J.H. COHOON ENGINEERING LIMITED

CONSULTING ENGINEERS

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#16933

September 8, 2024

County of Norfolk
Community Planning Services
60 Colborne Street S
Simcoe, Ontario
N3Y 4H3

Attention: Mr. Andrew Wallace
Planner, Development Planning

Re: Proposed Plan of Subdivision
MN 1045 LaPlante Road
Tillsonburg, Ontario
Norfolk County

Dear Sir:

On behalf of our client, Mr. J. Oliveira and Mr. P. Ruggeri, please find enclosed the following information regarding our application for rezoning and draft plan of subdivision relating to a proposed residential development located within the village of Tillsonburg, (Norfolk West) in Norfolk County . The proposal is an eight lot residential development on the subject lands.

Please find enclosed the following information in support of this application.

1. One (1) copy of the site plans as prepared by our office relating to this site including the proposed development. (Drawings 16933-1 to 16933-4 including the drainage area plans being 16933-A and 16933-B)
2. One (1) copy of the "Application being the General Application "for the re-zoning and draft plan approval" completed by our client and owner.
3. One (1) copy of the Draft Plan of Subdivision" as executed by the owner and the land surveyor for the proposed development
4. The required fee will be provided upon confirmation of the required amount. Please advise and this will be attended to by the owner.
5. One (1) copy of the initial Function Servicing Report as prepared by our office

6. One (1) copy of the initial Hydrogeological report as prepared by Peto MacCallum Ltd including an updated report relating to the additional lots being proposed
7. One (1) copy of the Natural Heritage Features assessment of the boundary information relating to the site.
8. One (1) copy of the stormwater management report as prepared by our office relating to the proposed development
9. One (1) copy of the traffic impact assessment as prepared by our office
10. One copy (1) of the preliminary draft pre-consultation notes and the final pre-consultation notes relating to this development
11. One copy (1) of the planning justification report as prepared by Mr. P. Ruggeri relating to the proposed development
12. Electronic Copy of documents included

The proposal is to construct an eight (8) lot residential plan of subdivision on the subject lands.

With the submission of this information, we would respectfully appreciate your prompt circulation of the application to the various departments.

If you require any further details, please do not hesitate to contact this office, at your earliest convenience.

Yours truly,

J.H. COHOON ENGINEERING LIMITED

R.W. Phillips, P.Eng.

c.c. Mr. P. Ruggeri

Planning Department Development Application Form Type text here

Complete Application

A complete development application consists of the following:

1. A completed, signed, and notarized application form
2. Supporting information adequate to illustrate your proposal as indicated in **Section H** of this application form
3. Written authorization from the registered owner of the subject lands where the applicant is not the owner as per Section N
4. Cash, debit, credit or cheque payable to Norfolk County in the amount set out in the user fees By-Law that will be accepted and deposited once the application has been deemed complete.

Pre-Submission Consultation:

Norfolk County requires a Pre-Consultation Meeting for all applications; however, minor applications may be exempted depending on the nature of the proposal. The purpose of a Pre-Consultation Meeting is to provide the applicant with an opportunity to present the proposed application, discuss potential issues, and for the Norfolk County and Agency staff to identify the application requirements. Application requirements, as detailed in the Pre-Consultation Meeting Comments, are valid for one year after the meeting date.

Development Application Process

Once an application has been deemed complete by a Planner, Norfolk County staff will circulate the application to adjacent landowners, public agencies, and internal departments for comment. The time involved in application processing varies depending on its complexity, acceptability to the other agencies, and statutory Planning Act decision time-frames.

Payment is required once your application is deemed complete. Pre-payments will not be accepted.

Norfolk County collects personal information submitted through this form under the Municipal Freedom of Information and Protection Act's authority. Norfolk County will use this information for the purposes indicated or implied by this form. You can direct questions about collecting personal information to Norfolk GIS Services at NorfolkGIS@norfolkcounty.ca. Type text here

Additional studies required for the complete application shall be at the applicant's sole expense. Sometimes, peer reviews may be necessary to review particular studies at the applicant's expense. In these caseds, Norfolk County staff will select the company to complete the peer review.

Norfolk County will refund the original fee if applicants withdraw their applications before circulation. If Norfolk County must recirculate your drawings, there will be an additional fee. If Norfolk County must do more than three reviews of engineering drawings due to revisions by the owner or failure to revise engineering drawings as requested, Norfolk County will charge an additional fee. Full refunds are only available before Norfolk County has circulated the application.

Notification Sign Requirements

For public notification, Norfolk County will provide you with a sign to indicate the intent and purpose of your development application. It is your responsibility to:

1. Post one sign per frontage in a conspicuous location on the subject lands.
2. Ensure one sign is posted at the front of the subject lands at least three feet above ground level and not on a tree.
3. Notify the Planner when the sign is in place.
4. Maintain the sign until the development application is finalized and, after that, remove it.

Contact Us

For additional information or assistance completing this application, please contact a Planner at 519-426-5870 or 519-875-4485 extension 1842 or planning@norfolkcounty.ca. Please submit the completed application and fees to the attention of the Planning Department at 185 Robinson Street, Suite 200, Simcoe, ON N3Y 5L6.

For Office Use Only:

File Number		Public Notice Sign	
Related File Number		Application Fee	
Pre-consultation Meeting		Conservation Authority Fee	
Application Submitted		Well & Septic Info Provided	
Complete Application		Planner	

Check the type of planning application(s) you are submitting.

- ☐ Official Plan Amendment
- ☒ Zoning By-Law Amendment
- ☐ Temporary Use By-law
- ☒ Draft Plan of Subdivision/Vacant Land Condominium
- ☐ Condominium Exemption
- ☐ Site Plan Application
- ☐ Extension of a Temporary Use By-law
- ☐ Part Lot Control
- ☐ Cash-in-Lieu of Parking
- ☐ Renewable Energy Project or Radio Communication Tower

Please summarize the desired result of this application (for example, a special zoning provision on the subject lands to include additional use(s), changing the zone or official plan designation of the subject lands, creating a certain number of lots, or similar)

Property Assessment Roll Number: ~~331054101005500000~~

331054101005500000

A. Applicant Information

Name of Owner ~~Joe Oliveira~~

Joseph Luis ~~and Joe~~ Oliveria

(Joe Oliveira deceased)

Address 114 BALDWIN STREET

Town and Postal Code TILLSONBURG, ON. N4G 2K4

Phone Number

Cell Number 519 8729609

Email elginjoe@hotmail.com

Name of Applicant PHIL RUGGERI

Address 20724 DENFIELD RD

Town and Postal Code LONDON, ON N6H 5L2

Phone Number

Cell Number 519 871-0533

Email phil@philruggeri.com

Name of Agent BOB PHILLIPS c/o J.H. COHOON ENGINEERING

Address 440 HARDY ROAD UNIT 1

Town and Postal Code BRANTFORD, ONTARIO N3T 5L8

Phone Number 519 753 2656

Cell Number

Email rphillips@cohooneng.com

Unless otherwise directed, Norfolk County will forward all correspondence and notices regarding this application to both owner and agent noted above.

☑ Owner ☑ Agent ☑ Applicant

Names and addresses of any holder of any mortgagees, charges or other encumbrances on the subject lands:

N/A none

B. Location, Legal Description and Property Information

1. Legal Description (include Geographic Township, Concession Number, Lot Number, Block Number and Urban Area or Hamlet):

   ~~1045 LAPLANTE ROAD~~, MID CON 4 NTR PT LOT 5 ~~NSEFD~~ RP 37R4896 PART of PART 1

   Municipal Civic Address: 1045 LAPLANTE RD. NORFOLK WEST

   Present Official Plan Designation(s): ~~RH(H)~~ HAMLET OP

   Present Zoning: ~~RH(H)~~ Hamlet Residential Zone and Hazard Land Zone

2. Is there a special provision or site specific zone on the subject lands?

   ☒ Yes ☐ No If yes, please specify corresponding number:
   Holding provision

3. Present use of the subject lands:

   AGRICULTURE and BUSH

4. Please describe **all existing** buildings or structures on the subject lands and whether they will be retained, demolished or removed. If retaining the buildings or structures, please describe the type of buildings or structures, and illustrate the setback, in metric units, from the front, rear and side lot lines, ground floor area, gross floor area, lot coverage, number of storeys, width, length, and height on your attached sketch which must be included with your application:

   none - property vacant land

5. If an addition to an existing building is being proposed, please explain what it will be used for (for example: bedroom, kitchen, or bathroom). If new fixtures are proposed, please describe.

   N/A.

6. Please describe **all proposed** buildings or structures/additions on the subject lands. Describe the type of buildings or structures/additions, and illustrate the setback, in metric units, from front, rear and side lot lines, ground floor area, gross floor area, lot coverage, number of storeys, width, length, and height on your attached sketch which must be included with your application:

   N/A

7. Are any existing buildings on the subject lands designated under the *Ontario Heritage Act* as being architecturally and/or historically significant? Yes ☐ No ☑

   If yes, identify and provide details of the building:

   N/A.

8. If known, the length of time the existing uses have continued on the subject lands:

   -

9. Existing use of abutting properties:

   RESIDENTIAL HOMES.

10. Are there any easements or restrictive covenants affecting the subject lands?

    ☐ Yes ☑ No If yes, describe the easement or restrictive covenant and its effect:

C. Purpose of Development Application

Note: Please complete all that apply.

1. Please explain what you propose to do on the subject lands/premises which makes this development application necessary:

   PROPOSE EIGHT LOTS, SINGLE FAMILY RESIDENCES WITH PRIVATE ON SITE SERVICING

2. Please explain why it is not possible to comply with the provision(s) of the Zoning By-law/and or Official Plan:

   CURRENT ZONING OF RH(4) does not comply, requesting CHANGE ~~to R1 A with specific provisions~~ from HAMLET RESIDENTIAL (RH)(4) to HAMLET RESIDENTIAL WITH SPECIAL PROVISIONS to allow for this use whilst using private individual services

3. Does the requested amendment alter all or any part of the boundary of an area of settlement in the municipality or implement a new area of settlement in the municipality? ☐ Yes ☑ No If yes, describe its effect:

4. Does the requested amendment remove the subject land from an area of employment? ☐ Yes ☑ No If yes, describe its effect:

~~331054~~

5. Does the requested amendment alter, replace, or delete a policy of the Official Plan?
☐ Yes ☑ No If yes, identify the policy, and also include a proposed text of the policy amendment (if additional space is required, please attach a separate sheet):

6. Description of land intended to be severed in metric units:
Frontage: N/A
Depth:
Width:
Lot Area:
Present Use:
Proposed Use:
Proposed final lot size (if boundary adjustment):
If a boundary adjustment, identify the assessment roll number and property owner of the lands to which the parcel will be added:

Description of land intended to be retained in metric units:
Frontage: N/A
Depth:
Width:
Lot Area:
Present Use:
Proposed Use:
Buildings on retained land:

7. Description of proposed right-of-way/easement:
Frontage:
Depth:
Width:
Area:
Proposed use:

8. Name of person(s), if known, to whom lands or interest in lands to be transferred, leased or charged (if known):
N/A

9. **Site Information**	**Zoning**	**Proposed**
Please indicate unit of measurement, for example: m, m^2 or %		
Lot frontage	Refer to Draft Plan	
Lot depth		
Lot width		
Lot area		
Lot coverage		
Front yard		
Rear yard		
Left Interior side yard		
Right Interior side yard		
Exterior side yard (corner lot)		
Landscaped open space		
Entrance access width		
Exit access width		
Size of fencing or screening		
Type of fencing		

10. Building Size

Number of storeys		
Building height		
Total ground floor area		
Total gross floor area		
Total useable floor area		

11. Off Street Parking and Loading Facilities

Number of off street parking spaces		
Number of visitor parking spaces		
Number of accessible parking spaces		
Number of off street loading facilities		

12. Residential (if applicable)

Number of buildings existing: NONE

Number of buildings proposed: 8

Is this a conversion or addition to an existing building? ☐ Yes ☑ No

If yes, describe: _____

Type	Number of Units	Floor Area per Unit in m2
Single Detached	8	
Semi-Detached		
Duplex		
Triplex		
Four-plex		
Street Townhouse		
Stacked Townhouse		
Apartment - Bachelor		
Apartment - One bedroom		
Apartment - Two bedroom		
Apartment - Three bedroom		

Other facilities provided (for example: play facilities, underground parking, games room, or swimming pool):

13. Commercial/Industrial Uses (if applicable)

Number of buildings existing: N/A

Number of buildings proposed: _____

Is this a conversion or addition to an existing building? ☐ Yes ☐ No

If yes, describe:

_____

Indicate the gross floor area by the type of use (for example: office, retail, or storage):

_____

_____

_____

Seating Capacity (for assembly halls or similar): _____

Total number of fixed seats: _____

Describe the type of business(es) proposed: N/A

Total number of staff proposed initially: _____

Total number of staff proposed in five years: _____

Maximum number of staff on the largest shift: _____

Is open storage required: ☐ Yes ☐ No

Is a residential use proposed as part of, or accessory to commercial/industrial use?

☐ Yes ☐ No If yes please describe:

_____

_____

14. Institutional (if applicable)

Describe the type of use proposed: N/A

Seating capacity (if applicable): _____

Number of beds (if applicable): _____

Total number of staff proposed initially: _____

Total number of staff proposed in five years: _____

Maximum number of staff on the largest shift: _____

Indicate the gross floor area by the type of use (for example: office, retail, or storage):

_____

_____

_____

15. Describe Recreational or Other Use(s) (if applicable)

N/A

_____

_____

_____

_____

D. Previous Use of the Property

1. Has there been an industrial or commercial use on the subject lands or adjacent lands? ☐ Yes ☑ No ☐ Unknown
   If yes, specify the uses (for example: gas station or petroleum storage):

2. Is there reason to believe the subject lands may have been contaminated by former uses on the site or adjacent sites? ☐ Yes ☑ No ☐ Unknown
3. Provide the information you used to determine the answers to the above questions:

4. If you answered yes to any of the above questions in Section D, a previous use inventory showing all known former uses of the subject lands, or if appropriate, the adjacent lands, is needed. Is the previous use inventory attached? ☐ Yes ☐ No

E. Provincial Policy

1. Is the requested amendment consistent with the provincial policy statements issued under subsection 3(1) of the *Planning Act, R.S.O. 1990, c. P. 13*? ☐ Yes ☐ No

   If no, please explain:

   YES

2. It is owner's responsibility to be aware of and comply with all relevant federal or provincial legislation, municipal by-laws or other agency approvals, including the Endangered Species Act, 2007. Have the subject lands been screened to ensure that development or site alteration will not have any impact on the habitat for endangered or threatened species further to the provincial policy statement subsection 2.1.7? ☑ Yes ☐ No

   If no, please explain:

   ENVIRONMENTAL IMPACT STUDY COMPLETED in 2018
   and UPDATED on JULY 17, 2024 (included)
   CONCLUDING NO IMPACT TO ENDANGERED SPECIES

3. Have the subject lands been screened to ensure that development or site alteration will not have any impact on source water protection? ☐ Yes ☒ No

   If no, please explain:

   _____

   _____

   Note: If in an area of source water Wellhead Protection Area (WHPA) A, B or C please attach relevant information and approved mitigation measures from the Risk Manager Official.

4. Are any of the following uses or features on the subject lands or within 500 metres of the subject lands, unless otherwise specified? Please check boxes, if applicable.

   Livestock facility or stockyard (submit MDS Calculation with application)

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Wooded area

   ☐ On the subject lands or ☒ within 500 meters – distance Adjacent

   Municipal Landfill

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Sewage treatment plant or waste stabilization plant

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Provincially significant wetland (class 1, 2 or 3) or other environmental feature

   ☒ On the subject lands or ☒ within 500 meters – distance On and Adjacent

   Floodplain

   ☐ On the subject lands or ☒ within 500 meters – distance LPRCA

   Rehabilitated mine site

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Non-operating mine site within one kilometre

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Active mine site within one kilometre

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Industrial or commercial use (specify the use(s))

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Active railway line

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Seasonal wetness of lands

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Erosion

   ☐ On the subject lands or ☐ within 500 meters – distance _____

   Abandoned gas wells

   ☐ On the subject lands or ☐ within 500 meters – distance _____

F. Servicing and Access

1. Indicate what services are available or proposed:

Water Supply

- ☐ Municipal piped water
- ☑ Individual wells
- ☐ Communal wells
- ☐ Other (describe below)

Sewage Treatment

- ☐ Municipal sewers
- ☑ Septic tank and tile bed in good working order
- ☐ Communal system
- ☐ Other (describe below)

Storm Drainage

- ☒ Storm sewers
- ☐ Other (describe below)
- ☐ Open ditches

STORM WATER MANAGEMENT POND PROPOSED on site

2. Existing or proposed access to subject lands:

- ☑ Municipal road
- ☐ Unopened road
- ☐ Provincial highway
- ☐ Other (describe below)

Name of road/street: _____

G. Other Information

1. Does the application involve a local business? ☐ Yes ☑ No
   If yes, how many people are employed on the subject lands?

2. Is there any other information that you think may be useful in the review of this application? If so, explain below or attach on a separate page.

None

H. Supporting Material to be submitted by Applicant

In order for your application to be considered complete, **folded** hard copies (number of paper copies as directed by the planner) and an **electronic version (PDF) of the properly named site plan drawings, additional plans, studies and reports** will be required, including but not limited to the following details:

1. Concept/Layout Plan
2. All measurements in metric
3. Key map
4. Scale, legend and north arrow
5. Legal description and municipal address
6. Development name
7. Drawing title, number, original date and revision dates
8. Owner's name, address and telephone number
9. Engineer's name, address and telephone number
10. Professional engineer's stamp
11. Existing and proposed easements and right of ways
12. Zoning compliance table – required versus proposed
13. Parking space totals – required and proposed
14. All entrances to parking areas marked with directional arrows
15. Loading spaces, facilities and routes (for commercial developments)
16. All dimensions of the subject lands
17. Dimensions and setbacks of all buildings and structures
18. Location and setbacks of septic system and well from all existing and proposed lot lines, and all existing and proposed structures
19. Gross, ground and useable floor area
20. Lot coverage
21. Floor area ratio
22. Building entrances, building type, height, grades and extent of overhangs
23. Names, dimensions and location of adjacent streets including daylighting triangles
24. Driveways, curbs, drop curbs, pavement markings, widths, radii and traffic directional signs
25. All exterior stairways and ramps with dimensions and setbacks
26. Retaining walls including materials proposed
27. Fire access and routes
28. Location, dimensions and number of parking spaces (including visitor and accessible) and drive aisles
29. Location of mechanical room, and other building services (e.g. A/C, HRV)
30. Refuse disposal and storage areas including any related screening (if indoors, need notation on site plan)
31. Winter snow storage location

32. Landscape areas with dimensions
33. Natural features, watercourses and trees
34. Fire hydrants and utilities location
35. Fencing, screening and buffering – size, type and location
36. All hard surface materials
37. Light standards and wall mounted lights (plus a note on the site plan that all outdoor lighting is to be dark sky compliant)
38. Business signs (make sure they are not in sight lines)
39. Sidewalks and walkways with dimensions
40. Pedestrian access routes into site and around site
41. Bicycle parking
42. Architectural elevations of all building sides
43. All other requirements as per the pre-consultation meeting

In addition, the following additional plans, studies and reports, including but not limited to, **may** also be required as part of the complete application submission:

- ☐ Zoning Deficiency Form
- ☐ On-Site Sewage Disposal System Evaluation Form (to verify location and condition)
- ☐ Architectural Plan
- ☐ Buildings Elevation Plan
- ☐ Cut and Fill Plan
- ☐ Erosion and Sediment Control Plan
- ☐ Grading and Drainage Control Plan (around perimeter and within site) (existing and proposed)
- ☐ Landscape Plan
- ☐ Photometric (Lighting) Plan
- ☐ Plan and Profile Drawings
- ☐ Site Servicing Plan
- ☐ Storm water Management Plan
- ☐ Street Sign and Traffic Plan
- ☐ Street Tree Planting Plan
- ☐ Tree Preservation Plan
- ☐ Archaeological Assessment
- ☐ Environmental Impact Study

☐ Functional Servicing Report

☐ Geotechnical Study / Hydrogeological Review

☐ Minimum Distance Separation Schedule

☐ Noise or Vibration Study

☐ Record of Site Condition

☐ Storm water Management Report

☐ Traffic Impact Study – please contact the Planner to verify the scope required

Site Plan applications will require the following supporting materials:

1. Two (2) complete sets of the site plan drawings folded to 8½ x 11 and an electronic version in PDF format
2. Letter requesting that the Holding be removed (if applicable)
3. A cost estimate prepared by the applicant's engineer
4. An estimate for Parkland dedication by a certified land appraiser
5. Property Identification Number (PIN) printout

Standard condominium exemptions will require the following supporting materials:

☐ Plan of standard condominium (2 paper copies and 1 electronic copy)

☐ Draft condominium declaration

☐ Property Identification Number (PIN) printout

Your development approval might also be dependent on other relevant federal or provincial legislation, municipal by-laws or other agency approvals.

All final plans must include the owner's signature as well as the engineer's signature and seal.

I. Development Agreements

A development agreement may be required prior to site plan approval, subdivision and condominium applications. Should this be necessary for your development, you will be contacted by the agreement administrator with further details of the requirements including but not limited to insurance coverage, professional liability for your engineer, additional fees and securities.

J. Transfers, Easements and Postponement of Interest

The owner acknowledges and agrees that if required, it is their solicitor's responsibility on behalf of the owner, to disclose the registration of all transfer(s) of land and/or easement in favour of the County and/or utilities. Also, the owner further acknowledges and agrees that it is their solicitor's responsibility on behalf of the owner for the registration of postponements of any charges in favour of the County.

K. Permission to Enter Subject Lands

Permission is hereby granted to Norfolk County officers, employees or agents, to enter the premises subject to this application for the purposes of making inspections associated with this application, during normal and reasonable working hours.

L. Freedom of Information

For the purposes of the *Municipal Freedom of Information and Protection of Privacy Act*, I authorize and consent to the use by or the disclosure to any person or public body any information that is collected under the authority of the *Planning Act, R.S.O. 1990, c. P. 13* for the purposes of processing this application.

Owner/Applicant Signature — Date: 11/14/2024

M. Owner's Authorization

If the applicant/agent is not the registered owner of the lands that is the subject of this application, the owner(s) must complete the authorization set out below.

I/We JOE OLIVEIRA. am/are the registered owner(s) of the lands that is the subject of this application.

I/We authorize PHIL ROGERI to make this application on my/our behalf and to provide any of my/our personal information necessary for the processing of this application. Moreover, this shall be your good and sufficient authorization for so doing.

Owner — Date: November 15/2024

Owner — Date

Owner — Date

05410100

N. Declaration

I, Phil Ruggeri of London ON

solemnly declare that:

all of the above statements and the statements contained in all of the exhibits transmitted herewith are true and I make this solemn declaration conscientiously believing it to be true and knowing that it is of the same force and effect as if made under oath and by virtue of *The Canada Evidence Act*.

Declared before me at:

London

Owner/Applicant Signature

In Province of Ontario

This 20th day of November

A.D., 2024

A Commissioner, etc.

Planning Justification Report

Joseph Luis Oliveira – 1045 Laplante Road

County of Norfolk

Findlater & Associates Inc.

January 2025

INTROUCTION

The following information is presented to establish planning justification for the rezoning of the property located at 1045 Laplante Road (See Appendix 1) from Hamlet Residential (RH-H) to Urban Residential Type 1 Zone (R1-A) to facilitate the development of a plan of subdivision with eight (8) single detached residential units on private services (See Appendix 2). Phillip Ruggeri has submitted the application for re-zoning to the County of Norfolk. A request was made by Norfolk County for a Planning Justification Report to be prepared by a Registered Professional Planner to accompany this re-zoning application.

SUBJECT LANDS

The subject lands are located on the south side of Laplante Road west of Highway #19 adjacent to the Town of Tillsonburg.

The lands comprise approximately 6.9 hectares (17 ac) with frontage on Laplante Road. There are currently no buildings or structures on the subject lands. The surrounding lands are characterized by residential development adjacent to the subject lands along both Highway 19 and Laplante Road, and agricultural cash crop operations to the west. The subject lands are fully within the Hamlet of Norfolk West.

PLANNING POLICY ANALYSIS

Provincial Planning Statement 2024 (PPS)

*Chapter 2 deals with policies related to **"Planning for People and Homes"**. Section 2.2 Housing states " Planning authorities shall provide for an appropriate range and mix of housing options and densities to meet projected needs of current and future residents of the regional market area by::*

a) *Establishing and implementing minimum targets for the provision of housing that is affordable to low and moderate households, and coordinating land use planning and planning for housing to address the full range of housing options;*
b) *Permitting an facilitating:*

1. All housing options required to meet the social, health, economic and well being requirements of current and future residents; and

2. All types of residential intensification;

c) *Promoting densities for new housing which efficiently use land, resources, infrastructure and public service facilities;*

Section 2.3 deals with polices related to **"Settlement Areas and Settlement Area Boundary Expansions".** Section 2.3.1 states:

1. Settlement Areas **shall be the focus of growth and development**.
3. Planning Authorities **shall support general intensification** and redevelopment to support the achievement of complete communities, including by planning for a range and mix of housing options and prioritizing planning and investment in the necessary infrastructure and public service facilities.

Chapter 3 deals with **"Infrastructure and Facilities**". Section 3.6 contains policies related to development in terms of sewage, water and stormwater. Section 3.6.4 states:

"Where municipal sewage services and municipal water services or private communal sewage services and private communal water services are not available, planned or feasible, individual on-site sewage services and individual on-site water services may be used provided the site conditions are suitable for the long-term provision of such services with no negative impacts."

The proposed re-zoning to facilitate the development of an eight (8) lot single detached dwelling subdivision is consistent with the relevant policies of the Provincial Planning Statement (PPS) 2024.

County of Norfolk Official Plan

The subject lands are located within the settlement area boundary of the **Hamlet of Norfolk West**. **Section 6.6 Hamlet Areas** states "Hamlet Areas are settlements that function as small clusters providing limited residential, institutional, recreational and small-scale commercial services to the surrounding agricultural community. The 42 Hamlet Areas identified on Schedule "A" to this Plan are an important component of Norfolk's community structure." Section 7.5.1 of the Plan states "**Low density residential dwellings on lots suitably sized to accommodate private servicing systems *shall be the main permitted* use**."

Section 7.5.2 b) deals with criteria that need to be addressed in the review of development applications within the Hamlet Area boundaries.

The following studies have been completed and submitted to address these issues:

Hydrogeological Site Assessment: Peto MacCallum Ltd. (November 24, 2022)

Geotechnical Investigation Report: Peto MacCallum Ltd. (February 8, 2022)

Environmental Impact Study (EIS): GeoProcess Research Associates (July 2017 & July 2024 Update)

Archaeological Assessment (Stage 1 & 2): Lincoln Environmental Consulting (May 2024)

It is my professional planning opinion that this application and development conforms to all relevant policies contained in the Norfolk County Official Plan.

County of Norfolk Zoning By-Law

The subject lands are currently zoned **Hamlet Residential (RH-H)** with a holding provision. Section 5.7.1 lists the permitted uses which includes single detached dwellings as the main use.

The requested zoning amendment application is to change the zoning on the subject lands from Hamlet Residential (RH-H) to **Urban Residential Type 1 Zone (R1-A)** to facilitate the development of an eight (8) lot single detached dwelling subdivision. This zoning would permit lot sizes similar to those immediately adjacent to the subject lands while still being large enough to function properly on private waste disposal and private water supply systems.

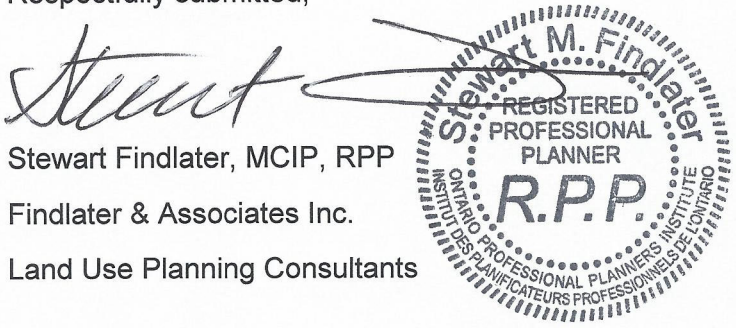
Summary

The owner of the subject lands wish to develop an eight (8) lot subdivision at 1045 Laplante Road. A pre-consultation meeting on this application was held on January 17, 2024. Since that time, the owners have taken into consideration the comments received at that meeting and are now prepared to move forward with the revised proposal. The number of lots has been increased from six (6) to eight (8) to be more compatible with the surrounding lot sizes, and the entrance road has been re-positioned as requested

Based on the analysis in this report, it is our opinion that the proposed Zoning By-Law Amendment is in the public interest and represents good land use planning. This opinion is supported by the following:

- Providing housing in an appropriate designated settlement area;
- The proposed development meets the requirements of the Provincial MDS
- The proposed development conforms with the relevant policies of the County of Norfolk Official Plan with regards to development within a designated settlement area
- the proposed development will have minimal, if any, adverse impacts on the surrounding agricultural lands.
- The Archaeological Assessment found "no material findings"
- The Hydrogeological Site Assessment concluded "the proposed eight unit lot configuration will be suitable for the subject site with enhanced septic system (Waterloo Biofilter Septic system" implementation of 10 metre setback from tree dripline and that this measure would result in no negative impact to the ANSI when implemented."
- Geotechnical Investigation Report concluded "potable water supply is available for private wells on the eight lots."

Respectfully submitted,

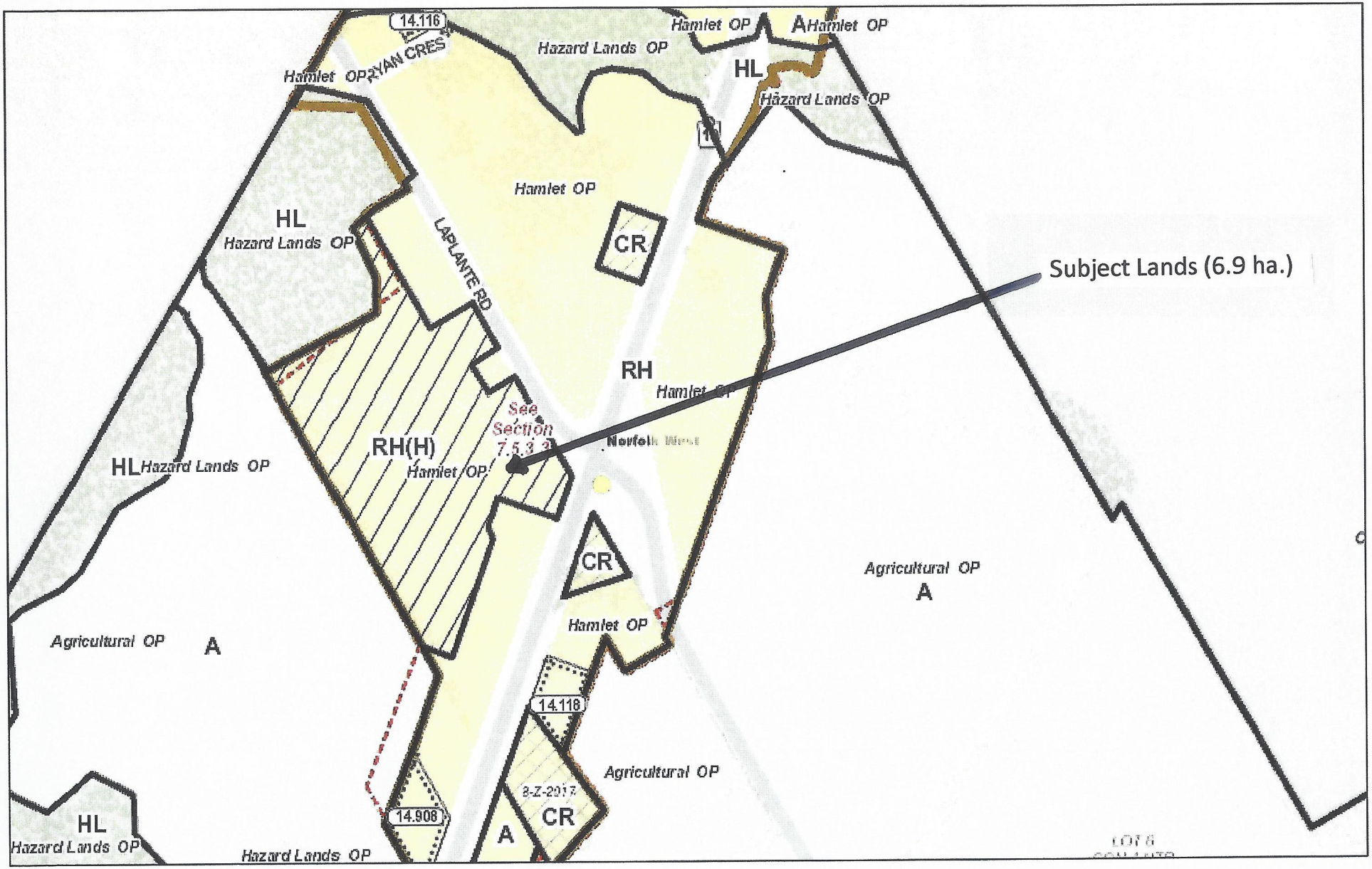


Stewart Findlater, MCIP, RPP

Findlater & Associates Inc.

