015-08-16 08:05 AM
Subject: ESEL

Hello Jim,
Wondering when the report on the ESEL will be ready.

Take care,

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 1A3
www.aecom.com

905 682 0212 tel
905 682 4495 fax

September 21, 2015

Project No: 60326620

Regarding: City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA: Response to Public Information Centre Comments

Dear :

On behalf of the City of Port Colborne, thank you for attending the Public Information Centre on March 23, 2015 and providing your comments dated March 25, 2015. We note that the study schedule has been extended to allow for the review of an alternate water and wastewater alignment to the Second Concession Road Niagara Region watermain. The Class EA Master Plan Project File is now anticipated to be filed in January 2016. The following are responses to your comments.
Comment # 1: I agree this project is important for the long-term development of an industrial tax-base for the City of Port Colborne.

Response # 1: Thank you for your comment.

Comment # 2: Continuous input from NPCA should be maintained.

Response # 2: The NPCA has been and will be consulted throughout the Class EA planning process in addition to detailed design and permitting/approvals.

Comment # 3: No comment on Sanitary Sewer servicing or Phasing. Maintain involvement by RMN for details of the pumping station to Regional Standards so that the Region will own and operate the pumping station as they have the knowledge and equipment to do so. Similarly for water servicing, and the involvement of the Region for construction of the trunk water facilities and storage. No comment on road Cross-sections (road improvement alignment and phasing addressed in 4.).

Response # 3: We have been in consultation with the Region of Niagara throughout the project and will continue to keep them involved through detailed design.

Comment # 4: When reviewing the servicing plans for the East Side Employment Lands, I noted that the watermains and sanitary sewers for Phase I were west of the rail ROW, and to the south to 2nd Concession. Phase I will require restoration of the lands where these services are installed.

The road improvements are proposed to be to the north, requiring significant improvement of 3rd Concession, including culvert work and rail crossing, and widening of turn lanes on Highway 140. Would it not be advantageous to improve the south RR crossing of Ramey Road, and provide the initial road access and improvements to the south, and restoring the utility installation disturbed area

with road reconstruction. This would leave all of 3rd Concession disturbance for Phase 2, funded by the development in Phase I.

Phase 2 sanitary sewers east of the rail ROW are shown partly on 3rd Concession, (and probably watermains although not shown) possibly destroying some of the proposed Phase I road improvements on 3rd Concession. I would also suggest a roadway connection to Barber Drive, or 2nd Concession, to provide direct access from the site to the Welland Canal (Highway H2O) and to an intersection at Hwy 140 with traffic lights, which may eliminate the need for turning lanes on Hwy 140. It may also allow elimination of the Ramey Road intersection to Hwy 140.

Response # 4: All lands including roads that are disturbed by the installation of services will be restored to existing condition.

By improving the roads in the north section of the ESEL, the City will be able to better market-develop its land holdings in the north. It is the City's vision to consider all lands between the Welland Canal and the Trillium Railway as Phase 1, with lands to east of the Trillium Railway likely being developed later. Improving Third Concession Road and Ramey Road North first frames the entire servicing for the ESEL which makes all ESEL lands more attractive to developers. Phase 2 servicing will be installed entirely east of the existing Trillium Railway corridor and will not affect roads which are developed as part of the Phase 1 installation. Phase 1 will include services on Ramey Road up to Third Concession Road, while Phase 2 services will be installed within the Trillium Railway corridor. With respect to phasing and a new roadway at Second Concession Road, we have discussed this with the City. A new roadway connection to Second Concession Road would be more expensive to build as it would require a new crossing at the Trillium Railway as well as new property purchase. We also note that any new intersection at Highway 140, north of Second Concession Road would result in poor sight lines and difficult MTO approvals.

Comment # 5: I would like to be kept informed of the progression of decisions on this project.

Response # 5: You have been added to the study mailing list and will receive the Notice of Study Completion.

In Closing...

We thank you for your comments. We will continue to keep you informed of study progress including the Notice of Study Completion and filing of the Master Plan Project File Report. Should you have any additional questions or comments, please feel free to contact me at 905-938-7657 or via email at ian.izzard@aecom.com. Alternatively you can contact Jim Huppunen, City of Port Colborne Project Manager at 905-835-2901 or via email at ssesel@portcolborne.ca.

Sincerely,
AECOM Canada Ltd.

Ian Izzard, P.Eng., M.A.Sc., PMP
Senior Project Manager

Encl.
cc: Jim Huppunen/Ron Hanson/Chris Lee – City of Port Colborne
Karl Grueneis/Jessica Mollo/Neil Johnston - AECOM

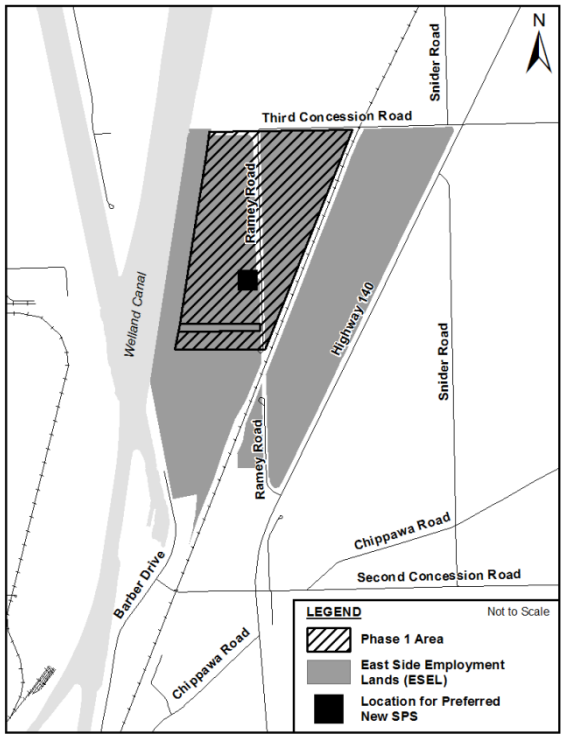
Notice of Study Completion

NOTICE OF COMPLETION
SITE SERVICING OF THE EAST SIDE EMPLOYMENT LANDS
CLASS ENVIRONMENTAL ASSESSMENT STUDY
CITY OF PORT COLBORNE

PORT COLBORNE

THE STUDY

To allow for future industrial park development, the City of Port Colborne, has completed a Municipal Class Environmental Assessment (EA) Study for site servicing of the East Side Employment Lands (ESEL) Phase 1 area (see map). The ESEL form part of Niagara Region's Niagara Gateway Economic Zone and Centre, which was first identified in the Provincial Growth Plan for the Greater Golden Horseshoe. The ESEL have been identified by the City as a priority for investment to enable and support development of these lands. Key components of the EA Study include the provision of municipal water and sanitary sewer systems, stormwater management, and road network improvements.



THE PROCESS

The EA Study is being completed in accordance with the Ontario *Environmental Assessment Act*, and followed Approach # 2 Master Planning Process of the Municipal Engineers Association. The review of alternatives and improvements has identified the preferred municipal servicing strategy to include a new pump station on the west side of Ramey Road (see map); a new watermain; a new sanitary sewer and road improvements at the intersection of Third Concession Road and Highway 140.

MASTER PLAN PROJECT FILE REPORT

A Master Plan Project File Report documenting the planning and decision making process has been prepared and is available for review for 30 calendar days beginning January 19, 2017 and ending February 17, 2017 at the following locations, during regular business hours.

City of Port Colborne **Clerk's Department** 66 Charlotte Street Port Colborne, Ontario L3K 3C8	**Port Colborne Public Library** 310 King Street Port Colborne, Ontario L3K 4H1

The Master Plan Project File Report can also be viewed on the City's website: http://portcolborne.ca/page/Current_Studies. Please provide written comments to Jim Huppunen, at the address below within the 30 day public review period. If concerns cannot be resolved, you may request that the Minister of the Environment and Climate Change make an order for the project to comply with Part II of the Environmental Assessment Act, which addresses individual environmental assessments. The Minister must receive requests for Part II Orders at the address below by 4:30pm on February 17, 2017. If no request is received by February 17, 2017, the project will proceed to design as presented in the Master Plan Project File Report.

The Minister of the Environment and Climate Change
77 Wellesley St. West, 11th Floor, Ferguson Block
Toronto, ON M7A 2T5.

Mr. Jim Huppunen, A.Sc.T.
Manager of Engineering Services
City of Port Colborne
66 Charlotte Street
Port Colborne, Ontario, L3K 3C8
ssesel@portcolborne.ca
Tel: (905) 835-2900 ext. 221
Fax: (905) 835-2939

Under the Freedom of Information and Protection of Privacy Act and the Environmental Assessment Act, unless otherwise stated in the submission, any personal information such as name, address, telephone number and property location included in a submission will become part of the public record files for this matter and may be released, if requested, to any person.

This notice was first issued on January 19, 2017
www.portcolborne.ca

Appendix H

Agency and First Nations Consultation

- Agency and First Nations Contact List
- Agency Correspondence
  - Regional Municipality of Niagara
  - Niagara Peninsula Conservation Authority
  - Ministry of Transportation
  - Ministry of Environment and Climate Change
  - Ministry of Tourism, Culture and Sport
  - Ministry of Natural Resources and Forestry
  - Ministry of Agriculture, Food and Rural Affairs
  - Ontario Infrastructure and Lands Corporation
  - Trillium Railway
  - St. Lawrence Seaway Management Corporation
  - Utilities
- First Nations Correspondence

Agency and First Nations Contact List

Project Mailing List

	Agency/Address	Name	Title	Contact Info	Comments	Salutation
A.	**PROVINCIAL AGENCIES**					
1.	Ministry of the Environment and Climate Change West-Central Region, Technical Support Section 119 King Street West, 12th Floor Hamilton, Ontario L8P 4Y7	Ms. Barb Slattery	EA Planning Coordinator		Response letter received September 2, 2014	Ms. Slattery
2.	Ministry of the Environment and Climate Change Environmental Assessment and Approvals Branch				***only send Notice of Completion**	
3.	Ministry of the Environment and Climate Change Environmental Assessment and Approvals Branch		Director		As per MOECC's Sept.2nd letter, contact only if project may adversely impact an Aboriginal or treaty right, consultation has reached an impasse or if a Part II Order is anticipated. Subject: Potential Duty to Consult	Sir or Madam
4.	Ministry of Natural Resources Niagara Area Office 4890 Victoria Avenue North, PO Box 5000 Vineland, Ontario L0R 2E0	Mr. Joad Durst	Area Supervisor			Mr. Durst
5.	Ministry of Tourism, Culture and Sport Cultural Services Unit Programs and Services Branch 401 Bay Street, 17th Floor Toronto, Ontario M7A 0A7	Ms. Rosi Zirger	Heritage Planner			Ms. Zirger
6.	Ministry of Transportation Corridor Management Section 1201 Wilson Avenue Building D, 7th Floor Downsview, Ontario M3M 1J8	Malvika Rudra	Project Engineer (Developmental)			Malvika Rudra
7.	Ministry of Transportation Corridor Management Section 1201 Wilson Avenue Building D, 7th Floor Downsview, Ontario M3M 1J8	James Gregory	Regional Operations Officer			Mr. Gregory
8.	Ministry of Transportation Corridor Management Section 1201 Wilson Avenue Building D, 7th Floor Downsview, Ontario M3M 1J8	Alice Lam	Planning and Design Representative			Ms. Lam

Project Mailing List

	Agency/Address	Name	Title	Contact Info	Comments	Salutation
9.	Ministry of Agriculture, Food and Rural Affairs 1 Stone Road West, 4th Floor Guelph, Ontario N1G 4Y2	Ms. Lynn Pardoe	Project Analyst			Ms. Pardoe
10.	Ministry of Agriculture, Food and Rural Affairs 1 Stone Road West, 4th Floor Guelph, Ontario N1G 4Y2	Mr. Sid Vander Veen	Drainage Coordinator			Mr. Vander Veen
11.	Ontario Infrastructure and Lands Corporated 1 Dundas Street West, Suite 2000 Toronto, Ontario M5G 2L5	Ms. Lisa Myslicki	Environmental Coordinator			Ms. Myslicki
12.	Ministry of Aboriginal Affairs – Consultation Unit 160 Bloor Street East, 4th Floor Toronto, Ontario M7A 2E6				See website about one window approach to consultation: http://www.ontario.ca/government/environment-assessments-consulting-aboriginal-communities	Sir or Madam
B.	**FEDERAL AGENCIES**					
13.	Aboriginal Affairs and Northern Development Canada, Consultation and Accommodation Unit 300 Sparks Street, Room 205 Ottawa, Ontario K1A 0H4	Allison Berman	Regional Subject Expert for Ontario			Ms. Berman
C.	**NIAGARA REGION**					
14.	Niagara Region Planning and Development Services 2201 St. David's Road, PO Box 1042 Thorold, Ontario L2V 4T7	Susan Dunsmore	Development Approvals Manager			Ms. Dunsmore
15.	Niagara Region Planning and Development Services 2201 St. David's Road, PO Box 1042 Thorold, Ontario L2V 4T7	Phil Berman				Mr. Berman
16.	Niagara Region Clerks Department 2201 St. David's Road, PO Box 1042 Thorold, Ontario L2V 4T7	Ralph Walton	Regional Clerk			Ms. Walton
17.	Niagara Region 2201 St. David's Road, PO Box 1042 Thorold, Ontario L2V 4T7	Mr. Alan Caslin	Regional Chair			Mr. Caslin

	Agency/Address	Name	Title	Contact Info	Comments	Salutation
18.	Niagara Region 2201 St. David's Road, PO Box 1042 Thorold, ON L2V 4T7	Mr. David Barrick	Regional Councillor			Mr. Barrick
19.	Niagara Region Public Works Department 2201 St. David's Road, PO Box 1042 Thorold, Ontario L2V 4T7	Mr. Ron Tripp	Commissioner of Public Works			Mr. Tripp
20.	Niagara Region Public Works Department 2201 St. David's Road, PO Box 1042 Thorold, Ontario L2V 4T7	Mr. Nick Palomba	Director, Transportation Services			Mr. Palomba
21.	Niagara Region Public Works Department 2201 St. David's Road, PO Box 1042 Thorold, Ontario L2V 4T7	Mr. Sunil Sharma	Assistant Director, Water and Wastewater			Mr. Sharma
22.	Niagara Region Public Works Department 2201 St. David's Road, PO Box 1042 Thorold, Ontario L2V 4T7	Mr. Paul Smeltzer	Director, Water and Wastewater			Mr. Smeltzer
23.	Niagara Region Planning and Development Services 2201 St. David's Road, PO Box 1042 Thorold, Ontario L2V 4T7	Ms. Mary-Lou Tanner	Acting Commissioner			Ms. Tanner
24.	Niagara Region Planning and Development Services 2201 St. David's Road, PO Box 1042 Thorold, Ontario L2V 4T7	Ms. Marilyn Radman	Manager, Development Planning			Ms. Radman
25.	Niagara Region Economic Development Department 2201 St. David's Road, PO Box 1042 Thorold, Ontario L2V 4T7	Mr. Bob Seguin	Director			Mr. Seguin
26.	Niagara Region Public Health Department 2201 St. David's Road, PO Box 1042 Thorold, Ontario L2V 4T7	Mr. Kevin Smith	Director of Emergency Services			Mr. Smith
D.	**CITY OF PORT COLBORNE (to be distributed by City Staff)**					
27.	City of Port Colborne 66 Charlotte Street Port Colborne, Ontario L3K 3C8	Ms. Ashley Grigg	City Clerk	Tel: 905-835-2900 x.106 Fax: 905-834-5746		Ms. Grigg

	Agency/Address	Name	Title	Contact Info	Comments	Salutation
28.	City of Port Colborne 66 Charlotte Street Port Colborne, Ontario L3K 3C8	Mr. Vance Badawey	Mayor			Mayor Badawey
29.	City of Port Colborne 66 Charlotte Street Port Colborne, Ontario L3K 3C8	Mr. Ron Hanson	Director, Engineering and Operations	Tel: 905-835-2900 x. 222 Fax: 905-835-2939		Mr. Hanson
30.	City of Port Colborne 66 Charlotte Street Port Colborne, Ontario L3K 3C8	Mr. Dan Aquilina	Director, Planning and Development	Tel: 905-835-2900 x. 203 Fax: 905-835-2939		Mr. Aquilina
31.	City of Port Colborne Planning and Development 66 Charlotte Street Port Colborne, Ontario L3K 3C8	Ms. Lindsay Richardson	Community/ Policy Planner	Tel: 905-835-2900	City contact for Niagara Gateway Economic Zone and Centre Community Improvement Plan	Ms. Richardson
32.	City of Port Colborne Economic Development, Tourism & Marketing 296 Fielden Avenue Port Colborne, Ontario L3K 4T6	Mr. Evan Acs	Economic Development Officer	Tel: 905-834-1668 x. 502		Mr. Acs
33.	City of Port Colborne Fire Department 3 Killaly Street West Port Colborne, Ontario L3K 6H1	Mr. Tom Cartwright	Fire Chief			Mr. Cartwright
34.	City of Port Colborne 66 Charlotte Street Port Colborne, Ontario L3K 3C8	Councilor Yvon Doucet	Councilor Ward 2			Councilor Doucet
35.	City of Port Colborne 66 Charlotte Street Port Colborne, Ontario L3K 3C8	Councilor Bea Kenny	Councilor Ward 3			Councilor Kenny
36.	City of Port Colborne 66 Charlotte Street Port Colborne, Ontario L3K 3C8	Councilor Barbara Buffers	Councilor Ward 4			Councilor Buffers
E.	**OTHER AGENCIES**					
37.	St. Lawrence Seaway Management Corporation 508 Glendale Avenue, PO Box 307 St. Catharines, Ontario L2R 6V8	Mr. Paul Kosinec	Sr. Civil Engineer, Civil Engineering Department		cc: Karine Mageren, Manager, Real Estate, kmageren@seaway.ca	Mr. Kosinec
38.	St. Lawrence Seaway Management Corporation 508 Glendale Avenue, PO Box 307 St. Catharines, Ontario L2R 6V8	Mr. Fraser Johnston	Technical Officer, Civil			Mr. Johnston

	Agency/Address	Name	Title	Contact Info	Comments	Salutation
39.	Niagara Peninsula Conservation Authority 250 Thorold Road West, 3rd Floor Welland, Ontario L3C 3W2	Mr. Cam D'Angelo	CAO/Secretary-Treasurer			Mr. D'Angelo
40.	Niagara Peninsula Conservation Authority 250 Thorold Road West, 3rd Floor Welland, Ontario L3C 3W2	Mr. Steve Miller	Supervisor, Water Resources			Mr. Miller
41.	Niagara Peninsula Conservation Authority 250 Thorold Road West, 3rd Floor Welland, Ontario L3C 3W2	Ms. Lara Widdifield	Supervisor, Construction Permit Approvals		cc: Suzanne McInnes Manager, Planning Review & Regulations smcinnes@npca.ca	Ms. Widdifield
F.	UTILITIES					
42.	Canadian Niagara Power Inc. 1150 Bertie Street, PO Box 1218 Fort Erie, Ontario L2A 5Y2	Mr. Jeff Hoover	Supervisor of Planning			Mr. Hoover
43.	Port Colborne Hydro Inc. 66 Charlotte Street Port Colborne, Ontario L3K 3C8			Tel: 905.835.8431		Sir or Madam
44.	Port Colborne Fibre Inc. 66 Charlotte Street Port Colborne, Ontario L3K 3C8					Sir or Madam
45.	Bell Canada 63 King St., Fl.2, PO Box 190, St. Catharines, Ontario L2R 6S9	Mr. Bill McKenzie	Niagara Implementation Manager	Tel: 905-641-3270 Fax: 905-685-0820 Cell: 289-219-1413		Mr. McKenzie
46.	Trillium Railway 265 King Street, PO Box 218 Port Colborne, Ontario L3K 5V8	Aaron White	Administration Officer			Mr. White
47.	Enbridge Consumers Gas 3401 Schmon Parkway, P.O. Box 1051 Thorold, Ontario L2V 5A8	Jamie Delaney	Distribution Asset Management		cc: robert.donofrio@enbridge.com	Mr. Delaney
48.	Cogeco 7170 McLeod Road Niagara Falls, Ontario L2G 3H2	Mr. Randy Leppert	Planning and Construction	Tel: 905.374.2196 Fax: 905.374.2398		Mr. Leppert
49.	Hydro One 483 May Street, 14th Floor Toronto, Ontario M5G 2P5	Mr. Brian McCormick	Manager, Environmental Supervisors & Approvals			Mr. McCormick

	Agency/Address	Name	Title	Contact Info	Comments	Salutation
50.	TransCanada PipeLines Limited C/O Lehman & Associates 97 Collier Street Barrie, Ontario L4M 1H2	Ms. Darlene Presley	Project Manager			Ms. Presley
51.	Sun-Canadian Pipe Line Company Limited 830 Highway 6 North, P.O. Box 470 Waterdown, Ontario L0R 2H0	Maintenance Coordinator				Sir or Madam
G.	**FIRST NATIONS**					
52.	Six Nations of the Grand River Territory 1695 Chiefswood Road, P.O. Box 5000 Ohsweken, Ontario N0A 1M0	Mr. Lonny Bomberry	Director, Lands and Resources		cc: Chief Hill	Mr. Bomberry
53.	Mississaugas of the New Credit First Nation 2789 Mississauga Road, R.R.#6 Hagersville, Ontario N0A 1H0	Chief Bryan LaForme	Chief		cc: Ms. Sault, Director of Lands, Membership and Research	Chief LaForme
54.	Haudenosaunee Confederacy Chiefs Council 2634 - 6th Line Road, RR2 Ohsweken, Ontario N0A 1M0	Hohahes Leroy Hill		Tel: 519-717-7326		Hohahes Leroy Hill
55.	Haudenosaunee Confederacy Development Institute 16 Sunrise Court, Suite 407 Ohsweken, Ontario N0A 1M0	Ms. Hazel Hill				Ms. Hill
56.	Niagara Region Métis Council 46 King Street Welland, Ontario L3B3H9	Derrick Pont	President			Mr. Pont
57.	Métis Nation of Ontario Head Office Métis Consultation Unit 500 Old St. Patrick Street, Unit D Ottawa, Ontario K1N 9G4			Fax: 613.725.4225		To Whom it May Concern
58.	The Chiefs of Ontario 111 Peter Street, Suite 804 Toronto, ON M5V 2H1	Ms. Kathleen Padulo	Environmental Coordinator			Ms. Padulo
59.	Aamjiwnaang Environment Department 978 Tashmoo Avenue Sarnia, Ontario N7T 7H5	Sharilyn Johnston	Environment Coordinator	519-336-8410		Ms. Johnston
60.	Alderville First Nation 11696 Second Line, PO Box 46 Roseneath, ON K0K 2X0	Dave Simpson	Land and Resources Communications Officer	905-352-2662		Mr. Simpson

	Agency/Address	Name	Title	Contact Info	Comments	Salutation
61.	Aundeck Omni Kaning First Nation R.R. #1, Comp. 21 Little Current, ON P0P 1K0	Chief Patsy Corbiere				Chief Corbiere
62.	Beausoleil First Nation 11 Ogemaa Miikaan Christian Island, ON L9M 0A9	Chief Roland Monague		705-247-2051		Chief Monague
63.	Chippewas of Georgina Island First Nation RR#2, PO Box N13 Sutton West, ON L0E 1R0	Chief Donna Big Canoe		705-437-1337		Chief Big Canoe
64.	Chippewas of Kettle and Stony Point First Nation 6247 Indian Lane, ON N0N 1J1	Chief Thomas Bressette		519-786-2125		Chief Bressette
65.	Chippewas of Nawash First Nation #135 Lakeshore Blvd. Neyaashiinigmiing, ON N0H 2T0	Chief Arlene Chegahno		519-534-1689		Chief Chegahno
66.	Chippewas of the Thames First Nation 320 Chippewa Road, RR#1 Muncey, Ontario	Chief R.K. (Joe) Miskokomon		519-289-5555		Chief Miskokomon
67.	Williams Treaty First Nations Claims Coordinator 8 Creswick Court Barrie, ON L4M 2J7	Karry Sandy-Mackenzie		705-792-5087	cc: Chief Keith Knott Curve Lake First Nation 22 Winookeeda Road Curve Lake, ON K0L 1R0 Chief Sharon Stinson Henry Chippewas of RAMA First Nation 5884 Rama Road, Suite 200 Rama, ON L0K 1T0	Ms. Sandy-Mackenzie
68.	Hiawatha First Nation 123 Paudash Street Hiawatha, ON K9J 0E6	Lori Loucks and Diane Sheridan	Land Resource Workers	705-295-4421		Ms. Loucks and Ms. Sheridan
69.	M'Chigeeng First Nation P.O. Box 333 M'Chigeeng, ON P0P 1G0	Chief Joe Hare		705-377-5362		Chief Hare
70.	Mississaugas of Scugog Island First Nation 22521 Island Road Port Perry, ON L9L 1B6	Chief Kelly LaRocca		905-985-3337		Chief LaRocca
71.	Mohawk Council of Akwesasne PO Box 579 Cornwall, ON K6H 5T3	Chief Tim Thompson		613-575-2250		Chief Thompson