Land Use Planning Consultants

MAP NORFOLK - Community Web Map



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Zones 1-Z-2014

- Zone
- Zone with Holding Provision
- Special Provisions

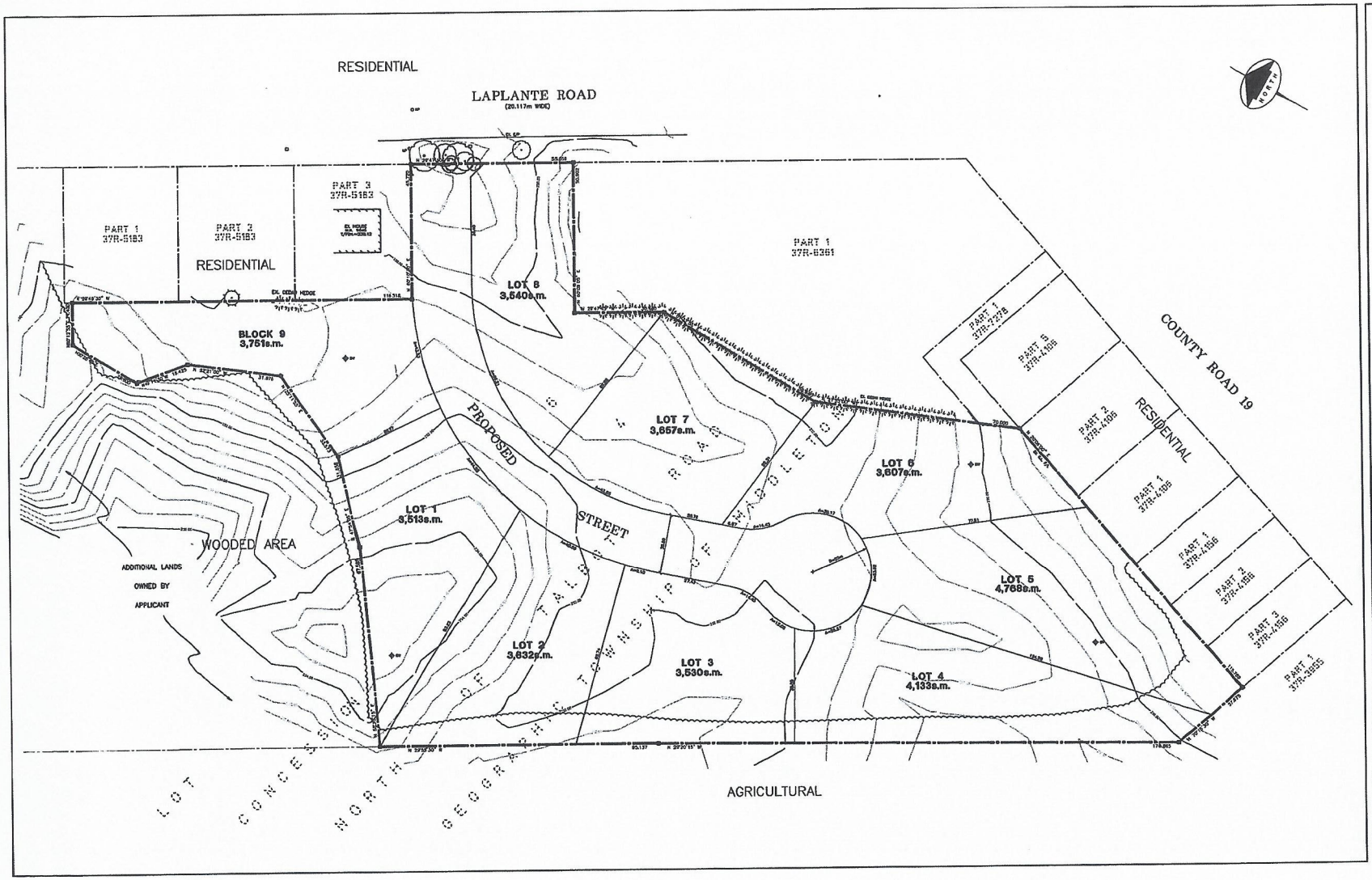
- Site Plan Control
- Lakeshore Erosion Prone Areas

Community Boundaries

- Urban Area Boundary
- Hamlet Area Boundary
- Resort Area Boundary
- Site Specific Policy Area

Norfolk GIS
© Norfolk County

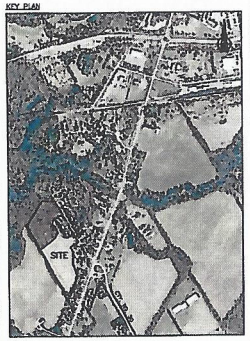
Appendix 1



DRAFT PLAN OF SUBDIVISION

PART OF LOT 5
CONCESSION 4
NORTH OF TALBOT ROAD
GEOGRAPHIC TOWNSHIP OF MIDDLETON
NORFOLK COUNTY

KEY PLAN



SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE — KEN MUSTEL, O.L.S.
JOHNT & SHAW LTD.

OWNER'S CERTIFICATE

I HEREBY AUTHORIZE J.H. COHOON ENGINEERING LTD. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE CORPORATION OF NORFOLK COUNTY FOR APPROVAL.

DATE — JOSE OLIVEIRA

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT

A – SEE PLAN	F – SEE PLAN
B – SEE PLAN	H – MUNICIPAL WATER
C – SEE PLAN	I – SANDY SILT
D – RESIDENTIAL	J – SEE PLAN
L – SEE PLAN	K – MUNICIPAL SEPTIC SYSTEMS
M – SEE PLAN	E – NONE

AREA SCHEDULE

LOTS 1-8	30,884s.m.
BLOCK 9	3,751s.m.
ROADS	5,355s.m.
TOTAL	39,990s.m.

J.H. COHOON ENGINEERING LIMITED
CONSULTING ENGINEERS

DESIGN	R.V.P.	JOB No. 16933
DRAWN	K.P.B.	
SCALE	1:500	DWG. No. DP1
DATE	NOV. 9/24	

Appendix 2

Pre-Consultation Meeting Notes

Date: January 17, 2024

Description of Proposal: The applicant proposes a 6-lot development.

Property Location: 1045 Laplante Road, Norfolk West

Roll Number: 3310541010055100000

Please read all the information in this document on the requirements for future development planning applications. As a result of the information shared at the pre-consultation meeting dated January 17, 2024, the following applications and qualified professional documents/reports are required as part of a complete application. Please include all listed items with the application to ensure a complete application. The County reserves the right to change, reduce or add requirements for a complete application, particularly if the submission does not match the proposal as reviewed during the pre-submission consultation meeting.

Please note that various fees are associated with each application, and there are also costs for qualified professionals retained to complete various documents/reports. All requirements identified are minimum and determined as of the date of the pre-consultation meeting, with the information available at that time. As the proposal proceeds, more information is made public, additional applications, studies, reports, etc., may be required. The information in this document is applicable for a maximum of one (1) year from the meeting date.

Before you submit your application, please contact the assigned Planner to confirm submission requirements and the applicable fee. Fees will not be accepted until the submission has been reviewed and confirmed by the Planning Department.

As part of a complete application, a signed version of these meeting notes is required.

Proponent / Agent Name	Signature	Date
Phil Ruggeri		
Joe Oliveira		

Attendance List

Proponent	Phil Ruggeri
Community Development – Planning and Agreement	Mohammad Alam, Supervisor Development Planning (Chair) Annette Helmig, Agreement Coordinator Andrew Wallace, Planner Olivia Davies, Planning Coordinator
Building and Zoning	Jonathan Weir, Building Inspector Roxanne Lambrecht, Zoning Administrator
Environment & Infrastructure Services – Development Engineering	Stephen Gradish, Development Technologist
Corporate Support Services – Realty Services	Alisha O'Brien, Corporate Services Generalist
Six Nations of the Grand River	Tanya Hill-Montour, Archaeology Supervisor

Table of Contents

Proposal Summary:

The applicant proposes to develop the property with 6 lots and a storm water management pond.

List of Application Requirements* and General Comments

Planning Department

Planning application(s) required to proceed	Required
Official Plan Amendment Application	
Zoning By-law Amendment Application	X
Site Plan Application	
Draft Plan of Subdivision Application	X

Draft Plan of Condominium Application		
Part Lot Control Application		
Consent / Severance Application		
Minor Variance Application		
Removal of Holding Application		
Temporary Use By-Law Application		
Other - Click here to enter text.		
Planning requirements for a complete application The items below are to be submitted as part of the identified Planning Application(s). ** electronic/PDF copies of all plans, studies and reports are required**	**Required at OPA/ Zoning Stage**	**Required at Site Plan Stage**
Agricultural Impact Assessment		
Air Treatment Control Study		
Archeological Assessment	X	
Contaminated Site Study		
Dust, Noise and Vibration Study		
Elevation Plan		
Environmental Impact Study – Species Survey	X	
Geotechnical Study	X	
Heritage Impact Assessment		
Hydrogeological Study	X	
Landscaping Plan	X	
Market Impact Analysis		
Minimum Distance Separation Schedule		
MOE D-Series Guidelines Analysis		
Neighbourhood Plan		
Odour Mitigation Plan		
Parking Assessment	X	
Planning Justification Report/Impact Analysis	X	
Photometrics (Lighting) Plan	X	
Record of Site Condition	X	
Restricted Land Use Screening Form		
Site Plan/Drawing	X	
Topographical Study	X	
Other:		
Additional Planning Requirements		**Required**
Development Agreement		X
Parkland Dedication/Cash-in-lieu of Parkland		X

Other:		

* Any changes to a proposal may necessitate changes to Planning Department submission requirements. Reports and studies are subject to peer review.

Summary of Fees, Forms, and other information pertaining to the Planning process can found by visiting https://www.norfolkcounty.ca/government/planning/

See Appendix A for additional information

Planning Comments

The proposal is for the removal of a holding provision on this Hamlet Residential lot which requires the submission of a Zoning By-law Amendment and a Draft Plan of Subdivision. The proposed subdivision, a submitted, would have 6 lots formed with detached dwellings on each, with a new road from Laplante Road, terminating in a cul-de-sac. Each proposed site is above the lot area required by the Zoning Provisions.

Whilst the proposal would likely meet planning needs, there are several issues in terms of surface water drainage and servicing which will be raised by Development Engineering which will likely have a significant impact on the proposed layout both in terms of the lots, lot sizes and road layout. Once you are in a position to address these engineering concerns, please come back to me with a revised scheme to discuss prior to submission for a pre-submission meeting to avert any planning concerns arising from revisions.

I think there is scope for smaller lot sizes given the prevailing lot sizes surrounding the subject lands are no more than 2000 sqm so we could look at a reduced lot size for this development. However, this will need to be balanced with any requirements/recommended lot sizes which emerge from the hydrogeological study to ensure that the lots can accommodate adequate private servicing. I think there will need to be a significant redesign of the site and I am happy to work with you on this to achieve a good end result. It would also be preferred if the proposed new road aligned with Ryan Crescent, even though this is now only in use as a private driveway.

I would also like you to confirm which, if any, trees of the significant woodlands you would need to remove as these are protected and any significant removal may trigger an Official Plan Amendment application. You also mentioned in our telephone call that the Species survey/EIS you have had done is from around 2018. Whilst there is no specific lapsing to these studies, they must provide a true picture of the species present given the potential for species at risk on the wider site. Perhaps a minor update to the survey could be undertaken by those who did the initial study rather than a totally new survey.

As raised by the Six Nations of the Grand River representative during the meeting, an archaeological report will be a requirement of a complete application. Information will be provided on the information necessary in this study.

Endangered and threatened species and their habitat are protected under the provinces Endangered Species Act, 2007 (ESA), O. Reg. 242/08 & O. Reg. 830/21. The Act prohibits development or site alteration within areas of significant habitat for endangered or threatened species without demonstrating that no negative impacts will occur. The Ministry of Environment, Conservation and Parks provides the service of responding to species at risk information requests and project screenings. The proponent is responsible for discussing the proposed activity and having their project screened with MECP (Ministry of Environment, Conservation and Parks).

Please be advised that it is the owner's responsibility to be aware of and comply with all relevant federal or provincial legislation, municipal by-laws, or other agency approvals.

Assigned Planner:

Andrew Wallace, Planner
Extension 1059
Andrew.wallace@norfolkcounty.ca

Development Engineering

Development Engineering – 1045 Laplante Road, Tillsonburg (15 Single detached dwelling)

Plan of Subdivision (NCDC Section 4.1.01 (A)

Development Engineering requirements to proceed The below requirements are to be submitted as part of the Formal Development Planning application.	**Required at Draft Plan Stage**	**Required at Plan of Subdivision Stage (Detailed Engineering)**	**Potentially Required (See Notes Section)**
General Requirements			
Draft Plan	X[11]	X	
Concept Plan	X	X	
Area Rough Grading Plan			X[37]
Master Grading Plan		X[23]	
Lot Grading Plan		X[24]	
Siltation and Erosion Control Plan		X[24]	
General Plan of Services		X[24]	
Plan and Profile Drawings		X[25]	

Composite Utility Plan		X[26]	
Geotechnical Report			X[38]
Functional Servicing Report	X[13]	X	
Consolidated Linear Infrastructure approval for Sanitary and/or Storm sewer Extension or Alteration		X[27]	
Storm Water Servicing Requirements – Section 7.0 and Section 8 Norfolk County Design Criteria and ISMP Section 4.0			
Storm Water Management Design Report (including calculations)	X[14]	X[28]	
Storm Water Drainage Plan		X[29]	
Storm Sewer Design Sheet		X[30]	
Establish/Confirm Legal and Adequate Outlet	X[15, 16]	X[31]	
Anticipated Flow/Analysis to Receiving Collection System		X	
Extension of Storm Water Mainline		X	
Easement and/or Block Registration	X[17]	X	
Municipal Drainage	X[18]	X[33, 34]	
Transportation Requirements – Section 6.0 Norfolk County Design Criteria, ISMP Section 5.0, Section 6.0 and Appendix J			
Traffic Impact Study	X[19]	X	
Street Signage/Traffic Control Plan		X[35]	
Improvements to Existing Roads & Sidewalk (urbanization, pavement structure, widening sidewalk replacement, upgrades, extension and accessibility)	X[20]	X[36]	

General Notes:

1. Securities in the amount of 100% will be required in the form of a Security Schedule ‘H’ Template. 100% security will be required at the time of registration. A copy of this template is available upon request.
2. All reports and drawings are to be signed and stamped by a Professional Engineer (P. Eng) and adhere to Norfolk County’s Design Criteria and Integrated Sustainable Master Plan (ISMP).
3. All Recommendations from all reports are to be implemented into the design, at the developer’s expense
4. All applicable permits and inspections are to be issued by Public Works.
5. As per Norfolk County By-Law 2016-32, only one entrance is permitted per residential lot.
6. All entrances are to be shown on the plans and are to be paved from back of curb (or edge of road) to property line
7. Norfolk County’s Plan of Subdivision Criteria for submission of engineering drawings (Section 4.1.01(A) of the design criteria) is to be adhered to

8. Any required infrastructure to facilitate the development will be at the developer's expense.
9. All reports and studies may be subject to peer review.
10. A Condition Assessment of LaPlante Road from Highway 19 to extent of subdivision is to be completed. This assessment can be included in the Traffic Impact Study, or it can be provided as a separate report.

Required at Zoning By-law Amendment and Draft Plan of Subdivision Stage:

11. A Draft Plan is required.
    a. At this time Development Engineering does not support the current road configuration. The primary concern is the location of Block A (assumed to be a future SWM Area) and the fact it is landlocked without access to the ROW. It the recommended by Development Engineering that the ROW be redesigned to the opposite side of the parcel frontage along Laplante Road. This way Block A would have legal Frontage.

12. The following reports/studies will be required at time of Draft Plan Submission:

    a. Concept Plan;

    b. Functional Servicing Report (as per Norfolk County Design Criteria);

    c. Storm Water Management Report (as per Norfolk County Design Criteria);

    d. Traffic Impact Study (as per ISMP Appendix J – TIS Guidelines);

13. A Functional Servicing Report is to be completed as per Norfolk County Design Criteria Section 3.
    a. When it comes to Well and Septic designs, the FSR shall reference the D-5-4 and D-5-5 Studies to confirm the lots are adequately sized to support the proposed development and servicing.
    b. Appropriate Hydrogeological studies/reports should also be referenced in the FSR confirming private well and septic servicing can be achieved.
14. Stormwater Management Report is to be completed as per Norfolk County Design Criteria Section 7. With respect to the proposed SWM strategy Development Engineering have the following comments:
    a. Development Engineering has concerns with the identified configuration of the SWM (pond) area located in Block A. In the current proposal this area is landlocked. This will not be permitted. Norfolk County must have direct access to the Block for maintenance. As suggested above it is recommended that the proposed road be relocated to create legal frontage for the SWM Block.
    b. The SWM area appears to be an odd shape property squeezed up against existing backyards where access may be difficult for maintenance. Norfolk County requires clear access roads to all inlets and outlets of the SWM area.
    c. Norfolk County will be looking for both Quality and Quantity control in the design of Stormwater Management. The ultimate requirements will be determined in consultation with LPRCA.
    d. All Stormwater Management Facility landscaping shall comply with Section 7.5.00 of Norfolk County Design Criteria.
15. Confirm Legal and Adequate outlet. From initial review it appears this site is tributary to 2 Municipal Drains (D'Hondt and Hessler). Through the SWM report it shall be determined if all Storm water can be self-contained on site and whether either of the drains are to be used OR whether the existing drains will be considered a restricted outlet.
16. Specific to the Zoning By-law Amendment – Comparing the concept plan and Norfolk County GIS mapping it has been recognized that the SWM block borders lands designated as Hazards Lands.

The applicant must be aware that installation of an outlet through Hazard lands may not be a permitted use.

17. All proposed Easements and/or Blocks are to be identified on the Draft Plan.
18. As this property drains into the "D'Hondt" and "Hessler" Municipal Drains. Prior to any future submission of a Planning application the Developer MUST consult with Norfolk County Drainage Department. The developer must be aware that prior to acceptance of a complete submission Development Engineering will require confirmation from the Drainage Department that discussions have been started to discuss how the overall SWM strategy will impact the existing Drains. Prior to approval of Draft Plan, Development Engineering will require confirmation from the Drainage department that the concept is in general compliance with the Drainage Act.

Any changes to the Municipal Drain or drainage area due to Intensification or increased flows will require Drainage Act compliance.

For questions or concerns pertaining to the Drainage Act please contact Bill Mayes, Drainage Superintendent, Norfolk County, bill.mayes@norfolkcounty.ca . The following is a concern to be aware of:

- A Drainage Act Section 65 report is required to address connections and increase in runoff to existing drain. The Engineer will address existing assessments, increase in runoff and confirm existing capacity of Drain. If a Major Improvement report is initiated a Section 65 report would not be required and can be addressed under one report.

19. As per Norfolk County's Integrated Sustainable Master Plan (ISMP) – Appendix J: Traffic Impact Study (TIS) Guidelines, a Traffic Impact Study is required with every planning application.

It appears a TIS was completed in 2019. Development Engineering requires that a Traffic Impact Study is current within 2years of application. A review will need to be done by the Engineer to ensure all data reflects current conditions. A new or revised TIS will be required as part of the Draft Plan application.

20. All Cul-de-sac's shall be designed and constructed as per Section 6.3.04 of Norfolk County Design Criteria. The following must be considered:
    a. It should be noted that Cul-de-sacs should be avoided. As stated in Section 6.3.04 "Subdivision Street pattern designs should try to avoid the use of cul-de-sacs". Development Engineering will be looking for justification that the Developer has investigated everything to avoid Cul-de-sac's.
    b. As stated in Section 6.3.04, Cul-de-sac for rural roadside environments shall conform to OPSD-500.01. In addition, Development Engineering will be looking for the Engineer to confirm that fire trucks and garbage collection vehicles can adequately operate within the road design including any bulb construction. It must also be confirmed if any parking restrictions would be required to ensure turning radius are maintained.

Required at Detailed Engineering review for Plan of Subdivision Stage:

21. Norfolk County's Plan of Subdivision Criteria for submission of engineering drawings (Section 4.1.01(A) of the design criteria) is to be adhered to.
22. All reports and studies above are to be submitted again including any required amendments. All Recommendations from all reports are to be implemented into the design, at the developer's expense
23. A master grading plan will be required. This plan shows the proposed grading for the overall development.

24. Lot Grading Plan, Siltation and Erosion Control Plan, and General Plan of Services (Domestic well and Septic system locations) drawing can be shown on one engineering plan as long as it's legible for review.
25. Plan and Profile drawings will be required as per Section 4.4.03.
26. Composite Utility Plan -This plan will identify the proposed Hydro servicing design as well as all criteria in Section 4.4.07 of Norfolk County Design Criteria.
27. All Consolidate Linear Infrastructure – Environmental Compliance Approval (CLI-ECA) criteria are to be followed including completion of all permits required for any proposed Stormwater Management Pond facilities and new Storm sewers.
28. Stormwater Management Report is to be completed as per Norfolk County Design Criteria Section 7
29. A Storm Drainage plan is required. This plan must include all tributary areas outside of the boundaries of the subject property to accurately show the overall Drainage area.
30. Storm sewer design sheets will be required if Storm sewers are designed.
31. Confirm Legal and Adequate outlet. From initial review it appears this site is tributary to 2 Municipal Drains (D'Hondt and Hessler). Through the SWM report it shall be determined if all Storm water can be self-contained on site and whether either of the drains are to be used OR whether the existing drains will be considered a restricted outlet.
32. Anticipated Flow to the receiving system.
33. Specific to Municipal Drains, all comments made above for Draft Plan will require further review at detailed Engineering review. Final approval will be dependant on approval from Norfolk County Drainage Department.
34. Drain reports may need to be amended to address the changes as a result of this development proposal. The extent of which will be highly dependent on the final development servicing. Any or all changes to the drain or drain report will be the requirement of the proponent. Furthermore the design:

    a. Will need an apportionment of the existing drain maintenance assessments.

    b. Will need an engineer report to address change in land use/increase in runoff.

    c. May need an engineer report for any drain alterations if required.

The drain will accommodate drainage from the development but to the extent of the existing conditions which would be considered a limited outlet. The drain is designed to an agricultural drain design standard which considered this property as farmland. Any additional runoff will need to be managed on-site or alterations to the drain through an engineer report under the *Drainage Act*.

35. A Street Signage and Traffic Control Plan will be required. The developer should be aware that Norfolk County no longer supplies Street signs for developments. The developer is responsible for sourcing all signs defined in Norfolk County Design Criteria Section 12.
36. Additional street lighting along Laplante Road may be required as per Norfolk County Design Criteria. The number of streetlights within the subdivision limits must be determined by a Photometric Plan prepared by a lighting consultant.

Potentially Required Notes:

37. Area Rough Grading Plan is required where earth cuts and fills are in excess of 0.5m.
38. A Geotechnical Report will be required if infiltration galleries are proposed for the Stormwater Management design.

    With respect to the existing area on this site designated as Hazard Lands, Development Engineering and the Drainage Department would like to know "WHO" will own those lands in the future? The SWM Block and the Hazard Lands are all identified as Block A. Is the Developer retaining anything OR will this be something he is looking to off load to the County?

Stephen Gradish
Development Technologist
Stephen.Gradish@norfolkcounty.ca

Development Agreement

Performance securities are required by the County to secure internal and external development works, a recommended condition for your planning application approval is to enter a subdivision agreement with the County. I will also recommend a holding be placed on your property until the registration of this agreement. The final subdivision plan that has been preapproval by Registry Office and the subdivision agreement will be registered on title to the subject lands, at the owner's expense. The additional requirements for an agreement could include, but are not limited to the following:

- Engineering drawing review
- Engineer's schedule of costs for the works
- Clearance letter and supporting documentation to support condition clearance
- User fees and performance securities
- Current property identification number (PIN printout)
- Owner's commercial general liability insurance certificate
- Professional liability insurance certificate
- Postponement of interest
- Transfers and / or transfer easements along with registered reference plan

All the best with your development.

Annette Helmig
Agreement and Development Coordinator
Annette.Helmig@norfolkcounty.ca

Building

Zoning Administrator:

Laplante Road Precon

Vacant land zoned RH(H)

- Holding provision to be removed prior to applying for building permits
- RH (residential hamlet) zone for 6 lots, min lot size in an RH zone is 0.4 hectares, min frontage on a lot in an RH zone is 30m for interior and corner lots.
- Refer to section 5.7 of our RH zoning bylaw for the zoning provisions which state how far a dwelling must be to property lines, refer to our bylaw on line 1-Z-2014
- Lot 1 front yard would be shortest distance abutting a street, therefore Laplante road would be front lot line for purposing of the zoning bylaw
- Are there any livestock facilities close by in neighboring counties?

Roxanne Lambrecht
Zoning Administrator

Extension 1839
Roxanne.Lambrecht@norfolkcounty.ca

Building Inspector:

The proposed construction is considered a Residential Group C type occupancy as defined by the Ontario Building Code (OBC). You will need to retain the services of a qualified individual with BCIN House, HVAC House, or Architect or a Professional Engineer to complete the design documentation for this application.
If any of the proposed dwellings include an accessory dwelling unit this must be included as part of the design documents at time of building permit application. Any accessory dwelling units proposed after construction begins will require a separate building permit.
The geotechnical investigation report does state that excavations should be examined by geotechnical personnel from PML prior to pouring concrete.
The hydrogeological report does conclude that lots less than 0.52ha require an advanced septic system.

A qualified individual with BCIN qualifications for On-Site Sewage Systems will be required to complete the design for any proposed new septic system. The septic must be a Class 4 or an advanced system with all required clearances from property lines, structures, wells on the property including wells on neighboring properties and the water table.
No Ontario Building Code review has been completed at this time and will be done at permit application stage.

MORE THAN 2 DWELLINGS-PLUMBING

The Ontario Building Code (OBC) 7.6.3.4 requires a review of water service connection size at the time of application for projects connected to a water system with more than one dwelling unit. To help with this the Building Department has created an excel spread sheet. This is to be included with at time building permit application.

FIRE FIGHTING REQUIREMENTS PART 9 BLDGS

OBC Article 9.10.20.3. will require fire department access to buildings by means of a street, private roadway or yard taking into account connection with public thoroughfares, weight of firefighting equipment, width of roadway, radius of curves, overhead clearance, location of fire hydrants, location of fire department connections and vehicular parking.

Items for Building Permit

“New Residential” “Septic Systems” “Applicable Law Checklist” Step by Step Guides have been attached to the minutes herein, they contain information on drawing requirements, designers, forms, contact information for Building Department etc.
If you have any questions on the building permit process or plans required, please check out our website www.norfolkcounty.ca/business/building or call 519-426-5870 ext. 6016

Jonathan Weir

Building Inspector
Extension 1832
jonathan.weir@norfolkcounty.ca

Corporate Support Services – Realty Services

The County will require a postponement of any Charge(s)/Mortgage(s) (if any) on title to the County's Development Agreement. We recommend that you connect with your Lender(s) (if any) and/or your solicitors as early in the process as possible to avoid any delays.

Alisha O'Brien, Corporate Services
Generalist, Realty Services
realty.services@norfolkcounty.ca

Corporate Support Services - Accessibility for Ontarians with Disabilities Act

No comments at this time from Accessibility.

Sam McFarlane
Manager, Accessibility and Special Projects
Corporate Support Services
519-426-5870 x. 8099 Sam.McFarlane@norfolkcounty.ca

Fire Department

Norfolk County Fire Department has the following comment(s) for this application:

- Ensure that adequate turn around facilities are provided to accomodate fire department apparatus
- If on-street parking is proposed, ensure that the road is an adequate width to accommodate fire department apparatus and parked vehicles

Katie Ballantyne
Community Safety Officer
Katie. Ballantyne@norfolkcounty.ca

Additional Agency Comments & Requirements

Oxford County

Please be advised that Oxford County has no comments respecting the proposed development.

Eric Gilbert

Manager of Development Planning, Oxford County

Egilbert@oxfordcounty.ca

Six Nations of the Grand River

Six Nations of the Grand River will require that a Stage One Archaeological Assessment be completed for this development.

Tanya Hill-Montour
Archaeological Supervisor
tanyahill-montour@sixnations.ca

Appendix A: Planning Reference Materials

Following is a summary of some land use planning reference materials. It is the requirement of the applicant to ensure compliance with applicable legislation, policies and regulations.

Provincial Policy Statement, 2020

https://www.ontario.ca/page/provincial-policy-statement-2020

Norfolk County Official Plan
https://www.norfolkcounty.ca/government/planning/official-plan/

Section 9.6.1 outlines requirements in relation to requests to amend the Official Plan.

Section 9.6.2 outlines requirements in relation to requests to amend the Zoning By-law.

It is the responsibility of the proponent to review and ensure relevant Official Plan policies are addressed in any future development application.

Norfolk County Zoning By-Law 1-Z-2014
https://www.norfolkcounty.ca/government/planning/new-zoning-by-law/

The provisions of the Norfolk County Zoning By-Law shall apply to all lands within the boundaries of Norfolk County. No land, building or structure shall be used, erected, or altered in whole or in part except in conformity with the provisions of this By-Law. No land, building or structure shall be used or occupied except for uses that are specifically identified in the By-Law as permitted uses by the relevant zoning category.

It is the responsibility of the proponent to review and ensure relevant Zoning By-law provisions are addressed in any future development application

REQUIRED INFORMATION

Development Name and Phase_____

Property Legal Description_____

Proposed Street Names_____

Roll Number_____

PIN Number_____

Type and Number of Units

Single Detached_____

Semi-Detached_____

Duplex _____

Triplex _____

Four-plex_____

Street Townhouse_____

Stacked Townhouse_____

Apartment_____

Transfer Easements Block Number and Purpose_____

Transfer Block Number and Purpose_____

Geotechnical Report prepared for Lands	YES	NO	UNKNOWN
Lands are Within the Source Water Protection Area	YES	NO	UNKNOWN
Lands Contain any Contaminated or Impacted Soil	YES	NO	UNKNOWN
Lands Contain any Natural Watercourse	YES	NO	UNKNOWN
Lands Contain any Wetlands	YES	NO	UNKNOWN
Lands Contain any Archaeological Sites	YES	NO	UNKNOWN
Lands Contain an Existing Well and or Septic Field	YES	NO	UNKNOWN
Species at Risk Branch MECP Screening	YES	NO	UNKNOWN
Lands Contain any Endangered Species	YES	NO	UNKNOWN

OWNER INFORMATION

NAME AND CONTACT_____

ADDRESS WITH POSTAL CODE_____

PHONE NUMBER_____

EMAIL _____

AGENT INFORMATION

NAME AND CONTACT_____

ADDRESS WITH POSTAL CODE_____

PHONE NUMBER_____

EMAIL _____

ENGINEER INFORMATION

NAME AND CONTACT_____

ADDRESS WITH POSTAL CODE_____

PHONE NUMBER_____

EMAIL _____

LAWYER INFORMATION

NAME AND CONTACT_____

ADDRESS WITH POSTAL CODE_____

PHONE NUMBER_____

EMAIL _____

SURVEYOR INFORMATION

NAME AND CONTACT_____

ADDRESS WITH POSTAL CODE_____

PHONE NUMBER_____

EMAIL _____

INSURANCE PROVIDER INFORMATION

NAME AND CONTACT_____

ADDRESS WITH POSTAL CODE_____

PHONE NUMBER_____

EMAIL_____

FINANCIAL INSTITUTION INFORMATION (IF APPLICABLE)

NAME AND CONTACT_____

ADDRESS WITH POSTAL CODE_____

PHONE NUMBER_____

EMAIL_____

MORTGAGEE INFORMATION (IF APPLICABLE)

NAME AND CONTACT_____

ADDRESS WITH POSTAL CODE_____

PHONE NUMBER_____

EMAIL _____

SPECIES AT RISK SCREENING

The Ontario Endangered Species Act inquiries and Species at Risk screening are now handled by the Ministry of the Environment, Conservation and Parks, specifically the "Species at Risk Branch" and the new e-mail address for handling these inquiries is now SAROntario@ontario.ca.

TRANSFERS, EASEMENTS AND POSTPONEMENT OF INTEREST

The owner acknowledges and agrees that, it is their solicitor's responsibility on behalf of the owner for the registration of all transfer(s) of land to the County, free and clear of any charges or encumbrances, and/or transfer(s) of easement in favour of the County and/or utilities at no cost to the County. In addition, the owner further acknowledges and agrees that it is their solicitor's responsibility on behalf of the owner for the registration of postponements of any charges to the County's agreements.

INSURANCE CERTIFICATES

Prior to the execution of the development agreement, the owner shall at their expense obtain and keep in force, during the term of this development agreement, commercial general liability insurance coverage satisfactory to the County. The owner further acknowledges and agrees that he/she has authorized the County to discuss with their insurance provider the specific insurance requirements of the County for agreement purposes. In addition, the County will require any professionals hired to carry professional liability insurance to provide coverage for acts, errors and omissions arising from their professional services performed.

OWNER'S AUTHORIZATION

I/We am/are the registered owner(s) of the lands that is the subject of this development agreement.

I/We authorize our agent to provide information on my/our behalf and to provide any of my/our personal information necessary for the processing of this agreement. Moreover, this shall be your good and sufficient authorization for so doing.

I/We authorize the Agreement Administrator to provide and receive information on my/our behalf in connection to the insurance coverage, letter of credit and agreement registration of my/our development.

I/We acknowledge that if there are any new charges or mortgage holders on the property they will be added to the development agreement and will be required to postpone their interest on the property to the County's development conformity interest.

Owner Signature Date

To start your agreement, please return the required supporting information and fees along with the first three pages of this document completed and signed. Provide your payments by the mail or courier to the address below or drop off at ServiceNorfolk customer service desk on the first floor 185 Robinson Street, Simcoe ON N3Y 5L6 Monday to Friday from 9 am to 4 pm. Please make your cheque payable to the Corporation of Norfolk County. If time is of the essence please provide a certified cheque, otherwise it will take three weeks to clear our financial institution. If paying by credit card please contact ServiceNorfolk at 519 426-5870 Ext. 4636.

CONTACT FOR FURTHER INFORMATION AND QUESTIONS

Annette Helmig, Agreement and Development Coordinator
Norfolk County, Community Development Division, Planning Department, Agreement Services
185 Robinson Street Suite 200, Simcoe ON N3Y 5L6
226.777.1445
annette.helmig@norfolkcounty.ca

The information submitted on this form is collected under the authority of the *Freedom of Information and Protection of Privacy Act* (FIPPA) and *Municipal Freedom of Information and Protection of Privacy Act* (MFIPPA) for Norfolk County employees to use for the purpose of preparing and registering a development agreement. Questions about the collection of personal information through this form may be directed to the Agreement and Development Coordinator or Information and Privacy Coordinator, Corporation of Norfolk County, 50 Colborne Street South, Simcoe ON N3Y 4H3.

KICK OFF MEETING TO DISCUSS YOUR DEVELOPMENT IS ENCOURAGED

Appropriate internal and external agencies will be invited to discuss relevant draft plan of subdivision conditions

Complete set of preliminary engineering drawings for review prior to meeting

DOCUMENTATION AND FEES REQUIRED FOR PRESERVICING AGREEMENT

Complete set of engineering drawings for detailed design review and acceptance including cost estimate, supporting reports, studies and Ministry approvals

Phasing plan

Street tree planting plan

Owner's agreement authorization

Postponement of interest from mortgagee / chargee to preservicing (if applicable)

Current parcel register (property identifier or PIN printout)

Owner's commercial general liability certificate of insurance

Construction estimates (100% for external works and 100% to secure site or 10% of total site)

Letter of credit or certified cheque for preservicing performance securities

User fee (according to the By-Law in effect at the time that payment is made) (if time is of the essence a certified cheque is requested)

- $2,621 for preparation of the preservicing agreement

DOCUMENTATION AND FEES REQUIRED FOR SUBDIVISION AGREEMENT

Items identified for preservicing agreement

Owner and solicitor's approval to proceed with draft agreement

Final reference plan for any transfer easements and lands to be transferred

Final preapproved 37M Plan for signature and deposit

Letter from owner requesting holding (H) symbol be removed from the subject lands

Clearance letter matrix and supporting documentation demonstrating clearance

Postponement of interest from mortgagee / chargee to agreement (if applicable)

Professional liability insurance for surveyor and / or engineer

Hydro One approval to proceed

Construction estimates (100% for uncompleted works and 10% for completed works)

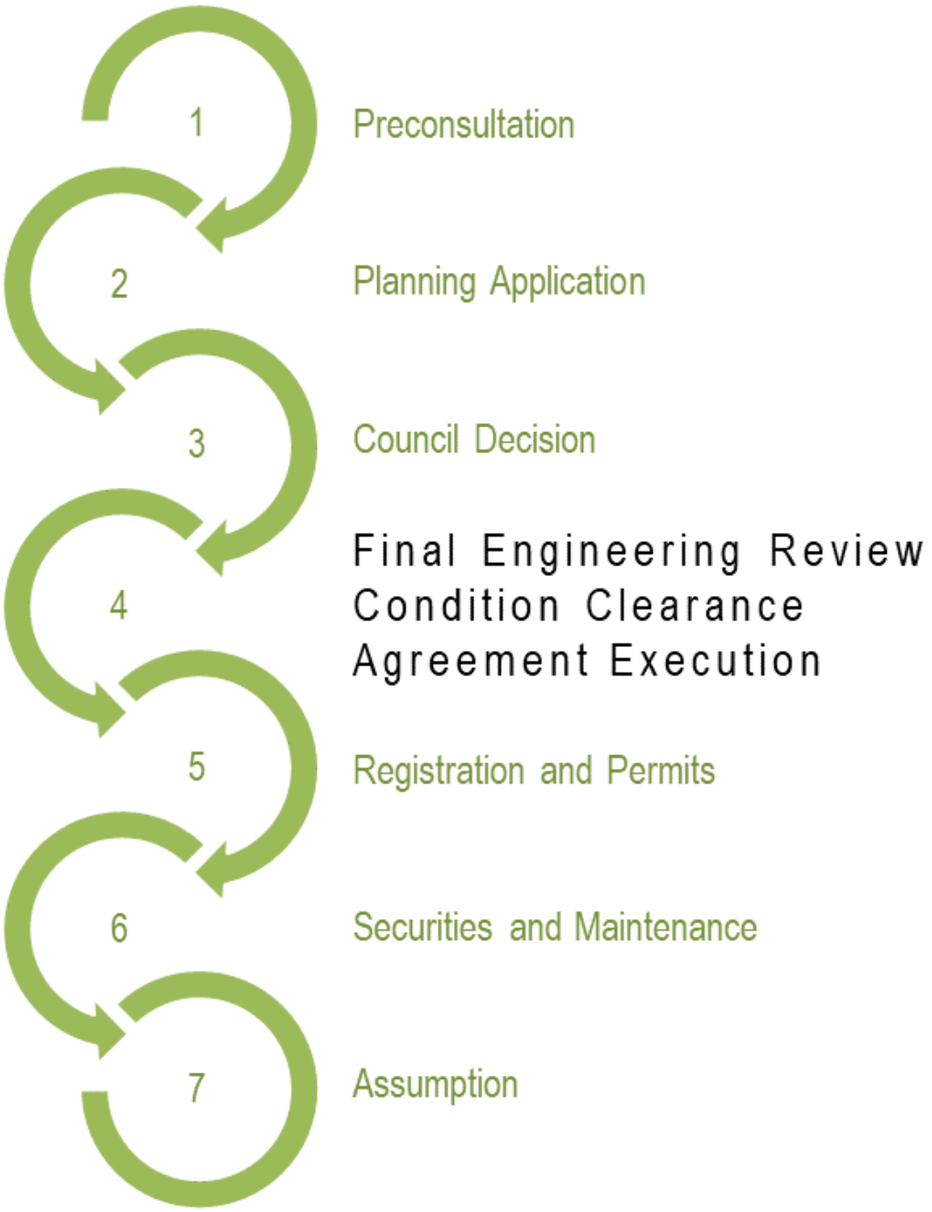
Letter of credit or certified cheque for subdivision performance securities

Current property taxes paid

User fees (according to the By-Law in effect at the time that payment is made) (if time is of the essence a certified cheque is requested)

- $4,902 for preparation of the subdivision agreement
- $971 to remove the holding from the zoning on the property (if applicable)
- $470 for financial administration of this agreement
- $570 per tree cash-in-lieu of trees
- $1,818 recirculation - engineering review for second and subsequent submission
- 5% land appraisal cash-in-lieu of parkland as per consolidated by-law 2016-126 (if applicable)
- 3% of developers cost for inspection / acceptance / assumption

Development Approval Stages



Planning Department – Agreement Administration
Community Development Division
185 Robinson Street Suite 200, Simcoe Ontario Canada N3Y 5L6
site.plan.agreements@norfolkcounty.ca

INSURANCE REQUIREMENTS

For the Owner Entering Into a Development Agreement

Prior to the execution of the Agreement, the Owner shall provide, at its expense, obtain and keep in force, until the end of the maintenance / guarantee period and return of all securities, a certificate of insurance to Norfolk County evidencing the insurance coverages required. The insurance certificate shall be in the Owner's name as shown on the property identification number.

The issuance of such insurance policies as described in a certificate of insurance shall not be construed as relieving the Owner from responsibility for any claims in excess of such policy or policies, if any, for which the Owner may be held responsible. Such insurance policy or policies shall be in a form acceptable to Norfolk County and, without limiting the generality of the foregoing, shall provide:

1. A **Commercial General Liability Policy** with a limit of not less than five million dollars ($5,000,000.00) per occurrence; and include the following coverages:

    a. The Corporation of Norfolk County 50 Colborne Street South, Simcoe ON N3Y 4H3 named as an additional insured

    b. Non-owned Automobile coverage with a limit of at least two million dollars ($2,000,000.00) per occurrence including contractual non-owned coverage

    c. Cross Liability & Severability of Interest in respect of the named insured

    d. Products and Completed Operations

    e. Premises & Operations Liability

    f. Contingent Employers Liability

    g. Owners & Contractors Protective

    h. Blanket Contractual

    i. Thirty (30) days prior written notice of any alteration, cancellation or change in policy terms, which reduces coverage, and any such notice of cancellation shall be given in writing to Norfolk County

Norfolk County reserves the right to request such higher limits of insurance or other types of policies appropriate to the Agreement as Norfolk County may reasonably require from time to time.

Proof of Insurance

The Owner shall provide the certificate of insurance or certified copies of the above referred to policies, satisfactory to Norfolk County. Provided that if a certificate is provided, all requirements as above set forth must be shown on the said certificate and notwithstanding the provision of any certificate, Norfolk County may require that the Owner provide a certified copy of the policy, if required. Such certificates or policies shall be provided prior to the commencement of any work.

The Owner shall further provide evidence of the continuance of said insurance be filed at each policy renewal date for the duration of the Agreement until the end of maintenance period. In the event any renewal premium is not paid, Norfolk County, in order to prevent the lapse of such policy, may pay the renewal premium or premiums, and the Owner agrees to reimburse Norfolk County for the cost of such renewals within ten (10) days of the account therefore being rendered by Norfolk County. Further, prior to the commencement of the Agreement, the Owner shall cause its insurance broker to confirm in writing that it will accept any request from Norfolk County to renew such insurance and will extend the term of any such insurance policy held by the Owner in accordance with such request upon payment of the renewal premium(s) by Norfolk County.

Notice

Every party to the Agreement agrees to immediately notify all other parties of any occurrence, incident, or event, which may reasonably be expected to expose any of the parties to liability of any kind in relation to the development of the Lands.

Planning Department – Agreement Administration
Community Development Division
185 Robinson Street Suite 200, Simcoe Ontario Canada N3Y 5L6
site.plan.agreements@norfolkcounty.ca

INSURANCE REQUIREMENTS

For the Engineer and/or Surveyor of the Owner Entering Into a Development Agreement

Prior to the execution of the Agreement, the Owner shall provide, a certificate of insurance to Norfolk County evidencing the insurance coverages required their Engineer and / or Surveyor who have prepared the Plans subject to the Agreement.

The issuance of such insurance policies as described in a certificate of insurance shall not be construed as relieving the Owner from responsibility for any claims in excess of such policy or policies, if any, for which the Owner may be held responsible. Such insurance policy or policies shall be in a form acceptable to Norfolk County and, without limiting the generality of the foregoing, shall be provided.

The Owner shall ensure that any Professionals hired shall provide for coverage for acts, errors and omissions arising from their professional services performed under the Agreement. The policy shall be underwritten by an insurer licensed to conduct business in the Province of Ontario and acceptable to Norfolk County. The Engineer and/or Surveyor shall provide:

1. A **Professional Liability** insurance certificate in the amount not less than two million dollars ($2,000,000) per claim, with a four million dollars ($4,000,000) aggregate limit

    a. The policy self-insured retention or deductible shall not exceed one hundred thousand dollars ($100,000) per claim

    b. The policy shall be renewed for two years after contract termination

    c. A certificate of insurance evidencing renewal is to be provided each and every year

    d. If the policy is to be cancelled or non-renewed for any reason, 30 day notice of said cancellation or non-renewal must be provided to Norfolk County

Norfolk County has the right to request that an extended reporting endorsement be purchased by the Owner's professional at the Owner's professional's sole expense. Norfolk County reserves the right to request such higher limits of insurance or other types of policies appropriate to the Agreement as Norfolk County may reasonably require from time to time.

APPLICABLE LAW CHECKLIST

The Building Code Act prohibits the issuance of a building permit if the proposed construction or demolition will contravene an applicable law as defined by the Building Code. The questions below will help you to determine if an applicable law applies to your project. No timeframe for building permit review can be established until all required applicable law approvals are completed and the approval documents are submitted to the Building Division.

If the answer is **YES** to any question, the relevant approval documents must be submitted with this permit application. Where any required approval has **NOT** been obtained, the agencies listed on the back of this form must be contacted to obtain approval, and the declaration on the bottom of this form must state accordingly.

Property Address: _____ **Permit Number** (office use)_____

Zoning By-Laws – *Norfolk County Planning Department*	YES	NO
Is/was relief required to permit a minor zoning variance in your proposal?		
Is/was rezoning required to permit the proposed building or land use?		
Is a land division or subdivision required and not yet fully completed?		
Are municipal services required but not yet completed or available?		

Planning Approval - *Norfolk County Planning Department*	YES	NO
Is this property regulated by Site Plan Control under Section 41 of the Planning Act?		

Heritage - N*orfolk County Heritage and Culture Department*	YES	NO
Are you demolishing a building that is listed on the County's heritage inventory?		
Is the building designated or in the process of being designated?		
Is the property located in a heritage district or study area?		

Construction and Fill Permits – *Long Point Regional or Grand River Conservation Authority*	YES	NO
Is the property located within a regulated area (i.e. abutting a ravine, watercourse, wetland, or shoreline)?		

Building and Land Use Permits - *Ontario Ministry of Transportation*	YES	NO
Is the property within 45m of a highway or 180 m from any highway intersection?		
Is the property within 395m of a controlled highway intersection? (applies to Sign Permits)		
Is this a major traffic generating project located within 800m of a highway?		

Clean Water Act – *Public Works*	YES	NO
Is the property located within a Source Water Protection regulated area?		
If yes: does a Water Source Protection Plan restrict the land use you are proposing? (s.59 screening form may be required)		

Community Development Division- Building Department
185 Robinson Street, Suite 200, Simcoe, ON N3Y 5L6 • 519-426-5870 Ext. 6016

Agriculture and Farms - *Ontario Ministry of Agriculture and Food*	YES	NO
Is this a farm building that will house animals or manure?		
Is this a milk processing plant?		

Crown Lands Work Permit – *Ministry of Natural Resources*	YES	NO
Are you proposing to construct or place a structure or combination of structures that are in physical contact with more than 15 square meters of shore lands?		
Are you proposing to build on Crown Land?		

Electrical Conductor Clearances - *Electrical Safety Authority*	YES	NO
Are any overhead power lines located above or within 5.5 metres of the proposed building?		

Environmental Approvals - *Ministry of Environment, Conservation, Parks*	YES	NO
Is a Record of Site Condition required to be filed because of a change to more sensitive land use? Is the property a former waste disposal site?		
Is this project a major industrial, commercial, or government project?		
Is this a renewable energy project?		
Does this property have a Certificate of Property Use under the Environmental Protection Act?		

Child Care Centres - *Ministry of Education*	YES	NO
Is a daycare proposed in any part of the building?		

Seniors Centres - Ministry of Children, Community and Social Services	YES	NO
Is this a seniors project where Ontario Government funding is being sought?		

Long Term Care Centres – *Ministry of Health & Long Term Care*	YES	NO
Construction, alteration or conversion of building used for a nursing home?		

Education Act - *Ministry of Education*	YES	NO
Is the project being carried out on the property of an educational facility?		
If so, is any or all building on the property being fully or partially demolished?		

DELCARATION – I have considered the list of applicable laws in the Ontario Building Code as described above, and do hereby declare that:

	None of these applicable law approvals apply to this project
	Applicable laws check 'yes' apply to this project, and approval documents are submitted with this application.
	Applicable laws checked 'yes' apply to this project; however, all approval documents have not yet been obtained

The information provided on this form is true to the best of my knowledge. I have authority to act on behalf of the owner, corporation, or partnership with respect to this application (if applicable).

Name: _____ Signature: _____ Date: _____

Approvals from other agencies are required in many instances before a building permit can be processed and issued. These approvals are **NOT** administered by the Building Department. The fastest way to obtain a building permit is to ensure that all other required approvals are completed prior to permit application. The Building Department is required by law to prioritize applications that are fully complete in terms of applicable law approvals and document submissions. Building permit documents must be consistent with applicable law approvals. If you answer yes to any of the following question please reach out to these agencies for approvals.

Zoning and Planning – Community Services Division – Norfolk County

Zoning 519-426-5870 ext. 6064 or zoning@norfolkcounty.ca
Planning 519-426-5870 ext. 1842 or planning@norfolkcounty.ca

Planning Act, s.34, 34(5), 45, and Part VI
Zoning By-laws restrict such things as land use, lot size, building size, and setbacks. If your project does not comply with any part of the Zoning By-law, a minor variance or rezoning must be obtained before any building permit can be issued. Zoning By-laws also restrict the issuance of permits until any associated land division, subdivision, or municipal servicing is complete.
Planning Act, s.41
Site Plan Approval applies to commercial, industrial, institutional, multi-residential and intensive livestock site plans. The site plan agreement must be registered before site plans will be approved.

Conservation Authority Permits

Grand River Conservation Authority (GRCA)1-866-900-4722 or grca@grandriver.ca
Long Point Regional Conservation Authority (LPRCA) 1-888-231-5408 or conservation@lprca.on.ca

Conservation Authorities Act s. 28 (1)(c), regulation 166/06
Development within certain conservation regulated areas requires a construction and fill permit from the conservation authority before any building permit can be issued. GRCA or LPRCA will confirm if your property falls within their jurisdiction.

Highway Corridor Building & Land Use Permits

Ministry of Transportation (MTO) 1-800-268-4686 or
www.mto.gov.on.ca/english/highway-bridges/highway-corridor-management/index.shtml

Public Transportation and Highway Improvement Act, s.34, 38
Ministry authorization is required for construction of all buildings within certain distances of a highway or intersection. The requirement for Ministry authorization extents to 800m from a highway where development will generate major traffic, such as a shopping centre.

Environmental Approvals

Ministry of the Environment, Conservation and Parks (MECP)1-800-461-6290 or www.ontario.ca

Environmental Protection Act s. 46, 47.3, 168 and the Environmental Assessment Act s 5.
Ministry of Environment approvals are required where a property of industrial or commercial use is changed to more sensitive residential or parkland use, for major government, industrial and commercial projects where defined by regulation, properties formerly used for landfill or waste disposal, or renewable energy projects.

Electrical Conductor Clearances

Electrical Safety Authority 1-877-372-7233 or www.esasafe.com

Subsection 3.1.19. of the Ontario Building Code prohibits buildings being located beneath or within a certain minimum distances of overhead electrical conductor wires, other than the power feed to the building.

Source Water Protection – Environmental and Infrastructure Services – Norfolk County

Environmental Services – Stephanie Davis- Manager, Water & Wastewater Compliance- 519-426-5870 ext. 8037 or Stephanie.Davis@norfolkcounty.ca
Cambium Inc. Racheal Doyle – sourcewaterprotection@cambium-inc.com

Clean Water Act s. 59
Special land use restrictions may apply if a water source protection plan is in effect in the area where the building is located. Uses affected by these restrictions require the approval of the designated Risk Management Official

Agriculture and Farms

Ministry of Agriculture Food and Rural Affairs 1-877-424-1300 or www.omafra.gov.on.ca

Nutrient Management Act 2002 s.11 reg 267/03, Milk Act s.14
Buildings or structures that house animals or store manure may trigger a requirement for a nutrient management strategy approved by the Ministry. The Ministry must determine that a milk processing plant is necessary and authorize it before a building permit can be issued.

Child Care Centres

Ministry of Education (905) 895-9192 or www.ontario.ca

Child Care and Early Years Act, s. 14 reg 137/15
Ministry plan approval is required if a new building is proposed to be used as a day nursery, an existing building is proposed to be used, altered or renovated for a day nursery, or if an existing day nursery is altered or renovated.

Seniors Centres

Ministry of Children, Community and Social Services 1-888-789-4199 or www.mcss.gov.on.ca

Elderly Persons Centres Act s. 6 of reg 314
Reports must be submitted to the Minister and approval obtained for all seniors centres to which government funding applies.

Long Term Care Homes

Ministry of Health & Long Term Care 1-800-387-5559 or www.health.gov.on.ca

Nursing Home Act s. 4, 5 reg 832
Homes for the Aged & Rest Homes Act s. 14
The Long Term Heath Care Act is designed to help ensure that residents of long-term care homes receive safe, consistent, high-quality, resident-centred care.

Education

Ministry of Education (905) 895-9192 or www.ontario.ca

Education Act s. 194
The board shall obtain approval from the Minister for the demolition of any buildings located on a school site regulated by the Education Act. App

Crown Lands Works Permits

Ministry of Natural Resources www.ontario.ca/page/crown-land-work-permits

Ontario Regulation 239/13 s. 2, s. 5
Ministry approval is required to construct a building on crown lands or to construct or place a structure along shorelines.

SEWAGE SYSTEMS
SEPTIC

Septic Permit **Package**

A step by step guide for making a septic permit application

Norfolk County Building Department
Community Development Division
185 Robinson Street, Suite 200 Simcoe, Ontario, N3Y 5L6
norfolkcounty.ca

Septic System Permit Application
Permit Package / Worksheets

A septic permit is required to install a new septic system, repair or replace any part of the septic system. The daily design flow needs to be 10,000 litres/day or below for the whole site.

Sewage Works is required if the daily design flow exceed 10,000 litres/day for the whole site. An Environmental Compliance Certificate (ECA) is required from the Ministry of Environment, Conservation and Parks (MECP) for a sewage works. Environmental Compliance Approval process can be found online.

Ministry of Environment, Park and Conservation keep well records.

NEW CONSTRUCTION AND FULL SYSTEM REPLACEMENTS

A COMPLETE SEPTIC SYSTEM APPLICATION INCLUDES:

Completed Forms.

- ☐ Application to Construct or Demolish,
- ☐ Schedule 1: Designers Information signed by system designer,
- ☐ Schedule 2: Septic System Installers Information signed by the applicant,
- ☐ Applicant Authorization Form if applicant is not the property owner.

Required Documents.

- ☐ Septic work sheets, plot plan and system cross section,
- ☐ Percolation time ('T' time) from a licensed soil testing agency,
- ☐ Building Material Evaluation Commission (BMEC) or CAN/ BNQ "Onsite Residential Wastewater Treatment Technologies" approvals (if applicable).

Fees.

- ☐ Septic Permit Fee.

BUILDING ADDITIONS, RENOVATIONS AND CONSTRUCTION THAT AFFECT THE SEWAGE DISPOSAL SYSTEM

Renovations to existing buildings may reduce the performance level of the sewage system in the following situations

- The number of bedrooms in a dwelling are increased,
- If the proposed construction exceeds 15% of the gross area of the dwelling unit,
- New plumbing fixtures are added to the dwelling, or
- If the addition, expansion, alteration or change proposed encroaches on the sewage system or any of its components.

If any of the above apply, applicants must submit a completed septic application to Norfolk County Building Department for approval to renovate.

Collection of Personal Information.

Personal information submitted in this form is collected under the authority with the **Municipal Freedom of Information and Privacy Act**, or for the purpose stated on the specific form being submitted. The information will be used by the Building Department administration for its intended submitted purpose.

Questions about the collection of personal information through this form may be directed to: Norfolk County's Chief Building Official, 185 Robinson Street, Simcoe, ON N3Y 5L6, 519-426-5870 ext. 2218, Information and Privacy Coordinator, 50 Colborne Street South, Simcoe ON N3Y 4H3, 519-426-5870 ext. 1261, or The contact names of the form being submitted.

Application for a Permit to Construct or Demolish

This form is authorized under subsection 8(1.1) of the *Building Code Act,1992*

For use by Principal Authority	
Application number:	Permit number (if different):
Date received:	Roll number:

Application submitted to: _____
(Name of municipality, upper-tier municipality, board of health or conservation authority)

A. Project information

Building number, street name			Unit number	Lot/con.
Municipality	Postal code	Plan number/other description		
Project value est. $		Area of work (m^2)		

B. Purpose of application

New construction | Addition to an existing building | Alteration/repair | Demolition | Conditional Permit

Proposed use of building	Current use of building
Description of proposed work	

C. Applicant

Applicant is: Owner or Authorized agent of owner

Last name	First name	Corporation or partnership		
Street address			Unit number	Lot/con.
Municipality	Postal code	Province	E-mail	
Telephone number	Fax		Cell number	

D. Owner (if different from applicant)

Last name	First name	Corporation or partnership		
Street address			Unit number	Lot/con.
Municipality	Postal code	Province	E-mail	
Telephone number	Fax		Cell number	

E. Builder (optional)

Last name	First name	Corporation or partnership (if applicable)		
Street address			Unit number	Lot/con.
Municipality	Postal code	Province	E-mail	
Telephone number	Fax		Cell number	

F. Tarion Warranty Corporation (Ontario New Home Warranty Program)

i. Is proposed construction for a new home as defined in the *Ontario New Home Warranties Plan Act*? If no, go to section G.	Yes	No
ii. Is registration required under the *Ontario New Home Warranties Plan Act*?	Yes	No

iii. If yes to (ii) provide registration number(s): _____

G. Required Schedules

i) Attach Schedule 1 for each individual who reviews and takes responsibility for design activities.

ii) Attach Schedule 2 where application is to construct on-site, install or repair a sewage system.

H. Completeness and compliance with applicable law

i) This application meets all the requirements of clauses 1.3.1.3 (5) (a) to (d) of Division C of the Building Code (the application is made in the correct form and by the owner or authorized agent, all applicable fields have been completed on the application and required schedules, and all required schedules are submitted).	Yes	No
Payment has been made of all fees that are required, under the applicable by-law, resolution or regulation made under clause 7(1)(c) of the *Building Code Act, 1992*, to be paid when the application is made.	Yes	No
ii) This application is accompanied by the plans and specifications prescribed by the applicable by-law, resolution or regulation made under clause 7(1)(b) of the *Building Code Act, 1992.*	Yes	No
iii) This application is accompanied by the information and documents prescribed by the applicable by-law, resolution or regulation made under clause 7(1)(b) of the *Building Code Act, 1992* which enable the chief building official to determine whether the proposed building, construction or demolition will contravene any applicable law.	Yes	No
iv) The proposed building, construction or demolition will not contravene any applicable law.	Yes	No

I. Declaration of applicant

I _____ declare that:
(print name)

1. The information contained in this application, attached schedules, attached plans and specifications, and other attached documentation is true to the best of my knowledge.
2. If the owner is a corporation or partnership, I have the authority to bind the corporation or partnership.

_____ _____
Date Signature of applicant

Personal information contained in this form and schedules is collected under the authority of subsection 8(1.1) of the *Building Code Act, 1992*, and will be used in the administration and enforcement of the *Building Code Act, 1992*. Questions about the collection of personal information may be addressed to: a) the Chief Building Official of the municipality or upper-tier municipality to which this application is being made, or, b) the inspector having the powers and duties of a chief building official in relation to sewage systems or plumbing for an upper-tier municipality, board of health or conservation authority to whom this application is made, or, c) Director, Building and Development Branch, Ministry of Municipal Affairs and Housing 777 Bay St., 2nd Floor. Toronto, M5G 2E5 (416) 585-6666.

Schedule 1: Designer Information

Use one form for each individual who reviews and takes responsibility for design activities with respect to the project.

A. Project Information

Building number, street name			Unit no.	Lot/con.
Municipality	Postal code	Plan number/ other description		

B. Individual who reviews and takes responsibility for design activities

Name		Firm		
Street address			Unit no.	Lot/con.
Municipality	Postal code	Province	E-mail	
Telephone number	Fax number		Cell number	

C. Design activities undertaken by individual identified in Section B. [Building Code Table 3.5.2.1. of Division C]

House	HVAC – House	Building Structural
Small Buildings	Building Services	Plumbing – House
Large Buildings	Detection, Lighting and Power	Plumbing – All Buildings
Complex Buildings	Fire Protection	On-site Sewage Systems

Description of designer's work

D. Declaration of Designer

I _____ declare that (choose one as appropriate):

(print name)

I review and take responsibility for the design work on behalf of a firm registered under subsection 3.2.4.of Division C, of the Building Code. I am qualified, and the firm is registered, in the appropriate classes/categories.

Individual BCIN: _____

Firm BCIN: _____

I review and take responsibility for the design and am qualified in the appropriate category as an "other designer" under subsection 3.2.5.of Division C, of the Building Code.

Individual BCIN: _____

Basis for exemption from registration: _____

The design work is exempt from the registration and qualification requirements of the Building Code.

Basis for exemption from registration and qualification: _____

I certify that:

1. The information contained in this schedule is true to the best of my knowledge.
2. I have submitted this application with the knowledge and consent of the firm.

_____ _____

Date Signature of Designer

NOTE:

1. For the purposes of this form, "individual" means the "person" referred to in Clause 3.2.4.7(1) (c).of Division C, Article 3.2.5.1. of Division C, and all other persons who are exempt from qualification under Subsections 3.2.4. and 3.2.5. of Division C.
2. Schedule 1 is not required to be completed by a holder of a license, temporary license, or a certificate of practice, issued by the Ontario Association of Architects. Schedule 1 is also not required to be completed by a holder of a license to practise, a limited license to practise, or a certificate of authorization, issued by the Association of Professional Engineers of Ontario.

Schedule 2: Sewage System Installer Information

A. Project Information			
Building number, street name		Unit number	Lot/con.
Municipality	Postal code	Plan number/ other description	

B. Sewage system installer

Is the installer of the sewage system engaged in the business of constructing on-site, installing, repairing, servicing, cleaning or emptying sewage systems, in accordance with Building Code Article 3.3.1.1, Division C?

Yes (Continue to Section C) No (Continue to Section E) Installer unknown at time of application (Continue to Section E)

C. Registered installer information (where answer to B is "Yes")			
Name			BCIN
Street address			Unit number / Lot/con.
Municipality	Postal code	Province	E-mail
Telephone number	Fax		Cell number

D. Qualified supervisor information (where answer to section B is "Yes")	
Name of qualified supervisor(s)	Building Code Identification Number (BCIN)

E. Declaration of Applicant:

I _____ declare that:
(print name)

I am the applicant for the permit to construct the sewage system. If the installer is unknown at time of application, I shall submit a new Schedule 2 prior to construction when the installer is known;

OR

I am the holder of the permit to construct the sewage system, and am submitting a new Schedule 2, now that the installer is known.

I certify that:

1. The information contained in this schedule is true to the best of my knowledge.
2. If the owner is a corporation or partnership, I have the authority to bind the corporation or partnership.

_____ _____
Date Signature of applicant

Project Address: _____

Septic Permit System Summary / Overview

Applicable Law Documents Attached (check all applicable)

□ Conservation Authority Approval
□ Source Water Protection
□ Construction in Hazard Lands
□ Site Plan Approval
□ Minor Variance
□ Grading Plan (raised beds)

Total Number of Bedrooms _____ Total Number of Fixture Units _____

Total Finished Floor Area _____m^2 _____sq.ft Daily Design Flow (Q) (litre/day) _____

□ Residential (dwelling) □ Camp for the Housing of Workers □ Other occupancy (Identify) _____

Water Supply:
□ Municipal
□ Dug Well
□ Drilled well
□ Shallow Well Point
□ Other:_____

Type of Native Soil:
_____
□ Soils Analysis attached
Percolation rate ('T' time): _____
Depth to water table: _____
Slope of land in tile bed area _____%

Type of Imported Fill:
_____
□ Soils Analysis attached
Percolation rate ("t" time): _____

Class of System □ Class 2 – Greywater □ Class 4 – Leaching Bed System □ Class 5 – Holding Tank

System Components (Complete all that apply)

□ Septic tank capacity (L) _____
□ Pump capacity (L) _____
□ Distribution Box
□ Other (please specify) _____
□ Advance Treatment Unit capacity: (L)_____
Manufacture and Model _____

Method of Distribution Pipe Detection

□ magnetic means
□ tracer wire (14 gauge TW solid copper light coloured plastic coated)
□ other means (please specify) _____

Complete A, B, C, D, E, or F – Class 4 Systems Only

A. ABSORPTION TRENCH
□ In- ground □ Raised
□ Distribution pipe
□ Leaching chambers □ Type I □ Type II
Length of pipe _____m
□ Mantel Required
Mantel Area _____m^2

B. FILTER BED
□ In- ground □ Raised
Effective Area: _____m^2
Contact Area: _____m^2
□ Distribution pipe
□ Leaching chambers □ Type I □ Type II
□ Mantel Required
Mantel Area _____

C. SHALLOW BURIED TRENCH
Type: _____
Length of chamber: _____m

D. ADVANCE TREATMENT SYSTEM (BMEC & CAN/BNQ)
□ BMEC authorization provided
□ CAN/BNQ authorization provided
□ Service agreement provided
Mantel area: _____m^2
Stone layer area: _____m^2
Sand layer area: _____m^2
□ System specifications provided
□ Manufacturer's installation manual provided

E. TYPE A DISPERSAL BED
□ In- ground □ Raised
Length of pipe _____m
Mantel Area _____m^2
Stone layer area: _____m^2
Sand layer area: _____ m^2

F. TYPE B DISPERSAL BED
□ In- ground □ Raised
Stone layer area _____m2
Linear loading rate □ 40 L/m □ 50 L/m

Worksheet A: Dwellings - Daily Design Flow Calculations (Q)

A) Residential Occupancy		(Q) Litres	Total
Number of Bedrooms	1 Bedroom	750	
	2 Bedrooms	1100	
	3 Bedrooms	1600	
	4 Bedrooms	2000	
	5 Bedrooms	2500	
		Subtotal (A)	

B) Plus Additional Flow for: **Note:** Use the largest additional flow calculation to determine Daily Design Flow (Q). If none apply Subtotal (B) is zero.		Quantity	(Q) Litres	Total
Either	Each bedroom over 5		500	
Or	Floor space for each 10m^2 over 200m^2 up to 400m^2		100	
	Floor space for each 10m^2 over 400m^2 up to 600m^2		75	
	Floor space for each 10m^2 over 600m^2		50	
Or	Each Fixture Unit over 20 fixture Units *(Total of Worksheet B - 20 = Quantity)*		50	
			Subtotal (B)	
			Subtotal A+B=Daily Design Flow (Q)	

Worksheet B: Dwellings Fixture Unit Count

Fixtures	Units	How Many?	Total
Bath group (toilet, sink, tub or shower) with flush tank	6.0	X =	
Bathtub only(with or without shower)	1.5	X =	
Shower stall	1.5	X =	
Wash basin / Lavatory (1.5 inch trap)	1.5	X =	
Water closet (toilet) tank operated	4.0	X =	
Bidet	1.0	X =	
Dishwasher	1.0	X =	
Floor Drain (3 inch trap)	3.0	X =	
Sink (with/without garbage grinder, domestic and other small type single, double or 2 single with a common trap)	1.5	X =	
Domestic washing machine	1.5	X =	
Combination sink and laundry tray single or double (installed on 1.5 inch trap)	1.5	X =	
Other:			
		Total Number of Fixture Units:	

1. Refer to Ontario Building Code Division B Table 7.4.9.3 for a complete listing of fixture types and units.
2. Where the laundry waste is not more than 20% of the total daily design flow, it may discharge to the sewage system. OBC 8.1.3.1(2)
3. Sump pumps are not to be connected to the sewage system. Connection to sewage system may lead to a hydraulic failure of the system.

Worksheet C: Other occupancies types

Camp for the Housing of Workers	Number of Employees	(Q) Litres	Total
Note: building size, number of bedrooms and fixture count are not required for a Camp for the Housing of Workers		250	
		Daily Design Flow (Q)	

Other Occupancy Daily Design Flow Calculation (Q)

To calculate the daily design flow for occupancies, please refer to Ontario Building Code Division B – Part 8 Table 8.2.1.3.B

Establishment	Operator Example: number of seats, per floor area, number of employees/students	Volume Litres	Total
		Daily Design Flow (Q)	

Work Sheet D: Septic Tank Size

Minimum septic tank size permitted by the Ontario Building Code is 3600 litres.

Occupancy type	Daily Design Flow (Q)	Minimum tank size (L)
Residential Occupancy house, apartment, camp for housing of workers	x 2 =	
All Other Occupancies	x 3 =	

Worksheet E: Leaching Bed Calculations (Class 4)

Part 1: Complete All

Type of leaching bed (select one)

□ A. Absorption trench □ B. Filter Bed □ C. Shallow Buried Trench
□ D. Advance Treatment System □ E. Type A Dispersal Bed □ F. Type B Dispersal Bed

Percolation rate of native soil (T):

Name of licensed testing agency:

□ In ground system □ Raised Bed system	Height raised above original grade (metres)

Mantel (if applicable) □ Imported □ Native Soil
Q/loading rate = _____m2 Configured as: _____ m X _____ m

Part 2: Complete One of A, B, C, D, E, F

□ A. Absorption Trench

Total length of distribution pipe	**Conventional** (Q x T) ÷ 200 = _____ m **Type I leaching chambers** (Q x T) ÷ 200 = _____ m **Type II leaching chambers** (Q x T) ÷ 300 = _____ m **Configured as:** _____ runs of _____ m Total: _____ m

□ B. Filter Bed

Effective Area If Q ≤ 3000 litres per day use Q ÷ 75 If Q > 3000 litres per day use Q ÷ 50 Level II-IV treatment units, use Q ÷ 100 **Distribution Pipe** **Contact Area = (Q x T) ÷ 850** **Mantel** (see Part 1)	**Effective area:** _____ (Q) ÷ _____ (75, 50, or 100) = _____ m^2 Configured as: _____ m x _____ m Number of beds _____ Number of runs: _____ Spacing of runs: _____ m **Contact Area**: (_____ (Q) X _____ (T)) ÷ 850 = _____m^2 _____m^2

□ C. Shallow Buried Trench

Percolation time (T) of soil in minutes:	Length of distribution pipe (metres)
1 < T ≤ 20	Q ÷ 75 metres
20 < T ≤ 50	Q ÷ 50 metres
50 < T < 125	Q ÷ 30 metres

(L) = _____ (Q) ÷ _____ (75, 50, 30) = _____ m
Configured as: _____ runs of _____ m Total: _____ m

□ D. Advance Treatment System

Provided BMEC or CAN/BNQ approval, and manufacturer's system design documentation.