	Agency/Address	Name	Title	Contact Info	Comments	Salutation
72.	Mohawks of the Bay of Quinte 1658 York Road Deseronto, ON K0K 1X0	Chief R. Donald Maracle		613-396-3424		Chief Maracle
73.	Saugeen First Nation 6493 Highway 21, R.R # 1 Southampton, ON N0H 2L0	Chief Vernon Roote		519-797-2781		Chief Roote
74.	Sheguiandah First Nation P.O. Box 101, Sheguiandah, ON P0P 1W0	Chief Georgina Thompson		705-368-2781		Chief Thompson
75.	Walpole Island First Nation R.R. #3, Ontario N8A 4K9	Chief		519-627-1481		Chief
76.	Zhiibaahaasing First Nation General Delivery Silver Water, Ontario P0P 1Y0	Chief Irene Sagon Kells		705-283-3963		Chief Sagon Kells
H.	**SCHOOL CONTACTS**					
77.	District School Board of Niagara 191 Carlton Street St. Catharines, Ontario L2R 7P4	Mr. Warren Hoshizaki	Director of Education		cc: Ms. Hyatt, Superintendent of Planning and Transportation	Mr. Hoshizaki
78.	Niagara Catholic District School Board 427 Rice Road Welland, Ontario L3C 7C1	Mr. John Crocco	Director of Education/ Secretary-Treasurer			Mr. Crocco
79.	Niagara Student Transportation Services 3350 Merrittville Highway, Suite 12 Thorold, Ontario L2V 4Y6	Ms. Lori Powell	Executive Director			Ms. Powell
I.	**PROPERTY OWNERS (private property owners within ESEL boundary – Notice of Commencement sent by City with PTE)**					
80.	K-Motion (1456408 Ontario Inc.) 2129 Barber Drive Port Colborne, Ontario L3K 5V5	[redacted]			[redacted]	[redacted]
81.	458 Chippawa Road Port Colborne, Ontario L3K 5V5	[redacted]			[redacted]	[redacted]
82.	2793 Ramey Road Port Colborne, Ontario L3K 5V5	[redacted]			[redacted]	[redacted]
83.	93 St. Arnaud Street Port Colborne, Ontario L3K 1L9	[redacted]			[redacted]	[redacted]
84.	621 Third Concession Road Port Colborne, Ontario L3K 5V5	[redacted]			[redacted]	[redacted]

	Agency/Address	Name	Title	Contact Info	Comments	Salutation
85.	62 Pine Street Welland, Ontario L3C 4G1	[redacted]			[redacted]	[redacted]
86.	552 Lakeshore Road East Port Colborne, Ontario L3K 5V3	[redacted]			[redacted]	[redacted]
87.	B.C. Investments Ltd. 597 Cranleigh Court Mississauga, Ontario L5H 4M5				[redacted]	
J.	**PROPERTY OWNERS (private property owners within 120 metres but outside of ESEL boundary – see GIS file provided June 25, 2014)**					
88.	2125 Ramey Road, RR3 Port Colborne, Ontario L3K 5V5	Owner/Occupant				Sir or Madam
89.	2105 Ramey Road, RR3 Port Colborne, Ontario L3K 5V5	Owner/Occupant				Sir or Madam
90.	2095 Ramey Road, RR3 Port Colborne, Ontario L3K 5V5	Owner/Occupant				Sir or Madam
91.	2085 Ramey Road, RR3 Port Colborne, Ontario L3K 5V5	Owner/Occupant				Sir or Madam
92.	2075 Ramey Road, RR3 Port Colborne, Ontario L3K 5V5	Owner/Occupant			Received call from [redacted] after Notice of Commencement.	Sir or Madam
93.	57 Woodland Avenue St. Catharines, Ontario L2R 5A7 **RE: CON 3 PT LOT 24, PORT COLBORNE**	[redacted]				[redacted]
94.	2051 Ramey Road, RR3 Port Colborne, Ontario L3K 5V5	Owner/Occupant				Sir or Madam
95.	2033 Ramey Road, RR3 Port Colborne, Ontario L3K 5V5	Owner/Occupant				Sir or Madam
96.	386 Concession 2 Road, RR3 Port Colborne, Ontario L3K 5V5	Owner/Occupant				Sir or Madam
97.	448 Chippawa Road, RR3 Port Colborne, Ontario L3K 5V5	Owner/Occupant				Sir or Madam
98.	456 Chippawa Road, RR3 Port Colborne, Ontario L3K 5V5	Owner/Occupant				Sir or Madam
99.	408 Concession 2 Road, RR3 Port Colborne, Ontario L3K 5V5	Owner/Occupant				Sir or Madam
100.	420 Concession 2 Road, RR3 Port Colborne, Ontario L3K 5V5	Owner/Occupant				Sir or Madam

Project Mailing List

	Agency/Address	Name	Title	Contact Info	Comments	Salutation
101.	51025 Lambert Road Welland, Ontario L3B 5N6 **RE: CON 3 PT LOT 24 PORT COLBORNE**	[redacted]				[redacted]
102.	3603 Miller Road, RR3 Port Colborne, Ontario L3K 5V5	Owner/Occupant				Sir or Madam
103.	572 Chippawa Road, RR3 Port Colborne, Ontario L3K 5V5	Owner/Occupant				Sir or Madam
104.	458 Chippawa Road, RR3 Port Colborne, Ontario L3K 5V5	Owner/Occupant				Sir or Madam
105.	734 Chippawa Road, RR3 Port Colborne, Ontario L3K 5V5	Owner/Occupant				Sir or Madam
106.	1684015 Ontario Ltd. 43 Whitley Avenue Toronto, Ontario M3K 1A1 **RE: CON 3 PT LOT 25 PORT COLBORNE**					Sir or Madam
107.	11265 Harbourview Road, RR2 Port Colborne, Ontario L3K 5V4	Owner/Occupant				Sir or Madam
108.	87 Aquador Drive Welland, Ontario L3C 5S5 **RE: PLAN 3 LOTS 42-44 PORT COLBORNE**	[redacted]				[redacted]
109.	942329 Ontario Limited O/A Chokey Real Estate 1818 Burlington Street East Hamilton, ON L8H 3L4 **RE: CON 3 PT LOTS 25 and 26 RP, PORT COLBORNE**					Sir or Madam
110.	275 Concession 2 Road, RR3 Port Colborne, Ontario L3K 5V5	Owner/Occupant			Received call from [redacted] after Notice of Commencement.	Sir or Madam
111.	242 Chippawa Road, RR3 Port Colborne, Ontario L3K 1T7	Owner/Occupant				Sir or Madam
112.	248 Chippawa Road, RR3 Port Colborne, Ontario L3K 1T7	Owner/Occupant				Sir or Madam
113.	250 Chippawa Road, RR3 Port Colborne, Ontario L3K 1T7	Owner/Occupant				Sir or Madam
114.	252 Chippawa Road, RR3 Port Colborne, Ontario L3K 1T7	Owner/Occupant				Sir or Madam

	Agency/Address	Name	Title	Contact Info	Comments	Salutation
115.	260 Chippawa Road, RR3 Port Colborne, Ontario L3K 1T7	Owner/Occupant				Sir or Madam
116.	264 Chippawa Road, RR3 Port Colborne, Ontario L3K 1T7	Owner/Occupant				Sir or Madam
117.	352 Chippawa Road, RR3 Port Colborne, Ontario L3K 5V5	Owner/Occupant				Sir or Madam
118.	266 Chippawa Road, RR3 Port Colborne, Ontario L3K 1T7	Owner/Occupant				Sir or Madam
119.	268 Chippawa Road, RR3 Port Colborne, Ontario L3K 1T7	Owner/Occupant				Sir or Madam
120.	251 Chippawa Road, RR3 Port Colborne, Ontario L3K 1T8	Owner/Occupant				Sir or Madam
121.	241 Chippawa Road, RR3 Port Colborne, Ontario L3K 1T8	Owner/Occupant				Sir or Madam
122.	211 Concession 2 Road, RR3 Port Colborne, Ontario L3K 5V5	Owner/Occupant				Sir or Madam
123.	International Marine Salvage 17 Invertose Drive, Box 6 Port Colborne, Ontario L3K 5V7	Owner/Occupant				Sir or Madam
124.	738 Concession 3 Road, RR3 Port Colborne, Ontario L3K 5V5	Owner/Occupant				Sir or Madam
125.	612 Concession 3 Road, RR3 Port Colborne, Ontario L3K 5V5	Owner/Occupant				Sir or Madam
126.	3461 Snider Road, RR3 Port Colborne, Ontario L3K 5V3	Owner/Occupant				Sir or Madam

Agency Correspondence

- Regional Municipality of Niagara
- Niagara Peninsula Conservation Authority
- Ministry of Transportation
- Ministry of Environment and Climate Change
- Ministry of Tourism, Culture and Sport
- Ministry of Natural Resources and Forestry
- Ministry of Agriculture, Food and Rural Affairs
- Ontario Infrastructure and Lands Corporation
- Trillium Railway
- St. Lawrence Seaway Management Corporation
- Utilities

AECOM

Regional Municipality of Niagara

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 0A1
www.aecom.com

905 682 0212 tel
905 682 4495 fax

August 8, 2014

Project # 60322620

SENT VIA E-MAIL

Mr. Ron Tripp, Commissioner
Niagara Region, Public Works Department
2201 St. David's Road, PO Box 1042
Thorold, Ontario L2V 4T7

Subject: Site Servicing of the East Side Employment Lands
NOTICE OF STUDY COMMENCEMENT

Dear Mr. Tripp:

Please find attached the Notice of Study Commencement for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Municipal Class Environmental Assessment* (Class EA). This public notice was recently published on the City's website and in local newspapers and is now being sent to you because we would like your comments regarding this important infrastructure project. Further information is provided below.

Study Background

This Class EA study is being completed under the Municipal Engineers Association Master Planning Process and was initiated by the City of Port Colborne to allow for future industrial park development of the East Side Employment Lands (see map in attached notice). Key components of the EA study include the provision of municipal water and sanitary sewer systems, stormwater management and road network improvements. The project team will examine a full range of alternatives and improvements to identify a preferred municipal servicing strategy that could be implemented in phases as development proposals come forward.

Next Steps

We will continue to keep you informed of study progress, including an upcoming Public Information Centre and study recommendations, tentatively scheduled for early 2015. Information will also be posted on the City's website as it becomes available (www.portcolborne.ca > City Services > Engineering > Current Studies). In the meantime, if you have any questions or comments or would like additional information, please do not hesitate to contact me. Alternatively, you may also send comments to the project email address at SSESEL@portcolborne.ca, or contact the City's Manager of Engineering Services, Jim Huppunen, at 905-835-2900 ext. 221.

Sincerely,
AECOM Canada Ltd.

Jennifer Whittard, B.E.S., PMP
Assistant Project Manager
jennifer.whittard@aecom.com
905-346-3744

Encl.

cc: SSESEL@portcolborne.ca
Jim Huppunen, City of Port Colborne
Mark Swan/Karl Grueneis, AECOM
See attached distribution list

L_2014-08-08_Notice Of Commencement 60322620 Email Doc

This letter was also sent to:
- Betty Matthews-Halow, Director of W&WW
- Bob Saguin, Director Economic Development
- Curt Benson, Manager Regional Policy Planning
- Danielle Defields, Ecological & Environmental Advisory Committee
- David Barrick, Regional Councillor
- Gene Chajka, Development Approvals Manager
- Gary Burroughs, Regional Chair
- Kevin Smith, Director of Emergency Services
- Marilyn Radman, Manager Development Planning
- Mary Lou Tanner, Acting Commissioner
- Nick Palomba, Director Transportation Services
- Ralph Walton, Regional Clerk

Mollo, Jessica

From: Sharma, Sunil
Sent: Monday, December 15, 2014 1:26 PM
To: Izzard, Ian; Chajka, Eugene
Cc: Grueneis, Karl
Subject: RE: Meeting Minutes

Hello Ian,

I would like to make some modification to the meeting minutes under item 4: Extension of Regional Watermain.

Subsequent to the meeting, Regional staff confirmed that:
Region's 10 year capital forecast for water have a project titled: New Watermain crossing from the New Elevated Tank at Barrick road under the Welland Canal up to Hwy 140.
The design of this project will start in the year 2018 and construction in 2020. We have budgeted $750,000 for design (2018) and $7,500,000 (2020) for construction.
Also, the tenders for the new elevated tank are ready and it will be tendered in 2015 subject to approval of additional funds from the council in 2015 budget and completion of stage 4 archeological assessment on the property.

Thanks,

Sunil Sharma, M.Eng., P.Eng.
Associate Director (T)
Water & Wastewater Engineering
Regional Municipality of Niagara
(905) 685-4225 ext. 3645

From: Izzard, Ian [mailto:Ian.Izzard@aecom.com]
Sent: Monday, December 08, 2014 4:04 PM
To: Chajka, Eugene; Sharma, Sunil
Cc: Grueneis, Karl
Subject: Meeting Minutes

Gentlemen,

Please find attached minutes from our meeting of last week. Please let me know if you have any comments or concerns.

Sincerely,

Ian Izzard, P. Eng., M.A.Sc., PMP.
Senior Project Manager - Community Infrastructure
Direct line: 905.938.7657
Cell: 289.213.4516
ian.izzard@aecom.com

AECOM
30 Hannover Drive, Suite 3
St. Catharines, Ontario, Canada
L2W 1A3
T 905.682.0212 F 905.682.4495

Mollo, Jessica

From:
Sent: Monday, December 15, 2014 4:37 PM
To: Izzard, Ian
Cc: Beattie, David; hanson@portcolborne.ca; Grueneis, Karl; ssesel@portcolborne.ca
Subject: RE: SSESEL - Regional Capital Budget

Hi Ian,

That is concerning as Sunil stated to us this morning that the design would take place in 2016. I would use the information I provided and send it back to Sunil and us for review to ensure that the proper information is recorded. If Sunil notes a discreptancy with your revised minutes, then we (City Staff) will have this clarified.

Regards,

Jim Huppunen, A.Sc.T.
Manager of Engineering Services
City of Port Colborne
66 Charlotte Street
Port Colborne, Ontario L3K 3C8

905-835-2901, Ext. 221
Fax: 905-835-2939

From: "Izzard, Ian" <Ian.Izzard@aecom.com>
To:
Cc: >, "ssesel@portcolborne.ca" <ssesel@portcolborne.ca>, "Grueneis, Karl" <Karl.Grueneis@aecom.com>, "Beattie, David" <David.Beattie@aecom.com>
Date: 12/15/14 04:30 PM
Subject: RE: SSESEL - Regional Capital Budget

Hi Jim,

Thanks for the update. I did receive a note from Sunil this morning and will update those minutes. However, the dates from Sunil don't quite match yours. Sunil stated: The design of this project will start in the year 2018 and construction in 2020. Shall I use Sunil's dates for the updated minutes?

Cheers,

Ian Izzard, P. Eng., M.A.Sc., PMP.
Senior Project Manager - Community Infrastructure
Direct line: 905.938.7657
Cell: 289.213.4516
ian.izzard@aecom.com

AECOM

30 Hannover Drive, Suite 3
St. Catharines, Ontario, Canada
L2W 1A3
T 905.682.0212 F 905.682.4495

From:
Sent: Monday, December 15, 2014 4:19 PM
To: Izzard, Ian
Cc: [redacted], Grueneis, Karl; Beattie, David
Subject: SSESEL - Regional Capital Budget

Hi Ian,

Thank you for the voicemail this afternoon. I just wanted to update you on the City's meeting with Sunil Sharma from the Region this morning. The Regional Trunk Watermain crossing the Canal was discussed this morning with the end result being that the Region has moved the Design phase of this main from 2017 to 2016 in their Capital Budget Forecast with the Construction Phase of the Budget to be discuss at a future date (previously was included in 2020 budget). Sunil also confirmed that it would make sense to include the design of the proposed forcemain that would be crossing the canal in the same location which would connect to the Seaway Treatment Plant. This would take care of our concerns of limited capacity of the existing sanitary system for the future build-out of the Employment Lands. There was minimal discussion regarding the hydro crossing and City Staff advised that JBL had completed their own crossing previously and that they may want to discuss the Seaway's previous requirements for this hydro crossing as it may not be needed. City Staff asked Sunil to contact yourself (AECOM) to have the minutes from your previous meeting with the Region adjusted to reflect this information he provided this morning.

Please advise if the above information matches the information that Sunil provided to you today.

We would also like to ensure that Eugene (Regions rep) is invited to all future meetings for this project to ensure that we have the updated information from the Region regarding their future plans.

Regards,

Jim Huppunen, A.Sc.T.
Manager of Engineering Services
City of Port Colborne
66 Charlotte Street
Port Colborne, Ontario L3K 3C8

905-835-2901, Ext. 221
Fax: 905-835-2939

Mollo, Jessica

From: Chajka, Eugene
Sent: Wednesday, December 17, 2014 12:03 PM
To: Izzard, Ian
Cc: Grueneis, Karl; Sharma, Sunil; Guthrie, Graeme
Subject: FW: Port Colborne Lands East of Welland Canal
Attachments: Port Colborne Class EA-Project FileReport (Final).pdf; Port Colborne W & WW Servicing-Conceptual Design Report-Final.pdf; 112396-20130823-EA Amendment-Project File-scanned copy.pdf

Ian:

Here are the EA docs from Graeme.

Regards,
Eugene

From: Guthrie, Graeme
Sent: Friday, December 12, 2014 9:54 AM
To: Chajka, Eugene
Subject: Port Colborne Lands East of Welland Canal

Eugene

With regards to the servicing of lands east of the Welland Canal in Port Colborne, attached for your information are:

1. Project File Report;
2. Project File Report Amendment; and
3. Conceptual Design Report.

Regards,

Graeme

Graeme Guthrie, C.E.T.
Manager, Design and Construction (T)
Water & Wastewater Services
Public Works
Niagara Region
3501 Schmon Parkway, Thorold, Ont.
Phone: 905-685-4225 ext. 3766 Toll-free: 1-800-263-7215
Cell: 905-321-9126
www.niagararegion.ca

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 1A3
www.aecom.com

905 682 0212 tel
905 682 4495 fax

March 11, 2015

Project # 60322620

Mr. Ron Tripp
Commissioner of Public Works
Niagara Region
Public Works Department
2201 St. David's Road, PO Box 1042
Thorold, Ontario L2V 4T7

Subject: **Site Servicing of the East Side Employment Lands Class Environmental Assessment Study, City of Port Colborne**
NOTICE OF PUBLIC INFORMATION CENTRE

Dear Mr. Tripp:

Further to our August 2014 Notice of Study Commencement, please find attached the Notice of Public Information Centre (PIC) for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Class Environmental Assessment Study*.

Study Purpose

The EA Study will be completed in keeping with the Ontario *Environmental Assessment Act*, and will follow the Master Planning Process of the Municipal Engineers Association. The Master Plan follows Approach #2 which will fulfill the requirements for Schedule A, A+, and Schedule B projects. The project team will examine a full range of alternatives and improvements and identify a preferred municipal servicing strategy for the ESEL that could be implemented in phases as development proposals come forward.

Public Information Centre

You are encouraged to attend the Public Information Centre scheduled for March 23, 2015, where the problem/opportunity statement and recommended servicing strategy will be presented. Representatives from both the City of Port Colborne and AECOM will be available to discuss the project and answer any questions you may have. If you are unable to attend, the display boards will be made available for review and comment following the PIC on the City website (www.portcolborne.ca > City Services > Engineering > Current Studies). All comments received throughout the course of this study will be considered in finalizing the recommended servicing strategies.

Next Steps

Upon completion of the study, a Master Plan Project File will be prepared and made available for public and agency review. In the meantime, if you have any questions or comments or would like additional information, please do not hesitate to contact me. Alternatively, you may also send comments to the project email address at SSESEL@portcolborne.ca, or contact the City's Manager of Engineering Services, Jim Huppunen, at 905-835-2900 ext. 221.

Sincerely,

AECOM Canada Ltd.

Ian Izzard, P.Eng., M.A.Sc., PMP
Project Manager
Ian.izzard@aecom.com
905-938-7657

Encl. Notice of Public Information Centre
cc: Jim Huppunen, City of Port Colborne
Karl Grueneis, AECOM

This letter was also sent to:
- Kevin Smith, Director of Emergency Services
- Nick Palomba, Director, Transportation Services
- Sunil Sharma, Assistant Director W&WW
- Paul Smeltzer, Director WWW
- Mary Lou Tanner, Acting Commissioner
- Marilyn Radman, Manager Development Planning
Bob Seguin, Director Economic Development
- David Barrick, Regional Councillor
Alan Caslin, Regional Chair
Ralph Walton, Regional Clerk

Mollo, Jessica

From: Dunsmore, Susan
Sent: Wednesday, June 03, 2015 11:36 AM
To: Johnston, Neil
Cc: Mollo, Jessica
Subject: RE: Port Colborne ESEL Class EA - Request for Meeting
Attachments: Port Colborne Class EA-Project FileReport (Final).pdf

Hello,

As per our conversation earlier today I have reviewed the options that were presented at the meeting on May 7th, 2015

On the water side of the project – there are no issues with the proposed watermain – the current design for the crossing is in the 2017 budget for design with construction in 2018.

The tank at Barrack and Elm is going to construction this year.

On the sanitary sewer side – the Region would like the forcemain to outlet to the East Side PS – if you provide us with the estimated flows we can add them to our current model and evaluate the PS capacity.

The eventual crossing of the canal to the WWTP is okay there is room in the WWTP header for the forcemain so the ultimate solution is okay as well.

I have attached the previous EA that has been completed for this area for your information as we discussed.

If you have any further questions or concerns or still want to meet to discuss this project please contact me at your convenience.

Thank you,

Susan M. Dunsmore, P. Eng.
Development Engineer
Planning and Development Services
Niagara Region
Phone: 905-685-4225 ext. 3661 Toll-free: 1-800-263-7215
www.niagararegion.ca

From: Mollo, Jessica [mailto:Jessica.Mollo@aecom.com]
Sent: Tuesday, May 26, 2015 2:51 PM
To: Dunsmore, Susan
Cc: Grueneis, Karl; Izzard, Ian; ssesel@portcolborne.ca
Subject: Port Colborne ESEL Class EA - Request for Meeting

Hi Susan,

We met with the City on May 14, 2015 to discuss the above noted project and as noted in the minutes, we are sending a copy to you. We would also like to set up a meeting with you and your team next week to discuss the forcemain connection and available capacity in nearby pump stations.

At your earliest convenience, please provide me with a few dates and times that you and your team are available to meet next week and I will set a meeting up.