□ E. Type A Dispersal Bed

Stone Layer If Q ≤ 3000 litres per day, use Q ÷ 75 If Q > 3000 litres per day, use Q ÷ 50 **Sand Layer** 1 < T ≤ 15 use (Q x T) ÷ 850 T > 15 use (Q x T) ÷ 400	**Stone Layer** = _____(Q) ÷ _____ (75 or 50) = _____m^2 **Sand Layer** = (_____ (Q) x _____ (T)) ÷ (850 or 400) = _____m^2

□ F. Type B Dispersal Bed

Area = (Q X T) ÷ 400 **Linear Loading Rate (LLR)** T < 24 minutes, use 50 L/min If T ≥ 24 minutes, use 40 L/min **Distribution Pipe**	**Area** = (_____(Q) x _____ (T)) ÷ 400 = _____ m2 **Pump chamber capacity** = _____ L **Length (Q ÷ LLR**) = _____ m **Bed configuration** = _____m x _____ m = _____ m2 Number of Beds = _____ Configured as: _____ runs of _____m Total: _____m

Worksheet F: Cross Sectional Drawings

Subsoil Investigation – Test pit

1. Soil sample to be taken at a depth of
2. Test pit to be a minimum 0.9m

Indicate level of rock and ground water level below original grade.	Original grade 0.5m 1.0m 1.5m	Soil and subgrade investigation. Indicate soil types

Cross sectional drawings are required for all septic systems

1. Location of existing grade.
2. Measurements to each component, distances to water table
3. Label each septic component.

Worksheet G: Septic Plot Plan

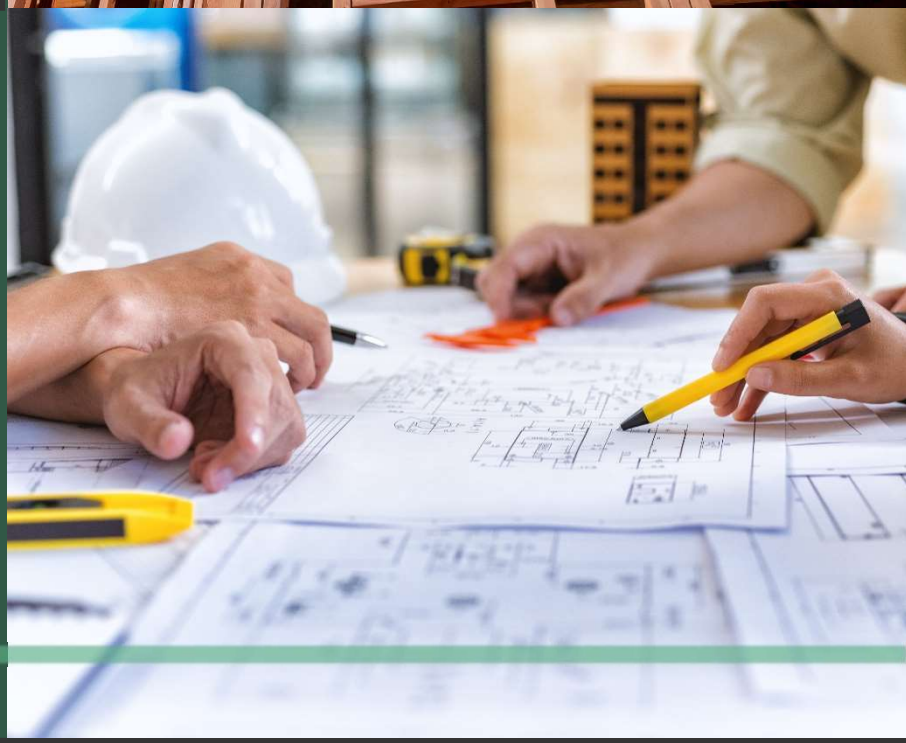
Please provide the following information on this work sheet:

1. Location of sewage system and its components (e.g. tank, leaching bed, pump chamber)
2. Location of all buildings, pools and wells on the property and neighbouring properties
3. Locate and show minimum clearances for treatment units and distribution piping of items. Ontario Building Code, Division B, Table 8.2.1.6.A. and 8.2.1.6.B.
4. Location of property lines, easements, and utility corridors.

NEW RESIDENTIAL HOUSE, SEMI-DETACHED TOWNHOUSES

Building Permit Package

A step by step guide for making a building permit application



Norfolk County Building Department
Community Development Division
185 Robinson Street, Suite 200 Simcoe, Ontario, N3Y 5L6
norfolkcounty.ca

New Residential Permit Package
Houses, Semi-detached, Townhomes

Building permits help protect you, your home, and the interests of your community by making sure the project is structurally sound and follows the Ontario Building Code, municipal zoning and other applicable laws.

There are multiple steps to the building permit process. The purpose of this permit package is to highlight these steps and provide guidance to the building permit process.

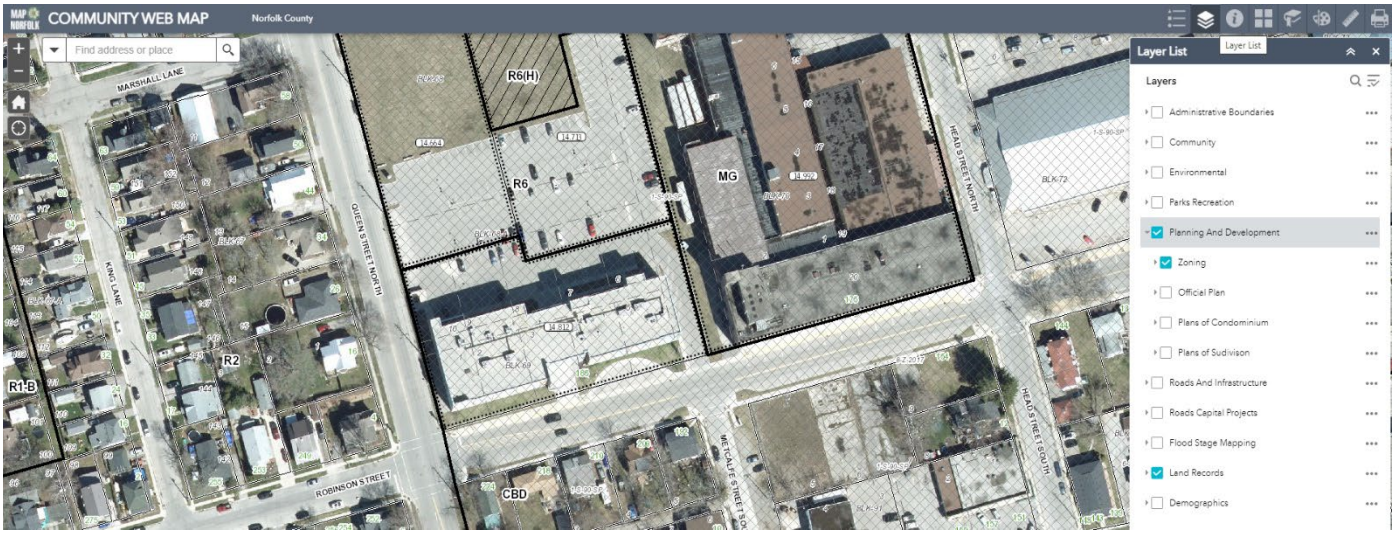
STEP 1: Applicable Law.

Approvals from other agencies are required in many instances before a building permit can be processed and issued. These approvals are **NOT** administered by the Building Department. The fastest way to obtain a building permit is to ensure that all other required approvals are completed prior to permit application.

An Applicable Law Checklist is required as part of a complete application. Agency contacts are attached with this form. Our community mapping has many of these layers mapped to help you determine if additional approvals are required for your application.

Zoning Requirements.

Finding the zoning associated with your property is easy with our GIS Community Web Map, position over your property and turn on the zoning layer by clicking layer list, planning, zoning.



Norfolk County Zoning Bylaw is available online.

To confirm your project conforms to the Zoning By-law you will need to provide a plot plan indicating:

- ☐ Property lines and lot dimensions,
- ☐ Location of building and all other structures on the lot,
- ☐ Location of all steps and landings,
- ☐ Distance from dwelling to property lines,
- ☐ Parking spots with dimensions,
- ☐ Location of septic system.

If your proposed building / structure does not comply with the zoning requirements, a planning application will be required. Zoning and Planning approval is required as part of a complete permit application.

Planning Department: planning@norfolkcounty.ca or 519-426-5870 ext. 1842.
Zoning: zoning@norfolkcounty.ca or 519-426-5870 ext. 1000.

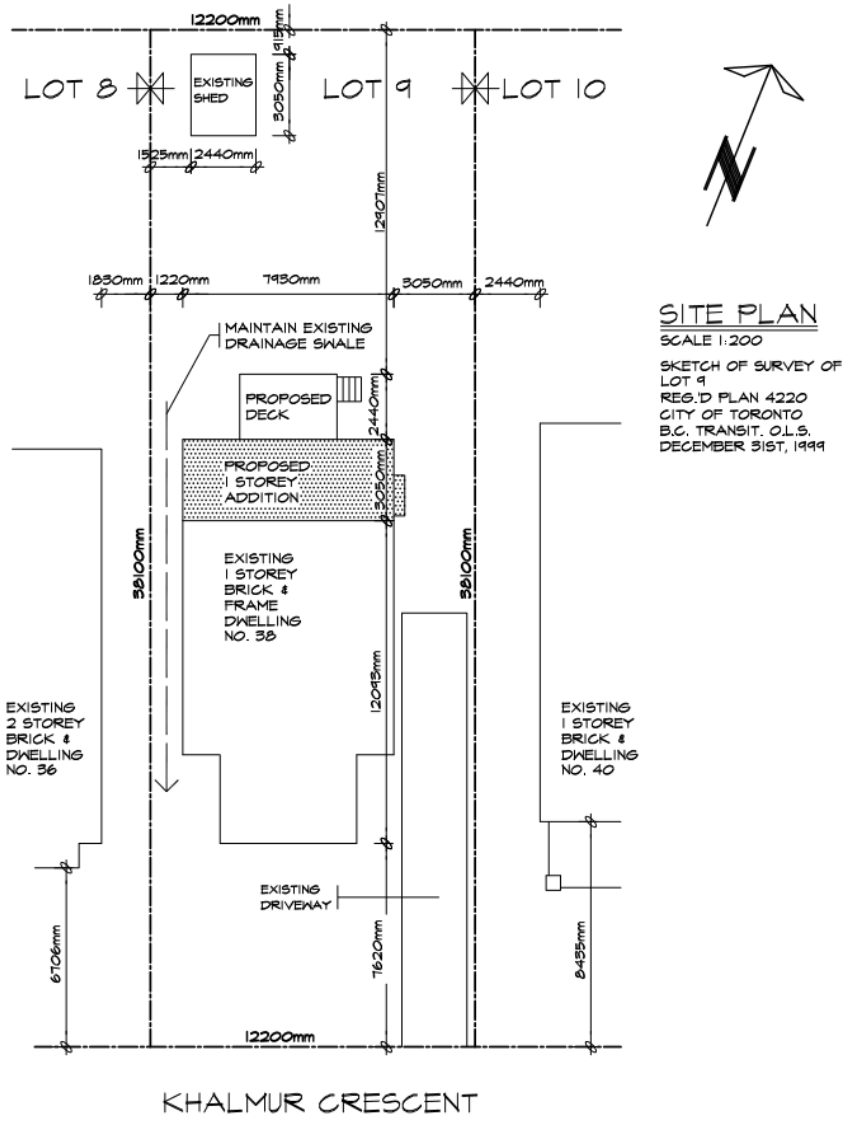
Lot Grading.

Proposed grading plans and lot grading form shall be submitted with all building permit applications, under Norfolk County Grading and Drainage By-law.

Proposed grading plan needs to identify:

- all surface features;
- existing and proposed structures;
- changes in grade and slopes in percent between such changes; and
- include sufficient information regarding adjacent properties to confirm conformance with this By-Law with respect to drainage onto those properties.

An exemption may be considered for a lot in a rural area (complete form, fee applies)



STEP 2: Preparing your application.

A building permit application consists of many documents. The forms attached are to be completed, signed, and dated.

Who can design a house?

As the property owner, you can complete the design yourself for a house, or have a qualified individual with a BCIN number in House, an Architect or a Professional Engineer complete the drawings.

Buildings containing multiple dwelling units may require qualified individuals to complete the design documents. Check with a Building Inspector prior to making application.

Drawings and Documents

Drawings are to be legible and to scale. Use a ruler or computer aided drafting (CAD) software to complete your drawings. Provide enough information and detail to ensure compliance with the Ontario Building Code.

The Ontario Building Code is available online under the 'regulations under this act' tab.

Building Department staff are not permitted by law to provide design advice. It is the responsibility of the property owner or authorized agent to complete a design that meets the requirements of the Ontario Building Code (OBC) and the Building Code Act (BCA).

If you are unable to complete the application and provide the required documents, should retain a qualified designer to assist you in completing the application.

Building Permits – Application Checklist.

Completed Forms.

- ☐ Building Permit Application Form.
- ☐ Schedule 1: Designer Information.
- ☐ Applicant Authorization Form, if application is not completed by the property owner.
- ☐ Applicable Law Checklist and supporting documents.
- ☐ Lot grading form or approved exemption.
- ☐ Water, storm sewer, sanitary sewer connection permit (where required).
- ☐ Evaluation of existing on-site septic system (where required).

Required Documents.

- ☐ Plot Plan:
  - Property lines and lot dimensions,
  - Location of building and all other structures on the lot,
  - Location of all steps and landings,
  - Distance from dwelling to property lines,
  - Parking spots with dimensions,
  - Location of septic system.
- ☐ Lot Grading Plan.

- ☐ Drawings of the Building:
  - Footing, foundations, anchorage details (where applicable),
  - Floor plans,
  - Room names, sizes and ceiling heights,
  - Door & window location and sizes,
  - Location of plumbing fixtures including laundry facilities,
  - Fire separations, fire wall design (if applicable),
  - Smoke alarms and/or fire alarm systems.
- ☐ Elevations.
- ☐ Cross sections of exterior wall from footing to roof.
- ☐ Roof truss layout or roof framing plan.
- ☐ Energy Efficiency Design Summary (EEDS), performance or prescriptive option.
- ☐ Engineered floor system layout (where required).
- ☐ Engineered beam details (i.e. LVL's, steel beams) (where required)
- ☐ Residential mechanical ventilation design summary.
- ☐ Ventilation duct design:
  - Heat Recovery Ventilator (HRV) duct sizing and layout,
  - Exhaust fan duct sizing and layout.
- ☐ Septic application (where required) This is a separate application, see septic.

Fees

- ☐ Building Permit fee.
- ☐ Plumbing fee.
- ☐ Occupancy fee.
- ☐ Lot grading exemption fee (if applicable).
- ☐ Water/Sewer/Storm connection permit fee(if applicable).
- ☐ Water meter fee (if applicable).
- ☐ Civic address fee (if applicable).
- ☐ Development charges.

Septic Permits - Application Checklist.

Completed Forms.

- ☐ Building Permit Application Form.
- ☐ Schedule 1: Designer Information.
- ☐ Schedule 2: Sewage System Installer Information.

Required Documents.

- ☐ Septic System Permit Application Information Package / Worksheets .
- ☐ Percolation time ('T' time) report from a licensed testing agency.

Fees.

- ☐ Septic Permit fee.

STEP 3: Applying.

Online Portal: Visit Norfolk Permits Portal and make your application online.

Building Department

Apply for a Building Permit
Status and Fees

In Person: Visit our service counter located at 185 Robinson Street, Suite 200 Simcoe Ontario.

Our Permit Coordinators will review your application and provide in writing any item which may be missing from the application and a cost break down for the permit fees and payment options.

Step 4: Plans Review.

A Building Inspector will contact you in writing if there are building code concerns or missing information from your application.

A building permit is issued once all documentation has been received, fees are paid in full, and your plans are check for compliance with zoning by-law and the building code.

Step 5: Inspections.

Once you have obtained a building permit, a building inspector needs to attend your site at several milestones in the construction process. For more information, please check the inspection section of Norfolk County's Building Department website. Once all inspections are complete and passed your permit is closed.

Need Help? If you have any question on the building permit process or plans required, please contact permits@norfolkcounty.ca or 519-426-5870 ext. 6016.

Updated October 2022

HYDROGEOLOGICAL SITE ASSESSMENT
LAPLANTE ROAD – 8 LOT PLAN OF SUBDIVISION
LAPLANTE ROAD
NORFOLK COUNTY, ONTARIO

for

MR. JOE OLIVEIRA

PETO MacCALLUM LTD.
45 BURFORD ROAD
HAMILTON, ONTARIO
L8E 3C6
Phone: (905) 561-2231
Fax: (905) 561-6366
Email: hamilton@petomaccallum.com

Distribution:
1 cc: Mr. Joe Oliveira (plus PDF)
1 cc: J H Cohoon Engineering Limited (plus PDF)
1 cc: PML Hamilton

PML Ref.: 20HF021
Report: 2 (Revision 1)
November 19, 2024

Peto MacCallum Ltd.
CONSULTING ENGINEERS

November 19, 2024

PML Ref.: 20HF021
Report: 2 (Revision 1)

Mr. Joe Oliveira
c/o Mr. Bob Phillips
J H Cohoon Engineering Limited
Consulting Engineers, Architect & Planners
440 Hardy Road, Unit 1
Brantford, Ontario
N3T 5L8

Dear Mr. Phillips

Hydrogeological Site Assessment
Laplante Road – 8 Lot Plan of Subdivision
Laplante Road
Norfolk County, Ontario

Peto MacCallum Ltd. (PML) is pleased to present the results of the hydrogeological site assessment (HSA) completed for this project. Authorization to proceed with this assignment was provided by Mr. Joe Oliveira in a signed Engineering Services Agreement (ESA) dated July 3, 2020. This report has been updated from an original Report 2 dated November 24, 2022. The updates contained herein reflect a revised subdivision plan comprising eight residential lots.

It is understood that the development of an eight-lot subdivision is planned at Laplante Road, near Tilsonburg in Norfolk County, Ontario. The HSA has been conducted on the lands to be developed. Current plans call for the severance of the site into eight individual lots, with lot sizes ranging between 0.35 to 0.47 ha each, to be serviced by individual sewage systems and private wells. The appended Drawing 2-1 (Borehole Location Plan) illustrates the location of the lands to be developed.

A geotechnical report, PML Ref. 20HF021 Report 1, has been previously completed for the subject lands and is referenced herein.

Based on the findings of this investigation, it is considered feasible to develop the site with eight individual lots serviced by private sewage systems and private water supply wells; however, advance treatment systems for nitrate reduction will be required, subject to regulatory approval.

We trust this report has been completed within our terms of reference and is sufficient for your current needs.

Should you have further questions, please do not hesitate to contact our office.

Sincerely

Peto MacCallum Ltd.

Scott Jeffrey, P.Eng., QPESA, LEED$_{GA}$
Director
Regional Manager, Geotechnical and Geoenvironmental Services

SM/SJ:ld/tc

45 Burford Road, Hamilton, Ontario L8E 3C6
Tel: (905) 561-2231
E-mail: hamilton@petomaccallum.com
BARRIE, HAMILTON, KITCHENER, LONDON, TORONTO

TABLE OF CONTENTS

1. INTRODUCTION

Peto MacCallum Ltd. (PML) is pleased to present the results of the hydrogeological site assessment (HSA) recently completed for this project. Authorization to proceed with this assignment was provided by Mr. Joe Oliveira in a signed Engineering Services Agreement (ESA) dated July 3, 2020. This report has been updated from an original Report 2 dated November 24, 2022. The updates contained herein reflect a revised subdivision plan comprising eight residential lots.

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The objective of this study was to determine the subsurface soil and ground water conditions at the Site and based on this information, provide an assessment of the feasibility for on-site treatment of domestic sewage, mitigation of the nutrient loading from the sewage treatment system and the off-site impact of infiltration of septic effluent on the ground water resource in the area. Additionally, an evaluation of the feasibility of developing a potable water supply for each of the lots has been completed.

The comments and recommendations provided in this report are based on the site conditions at the time of the investigation and are applicable only to the proposed development as described in the report. Any changes in the development plan, including finished grades and layout will require review by PML to assess the validity of the report and may require modified recommendations, additional investigation and/or analysis.

2. STUDY METHODOLOGY

The objectives of the study were accomplished by:

1. Attending the site to visually examine the terrain on and in the vicinity of the lands to be severed.
2. Review relevant background information including geotechnical and hydrogeological reports conducted in the area, Ontario Ministry of Environment Conservation and Parks (MECP) water well records, and published geological data in order to determine the hydrostratigraphy and hydrogeological conditions in the area.
3. Conducting a house-to-house survey of residents within 0.5 km of the property to determine pertinent details of their wells (type, depth, quality, and quantity) and sample three (3) existing wells to determine nitrate levels.
4. Sample one existing well on Site to determine basic water quality in accordance with the Safe Drinking Water Act (Ontario Drinking Water Quality Standards). The water sample will be tested for turbidity, hardness, pH, E. Coli, Total Coliforms, nitrate and Schedule 23 under Ontario Regulation (O. Reg.) 170/03. Results will be compared with O. Reg. 169/03.
5. In conjunction with the concurrent geotechnical investigation, mobilize equipment and drill rig rental to advance five (5) boreholes up to a depth of 6 m (or prior refusal), supply and installation of three ground water monitoring wells to define the subsurface conditions and depth to and direction of shallow ground water flow on Site. Provide related engineering supervision to locate public underground services; full time supervision of drilling operations, log subsurface stratigraphy, recover samples, survey ground surface elevations at the borehole locations and obtain water levels.
6. Conducting three (3) particle size distribution analyses on soil samples retrieved from the boreholes (one sample from each lot) to determine appropriate soil permeability parameters for septic bed design
7. Conducting engineering analysis to determine the nitrate loading from septic effluent infiltration on the lands to be severed.
8. Preparing one engineering report to address the factual aspects of the study, summarize the hydrogeologic conditions, document the results of the house-to-house survey and water quality laboratory test results, provide hydrogeological comments regarding the feasibility of drilling new wells to supply potable water to the proposed houses, as well as to assess the capability of the on-site soils to treat domestic sewage.

3. SITE SETTING

The land parcels that are the subject of this assessment are shown on Drawing 2-1 and are referred to herein as the "Site". The Site It is located southwest of the intersection of Laplante Road and Ontario Highway 19, located on Lot 5, Concession 4, in the Regional Municipality of Norfolk, Ontario.

The lands to be developed comprise an approximate total plan area of 3.99 including the proposed lots (Lots 1 to 8), stormwater management pond (Block 9) and residential street (Street A) with cul-de-sac.

Adjacent land uses include residential dwellings to the north, east and south and agricultural fields to the west. A woodlot is located to the northwest.

3.1 Physiographic and Geological Setting

The Site is situated within the physiographic region known as the Norfolk Sand Plain. The sands and silts of this region were deposited as a delta in glacial Lakes Whittlesey and Warren (Chapman and Putnam, 1984).

Ontario Base Map (OBM) data published in 2004 on the Geography Network Canada online GIS service was reviewed and topographic contours indicate the grade of the Site was at about elevation 233 to 230 (metric, geodetic). The topography of the area dips down to the northeast.

4. HYDROGEOLOGY

4.1 Surface Water

A tributary stream of Lake Lisgar runs about 300 m from the northwest corner of the Site. No other prominent surface water bodies were identified on the Site.

4.2 Aquifers and Local Ground Water Use

Published water well records were obtained for the Site and adjacent land from the Ontario Ministry of Environment Conservation and Parks (MECP) Environmental Monitoring and Reporting Branch, Water Well Records Management. These records were reviewed in order to establish the general hydrogeological environment in the area and determine anticipated well capacities.

Based on water well information obtained from the MECP, 39 wells were reported to be located within an approximate 500 m radius of the centroid of the Site. A summary of the 39 well records is included in Appendix A.

Based on the records, we note the following:

- The 39 wells were drilled between the years 1962 to 2020.
- Most of the wells were terminated in the sand overburden at depths of 18 to 21 m or the limestone bedrock at about 42 m.
- Pump tests were conducted sixteen (16) of wells following installation in the overburden. The pump tests indicated the yield of the wells to be between 20 and 49 L/min.
- The water quality reported on all the overburden well records was fresh. The water quality reported on the bedrock well records were either untested or sulphurous.

Based on the static water levels documented in the well records and general elevation of the Site, the ground water flow direction in the bedrock wells is to the south, towards Nanticoke Creek. The ground water flow direction in the limited overburden wells is towards the southeast.

4.3 Potable Water Supply Assessment

4.3.1 Water Supply

Based on a review of the MECP well record, the well located on Site at 1064 Laplante Road (MECP Well Record No. 4403399) is a drilled well developed in the sand overburden at a depth of 10.3 m. The static water level in the well was 8.3 m. A pump test was carried out on the well and the recommended pumping rate was 7.5 L/min.

Another deeper overburden well (MECP Well Record 7118927) is located at 1068 Laplante Road and was drilled to 22.5 m. The static water level was 17.8 m while a pump test determined a recommended pumping rate of 26.5 L/min.

Another well drilled into bedrock (MECP Well Record 7214065) is located at 1080 Laplante Road and was drilled to 47.5 m. The static water level was 20.4 m while a pump test determined a recommended pumping rate of 37.9 L/min or more.

The well records of these three wells close to the Site are included in Appendix A

The MECP considers a well to be sustainable with a minimum yield of 18.75 L/min. This is based on a minimum four-bedroom dwelling.

Only one overburden well in the vicinity of the Site had a reported yield (4.5 L/min.), which was below the MECP sustainable minimum yield a outlined in MECP Procedure D-5-5. Based on the reported information from the MECP well records within a 500 m radius of the site and their respective well yields, for best performance, it is recommended that wells are developed in the bedrock aquifer. Wells developed in the bedrock are anticipated to supply adequate yield to the development.

Pump tests will be required to confirm that an adequate water supply can be developed on each property and the sustained pumping rate required for domestic use is not expected to have an adverse impact on the supply from other nearby wells in the area.

4.3.2 Water Quality

In order to check the quality of the ground water, one sample of raw, untreated ground water was retrieved from BH/MW 2 on the lands to be severed, located at Laplante Road. The samples were tested for turbidity, hardness, pH, E. coli, total coliform and Schedule 23 inorganic parameters, which includes nitrate.

Laboratory Certificates of Analysis are included in Appendix B.

The results of the water quality testing were compared to the Ontario Drinking Water Quality Standards (ODWQS), Ontario Regulation 169/03 of the Safe Drinking Water Act, 2002. The results indicate that the level of nitrate met the criteria of 10 mg/L.

Water samples taken at BH/MW 2 were tested, the measured concentrations met the ODWQS, with the exception of the following:

Analyte	ODWQS Standard	Units	Measured Concentration
Total Hardness (as CaCO3)	80-100	mg/L	3130
Turbidity	5	NTU	1110

Hardness is an Operational Guideline (OG), which is established for parameters that, if not controlled, may negatively affect the efficient and effective treatment, disinfection and distribution of the water. The OG for hardness in drinking water is set at between 80 and 100 mg/L as calcium carbonate. Hardness levels between 80 and 100 mg/L are considered to provide an acceptable balance between corrosion and incrustation. Water supplies with a hardness greater than 200 mg/L are considered poor but tolerable. Hardness in excess of 500 mg/L in drinking water is unacceptable for most domestic purposes. Water softener systems will be required to reduce total hardness levels of water supplied from the on-site domestic wells.

Turbidity is an AO and in excess of 5.0 NTU becomes visible to the naked eye and as such most consumers may object to its presence. It is an important indicator of treatment efficiency and it is recommended that this parameter be checked during the design and installation of any water treatment system.

For any water treatment system installed, it recommended that a sample of the treated drinking water be obtained and tested to ensure the treatment system is functioning properly and the quality of the water meets the ODWQS.

5. BOREHOLE INVESTIGATION

This section references the geotechnical study completed for PML as presented in PML Reference 20HF021 Report 1 dated February 8, 2022. For more information, please refer to the report.

Drilling field work was carried out on February 11, 2021 and consisted of six boreholes (Boreholes 1 to 6) drilled to 6.5 m termination depths. The borehole locations are shown on Drawing 2-1, appended.

The borehole locations were selected by the Client and established in the field by PML. Geodetic, metric ground surface elevations and UTM co-ordinates at the borehole locations were determined by PML using a Sokkia GCX3 GNSS Receiver.

The boreholes were advanced using continuous flight solid stem augers, powered by a track mounted CME75 drill rig, supplied, and operated by a specialist drilling contractor, working under the full-time supervision of a member of PML's engineering staff.

Representative samples of the overburden were recovered at frequent depth intervals using a conventional split-spoon sampler during drilling. Standard penetration tests along with pocket penetrometer tests were conducted where applicable with the sampling operation to assess the strength characteristics of the substrata. Additionally, a Dynamic Cone Penetration Test was conducted at Borehole 5.

The ground water conditions at the borehole locations were assessed during drilling by visual examination of the soil, the sampler and the drill rods as the samples were retrieved and when appropriate by measurement of the water level in the open borehole.

Ground water monitoring wells were installed in Boreholes 1, 2, 5 and 6 comprising clean 50 mm diameter screened and solid PVC Schedule 40 pipe. The wells were installed to depths of 6.5 m and were screened at the bottom over a length of 1.5 m. The annular space of the borehole around the screen was backfilled with clean filter sand covered by a bentonite seal and stick-up protective cover set in concrete. The details of the monitoring well construction are shown on the appended Log of Borehole/Monitoring Well sheets. Well records will be kept on file by PML for future reference in accordance with O. Reg. 903/90, as amended

All of the recovered samples were returned to our laboratory for detailed visual examination and classification on selected samples.

5.1 Summarized Surface Conditions

Reference is made to the appended Log of Borehole sheets for details of the subsurface conditions including soil classifications, inferred stratigraphy, ground water observations, and the results of laboratory grain size analysis.

5.1.1 Soil

The subsurface stratigraphy in the boreholes typically comprised a topsoil, over native sand, over silty clay, underlain by sand.

A 200 to 680 mm topsoil veneer was encountered at the surface of the boreholes. The topsoil generally consisted of sand had some to trace silt with the occasional rootlet.

Locally, a 1.8 m silt layer was contacted below the topsoil in Borehole 1. The silt consists of some to trace clay and sand with occasional iron staining and clay seams.

A 1.5 m to 6.0 m native sand layer was contacted below the isolated silt layer in Borehole 1 and below the topsoil of Boreholes 2 to 6 and penetrated at 1.7 to 6.2 m. The sand generally contained some silt and was occasionally silty.

A 300 mm to 2.5 m clayey silt layer was contacted below the upper sand in the boreholes and was penetrated at 4.0 and 5.5 in Boreholes 2 and 4 and extended to termination of 6.5 m in the remaining boreholes.

A second 1.0 and 2.5 m thick sand layer was encountered below the silty clay in Boreholes 2 and 4. The sand extended to termination depths of 6.5 m in Boreholes 2 and 4 respectively. The sand was silty to containing trace silt and trace clay.

5.1.2 Groundwater

Upon completion of auguring, caving soil was observed at 0.9 to 5.2 m (elevations 225.5 to 230.8) in Boreholes 1 to 6. Free water was observed at 3.7 and 5.1 m (elevations 225.5 and 226.1) in Boreholes 1 and 3. Monitoring wells were installed in Boreholes 1, 2, 5 and 6. The most recent water levels taken at the wells were taken on April 6, 2022. Water levels were observed from 3.6 to 4.2 m (elevation 226.4 to 231.0).

5.1.3 Particle Size Distribution Testing

Three soil samples were submitted for particle size analysis. The results are included in Figures 2-1 to 2-3. Based on these results, infiltration rate and percolation times may be assumed to be below:

Sample No.	Sample Depth (m)	Soil Type	Hydraulic Conductivity (K, cm/s)	Infiltration Rate (mm/hour)	Estimated Percolation Time (T, min/cm)
BH2 SS4	2.3 – 2.8	Sand	$< 1.0 \times 10^{-3}$	85	8
BH3 SS7	6.0 – 6.5	Clayey Silt	$< 1.0 \times 10^{-5}$	25	25
BH4 SS5	3.0 – 3.5	Clayey Silt	$< 1.0 \times 10^{-5}$	25	25

6. ASSESSMENT OF POTENTIAL SEWAGE SYSTEM IMPACTS

6.1 Nitrate Loading Considerations

Assessment of the nitrate loading from infiltration of effluent from the sewage treatment systems was conducted in accordance with the following documents:

- Procedure D-5-4 – Technical Guideline for Individual On Site Sewage Systems: Water Quality Impact Assessment (MOEE April 1996);
- Hydrogeological Technical Information Requirements for Land Development Chapter 4, Section 4.5 (MOEE April 1995).

Nitrate in septic effluent is attenuated by dilution with infiltrating surface water and water discharged into the septic bed as well as ground water seepage from the upstream to the downstream side of the property (ground water flux). Ground water flux was not considered in the nitrate dilution calculation for this severance; consequently, the nitrate loading assessment is considered to be conservative.

The surface water infiltration rate was computed in accordance with the procedure noted in the MOEE information document. This procedure involves a three-step process:

i) A water budget analysis to compute the 'water surplus' (total rainfall – evapotranspiration).

ii) Selection of infiltration factors for the conditions at this particular Site to compute the rate of infiltration (sum of infiltration factors x water surplus).

iii) Computation of the nitrate loading on the ground water resource.

The water budget analysis was conducted using the Thornwaite and Mather procedure noted in the MOEE information document. This method is based on classic storm water management principles. Since the equations employed to compute the volume of surface water runoff were developed for heavy rainfall events of short duration, and a large volume of the precipitation occurs at a light to moderate rate over an extended period, the procedure over-estimates the volume of runoff and yields a conservative assessment of the infiltration rate.

The water surplus and infiltration rates noted in the following table were computed from rainfall data provided by Environment Canada and the infiltration factors noted in the MOEE information document:

Topography (rolling)	0.2
Soil (between clay and loam to sandy loam)	0.3
Cover (cultivated)	0.1
**Total ..... **	**0.6**

Monitoring Station	Annual Precipitation (mm)	Water Surplus[1] (mm/year)	Infiltration Rate (mm/year)
Delhi	965.	348	209

1. Computed by the Thornthwaite and Mather Method (Figure 2-4)

The nitrate loading computation was based on the following equation and input parameters noted in the MOEE Procedure.

$$N_C = \frac{N_E Q_E + N_B V_D}{Q_E + V_D}$$

where N_C = predicted nitrate loading at the property boundary (mg/L)

N_E = nitrate concentration in septic effluent (40 mg/L per MOEE Procedure)

N_B = background nitrate concentration (assume 0.15 mg/L for rainwater)

Q_E = total effluent sewage flow volume (L/day)
(1000 L/day per MECP Procedure)

V_D = infiltration volume (L/day)
(infiltration rate x land area)/365 days

infiltration rate = 209 mm/year

land area = 3500 m^2 less 5% impermeable surfaces = 3325 m^2

The nitrate concentration at the down gradient property line of the minimum proposed lot size of 0.35 ha is computed to be 13.9 mg/L which does not satisfy the regulatory requirement of 10.0 mg/L. A copy of the calculation is provided on Figure 2-5 (Case 1). To achieve a nitrate concentration of 10 mg/L or less at the down gradient property line for a lot size of 0.35 ha, a maximum effluent nitrate concentration of 30 mg/L is required, which is a 30% reduction from the

40 mg/L required by the MECP. In this regard, an advanced treatment system would be required to reduce the nitrate concentration by a minimum of 30%, which results in a downgradient concentration of 9.8 mg/L. A copy of this calculation is provided on Figure 2-6 (Case 2). It is noted that advance treatment systems can achieve a minimum of 50% or greater nitrate reduction. The use of advanced treatment systems for nitrate reduction are subject to regulatory approval.

For comparison purposes, the minimum lot size that will result in a predicted nitrate concentration of 10 mg/L or less at the down gradient property line using a conventional treatment unit without nitrate reduction is 0.56 ha. A copy of this calculation is provided in Figure 2-7 (Case 3).

6.2 Leaching Bed Design Criteria

The sand on Site is considered to be capable of treating domestic sewage. Free water was observed at 3.7 and 5.1 m (elevations 225.5 and 226.1) in Boreholes 1 and 3. Monitoring wells were installed in Boreholes 1, 2, 5 and 6. The most recent water levels taken at the wells were taken on March 10, 2021. Water levels were observed from 3.8 to 4.5 m (elevation 226.2 to 226.5 and elevation 230.4 in Borehole 2). Provided Site grades are maintained or raised during development, the minimum 900 mm clearance requirement between the water level and the base of the trench excavated for leaching beds should be satisfied.

The leaching bed should be designed based on the expected maximum daily sewage effluent loading. For example, the total daily sewage flow (Q) for a typical four-bedroom 230 m^2 house with up to 26 fixture units is 2,300 L/day, based on the criteria noted in the 2012 Ontario Building Code (Table 8.2.1.3.A).

Based on the grain size distribution curves (Figures 2-1 to 2-3), it is expected the native soils on the lands to be severed will exhibit a coefficient of permeability, K in the order of 10^{-3} to 10^{-5} cm/sec. The upper receiving soils are predominantly sand with typical percolation times in the range of 8-20 mins/cm, however some localized areas contain higher percentages of fins and therefore for design purposes, a percolation rate, T, of 25 min/cm is recommended.

Various septic system configurations may be considered for the proposed lot and once lot development plans are known, detailed septic system design and layout will be required for each lot. For preliminary planning purposes, an advanced Level IV treatment system such as System O)) Standard Configuration may be considered to achieve the required nitrate reduction.

In this case, the minimum required contact area for a Type A Dispersal Bed is determined as follows:

$$A = \frac{QT}{400}$$

Where, A = area of contact between the base of the sand and underlying soil
Q = the total daily design sanitary sewage flow in litres (2300 l/day)
T = the lesser of 50 and the percolation time of the underlying soil (25 min/cm)

As per the above, the minimum contact area would be 144 m2, plus additional space for treatment units, pumps and the like. The sand layer must extend a minimum of 15 m beyond the centrelines of the outer distribution pipes. Alternatively, it may be possible to further reduce the required area for the system by considering a System O)) nested pipe configuration.

Once the location of the sewage treatment system is selected, we recommend field percolation tests to determine the in situ percolation rate and confirm the required area of the leaching bed.

The layout and positioning of the septic system components must be in accordance with the Ontario Building Code and/or local regulations. This includes meeting all of the following minimum clearances:

MINIMUM CLEARANCES FOR TREATMENT UNITS

As per OBC Table 8.2.1.6.A and B

Object	Minimum Clearance for Treatment Units (m)	Minimum Clearance for Distribution Piping and Leaching Chambers (m)
Structure	1.5	5
Well with a watertight casing to a depth of at least 6 m	15	15
Any other well	15	30
Lake	15	15
Pond	15	15
Reservoir	15	15
River	15	15
Spring	15	15
Stream	15	15
Property Line	3	3

Based on the proposed lot sizes and dimensions and considering the preliminary septic system sizing and the required minimum clearances as presented above, it is considered feasible to service the proposed lots with individual on-site sewage treatment systems. This includes sufficient space for a replacement system, if needed.

General recommendations for management practices are provided on Table 1.

7. CONCLUSIONS

Based on the findings of this study, our summarized comments are provided below.

1. It is likely that the ground water aquifer on this Site will be capable of meeting the water demand for the development, subject to the results of pump testing. A private water treatment system will be required.

   Pump tests will be required to confirm the aquifer characteristics, yield and the potential for an adverse impact to the ground water resource in the area and neighbouring wells.

2. It is recommended that a sample of the treated drinking water be obtained and tested to ensure the treatment system is functioning properly and the quality of the water meets the ODWQS.

3. The nitrate loading for the proposed minimum lot size of 0.35 ha was determined to be 13.9 mg/L, which exceeds the regulatory limit of 10 mg/L. Advanced treatment units incorporating nitrate reduction will be required to support the minimum proposed lot size.

4. The minimum lot size supported without advanced treatment was determined to be 0.56 ha. The nitrate concentration at the down gradient property line of a lot size of 0.56 ha was computed to be 10.0 mg/L, which satisfies the regulatory requirement of 10.0 mg/L.

5. On site treatment of domestic sewage is considered to be feasible through the installation of a septic bed; the minimum area required is estimated to be 250 m^2 for a four bedroom dwelling.

6. Once the location of the sewage treatment system is selected, we recommend field percolation tests to determine the in situ percolation rate and confirm the required area of the leaching bed.

7. The sewage treatment system should be designed and constructed in accordance with the Ontario Building Code and/or local regulations.

8. CLOSURE

We trust the information presented in this report is sufficient for your present purposes. If you have any questions, please do not hesitate to contact our office.

Sincerely

Peto MacCallum Ltd.

Scott Jeffrey, P.Eng., QP_{ESA}, $LEED_{GA}$
Director
Regional Manager, Geotechnical and Geoenvironmental Services

AR/SJ:ld/tc

References

Topographic and Other Maps

Ontario Basic Maps (OBM) ArcIMS Service, Environmental Systems Research Institute Canada, 2004, http://www.geographynetwork.ca/

Google Earth™, http://www.google.com/earth/index.html

Chapman, L.J., and Putnam, D.F., 1984: The Physiography of Southern Ontario; Ontario. Ontario Research Foundation.

M2369; Quaternary Geology, Simcoe, Southern Ontario; Ministry of Natural Resources; 1976; Scale: 1:50 000.

M2370; Bedrock Topography of the Simcoe Area, Southern Ontario; Ontario Department of Mines, 1976; Scale: 1:50,000.

M2371; Drift Thickness Series, Simcoe Sheet, Southern Ontario; Ontario Department of Mines, 1976; Scale: 1:50,000.

P2234; Paleozoic Geology, Simcoe, Southern Ontario; Ontario Division of Mines, 1980; Scale: 1:50 000.

Publications

Aqua Resource Inc., Long Point Region, Kettle Creek and Catfish Creek Integrated Water Budget - Final Report, April 2009

Ministry of Environment and Energy (MOEE) Hydrogeological Technical Information Requirements for Land Development Applications, April 1995, Her Majesty the Queen in Right of Ontario as Represented by the Minister of Environment and Energy.

Ministry of the Environment and Energy (MOEE), Procedure D-5-4 – Technical Guideline for Individual on Site Sewage Systems: Water Quality Impact Assessment, April 1996.

O. Reg. 169/03 Ontario Drinking Water Quality Standards, Safe Drinking Water Act, 2002.

O. Reg. 170/03 Drinking Water Systems, Safe Drinking Water Act, 2002.

Well Records

Ontario Ministry of the Environment (MOE) Environmental Monitoring and Reporting Branch, Water Well Records Management

TABLE 1

RECOMMENDED CONSTRUCTION AND MANAGEMENT PRACTICES FOR PRIVATE SEPTIC TILE LEACHING BED SEWAGE DISPOSAL SYSTEMS

1. Lot drainage should be accentuated to ensure positive runoff of storm water away from the tile field. Sewage effluent should not compete with infiltrating storm water which may overload the tile field capacity.
2. Provided it is allowed by local authorities, eavestrough downspouts should be connected directly into the storm sewer, eliminating a potential water source to compete for ground infiltration.

   If storm sewers are not available, the downspouts and extensions should be planned for the opposite side of the house away from the leaching bed.
3. Water conservation should be exercised to reduce the volume of effluent to be handled by the tile field.

   The tile field should be fenced off before construction proceeds.
4. All heavy construction equipment and stockpiling of fill should be prohibited on the tile field area, since soil compaction will result which could severely restrict evapotranspiration within the bed area.
5. Vehicular traffic of any type should not be permitted on the surface of the leaching bed following construction.
6. In order to prevent frost damage, the snow cover should be left in place and measures taken to ensure it is not packed by surface use.
7. Construction of the leaching bed system should be supervised by geotechnical personnel.
8. Routine maintenance is necessary to control growth of excessive vegetation such as trees and heavy growth of weeds over the leaching bed area.
9. To ensure continued bacterial breakdown of sewage effluent, the septic tank should be pumped periodically to remove sludge build-up.
10. If the septic system is equipped with a grease trap, a routine maintenance program must be implemented to ensure it is cleaned regularly.
11. Backwash water from water softener systems can adversely affect bacterial action and concrete components of the sewage system. Therefore, the water should not be discharged to the sewage system.
12. Chemicals such as drain cleaners, petroleum products, solvents, degreasers, etc. will also affect bacterial action and should not be discharged into the sewage system.

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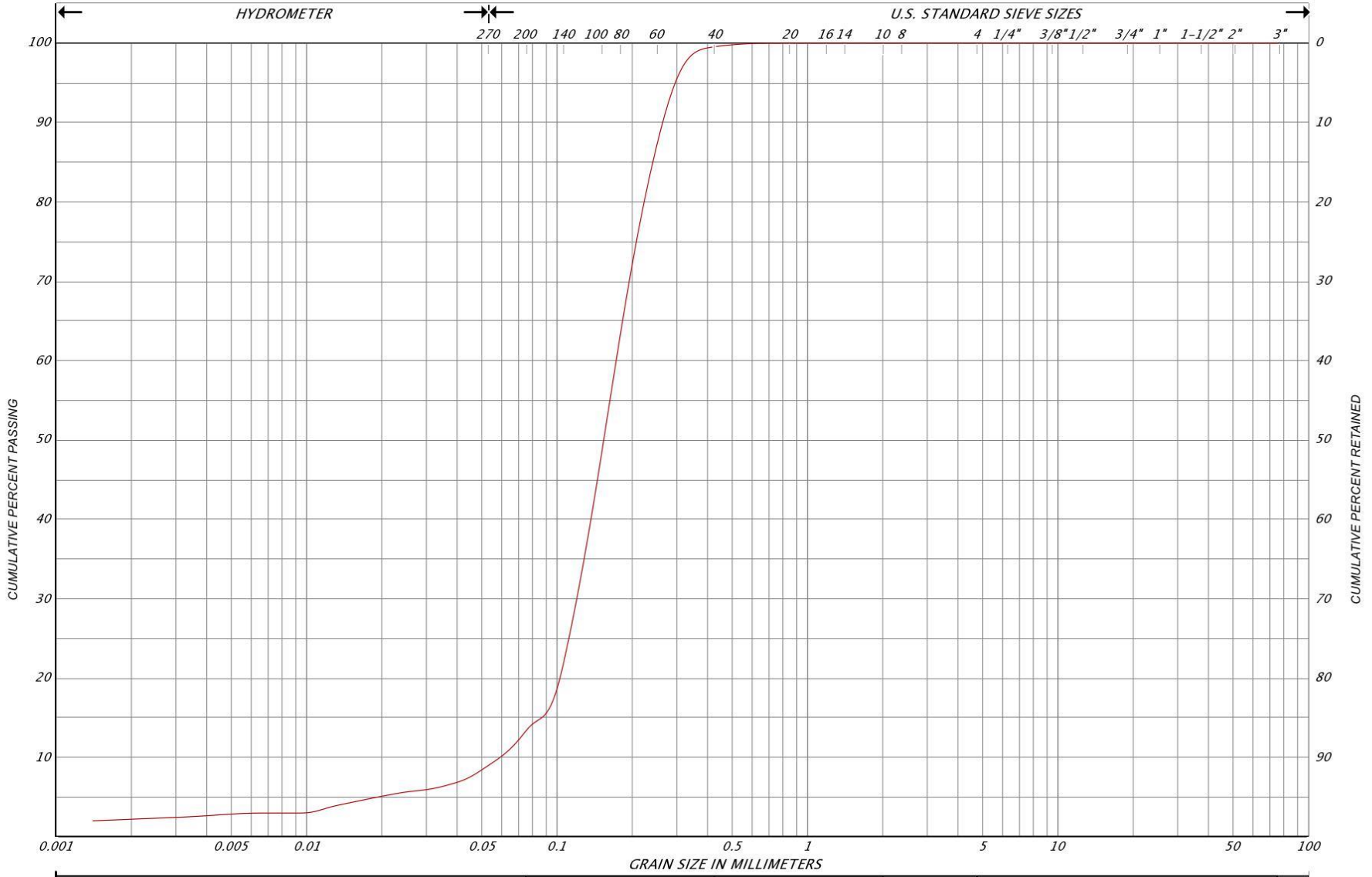
PARTICLE SIZE DISTRIBUTION CHART

SOIL TYPE: SAND

PROJECT NO.20HF021
FIGURE NO.2-1
BH2 SS4



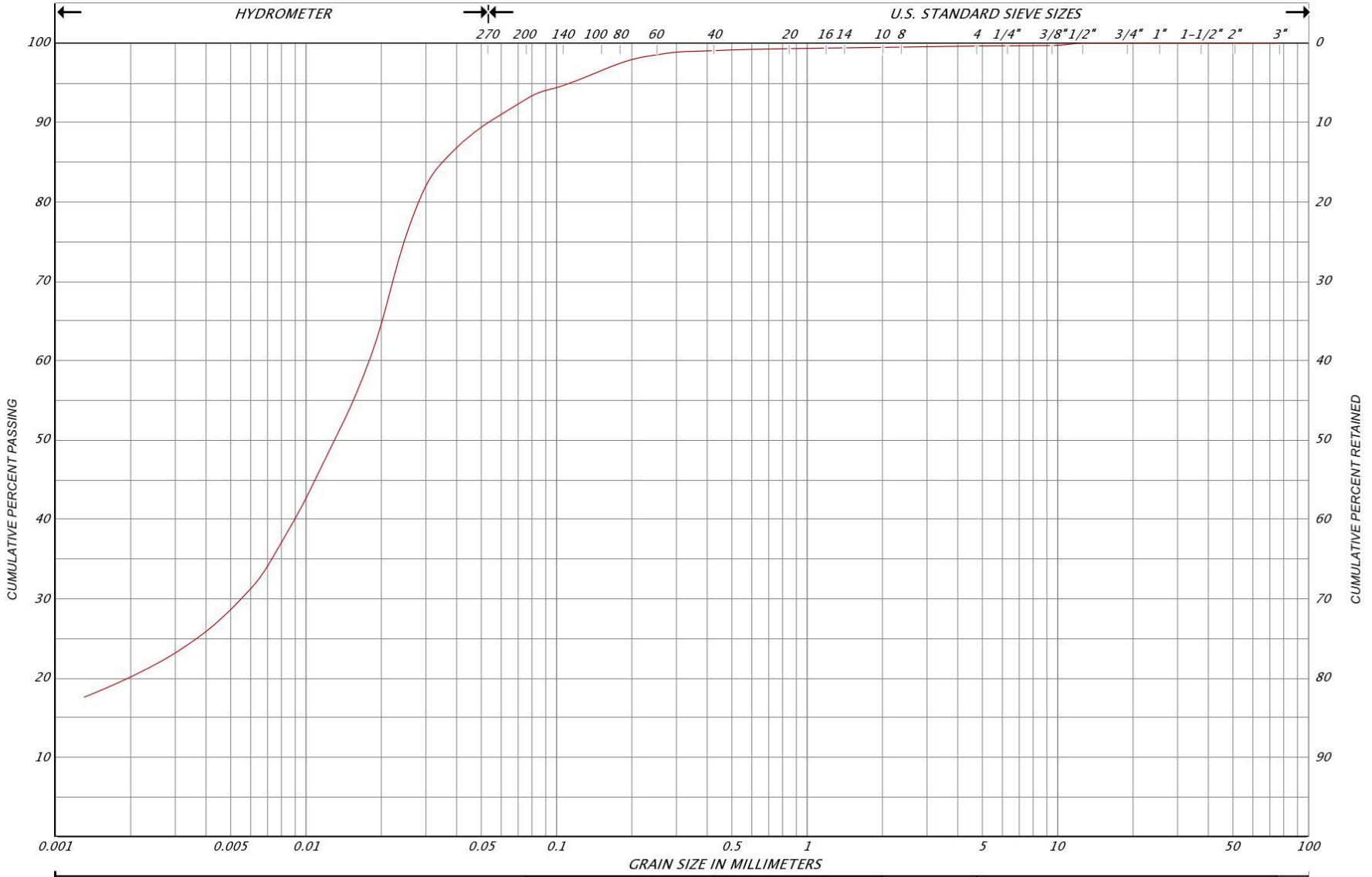
SILT & CLAY			FINE	MEDIUM	COARSE	GRAVEL		COB BLES	UNIFIED
			SAND						
CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	GRAVEL		COBBLES	M.I.T
	SILT			SAND						
CLAY	SILT		V.FINE	FINE	MED.	COARSE	GRAVEL			US BUREAU
			SAND							

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

PROJECT NO.20HF021
FIGURE NO.2-2
BH3 SS7

PARTICLE SIZE DISTRIBUTION CHART

SOIL TYPE: CLAYEY SILT



SILT & CLAY			FINE	MEDIUM	COARSE	GRAVEL		COB BLES	UNIFIED
			SAND						
CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	GRAVEL		COBBLES	M.I.T
	SILT			SAND						
CLAY	SILT		V.FINE	FINE	MED.	COARSE	GRAVEL			US BUREAU
			SAND							

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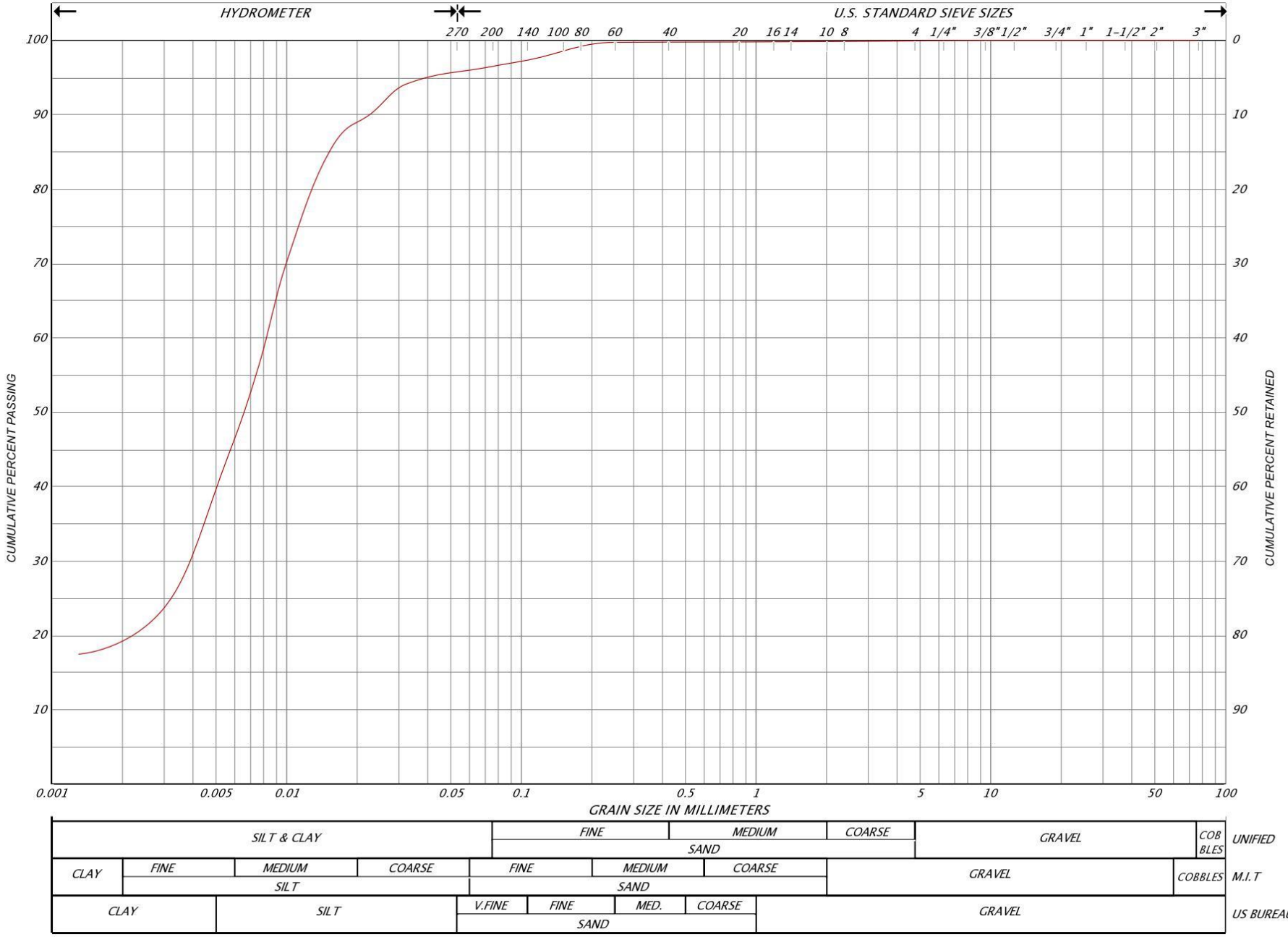
PROJECT NO.20HF021
FIGURE NO.2-3

PARTICLE SIZE DISTRIBUTION CHART

SOIL TYPE: CLAYEY SILT
BH4 SS5



SILT & CLAY			FINE	MEDIUM	COARSE	GRAVEL		COB BLES	UNIFIED
			SAND						
CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	GRAVEL		COBBLES	M.I.T
	SILT			SAND						
CLAY	SILT		V.FINE	FINE	MED.	COARSE	GRAVEL			US BUREAU
			SAND							

Figure 2-4

Water Budget Summary (Using Thornthwaite Empirical Approach)

Month	Mean Daily Average Daily Temp, t [1] (°C)	Heat Index, i [2]	Mean Montly Precipitation, P [1] (mm)	Days in Month, d	Average Daylight Hours, N [3]	Unadjusted Potential Evapotranspiration, PE_{unadj} [4] (mm)	Adjusted Evapotranspiration Adjusted for Month and Daylight, PE [5] (mm)	Actual Water Balance, P - PE (mm)
January	-5.0	0.00	81.3	31	9.45	0.00	0.00	81.30
February	-4.5	0.00	58.0	28	10.57	0.00	0.00	58.00
March	0.3	0.01	70.8	31	11.98	0.84	0.87	69.93
April	6.8	1.59	87.4	30	13.44	28.83	32.29	55.11
May	13.6	4.55	87.6	31	14.67	63.17	79.81	7.79
June	19.0	7.55	81.5	30	15.28	92.23	117.47	-35.97
July	21.2	8.91	88.6	31	14.95	104.41	134.39	-45.79
August	20.1	8.22	79.5	31	13.85	98.30	117.20	-37.70
September	16.4	6.04	85.8	30	12.45	78.08	81.00	4.80
October	10.0	2.86	86.1	31	11.00	44.61	42.27	43.83
November	3.9	0.69	82.5	30	9.74	15.37	12.47	70.03
December	-1.7	0.00	76.3	31	9.09	0.00	0.00	76.30
Totals		40.41	965.4			525.8	617.8	347.6

Annual Heat Index, I	40.41
α [3]	1.13

Notes:

[1] Data from Environment Canada 1991-2020 Climate Nomrals - Delhi Station (1991-2020 Data)

[2] Monthly Heat Index, $i = (T/5)^{1.514}$; I = Annual Heat Index = sum of monthly heat indecies

[3] from US Naval Observatory web site

[3] $\alpha = (6.75*10^{-7} * I^3) - (7.71*10^{-5} * I^2) + (0.01792 * I) + .49239$ Where I = Annual Heat Index

[4] $PE_{unadj} = 16 * (10*t / I)\alpha$ Where: t= Degrees C; I= Annual heat index; α = factor based on heat index

[5] PE = PEunadj x (N / 12) * (d / 30) Where N = number of daylight hours in that month; d = number of days in the month

MECP D-5-4 PREDICTIVE ASSESSMENT CALCULATIONS

CASE 1:

3500 m2 Lot with 5% impervious space serviced by a conventional treatment unit without Nitrate reduction

Water Budget Calculations

Annual Precipitation, P	0.965	m/yr	*Environment Canada 1991 to 2020 Climate Normals, Delhi Station*
Evapotranspiration, E	0.618	m/yr	*Thornthwaite Mather Water Balance*
Water Surplus, S	0.348	m/yr	[S = P - E]

Infiltration Calculations

Infiltration Factors based on MOEE Hydrogeological Technical Information Requiremetns for Land Development Applications (April 1995)

Topography, I_T		Soil Type, I_S		Vegetative Cover, I_V	
Flat	0.3	Tight Impervious Clay	0.1	Cultivated	0.1
Rolling	0.2	Medium (Clay & Loam)	0.2	Woodland	0.2
Hilly	0.1	Open Sandy Loam	0.4		
Selected: I_T =	0.2	I_S =	0.3	I_V =	0.1

Combined Infiltration Factor, I	0.6		[$I = I_T + I_S + I_V$]
Infiltration Rate, IR	0.2086	m/yr	[IR = S x I]
Site Area, A_S	3500	m^2	
Percent Impervious Areas	5	%	
Impervious Areas, A_I	175	m^2	
Pervious Area, A_P	3325	m^2	[$A_P = A_S - A_I$]
Dilution Volume, V_D	1900	L/day	[V_D = IR x AP) x 1000 L/m^3 ÷ 365 days/year]

Nitrate Loading

Number of Lots, L	1	Lots	
Daily Effluent Flow per lot, Q_e	1000	L/day	*Default as per MOEE Technical Guideline*
Total Effluent Flow, Q_E	1000	L/day	[$Q_T = L \times Q_e$]
Nitrate Concentration in Effluent, N_E	40	mg/L	*Default concentration without treatment as per MOEE Technical Guideline*
Nitrate Reduction with Advanced Treatment	0	%	*Conventional treatment unit without Nitrate reduction*
Nitrate Concentration in Effluent, N_E	40	mg/L	
Background Nitrate Concentration, N_B	0.15	mg/L	*Assumed background concentration*

Predictive Assessment

Nitrate Concentration at Property Boundary, N_C

$$N_C = \frac{(N_E \times Q_E) + (N_B \times V_D)}{(Q_E + V_D)}$$

MOEE D-5-4 Guidelines for Residential Developments

N_C = 13.9 mg/L ***** Exceeds ODWQ Guideline Limit of 10 mg/L**

MECP D-5-4 PREDICTIVE ASSESSMENT CALCULATIONS

CASE 1:

3500 m2 Lot with 5% impervious space serviced by an advance treatment unit with Nitrate reduction

Water Budget Calculations

Annual Precipitation, P	0.965	m/yr	*Environment Canada 1991 to 2020 Climate Normals, Delhi Station*
Evapotranspiration, E	0.618	m/yr	*Thornthwaite Mather Water Balance*
Water Surplus, S	0.348	m/yr	[S = P - E]

Infiltration Calculations

Infiltration Factors based on MOEE Hydrogeological Technical Information Requiremetns for Land Development Applications (April 1995)

Topography, I_T		Soil Type, I_S		Vegetative Cover, I_V	
Flat	0.3	Tight Impervious Clay	0.1	Cultivated	0.1
Rolling	0.2	Medium (Clay & Loam)	0.2	Woodland	0.2
Hilly	0.1	Open Sandy Loam	0.4		
Selected: I_T =	0.2	I_S =	0.3	I_V =	0.1

Combined Infiltration Factor, I	0.6		[$I = I_T + I_S + I_V$]
Infiltration Rate, IR	0.2086	m/yr	[IR = S x I]
Site Area, A_S	3500	m^2	
Percent Impervious Areas	5	%	
Impervious Areas, A_I	175	m^2	
Pervious Area, A_P	3325	m^2	[$A_P = A_S - A_I$]
Dilution Volume, V_D	1900	L/day	[V_D = IR x AP) x 1000 L/m^3 ÷ 365 days/year]

Nitrate Loading

Number of Lots, L	1	Lots	
Daily Effluent Flow per lot, Q_e	1000	L/day	*Default as per MOEE Technical Guideline*
Total Effluent Flow, Q_E	1000	L/day	[$Q_T = L \times Q_e$]
Nitrate Concentration in Effluent, N_E	40	mg/L	*Default concentration without treatment as per MOEE Technical Guideline*
Nitrate Reduction with Advanced Treatment	30	%	*Nitrate reduction using Level IV Advanced Treatment Unit*
Nitrate Concentration in Effluent, N_E	28	mg/L	
Background Nitrate Concentration, N_B	0.15	mg/L	*Assumed background concentration*

Predictive Assessment

Nitrate Concentration at Property Boundary, N_C

$$N_C = \frac{(N_E \times Q_E) + (N_B \times V_D)}{(Q_E + V_D)}$$

MOEE D-5-4 Guidelines for Residential Developments

N_C = 9.8 mg/L **O.K. - Meets ODWQ Guideline Limit of 10 mg/L**

Figure 2-7

MECP D-5-4 PREDICTIVE ASSESSMENT CALCULATIONS

CASE 1:

Minimum Lot Size assuming 5% impervious space serviced by an conventional treatment unit to meet 10 mg/L at property boundary.

Water Budget Calculations

Annual Precipitation, P	0.965	m/yr	*Environment Canada 1991 to 2020 Climate Normals, Delhi Station*
Evapotranspiration, E	0.618	m/yr	*Thornthwaite Mather Water Balance*
Water Surplus, S	0.348	m/yr	[S = P - E]

Infiltration Calculations

Infiltration Factors based on MOEE Hydrogeological Technical Information Requiremetns for Land Development Applications (April 1995)

Topography, I_T		Soil Type, I_S		Vegetative Cover, I_V	
Flat	0.3	Tight Impervious Clay	0.1	Cultivated	0.1
Rolling	0.2	Medium (Clay & Loam)	0.2	Woodland	0.2
Hilly	0.1	Open Sandy Loam	0.4		
Selected: I_T =	0.2	I_S =	0.3	I_V =	0.1

Combined Infiltration Factor, I	0.6		[$I = I_T + I_S + I_V$]
Infiltration Rate, IR	0.2086	m/yr	[IR = S x I]
Site Area, A_S	5600	m^2	
Percent Impervious Areas	5	%	
Impervious Areas, A_I	280	m^2	
Pervious Area, A_P	5320	m^2	[$A_P = A_S - A_I$]
Dilution Volume, V_D	3040	L/day	[V_D = IR x AP) x 1000 L/m^3 ÷ 365 days/year]

Nitrate Loading

Number of Lots, L	1	Lots	
Daily Effluent Flow per lot, Q_e	1000	L/day	*Default as per MOEE Technical Guideline*
Total Effluent Flow, Q_E	1000	L/day	[$Q_T = L \times Q_e$]
Nitrate Concentration in Effluent, N_E	40	mg/L	*Default concentration without treatment as per MOEE Technical Guideline*
Nitrate Reduction with Advanced Treatment	0	%	*Conventional treatment unit without Nitrate reduction*
Nitrate Concentration in Effluent, N_E	40	mg/L	
Background Nitrate Concentration, N_B	0.15	mg/L	*Assumed background concentration*

Predictive Assessment

Nitrate Concentration at Property Boundary, N_C

$$N_C = \frac{(N_E \times Q_E) + (N_B \times V_D)}{(Q_E + V_D)}$$

MOEE D-5-4 Guidelines for Residential Developments

N_C = 10.0 mg/L ***** Exceeds ODWQ Guideline Limit of 10 mg/L**

LIST OF ABBREVIATIONS

PENETRATION RESISTANCE

Standard Penetration Resistance N: - The number of blows required to advance a standard split spoon sampler 0.3 m into the subsoil. Driven by means of a 63.5 kg hammer falling freely a distance of 0.76 m.

Dynamic Penetration Resistance: - The number of blows required to advance a 51 mm, 60 degree cone, fitted to the end of drill rods, 0.3 m into the subsoil. The driving energy being 475 J per blow.

DESCRIPTION OF SOIL

The consistency of cohesive soils and the relative density or denseness of cohesionless soils are described in the following terms:

CONSISTENCY	N (blows/0.3 m)	c (kPa)	DENSENESS	N (blows/0.3 m)
Very Soft	0 - 2	0 - 12	Very Loose	0 - 4
Soft	2 - 4	12 - 25	Loose	4 - 10
Firm	4 - 8	25 - 50	Compact	10 - 30
Stiff	8 - 15	50 - 100	Dense	30 - 50
Very Stiff	15 - 30	100 - 200	Very Dense	> 50
Hard	> 30	> 200		

WTPL	Wetter Than Plastic Limit
APL	About Plastic Limit
DTPL	Drier Than Plastic Limit

TYPE OF SAMPLE

SS	Split Spoon	TW	Thinwall Open
WS	Washed Sample	TP	Thinwall Piston
SB	Scraper Bucket Sample	OS	Oesterberg Sample
AS	Auger Sample	FS	Foil Sample
CS	Chunk Sample	RC	Rock Core
ST	Slotted Tube Sample		

PH	Sample Advanced Hydraulically
PM	Sample Advanced Manually

SOIL TESTS

Qu	Unconfined Compression	LV	Laboratory Vane
Q	Undrained Triaxial	FV	Field Vane
Qcu	Consolidated Undrained Triaxial	C	Consolidation
Qd	Drained Triaxial		

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 1

1 of 1

PROJECT Laplante Road - 8 Lot Plan of Subdivision
OUR PROJECT NO. 20HF021
LOCATION Laplante Road, Tilsonburg
BORING DATE February 11, 2021
ENGINEER SJ
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN SM

ELEV / DEPTH in feet	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES
230.6 / 0.0	TOPSOIL: 670 mm Loose, brown sand topsoil, some silt, damp; occasional rootlet		1	SS	8
0.7	SILT: Loose, brown silt, some clay, trace sand, wet; occasional iron staining and clay seams		2	SS	5
1.4	becoming very loose, some sand, trace clay		3	SS	2
228.2			4A	SS	1
2.5	SAND: Very loose, brown sand, some silt, trace clay, moist		4B	SS	
			5	SS	3
226.6					
4.0	CLAYEY SILT: Very stiff, brown clayey silt, trace sand WTPL		6	SS	15
225.1					
5.5	becoming hard, grey		7	SS	36
6.5	BOREHOLE TERMINATED AT 6.5 m				

ELEVATION SCALE: 230, 229, 228, 227, 226, 225

SHEAR STRENGTH ksf
○ UNCONFINED + FIELD VANE
▲ POCKET PENETROMETER
1 2 3 4
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

GAS READINGS ppm

REMARKS & GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

Stickup Well Protector Set
Bentonite Seal
50 mm Diameter PVC Pipe
Filter Sand
Screen
Upon completion of augering, free water and cave at 5.1 m.