Thanks and regards,
Jessica

Jessica Mollo, B.Sc
Environmental Planner, Environment
D 905.346.3742
Cisco Ext. 3323742
jessica.mollo@aecom.com

AECOM
3-30 Hannover Drive, St. Catharines ON L2W 1A3
T 905.682.0212 F 905.682.4495
www.aecom.com

Grueneis, Karl

From: Dunsmore, Susan <Susan.Dunsmore@niagararegion.ca>
Sent: Tuesday, June 28, 2016 9:38 AM
To: Grueneis, Karl
Subject: FW: RMON Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Susan M. Dunsmore, P. Eng.
Development Engineer
Planning and Development Services
Niagara Region
Phone: 905-980-6000 ext. 3661 Toll-free: 1-800-263-7215
www.niagararegion.ca

From: Dunsmore, Susan
Sent: Tuesday, June 28, 2016 9:36 AM
To: 'karl.grueneis@aecom.com.'
Subject: FW: RMON Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Susan M. Dunsmore, P. Eng.
Development Engineer
Planning and Development Services
Niagara Region
Phone: 905-980-6000 ext. 3661 Toll-free: 1-800-263-7215
www.niagararegion.ca

From: Dunsmore, Susan
Sent: Tuesday, June 28, 2016 9:34 AM
To: 'Mollo, Jessica'
Subject: RE: RMON Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Jessica,

I am not sure if it is too late – I received a call from Karl who had mentioned he spoke with Paul S and Joe T in W&WW and had said they had wanted to see the document – the only additional comments they have are as follows:

- Apparently I was wrong we have 20 pumping stations not 21

- And on Page 58 would you be able to add that the pumping station to be designed to Regional Standard

Thanks

Susan M. Dunsmore, P. Eng.
Development Engineer
Planning and Development Services
Niagara Region
Phone: 905-980-6000 ext. 3661 Toll-free: 1-800-263-7215
www.niagararegion.ca

From: Mollo, Jessica [mailto:Jessica.Mollo@aecom.com]
Sent: Monday, May 16, 2016 1:31 PM
To: Dunsmore, Susan; Radman, Marilyn
Cc: jimhuppunen@portcolborne.ca; ssesel@portcolborne.ca; Grueneis, Karl; Izzard, Ian; St. Denis, Jocelyn
Subject: RMON Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Good afternoon Susan & Marilyn,

The City of Port Colborne is preparing to file the City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File.

For your review and comment, please see the link below for the Master Plan Project File Report. As the City would like to file the report for the 30 day public review period by the end of June, any comments the RMON has would be greatly appreciated by mid-June 2016.

This file will be available for download until 5/23/2016

File	Description	Size
RPT-2016-05-12-ESEL MP Project File-60322620-DRAFT.pdf		63,658KB

Download all files (.zip)

Should you have any questions, or require additional information please feel free to contact me.

Thanks and regards,
Jessica

Jessica Mollo, B.Sc
Environmental Planner, Environment
D +905-346-3742
jessica.mollo@aecom.com

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aecom.com

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Grueneis, Karl

From: Mollo, Jessica
Sent: Tuesday, June 14, 2016 9:46 AM
To: Grueneis, Karl
Cc: Boerema, Gerrit
Subject: FW: RMON Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Comments from Susan below. This email is saved in the directory (with other comments we have received to date) here: P:\60322620 - Port Colborne ESEL\400-Technical\401 EA\Agency Comments on Project File Report.

Jessica Mollo, B.Sc
Environmental Planner, Environment
D +905-346-3742
jessica.mollo@aecom.com

AECOM
3-30 Hannover Drive
St. Catharines, Ontario, Canada
T +905-682-0212
aecom.com

From: Dunsmore, Susan [mailto:Susan.Dunsmore@niagararegion.ca]
Sent: Tuesday, June 14, 2016 9:43 AM
To: Mollo, Jessica
Subject: RE: RMON Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hello Jessica,

I have reviewed the document the largest change I have is that during this process the scheduling in our capital budget have changed from the 2017 design to 2018 construction – to 2018 design and 2020 construction.

The following are just information corrections:

- On page 13 (Section 3.1.1) – we have one water pumping station, and two water storage facilities
- On page 13 (section 3.1.2) – we have 21 pumping stations

That is all I have, if you have any questions or concerns please contact me at your convenience.

Thank you,

Susan M. Dunsmore, P. Eng.
Development Engineer
Planning and Development Services
Niagara Region
Phone: 905-980-6000 ext. 3661 Toll-free: 1-800-263-7215
www.niagararegion.ca

From: Mollo, Jessica [mailto:Jessica.Mollo@aecom.com]
Sent: Monday, May 16, 2016 1:31 PM
To: Dunsmore, Susan; Radman, Marilyn
Cc: jimhuppunen@portcolborne.ca; ssesel@portcolborne.ca; Grueneis, Karl; Izzard, Ian; St. Denis, Jocelyn
Subject: RMON Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Good afternoon Susan & Marilyn,

The City of Port Colborne is preparing to file the City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File.

For your review and comment, please see the link below for the Master Plan Project File Report. As the City would like to file the report for the 30 day public review period by the end of June, any comments the RMON has would be greatly appreciated by mid-June 2016.

This file will be available for download until 5/23/2016

File	Description	Size
RPT-2016-05-12-ESEL MP Project File-60322620-DRAFT.pdf		63,658KB

Download all files (.zip)

Should you have any questions, or require additional information please feel free to contact me.

Thanks and regards,
Jessica

Jessica Mollo, B.Sc
Environmental Planner, Environment
D +905-346-3742
jessica.mollo@aecom.com

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AECOM

Niagara Peninsula Conservation Authority

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 0A1
www.aecom.com

905 682 0212 tel
905 682 4495 fax

August 8, 2014

Project # 60322620

SENT VIA E-MAIL

Ms. Suzanne McInnes
Manager, Planning Review & Regulations
Niagara Peninsula Conservation Authority
250 Thorold Road West, 3rd Floor
Welland, Ontario L3C 3W2

Subject: Site Servicing of the East Side Employment Lands
NOTICE OF STUDY COMMENCEMENT & REQUEST FOR INFORMATION

Dear Ms. McInnes:

Please find attached the Notice of Study Commencement for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Municipal Class Environmental Assessment* (Class EA). This public notice was recently published on the City's website and in local newspapers and is now being sent to you because we would like NPCA comments regarding this important infrastructure project. Further information is provided below.

Study Background

This Class EA study is being completed under the Municipal Engineers Association Master Planning Process and was initiated by the City of Port Colborne to allow for future industrial park development of the East Side Employment Lands (see map in attached notice). Key components of the EA study include the provision of municipal water and sanitary sewer systems, stormwater management and road network improvements. The project team will examine a full range of alternatives and improvements to identify a preferred municipal servicing strategy that could be implemented in phases as development proposals come forward.

Request for Information

In order to evaluate the design alternatives through the Class EA process, we would appreciate receiving the following digital information, if available:

- Stormwater management design standards;
- Floodplain data, including watercourses and NPCA regulated-areas, if applicable;
- Mapping of natural heritage features including ANSIs, ESAs and wetlands;
- Mapping of any known species of concern or species at risk (flora/fauna);
- Woodlots and any other natural areas of significance;

- ELC vegetation/community series mapping;
- Fish collection record summaries; and
- NPCA property boundaries, if applicable.

For your use we have attached a shapefile which shows the area for which we are requesting the above data (includes study area and surrounding lands). Should you require any further information regarding this information request, please do not hesitate to contact me.

Next Steps

Recognizing that NPCA will be a key stakeholder in this important project, we will continue to keep you informed of study progress, including an upcoming Public Information Centre and study recommendations, tentatively scheduled for early 2015. Information will also be posted on the City's website as it becomes available (www.portcolborne.ca > City Services > Engineering > Current Studies).

In the meantime, if you have any questions or comments or would like to arrange an introductory meeting, please do not hesitate to contact me at the number provided below. Alternatively, you may also send comments to the project email address at SSESEL@portcolborne.ca or contact the City's Manager of Engineering Services, Jim Huppunen, at 905-835-2900 ext. 221.

Sincerely,

AECOM Canada Ltd.

Jennifer Whittard, B.E.S., PMP
Assistant Project Manager
jennifer.whittard@aecom.com
905-346-3744

Encl.

cc: Cam D'Angelo, CAO, NPAC
Steve Miller, Supervisor, Water Resources, NPCA
Jim Huppunen, City of Port Colborne
Mark Swan/Karl Grueneis, AECOM
SSESEL@portcolborne.ca

Mollo, Jessica

From: Widdifield, Lara
Sent: Thursday, August 21, 2014 12:59 PM
To: Whittard, Jennifer
Subject: FW: Notice of Study Commencement - Site Servicing of the East Side Employment Lands, Port Colborne
Attachments: Notice of Study Commencement.pdf; L_2014-08-08_Notice of Commencement NPCA 60322620.pdf; Map Site Servicing East Side Employment Lands 14-08-21.pdf

Hi Jennifer,

Thank you for circulating us on the above study notice. Please add me to the contact list as the contact person from the NPCA for this file.

The study area is constrained by several minor watercourses and one watercourse with an upstream drainage area greater than 125ha. These watercourses are afforded 15m buffer zones that should be maintained in a naturalized state.

The study area lies within two sub-watersheds tributary to the Central Welland River: the CWR Welland Canal South, which drains to the west to the Canal, and CWR Indian Creek, which discharges toward the east.

I have attached a map of NPCA Regulated Areas (which also shows the subwatershed Boundary), for your reference. The NPCA would appreciate being circulated on the study documents as they become available.

I trust the above is sufficient for your needs at this time, however should you have any questions or concerns, please contact the undersigned.

Regards,

Lara Widdifield, C.E.T.
Supervisor, Construction Permit Approvals
Niagara Peninsula Conservation Authority
250 Thorold Road West, 3rd Floor
Welland, ON, L3C 3W2
Phone: 905-788-3135 ext. 229
Fax: 905-788-1121
Email: [redacted]
Website: www.npca.ca

From: McInnes, Suzanne
Sent: August 11, 2014 8:35 AM
To: Widdifield, Lara
Cc: Miller, Steve; D'Angelo, Carmen; Graham, Peter
Subject: FW: Notice of Study Commencement - Site Servicing of the East Side Employment Lands, Port Colborne

Hi Lara, can you take the lead on this file please.

Thanks.

Suzanne McInnes, MCIP, RPP
Manager, Plan Review and Regulation
Niagara Peninsula Conservation Authority
250 Thorold Road West, 3rd Floor
Welland, Ontario L3C 3W2
phone: (905) 788-3135 ext. 235
fax: (905) 788-1121

www.npca.ca

From: Whittard, Jennifer [mailto:Jennifer.Whittard@aecom.com]
Sent: Friday, August 08, 2014 5:48 PM
To: McInnes, Suzanne
Cc: D'Angelo, Carmen; Miller, Steve; 'ssesel@portcolborne.ca'
Subject: Notice of Study Commencement - Site Servicing of the East Side Employment Lands, Port Colborne

Hi Suzanne,

On behalf of the City of Port Colborne, please find attached the Notice of Study Commencement for the City's **Site Servicing of the East Side Employment Lands Municipal Class Environmental Assessment**. Also attached is a covering letter which provides additional information and a GIS shapefile to facilitate our information request.

We will continue to keep you informed as the project progresses, but in the meantime, please let us know if you have any questions or comments or require further information.

Thanks,
Jen

Jennifer Whittard, B.E.S., PMP
Assistant Project Manager, Water
905.346.3744
jennifer.whittard@aecom.com

AECOM
30 Hannover Drive, St. Catharines, ON L2W 1A3
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www.aecom.com

NIAGARA PENINSULA CONSERVATION AUTHORITY

Site Servicing East Side Employment Lands EA. PC

Legend

- Subwatersheds (2K)
- NPCA APPROXIMATE REGUL
- Regulated Floodplain Extent
  - Advisory (CWR)
  - Regulated
- Reaches Draining 125ha Requi
- DRAFT Slope Features
  - Connectors
  - Top of Slope
  - Toe of Slope
  - Watercourse As Toe of Slope
  - Watercourse Centerline
- OWES WETLANDS
  - Non-Provincially Significant Wetland
  - Provincially Significant Wetland
- RMN Streets
  - Provincial
  - Regional
  - Municipal Other
- MEMBER MUNICIPALITY Labe
- Member Municipal Boundary Li
- 2K HydroPoly
- 2K Hydrography
- NPCA Watershed Municipalities
- 2010 Niagara Air Photos

1: 26,144
8/21/2014

Notes

Showing NPCA Regulated areas and Sub-Watershed Boundaries

1.3 0 0 66 1 3 Kilometers

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 1A3
www.aecom.com

905 682 0212 tel
905 682 4495 fax

March 11, 2015

Project # 60322620

Ms. Lara Widdifield
Supervisor, Construction Permit Approvals
Niagara Peninsula Conservation Authority
250 Thorold Road West, 3rd Floor
Welland, Ontario L3C 3W2

Subject: **Site Servicing of the East Side Employment Lands Class Environmental Assessment Study, City of Port Colborne**
NOTICE OF PUBLIC INFORMATION CENTRE

Dear Ms. Widdifield:

Further to our August 2014 Notice of Study Commencement, please find attached the Notice of Public Information Centre (PIC) for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Class Environmental Assessment Study.*

Study Purpose

The EA Study will be completed in keeping with the Ontario *Environmental Assessment Act*, and will follow the Master Planning Process of the Municipal Engineers Association. The Master Plan follows Approach #2 which will fulfill the requirements for Schedule A, A+, and Schedule B projects. The project team will examine a full range of alternatives and improvements and identify a preferred municipal servicing strategy for the ESEL that could be implemented in phases as development proposals come forward.

Public Information Centre

You are encouraged to attend the Public Information Centre scheduled for March 23, 2015, where the problem/opportunity statement and recommended servicing strategy will be presented. Representatives from both the City of Port Colborne and AECOM will be available to discuss the project and answer any questions you may have. If you are unable to attend, the display boards will be made available for review and comment following the PIC on the City website (www.portcolborne.ca > City Services > Engineering > Current Studies). All comments received throughout the course of this study will be considered in finalizing the recommended servicing strategies.

Next Steps

Upon completion of the study, a Master Plan Project File will be prepared and made available for public and agency review. In the meantime, if you have any questions or comments or would like additional information, please do not hesitate to contact me. Alternatively, you may also send comments to the project email address at SSESEL@portcolborne.ca, or contact the City's Manager of Engineering Services, Jim Huppunen, at 905-835-2900 ext. 221.

Sincerely,

AECOM Canada Ltd.

Ian Izzard, P.Eng., M.A.Sc., PMP
Project Manager
Ian.izzard@aecom.com
905-938-7657

Encl. Notice of Public Information Centre
cc: Jim Huppunen, City of Port Colborne
Karl Grueneis, AECOM

Grueneis, Karl

From: Deman, Jillian
Sent: Monday, September 19, 2016 11:56 PM
To: Boerema, Gerrit
Cc: Grueneis, Karl
Subject: RE: NPCA Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Gerrit!
I am in the field tomorrow leading an all day site meeting.

See my brief comments below.
jill

Jillian deMan, H.B.Sc
Terrestrial and Wetland Ecologist,
Water & Natural Resources,
Environment, North America
D +1-519-650-8694
M +1-519-504-0966
jillian.deman@aecom.com

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Suite 290, West Entrance
Kitchener, Ontario, N2P 0A4, Canada
T +1-519-650-5313
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From: Boerema, Gerrit
Sent: Monday, September 19, 2016 3:03 PM
To: Deman, Jillian
Cc: Grueneis, Karl
Subject: FW: NPCA Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Jill,

Are you available for a call tomorrow to discuss the comments received on Port Colborne ESEL from the Conservation Authority? There comments are below. Let me know when you are available.

Gerrit

From: Darren MacKenzie [mailto:DMacKenzie@npca.ca]
Sent: Thursday, September 15, 2016 3:27 PM
To: Grueneis, Karl
Subject: FW: NPCA Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Karl,

Please find below the comments from Lee-Ann regarding the East Side Employment Lands Municipal Class EA.

Let me know if you have any questions.

Cheers.

Darren MacKenzie, C.Tech., rcsi
Supervisor, Construction Permits and Compliance
Niagara Peninsula Conservation Authority
250 Thorold Road West, 3rd Floor
Welland, ON, L3C 3W2
P: 905-788-3135 ext. 229
F: 905-788-1121
Email: dmackenzie@npca.ca
Website: www.npca.ca

From: Lee-Ann Hamilton
Sent: September-14-16 4:12 PM
To: Darren MacKenzie <DMacKenzie@npca.ca>
Subject: RE: NPCA Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Darren,

I have reviewed the Appendix C Natural Environmental Technical Memorandum (January 13, 2016) for the City of Port Colborne Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project, and can offer the following comments:

— The NPCA would note that more detailed natural heritage information, inventories, and mapping are provided within the Preliminary Environmental Impact Assessment (December 21, 2013) prepared by MMM Group for the previous proposed development of these lands, where permission to access all lands was granted, and which may be of assistance in characterizing and mapping the natural heritage features existing on site, which include habitat of a number of Species at Risk, habitat of a number of Species of Concern, and Significant Wildlife Habitats (S3S4 Ranked vegetation communities).

This can be included in the next stage.

— Habitat inventories and assessment should include the MNRF Protocol (August 2016) for treed habitats for the four species of Species at Risk listed bats in Ontario.

This should be added as a recommendation for further work.

— Species rankings provided in Attachment C (Floral Species List) is required to be updated, as the rankings and discussion of the rankings within the report are out of date.

We will need to clarify this with NPCA. I would request if they have an updated regional floral species list for Niagara Region.

— The NPCA agrees that the requirement for 15 metre buffers for the watercourses on site is consistent with current NPCA Policies. Conclusions regarding final buffer requirements would be dependent on the proposed adjacent land

use, therefore the NPCA cannot agree at this time that this buffer requirement would be approved to be reduced. Also, please note that NPCA Policies are currently in the process of being updated, and this requirement could change in the near future.

The recommendations should be refined to include this clarification

— NPCA buffer requirements for Provincially Significant Wetlands are currently a minimum of 30 metres.

The recommendations should be refined to include this clarification.

— The NPCA agrees with the recommendation of the report to conduct more detailed Species at Risk habitat assessments, feature boundary confirmations, buffer recommendations, and all other constraints and recommendations provided in Table 3.

Great!

The NPCA would be happy to assist with the scoping of future EIS's for the site, to ensure that they would meet Provincial and NPCA Policy requirements.

Thanks,

Lee-Ann Hamilton
Supervisor, Watershed Biology
Niagara Peninsula Conservation Authority
250 Thorold Road West, 3rd Floor
Welland, ON L3C 3W2
905.788.3135 x. 265
lhamilton@npca.ca

Ministry of Transportation

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905 682 0212 tel
905 682 4495 fax

August 8, 2014

Project # 60322620

SENT VIA E-MAIL

Alexandre Gitkow , Permits Officer, Niagara Region
Ministry of Transportation
Corridor Management Section
1201 Wilson Avenue, Building D, 7th Floor
Downsview, Ontario M3M 1J8

Subject: Site Servicing of the East Side Employment Lands
NOTICE OF STUDY COMMENCEMENT

Dear Mr. Gitkow:

Please find attached the Notice of Study Commencement for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Municipal Class Environmental Assessment* (Class EA). This public notice was recently published on the City's website and in local newspapers and is now being sent to you because we would like your comments regarding this important infrastructure project. Further information is provided below.

Study Background

This Class EA study is being completed under the Municipal Engineers Association Master Planning Process and was initiated by the City of Port Colborne to allow for future industrial park development of the East Side Employment Lands (see map in attached notice). Key components of the EA study include the provision of municipal water and sanitary sewer systems, stormwater management and road network improvements. The project team will examine a full range of alternatives and improvements to identify a preferred municipal servicing strategy that could be implemented in phases as development proposals come forward.

Next Steps

We will continue to keep you informed of study progress, including an upcoming Public Information Centre and study recommendations, tentatively scheduled for early 2015. Information will also be posted on the City's website as it becomes available (www.portcolborne.ca > City Services > Engineering > Current Studies). In the meantime, if you have any questions or comments or would like additional information, please do not hesitate to contact me. Alternatively, you may also send comments to the project email address at SSESEL@portcolborne.ca, or contact the City's Manager of Engineering Services, Jim Huppunen, at 905-835-2900 ext. 221.

Sincerely,
AECOM Canada Ltd.

Jennifer Whittard, B.E.S., PMP
Assistant Project Manager
jennifer.whittard@aecom.com
905-346-3744

Encl.

cc: SSESEL@portcolborne.ca
Jim Huppunen, City of Port Colborne
Mark Swan/Karl Grueneis, AECOM

Mollo, Jessica

From: Gearin, Lily (MTO)
Sent: Thursday, August 21, 2014 4:23 PM
To: Whittard, Jennifer
Cc: Lam, Alice (MTO); Fyffe, Hugh (MTO)
Subject: RE: Notice of Study Commencement - Site Servicing of the East Side Employment Lands, Port Colborne

Good afternoon Jennifer,

Thank you for providing notice of study. Please provide further details on past discussions had about permits. Prior to any work or entry onto the Ministry's right-of-way a permit must be issued and all Central Region lane closure policies must be followed as well as OTM Book 7.

Please note that Alice Lam is the Planning and Design Representative for this study. Please include her in the future correspondence and meetings with AECOM/City of Port Colborne for the EA of Third concession & Hwy 140 intersection reconstruction. The Corridor Management Section's representative is Hugh Fyffe, he will be your first contact in our office.

The Ministry has already been contacted by AECOM regarding this project. I will CC you on correspondence.

Please do not hesitate to contact me should you have any questions.

Best,

Lily Gearin
Central Region Corridor Management Section
Ministry of Transportation
416-235-5380

From: Gitkow, Alexandre (MTO)
Sent: August 11, 2014 7:16 AM
To: Whittard, Jennifer
Cc: 'ssesel@portcolborne.ca'; Kolet, Arieh (MTO)
Subject: RE: Notice of Study Commencement - Site Servicing of the East Side Employment Lands, Port Colborne

Dear Jennifer Whittard,

I no longer work in this area, Arieh Kolet is and he will be glade to help you. His phone # is 416-235-3497.

Please do not hesitate to contact me should you require more information.

Sincerely Yours,

Alexandre Gitkow
Corridor Management Officer
Ottawa Area Office
Ministry of Transportation (MTO)
Phone: 613-748-5270

From: Whittard, Jennifer [mailto:Jennifer.Whittard@aecom.com]
Sent: August-08-14 5:49 PM
To: Gitkow, Alexandre (MTO)
Cc: 'ssesel@portcolborne.ca'
Subject: Notice of Study Commencement - Site Servicing of the East Side Employment Lands, Port Colborne

Hi Alexandre,

On behalf of the City of Port Colborne, please find attached the Notice of Study Commencement for the City's **Site Servicing of the East Side Employment Lands Municipal Class Environmental Assessment**. Also attached is a covering letter which provides additional information.

You should also know that the City has contacted the MTO regarding Permission to Enter for borehole drilling and surveys on their properties. I can provide you with further details if needed.

We will continue to keep you informed as the project progresses, but in the meantime, please let us know if you have any questions or comments or require further information.

Thanks,
Jen

Jennifer Whittard, B.E.S., PMP
Assistant Project Manager, Water
905.346.3744
jennifer.whittard@aecom.com

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www.aecom.com

905 682 0212 tel
905 682 4495 fax

February 3, 2015

SENT VIA EMAIL

Malvika Rudra
Permits Officer, Niagara Region
Ministry of Transportation
Corridor Management Section
1201 Wilson Avenue, Building D, 7th Floor
Downsview, Ontario M3M 1J8

Regarding: City of Port Colborne, Site Servicing of the East Side Employment Lands: Request for Review and Comment of Traffic Impact Study

Dear Ms. Rudra:

The City of Port Colborne is currently completing a Municipal Class Environmental Assessment for the Site Servicing of the East Side Employment Lands, in the City of Port Colborne. The Notice of Study Commencement was sent to Alexandre Gitkow in August 2014. Please find enclosed a copy of the *Traffic Impact Study* for your review and comment.

Based on the Traffic Impact Study, at the intersection of Highway 140 and Third Concession Road a northbound left turn lane has been included in the design and the southbound right turn slip is being maintained. We would like to note that at this time, this intersection is not illuminated.

We would appreciate any comments you may have by end of February 2015.

We will continue to keep you informed of study progress, including an upcoming Public Information Centre (tentatively scheduled for March 2015) and study recommendations. Information will also be posted on the City's website as it becomes available (www.portcolborne.ca > City Services > Engineering > Current Studies). In the meantime, if you have any questions or would like additional information, please do not hesitate to contact me. Alternatively, you may also send comments to the project email address at SSESEL@portcolborne.ca, or contact the City's Manager of Engineering Services, Jim Huppunen, at 905-835-2900 ext. 221.

Sincerely,
AECOM Canada Ltd.