5.0
10.0

DOFASCO 20HF021 BOREHOLE LOGS.GPJ ON_MOT.GDT 11/19/2024 4:00:57 PM

+7, ×5 : Numbers refer to Sensitivity

20
15 5
10
(%) STRAIN AT FAILURE

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 2

1 of 1

PROJECT Laplante Road - 8 Lot Plan of Subdivision
OUR PROJECT NO. 20HF021
LOCATION Laplante Road, Tilsonburg
BORING DATE February 11, 2021
ENGINEER SJ
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN SM

ELEV / DEPTH in feet	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES
234.9					
0.0	TOPSOIL: 200 mm compact, dark brown sand topsoil, some silt damp; occasional rootlet		1A	SS	13
0.2	SAND: Loose, brown sand, some silt, damp		1B	SS	
			2	SS	7
			3	SS	8
232.8					
2.1	becoming compact		4	SS	13
			5	SS	13
230.9					
4.0	CLAYEY SILT: Stiff, brown clayey silt, trace sand DTPL; occasional clay layers		6	SS	10
5.0					
229.4					
5.5	SAND: Compact, brown and grey sand, trace silt, damp; occasional oxidation staining		7	SS	27
6.5	BOREHOLE TERMINATED AT 6.5 m				
10.0					

ELEVATION SCALE: 234, 233, 232, 231, 230, 229

SHEAR STRENGTH ksf
○ UNCONFINED + FIELD VANE
▲ POCKET PENETROMETER
1 2 3 4
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

GAS READINGS ppm

REMARKS & GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL
0 87 11 2

Upon completion of augering, no free water, cave at 5.2 m

+7, ×5 : Numbers refer to Sensitivity

20
15 — 5
10

(%) STRAIN AT FAILURE

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 3

1 of 1

PROJECT Laplante Road - 8 Lot Plan of Subdivision
OUR PROJECT NO. 20HF021
LOCATION Laplante Road, Tilsonburg
BORING DATE February 11, 2021
ENGINEER SJ
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN SM

ELEV / DEPTH in feet	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	ELEVATION SCALE	SHEAR STRENGTH ksf (○ UNCONFINED + FIELD VANE ▲ POCKET PENETROMETER; DYNAMIC CONE PENETRATION / STANDARD PENETRATION TEST ×/●)	WATER CONTENT (%) (PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L)	GAS READINGS ppm	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
229.8										
0.0	TOPSOIL: 680 mm Loose, brown sand topsoil, trace silt, damp; occasional rootlet		1	SS	6					
0.7	SAND: Loose, light brown silt, some clay, trace sand, moist		2	SS	7	229				
			3	SS	4	228				
227.7										
2.1	becoming compact, wet		4	SS	11					
2.9	becoming saturated		5	SS	14	227				
225.8						226				
4.0	CLAYEY SILT: Stiff, grey clayey silt, trace sand, WTPL		6	SS	8	225	>> ▲			
5.0										
224.4						224				
5.5	becoming very stiff		7	SS	25		>> ▲			0 7 73 20
6.5	BOREHOLE TERMINATED AT 6.5 m									Upon completion of augering, free water and cave at 3.7 m
10.0										

DOFASCO 20HF021 BOREHOLE LOGS.GPJ ON_MOT.GDT 11/19/2024 4:01:00 PM

+7, ×5 : Numbers refer to Sensitivity

(%) STRAIN AT FAILURE

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 4

1 of 1

PROJECT Laplante Road - 8 Lot Plan of Subdivision
OUR PROJECT NO. 20HF021
LOCATION Laplante Road, Tilsonburg
BORING DATE February 11, 2021
ENGINEER SJ
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN SM

ELEV / DEPTH in feet	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	TYPE	"N" VALUES
231.7 / 0.0	TOPSOIL: 250 mm Loose, brown sand topsoil, damp; occasional rootlet		1	SS	7
0.3	SAND: Loose, brown sand, trace silt, wet		2A	SS	4
			2B	SS	
			3A	SS	9
230.0 / 1.7	CLAYEY SILT: Stiff, brown clayey silt, trace sand, DTPL; occasional sand lenses		3B	SS	
2.1	becoming firm		4	SS	7
2.9	becoming stiff		5	SS	12
227.7 / 4.0	SAND: Dense, brown and grey sand, trace silt, damp; occasional oxidation staining		6	SS	35
5.0 / 226.3 / 5.5	becoming compact, saturated		7	SS	12
6.5	BOREHOLE TERMINATED AT 6.5 m				

ELEVATION SCALE: 231, 230, 229, 228, 227, 226

SHEAR STRENGTH ksf
○ UNCONFINED + FIELD VANE
▲ POCKET PENETROMETER
1 2 3 4
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

GAS READINGS (ppm)

REMARKS & GRAIN SIZE DISTRIBUTION (%)

	GR	SA	SI	CL
4	0	3	76	20

Upon completion of augering, no free water, cave at 0.9 m

10.0

DOFASCO 20HF021 BOREHOLE LOGS.GPJ ON_MOT.GDT 11/19/2024 4:01:01 PM

+7, ×5 : Numbers refer to Sensitivity

20
15 — 5
10

(%) STRAIN AT FAILURE

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 5

PROJECT Laplante Road - 8 Lot Plan of Subdivision
OUR PROJECT NO. 20HF021
LOCATION Laplante Road, Tilsonburg
BORING DATE February 11, 2021
ENGINEER SJ
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN SM

ELEV / DEPTH in feet	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES
230.4 / 0.0	TOPSOIL: 200 mm very loose, dark brown sand topsoil, some silt damp; occasional rootlet		1A	SS	3
0.2	SAND: Very loose, brown sand, some silt, damp		1B	SS	
0.7	becoming wet; occasional silt seams		2	SS	4
			3A	SS	3
			3B	SS	
			4	SS	1
			5	SS	2
226.4 / 4.0	becoming compact, saturated		6	SS	30
224.2 / 6.2	CLAYEY SILT: Stiff, grey clayey silt, trace sand, WTPL		7A	SS	10
6.5	BOREHOLE TERMINATED AT 6.5 m		7B	SS	

ELEVATION SCALE: 230, 229, 228, 227, 226, 225, 224

SHEAR STRENGTH ksf
○ UNCONFINED + FIELD VANE
▲ POCKET PENETROMETER
1 2 3 4

DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

GAS READINGS ppm

REMARKS & GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

Stickup Well Protector Set
Bentonite Seal
50 mm Diameter PVC Pipe
Filter Sand
Screen
Upon completion of augering, free water and cave at 2.1 m

5.0
10.0

DOFASCO 20HF021 BOREHOLE LOGS.GPJ ON_MOT.GDT 11/19/2024 4:01:03 PM

+7 , ×5 : Numbers refer to Sensitivity

20 / 15 5 / 10 (%) STRAIN AT FAILURE

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 6

1 of 1

PROJECT Laplante Road - 8 Lot Plan of Subdivision
OUR PROJECT NO. 20HF021
LOCATION Laplante Road, Tilsonburg
BORING DATE February 11, 2021
ENGINEER SJ
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN SM

ELEV / DEPTH in feet	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	TYPE	"N" VALUES
230.2 / 0.0	TOPSOIL: 250 mm Compact, brown sandy silt topsoil, damp; occasional rootlet		1A	SS	8
0.3	SAND: Loose, brown sand, trace silt, damp		1B	SS	
			2	SS	10
			3	SS	9
228.1 / 2.1	becoming compact		4	SS	19
			5	SS	29
226.2 / 4.0	becoming loose, saturated		6	SS	5
224.8 / 5.5	CLAYEY SILT: Very stiff, grey clayey silt, WTPL		7	SS	28
6.5	BOREHOLE TERMINATED AT 6.5 m				

ELEVATION SCALE: 230, 229, 228, 227, 226, 225, 224

SHEAR STRENGTH ksf
○ UNCONFINED + FIELD VANE
▲ POCKET PENETROMETER
1 2 3 4
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

GAS READINGS ppm

REMARKS & GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

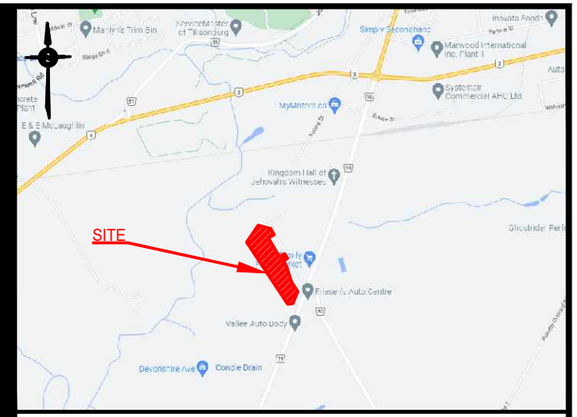
Stickup Well Protector Set
Bentonite Seal
50 mm Diameter PVC Pipe
Filter Sand
Screen
Upon completion of augering, free water and cave at 2.1 m

5.0
10.0

DOFASCO 20HF021 BOREHOLE LOGS.GPJ ON_MOT.GDT 11/19/2024 4:01:04 PM

+7 , ×5 : Numbers refer to Sensitivity

(%) STRAIN AT FAILURE



KEY PLAN

NORFOLK COUNTY, ONTARIO

LEGEND:

BH 6
EL. 230.24 — PETO MACCALLUM LTD. (PML) BOREHOLE (BH) LOCATION
ELEVATION (METRIC, GEODETIC)

DEVELOPMENT BOUNDARY

REFERENCE:

PLAN PRODUCED FROM DRAWING LABELED "116933-1", DATED SEPTEMBER 17, 2024AND FROM GIS INFORMATION FROM THE COUNTY OF NORFOLK ONLINE INTERACTIVE MAPPING SERVICE.

NOTE:

1. THE INFERRED STRATIGRAPHY REFERRED TO IN THE REPORT IS BASED ON THE DATA FROM THESE BOREHOLES SUPPLEMENTED BY GEOLOGICAL EVIDENCE. THE ACTUAL STRATIGRAPHY BETWEEN THE BOREHOLES MAY VARY.
2. GEODETIC GROUND SURFACE ELEVATIONS AND UTM CO-ORDINATES AT THE BOREHOLE LOCATIONS WERE DETERMINED BY PML USING A GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS). THE SURVEY EQUIPMENT COMPRISED A SOKKIA CANADA GCX-3 NETWORK REAL TIME KINEMATIC (RTK) ROVER SYSTEM.

0m 25 50 75 100 150

SCALE
(1:2000)

MR. JOE OLIVEIRA

HYDROGEOLOGICAL SITE ASSESSMENT
SUBDIVISION
LAPLANTE ROAD, NORFOLK COUNTY ONTARIO

BOREHOLE LOCATION PLAN

Peto MacCallum Ltd.
CONSULTING ENGINEERS

		DATE	SCALE	PML REF.	DRAWING NO.
DRAWN	SM	NOV 2024	AS SHOWN	20HF021	2-1
CHECKED	SJ				
APPROVED	SJ				

Appendix A

Water Well Records

Peto MacCallum Ltd.
CONSULTING ENGINEERS

PML Number	TOWNSHIP CON LOT	UTM ZONE	EASTING	NORTHING		DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
1	MIDDLETON TOWNSHIP TR N 04 004	17	522155	4742600	W	2020/12 7090						7377669 (Z350447) A276468 P	
2	MIDDLETON TOWNSHIP TR N 04 006	17	522370	4743197	W	2020/11 6824						7373349 (Z351474) A297003 P	
3	MIDDLETON TOWNSHIP TR N 04 006	17	522322	4743017	W	2016/06 4634	5	FR 0065	42/60/3/12:	DO	0065 4	7265716 (Z228419) A201162	BLCK LOAM 0002 BRWN SAND 0012 GREY CLAY SAND 0021 GREY CLAY DNSE 0050 GREY CLAY SLTY 0062 GREY FSND 0066 GREY STNS CLAY 0070
4	MIDDLETON TOWNSHIP TR N 04 006	17	522561	4743171	W	2016/05 7090	6 6	FR 0015	26/28/20/1:0	DO	0058 12	7264284 (Z217643) A176899	BLCK LOAM LOAM 0001 BRWN SAND LOOS 0015 GREY LOOS 0071 GREY CLAY STKY 0076
5	MIDDLETON TOWNSHIP TR N 04 006	17	522600	4743113	W	2016/05 7090	6 6	FR 0013	24/26/20/1:0	OT	0056 13	7264283 (Z217640) A176898	BLCK LOAM LOAM 0001 BRWN SAND LOOS 0013 GREY SAND LOOS 0069 GREY GRVL CLAY HARD 0074
6	MIDDLETON TOWNSHIP TR N 04 006	17	522588	4742485	W	2015/06 7090		UT	30/37/9/1:30	DO	0058 12	7254821 (Z201690) A170119	BRWN SAND 0029 GREY SAND PCKD 0070 GREY CLAY 0071
7	MIDDLETON TOWNSHIP TR N 04 006	17	522432	4742966	W	2015/06 7090		UT	39/48/9/1:30	DO	0055 16	7254823 (Z201685) A170113	BRWN LOAM 0002 BRWN SAND 0021 GREY CLAY 0049 GREY SAND 0072 GREY CLAY 0076
8	MIDDLETON TOWNSHIP TR N 04 006	17	522086	4743318	W	2013/06 7090	36			DO		7214087 (Z171020) A	
9	MIDDLETON TOWNSHIP TR N 04 006	17	522091	4743324	W	2013/04 7090	6.61	UT 0154	67/72/40/1:30	DO		7214065 (Z160156) A129700	BLCK LOAM 0001 BRWN SAND 0035 GREY CLAY 0062 GREY SAND SLTY 0071 GREY HPAN 0152 GREY LMSN 0156
10	MIDDLETON TOWNSHIP TR N 04 005	17	522164	4742592	W	2012/11 4634				OT		7194952 (Z145016) A127866 A	BLCK LOAM 0002 BRWN SAND 0015 GREY CLAY SOFT 0030
11	MIDDLETON TOWNSHIP TR N 04 004	17	522280	4743104	W	2012/02 5466	5.19 4.11 4.11	FR 0055 OT 0015	50/69/11/72:	DO	0061 5 0066 3	7180832 (Z145148) A108876	BRWN SAND 0015 GREY CLAY 0055 GREY SAND CLAY LYRD 0060 GREY FSND 0066 GREY CLAY 0067 GREY FSND 0069 GREY CLAY 0073
12	MIDDLETON TOWNSHIP TR N 04 006	17	522459	4743000	W	2011/07 3563	6.25	FR 0053	31/50/6/2:0	DO	0053 10	7168262 (Z133522) A109534	BRWN SAND 0010 BRWN CLAY 0048 GREY SAND 0063
13	MIDDLETON TOWNSHIP TR N 04 004	17	522121	4743266	W	2009/03 5466	5.19					7128034 (Z67064) A080565 A	
14	MIDDLETON TOWNSHIP TR N 04 006	17	522474	4743071	W	2008/10 3563	6.25	FR 0049 UT 0059	31/49/5/1:30	CO	0049 10	7114403 (Z85047) A080135	BRWN SAND 0010 BLUE CLAY STKY 0049 GREY SAND FSND 0059
15	MIDDLETON TOWNSHIP TR N 04 004	17	522127	4743266	W	2008/06 5466	5.19 4.25 4.25	FR	58/68/7/2:	DO	0064 3	7118927 (Z71583) A067852	BLCK LOAM 0001 BRWN SAND 0027 GREY CLAY 0060 GREY CLAY SAND 0065 GREY FSND 0071 GREY CLAY 0074
16		17	522179	4742644	W	2007/08 6808	5	SU 0138 FR 0059	34/49/7/24:0	DO		7051482 (Z69363) A049278	BRWN SAND LOAM 0007 BRWN SAND 0011 GREY CLAY SILT 0060 GREY FSND 0070 GREY CLAY STNS 0140 GREY LMSN FCRD 0142
17	MIDDLETON TOWNSHIP 004	17	522018	4742533	W	2007/06 3030	48 36	0006 0025	6///:	DO		7046355 (Z70784) A056288	BRWN LOAM 0001 BRWN SAND 0006 BRWN SAND 0012 GREY CLAY 0025 GREY SILT CLAY 0040
18	MIDDLETON TOWNSHIP 04 005	17	522178	4742645	W	2006/12 6808	5 4	FR 0056	49/49/4/8:0	DO	0056 8	7045103 (Z73717) A024827	BRWN SAND 0010 BRWN CLAY HARD 0023 GREY CLAY SILT SAND 0056 GREY FSND 0064 GREY CLAY SILT SAND 0068
19	MIDDLETON TOWNSHIP TR N 04 006	17	522199	4743134	W	2003/01 5466	5 4 4	FR 0065	45/58/6/2:0	DO	0059 6	4407865 (228434)	BRWN SAND PCKD 0016 GREY CLAY DNSE 0050 GREY CLAY SAND 0058 GREY FSND LOOS 0065 GREY CLAY STNS DNSE 0069
20	MIDDLETON TOWNSHIP TR N 04 005	17	522214	4742783	W	1984/08 5413	1	FR 0012	12/12/5/2:0	DO	0014 42	4404942 ()	YLLW SAND SOFT 0018
21	MIDDLETON TOWNSHIP TR N 04 006	17	522274	4743043	W	1982/05 1361	1	FR 0010	10/10/7/1:0	DO	0015 3	4404612 ()	LOAM 0001 YLLW SAND 0005 GREY CLAY HARD 0008 GREY SAND LOOS 0010 GREY FSND 0012 GREY CLAY SOFT 0014 GREY FSND 0018
22	MIDDLETON TOWNSHIP TR N 04 006	17	522334	4743223	W	1979/07 3913	30	FR 0018	18///:	DO		4404235 ()	BRWN LOAM 0001 BRWN SAND 0018 BRWN CSND 0022 BLUE CLAY 0036
23	MIDDLETON TOWNSHIP TR N 04 006	17	522374	4742903	W	1978/09 1361	1	UK 0007	7//12/1:0	DO	0011 4	4404044 ()	BLCK LOAM 0002 YLLW SAND 0007 GREY SAND 0015
24	MIDDLETON TOWNSHIP TR N 04 006	17	522434	4743383	W	1977/10 5413	5	SU 0162	60/60/10/5:0	DO		4403903 ()	YLLW SAND 0009 GREY CLAY STNS SOFT 0160 BLCK SHLE SOFT 0162
25	MIDDLETON TOWNSHIP TR N 04 006	17	522237	4743084	W	1975/10 2519	30 24	FR 0005 FR 0019	5/30/4/:	DO		4403582 ()	BRWN SAND 0010 GREY CLAY 0019 GREY SAND 0022 GREY CLAY 0030
26	MIDDLETON TOWNSHIP TR N 04 006	17	522198	4743329	W	1975/04 3030	36	UK 0025	25///:	DO		4403462 ()	BRWN SAND 0002 BRWN CLAY 0010 BRWN SAND 0022 BRWN SAND 0028 GREY CLAY 0030 BRWN SAND 0035
27	MIDDLETON TOWNSHIP TR N 04 006	17	522133	4743245	W	1974/05 5413	2	FR 0032	28//2/10:0	DO	0032 2	4403399 ()	YLLW CLAY SAND 0033 YLLW SAND 0034
28	MIDDLETON TOWNSHIP TR N 04 006	17	522314	4743123	W	1972/06 2623	1	FR 0003	3//10/2:0	DO	0008 2	4403027 ()	YLLW LOAM 0003 GREY FSND 0010
29	MIDDLETON TOWNSHIP TR N 04 006	17	522244	4743203	W	1972/03 5413	5	SU 0146	48/132/10/97:30	NU		4402910 () A	BLCK LOAM 0001 YLLW SAND STNS 0017 GREY CLAY STNS 0054 GREY SAND CLAY 0055 GREY CLAY STNS 0146
30	MIDDLETON TOWNSHIP TR N 04 006	17	522264	4743173	W	1972/02 5413	5					4402911 () A	BLCK LOAM 0001 YLLW SAND STNS 0017 GREY CLAY STNS 0054 GREY SAND STNS CLAY 0055 GREY CLAY STNS 0085
31	MIDDLETON TOWNSHIP TR N 04 005	17	522174	4742598	W	1971/12 2623	1	FR 0008	8//5/:	DO	0011 2	4402821 ()	BRWN MSND 0008 GREY MSND 0013
32	MIDDLETON TOWNSHIP TR N 04 006	17	522214	4743143	W	1971/11 2607	36 27	FR 0010	10/26/0/:	DO		4402839 ()	YLLW MSND 0010 CLAY QSND 0026
33	MIDDLETON TOWNSHIP TR N 04 006	17	522334	4743178	W	1970/09 2622	3	FR 0013	10//4/8:0	PS	0013 4	4402661 ()	BRWN MSND 0010 RED MSND 0017
34	MIDDLETON TOWNSHIP TR N 04 006	17	522529	4743353	W	1970/07 5413	5	FR 0051 SU 0143	55/57/5/8:0	DO		4402518 ()	YLLW MSND 0003 YLLW CLAY STNS 0018 GREY CLAY 0036 GREY MSND SILT CLAY 0051 GREY FSND 0053 GREY CLAY STNS 0061 GREY CLAY MSND 0142 BLCK SHLE 0143
35	MIDDLETON TOWNSHIP TR N 04 006	17	522364	4743373	W	1970/03 3904	4	SU 0143	50/50/6/24:0	DO		4402462 ()	BRWN LOAM MSND 0003 BLUE CLAY GRVL 0030 BRWN MUCK 0090 GREY CLAY 0140 GREY ROCK 0143
36	MIDDLETON TOWNSHIP TR N 04 006	17	522114	4743263	W	1970/01 2607	36	FR 0021	21/32/1/:	DO		4402455 ()	BRWN MSND 0022 BLUE CLAY 0032
37	MIDDLETON TOWNSHIP TR N 04 006	17	522454	4743408	W	1968/09 1408	5	FR 0143	75/110/4/3:0	DO		4402239 ()	RED MSND 0005 MSND 0007 CLAY 0046 MSND 0054 CLAY 0140 LMSN 0143
38	MIDDLETON TOWNSHIP TR N 04 006	17	522364	4743373	W	1966/12 1611	5	FR 0050	30/50/3/2:0	DO	0055 5	4400776 ()	BLCK LOAM 0001 YLLW MSND 0012 CLAY 0048 UNKN UNKN UNKN 0052 BLCK MSND 0060
39	MIDDLETON TOWNSHIP TR N 04 005	17	522189	4742743	W	1962/09 5424	1	FR 0009	9//4/1:0	DO	0011 3	4400774 ()	LOAM 0001 YLLW MSND 0008 HPAN 0009 MSND 0014

MINISTRY OF THE ENVIRONMENT

The Ontario Water Resources Act

WATER WELL RECORD

40-1/19e

Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 4403399 | MUNICIP. 4400 | CON. N | 04

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Norfolk	Middleton	4 TV	006

[redacted] RR6 Tillsonburg

DATE COMPLETED: DAY 24 MO 05 YR 74

HING	RC	ELEVATION	RC	BASIN CODE	II	III	IV
4743022	5	750	5	23	JUN 17, 1977		279

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
yellow	clay	sand	soft	0	33½
yellow		sand	wet	33½	34

8" Gravelpack

OWRC P.8

31 | 003350528 | 0034528

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0032	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
32-34	
15-18	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
20-23	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
25-28	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
30-33	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
1¼ 02	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE		-8	32 0032
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
008	03 000 INCHES	02 FEET
MATERIAL AND TYPE: Johnson Stainless	DEPTH TO TOP OF SCREEN: 0032 FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
10-13	14-17	
18-21	22-25	
26-29	30-33	

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	0002 1½ GPM	10 HOURS 00 MINS

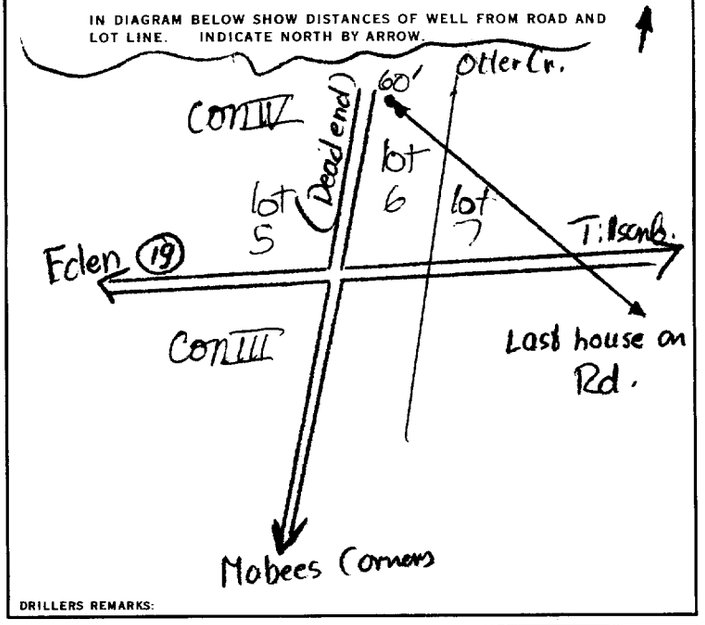
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☐ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
028 FEET	[illegible] FEET	FEET	FEET	FEET	FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	8 FEET	1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☒ SHALLOW ☐ DEEP	RECOMMENDED PUMP SETTING: 8 FEET	RECOMMENDED PUMPING RATE: 0002 GPM

GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL 2243

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL 54: 1

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE 55-56: 01

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING 57: 1

1 ☒ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Warren Water Wells — LICENCE NUMBER: 5413

ADDRESS: RR 7 Tillsonburg

NAME OF DRILLER OR BORER: Gus Holzhey — LICENCE NUMBER: 5413

SIGNATURE OF CONTRACTOR: [signature] — SUBMISSION DATE: DAY ____ MO. ____ YR. ____

OFFICE USE ONLY

DATA SOURCE 58: 1 — CONTRACTOR 59-62: 5413 — DATE RECEIVED 63-68: 060375

DATE OF INSPECTION — INSPECTOR

REMARKS: CSS.S8

P KP

WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 MOE 07-091

Ontario Ministry of the Environment

Well' ... t number below)
A 067852
A067852

Well Record
Regulation 903 Ontario Water Resources Act

page ___ of ___

Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.
- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Help Desk (Toll Free) at 1-888-396-9355.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only
MUN | CON | LOT

Well Owner's Information and Location of Well Information

[redacted]

NORFOLK | NORFOLK WEST (MIDDLETON) | 9 | 5

RR#/Street Number/Name: 1068 LAPLANTE RD. , RR #6
City/Town/Village: TILLSONBURG
Site/Compartment/Block/Tract etc.:

GPS Reading | NAD: 8 3 | Zone: 17 | Easting: 522127 | Northing: 4743266
Unit Make/Model: MAGELLAN
Mode of Operation: ☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From (FT)	Depth To (FT)
BLACK	TOPSOIL			0'	1'
BROWN	SAND			1'	27'
GREY	CLAY			27'	60'
GREY	CLAY	SAND		60'	65'
GREY	FINE SAND			65'	71'
GREY	CLAY			71'	74'

Hole Diameter

Depth From (FT)	Depth To (FT)	Diameter (Centimetres)
0'	74'	8 5/8"

Water Record

Water found at (FT)	Kind of Water	
	☒ Fresh	☐ Sulphur
	☐ Salty	☐ Minerals
	☐ Other:	
m	☐ Fresh	☐ Sulphur
	☐ Salty	☐ Minerals
	☐ Other:	
m	☐ Fresh	☐ Sulphur
	☐ Salty	☐ Minerals
	☐ Other:	

After test of well yield, water was
☒ Clear and sediment free
☒ Other, specify
Chlorinated ☒ Yes ☐ No

Construction Record

Casing

Inside diam (IN.)	Material	Wall thickness (IN.)	Depth From (FT)	Depth To (FT)
5 3/16	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	0.188"	+1.5'	56'
4 1/4"	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	0.188"	56	64
4 1/4"	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	0.188"	70	72'

Screen

Outside diam		Slot No.		
4 3/4"	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	A- 10 B- 12	A-64 B-67	67 70

No Casing or Screen
☐ Open hole

Test of Well Yield

Pumping test method: SUBMERSIBLE PUMP

	Draw Down Time min	Draw Down Water Level (FT)	Recovery Time min	Recovery Water Level (FT)
Pump intake set at -	Static Level	58.4'		67.5'
Pumping rate - 7 GPM	1	63.9'	1	61.3'
Duration of pumping 2 hrs + ___ min	2	65.5'	2	59.7'
Final water level end of pumping 67.5' metres	3	66.2'	3	59.3'
Recommended pump type. ☐ Shallow ☒ Deep	4	66.5'	4	59.1'
Recommended pump depth. ___ metres	5	66.8'	5	58.9
Recommended pump rate. 7 GPM	10	67.1	10	58.6'
	15	67.4	15	58.5'
If flowing give rate - (litres/min)	20	67.5	20	58.4'
	25		25	
If pumping discontinued, give reason.	30		30	
	40		40	
	50		50	
	60		60	

Plugging and Sealing Record
☒ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0'	62'	BENTONITE	
62'	72'	WELL SAND	

Method of Construction
☒ Cable Tool ☐ Rotary (air) ☐ Diamond ☐ Digging
☐ Rotary (conventional) ☐ Air percussion ☐ Jetting ☐ Other
☐ Rotary (reverse) ☐ Boring ☐ Driving

Water Use
☒ Domestic ☐ Industrial ☐ Public Supply ☐ Other
☐ Stock ☐ Commercial ☐ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

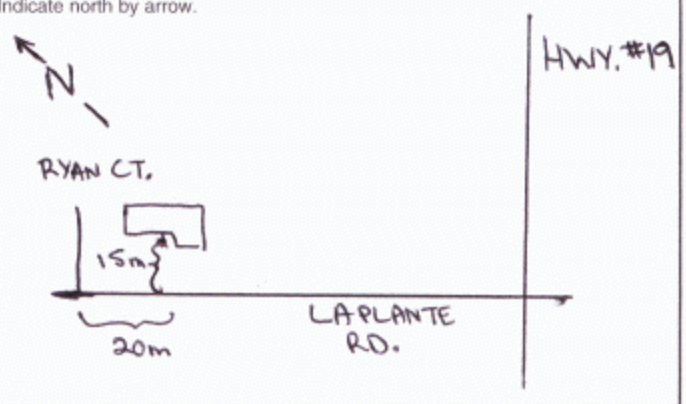
Final Status of Well
☒ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☐ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☐ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Well Contractor/Technician Information

Name of Well Contractor: J.B. WILSON & SON LTD
Well Contractor's Licence No.: 5466
Business Address (street name, number, city etc.): RR #1 SPRINGFIELD
Name of Well Technician (last name, first name): WILSON, JOHN H.
Well Technician's Licence No.: T-2668
Signature of Technician/Contractor: X [signature]
Date Submitted YYYY MM DD:

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.