Ian Izzard, P.Eng., M.A.Sc., PMP
Project Manager
ian.izzard@aecom.com, 905-938-7657

Encl. Traffic Impact Study

cc: ssesel@portcolborne.ca
Jim Huppunen, City of Port Colborne

Mollo, Jessica

From: Rudra, Malvika (MTO)
Sent: Friday, March 06, 2015 3:32 PM
To: Izzard, Ian
Cc: Mollo, Jessica; Aurini, Shawn (MTO)
Subject: RE: City of Port Colborne, Site Servicing of the East Side Employment Lands: Traffic Impact Study

Mr. Izzard:

Further to our earlier comments on this development, please also include in this study 53 trips associated with the food processing plant at 316 Enterprise Blvd.

Best Regards,
Malvika

Malvika Rudra, M.A.Sc., B.A.Sc.
Project Engineer (Developmental)- Engineering Development Program
Ontario Ministry of Transportation
Corridor Management Office | Central Region | Provincial Highways Management
1201 Wilson Avenue | Building D, 7th Floor | Toronto, ON M3M 1J8
416-235-5380 | Malvika.Rudra@ontario.ca

From: Rudra, Malvika (MTO)
Sent: March-04-15 3:34 PM
To: Izzard, Ian
Cc: 'Mollo, Jessica'; Aurini, Shawn (MTO)
Subject: RE: City of Port Colborne, Site Servicing of the East Side Employment Lands: Traffic Impact Study

Good Afternoon, Mr. Izzard:

Please find attached comments on the TIS for Site Servicing of the East Side Employment Lands in the City of Port Colborne.

In addition to these comments, please submit the Synchro data files for this site.

Should you have any comments or concerns, please do not hesitate to contact me.

Best Regards,

Malvika Rudra, M.A.Sc., B.A.Sc.
Project Engineer (Developmental)- Engineering Development Program
Ontario Ministry of Transportation
Corridor Management Office | Central Region | Provincial Highways Management
1201 Wilson Avenue | Building D, 7th Floor | Toronto, ON M3M 1J8
416-235-5380 |

From: Mollo, Jessica [mailto:Jessica.Mollo@aecom.com]
Sent: February-23-15 9:11 AM
To: Rudra, Malvika (MTO)
Cc: Izzard, Ian
Subject: RE: City of Port Colborne, Site Servicing of the East Side Employment Lands: Traffic Impact Study

Good morning Malvika,

I am just following up on my email below and would like to confirm if you have had a chance to review the Traffic Impact Study and if you have any questions or comments. If you have reviewed it and would like to discuss anything please feel free to contact AECOM's project manager Ian Izzard at 905-938-7657 or ian.izzard@aecom.com.

Any comments you have would be greatly appreciated by within the next week or so.

Thanks and regards,
Jessica

Jessica Mollo, B.Sc
Environmental Planner, Water
D 905.346.3742
jessica.mollo@aecom.com

AECOM
3-30 Hannover Drive, St. Catharines ON L2W 1A3
T 905.682.0212 F 905.682.4495
www.aecom.com

From: Mollo, Jessica
Sent: Tuesday, February 03, 2015 2:14 PM
To:
Cc: Izzard, Ian; 'ssesel@portcolborne.ca'; '
Subject: City of Port Colborne, Site Servicing of the East Side Employment Lands: Traffic Impact Study

Good afternoon Malvika,

On behalf of Ian Izzard, AECOM is currently completing a Municipal Class EA for the Site Servicing of the East Side Employment Lands in the City of Port Colborne. The Notice of Study Commencement was sent to Alexandre Gitkow in August 2014. As part of the study, a Traffic Impact Study was completed and is attached for your review and comment. For more information, please refer to the attached letter.

Any comments you have would be appreciated by the end of February. For your information, a Technical Advisory Committee meeting is being planned for the end of February. Details about this meeting are to follow within the next week.

If you have any questions, feel free to contact myself or the City's Project Manager Jim Huppunen at 905-835-2900 ext. 221.

Thanks and regards,
Jessica

Jessica Mollo, B.Sc
Environmental Planner, Water
D 905.346.3742
jessica.mollo@aecom.com

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Please consider the environment before printing this e-mail.

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www.aecom.com

905 682 0212 tel
905 682 4495 fax

March 11, 2015

Project # 60322620

Malvika Rudra
Project Engineer (Developmental)
Ministry of Transportation
Corridor Management Section
1201 Wilson Avenue
Building D, 7th Floor
Downsview, Ontario M3M 1J8

Subject: **Site Servicing of the East Side Employment Lands Class Environmental Assessment Study, City of Port Colborne**
NOTICE OF PUBLIC INFORMATION CENTRE

Dear Malvika Rudra:

Further to our August 2014 Notice of Study Commencement, please find attached the Notice of Public Information Centre (PIC) for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Class Environmental Assessment Study.*

Study Purpose

The EA Study will be completed in keeping with the Ontario *Environmental Assessment Act*, and will follow the Master Planning Process of the Municipal Engineers Association. The Master Plan follows Approach #2 which will fulfill the requirements for Schedule A, A+, and Schedule B projects. The project team will examine a full range of alternatives and improvements and identify a preferred municipal servicing strategy for the ESEL that could be implemented in phases as development proposals come forward.

Public Information Centre

You are encouraged to attend the Public Information Centre scheduled for March 23, 2015, where the problem/opportunity statement and recommended servicing strategy will be presented. Representatives from both the City of Port Colborne and AECOM will be available to discuss the project and answer any questions you may have. If you are unable to attend, the display boards will be made available for review and comment following the PIC on the City website (www.portcolborne.ca > City Services > Engineering > Current Studies). All comments received throughout the course of this study will be considered in finalizing the recommended servicing strategies.

Next Steps

Upon completion of the study, a Master Plan Project File will be prepared and made available for public and agency review. In the meantime, if you have any questions or comments or would like additional information, please do not hesitate to contact me. Alternatively, you may also send comments to the project email address at SSESEL@portcolborne.ca, or contact the City's Manager of Engineering Services, Jim Huppunen, at 905-835-2900 ext. 221.

Sincerely,

AECOM Canada Ltd.

Ian Izzard, P.Eng., M.A.Sc., PMP
Project Manager
Ian.izzard@aecom.com
905-938-7657

Encl. Notice of Public Information Centre
cc: Jim Huppunen, City of Port Colborne
Karl Grueneis, AECOM

Letter also sent to:
- James Gregory, Regional Operations Officer
- Alice Lam, Planning & Design Representative

Mollo, Jessica

From: Izzard, Ian
Sent: Wednesday, April 22, 2015 11:03 AM
To: Mollo, Jessica; Grueneis, Karl
Subject: FW: Notice of Public Information Centre - East Side Employment Lands

Follow Up Flag: Follow up
Flag Status: Flagged

Ian Izzard, P. Eng., M.A.Sc., PMP.
Senior Project Manager - Community Infrastructure
Direct line: 905.938.7657
Cell: 289.213.4516
ian.izzard@aecom.com

AECOM
30 Hannover Drive, Suite 3
St. Catharines, Ontario, Canada
L2W 1A3
T 905.682.0212 F 905.682.4495

From: Fyffe, Hugh (MTO) [mailto:]
Sent: Wednesday, April 22, 2015 10:56 AM
To: Izzard, Ian
Subject: Notice of Public Information Centre - East Side Employment Lands

Good morning Mr. Izzard:

Thanks for the subject notice.

Further to correspondence from MTO on the subject study, we note Highway 140 is the east boundary of the ESEL. Note that all developments adjacent to and within a 395m radius around an intersection with Highway 140 is subject to MTO permit(s). Also, there are entrance restrictions to Highway 140.

Please keep the MTO informed as the study progresses.

Thanks

Hugh Fyffe
Project Manager
Corridor Management Section
416 235-4572

Zandvliet, Samantha

To: Grueneis, Karl
Subject: RE: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

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From: El-Shabani, Abdallah
Sent: Sunday, January 15, 2017 6:24 PM
To: St. Denis, Jocelyn
Cc: Lunn, James; Ashraf, Khawar; Grueneis, Karl
Subject: RE: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Jocelyn,

Apologies for the delay, I had a few urgent deliverables after the holidays.

Below are my responses to the MTO comments. I will call you tomorrow to discuss the responses, and answer any question you may have.

MTO Comments	AECOM Responses
1. The trip generation equation that the Consultant used for light industrial has an R squared value of 0.76 which is just above the minimum value of 0.75.	1. While we agree that the R squared value is close to the minimum of 0.75, the trip generation values are supported by other ITE classifications. Please note Response 2.
2. The trip generation of 200 peak hr trips seems low considering that lands are to employ over 500 people. Please provide further justification/clarification on how this trip generation was derived. i. If we are to consider 1.3 persons/trip the result would still be approximately 380 trips. ii. If the light industrial were to run shifts then the number could be much higher as the peak hour would now have both arrivals and departures	2. The trip generation in the TIS is based on a Light industrial land use. It is calculated for the peak hour of the adjacent road, which is different from the development's peak hour. The trip generation for facility's peak hour would is 250 trips for the AM peak as per ITE guidelines (R squared = .86). The high R squared for this case supports the trip generation number in the submitted TIS, which should be lower than the peak of the generator. The difference between the peaks of the adjacent street and the generator, and the low trip generation rate indicate peak spreading, carpooling and/or the use of shuttles.
3. Please provide Truck Turning Templates to confirm that the geometrics of the intersection will work.	-
4. It appears that the peak volumes on 3rd Concession were not used to determine LOS. Perhaps the peak hour volumes on 3rd Concession with a lower Hwy 140 volume would be a worse combination potentially increasing the delay to the side street to greater than 50 seconds. This could lead to drivers accepting smaller gaps creating potential safety issues.	4. The assumed future trip distribution is based on the approved "Nyon Fuelling Corporation Traffic Impact Study (Nyon TIS)" report, completed in September 2013.

Regards,
Abdallah

Abdallah El-Shabani M.Eng.,
Transportation planner, Transit & Rail
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From: Dave, Pranav
Sent: Friday, December 23, 2016 7:04 PM
To: St. Denis, Jocelyn
Cc: Grueneis, Karl; Lunn, James; El-Shabani, Abdallah; Ashraf, Khawar
Subject: RE: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Jocelyn/Karl,

Unfortunately, I will not be able to respond to the comments as today is my last day with AECOM. Khawar/Abdallah in our Mississauga office should be able to respond to the comments. They should contact you in the new year.

Regards,

Pranav Dave, P.Eng., PTOE
Project Manager, (Transit & Rail)
D +1-(905)-755-8958

From: St. Denis, Jocelyn
Sent: Thursday, December 22, 2016 4:14 PM
To: Dave, Pranav
Cc: Grueneis, Karl; Lunn, James
Subject: FW: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hello Pranav,

At the beginning of 2015, Michael Tracey completed a Traffic Impact Study for a project that the St. Catharines office is working on in the City of Port Colborne (report is attached). We had submitted our design drawings for Hwy 140 to the MTO and received the comments below. The highlighted comments pertain to the TIS and so were hoping that you could provide some insight.

Thank you in advance.

Regards,
Jocelyn St. Denis, P.Eng
Project Engineer, Water
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M +905-931-1932
jocelyn.st.denis@aecom.com

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aecom.com

From: Thai, Huy (MTO) [mailto:Huy.Thai@ontario.ca]
Sent: Thursday, December 22, 2016 2:35 PM
To: Grueneis, Karl
Cc: Lunn, James; St. Denis, Jocelyn
Subject: RE: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Good afternoon Karl,

The Ministry has reviewed the submission from Nov 21st, 2016 and offer the following comments.

1. The trip generation equation that the Consultant used for light industrial has an R squared value of 0.76 which is just above the minimum value of 0.75.

2. The trip generation of 200 peak hr trips seems low considering that lands are to employ over 500 people. Please provide further justification/clarification on how this trip generation was derived.
    i. If we are to consider 1.3 persons/trip the result would still be approximately 380 trips.
    ii. If the light industrial were to run shifts then the number could be much higher as the peak hour would now have both arrivals and departures

3. Please provide Truck Turning Templates to confirm that the geometrics of the intersection will work.

4. It appears that the peak volumes on 3rd Concession were not used to determine LOS. Perhaps the peak hour volumes on 3rd Concession with a lower Hwy 140 volume would be a worse combination potentially increasing the delay to the side street to greater than 50 seconds. This could lead to drivers accepting smaller gaps creating potential safety issues.

Please provide responses to our comments.

I'll be off over the holiday break and will return Jan 3rd.

Thanks.

Huy Thai
Corridor Management Planner
Hamilton/Halton/Niagara Area | Ministry of Transportation,
Central Region Highway Corridor Management
159 Sir William Hearst Ave, 7th Floor, Downsview, Ontario, M3M 0B7
Phone: 416-235-4387 | Fax: 416-235-4267

Zandvliet, Samantha

To: Grueneis, Karl
Subject: RE: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

---

From: St. Denis, Jocelyn
Sent: Friday, January 06, 2017 12:20 PM
To: Thai, Huy (MTO)
Cc: Lunn, James; Grueneis, Karl; Kolesnik, Barbara; Hwang, James(Taeyoung)
Subject: RE: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hello Huy,

We are currently putting together the information that you have requested, however for the time being, did the MTO have any comments on the information that we had provided previous (sightline analysis, photometric analysis, etc.)? If you could please let me know, it would be greatly appreciated.

Thank you in advance.

Regards,
Jocelyn St. Denis, P.Eng
Project Engineer, Water
D +905-938-7668
M +905-931-1932
jocelyn.st.denis@aecom.com

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T +905-682-0212
aecom.com

From: Thai, Huy (MTO) [mailto:Huy.Thai@ontario.ca]
Sent: Thursday, December 22, 2016 2:35 PM
To: Grueneis, Karl
Cc: Lunn, James; St. Denis, Jocelyn
Subject: RE: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Good afternoon Karl,

The Ministry has reviewed the submission from Nov 21st, 2016 and offer the following comments.

1. The trip generation equation that the Consultant used for light industrial has an R squared value of 0.76 which is just above the minimum value of 0.75.

2. The trip generation of 200 peak hr trips seems low considering that lands are to employ over 500 people. Please provide further justification/clarification on how this trip generation was derived.
    i. If we are to consider 1.3 persons/trip the result would still be approximately 380 trips.
    ii. If the light industrial were to run shifts then the number could be much higher as the peak hour would now have both arrivals and departures

3. Please provide Truck Turning Templates to confirm that the geometrics of the intersection will work.

4. It appears that the peak volumes on 3rd Concession were not used to determine LOS. Perhaps the peak hour volumes on 3rd Concession with a lower Hwy 140 volume would be a worse combination potentially increasing the delay to the side street to greater than 50 seconds. This could lead to drivers accepting smaller gaps creating potential safety issues.

Please provide responses to our comments.

I'll be off over the holiday break and will return Jan 3rd.

Thanks.

Huy Thai
Corridor Management Planner
Hamilton/Halton/Niagara Area | Ministry of Transportation,
Central Region Highway Corridor Management
159 Sir William Hearst Ave, 7th Floor, Downsview, Ontario, M3M 0B7
Phone: 416-235-4387 | Fax: 416-235-4267

Zandvliet, Samantha

To: Grueneis, Karl
Subject: RE: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

---

From: Lunn, James
Sent: Tuesday, November 29, 2016 11:52 AM
To: Grueneis, Karl
Subject: FW: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

---

From: Grueneis, Karl
Sent: Friday, November 25, 2016 11:51 AM
To: Thai, Huy (MTO)
Cc: Lunn, James; St. Denis, Jocelyn
Subject: RE: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Huy

The traffic impact study says signalization of the HWY 140 and Third Concession Road is not warranted.

Regards

Karl

Karl Grueneis
Senior Environmental Planner
D 905.346.3732

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www.aecom.com

From: Thai, Huy (MTO) [mailto:Huy.Thai@ontario.ca]
Sent: Thursday, November 24, 2016 10:40 AM
To: Grueneis, Karl
Cc: Lunn, James; St. Denis, Jocelyn
Subject: RE: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Karl,

Is Hwy 140 and Third Concession still being signalized?

Huy Thai

Corridor Management Planner
Hamilton/Halton/Niagara Area | Ministry of Transportation,
Central Region Highway Corridor Management
159 Sir William Hearst Ave, 7th Floor, Downsview, Ontario, M3M 0B7
Phone: 416-235-4387 | Fax: 416-235-4267

From: Grueneis, Karl [mailto:Karl.Grueneis@aecom.com]
Sent: November-21-16 10:29 AM
To: Thai, Huy (MTO)
Cc: Lunn, James; St. Denis, Jocelyn
Subject: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Huy

Further to our last email correspondence please see below email and attachments which address your comments-request for information.

In terms of our EA schedule we are making a presentation to Council Dec 12th which will be followed by notice of study completion late December or early January.

Appreciate if you could give us a rough timeframe for when you will have your review done and comments to us.

Many thanks

Karl

Karl Grueneis
Senior Environmental Planner
D 905.346.3732

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From: St. Denis, Jocelyn
Sent: Monday, November 21, 2016 9:16 AM
To: Grueneis, Karl
Subject: RE: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Karl,

Attached is the following information that the MTO requested:

1) Traffic Impact Study
2) Lighting Analysis (this file is actually for the entire project including the Hwy 140 intersection)
3) Sightline analysis at the intersection

When completing the sightline analysis it was determined that we needed to clear some of the brush at the southeast corner of the intersection and so the plan and profile drawing was updated. It is also attached to this email.

Jocelyn

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From: Grueneis, Karl
Sent: Monday, November 07, 2016 4:07 PM
To: Thai, Huy (MTO)
Cc: St. Denis, Jocelyn; Lunn, James
Subject: RE: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Huy

Thought we would give you a status update.

We are preparing a memorandum addressing your comments. Hope to have it to you next week. EA will be filed in December or January 2017.

Thanks-regards

Karl

Karl Grueneis
Senior Environmental Planner
D 905.346.3732

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From: Thai, Huy (MTO) [mailto:Huy.Thai@ontario.ca]
Sent: Monday, August 29, 2016 1:58 PM

To: Grueneis, Karl
Cc: St. Denis, Jocelyn; Lunn, James
Subject: RE: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Karl,

In addition to my last email below, I would also like to add that the plans show ditch realignment and culvert work which will require a drainage report. If you have completed a Geotech Investigation, which also appears that it may have been, please forward for our review as well.

When you mentioned that you'd like to wrap up the project by September, did you mean the EA report? Or the design work for the intersection improvements?

Has the City of Port Colborne ever discussed their plan to construct improvements to Hwy 140 and Third Concession with the MTO?

Thanks.

Huy Thai
Corridor Management Planner
Hamilton/Halton/Niagara Area | Ministry of Transportation, Central Region Highway Corridor Management
159 Sir William Hearst Ave, 7th Floor, Downsview, Ontario, M3M 0B7
Phone: 416-235-4387 | Fax: 416-235-4267

From: Thai, Huy (MTO)
Sent: August-29-16 11:02 AM
To: 'Grueneis, Karl'
Cc: St. Denis, Jocelyn; Lunn, James
Subject: RE: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Good morning Karl,

Aside from the design drawings, when would you be able to provide the remaining technical information as requested from my comments?

a. The Proponent must provide the following for Ministry review:
    i. traffic impact analysis with signalization warrant analysis
    ii. ROW lighting/Illumination warrants
    iii. sight line analysis of the intersection and the surrounding area, and
    iv. detailed design drawings.

Specifically, comment i, ii, and iii

We'll do our best to provide comments to the drawings, however, the above will be beneficial to our complete review.

Thanks.

Huy Thai
Corridor Management Planner
Hamilton/Halton/Niagara Area | Ministry of Transportation, Central Region Highway Corridor Management
159 Sir William Hearst Ave, 7th Floor, Downsview, Ontario, M3M 0B7
Phone: 416-235-4387 | Fax: 416-235-4267

From: Grueneis, Karl [mailto:Karl.Grueneis@aecom.com]
Sent: August-26-16 11:38 AM
To: Thai, Huy (MTO)
Cc: St. Denis, Jocelyn; Lunn, James
Subject: FW: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Huy

Thanks again for HWY 140 drawings and comments on EA.

Please find attached detailed design drawings of HWY 140 and Third Concession Road intersection improvements for MTO review and comments.

Please confirm receipt and when you think we can expect comments. We are trying to wrap up the project in late September.

Thanks-regards

Karl

Karl Grueneis
Senior Environmental Planner
D 905.346.3732

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www.aecom.com

From: Thai, Huy (MTO) [mailto:Huy.Thai@ontario.ca]
Sent: Wednesday, July 06, 2016 3:40 PM
To: Grueneis, Karl
Subject: RE: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Karl,

The Ministry does not have as built drawings for this area. However the latest contract that repaved this section of Hwy 140 is attached. This contract was completed in 2010/2011.

The attached contract drawing set for contract 2010-2009 is being shared since the proponent is the City of Port Colborne for the proposed signalization design/work at Hwy 140 and Third Concession. They shall not be shared with any other party or used for any other purpose than as reference material.

All data contained in the drawings must be field verified and the Ministry does not take liability for misinformation as a result of the drawings.

Let me know if you have any questions.

Huy Thai

Corridor Management Planner
Hamilton/Halton/Niagara Area | Ministry of Transportation, Central Region Corridor Management
159 Sir William Hearst Ave, 7th Floor, Downsview, Ontario, M3M 0B7
Phone: 416-235-4387 | Fax: 416-235-4267

From: Grueneis, Karl [mailto:Karl.Grueneis@aecom.com]
Sent: July-05-16 4:11 PM
To: Thai, Huy (MTO)
Subject: RE: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Huy

Thanks for detailed EA comments.

Would it be possible to get HWY 140 as built PDF DWGs in the area around the Third Concession intersection. Like to see road platform road cross section etc....thanks!

Karl

Karl Grueneis
Senior Environmental Planner
D 905.346.3732

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www.aecom.com

From: Thai, Huy (MTO) [mailto:Huy.Thai@ontario.ca]
Sent: Wednesday, June 29, 2016 1:02 PM
To: Grueneis, Karl
Cc: Fyffe, Hugh (MTO); Glofcheskie, Christopher (MTO); Nunes, Paul (MTO); St. Denis, Jocelyn; Lunn, James; Singh, Christian (MTO)
Subject: RE: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Good afternoon Karl,

I've reviewed the EA document circulated to the Ministry.

With respect to the preferred alignment (alignment #2, as detailed in Fig 10, pg 36 of EA) of the force main servicing, the Ministry does not have any comment and it appears to have the least impact to the Ministry's Right-of-Way (ROW). However, the southern end of the proposed alignment (between

Second Line and Ramey Rd) is in the Ministry's Permit Control Area and will require that the Proponent acquire the Ministry's Building and Land Use Permit prior to any construction.

Should the alignment be revised and eventually cross the Ministry's ROW at any point, the Proponent will require an Encroachment Permit prior to the commencement of any construction within the Permit Control Area and crossing the ROW. Pipe crossing proposals should be accompanied by a Geotechnical Investigations Report, Traffic Management plans, Plan & Profile drawings which clearly show the alignment depth and bore pits, and remediation plans. Open cut installation will not be allowed across the ROW.

Additional information with respect to the permit process can be found at our website:

http://www.mto.gov.on.ca/english/engineering/management/corridor/index.shtml

While Aligment #1 was not identified as the preferred alignment, the Ministry would like to note the following concerns with this option:

a. The proximity of the alignment to Hwy 140
b. That it shall be set back 14m from the current or future ROW limits of the Ministry's ROW
c. That this alignment shall not be allowed to run parallel within the Ministry's ROW limits.

With respect to section 6.4.3 which proposes to signalize the intersection of Third Line and Hwy 140, the Ministry has the following comments:

a. At this time, the Ministry has not received detailed drawings of the proposed signalization work. As such, the Ministry cannot support the proposed signalization without further consultation with the Ministry and detailed review of the design drawings.
b. The Proponent must provide the following for Ministry review:
    i. traffic impact analysis with signalization warrant analysis
    ii. ROW lighting/Illumination warrants
    iii. sight line analysis of the intersection and the surrounding area, and
    iv. detailed design drawings.
c. The Proponent must be advised that Hwy 140 is a Class 2A Highway designated as Controlled Access Highway. All roadway improvements must take into consideration the Ministry's Highway Access Management Guidelines Dec 2013, and the Ministry's design standards.
d. Should the Proponent be allowed to undertake the work, they will be required to enter into a legal agreement and obtain an Encroachment Permit prior to commencement of any work. A Letter of Credit may also be requested as part of the legal agreement.

Please feel free to contact me if you have any questions with regard to the above comments.

Further correspondence can be forwarded to me directly with cc to Chris Glofcheskie and Hugh Fyffe (both copied on this email).

Thanks.

Huy Thai
Corridor Management Planner
Hamilton/Halton/Niagara Area | Ministry of Transportation, Central Region Corridor Management
159 Sir William Hearst Ave, 7th Floor, Downsview, Ontario, M3M 0B7
Phone: 416-235-4387 | Fax: 416-235-4267

From: Singh, Christian (MTO)
Sent: June-03-16 10:58 AM
To: Fyffe, Hugh (MTO); Nunes, Paul (MTO); Thai, Huy (MTO); Glofcheskie, Christopher (MTO)
Subject: FW: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Are any of you aware of this EA?

C

From: Rudra, Malvika (MTO)
Sent: June 3, 2016 10:50 AM
To: Mollo, Jessica
Cc: Grueneis, Karl; Singh, Christian (MTO)
Subject: RE: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Jessica,

I am no longer part of the Corridor Mgmt office of the MTO. I had previously forwarded your email to that office for a response.
You should be hearing from them soon.

Best Regards,

Malvika Rudra, B.A.Sc., M.A.Sc.
Engineer-in-Training, Engineering Development Program
Ontario Ministry of Transportation
Planning and Design Office | Central Region Engineering | Provincial Highways Management
159 Sir William Hearst Avenue | 4th Floor | Toronto, ON M3M 0B7
416-235-3561 | Malvika.Rudra@ontario.ca

From: Mollo, Jessica [mailto:Jessica.Mollo@aecom.com]
Sent: June-03-16 10:42 AM
To: Rudra, Malvika (MTO)
Cc: Grueneis, Karl
Subject: RE: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Malvika,

I am just following up on my email below regarding the status of your review and if you have any questions or require additional information.

As noted below, any comments you have would be appreciated by mid-June.

Thanks and regards,
Jessica

Jessica Mollo, B.Sc
Environmental Planner, Environment
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From: Mollo, Jessica
Sent: Friday, May 13, 2016 9:00 AM
To: malvika.rudra@ontario.ca
Cc: 'jimhuppunen@portcolborne.ca'; 'ssesel@portcolborne.ca'; Grueneis, Karl; Izzard, Ian; St. Denis, Jocelyn
Subject: MTO Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Malvika,

The City of Port Colborne is preparing to file the City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File.

For your review and comment, please see the link below for the Master Plan Project File Report. As the City would like to file the report for the 30 day public review period by the end of June, any comments the MTO has would be greatly appreciated by mid-June 2016.

This file will be available for download until 5/20/2016

File	Description	Size
RPT-2016-05-12-ESEL MP Project File-60322620-DRAFT.pdf		63,658KB

Download all files (.zip)

Should you have any questions, or require additional information please feel free to contact me.

Thanks and regards,
Jessica

Jessica Mollo, B.Sc
Environmental Planner, Environment
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AECOM

Ministry of Environment and Climate Change

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905 682 0212 tel
905 682 4495 fax

August 8, 2014

Project # 60322620

SENT VIA E-MAIL

Ms. Barb Slattery, EA Planning Coordinator
Ministry of the Environment and Climate Change
West Central Region Office
119 King Street West, 9th Floor
Hamilton, Ontario L8P 4Y7

Subject: Site Servicing of the East Side Employment Lands
NOTICE OF STUDY COMMENCEMENT

Dear Ms. Slattery:

Please find attached the Notice of Study Commencement for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Municipal Class Environmental Assessment* (Class EA). This public notice was recently published on the City's website and in local newspapers and is now being sent to you because we would like your comments regarding this important infrastructure project. Further information is provided below.

Study Background

This Class EA study is being completed under the Municipal Engineers Association Master Planning Process and was initiated by the City of Port Colborne to allow for future industrial park development of the East Side Employment Lands (see map in attached notice). Key components of the EA study include the provision of municipal water and sanitary sewer systems, stormwater management and road network improvements. The project team will examine a full range of alternatives and improvements to identify a preferred municipal servicing strategy that could be implemented in phases as development proposals come forward.

Next Steps

We will continue to keep you informed of study progress, including an upcoming Public Information Centre and study recommendations, tentatively scheduled for early 2015. Information will also be posted on the City's website as it becomes available (www.portcolborne.ca > City Services > Engineering > Current Studies). In the meantime, if you have any questions or comments or would like additional information, please do not hesitate to contact me. Alternatively, you may also send comments to the project email address at SSESEL@portcolborne.ca, or contact the City's Manager of Engineering Services, Jim Huppunen, at 905-835-2900 ext. 221.

Sincerely,
AECOM Canada Ltd.

Jennifer Whittard, B.E.S., PMP
Assistant Project Manager
jennifer.whittard@aecom.com
905-346-3744

Encl.

cc: SSESEL@portcolborne.ca
Jim Huppunen, City of Port Colborne
Mark Swan/Karl Grueneis, AECOM

AECOM
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905 682 0212 tel
905 682 4495 fax

March 11, 2015

Project # 60322620

Ms. Barb Slattery
EA Planning Coordinator
Ministry of the Environment and Climate Change
West-Central Region, Technical Support Section
119 King Street West, 12th Floor
Hamilton, Ontario L8P 4Y7

Subject: **Site Servicing of the East Side Employment Lands Class Environmental Assessment Study, City of Port Colborne**
NOTICE OF PUBLIC INFORMATION CENTRE

Dear Ms. Slattery:

Further to our August 2014 Notice of Study Commencement, please find attached the Notice of Public Information Centre (PIC) for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Class Environmental Assessment Study.*

Study Purpose

The EA Study will be completed in keeping with the Ontario *Environmental Assessment Act*, and will follow the Master Planning Process of the Municipal Engineers Association. The Master Plan follows Approach #2 which will fulfill the requirements for Schedule A, A+, and Schedule B projects. The project team will examine a full range of alternatives and improvements and identify a preferred municipal servicing strategy for the ESEL that could be implemented in phases as development proposals come forward.

Public Information Centre

You are encouraged to attend the Public Information Centre scheduled for March 23, 2015, where the problem/opportunity statement and recommended servicing strategy will be presented. Representatives from both the City of Port Colborne and AECOM will be available to discuss the project and answer any questions you may have. If you are unable to attend, the display boards will be made available for review and comment following the PIC on the City website (www.portcolborne.ca > City Services > Engineering > Current Studies). All comments received throughout the course of this study will be considered in finalizing the recommended servicing strategies.

Next Steps

Upon completion of the study, a Master Plan Project File will be prepared and made available for public and agency review. In the meantime, if you have any questions or comments or would like additional information, please do not hesitate to contact me. Alternatively, you may also send comments to the project email address at SSESEL@portcolborne.ca, or contact the City's Manager of Engineering Services, Jim Huppunen, at 905-835-2900 ext. 221.

Sincerely,

AECOM Canada Ltd.

Ian Izzard, P.Eng., M.A.Sc., PMP
Project Manager
Ian.izzard@aecom.com
905-938-7657

Encl. Notice of Public Information Centre
cc: Jim Huppunen, City of Port Colborne
Karl Grueneis, AECOM

Ministry of the Environment and Climate Change
West-Central Region
Technical Support Section
Air, Pesticides & Environmental Planning
12th Floor
119 King St W
Hamilton ON L8P 4Y7
Fax: (905) 521-7820
Tel:

Ministère de l'Environnement et de l'Action en matière de changement climatique
Direction régionale du Centre-Ouest
Section du Soutien Technique
Air, pesticides et planification environnementale
12e étage
119 rue King W
Hamilton ON L8P 4Y7
Télécopieur: (905) 521-7820
Tél:

Ontario

September 2, 2014

Ms J. Whittard
AECOM
3-30 Hannover Drive
St. Catharines, ON
L2W 0A1
Canada

Dear Ms Whittard:

RE: Response to Notice of Commencement
Site Servicing of the East Side Employment Lands
Class EA Study
Reference Number 0358-9NEME4

This letter is our response to the Notice of Commencement for the above noted project. This response acknowledges that the City of Port Colborne has initiated a study that will be carried out in accordance with the provisions for master plans as outlined in the MEA Class Environmental Assessment. It is understood that this comprehensive study is intended to enable the City to determine the preferred means of providing all aspects of site servicing to the area known as the East Side Employment Lands, to facilitate their development. As such, the study will be looking at the transportation, water supply, sanitary servicing and stormwater management requirements.

Thank you for the opportunity to comment on this project. To assist, we prepared a map of the study and surrounding area in order to determine the presence of any environmental features that may affect the identification of impacts and required mitigation. From the map, it is evident that in addition to the canals, the area is in the immediate proximity of, and even contains some wetland areas. A number of Permits to Take Water have also been issued and a significant number of individual water supply wells are in the immediate vicinity.

Consultation with First Nation and Métis Communities

Your proposed project may have the potential to affect Aboriginal communities who hold or claim Aboriginal or treaty rights protected under Section 35 of Canada's *Constitution Act* 1982. The Crown has a duty to consult First Nation and Métis communities when it knows about established or credibly asserted Aboriginal or treaty rights, and contemplates decisions or actions that may adversely affect them.

Although the Crown remains responsible for ensuring the adequacy of consultation with potentially affected Aboriginal communities, it may delegate procedural aspects of the consultation process to project proponents.

The environmental assessment process requires proponents to consult with interested persons and government agencies, including those potentially affected by the proposed project. This includes a responsibility to conduct adequate consultation with First Nation and Métis communities. The Ministry relies on consultation conducted by proponents when it assesses the Crown's obligations and directs proponents during the regulatory process.

Where the Crown's duty to consult is triggered in relation to your proposed project, the Ontario Ministry of the Environment is delegating the procedural aspects of rights-based consultation to you through this letter.

Steps that you may need to take in relation to Aboriginal consultation for your proposed project are outlined in the attached "Aboriginal Consultation Information" document. Please complete the checklist contained there, and keep related notes as part of your consultation record. Doing so will help you assess your project's potential adverse effects on Aboriginal or treaty rights.

In light of the approval role that MOECC will have in approving some of the resulting infrastructure, we would encourage you to involve us particularly at key decision points. It is customary to provide us with copies of all subsequent notices regarding public meetings. If you intend to create a draft document for circulation to relevant agencies, please provide this office with a copy and sufficient time to enable our review. In the past, proponents have valued this input particularly where it has resulted in good advice relevant to meeting subsequent approval requirements.

Should you or any members of your project team have any questions regarding the material above, please contact me at (905) 521-7864 or at
Yours truly,

Barbara Slattery

Barbara Slattery
EA/Planning Coordinator
West Central Region

File Storage Number: EA05 PC EA

AECOM

Ministry of Tourism, Culture and Sport

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 0A1
www.aecom.com

905 682 0212 tel
905 682 4495 fax

August 8, 2014

Project # 60322620

SENT VIA E-MAIL

Ms. Rosi Zirger, Heritage Planner
Ministry of Tourism, Culture and Sport
Cultural Services Unit, Programs and Services Branch
401 Bay Street, 17th Floor
Toronto, Ontario M7A 0A7

Subject: Site Servicing of the East Side Employment Lands
NOTICE OF STUDY COMMENCEMENT

Dear Ms. Zirger:

Please find attached the Notice of Study Commencement for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Municipal Class Environmental Assessment* (Class EA). This public notice was recently published on the City's website and in local newspapers and is now being sent to you because we would like your comments regarding this important infrastructure project. Further information is provided below.

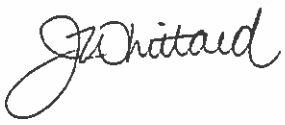
Study Background

This Class EA study is being completed under the Municipal Engineers Association Master Planning Process and was initiated by the City of Port Colborne to allow for future industrial park development of the East Side Employment Lands (see map in attached notice). Key components of the EA study include the provision of municipal water and sanitary sewer systems, stormwater management and road network improvements. The project team will examine a full range of alternatives and improvements to identify a preferred municipal servicing strategy that could be implemented in phases as development proposals come forward.

Next Steps

We will continue to keep you informed of study progress, including an upcoming Public Information Centre and study recommendations, tentatively scheduled for early 2015. Information will also be posted on the City's website as it becomes available (www.portcolborne.ca > City Services > Engineering > Current Studies). In the meantime, if you have any questions or comments or would like additional information, please do not hesitate to contact me. Alternatively, you may also send comments to the project email address at SSESEL@portcolborne.ca, or contact the City's Manager of Engineering Services, Jim Huppunen, at 905-835-2900 ext. 221.

Sincerely,
AECOM Canada Ltd.



Jennifer Whittard, B.E.S., PMP
Assistant Project Manager
jennifer.whittard@aecom.com
905-346-3744

Encl.

cc: SSESEL@portcolborne.ca
Jim Huppunen, City of Port Colborne
Mark Swan/Karl Grueneis, AECOM

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 1A3
www.aecom.com

905 682 0212 tel
905 682 4495 fax

March 11, 2015

Project # 60322620

Ms. Rosi Zirger
Heritage Planner
Ministry of Tourism, Culture and Sport
Cultural Services Unit
Programs and Services Branch
401 Bay Street, 17th Floor
Toronto, Ontario M7A 0A7

Subject: **Site Servicing of the East Side Employment Lands Class Environmental Assessment Study, City of Port Colborne**
NOTICE OF PUBLIC INFORMATION CENTRE

Dear Ms. Zirger:

Further to our August 2014 Notice of Study Commencement, please find attached the Notice of Public Information Centre (PIC) for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Class Environmental Assessment Study*.

Study Purpose

The EA Study will be completed in keeping with the Ontario *Environmental Assessment Act*, and will follow the Master Planning Process of the Municipal Engineers Association. The Master Plan follows Approach #2 which will fulfill the requirements for Schedule A, A+, and Schedule B projects. The project team will examine a full range of alternatives and improvements and identify a preferred municipal servicing strategy for the ESEL that could be implemented in phases as development proposals come forward.

Public Information Centre

You are encouraged to attend the Public Information Centre scheduled for March 23, 2015, where the problem/opportunity statement and recommended servicing strategy will be presented. Representatives from both the City of Port Colborne and AECOM will be available to discuss the project and answer any questions you may have. If you are unable to attend, the display boards will be made available for review and comment following the PIC on the City website (www.portcolborne.ca > City Services > Engineering > Current Studies). All comments received throughout the course of this study will be considered in finalizing the recommended servicing strategies.

Next Steps

Upon completion of the study, a Master Plan Project File will be prepared and made available for public and agency review. In the meantime, if you have any questions or comments or would like additional information, please do not hesitate to contact me. Alternatively, you may also send comments to the project email address at SSESEL@portcolborne.ca, or contact the City's Manager of Engineering Services, Jim Huppunen, at 905-835-2900 ext. 221.

Sincerely,

AECOM Canada Ltd.

Ian Izzard, P.Eng., M.A.Sc., PMP
Project Manager
Ian.izzard@aecom.com
905-938-7657

Encl. Notice of Public Information Centre
cc: Jim Huppunen, City of Port Colborne
Karl Grueneis, AECOM

Ministry of Tourism, Culture and Sport

Culture Programs Unit
Programs and Services Branch
Culture Division
401 Bay Street, Suite 1700
Toronto ON M7A 0A7
Tel : (416) 314-7123
Email: meagan.brooks@ontario.ca

Ministère du Tourisme, de la Culture et du Sport

Unité des programmes culturels
Direction des programmes et des services
Division de culture
401, rue Bay, bureau 1700
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Tél : (416) 314-7123
Email: meagan.brooks@ontario.ca

Ontario

Mar 3, 2015

Samantha Markham (P438)
AECOM
747 - 530 Mornington London ON N5Y 3E5

RE: Review and Entry into the Ontario Public Register of Archaeological Reports: Archaeological Assessment Report Entitled, "Stage 1 Archaeological Assessment for the Port Colborne Site Servicing of East Side Employment Lands (SSESEL). Part of Lots 22, 23, 24 &25, Concession 3, Geographical Township of Humberstone, Municipality of Niagara, City of Port Colborne, Welland County, Ontario ", Dated Jan 30, 2015, Filed with MTCS Toronto Office on Feb 17, 2015, MTCS Project Information Form Number P438-0009-2014

Dear Ms. Markham:

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

The report documents the assessment/mitigation of the study area as depicted in Figure 1 and Figure 6 of the above titled report and recommends the following:

The evaluation of archaeological potential has resulted in the determination that there is a high potential for both Aboriginal and Euro-Canadian archaeological resources to be present in the general region surrounding the Port Colborne SSESEL. Due to the construction of the Welland Canal, the majority of land to the west of Ramey Road has been extensively and intensively disturbed and consists of fill and spoil piles. However, deeply buried archaeological sites have been noted on properties adjacent to the study area (Golder 2012). Therefore, should any archaeological remains be encountered during construction, all work must stop immediately and a licensed archaeologist must be contacted. There are areas where archaeological integrity remains to the east of Ramey Road and the potential for archaeological resources here is high. Stage 2 archaeological assessment is recommended for the land east of Ramey Road prior to any ground disturbance activities as follows:

-A Stage 2 archaeological assessment will be conducted by a licenced archaeologist using the pedestrian survey method at 5 m intervals where ploughing is possible (e.g., agricultural fields). This assessment will occur when the agricultural fields have been recently ploughed, weathered, and exhibit at least 80% surface visibility.

-A Stage 2 archaeological assessment will be conducted by a licenced archaeologist using the test pit survey method at 5 m intervals in all areas that will be impacted by the project and where ploughing is not

possible (e.g., woodlots, overgrown areas, manicured lawns).

-Poorly drained areas, areas of steep slope and areas of previous disturbance (e.g., pipelines, railways, road ROWs, buildings) identified within all areas that will be impacted by the project are to be mapped and photo-documented, but are not recommended for Stage 2 survey as they possess low to no archaeological potential.

-The Stage 2 archaeological assessment will follow the requirements set out in the Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011).

Should deeply buried sites be discovered, a Stage 2 assessment will be conducted according to the standards appropriate for survey in deeply buried conditions as per Section 2.1.7 in the Ministry of Tourism, Culture and Sport's Standards and Guidelines for Consultant Archaeologists (Ontario Government 2011).

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

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

Sincerely,
Meagan Brooks
Archaeology Review Officer

cc. Archaeology Licensing Officer
Jim Huppunen,City of Port Colborne
Barbara Slattery,Ministry of the Environment and Climate Change

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

Ministry of Tourism, Culture and Sport

Culture Services Unit
Programs and Services Branch
401 Bay Street, Suite 1700
Toronto ON M7A 0A7
Tel: 416 314-7159
Fax: 416 212 1802

Ministère du Tourisme, de la Culture et du Sport

Unité des services culturels
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Téléc: 416 212 1802

Ontario

March 19, 2015 (EMAIL ONLY)

Mr. Ian Izzard, Project Manager
AECOM Canada Ltd.
#3- 30 Hanover Drive
St Catharines, ON L2W 1A3
E: Ian.Izzard@aecom.com

RE: MTCS file #: 0001807
Proponent: City of Port Colborne
Subject: Notice of PIC
Site Servicing of the East Side Employment Lands – Class EA
Location: City of Port Colborne

Dear Mr. Izzard

Thank you for providing the Ministry of Tourism, Culture and Sport (MTCS) with the Notice of PIC for this EA 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
- cultural heritage landscapes

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

Master Plan Study

We would normally expect at minimum that in a Class EA master planning process such as this one, cultural heritage resources and concerns would be inventoried for the study area and the proposed facilities locations, and a process would be described for more complete assessment and mitigation of cultural heritage impacts when the proposed facilities are subjected to Phase 3 of the Class 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 *archaeologicalsites@ontario.ca*. If this 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 cultural heritage resources. The Clerk for the City of Port Colborne 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 and the local municipality as appropriate 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,

Rosi Zirger
Heritage Planner

Ministry of Tourism, Culture & Sport

Heritage Program Unit
Programs and Services Branch
401 Bay Street, Suite 1700
Toronto ON M7A 0A7
Tel. 416 314-7159
Fax: 416 212-1802

Ministère du Tourisme et de la Culture

Unité des programmes patrimoine
Direction des programmes et des services
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Téléc. : 416 212-1802

Ontario

June 22, 2016 (by email only)

Karl Grueneis, Senior Environmental Planner
AECOM
3 - 30 Hanover Drive
St Catharines, ON L2W 1A3

Dear Mr. Grueneis,

MTCS File No.: 0001807
Proponent: City of Port Colborne
Subject: Draft Master Plan Project File Report dated May 2016
Port Colborne - Site Servicing of the East Side Employment Lands Municipal Class EA
Location: Port Colborne

Thank you for sending the Ministry of Tourism, Culture and Sport (MTCS) ***Draft Master Plan Project File Report*** (PFR) dated May 2016 prepared by AECOM for the above named EA project. MTCS's interest in this EA project relates to its mandate of conserving Ontario's cultural heritage, which includes archaeological resources, built heritage resources, and cultural heritage landscapes.

We have reviewed the above named Draft PFR and offer the following comments and recommendations:

Archaeological Resources

Section 3.5.1 of the PFR, states that Stage 1 and 2 archaeological assessments have been completed for this project. The report states that field investigations did not identify any archaeological sites and recommended no further archaeological assessment.

MTCS records indicate that the archaeological assessment report (PIF #P438-0059-2015) has been filed with this Ministry and has been entered into the provincial register. The general mitigation measures, outlined in Table 9 of the PFR, of actions in the event that archaeological resources are encountered during construction should be followed.

Built Heritage and Cultural Heritage Landscapes

Section 3.5.2 of the PFR states that built heritage resources (Welland Canal, two farmhouses and barns, and 352 Chippawa Road-a listed property) were identified within the study area. However, the PFR makes no further mention of these resources nor does it indicate whether they will be impacted by the proposed project.

In this regard we direct you to previous correspondence. On March 19, 2015 MTCS advised that for a master plan EA, at a minimum, known and potential cultural heritage resources should be inventoried for the study area, and direction provided for when assessment would be completed. We also note AECOM's project update of February 23, 2016 advising us that the inventoried "structures" are not expected to be negatively impacted by the project. MTCS's email of March 22, 2016 advised to summarize this information in the EA report and provide supporting documentation.

Please revise the PFR to include further information regarding the known and potential cultural heritage resources, including:

1. Completed MTCS checklist sent to you on March 19, 2015 confirming that none of the criteria have been met, OR

2. If, as you have advised, there are properties that include buildings or structures that are older than 40 years, provide, at a minimum, base information about the property, including:

    a) a map showing the location of the identified properties in relation to the study area (and construction area)

    b) photographs taken during the site visit of any buildings, structures or other features that meet the screening criteria (see MTCS checklist)

    c) details as to the potential project impacts on each property, if any.

Thank you for the opportunity to review the Draft PFR for this project. We would be pleased to review the revised version when available. Please contact me as necessary for clarification or further discussion.