Audit No. Z 71583
Date Well Completed YYYY MM DD: 2008 06 26
Was the well owner's information package delivered? ☒ Yes ☐ No
Date Delivered YYYY MM DD:

Ministry Use Only

Data Source | Contractor
Date Received YYYY MM DD: FEB 2 2009 | Date of Inspection YYYY MM DD
Remarks: FEB 2 2009 | Well Record Number

0506E (08/2006)

Ministry's Copy

Cette formule est disponible en français

Ontario — Ministry of the Environment

Measurements recorded in: ☐ Metric ☒ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* A129700

Tag#: A129700

Well Record

Regulation 903 Ontario Water Resources Act

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
1080 Laplante Road RR # 6	Middleton Township	10	4

County/District/Municipality	City/Town/Village	Province	Postal Code
Norfolk	Tillsonburg	Ontario	N4G 4G9

UTM Coordinates NAD 83	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
	17	522091	4743324		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (*m/ft*) From	To
Black	Top Soil			0	1
Brown	Sand			1	35
Grey	Clay			35	62
Grey	Sand		Silty	62	71
Grey	Hardpan			71	152
Grey	Limestone			152	156

Annular Space

Depth Set at (*m/ft*) From	To	Type of Sealant Used (*Material and Type*)	Volume Placed (m^3/ft^3)
0	24	Bentonite Grout	
24	152	Bentonite Slurry	

Method of Construction

☐ Cable Tool ☐ Diamond
☒ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☐ Other, *specify* _____

Well Use

☐ Public ☐ Commercial ☐ Not used
☒ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, *specify* _____

Construction Record - Casing

Inside Diameter (*cm/in*)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (*cm/in*)	Depth (*m/ft*) From	To
5 5/8"	Steel	0.188 Wall	+2	152
Open Hole			152	156

Construction Record - Screen

Outside Diameter (*cm/in*)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (*m/ft*) From	To

Status of Well

☒ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, *specify*
☐ Other, *specify*

Water Details

Water found at Depth (*m/ft*)	Kind of Water	
154	☐ Fresh ☒ Untested	☐ Gas ☐ Other, *specify*
	☐ Fresh ☐ Untested	☐ Gas ☐ Other, *specify*
	☐ Fresh ☐ Untested	☐ Gas ☐ Other, *specify*

Hole Diameter

Depth (*m/ft*) From	To	Diameter (*cm/in*)
0	156	9

Results of Well Yield Testing

After test of well yield, water was:
☒ Clear and sand free
☐ Other, *specify* _____

If pumping discontinued, give reason: CLEAR

Pump intake set at (*m/ft*) 85

Pumping rate (*l/min / GPM*) 40

Duration of pumping 1 hrs + 30 min

Final water level end of pumping (*m/ft*) 72

If flowing give rate (*l/min / GPM*) NOT FLOWING

Recommended pump depth (*m/ft*) ~~40~~ 85

Recommended pump rate (*l/min / GPM*) 10+

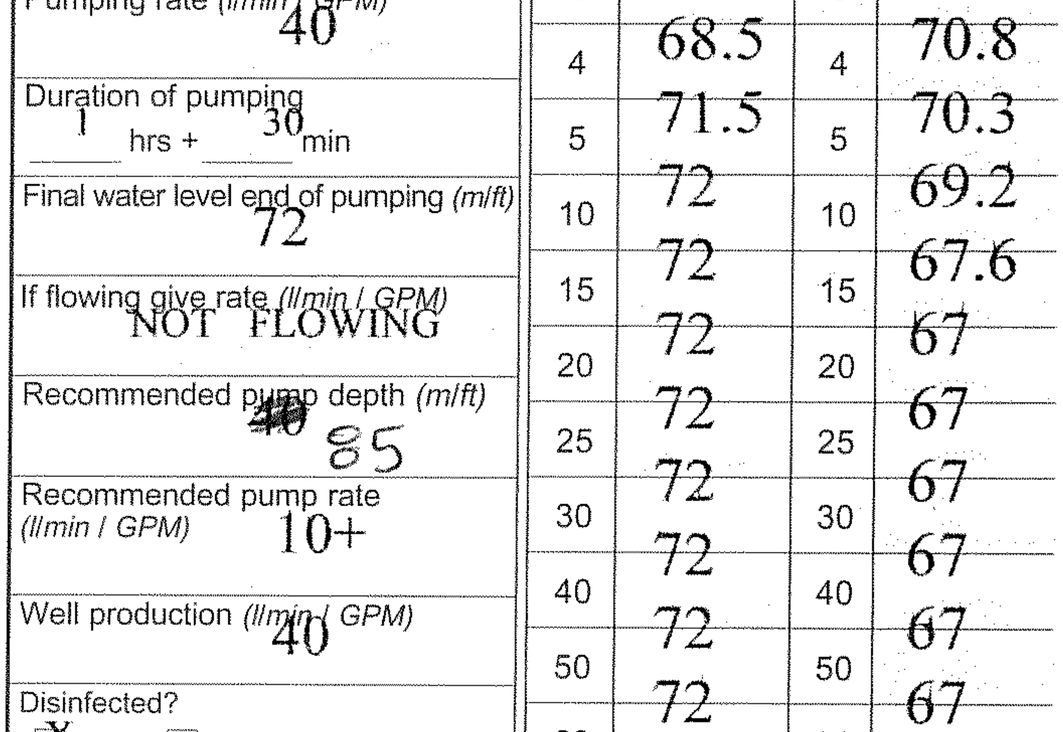
Well production (*l/min / GPM*) 40

Disinfected? ☒ Yes ☐ No

Draw Down Time (*min*)	Water Level (*m/ft*)	Recovery Time (*min*)	Water Level (*m/ft*)
Static Level	67		72
1	67.4	1	71.9
2	67.8	2	71.6
3	67.11	3	71.3
4	68.5	4	70.8
5	71.5	5	70.3
10	72	10	69.2
15	72	15	67.6
20	72	20	67
25	72	25	67
30	72	30	67
40	72	40	67
50	72	50	67
60		60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:
Well is 75 feet off the road

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
HAYDEN WATER WELLS CO.,INC.	7090

Business Address (Street Number/Name)	Municipality
5339 Saintsbury Line RR # 1	Lucan

Province	Postal Code	Business E-mail Address
Ontario	N0M2J0	haydenwaterwells@on.aibn.com

Business Telephone No. (*inc. area code*)	Name of Well Technician (Last Name, First Name)
1922700357	Hayden, Jay

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
0334		

Well owner's information package delivered: ☒ Yes ☐ No

Date Package Delivered: 2013 04 18

Date Work Completed: 2013 04 18

Ministry Use Only

Audit No. Z160156

RECEIVED 02 2014

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Appendix B

SGS Laboratories - Certificate of Analysis

FINAL REPORT

CA40109-APR22 R

20HF021

Prepared for

Peto MacCallum Ltd

FINAL REPORT

CA40109-APR22 R

First Page

CLIENT DETAILS

Client	Peto MacCallum Ltd
Address	45 Burford Road Hamilton, ON L8E 3C6. Canada
Contact	Alonzo Rowe
Telephone	(905) 561-2231
Facsimile	(905) 561-6366
Email	arowe@petomaccallum.com;smacdonald@petomaccallum.con
Project	20HF021
Order Number	
Samples	Ground Water (4)

LABORATORY DETAILS

Project Specialist	Maarit Wolfe, Hon.B.Sc
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-652-2000
Facsimile	705-652-6365
Email	Maarit.Wolfe@sgs.com
SGS Reference	CA40109-APR22
Received	04/07/2022
Approved	04/12/2022
Report Number	CA40109-APR22 R
Date Reported	04/12/2022

COMMENTS

MAC - Maximum Acceptable Concentration
Half MAC - Half of the Maximum Acceptable Concentration
MDL - SGS Method Detection Limit

Temperature of Sample upon Receipt: 7 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: 016944

SIGNATORIES

Maarit Wolfe, Hon.B.Sc

TABLE OF CONTENTS

Client: Peto MacCallum Ltd
Project: 20HF021
Project Manager: Alonzo Rowe
Samplers: SM

MATRIX: WATER

Sample Number	9	10	11	12
Sample Name	20HF021 GW-1	20HF021 GW-2	20HF021 GW-3	20HF021 GW-4
Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water
Sample Date	06/04/2022	06/04/2022	06/04/2022	06/04/2022

Parameter	Units	RL	Result	Result	Result	Result
General Chemistry						
Turbidity	NTU	0.10	1110	---	---	---
Metals and Inorganics						
Hardness	mg/L as CaCO3	0.05	3130	---	---	---
Antimony	µg/L	0.6	< 0.6	---	---	---
Arsenic	µg/L	0.2	1.9	---	---	---
Barium	µg/L	0.02	199	---	---	---
Boron	µg/L	2	22	---	---	---
Cadmium	µg/L	0.003	0.634	---	---	---
Chromium	µg/L	0.08	2.02	---	---	---
Mercury	µg/L	0.01	0.02	---	---	---
Selenium	µg/L	0.04	0.14	---	---	---
Uranium	µg/L	0.002	0.682	---	---	---
Nitrite (as N)	as N mg/L	0.003	0.003#<MDL	0.003#<MDL	0.003#<MDL	0.003#<MDL
Nitrate (as N)	as N mg/L	0.006	5.97	6.04	6.03	6.02
Nitrate + Nitrite (as N)	as N mg/L	0.006	5.97	6.04	6.03	6.02

Client: Peto MacCallum Ltd
Project: 20HF021
Project Manager: Alonzo Rowe
Samplers: SM

MATRIX: WATER

Sample Number	9	10	11	12
Sample Name	20HF021 GW-1	20HF021 GW-2	20HF021 GW-3	20HF021 GW-4
Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water
Sample Date	06/04/2022	06/04/2022	06/04/2022	06/04/2022

Parameter	Units	RL		Result	Result	Result	Result
Microbiology							
E. Coli	cfu/100mL	0		< 2↑	---	---	---
Total Coliform	cfu/100mL	0		< 2↑	---	---	---
Other (ORP)							
pH	No unit	0.05		8.26	---	---	---

QC SUMMARY

QCR_SubCategory

Method: SM 2130 I Internal ref.: ME-CA-[ENVIEWL-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Turbidity	EWL0134-APR22	NTU	0.10	< 0.10	0	10	99	90	110	NA		

Anions by IC

Method: EPA300/MA300-Ions1.3 I Internal ref.: ME-CA-[ENVIIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrate + Nitrite (as N)	DIO0165-APR22	mg/L	0.006	<0.006	NA		NA			NA		
Nitrite (as N)	DIO0165-APR22	mg/L	0.003	<0.003	6	20	99	90	110	98	75	125
Nitrate (as N)	DIO0165-APR22	mg/L	0.006	<0.006	0	20	98	90	110	93	75	125

QC SUMMARY

Mercury by CVAAS

Method: SM3112/EPA 245 | Internal ref.: ME-CA-IENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury	EHG0021-APR22	ug/L	0.01	< 0.01	ND	20	100	80	120			

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Arsenic	EMS0066-APR22	ug/L	0.2	<0.0002	7	20	100	90	110	95	70	130
Barium	EMS0066-APR22	ug/L	0.02	<0.00002	2	20	98	90	110	99	70	130
Boron	EMS0066-APR22	ug/L	2	< 2	20	20	107	90	110	97	70	130
Cadmium	EMS0066-APR22	ug/L	0.003	<0.000003	ND	20	96	90	110	94	70	130
Chromium	EMS0066-APR22	ug/L	0.08	<0.00008	14	20	92	90	110	78	70	130
Antimony	EMS0066-APR22	ug/L	0.6	<0.0009	4	20	110	90	110	114	70	130
Selenium	EMS0066-APR22	ug/L	0.04	<0.00004	8	20	104	90	110	124	70	130
Uranium	EMS0066-APR22	ug/L	0.002	< 0.002	14	20	99	90	110	99	70	130

QC SUMMARY

Microbiology

Method: SM 9222D | Internal ref.: ME-CA-IENVIMIC-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
E. Coli	BAC9129-APR22	cfu/100mL	-	ACCEPTED	ACCEPTED							
Total Coliform	BAC9129-APR22	cfu/100mL	-	ACCEPTED	ACCEPTED							

pH

Method: SM 4500 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
pH	EWL0232-APR22	No unit	0.05	NA	1		100			NA		

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates 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.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.
"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

This report supersedes all previous versions.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

No: 016944

Page _____ of _____

SGS Environment, Health & Safety - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

Laboratory Information Section - Lab use only

Received By: 2D
Received Date: 4 / 7 / 22 (mm/dd/yy)
Received Time: 11 : 20 (hr : min)
Received By (signature): [signature]
Custody Seal Present: Yes ☑ No ☐
Custody Seal Intact: Yes ☑ No ☐
Cooling Agent Present: Yes ☑ No ☐ Type: Prck
Temperature Upon Receipt (°C) 2.3
LAB LIMS #: CA40109-Apr22

REPORT INFORMATION	INVOICE INFORMATION
Company: Peto MacCallum	☒ (same as Report Information)
Contact: A. Rowe	Company:
Address: 41 Burford	Contact:
Hamilton	Address:
Phone: 905-536-7305	
Fax: smacdonald@petomaccallum.com	Phone:
Email: arowe@petomaccallum.com	Email:

Quotation #: _____ P.O. #: _____
Project #: 20HF021 Site Location/ID:

TURNAROUND TIME (TAT) REQUIRED

☒ Regular TAT (5-7days) — TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day

RUSH TAT (Additional Charges May Apply): ☐1 Day ☐2 Days ☐3 Days ☐4 Days

PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date: _____

***NOTE**: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS

☐ O.Reg 153/04 ☐ O.Reg 406/19

☐ Table 1 ☐ Res/Park Soil Texture: ☐ Coarse
☐ Table 2 ☐ Ind/Com ☐ Medium/Fine
☐ Table 3 ☐ Agri/Other
☐ Table _____
Soil Volume ☐ <350m3 ☐ >350m3

Other Regulations: ☐ Reg 347/558 (3 Day min TAT) ☐ PWQO ☐ MMER ☐ CCME ☐ Other: ☐ MISA _____ ☐ ODWS Not Reportable *See note

Sewer By-Law: ☐ Sanitary ☐ Storm Municipality: _____

RECORD OF SITE CONDITION (RSC) ☐ YES ☒ NO

ANALYSIS REQUESTED

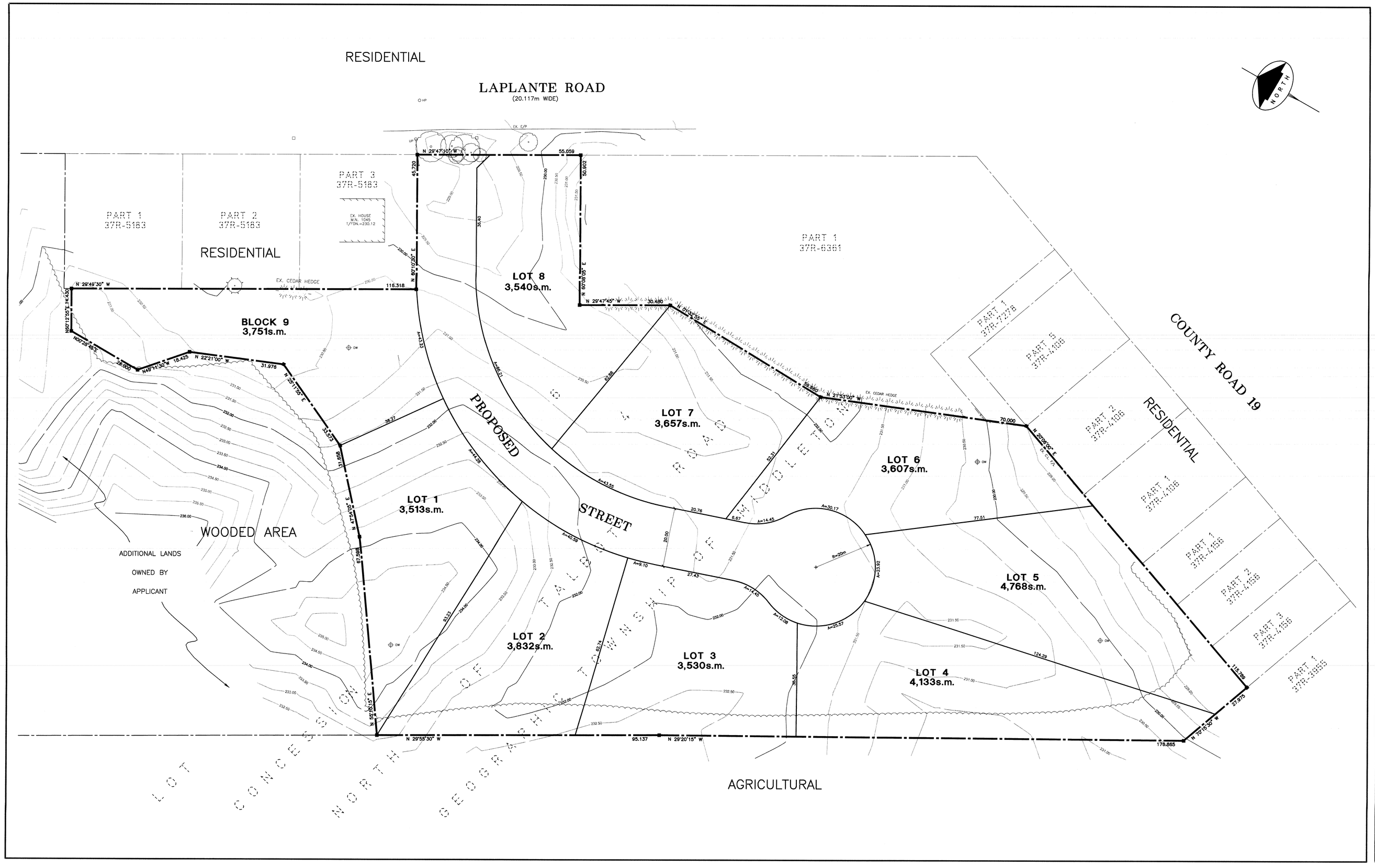
	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	Field Filtered (Y/N)	M&I: Metals & Inorganics (incl CrVI, CN, Hg pH, (B(HWS),EC,SAR–soil) (Cl, Na–water)	M&I: Full Metals Suite (ICP metals plus B(HWS-soil only) Hg, CrVI	M&I: ICP Metals only Sb,As,Ba,Be,B,Cd,Cr,Co,Cu,Pb,Mo,Ni,	SVOC: PAHs only	SVOC: SVOCs all incl PAHs, ABNs, CPs	PCB: PCBs ☐ Total ☐ Aroclor	PHC: F1-F4 + BTEX	PHC: F1-F4 only no BTEX	VOC: VOCs all incl BTEX	VOC: BTEX only	Pest: Pesticides Organochlorine or specify other	Other: Nitrates	Other: Turbidity, hardness, pH, E.Coli, Total Coliforms	Other: Sched. 13 O.Reg 170/03	Other: Appendix 2: 406/19 Leachate Screening Levels Table :	Other: Sewer Use: Specify pkg:	Other: Water Characterization Pkg General ☐ Extended	TCLP: Specify TCLP tests ☐M&I ☐VOC ☐PCB ☐B(a)P ☐ABN ☐Ignit.	COMMENTS:
1	20HF021 GW-1	06/04/2022	2PM	6	GW	N												X	X	X					
2	20HF021 GW 2	↓	↓	1	↓	N												X							
3	20HF021 GW 3			1		N												X							
4	20HF021 GW 4			1		N												X							
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									

Observations/Comments/Special Instructions

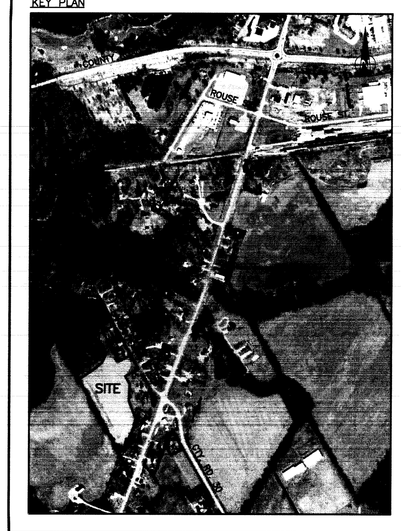
Sampled By (NAME): SM	**Signature:** [signature]	Date: 04 / 06 / 2022 (mm/dd/yy)	Pink Copy - Client
Relinquished by (NAME): AR	**Signature:** [signature]	Date: 04 / 06 / 2022 (mm/dd/yy)	Yellow & White Copy - SGS

DRAFT PLAN OF SUBDIVISION

PART OF LOT 5
CONCESSION 4
NORTH OF TALBOT ROAD
GEOGRAPHIC TOWNSHIP OF MIDDLETON
NORFOLK COUNTY



KEY PLAN



SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE 22/2/24

KIM HEWITT, O.L.S.
JEWITT & WATSON LTD.

OWNER'S CERTIFICATE

I HEREBY AUTHORIZE J.H. COHOON ENGINEERING LTD. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE CORPORATION OF NORFOLK COUNTY FOR APPROVAL.

DATE

JOSE OLIVEIRA

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT

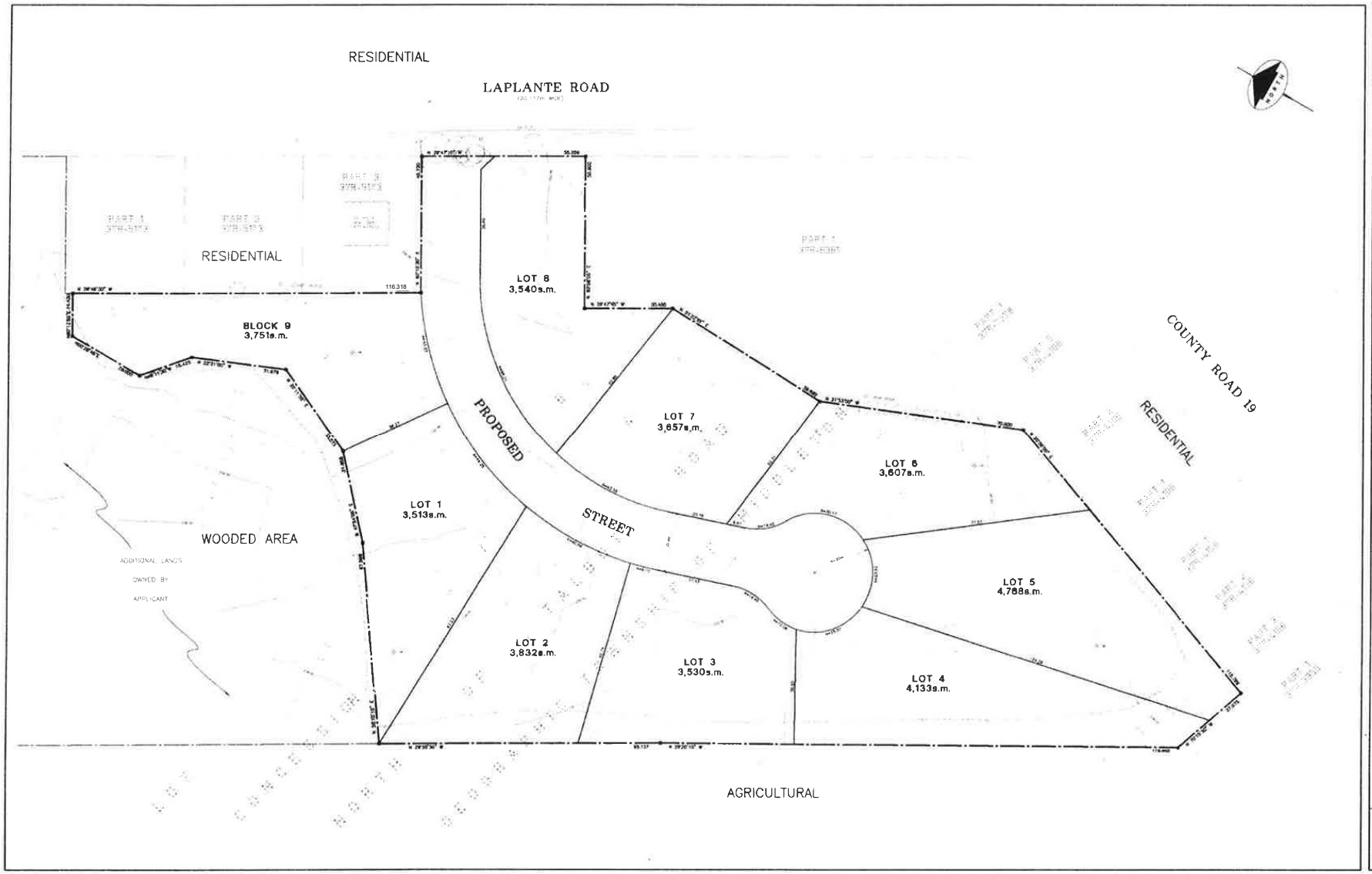
A – SEE PLAN
B – SEE PLAN
C – SEE PLAN
D – RESIDENTIAL
E – SEE PLAN
F – SEE PLAN
G – SEE PLAN
H – INDIVIDUAL WELLS
I – SANDY SILT
J – SEE PLAN
K – INDIVIDUAL SEPTIC SYSTEMS
L – NONE

AREA SCHEDULE

LOTS 1–8	30,584s.m.
BLOCK 9	3,751s.m.
ROADS	5,268s.m.
TOTAL	39,603s.m.

J.H. COHOON ENGINEERING LIMITED
CONSULTING ENGINEERS
440 IVADO ROAD - UNIT #1 - BRANTFORD - ONTARIO - N3T 5L8
TEL. (519) 753-2656 FAX. (519) 753-4263 www.cohooneng.com

DESIGN:	R.W.P.	JOB No:	16933
DRAWN:	K.P.B.		
SCALE:	1:500	DWG. No:	DP1
DATE:	NOV. 5/24		



DRAFT PLAN OF SUBDIVISION

PART OF LOT 5
CONCESSION 4
NORTH OF TALBOT ROAD
GEOGRAPHIC TOWNSHIP OF MIDDLETON
NORFOLK COUNTY

KEY PLAN

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE — S.M. HOSTETLER, O.L.S.
HOSTETLER & DYCK LTD.

OWNER'S CERTIFICATE

I HEREBY AUTHORIZE J.H. COHOON ENGINEERING LTD. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE CORPORATION OF NORFOLK COUNTY FOR APPROVAL.

11/05/24 — [signature]
DATE

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT

A – SEE PLAN
B – SEE PLAN
C – SEE PLAN
D – RESIDENTIAL
E – SEE PLAN
F – SEE PLAN
G – SEE PLAN
H – MUNICIPAL WELLS
I – SANDY SILT
J – SEE PLAN
K – MUNICIPAL SEPTIC SYSTEMS
L – NONE

AREA SCHEDULE

LOTS 1 - 8	30.884 s.m.
BLOCK 9	3.751 s.m.
ROADS	5.266 s.m.
TOTAL	39.901 s.m.

J.H. COHOON ENGINEERING LIMITED

DRAWN	R.W.F.
CHECKED	K.F.S.
SCALE	1:500
DATE	NOV. 5/24
PROJECT NO.	16933
DRAWING NO.	DP1

HYDROGEOLOGICAL SITE ASSESSMENT
LAPLANTE ROAD – 8 LOT PLAN OF SUBDIVISION
LAPLANTE ROAD
NORFOLK COUNTY, ONTARIO

for

MR. JOE OLIVEIRA

PETO MacCALLUM LTD.
45 BURFORD ROAD
HAMILTON, ONTARIO
L8E 3C6
Phone: (905) 561-2231
Fax: (905) 561-6366
Email: hamilton@petomaccallum.com

Distribution:
1 cc: Mr. Joe Oliveira (plus PDF)
1 cc: J H Cohoon Engineering Limited (plus PDF)
1 cc: PML Hamilton

PML Ref.: 20HF021
Report: 2 (Revision 1)
November 19, 2024

Peto MacCallum Ltd.
CONSULTING ENGINEERS

November 19, 2024

PML Ref.: 20HF021
Report: 2 (Revision 1)

Mr. Joe Oliveira
c/o Mr. Bob Phillips
J H Cohoon Engineering Limited
Consulting Engineers, Architect & Planners
440 Hardy Road, Unit 1
Brantford, Ontario
N3T 5L8

Dear Mr. Phillips

Hydrogeological Site Assessment
Laplante Road – 8 Lot Plan of Subdivision
Laplante Road
Norfolk County, Ontario

Peto MacCallum Ltd. (PML) is pleased to present the results of the hydrogeological site assessment (HSA) completed for this project. Authorization to proceed with this assignment was provided by Mr. Joe Oliveira in a signed Engineering Services Agreement (ESA) dated July 3, 2020. This report has been updated from an original Report 2 dated November 24, 2022. The updates contained herein reflect a revised subdivision plan comprising eight residential lots.

It is understood that the development of an eight-lot subdivision is planned at Laplante Road, near Tilsonburg in Norfolk County, Ontario. The HSA has been conducted on the lands to be developed. Current plans call for the severance of the site into eight individual lots, with lot sizes ranging between 0.35 to 0.47 ha each, to be serviced by individual sewage systems and private wells. The appended Drawing 2-1 (Borehole Location Plan) illustrates the location of the lands to be developed.

A geotechnical report, PML Ref. 20HF021 Report 1, has been previously completed for the subject lands and is referenced herein.

Based on the findings of this investigation, it is considered feasible to develop the site with eight individual lots serviced by private sewage systems and private water supply wells; however, advance treatment systems for nitrate reduction will be required, subject to regulatory approval.

We trust this report has been completed within our terms of reference and is sufficient for your current needs.

Should you have further questions, please do not hesitate to contact our office.

Sincerely

Peto MacCallum Ltd.

Scott Jeffrey, P.Eng., QPESA, LEED$_{GA}$
Director
Regional Manager, Geotechnical and Geoenvironmental Services

SM/SJ:ld/tc

45 Burford Road, Hamilton, Ontario L8E 3C6
Tel: (905) 561-2231
E-mail: hamilton@petomaccallum.com
BARRIE, HAMILTON, KITCHENER, LONDON, TORONTO

TABLE OF CONTENTS

1. INTRODUCTION

Peto MacCallum Ltd. (PML) is pleased to present the results of the hydrogeological site assessment (HSA) recently completed for this project. Authorization to proceed with this assignment was provided by Mr. Joe Oliveira in a signed Engineering Services Agreement (ESA) dated July 3, 2020. This report has been updated from an original Report 2 dated November 24, 2022. The updates contained herein reflect a revised subdivision plan comprising eight residential lots.

It is understood that the development of an eight-lot subdivision is planned at Laplante Road, near Tilsonburg in Norfolk County, Ontario. The HSA has been conducted on the lands to be developed. Current plans call for the development of the site into eight individual lots, with lot sizes ranging between 0.35 to 0.47 ha each, to be serviced by individual sewage systems and private wells. The appended Drawing 2-1 (Borehole Location Plan) illustrates the location of the lands to be developed.

The objective of this study was to determine the subsurface soil and ground water conditions at the Site and based on this information, provide an assessment of the feasibility for on-site treatment of domestic sewage, mitigation of the nutrient loading from the sewage treatment system and the off-site impact of infiltration of septic effluent on the ground water resource in the area. Additionally, an evaluation of the feasibility of developing a potable water supply for each of the lots has been completed.

The comments and recommendations provided in this report are based on the site conditions at the time of the investigation and are applicable only to the proposed development as described in the report. Any changes in the development plan, including finished grades and layout will require review by PML to assess the validity of the report and may require modified recommendations, additional investigation and/or analysis.

2. STUDY METHODOLOGY

The objectives of the study were accomplished by:

1. Attending the site to visually examine the terrain on and in the vicinity of the lands to be severed.
2. Review relevant background information including geotechnical and hydrogeological reports conducted in the area, Ontario Ministry of Environment Conservation and Parks (MECP) water well records, and published geological data in order to determine the hydrostratigraphy and hydrogeological conditions in the area.
3. Conducting a house-to-house survey of residents within 0.5 km of the property to determine pertinent details of their wells (type, depth, quality, and quantity) and sample three (3) existing wells to determine nitrate levels.
4. Sample one existing well on Site to determine basic water quality in accordance with the Safe Drinking Water Act (Ontario Drinking Water Quality Standards). The water sample will be tested for turbidity, hardness, pH, E. Coli, Total Coliforms, nitrate and Schedule 23 under Ontario Regulation (O. Reg.) 170/03. Results will be compared with O. Reg. 169/03.
5. In conjunction with the concurrent geotechnical investigation, mobilize equipment and drill rig rental to advance five (5) boreholes up to a depth of 6 m (or prior refusal), supply and installation of three ground water monitoring wells to define the subsurface conditions and depth to and direction of shallow ground water flow on Site. Provide related engineering supervision to locate public underground services; full time supervision of drilling operations, log subsurface stratigraphy, recover samples, survey ground surface elevations at the borehole locations and obtain water levels.
6. Conducting three (3) particle size distribution analyses on soil samples retrieved from the boreholes (one sample from each lot) to determine appropriate soil permeability parameters for septic bed design
7. Conducting engineering analysis to determine the nitrate loading from septic effluent infiltration on the lands to be severed.
8. Preparing one engineering report to address the factual aspects of the study, summarize the hydrogeologic conditions, document the results of the house-to-house survey and water quality laboratory test results, provide hydrogeological comments regarding the feasibility of drilling new wells to supply potable water to the proposed houses, as well as to assess the capability of the on-site soils to treat domestic sewage.

3. SITE SETTING

The land parcels that are the subject of this assessment are shown on Drawing 2-1 and are referred to herein as the "Site". The Site It is located southwest of the intersection of Laplante Road and Ontario Highway 19, located on Lot 5, Concession 4, in the Regional Municipality of Norfolk, Ontario.

The lands to be developed comprise an approximate total plan area of 3.99 including the proposed lots (Lots 1 to 8), stormwater management pond (Block 9) and residential street (Street A) with cul-de-sac.

Adjacent land uses include residential dwellings to the north, east and south and agricultural fields to the west. A woodlot is located to the northwest.

3.1 Physiographic and Geological Setting

The Site is situated within the physiographic region known as the Norfolk Sand Plain. The sands and silts of this region were deposited as a delta in glacial Lakes Whittlesey and Warren (Chapman and Putnam, 1984).

Ontario Base Map (OBM) data published in 2004 on the Geography Network Canada online GIS service was reviewed and topographic contours indicate the grade of the Site was at about elevation 233 to 230 (metric, geodetic). The topography of the area dips down to the northeast.

4. HYDROGEOLOGY

4.1 Surface Water

A tributary stream of Lake Lisgar runs about 300 m from the northwest corner of the Site. No other prominent surface water bodies were identified on the Site.

4.2 Aquifers and Local Ground Water Use

Published water well records were obtained for the Site and adjacent land from the Ontario Ministry of Environment Conservation and Parks (MECP) Environmental Monitoring and Reporting Branch, Water Well Records Management. These records were reviewed in order to establish the general hydrogeological environment in the area and determine anticipated well capacities.

Based on water well information obtained from the MECP, 39 wells were reported to be located within an approximate 500 m radius of the centroid of the Site. A summary of the 39 well records is included in Appendix A.

Based on the records, we note the following:

- The 39 wells were drilled between the years 1962 to 2020.
- Most of the wells were terminated in the sand overburden at depths of 18 to 21 m or the limestone bedrock at about 42 m.
- Pump tests were conducted sixteen (16) of wells following installation in the overburden. The pump tests indicated the yield of the wells to be between 20 and 49 L/min.
- The water quality reported on all the overburden well records was fresh. The water quality reported on the bedrock well records were either untested or sulphurous.

Based on the static water levels documented in the well records and general elevation of the Site, the ground water flow direction in the bedrock wells is to the south, towards Nanticoke Creek. The ground water flow direction in the limited overburden wells is towards the southeast.

4.3 Potable Water Supply Assessment

4.3.1 Water Supply

Based on a review of the MECP well record, the well located on Site at 1064 Laplante Road (MECP Well Record No. 4403399) is a drilled well developed in the sand overburden at a depth of 10.3 m. The static water level in the well was 8.3 m. A pump test was carried out on the well and the recommended pumping rate was 7.5 L/min.

Another deeper overburden well (MECP Well Record 7118927) is located at 1068 Laplante Road and was drilled to 22.5 m. The static water level was 17.8 m while a pump test determined a recommended pumping rate of 26.5 L/min.

Another well drilled into bedrock (MECP Well Record 7214065) is located at 1080 Laplante Road and was drilled to 47.5 m. The static water level was 20.4 m while a pump test determined a recommended pumping rate of 37.9 L/min or more.

The well records of these three wells close to the Site are included in Appendix A

The MECP considers a well to be sustainable with a minimum yield of 18.75 L/min. This is based on a minimum four-bedroom dwelling.

Only one overburden well in the vicinity of the Site had a reported yield (4.5 L/min.), which was below the MECP sustainable minimum yield a outlined in MECP Procedure D-5-5. Based on the reported information from the MECP well records within a 500 m radius of the site and their respective well yields, for best performance, it is recommended that wells are developed in the bedrock aquifer. Wells developed in the bedrock are anticipated to supply adequate yield to the development.

Pump tests will be required to confirm that an adequate water supply can be developed on each property and the sustained pumping rate required for domestic use is not expected to have an adverse impact on the supply from other nearby wells in the area.

4.3.2 Water Quality

In order to check the quality of the ground water, one sample of raw, untreated ground water was retrieved from BH/MW 2 on the lands to be severed, located at Laplante Road. The samples were tested for turbidity, hardness, pH, E. coli, total coliform and Schedule 23 inorganic parameters, which includes nitrate.

Laboratory Certificates of Analysis are included in Appendix B.

The results of the water quality testing were compared to the Ontario Drinking Water Quality Standards (ODWQS), Ontario Regulation 169/03 of the Safe Drinking Water Act, 2002. The results indicate that the level of nitrate met the criteria of 10 mg/L.

Water samples taken at BH/MW 2 were tested, the measured concentrations met the ODWQS, with the exception of the following:

Analyte	ODWQS Standard	Units	Measured Concentration
Total Hardness (as CaCO3)	80-100	mg/L	3130
Turbidity	5	NTU	1110

Hardness is an Operational Guideline (OG), which is established for parameters that, if not controlled, may negatively affect the efficient and effective treatment, disinfection and distribution of the water. The OG for hardness in drinking water is set at between 80 and 100 mg/L as calcium carbonate. Hardness levels between 80 and 100 mg/L are considered to provide an acceptable balance between corrosion and incrustation. Water supplies with a hardness greater than 200 mg/L are considered poor but tolerable. Hardness in excess of 500 mg/L in drinking water is unacceptable for most domestic purposes. Water softener systems will be required to reduce total hardness levels of water supplied from the on-site domestic wells.

Turbidity is an AO and in excess of 5.0 NTU becomes visible to the naked eye and as such most consumers may object to its presence. It is an important indicator of treatment efficiency and it is recommended that this parameter be checked during the design and installation of any water treatment system.

For any water treatment system installed, it recommended that a sample of the treated drinking water be obtained and tested to ensure the treatment system is functioning properly and the quality of the water meets the ODWQS.

5. BOREHOLE INVESTIGATION

This section references the geotechnical study completed for PML as presented in PML Reference 20HF021 Report 1 dated February 8, 2022. For more information, please refer to the report.

Drilling field work was carried out on February 11, 2021 and consisted of six boreholes (Boreholes 1 to 6) drilled to 6.5 m termination depths. The borehole locations are shown on Drawing 2-1, appended.

The borehole locations were selected by the Client and established in the field by PML. Geodetic, metric ground surface elevations and UTM co-ordinates at the borehole locations were determined by PML using a Sokkia GCX3 GNSS Receiver.

The boreholes were advanced using continuous flight solid stem augers, powered by a track mounted CME75 drill rig, supplied, and operated by a specialist drilling contractor, working under the full-time supervision of a member of PML's engineering staff.