Sincerely

Rosi Zirger
Heritage Planner
416-314-7159
rosi.zirger@ontario.ca

copy to Jim Huppunen, City of Port Colborne
Ian Izzard, AECOM

AECOM Canada Ltd.
250 York Street
Suite 410, Citi Plaza
London ON N6A 6K2
Canada

T: 519.673.0510
F: 519.673.5975
aecom.com

To:
Karl Grueneis
Senior Environmental Planner
AECOM
3 - 30 Hanover Drive
St. Catharines, ON
L2W 1A3

CC:
Geritt Boerema

Project name:
Port Colborne - Site Servicing of the East Side Employment Lands Municipal Class EA

From:
Michael Greguol, Cultural Heritage Specialistr

Date:
October 6 2016

Memo

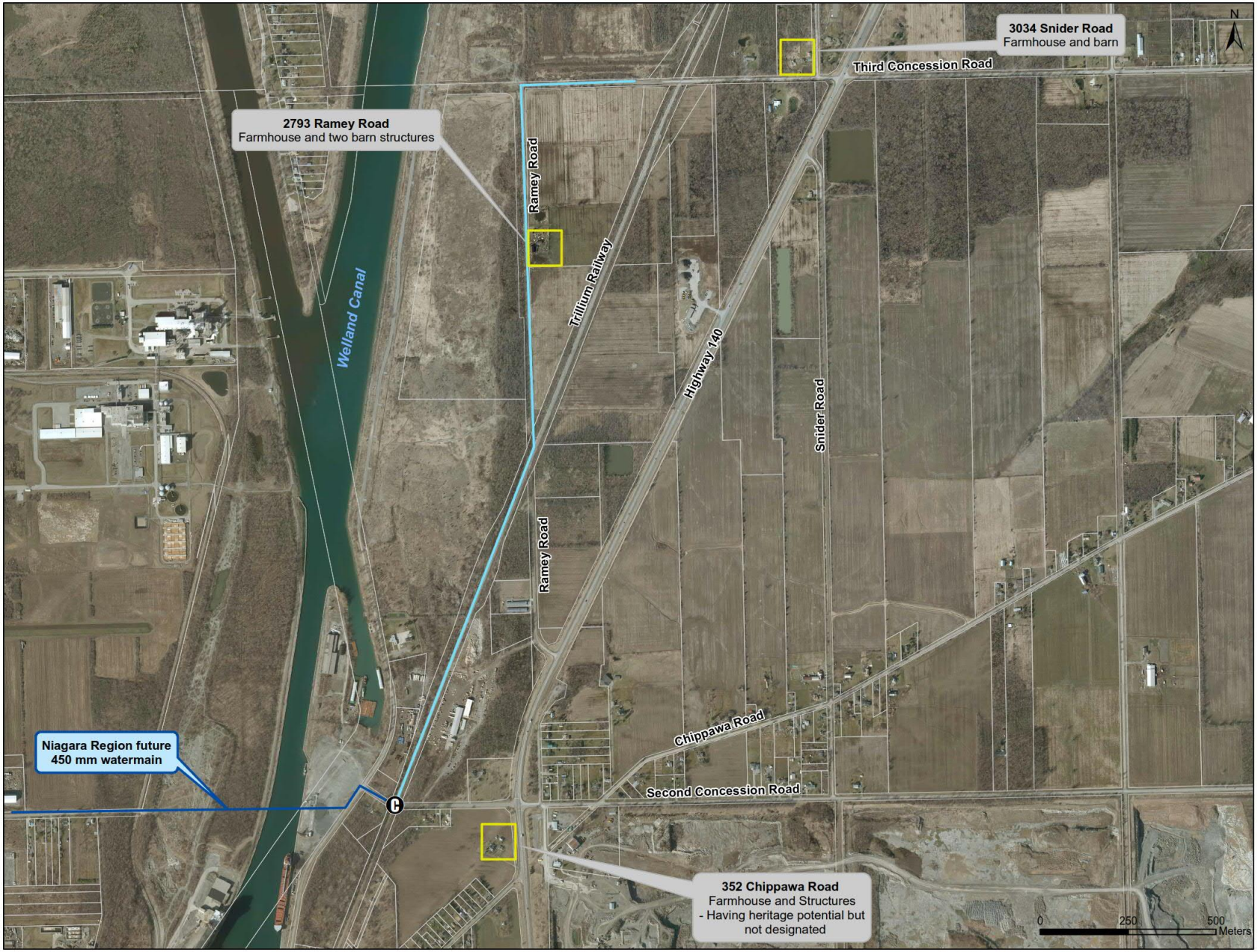
Subject: Draft Master Plan - Built Heritage and Cultural Heritage Landscapes

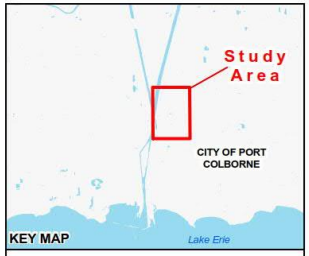
This memo has been prepared to include additional information related to the Built Heritage and Cultural Heritage Landscapes reviewed as a part of the City of Port Colborne's Draft Master Plan for Site Servicing of the East Side Employment Land (ESEL) Municipal Class Environmental Assessment (EA). It is understood that in response to comments received from the Ministry of Tourism, Culture, and Sport (MTCS), further information is required in order to map the location of properties identified during field work, including their location in relation to the study area, include photographs taken during the site visits of any buildings, structures, or other features, and to provide details regarding potential project impacts on each property, if any.

Project File Report

The Project File Report (PFR) for the ESEL EA noted that the during a site visit conducted on May 20, 2014 built heritage features within the study area were noted to include the fourth and currently utilized Welland Canal and two old farmhouses and barns, located on the side east of Ramey Road and the south side of Third Concession Road. A third property, 352 Chippawa Road was identified as a listed property on the City of Port Colborne's Heritage Property Registry.

The locations of the three properties (352 Chippawa Road, 2793 Ramey Road, and 3034 Snider Road/Third Concession Road) are shown on **Figure 1**. In addition, the location of the Welland Canal, as well the proposed watermain and sewer alignment construction work is anticipated to take place. A description of the proposed project and potential impacts is included below.





Legend

Proposed Watermain and Sewer Alignment

All features are well setback from existing and future road allowances which is where road, wastewater and water construction will take place.

City of Port Colborne
Site Servicing of East
Side Employment Lands

Cultural Heritage Features and Watermain and Sewer Forcemain Alignment

Source: City of Port Colborne
Datum: NAD83 UTM Zone 17

Figure 1

PORT COLBORNE

AECOM

Property Site Descriptions

The properties identified as a part of the ESEL EA include three residential properties located at 352 Chippawa Road, 2793 Ramey Road, and 3034 Snide Road/Third Concession. A brief description and photograph of each property is included below:

352 Chippawa Road

The property located at 352 Chippawa Road (**Figure 2**) consists of an irregularly shaped lot at the intersection of Chippawa Road and Highway 140. The property includes a farmhouse located in the centre of the property, which is surrounded by various structures including a garage, a shed, and a barn. A long winding driveway extends from Highway 140 to the rear of the house creating a deep property setback surrounding by trees. As a result, a clear photograph showing the house on the property could not be taken. The property is listed on the City of Port Colborne's Heritage Property Register.

Figure 2: 352 Chippawa Road as seen from Highway 140

2793 Ramey Road

The property located at 2793 Ramey Road (**Figure 3**) consists of a large agricultural property with a single farmhouse and two barn structures. The property backs onto the Trillium Railway and access to the property is provided off of Ramey Road, a gravel road. The house on the property consist of a 2 storey farmhouse with a gable roof and aluminum siding. The front façade of the dwelling is non-symmetrical and includes 2 ground floor windows and a second floor window. A brick chimney extends above the roof line in the centre of the gable roof. A small single story addition is located at the rear of the farmhouse. Two timber frame barns are located on the property. Both are clad with vertical board siding and include metal gable roofs. A municipal drainage ditch separates the property from the gravel road resulting in a relatively moderate setback from the road.

Figure 3: View showing farmhouse and barns at 2793 Ramey Road

3034 Snider Road

The property located at 3034 Snider Road (**Figure 4)** consists of a narrow residential lot at the intersection of Snider Road and Third Concession Road. The structures on the property include a 2 storey farm house with a gable roof, aluminum siding, and enclosed front porch entry. The front door is flanked by sash windows, and symmetrical ground and second floor windows are located on the front façade of the house. A partially collapsed barn is located behind the house.

Figure 4: View showing 3034 Snider Road from north of Thrid Concession Road

Potential Impacts

Project Description

The key component of this Class EA project is the preparation of a master servicing plan which is the development and assessment of municipal infrastructure systems for water distribution, sanitary sewage distribution and roadways, including stormwater management related to the roadways.

Based on the comparative evaluation, a new Sewage Pumping Station (SPS) will be constructed on the west side of Ramey Road, south of Third Concession Road. The preferred sanitary forcemain alignment travels from the SPS, south on Ramey

Road to City owned railway, and south along the City owned railway right-of-way, connecting to the future wastewater forcemain at Second Concession Road.

The proposed 450mm diameter watermain follows the previously described forcemain alignment and extends northerly from Second Concession Road at the City owned railway to Third Concession Road via along the City owned railway and Ramey Road. At the south end, the watermain will connect to the future Niagara Region trunk watermain that will extend from the west side of the Welland Canal. At the north end, the watermain will have an automated flushing system in order to ensure water quality at service locations. A valve chamber is also proposed at the Second Concession Road and City owned railway.

Ramey Road Improvement

Based on the comparative evaluation, the preferred road improvement option for Ramey Road is Option 1 (deep ditch west side of road). Refer to **Figure 5** for a cross section that illustrates the preferred option.

Third Concession Road Improvement

Preferred alternatives for the widening of Third Concession Road take into account physical constraints including the Haun Drain and wetland on south side and location of hydro poles and high pressure gas main on the north side. As such, alternative road cross sections for Third Concession Road were limited to one cross section that includes:

- Shallow ditch on the north side; and
- Subdrain from the road into the existing Haun Drain on the south side.

Similar to Ramey Road, landowners/developers will be responsible for managing their own stormwater as it relates to development applications. This study only addresses road runoff. Refer to **Figure 6** for a cross section illustrating the Third Concession Road improvements.

Potential Impacts to Built Heritage and Cultural Heritage Landscapes

Based on the description of the project above it is anticipated that all work will take place within the municipally-owned right-of-way, with the exception of the new SPS. The new SPS will be constructed on a property that was not identified for potential cultural heritage value. The improvements to Ramey Road and Third Concession Road will be undertaken in order to improve drainage along the rights-of-way. As such, no property impacts are anticipated and no impacts are anticipated to the potential cultural heritage value of the properties identified as a part of the EA. As such, no further mitigation or reporting is anticipated.

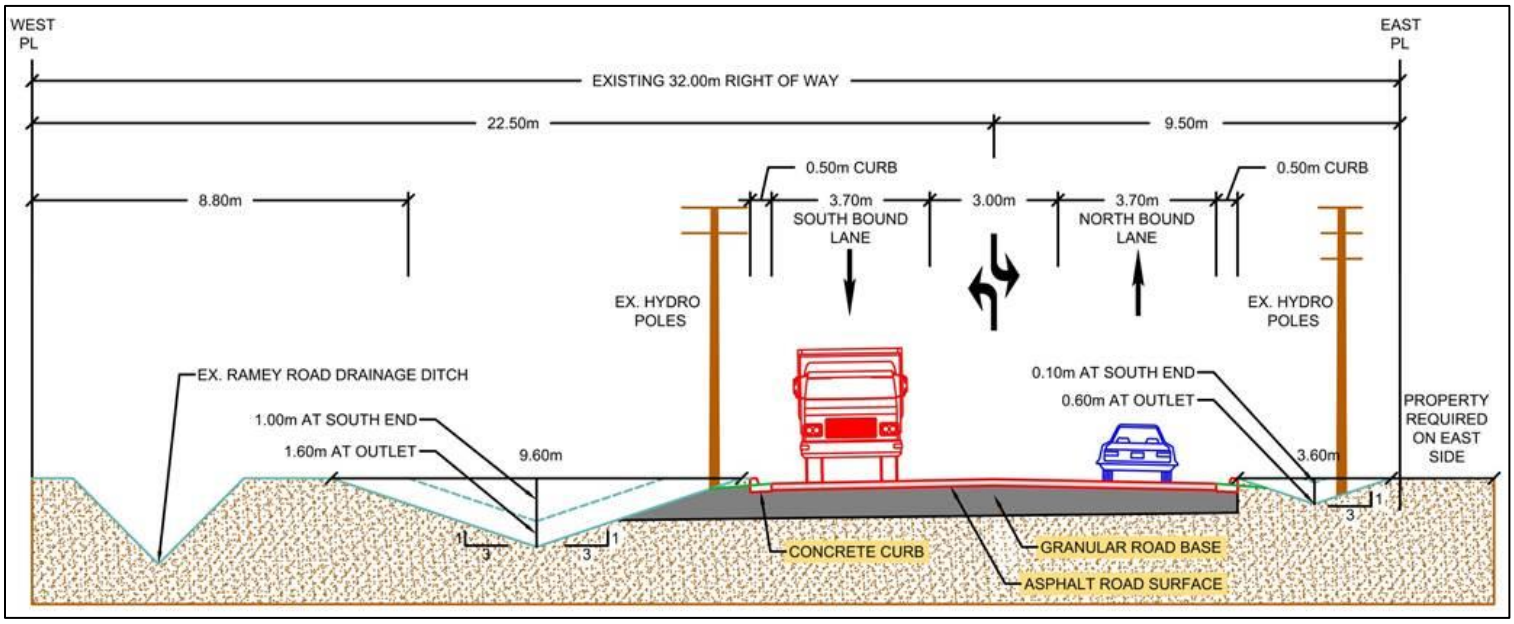


Figure 5: Proposed Ramey Road Cross Section

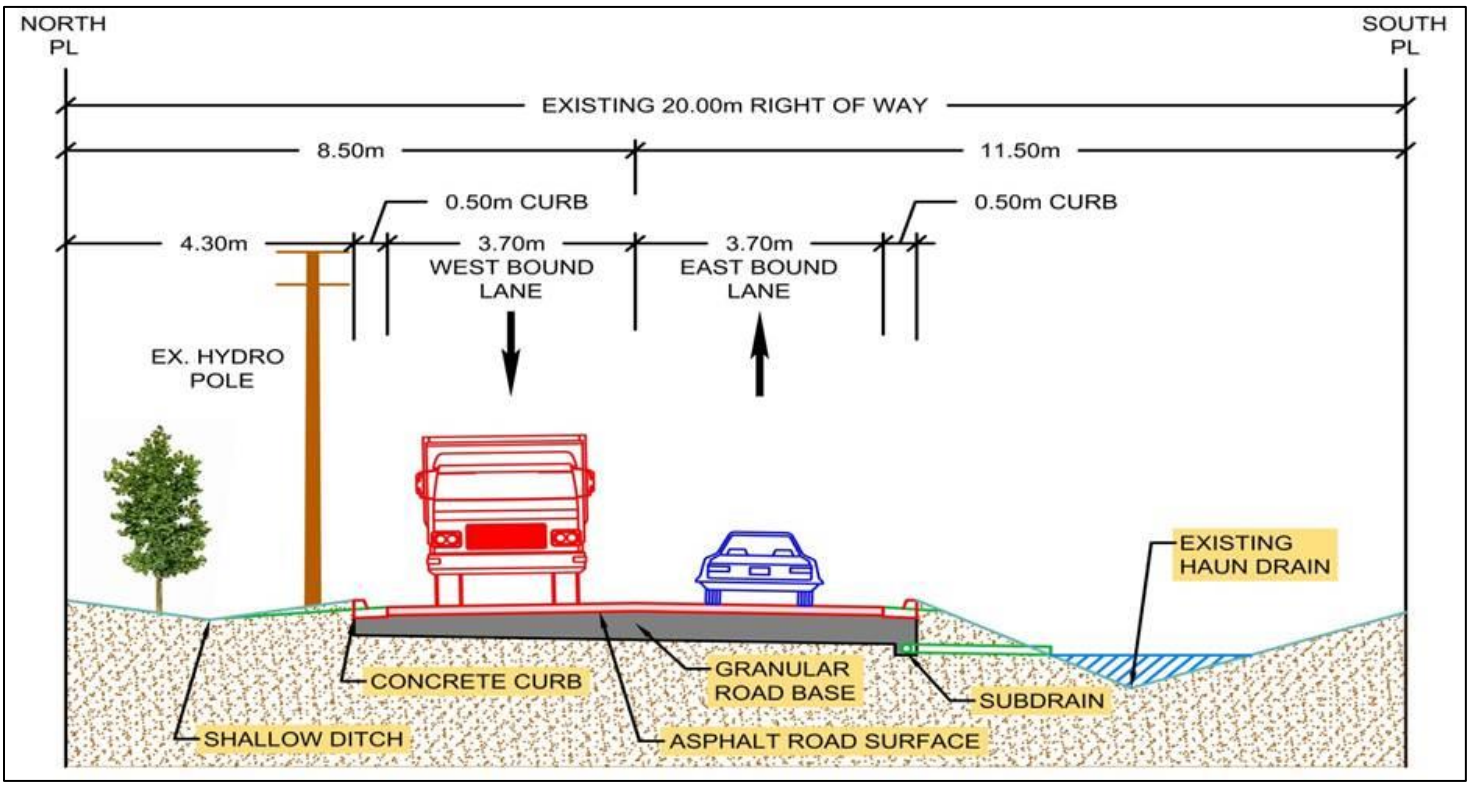


Figure 6: Proposed Third Concession Road Cross Section

Grueneis, Karl

From: Zirger, Rosi (MTCS) <Rosi.Zirger@ontario.ca>
Sent: Monday, November 14, 2016 12:22 PM
To: Grueneis, Karl
Cc: Zandvliet, Samantha
Subject: RE: MTCS Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Karl

Please accept my apologies for not responding sooner. Thank you for sending Memo dated October 6, 2016. The additional information provided in the Memo addresses MTCS comments regarding the built heritage resources and cultural heritage landscapes in or near the study area of this EA project.

Please contact me as necessary. Thanks.

Sincerely
Rosi

Rosi Zirger
Heritage Planner
Ministry of Tourism, Culture & Sport
Culture Division| Programs & Services Branch | Heritage Programs Unit

401 Bay Street, Suite 1700 Toronto, Ontario M7A 0A7
Tel. 416.314.7159 | Fax 416.212-1802| E-mail: rosi.zirger@ontario.ca

---

From: Grueneis, Karl [mailto:Karl.Grueneis@aecom.com]
Sent: November 14, 2016 11:44 AM
To: Zirger, Rosi (MTCS)
Cc: Zandvliet, Samantha
Subject: FW: MTCS Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Rosi
Just following up on below email.

Look forward to hearing back from you.

Regards Karl

Karl Grueneis
Senior Environmental Planner
D 905.346.3732

AECOM
3-30 Hannover Drive
St. Catharines, Ontario L2W 1A3
T 905.682.0212 F 905.682.4495
www.aecom.com

From: Grueneis, Karl
Sent: Friday, October 14, 2016 2:02 PM
To: 'Zirger, Rosi (MTCS) (Rosi.Zirger@ontario.ca)'
Subject: MTCS Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Rosi

Hope all is well.

Please see attached built heritage memo for Port Colborne ESEL Site Servicing EA. Does it address your comments?

Thanks-regards

Karl

Karl Grueneis
Senior Environmental Planner
D 905.346.3732

AECOM
3-30 Hannover Drive
St. Catharines, Ontario L2W 1A3
T 905.682.0212 F 905.682.4495
www.aecom.com

From: Zirger, Rosi (MTCS) [mailto:Rosi.Zirger@ontario.ca]
Sent: Wednesday, June 22, 2016 3:07 PM
To: Grueneis, Karl
Cc: Izzard, Ian; ssesel@portcolborne.ca
Subject: MTCS Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Karl

Thank you for sending Ministry of Tourism, Culture and Sport (MTCS) the Draft Project File Report for the project mentioned above. Attached please find MTCS comments and recommendations for the Draft PFR and this project.

Please contact me as necessary for clarification or further discussion.

Sincerely
Rosi

Rosi Zirger
Heritage Planner
Ministry of Tourism, Culture & Sport
Culture Division| Programs & Services Branch | Heritage Programs Unit

401 Bay Street, Suite 1700 Toronto, Ontario M7A 0A7
Tel. 416.314.7159 | Fax 416.212-1802| E-mail: rosi.zirger@ontario.ca

---

From: Mollo, Jessica [mailto:Jessica.Mollo@aecom.com]
Sent: June 3, 2016 11:21 AM
To: Zirger, Rosi (MTCS)

Cc: Grueneis, Karl
Subject: RE: MTCS Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Rosi,

I am just following up on my email below regarding the status of your review and if you have any questions or require additional information.

As noted below, any comments you have would be appreciated by mid-June.

Thanks and regards,
Jessica

From: Mollo, Jessica
Sent: Friday, May 13, 2016 8:59 AM
To: 'rosi.zirger@ontario.ca'
Cc: 'jimhuppunen@portcolborne.ca'; 'ssesel@portcolborne.ca'; Grueneis, Karl; Izzard, Ian; St. Denis, Jocelyn
Subject: MTCS Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Rosi,

The City of Port Colborne is preparing to file the City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File.

For your review and comment, please see the link below for the Master Plan Project File Report. As the City would like to file the report for the 30 day public review period by the end of June, any comments the MTCS has would be greatly appreciated by mid-June 2016.

This file will be available for download until 5/20/2016

File	Description	Size
RPT-2016-05-12-ESEL MP Project File-60322620-DRAFT.pdf		63,658KB

Download all files (.zip)

Should you have any questions, or require additional information please feel free to contact me.

Thanks and regards,
Jessica

Jessica Mollo, B.Sc
Environmental Planner, Environment
D +905-346-3742
jessica.mollo@aecom.com

AECOM
3-30 Hannover Drive
St. Catharines, Ontario, Canada
T +905-682-0212
aecom.com

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AECOM

Ministry of Natural Resources and Forestry

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 0A1
www.aecom.com

905 682 0212 tel
905 682 4495 fax

August 8, 2014

Project # 60322620

SENT VIA E-MAIL

Mr. Joad Durst, Area Supervisor
Ministry of Natural Resources
Niagara Area Office
4890 Victoria Avenue North, PO Box 5000
Vineland, Ontario L0R 2E0

Subject: Site Servicing of the East Side Employment Lands
NOTICE OF STUDY COMMENCEMENT

Dear Mr. Durst:

Please find attached the Notice of Study Commencement for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Municipal Class Environmental Assessment* (Class EA). This public notice was recently published on the City's website and in local newspapers and is now being sent to you because we would like your comments regarding this important infrastructure project. Further information is provided below.

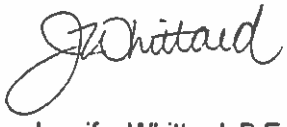
Study Background

This Class EA study is being completed under the Municipal Engineers Association Master Planning Process and was initiated by the City of Port Colborne to allow for future industrial park development of the East Side Employment Lands (see map in attached notice). Key components of the EA study include the provision of municipal water and sanitary sewer systems, stormwater management and road network improvements. The project team will examine a full range of alternatives and improvements to identify a preferred municipal servicing strategy that could be implemented in phases as development proposals come forward.

Next Steps

We will continue to keep you informed of study progress, including an upcoming Public Information Centre and study recommendations, tentatively scheduled for early 2015. Information will also be posted on the City's website as it becomes available (www.portcolborne.ca > City Services > Engineering > Current Studies). In the meantime, if you have any questions or comments or would like additional information, please do not hesitate to contact me. Alternatively, you may also send comments to the project email address at SSESEL@portcolborne.ca, or contact the City's Manager of Engineering Services, Jim Huppunen, at 905-835-2900 ext. 221.

Sincerely,
AECOM Canada Ltd.



Jennifer Whittard, B.E.S., PMP
Assistant Project Manager
jennifer.whittard@aecom.com
905-346-3744

Encl.

cc: SSESEL@portcolborne.ca
Jim Huppunen, City of Port Colborne
Mark Swan/Karl Grueneis, AECOM

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 1A3
www.aecom.com

905 682 0212 tel
905 682 4495 fax

March 11, 2015

Project # 60322620

Mr. Joad Durst
Area Supervisor
Ministry of Natural Resources
Niagara Area Office
4890 Victoria Avenue North, PO Box 5000
Vineland, Ontario L0R 2E0

Subject: **Site Servicing of the East Side Employment Lands Class Environmental Assessment Study, City of Port Colborne**
NOTICE OF PUBLIC INFORMATION CENTRE

Dear Mr. Durst:

Further to our August 2014 Notice of Study Commencement, please find attached the Notice of Public Information Centre (PIC) for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Class Environmental Assessment Study*.

Study Purpose

The EA Study will be completed in keeping with the Ontario *Environmental Assessment Act*, and will follow the Master Planning Process of the Municipal Engineers Association. The Master Plan follows Approach #2 which will fulfill the requirements for Schedule A, A+, and Schedule B projects. The project team will examine a full range of alternatives and improvements and identify a preferred municipal servicing strategy for the ESEL that could be implemented in phases as development proposals come forward.

Public Information Centre

You are encouraged to attend the Public Information Centre scheduled for March 23, 2015, where the problem/opportunity statement and recommended servicing strategy will be presented. Representatives from both the City of Port Colborne and AECOM will be available to discuss the project and answer any questions you may have. If you are unable to attend, the display boards will be made available for review and comment following the PIC on the City website (www.portcolborne.ca > City Services > Engineering > Current Studies). All comments received throughout the course of this study will be considered in finalizing the recommended servicing strategies.

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Upon completion of the study, a Master Plan Project File will be prepared and made available for public and agency review. In the meantime, if you have any questions or comments or would like additional information, please do not hesitate to contact me. Alternatively, you may also send comments to the project email address at SSESEL@portcolborne.ca, or contact the City's Manager of Engineering Services, Jim Huppunen, at 905-835-2900 ext. 221.

Sincerely,

AECOM Canada Ltd.

Ian Izzard, P.Eng., M.A.Sc., PMP
Project Manager
Ian.izzard@aecom.com
905-938-7657

Encl. Notice of Public Information Centre
cc: Jim Huppunen, City of Port Colborne
Karl Grueneis, AECOM

AECOM

Ministry of Agriculture, Food and Rural Affairs

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 0A1
www.aecom.com

905 682 0212 tel
905 682 4495 fax

August 8, 2014

Project # 60322620

SENT VIA E-MAIL

Ms. Lynn Pardoe, Project Analyst
Ministry of Agriculture, Food and Rural Affairs
1 Stone Road West, 4th Floor
Guelph, Ontario N1G 4Y2

Subject: Site Servicing of the East Side Employment Lands
NOTICE OF STUDY COMMENCEMENT

Dear Ms. Pardoe:

Please find attached the Notice of Study Commencement for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Municipal Class Environmental Assessment* (Class EA). This public notice was recently published on the City's website and in local newspapers and is now being sent to you because we would like your comments regarding this important infrastructure project. Further information is provided below.

Study Background

This Class EA study is being completed under the Municipal Engineers Association Master Planning Process and was initiated by the City of Port Colborne to allow for future industrial park development of the East Side Employment Lands (see map in attached notice). Key components of the EA study include the provision of municipal water and sanitary sewer systems, stormwater management and road network improvements. The project team will examine a full range of alternatives and improvements to identify a preferred municipal servicing strategy that could be implemented in phases as development proposals come forward.

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Sincerely,
AECOM Canada Ltd.

Jennifer Whittard, B.E.S., PMP
Assistant Project Manager
jennifer.whittard@aecom.com
905-346-3744

Encl.

cc: SSESEL@portcolborne.ca
Jim Huppunen, City of Port Colborne
Mark Swan/Karl Grueneis, AECOM
Sid Vander Veen, Drainage Coordinator sid.vanderveen@ontario.ca

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 1A3
www.aecom.com

905 682 0212 tel
905 682 4495 fax

March 11, 2015

Project # 60322620

Ms. Lynn Pardoe
Project Analyst
Ministry of Agriculture, Food and Rural Affairs
1 Stone Road West, 4th Floor
Guelph, Ontario N1G 4Y2

Subject: **Site Servicing of the East Side Employment Lands Class Environmental Assessment Study, City of Port Colborne**
NOTICE OF PUBLIC INFORMATION CENTRE

Dear Ms. Pardoe:

Further to our August 2014 Notice of Study Commencement, please find attached the Notice of Public Information Centre (PIC) for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Class Environmental Assessment Study*.

Study Purpose

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Sincerely,

AECOM Canada Ltd.

Ian Izzard, P.Eng., M.A.Sc., PMP
Project Manager
Ian.izzard@aecom.com
905-938-7657

Encl. Notice of Public Information Centre
cc: Jim Huppunen, City of Port Colborne
Karl Grueneis, AECOM

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 1A3
www.aecom.com

905 682 0212 tel
905 682 4495 fax

March 11, 2015

Project # 60322620

Mr. Sid Vander Veen
Drainage Coordinator
Ministry of Agriculture, Food and Rural Affairs
1 Stone Road West, 4th Floor
Guelph, Ontario N1G 4Y2

Subject: **Site Servicing of the East Side Employment Lands Class Environmental Assessment Study, City of Port Colborne**
NOTICE OF PUBLIC INFORMATION CENTRE

Dear Mr. Vander Veen:

Further to our August 2014 Notice of Study Commencement, please find attached the Notice of Public Information Centre (PIC) for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Class Environmental Assessment Study*.

Study Purpose

The EA Study will be completed in keeping with the Ontario *Environmental Assessment Act*, and will follow the Master Planning Process of the Municipal Engineers Association. The Master Plan follows Approach #2 which will fulfill the requirements for Schedule A, A+, and Schedule B projects. The project team will examine a full range of alternatives and improvements and identify a preferred municipal servicing strategy for the ESEL that could be implemented in phases as development proposals come forward.

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Sincerely,

AECOM Canada Ltd.

Ian Izzard, P.Eng., M.A.Sc., PMP
Project Manager
Ian.izzard@aecom.com
905-938-7657

Encl. Notice of Public Information Centre
cc: Jim Huppunen, City of Port Colborne
Karl Grueneis, AECOM

AECOM

Ontario Infrastructure and Lands Corporation

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 0A1
www.aecom.com

905 682 0212 tel
905 682 4495 fax

August 8, 2014

Project # 60322620

SENT VIA E-MAIL

Ms. Lisa Myslicki, Environmental Coordinator
Ministry of Economic Development, Employment and Infrastructure
1 Dundas Street West, Suite 2000
Toronto, Ontario M5G 2L5

Subject: Site Servicing of the East Side Employment Lands
NOTICE OF STUDY COMMENCEMENT

Dear Ms. Myslicki:

Please find attached the Notice of Study Commencement for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Municipal Class Environmental Assessment* (Class EA). This public notice was recently published on the City's website and in local newspapers and is now being sent to you because we would like your comments regarding this important infrastructure project. Further information is provided below.

Study Background

This Class EA study is being completed under the Municipal Engineers Association Master Planning Process and was initiated by the City of Port Colborne to allow for future industrial park development of the East Side Employment Lands (see map in attached notice). Key components of the EA study include the provision of municipal water and sanitary sewer systems, stormwater management and road network improvements. The project team will examine a full range of alternatives and improvements to identify a preferred municipal servicing strategy that could be implemented in phases as development proposals come forward.

Next Steps

We will continue to keep you informed of study progress, including an upcoming Public Information Centre and study recommendations, tentatively scheduled for early 2015. Information will also be posted on the City's website as it becomes available (www.portcolborne.ca > City Services > Engineering > Current Studies). In the meantime, if you have any questions or comments or would like additional information, please do not hesitate to contact me. Alternatively, you may also send comments to the project email address at SSESEL@portcolborne.ca, or contact the City's Manager of Engineering Services, Jim Huppunen, at 905-835-2900 ext. 221.

Sincerely,
AECOM Canada Ltd.

Jennifer Whittard, B.E.S., PMP
Assistant Project Manager
jennifer.whittard@aecom.com
905-346-3744

Encl.

cc: SSESEL@portcolborne.ca
Jim Huppunen, City of Port Colborne
Mark Swan/Karl Grueneis, AECOM

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 1A3
www.aecom.com

905 682 0212 tel
905 682 4495 fax

March 11, 2015

Project # 60322620

Ms. Lisa Myslicki
Environmental Coordinator
Ontario Infrastructure and Lands Corporated
1 Dundas Street West, Suite 2000
Toronto, Ontario M5G 2L5

Subject: **Site Servicing of the East Side Employment Lands Class Environmental Assessment Study, City of Port Colborne**
NOTICE OF PUBLIC INFORMATION CENTRE

Dear Ms. Myslicki:

Further to our August 2014 Notice of Study Commencement, please find attached the Notice of Public Information Centre (PIC) for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Class Environmental Assessment Study*.

Study Purpose

The EA Study will be completed in keeping with the Ontario *Environmental Assessment Act*, and will follow the Master Planning Process of the Municipal Engineers Association. The Master Plan follows Approach #2 which will fulfill the requirements for Schedule A, A+, and Schedule B projects. The project team will examine a full range of alternatives and improvements and identify a preferred municipal servicing strategy for the ESEL that could be implemented in phases as development proposals come forward.

Public Information Centre

You are encouraged to attend the Public Information Centre scheduled for March 23, 2015, where the problem/opportunity statement and recommended servicing strategy will be presented. Representatives from both the City of Port Colborne and AECOM will be available to discuss the project and answer any questions you may have. If you are unable to attend, the display boards will be made available for review and comment following the PIC on the City website (www.portcolborne.ca > City Services > Engineering > Current Studies). All comments received throughout the course of this study will be considered in finalizing the recommended servicing strategies.

Next Steps

Upon completion of the study, a Master Plan Project File will be prepared and made available for public and agency review. In the meantime, if you have any questions or comments or would like additional information, please do not hesitate to contact me. Alternatively, you may also send comments to the project email address at SSESEL@portcolborne.ca, or contact the City's Manager of Engineering Services, Jim Huppunen, at 905-835-2900 ext. 221.

Sincerely,

AECOM Canada Ltd.

Ian Izzard, P.Eng., M.A.Sc., PMP
Project Manager
Ian.izzard@aecom.com
905-938-7657

Encl. Notice of Public Information Centre
cc: Jim Huppunen, City of Port Colborne
Karl Grueneis, AECOM

Ontario
Infrastructure Ontario

One Dundas Street West, Suite 2000, Toronto, ON M5G 2L5
1, rue Dundas Ouest, bureau 2000, Toronto, ON M5G 2L5

March 17th 2015

To whom it may concern,

Thank you for circulating Infrastructure Ontario (IO) on your Notice. Infrastructure Ontario is the strategic manager of the provincial government's real estate with a mandate of maintaining and optimizing value of the portfolio while ensuring real estate decisions reflect public policy objectives of the government.

As you may be aware, *IO is responsible for managing property that is owned by Her Majesty the Queen in Right of Ontario as represented by the Minister of Infrastructure (MOI).* There is a potential that IO manages lands fall within your study area. As a result, your proposal may impact IO managed properties and/or the activities of tenants present on IO-managed properties. In order to determine if IO property is within your study area, IO requires that the proponent of the project conduct a title search by reviewing parcel register(s) for adjoining lands, to determine the extent of ownership by MOI or its predecessor's ownership (listed below). Please contact IO if any ownership of provincial government lands are known to occur within your study area and are proposed to be impacted. IO managed land can ***include within the title but is not limited to*** variations of the following: Her Majesty the Queen/King, OLC, ORC, Public Works, Hydro One, PIR, MGS, MBS, MOI, MTO, MNR and MEI*. Please ensure that a copy of your notice is also sent to the ministry/agency on title. As an example, if the study area includes a Provincial Park, then MNR is to also to be circulated notices related to your project.

IO obligates proponents to complete all due diligence for any realty activity on IO managed lands and this should be incorporated into all project timelines.

Potential Negative Impacts to IO Tenants and Lands

General Impacts
Negative environmental impacts associated with the project design and construction, such as the potential for dewatering, dust, noise and vibration impacts, impacts to natural heritage features/habitat and functions, etc should be avoided and/or appropriately mitigated in accordance with applicable regulations best practices as well as Ministry of Natural Resources (MNR) and Ministry of the Environment (MOE) standards. Avoidance and mitigation options that characterize baseline conditions and quantify the potential impacts should be present as part of the EA project file. Details of appropriate mitigation, contingency plans and triggers for implementing contingency plans should also be present.

Impacts to Land holdings
Negative impacts to land holdings, such as the taking of developable parcels of IO managed land or fragmentation of utility or transportation corridors, should be avoided. If the potential for such impacts is present as part of this undertaking, you should contact the undersigned to discuss these issues at the earliest possible stage of your study.

If takings are suggested as part of any alternative, these should be appropriately mapped and quantified within the EA report documentation. In addition, details of appropriate mitigation and or next steps related to compensation for any required takings should be present. IO requests circulation of the draft EA report prior to finalization if potential impacts to IO-managed lands are present as part of this study.

416.327.3937 416.327.1906 info@infrastructureontario.ca www.infrastructureontario.ca

Ontario
Infrastructure Ontario

One Dundas Street West, Suite 2000, Toronto, ON M5G 2L5
1, rue Dundas Ouest, bureau 2000, Toronto, ON M5G 2L5

Impacts to Cultural Heritage
Should the proposed activities impact cultural heritage features on IO managed lands, a request to examine cultural heritage features, which can include cultural landscapes, built heritage, and archaeological potential and/or sites, could be required. If the potential for such impacts is present as part of this undertaking, you should contact the undersigned to discuss these issues at the earliest possible stage of your study.

Potential Triggers Related to MOI's Class EA
IO is required to follow the MOI Public Work Class Environmental Assessment Process for (PW Class EA). The PW Class EA applies to a wide range of realty and planning activities including leasing or letting, planning approvals, dispostion, granting of easements, demolition and property maintenance/repair. For details on the PW Class EA please visit the Environment and Heritage page of our website found at

http://www.infrastructureontario.ca/Templates/Buildings.aspx?id=2147490336&langtype=1033

Please note that completion of any EA process does not provide an approval for MOI's Class EA obligations. Class EA processes are developed and in place to assess undertakings associated with different types of projects. For example, assessing the impacts of disposing of land from the public portfolio is significantly different then assessing the best location for a proposed road.

IO is providing this information so that adequate timelines and project budgets can consider MOI's regulatory requirements associated with a proposed realty activity in support of a project. Some due diligences processes and studies can be streamlined. For example, prior to any disposition of land, at minimum a Phase I Environmental Site Assessment and a Stage I Archaeological Assessment and the MOI Category B Environmental Assessment should be undertaken.. Deficiencies in any of these requirements could result in substantial project delays and increased project costs.

In summary, the purchase of MOI-owned/IO-managed lands or disposal of rights and responsibilities (e.g. easement) for IO-managed lands triggers the application of the MOI Class EA. If any of these realty activities affecting IO-managed lands are being proposed as part of any alternative, please contact the Sales, Easements and Acquisitions Group through IO's main line (Phone: 416-327-3937, Toll Free: 1-877-863-9672), and also contact the undersigned at your earliest convenience to discuss next steps.

Specific Comments

Please remove IO from your circulation list, with respect to this project, if MOI owned lands are not anticipated to be impacted. In addition, in the future, please send only **electronic copies of notices** for any projects impacting IO managed lands to:

Thank you for the opportunity to provide initial comments on this undertaking. If you have any questions I can be reached at the contacts below.

Sincerely,

Ontario
Infrastructure Ontario

One Dundas Street West, Suite 2000, Toronto, ON M5G 2L5
1, rue Dundas Ouest, bureau 2000, Toronto, ON M5G 2L5

Lisa Myslicki
Environmental Advisor, Environmental Management
Infrastructure Ontario
1 Dundas Street West,
Suite 2000, Toronto, Ontario
M5G 2L5
(416) 212-3768

* Below are the acronyms for agencies/ministries listed in the above letter

OLC	Ontario Lands Corporation
ORC	Ontario Realty Corporation
PIR	Public Infrastructure and Renewal
MGS	Ministry of Government Services
MBS	Management Board and Secretariat
MOI	Ministry of Infrastructure
MTO	Ministry of Transportation
MNR	Ministry of Natural Resources
MEI	Ministry of Energy and Infrastructure

AECOM

Trillium Railway

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 0A1
www.aecom.com

905 682 0212 tel
905 682 4495 fax

August 8, 2014

Project # 60322620

SENT VIA E-MAIL

Aaron White, Administration Officer
Trillium Railway
265 King Street, PO Box 218
Port Colborne, Ontario L3K 5V8

Subject: Site Servicing of the East Side Employment Lands
NOTICE OF STUDY COMMENCEMENT

Dear Mr. White:

Please find attached the Notice of Study Commencement for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Municipal Class Environmental Assessment* (Class EA). This public notice was recently published on the City's website and in local newspapers and is now being sent to you because we would like your comments regarding this important infrastructure project. Further information is provided below.

Study Background

This Class EA study is being completed under the Municipal Engineers Association Master Planning Process and was initiated by the City of Port Colborne to allow for future industrial park development of the East Side Employment Lands (see map in attached notice). Key components of the EA study include the provision of municipal water and sanitary sewer systems, stormwater management and road network improvements. The project team will examine a full range of alternatives and improvements to identify a preferred municipal servicing strategy that could be implemented in phases as development proposals come forward.

Next Steps

We will continue to keep you informed of study progress, including an upcoming Public Information Centre and study recommendations, tentatively scheduled for early 2015. Information will also be posted on the City's website as it becomes available (www.portcolborne.ca > City Services > Engineering > Current Studies). In the meantime, if you have any questions or comments or would like additional information, please do not hesitate to contact me. Alternatively, you may also send comments to the project email address at SSESEL@portcolborne.ca, or contact the City's Manager of Engineering Services, Jim Huppunen, at 905-835-2900 ext. 221.

Sincerely,
AECOM Canada Ltd.

Jennifer Whittard, B.E.S., PMP
Assistant Project Manager
jennifer.whittard@aecom.com
905-346-3744

Encl.

cc: SSESEL@portcolborne.ca
Jim Huppunen, City of Port Colborne
Mark Swan/Karl Grueneis, AECOM

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 1A3
www.aecom.com

905 682 0212 tel
905 682 4495 fax

March 11, 2015

Project # 60322620

Aaron White
Administration Officer
Trillium Railway
265 King Street, PO Box 218
Port Colborne, Ontario L3K 5V8

Subject: **Site Servicing of the East Side Employment Lands Class Environmental Assessment Study, City of Port Colborne**
NOTICE OF PUBLIC INFORMATION CENTRE

Dear Mr. White:

Further to our August 2014 Notice of Study Commencement, please find attached the Notice of Public Information Centre (PIC) for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Class Environmental Assessment Study*.

Study Purpose

The EA Study will be completed in keeping with the Ontario *Environmental Assessment Act*, and will follow the Master Planning Process of the Municipal Engineers Association. The Master Plan follows Approach #2 which will fulfill the requirements for Schedule A, A+, and Schedule B projects. The project team will examine a full range of alternatives and improvements and identify a preferred municipal servicing strategy for the ESEL that could be implemented in phases as development proposals come forward.

Public Information Centre

You are encouraged to attend the Public Information Centre scheduled for March 23, 2015, where the problem/opportunity statement and recommended servicing strategy will be presented. Representatives from both the City of Port Colborne and AECOM will be available to discuss the project and answer any questions you may have. If you are unable to attend, the display boards will be made available for review and comment following the PIC on the City website (www.portcolborne.ca > City Services > Engineering > Current Studies). All comments received throughout the course of this study will be considered in finalizing the recommended servicing strategies.

Next Steps

Upon completion of the study, a Master Plan Project File will be prepared and made available for public and agency review. In the meantime, if you have any questions or comments or would like additional information, please do not hesitate to contact me. Alternatively, you may also send comments to the project email address at SSESEL@portcolborne.ca, or contact the City's Manager of Engineering Services, Jim Huppunen, at 905-835-2900 ext. 221.

Sincerely,

AECOM Canada Ltd.

Ian Izzard, P.Eng., M.A.Sc., PMP
Project Manager
ian.izzard@aecom.com
905-938-7657

Encl. Notice of Public Information Centre
cc: Jim Huppunen, City of Port Colborne
Karl Grueneis, AECOM

AECOM

St. Lawrence Seaway Management Corporation

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 0A1
www.aecom.com

905 682 0212 tel
905 682 4495 fax

August 8, 2014

Project # 60322620

SENT VIA E-MAIL

Mr. Paul Kosinec, Sr. Civil Engineer, Civil Engineering Department
St. Lawrence Seaway Management Corporation
508 Glendale Avenue, PO Box 307
St. Catharines, Ontario L2R 6V8

Subject: Site Servicing of the East Side Employment Lands
NOTICE OF STUDY COMMENCEMENT

Dear Mr. Kosinec:

Please find attached the Notice of Study Commencement for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Municipal Class Environmental Assessment* (Class EA). This public notice was recently published on the City's website and in local newspapers and is now being sent to you because we would like your comments regarding this important infrastructure project. Further information is provided below.

Study Background

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Sincerely,
AECOM Canada Ltd.

Jennifer Whittard, B.E.S., PMP
Assistant Project Manager
jennifer.whittard@aecom.com
905-346-3744

Encl.

cc: SSESEL@portcolborne.ca
Jim Huppunen, City of Port Colborne
Mark Swan/Karl Grueneis, AECOM
Fraser Johnston, Technical Officer, Civil fjohnston@seaway.ca

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 1A3
www.aecom.com

905 682 0212 tel
905 682 4495 fax

March 11, 2015

Project # 60322620

Mr. Fraser Johnston
Technical Officer, Civil
St. Lawrence Seaway Management Corporation
508 Glendale Avenue, PO Box 307
St. Catharines, Ontario L2R 6V8

Subject: **Site Servicing of the East Side Employment Lands Class Environmental Assessment Study, City of Port Colborne**
NOTICE OF PUBLIC INFORMATION CENTRE

Dear Mr. Johnston:

Further to our August 2014 Notice of Study Commencement, please find attached the Notice of Public Information Centre (PIC) for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Class Environmental Assessment Study.*

Study Purpose

The EA Study will be completed in keeping with the Ontario *Environmental Assessment Act*, and will follow the Master Planning Process of the Municipal Engineers Association. The Master Plan follows Approach #2 which will fulfill the requirements for Schedule A, A+, and Schedule B projects. The project team will examine a full range of alternatives and improvements and identify a preferred municipal servicing strategy for the ESEL that could be implemented in phases as development proposals come forward.

Public Information Centre

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Sincerely,

AECOM Canada Ltd.

Ian Izzard, P.Eng., M.A.Sc., PMP
Project Manager
Ian.izzard@aecom.com
905-938-7657

Encl. Notice of Public Information Centre
cc: Jim Huppunen, City of Port Colborne
Karl Grueneis, AECOM

The St. Lawrence Seaway Management Corporation

Corporation de Gestion de la Voie Maritime du Saint-Laurent

The St. Lawrence Seaway Management Corporation
508 Glendale Avenue,
St. Catharines, ON L2R 6V8
(905)-641-1932 Ext. 5068

Delivered via email

July 21, 2016

Mr. Karl Grueneis
Senior Environmental Planner
AECOM
3- 30 Hannover Drive
St. Catharines, ON
L2W 1A3

Dear Mr. Grueneis,

Re: Request for Comments- Site Servicing of the East Side Employment Lands Municipal Class Environmental Assessment – City of Port Colborne

Please be advised that we have reviewed the notice and draft Site Servicing of the East Side Employment Lands Municipal Class Environmental Assessment dated in May, 2016 (the **"Assessment"**). *Based on the information received as of the date of this letter, the SLSMC hereby reserves the right to add any other comments in relation to the Assessment at any given time.* Such review of the above draft report has constituted the following remarks:

1) The City of Port Colborne, together with its agents, contractors and or other third party clients in relation to the above referenced project shall follow the SLSMC established access protocols when accessing SLSMC lands. Once the proposed project is finalized, please contact the undersigned to coordinate an access agreement accordingly;

2) SLSMC Engineering notes that there is a number of canal crossings, both sanitary and water main present in the Assessment. Details of intended methods of crossings, including, but not limited to open trench and jack and bores shall be reviewed in detail, prior to construction by SLSMC. Further it is recommended that all boreholes be undertaken in the vicinity of the crossings to ensure suitable geological competence of bedrock to determine suitable methods of crossing construction. SLSMC will need to review and approve all construction plans and methods to ensure that concerns related to water leakage from the Canal is addressed. All submerged canal crossings are to be buried at least 3 meters below channel bottom. It should be noted that the SLSMC reserves the right to assess the impact of such crossings to its land, including but not limited to the impact to potential development on such lands.;

3) In addition to the above, the crossings of the canal appear to cross the SLSMC Wharf 12 dock in Port Colborne. This structure consists of concrete cribs and cannot be structurally compromised. In addition there may be materials and vessels at this working wharf, therefore, the coordination and advisement with the Leaseholder is requried. Please refer to Appendix "A" which supports the above.

4) It should be noted that SLSMC manages the drain outlets at the canal bank; construction or changes to these drain outlets must be considered when increasing or redirecting the Haun and Indian Drainage ditches. If there are Corrugated Steel Pipes (**"CSP"**) on SLSMC property, they much be inspected by SLSMC for suitability as the CSP pipes are at their end of life in many locations and may require replacement.

5) SLSMC notes a number of Utilities in and around the subject area, including, but not limited to High Voltage and Fibre Optic communication lines. It is requried that the City, its agents and or supporting staff request locates from SLSMC well in advance of project commencement.

6) Any required access agreement requried in relation to this project shall be coordinated through the SLSMC Real Property Department and shall be coordinated directly with the undersigned.

7) The proposed project is beside a navigational waterway and it is to be understood that at any time there may be lights, noises and other related sounds in the area as a result from such commercial waterway. For greater clarity, the City, its agents, contractors or related parties shall at all times, ensure that any work or assessments completed in relation to the Assessment shall not hinder the Seaway's marine or other operations in any manner whatsoever. Without restricting the generality of the foregoing, the parties shall neither hinder navigation safety on the Seaway nor obstruct the Seaway in any manner whatsoever.

8) In addition to the above, SLSMC requires that during project implementation, no bright lights are to interfere with navigation.

9) Lastly, SLSMC has noted that a portion of the Site in relation to the Assessment encroaches on SLSMC property. The aforementioned study should not include any part of portion of SLSMC land. For greater certainty a map showing SLSMC lands is attached as Appendix "B" for reference.

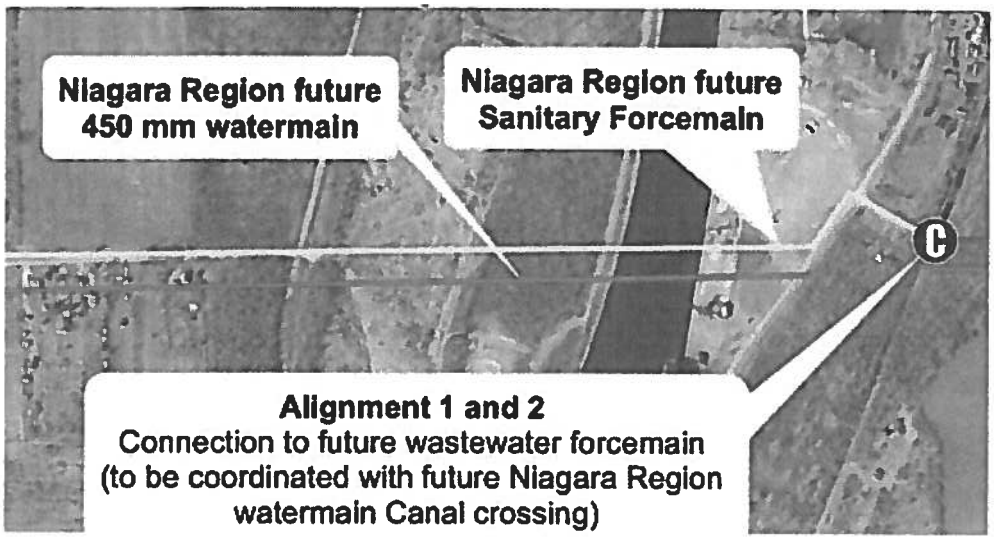
I trust you find the foregoing in order, however, should you require any additional information, please feel free to contact the undersigned direct.

Regards,

Lisa Allen
Real Property Management Officer

Cc: Jim Huppunen, City of Port Colborne
Cassie Kelly, SLSMC
Karine Mageren, SLSMC

Appendix "A"


Niagara Region future
450 mm watermain
Niagara Region future
Sanitary Forcemain
C
Alignment 1 and 2
Connection to future wastewater forcemain
(to be coordinated with future Niagara Region
watermain Canal crossing)

Appendix "B"

SLSMC Property Lines are outlined in Pink

Utilities

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 0A1
www.aecom.com

905 682 0212 tel
905 682 4495 fax

August 8, 2014

Project # 60322620

SENT VIA E-MAIL

Ms. Rhonda Nicholson, General Supervisor, Planning and Technology
Enbridge Consumers Gas
3401 Schmon Parkway, P.O. Box 1051
Thorold, Ontario L2V 5A8

Subject: Site Servicing of the East Side Employment Lands
NOTICE OF STUDY COMMENCEMENT

Dear Ms. Nicholson:

Please find attached the Notice of Study Commencement for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Municipal Class Environmental Assessment* (Class EA). This public notice was recently published on the City's website and in local newspapers and is now being sent to you because we would like your comments regarding this important infrastructure project. Further information is provided below.

Study Background

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Sincerely,
AECOM Canada Ltd.

Jennifer Whittard, B.E.S., PMP
Assistant Project Manager
jennifer.whittard@aecom.com
905-346-3744

Encl.

cc: SSESEL@portcolborne.ca
Jim Huppunen, City of Port Colborne
Mark Swan/Karl Grueneis, AECOM

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3 – 30 Hannover Drive
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www.aecom.com

905 682 0212 tel
905 682 4495 fax

March 11, 2015

Project # 60322620

Mr. Jeff Hoover
Supervisor of Planning
Canadian Niagara Power Inc.
1150 Bertie Street, PO Box 1218
Fort Erie, Ontario L2A 5Y2

Subject: **Site Servicing of the East Side Employment Lands Class Environmental Assessment Study, City of Port Colborne**
NOTICE OF PUBLIC INFORMATION CENTRE

Dear Mr. Hoover:

Further to our August 2014 Notice of Study Commencement, please find attached the Notice of Public Information Centre (PIC) for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Class Environmental Assessment Study*.

Study Purpose

The EA Study will be completed in keeping with the Ontario *Environmental Assessment Act*, and will follow the Master Planning Process of the Municipal Engineers Association. The Master Plan follows Approach #2 which will fulfill the requirements for Schedule A, A+, and Schedule B projects. The project team will examine a full range of alternatives and improvements and identify a preferred municipal servicing strategy for the ESEL that could be implemented in phases as development proposals come forward.

Public Information Centre

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Sincerely,

AECOM Canada Ltd.

Ian Izzard, P.Eng., M.A.Sc., PMP
Project Manager
lan.izzard@aecom.com
905-938-7657

Encl. Notice of Public Information Centre
cc: Jim Huppunen, City of Port Colborne
Karl Grueneis, AECOM

Letter also sent to:
- Bell Canada
- Enbridge Consumers Gas
Cogeco
Hydro One
- TransCanada Pipelines Limited
- Sun-Canadian Pipe Line Company Limited

Mollo, Jessica

From:
Sent: Monday, May 11, 2015 10:12 AM
To: Izzard, Ian
Cc: Grueneis, Karl; Mollo, Jessica; ssesel@portcolborne.ca
Subject: Fw: East Side Employment Lands EA

Follow Up Flag: Follow up
Flag Status: Flagged

Hi Ian,

Please see the e-mail received Friday from Hydro One regarding the project area.

Regards,

Jim Huppunen, A.Sc.T.
Manager of Engineering Services
City of Port Colborne
66 Charlotte Street
Port Colborne, Ontario L3K 3C8

905-835-2901, Ext. 221
Fax: 905-835-2939

----- Forwarded by Jim Huppunen/Port_Notes on 05/11/2015 10:11 AM -----

Project
Site Servicing East Side Employment Lands

<: .....
Sent by: ·

05/08/2015 03:57 PM

To<SSESEL@portcolborne.ca>

cc·
<

SubjectEast Side Employment Lands EA

Dear Mr. Huppunen,

In our initial review, we have confirmed that Hydro One has high voltage transmission facilities within your study area. At this point in time we do not have enough information about your project to provide you with meaningful input with respect to the impacts that your project may have on our infrastructure. As such, this response does not constitute any sort of approval for your plans and is being sent to you as a courtesy to inform you that we must be consulted on your project.

In addition to the existing infrastructure mentioned above, the affected transmission corridor may have provisions for future lines or already contain secondary land uses (i.e. pipelines, water mains, parking, etc). Please take this into consideration in your planning.

Please allow the appropriate lead-time in your project schedule in the event that your proposed development impacts Hydro One infrastructure to the extent that it would require modifications to our infrastructure.

In planning, please note that developments should not reduce line clearances or limit access to our facilities at any time in the study area of your Proposal. Any construction activities must maintain the electrical clearance from the transmission line conductors as specified in the Ontario Health and Safety Act for the respective line voltage.

The integrity of the structure foundations must be maintained at all times, with no disturbance of the earth around the poles, guy wires and tower footings. There must not be any grading, excavating, filling or other civil work close to the structures.

We reiterate that this message does not constitute any form of approval for your project. Once more details about your plans are known and it is established that your development will affect Hydro One facilities including the rights of way, please submit your plans to:

Jim Oriotis, Hydro One Real Estate Management
185 Clegg Road, Markham L6G 1B7
Phone: (905) 946-6261

Please note that the proponent will be held responsible for all costs associated with modification or relocation of Hydro One facilities, as well as any added costs that may be incurred due to increase efforts to maintain our facilities.

Regards,

Claire Zhang
Tel: 647-896-8862
On behalf of
Secondary Land Use
Transmission Asset Management
Hydro One Networks

Grueneis, Karl

Subject: FW: Hydro One Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

---

From: Brian.Mccormick@HydroOne.com [mailto:Brian.Mccormick@HydroOne.com]
Sent: Wednesday, August 10, 2016 11:35 AM
To: Grueneis, Karl
Subject: RE: Hydro One Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

We have no comments.

Brian

From: Grueneis, Karl [mailto:Karl.Grueneis@aecom.com]
Sent: Tuesday, August 09, 2016 3:59 PM
To: MCCORMICK Brian
Cc: Boerema, Gerrit
Subject: FW: Hydro One Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Brian

Will someone be providing comments on draft EA document?

Thanks

Karl

Karl Grueneis
Senior Environmental Planner
D 905.346.3732

AECOM
3-30 Hannover Drive
St. Catharines, Ontario L2W 1A3
T 905.682.0212 F 905.682.4495
www.aecom.com

From: Grueneis, Karl
Sent: Friday, July 22, 2016 3:10 PM
To: Grueneis, Karl
Subject: FW: Hydro One Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Karl Grueneis
Senior Environmental Planner
D 905.346.3732

AECOM
3-30 Hannover Drive
St. Catharines, Ontario L2W 1A3
T 905.682.0212 F 905.682.4495
www.aecom.com

From: Brian.Mccormick@HydroOne.com [mailto:Brian.Mccormick@HydroOne.com]
Sent: Thursday, June 30, 2016 9:01 AM
To: Grueneis, Karl
Subject: RE: Hydro One Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Will have someone get back to you

Brian McCormick

From: Grueneis, Karl [mailto:Karl.Grueneis@aecom.com]
Sent: Tuesday, June 28, 2016 3:26 PM
To: MCCORMICK Brian
Subject: FW: Hydro One Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Brian

Jessica is no longer with us. Will you be providing comments on the EA master plan?

Regards

Karl

Karl Grueneis
Senior Environmental Planner
D 905.346.3732

AECOM
3-30 Hannover Drive
St. Catharines, Ontario L2W 1A3
T 905.682.0212 F 905.682.4495
www.aecom.com

From: Mollo, Jessica
Sent: Friday, June 03, 2016 11:21 AM
To: 'mccormick.bj@hydroone.com'
Cc: Grueneis, Karl
Subject: RE: Hydro One Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Hi Brian,

I am just following up on my email below regarding the status of your review and if you have any questions or require additional information.

As noted below, any comments you have would be appreciated by mid-June.

Thanks and regards,

Jessica

Jessica Mollo, B.Sc
Environmental Planner, Environment
D +905-346-3742
jessica.mollo@aecom.com

AECOM
3-30 Hannover Drive
St. Catharines, Ontario, Canada
T +905-682-0212
aecom.com

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From: Mollo, Jessica
Sent: Monday, May 16, 2016 2:13 PM
To: 'mccormick.bj@hydroone.com'
Cc: 'jimhuppunen@portcolborne.ca'; ssesel@portcolborne.ca; Grueneis, Karl; Izzard, Ian; St. Denis, Jocelyn
Subject: Hydro One Request for Comments - City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File

Good afternoon Brian,

The City of Port Colborne is preparing to file the City of Port Colborne, Site Servicing of the East Side Employment Lands Municipal Class EA Master Plan Project File.

For your review and comment, please see the link below for the Master Plan Project File Report. As the City would like to file the report for the 30 day public review period by the end of June, any comments the Hydro One has would be greatly appreciated by mid-June 2016.

This file will be available for download until 5/23/2016

File	Description	Size
RPT-2016-05-12-ESEL MP Project File-60322620-DRAFT.pdf		63,658KB

Download all files (.zip)

Should you have any questions, or require additional information please feel free to contact me.

Thanks and regards,
Jessica

Jessica Mollo, B.Sc
Environmental Planner, Environment
D +905-346-3742
jessica.mollo@aecom.com

AECOM
3-30 Hannover Drive
St. Catharines, Ontario, Canada
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First Nations Correspondence

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 0A1
www.aecom.com

905 682 0212 tel
905 682 4495 fax

August 8, 2014

Project # 60322620

SENT VIA E-MAIL

Mr. Lonny Bomberry, Director, Lands and Resources
Six Nations of the Grand River Territory
1695 Chiefswood Road, P.O. Box 5000
Ohsweken, Ontario N0A 1M0

Subject: Site Servicing of the East Side Employment Lands
NOTICE OF STUDY COMMENCEMENT

Dear Mr. Bomberry:

Please find attached the Notice of Study Commencement for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Municipal Class Environmental Assessment* (Class EA). This public notice was recently published on the City's website and in local newspapers and is now being sent to you because we would like your comments regarding this important infrastructure project. Further information is provided below.

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First Nation Interests

As input to the study, this project will also include Stage 1 archaeological investigations. Please let us know if you would like to review the archaeological assessment report, or if there are any suggestions you would like to make.

The City encourages participation and dialogue with all stakeholders and invites your valued input to this project. Through the Environmental Assessment process, we are notifying you as part of the City's statutory obligation under the *Environmental Assessment Act*. We wish to confirm that the City will make every reasonable effort to ensure that the cultural and heritage interests of your First Nation will be properly considered and addressed.

Next Steps

We will continue to keep you informed of study progress, including an upcoming Public Information Centre and study recommendations, tentatively scheduled for early 2015. Information will also be posted on the City's website as it becomes available (www.portcolborne.ca > City Services > Engineering > Current Studies).

In the meantime, if you have any questions or comments or would like additional information, please do not hesitate to contact me. Alternatively, you may also send comments to the project email address at SSESEL@portcolborne.ca, or contact the City's Manager of Engineering Services, Jim Huppunen, at 905-835-2900 ext. 221.

Sincerely,

AECOM Canada Ltd.

Jennifer Whittard, B.E.S., PMP
Assistant Project Manager
jennifer.whittard@aecom.com
905-346-3744

Encl.

cc: SSESEL@portcolborne.ca
Jim Huppunen, City of Port Colborne
Mark Swan/Karl Grueneis, AECOM

Letter also sent to:
- Mississaugas of the New Credit First Nation
- Niagara Region Métis Council
- The Chiefs of Ontario

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 1A3
www.aecom.com

905 682 0212 tel
905 682 4495 fax

March 11, 2015

Project # 60322620

Allison Berman
Regional Subject Expert for Ontario
Aboriginal Affairs and Northern Development Canada, Consultation and Accommodation Unit
300 Sparks Street, Room 205
Ottawa, Ontario K1A 0H4

Subject: **Site Servicing of the East Side Employment Lands Class Environmental Assessment Study, City of Port Colborne**
NOTICE OF PUBLIC INFORMATION CENTRE

Dear Ms. Berman:

Further to our August 2014 Notice of Study Commencement, please find attached the Notice of Public Information Centre (PIC) for the City of Port Colborne's *Site Servicing of the East Side Employment Lands Class Environmental Assessment Study*.

Study Purpose

The EA Study will be completed in keeping with the Ontario *Environmental Assessment Act*, and will follow the Master Planning Process of the Municipal Engineers Association. The Master Plan follows Approach #2 which will fulfill the requirements for Schedule A, A+, and Schedule B projects. The project team will examine a full range of alternatives and improvements and identify a preferred municipal servicing strategy for the ESEL that could be implemented in phases as development proposals come forward.

Public Information Centre

You are encouraged to attend the Public Information Centre scheduled for March 23, 2015, where the problem/opportunity statement and recommended servicing strategy will be presented. Representatives from both the City of Port Colborne and AECOM will be available to discuss the project and answer any questions you may have. If you are unable to attend, the display boards will be made available for review and comment following the PIC on the City website (www.portcolborne.ca > City Services > Engineering > Current Studies). All comments received throughout the course of this study will be considered in finalizing the recommended servicing strategies.

Next Steps

Upon completion of the study, a Master Plan Project File will be prepared and made available for public and agency review. In the meantime, if you have any questions or comments or would like additional information, please do not hesitate to contact me. Alternatively, you may also send comments to the project email address at SSESEL@portcolborne.ca, or contact the City's Manager of Engineering Services, Jim Huppunen, at 905-835-2900 ext. 221.

Sincerely,

AECOM Canada Ltd.

Ian Izzard, P.Eng., M.A.Sc., PMP
Project Manager
Ian.izzard@aecom.com
905-938-7657

Encl. Notice of Public Information Centre
cc: Jim Huppunen, City of Port Colborne
Karl Grueneis, AECOM

Letter also sent to:
- Ministry of Aboriginal Affairs - Consultation Unit

AECOM
3 – 30 Hannover Drive
St. Catharines, ON, Canada L2W 1A3
www.aecom.com

905 682 0212 tel
905 682 4495 fax

March 11, 2015

Project # 60322620

Mr. Lonny Bomberry
Director, Lands and Resources
Six Nations of the Grand River Territory
1695 Chiefswood Road, P.O. Box 5000
Ohsweken, Ontario N0A 1M0

Subject: **Site Servicing of the East Side Employment Lands Class Environmental Assessment Study, City of Port Colborne**
NOTICE OF PUBLIC INFORMATION CENTRE

Dear Mr. Bomberry:

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Sincerely,

AECOM Canada Ltd.

Ian Izzard, P.Eng., M.A.Sc., PMP
Project Manager
Ian.izzard@aecom.com
905-938-7657

Encl. Notice of Public Information Centre
cc: Jim Huppunen, City of Port Colborne
Karl Grueneis, AECOM

Letter also sent to.
- Mississaugas of the New Credit First Nation
- Haudenosaunee Confederacy Chiefs Council
- Haudenosaunee Confederacy Development Institute
- Niagara Region Métis Council
- Métis Nation of Ontario
- The Chiefs of Ontario
- Aamjiwnaang Environment Department
- Aldrville First Nation
- Aundeck Omni Kaning First Nation
- Beausdeil First Nation
- Chippewas of Georgina Island First Nation
- Chippewas of Kettle & Stony Point First Nation
- Chippewas of Nawash First Nation
- Chippewas of the Thames First Nation
- Williams Treaty First Nations
- Hiawatha First Nation
- M'Chigeeng First Nation
- Mississaugas of Scugog Island First Nation
- Mohawk Council of Akwesasne
- Mohawks of the Bay of Quinte
- Saugeen First Nation
- Sheguiandah First Nation
- Walpole Island First Nation
- Zhiibaahaasing First Nation

ALDERVILLE FIRST NATION
P.O. Box 46
11696 Second Line
Roseneath, Ontario K0K 2X0

March 17, 2015

AECOM Canada Ltd.
3-30 Hannover Drive
St. Catherines, ON
L2W 1A3

Attn: Ian Izzard, Project Manager

Re: Site Servicing of the East Side Employment Lands Class Environmental Assessment Study, City of Port Colborne
Notice of Public Information Centre

Dear Tim,

Thank you for your notice to Alderville First Nation regarding the **Public Information Centre**. Your project does not fall within our Traditional or Treaty area therefore I would suggest you contact the New Credit First Nation whose territory the project is being proposed in. We appreciate the fact the **AECOM Canada Ltd.** recognizes the importance of First Nations Consultation and that your office is conforming to the requirements within the Duty to Consult process.

If in the future you have a project in our Traditional or Treaty area we appreciate Alderville being kept apprised of developments, archaeological findings, burial sites or any environmental impacts, should any occur. I can be contacted at the mailing address above or electronically via email, at the email address below.

In good faith and respect,

Dave Simpson
Lands and Resources

Communications Officer
Alderville First Nation

Tele: (905) 352-2662
Fax: (905) 352-3242

Ministry of Aboriginal Affairs

160 Bloor St. East, 9th Floor
Toronto, ON M7A 2E6
Tel: (416) 326-4740
Fax: (416) 325-1066
www.aboriginalaffairs.gov.on.ca

Ministère des Affaires Autochtones

160, rue Bloor Est, 9e étage
Toronto ON M7A 2E6
Tél. : (416) 326-4740
Téléc. : (416) 325-1066
www.aboriginalaffairs.gov.on.ca

Ontario

Reference: EA #2015-105

Jim Huppunen, A.Sc.T.
Manager of Engineering Services
City of Port Colborne
66 Charlotte Street
Port Colborne, ON L3K 3C8

Re: Notice of Public Information Centre
Site Servicing of the East Side Employment Lands
Class Environmental Assessment Study
City of Port Colborne

Dear Mr. Huppunen:

Thank you for informing the Ministry of Aboriginal Affairs (MAA) of your project. Please note that MAA treats all letters, emails, general notices, etc. about a project as a request for information about which Aboriginal communities may have rights or interests in the project area.

As a member of the government review team, the Ministry of Aboriginal Affairs (MAA) identifies First Nation and Métis communities who may have the following interests in the area of your project:

- reserves;
- land claims or claims in litigation against Ontario;
- existing or asserted Aboriginal or treaty rights, such as harvesting rights; or
- an interest in the area of the project.

MAA is not the approval or regulatory authority for your project, and receives very limited information about projects in the early stages of their development. In circumstances where a Crown-approved project may negatively impact a claimed Aboriginal or treaty right, the Crown may have a duty to consult the Aboriginal community advancing the claim. The Crown often delegates procedural aspects of its duty to consult to proponents. Please note that the information in this letter should not be relied on as advice about whether the Crown owes a duty to consult in respect of your project, or what consultation may be appropriate. Should you have any questions about your consultation obligations, please contact the appropriate ministry.

You should be aware that many First Nations and/or Métis Communities either have or assert rights to hunt and fish in their traditional territories. For First Nations, these territories typically include lands and waters outside of their reserves.

In some instances, project work may impact aboriginal archaeological resources. If any Aboriginal archaeological resources could be impacted by your project, you should contact your regulating or approving Ministry to inquire about whether any additional Aboriginal communities should be contacted. Aboriginal communities with an interest in archaeological resources may include communities who are not presently located in the vicinity of the proposed project.

With respect to your project, and based on the brief materials you have provided, we can advise that the project appears to be located in an area where First Nations may have existing or asserted rights or claims in Ontario's land claims process or litigation, that could be impacted by your project. Contact information is below:

Six Nations of the Grand River Territory P.O. Box 5000, 1695 Chiefswood Road OHSWEKEN, Ontario N0A 1M0	Chief Ava Hill (519) 445-2201 (Fax) 445-4208
Haudenosaunee Confederacy Chiefs Council 2634 6th Line Road RR 2 Ohsweken, ON N0A 1M0	Hohahes Leroy Hill Secretary to Haudenosaunee Confederacy Chiefs Council Cell 519 717 7326
Mississaugas of the New Credit First Nation 2789 Mississauga Rd., R.R. #6 HAGERSVILLE, Ontario N0A 1H0	Chief Bryan LaForme (905) 768-1133 (Fax) 768-1225

The information upon which the above comments are based is subject to change. First Nation or Métis communities can make claims at any time, and other developments can occur that could result in additional communities being affected by or interested in your undertaking.

Through Aboriginal Affairs and Northern Development (AANDC), the Government of Canada sometimes receives claims that Ontario does not receive, or with which Ontario does not become involved. AANDC's Consultation and Accommodation Unit (CAU) established a "single window" to respond to requests for baseline information held by AANDC on established or potential Aboriginal Treaty and rights. To request information from the Ontario Subject Matter Expert send an email to: UCA-CAU@aadnc-aandc.gc.ca.

Additional details about your project or changes to it that suggest impacts beyond what you have provided to date may necessitate further consideration of which Aboriginal

communities may be affected by or interested in your undertaking. If you think that further consideration may be required, please bring your inquiry to whatever government body oversees the regulatory process for your project. MAA does not wish to be kept informed of the progress of the project; please be sure to remove MAA from the mailing list.

Yours truly,

Corwin Troje
Manager, Ministry Partnerships Unit
Aboriginal Relations and Ministry Partnerships Branch