Representative samples of the overburden were recovered at frequent depth intervals using a conventional split-spoon sampler during drilling. Standard penetration tests along with pocket penetrometer tests were conducted where applicable with the sampling operation to assess the strength characteristics of the substrata. Additionally, a Dynamic Cone Penetration Test was conducted at Borehole 5.

The ground water conditions at the borehole locations were assessed during drilling by visual examination of the soil, the sampler and the drill rods as the samples were retrieved and when appropriate by measurement of the water level in the open borehole.

Ground water monitoring wells were installed in Boreholes 1, 2, 5 and 6 comprising clean 50 mm diameter screened and solid PVC Schedule 40 pipe. The wells were installed to depths of 6.5 m and were screened at the bottom over a length of 1.5 m. The annular space of the borehole around the screen was backfilled with clean filter sand covered by a bentonite seal and stick-up protective cover set in concrete. The details of the monitoring well construction are shown on the appended Log of Borehole/Monitoring Well sheets. Well records will be kept on file by PML for future reference in accordance with O. Reg. 903/90, as amended

All of the recovered samples were returned to our laboratory for detailed visual examination and classification on selected samples.

5.1 Summarized Surface Conditions

Reference is made to the appended Log of Borehole sheets for details of the subsurface conditions including soil classifications, inferred stratigraphy, ground water observations, and the results of laboratory grain size analysis.

5.1.1 Soil

The subsurface stratigraphy in the boreholes typically comprised a topsoil, over native sand, over silty clay, underlain by sand.

A 200 to 680 mm topsoil veneer was encountered at the surface of the boreholes. The topsoil generally consisted of sand had some to trace silt with the occasional rootlet.

Locally, a 1.8 m silt layer was contacted below the topsoil in Borehole 1. The silt consists of some to trace clay and sand with occasional iron staining and clay seams.

A 1.5 m to 6.0 m native sand layer was contacted below the isolated silt layer in Borehole 1 and below the topsoil of Boreholes 2 to 6 and penetrated at 1.7 to 6.2 m. The sand generally contained some silt and was occasionally silty.

A 300 mm to 2.5 m clayey silt layer was contacted below the upper sand in the boreholes and was penetrated at 4.0 and 5.5 in Boreholes 2 and 4 and extended to termination of 6.5 m in the remaining boreholes.

A second 1.0 and 2.5 m thick sand layer was encountered below the silty clay in Boreholes 2 and 4. The sand extended to termination depths of 6.5 m in Boreholes 2 and 4 respectively. The sand was silty to containing trace silt and trace clay.

5.1.2 Groundwater

Upon completion of auguring, caving soil was observed at 0.9 to 5.2 m (elevations 225.5 to 230.8) in Boreholes 1 to 6. Free water was observed at 3.7 and 5.1 m (elevations 225.5 and 226.1) in Boreholes 1 and 3. Monitoring wells were installed in Boreholes 1, 2, 5 and 6. The most recent water levels taken at the wells were taken on April 6, 2022. Water levels were observed from 3.6 to 4.2 m (elevation 226.4 to 231.0).

5.1.3 Particle Size Distribution Testing

Three soil samples were submitted for particle size analysis. The results are included in Figures 2-1 to 2-3. Based on these results, infiltration rate and percolation times may be assumed to be below:

Sample No.	Sample Depth (m)	Soil Type	Hydraulic Conductivity (K, cm/s)	Infiltration Rate (mm/hour)	Estimated Percolation Time (T, min/cm)
BH2 SS4	2.3 – 2.8	Sand	$< 1.0 \times 10^{-3}$	85	8
BH3 SS7	6.0 – 6.5	Clayey Silt	$< 1.0 \times 10^{-5}$	25	25
BH4 SS5	3.0 – 3.5	Clayey Silt	$< 1.0 \times 10^{-5}$	25	25

6. ASSESSMENT OF POTENTIAL SEWAGE SYSTEM IMPACTS

6.1 Nitrate Loading Considerations

Assessment of the nitrate loading from infiltration of effluent from the sewage treatment systems was conducted in accordance with the following documents:

- Procedure D-5-4 – Technical Guideline for Individual On Site Sewage Systems: Water Quality Impact Assessment (MOEE April 1996);
- Hydrogeological Technical Information Requirements for Land Development Chapter 4, Section 4.5 (MOEE April 1995).

Nitrate in septic effluent is attenuated by dilution with infiltrating surface water and water discharged into the septic bed as well as ground water seepage from the upstream to the downstream side of the property (ground water flux). Ground water flux was not considered in the nitrate dilution calculation for this severance; consequently, the nitrate loading assessment is considered to be conservative.

The surface water infiltration rate was computed in accordance with the procedure noted in the MOEE information document. This procedure involves a three-step process:

i) A water budget analysis to compute the 'water surplus' (total rainfall – evapotranspiration).

ii) Selection of infiltration factors for the conditions at this particular Site to compute the rate of infiltration (sum of infiltration factors x water surplus).

iii) Computation of the nitrate loading on the ground water resource.

The water budget analysis was conducted using the Thornwaite and Mather procedure noted in the MOEE information document. This method is based on classic storm water management principles. Since the equations employed to compute the volume of surface water runoff were developed for heavy rainfall events of short duration, and a large volume of the precipitation occurs at a light to moderate rate over an extended period, the procedure over-estimates the volume of runoff and yields a conservative assessment of the infiltration rate.

The water surplus and infiltration rates noted in the following table were computed from rainfall data provided by Environment Canada and the infiltration factors noted in the MOEE information document:

Topography (rolling)	0.2
Soil (between clay and loam to sandy loam)	0.3
Cover (cultivated)	0.1
**Total ..... **	**0.6**

Monitoring Station	Annual Precipitation (mm)	Water Surplus[1] (mm/year)	Infiltration Rate (mm/year)
Delhi	965.	348	209

1. Computed by the Thornthwaite and Mather Method (Figure 2-4)

The nitrate loading computation was based on the following equation and input parameters noted in the MOEE Procedure.

$$N_C = \frac{N_E Q_E + N_B V_D}{Q_E + V_D}$$

where N_C = predicted nitrate loading at the property boundary (mg/L)

N_E = nitrate concentration in septic effluent (40 mg/L per MOEE Procedure)

N_B = background nitrate concentration (assume 0.15 mg/L for rainwater)

Q_E = total effluent sewage flow volume (L/day)
(1000 L/day per MECP Procedure)

V_D = infiltration volume (L/day)
(infiltration rate x land area)/365 days

infiltration rate = 209 mm/year

land area = 3500 m^2 less 5% impermeable surfaces = 3325 m^2

The nitrate concentration at the down gradient property line of the minimum proposed lot size of 0.35 ha is computed to be 13.9 mg/L which does not satisfy the regulatory requirement of 10.0 mg/L. A copy of the calculation is provided on Figure 2-5 (Case 1). To achieve a nitrate concentration of 10 mg/L or less at the down gradient property line for a lot size of 0.35 ha, a maximum effluent nitrate concentration of 30 mg/L is required, which is a 30% reduction from the

40 mg/L required by the MECP. In this regard, an advanced treatment system would be required to reduce the nitrate concentration by a minimum of 30%, which results in a downgradient concentration of 9.8 mg/L. A copy of this calculation is provided on Figure 2-6 (Case 2). It is noted that advance treatment systems can achieve a minimum of 50% or greater nitrate reduction. The use of advanced treatment systems for nitrate reduction are subject to regulatory approval.

For comparison purposes, the minimum lot size that will result in a predicted nitrate concentration of 10 mg/L or less at the down gradient property line using a conventional treatment unit without nitrate reduction is 0.56 ha. A copy of this calculation is provided in Figure 2-7 (Case 3).

6.2 Leaching Bed Design Criteria

The sand on Site is considered to be capable of treating domestic sewage. Free water was observed at 3.7 and 5.1 m (elevations 225.5 and 226.1) in Boreholes 1 and 3. Monitoring wells were installed in Boreholes 1, 2, 5 and 6. The most recent water levels taken at the wells were taken on March 10, 2021. Water levels were observed from 3.8 to 4.5 m (elevation 226.2 to 226.5 and elevation 230.4 in Borehole 2). Provided Site grades are maintained or raised during development, the minimum 900 mm clearance requirement between the water level and the base of the trench excavated for leaching beds should be satisfied.

The leaching bed should be designed based on the expected maximum daily sewage effluent loading. For example, the total daily sewage flow (Q) for a typical four-bedroom 230 m^2 house with up to 26 fixture units is 2,300 L/day, based on the criteria noted in the 2012 Ontario Building Code (Table 8.2.1.3.A).

Based on the grain size distribution curves (Figures 2-1 to 2-3), it is expected the native soils on the lands to be severed will exhibit a coefficient of permeability, K in the order of 10^{-3} to 10^{-5} cm/sec. The upper receiving soils are predominantly sand with typical percolation times in the range of 8-20 mins/cm, however some localized areas contain higher percentages of fins and therefore for design purposes, a percolation rate, T, of 25 min/cm is recommended.

Various septic system configurations may be considered for the proposed lot and once lot development plans are known, detailed septic system design and layout will be required for each lot. For preliminary planning purposes, an advanced Level IV treatment system such as System O)) Standard Configuration may be considered to achieve the required nitrate reduction.

In this case, the minimum required contact area for a Type A Dispersal Bed is determined as follows:

$$A = \frac{QT}{400}$$

Where, A = area of contact between the base of the sand and underlying soil
Q = the total daily design sanitary sewage flow in litres (2300 l/day)
T = the lesser of 50 and the percolation time of the underlying soil (25 min/cm)

As per the above, the minimum contact area would be 144 m2, plus additional space for treatment units, pumps and the like. The sand layer must extend a minimum of 15 m beyond the centrelines of the outer distribution pipes. Alternatively, it may be possible to further reduce the required area for the system by considering a System O)) nested pipe configuration.

Once the location of the sewage treatment system is selected, we recommend field percolation tests to determine the in situ percolation rate and confirm the required area of the leaching bed.

The layout and positioning of the septic system components must be in accordance with the Ontario Building Code and/or local regulations. This includes meeting all of the following minimum clearances:

MINIMUM CLEARANCES FOR TREATMENT UNITS

As per OBC Table 8.2.1.6.A and B

Object	Minimum Clearance for Treatment Units (m)	Minimum Clearance for Distribution Piping and Leaching Chambers (m)
Structure	1.5	5
Well with a watertight casing to a depth of at least 6 m	15	15
Any other well	15	30
Lake	15	15
Pond	15	15
Reservoir	15	15
River	15	15
Spring	15	15
Stream	15	15
Property Line	3	3

Based on the proposed lot sizes and dimensions and considering the preliminary septic system sizing and the required minimum clearances as presented above, it is considered feasible to service the proposed lots with individual on-site sewage treatment systems. This includes sufficient space for a replacement system, if needed.

General recommendations for management practices are provided on Table 1.

7. CONCLUSIONS

Based on the findings of this study, our summarized comments are provided below.

1. It is likely that the ground water aquifer on this Site will be capable of meeting the water demand for the development, subject to the results of pump testing. A private water treatment system will be required.

   Pump tests will be required to confirm the aquifer characteristics, yield and the potential for an adverse impact to the ground water resource in the area and neighbouring wells.

2. It is recommended that a sample of the treated drinking water be obtained and tested to ensure the treatment system is functioning properly and the quality of the water meets the ODWQS.

3. The nitrate loading for the proposed minimum lot size of 0.35 ha was determined to be 13.9 mg/L, which exceeds the regulatory limit of 10 mg/L. Advanced treatment units incorporating nitrate reduction will be required to support the minimum proposed lot size.

4. The minimum lot size supported without advanced treatment was determined to be 0.56 ha. The nitrate concentration at the down gradient property line of a lot size of 0.56 ha was computed to be 10.0 mg/L, which satisfies the regulatory requirement of 10.0 mg/L.

5. On site treatment of domestic sewage is considered to be feasible through the installation of a septic bed; the minimum area required is estimated to be 250 m^2 for a four bedroom dwelling.

6. Once the location of the sewage treatment system is selected, we recommend field percolation tests to determine the in situ percolation rate and confirm the required area of the leaching bed.

7. The sewage treatment system should be designed and constructed in accordance with the Ontario Building Code and/or local regulations.

8. CLOSURE

We trust the information presented in this report is sufficient for your present purposes. If you have any questions, please do not hesitate to contact our office.

Sincerely

Peto MacCallum Ltd.

Scott Jeffrey, P.Eng., QP_{ESA}, $LEED_{GA}$
Director
Regional Manager, Geotechnical and Geoenvironmental Services

AR/SJ:ld/tc

References

Topographic and Other Maps

Ontario Basic Maps (OBM) ArcIMS Service, Environmental Systems Research Institute Canada, 2004, http://www.geographynetwork.ca/

Google Earth™, http://www.google.com/earth/index.html

Chapman, L.J., and Putnam, D.F., 1984: The Physiography of Southern Ontario; Ontario. Ontario Research Foundation.

M2369; Quaternary Geology, Simcoe, Southern Ontario; Ministry of Natural Resources; 1976; Scale: 1:50 000.

M2370; Bedrock Topography of the Simcoe Area, Southern Ontario; Ontario Department of Mines, 1976; Scale: 1:50,000.

M2371; Drift Thickness Series, Simcoe Sheet, Southern Ontario; Ontario Department of Mines, 1976; Scale: 1:50,000.

P2234; Paleozoic Geology, Simcoe, Southern Ontario; Ontario Division of Mines, 1980; Scale: 1:50 000.

Publications

Aqua Resource Inc., Long Point Region, Kettle Creek and Catfish Creek Integrated Water Budget - Final Report, April 2009

Ministry of Environment and Energy (MOEE) Hydrogeological Technical Information Requirements for Land Development Applications, April 1995, Her Majesty the Queen in Right of Ontario as Represented by the Minister of Environment and Energy.

Ministry of the Environment and Energy (MOEE), Procedure D-5-4 – Technical Guideline for Individual on Site Sewage Systems: Water Quality Impact Assessment, April 1996.

O. Reg. 169/03 Ontario Drinking Water Quality Standards, Safe Drinking Water Act, 2002.

O. Reg. 170/03 Drinking Water Systems, Safe Drinking Water Act, 2002.

Well Records

Ontario Ministry of the Environment (MOE) Environmental Monitoring and Reporting Branch, Water Well Records Management

TABLE 1

RECOMMENDED CONSTRUCTION AND MANAGEMENT PRACTICES FOR PRIVATE SEPTIC TILE LEACHING BED SEWAGE DISPOSAL SYSTEMS

1. Lot drainage should be accentuated to ensure positive runoff of storm water away from the tile field. Sewage effluent should not compete with infiltrating storm water which may overload the tile field capacity.
2. Provided it is allowed by local authorities, eavestrough downspouts should be connected directly into the storm sewer, eliminating a potential water source to compete for ground infiltration.

   If storm sewers are not available, the downspouts and extensions should be planned for the opposite side of the house away from the leaching bed.
3. Water conservation should be exercised to reduce the volume of effluent to be handled by the tile field.

   The tile field should be fenced off before construction proceeds.
4. All heavy construction equipment and stockpiling of fill should be prohibited on the tile field area, since soil compaction will result which could severely restrict evapotranspiration within the bed area.
5. Vehicular traffic of any type should not be permitted on the surface of the leaching bed following construction.
6. In order to prevent frost damage, the snow cover should be left in place and measures taken to ensure it is not packed by surface use.
7. Construction of the leaching bed system should be supervised by geotechnical personnel.
8. Routine maintenance is necessary to control growth of excessive vegetation such as trees and heavy growth of weeds over the leaching bed area.
9. To ensure continued bacterial breakdown of sewage effluent, the septic tank should be pumped periodically to remove sludge build-up.
10. If the septic system is equipped with a grease trap, a routine maintenance program must be implemented to ensure it is cleaned regularly.
11. Backwash water from water softener systems can adversely affect bacterial action and concrete components of the sewage system. Therefore, the water should not be discharged to the sewage system.
12. Chemicals such as drain cleaners, petroleum products, solvents, degreasers, etc. will also affect bacterial action and should not be discharged into the sewage system.

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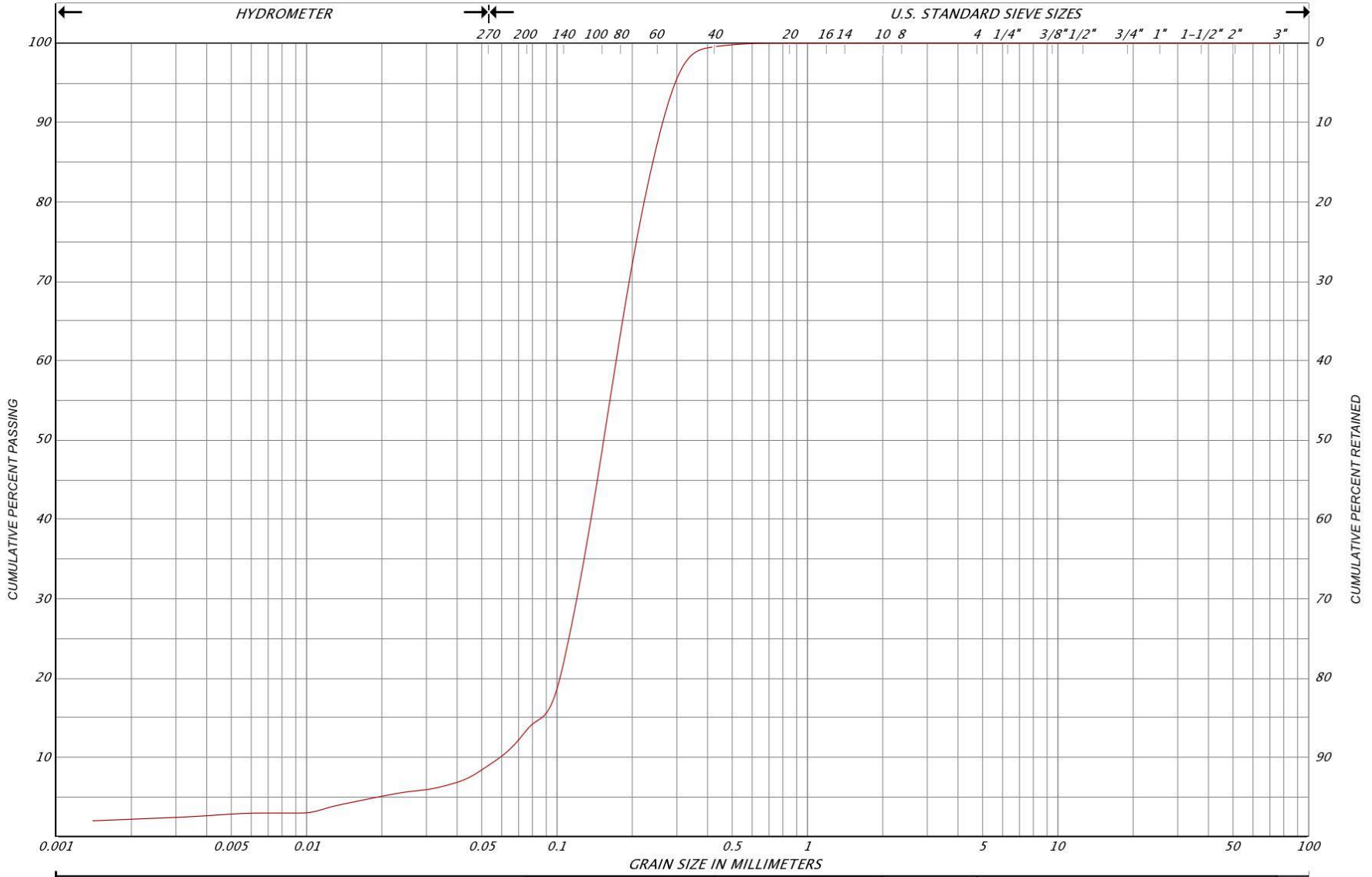
PARTICLE SIZE DISTRIBUTION CHART

SOIL TYPE: SAND

PROJECT NO.20HF021
FIGURE NO.2-1
BH2 SS4



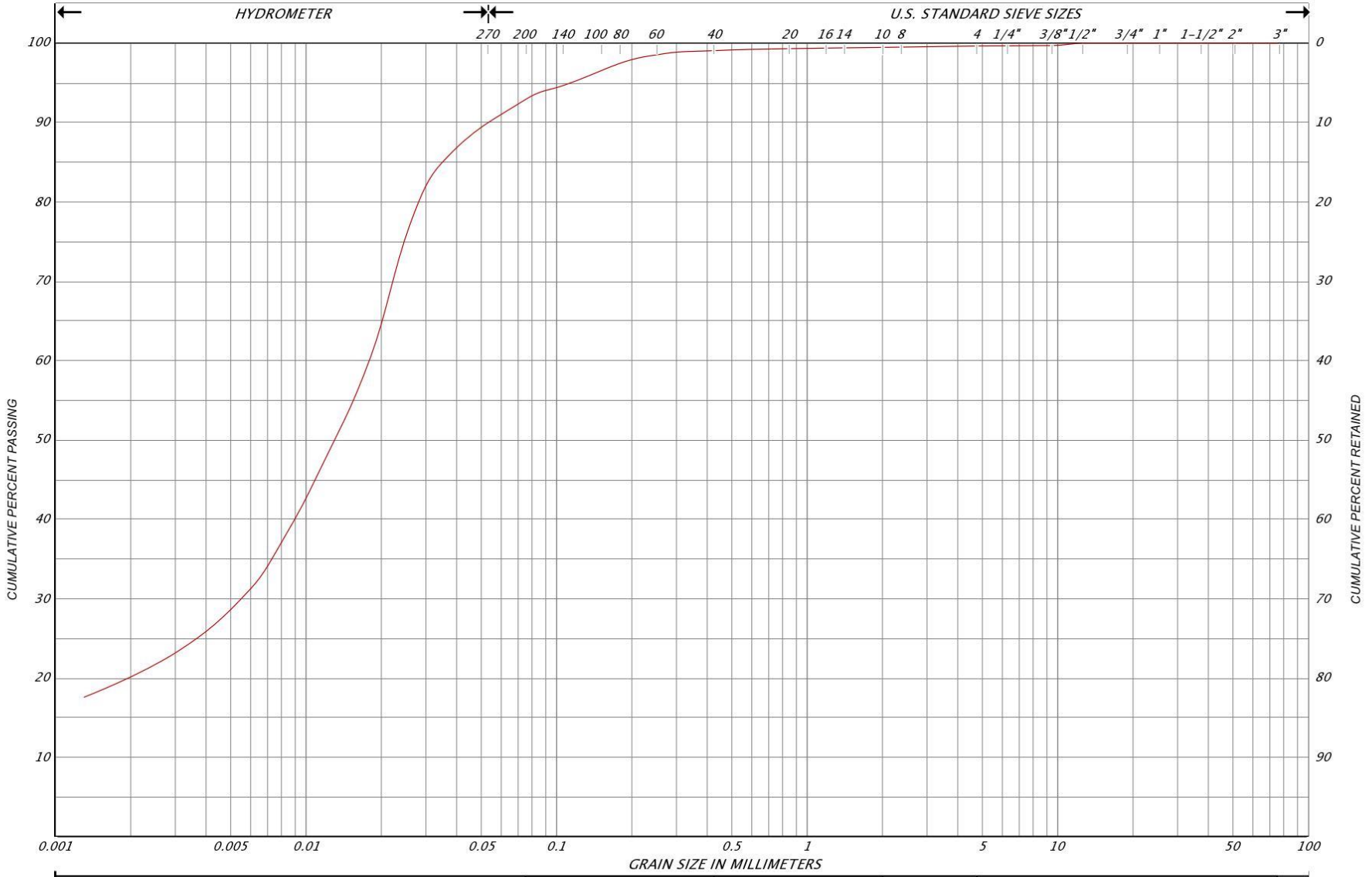
SILT & CLAY			FINE	MEDIUM	COARSE	GRAVEL		COB BLES	UNIFIED
			SAND						
CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	GRAVEL		COBBLES	M.I.T
	SILT			SAND						
CLAY	SILT		V.FINE	FINE	MED.	COARSE	GRAVEL			US BUREAU
			SAND							

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

PROJECT NO.20HF021
FIGURE NO.2-2
BH3 SS7

PARTICLE SIZE DISTRIBUTION CHART

SOIL TYPE: CLAYEY SILT



SILT & CLAY			FINE	MEDIUM	COARSE	GRAVEL		COB BLES	UNIFIED
			SAND						
CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	GRAVEL		COBBLES	M.I.T
	SILT			SAND						
CLAY	SILT		V.FINE	FINE	MED.	COARSE	GRAVEL			US BUREAU
			SAND							

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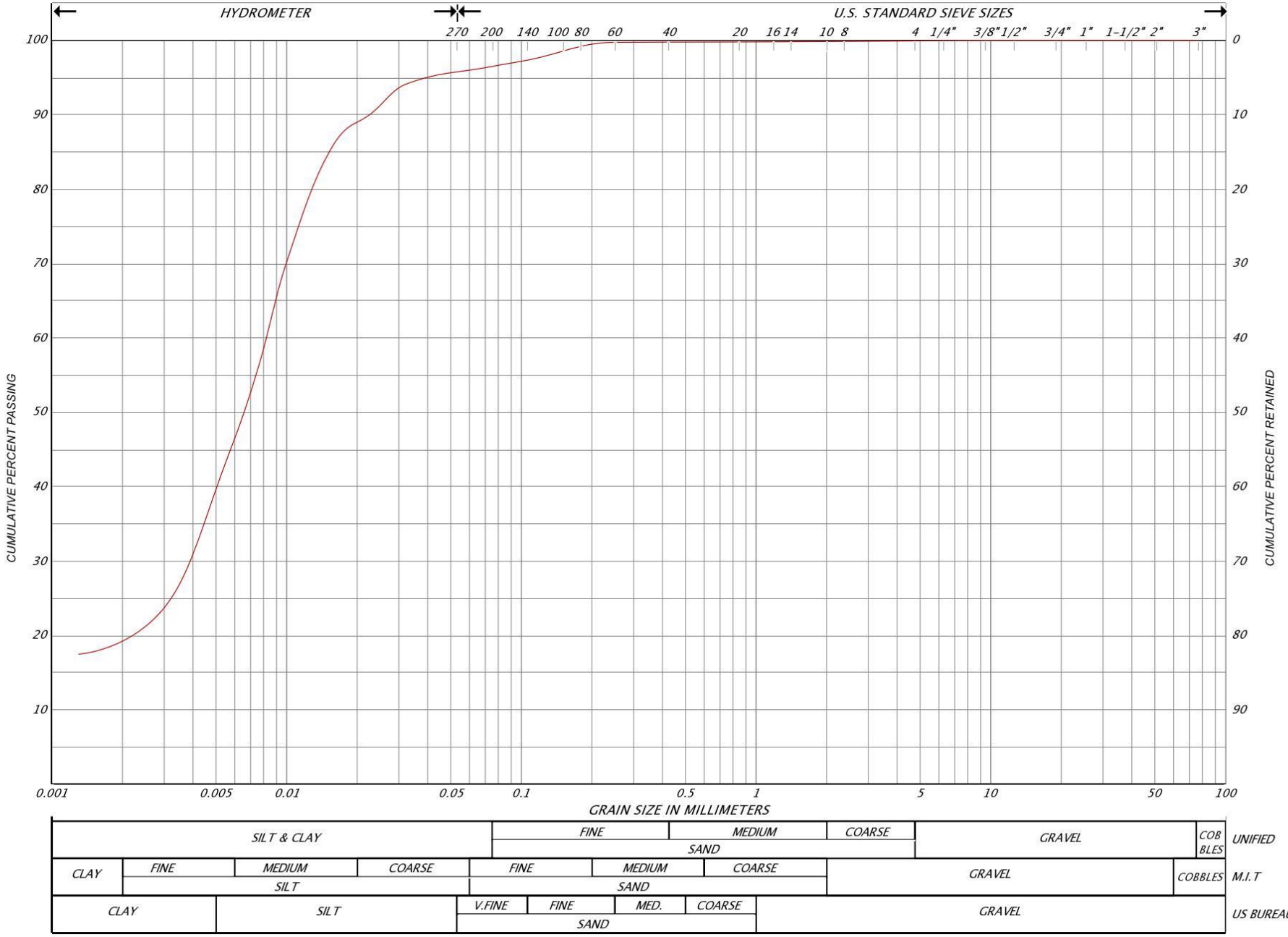
PROJECT NO.20HF021
FIGURE NO.2-3

PARTICLE SIZE DISTRIBUTION CHART

SOIL TYPE: CLAYEY SILT
BH4 SS5



SILT & CLAY			FINE	MEDIUM	COARSE	GRAVEL		COB BLES	UNIFIED
			SAND						
CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	GRAVEL		COBBLES	M.I.T
	SILT			SAND						
CLAY	SILT		V.FINE	FINE	MED.	COARSE	GRAVEL			US BUREAU
			SAND							

Figure 2-4

Water Budget Summary (Using Thornthwaite Empirical Approach)

Month	Mean Daily Average Daily Temp, t [1] (°C)	Heat Index, i [2]	Mean Montly Precipitation, P [1] (mm)	Days in Month, d	Average Daylight Hours, N [3]	Unadjusted Potential Evapotranspiration, PE_{unadj} [4] (mm)	Adjusted Evapotranspiration Adjusted for Month and Daylight, PE [5] (mm)	Actual Water Balance, P - PE (mm)
January	-5.0	0.00	81.3	31	9.45	0.00	0.00	81.30
February	-4.5	0.00	58.0	28	10.57	0.00	0.00	58.00
March	0.3	0.01	70.8	31	11.98	0.84	0.87	69.93
April	6.8	1.59	87.4	30	13.44	28.83	32.29	55.11
May	13.6	4.55	87.6	31	14.67	63.17	79.81	7.79
June	19.0	7.55	81.5	30	15.28	92.23	117.47	-35.97
July	21.2	8.91	88.6	31	14.95	104.41	134.39	-45.79
August	20.1	8.22	79.5	31	13.85	98.30	117.20	-37.70
September	16.4	6.04	85.8	30	12.45	78.08	81.00	4.80
October	10.0	2.86	86.1	31	11.00	44.61	42.27	43.83
November	3.9	0.69	82.5	30	9.74	15.37	12.47	70.03
December	-1.7	0.00	76.3	31	9.09	0.00	0.00	76.30
Totals		40.41	965.4			525.8	617.8	347.6

Annual Heat Index, I	40.41
α [3]	1.13

Notes:

[1] Data from Environment Canada 1991-2020 Climate Nomrals - Delhi Station (1991-2020 Data)

[2] Monthly Heat Index, $i = (T/5)^{1.514}$; I = Annual Heat Index = sum of monthly heat indecies

[3] from US Naval Observatory web site

[3] $\alpha = (6.75*10^{-7} * I^3) - (7.71*10^{-5} * I^2) + (0.01792 * I) + .49239$ Where I = Annual Heat Index

[4] $PE_{unadj} = 16 * (10*t / I)\alpha$ Where: t= Degrees C; I= Annual heat index; α = factor based on heat index

[5] PE = PEunadj x (N / 12) * (d / 30) Where N = number of daylight hours in that month; d = number of days in the month

MECP D-5-4 PREDICTIVE ASSESSMENT CALCULATIONS

CASE 1:

3500 m2 Lot with 5% impervious space serviced by a conventional treatment unit without Nitrate reduction

Water Budget Calculations

Annual Precipitation, P	0.965	m/yr	*Environment Canada 1991 to 2020 Climate Normals, Delhi Station*
Evapotranspiration, E	0.618	m/yr	*Thornthwaite Mather Water Balance*
Water Surplus, S	0.348	m/yr	[S = P - E]

Infiltration Calculations

Infiltration Factors based on MOEE Hydrogeological Technical Information Requiremetns for Land Development Applications (April 1995)

Topography, I_T		Soil Type, I_S		Vegetative Cover, I_V	
Flat	0.3	Tight Impervious Clay	0.1	Cultivated	0.1
Rolling	0.2	Medium (Clay & Loam)	0.2	Woodland	0.2
Hilly	0.1	Open Sandy Loam	0.4		
Selected: I_T =	0.2	I_S =	0.3	I_V =	0.1

Combined Infiltration Factor, I	0.6		[$I = I_T + I_S + I_V$]
Infiltration Rate, IR	0.2086	m/yr	[IR = S x I]
Site Area, A_S	3500	m^2	
Percent Impervious Areas	5	%	
Impervious Areas, A_I	175	m^2	
Pervious Area, A_P	3325	m^2	[$A_P = A_S - A_I$]
Dilution Volume, V_D	1900	L/day	[V_D = IR x AP) x 1000 L/m^3 ÷ 365 days/year]

Nitrate Loading

Number of Lots, L	1	Lots	
Daily Effluent Flow per lot, Q_e	1000	L/day	*Default as per MOEE Technical Guideline*
Total Effluent Flow, Q_E	1000	L/day	[$Q_T = L \times Q_e$]
Nitrate Concentration in Effluent, N_E	40	mg/L	*Default concentration without treatment as per MOEE Technical Guideline*
Nitrate Reduction with Advanced Treatment	0	%	*Conventional treatment unit without Nitrate reduction*
Nitrate Concentration in Effluent, N_E	40	mg/L	
Background Nitrate Concentration, N_B	0.15	mg/L	*Assumed background concentration*

Predictive Assessment

Nitrate Concentration at Property Boundary, N_C

$$N_C = \frac{(N_E \times Q_E) + (N_B \times V_D)}{(Q_E + V_D)}$$

MOEE D-5-4 Guidelines for Residential Developments

N_C = 13.9 mg/L ***** Exceeds ODWQ Guideline Limit of 10 mg/L**

MECP D-5-4 PREDICTIVE ASSESSMENT CALCULATIONS

CASE 1:

3500 m2 Lot with 5% impervious space serviced by an advance treatment unit with Nitrate reduction

Water Budget Calculations

Annual Precipitation, P	0.965	m/yr	*Environment Canada 1991 to 2020 Climate Normals, Delhi Station*
Evapotranspiration, E	0.618	m/yr	*Thornthwaite Mather Water Balance*
Water Surplus, S	0.348	m/yr	[S = P - E]

Infiltration Calculations

Infiltration Factors based on MOEE Hydrogeological Technical Information Requiremetns for Land Development Applications (April 1995)

Topography, I_T		Soil Type, I_S		Vegetative Cover, I_V	
Flat	0.3	Tight Impervious Clay	0.1	Cultivated	0.1
Rolling	0.2	Medium (Clay & Loam)	0.2	Woodland	0.2
Hilly	0.1	Open Sandy Loam	0.4		
Selected: I_T =	0.2	I_S =	0.3	I_V =	0.1

Combined Infiltration Factor, I	0.6		[$I = I_T + I_S + I_V$]
Infiltration Rate, IR	0.2086	m/yr	[IR = S x I]
Site Area, A_S	3500	m^2	
Percent Impervious Areas	5	%	
Impervious Areas, A_I	175	m^2	
Pervious Area, A_P	3325	m^2	[$A_P = A_S - A_I$]
Dilution Volume, V_D	1900	L/day	[V_D = IR x AP) x 1000 L/m^3 ÷ 365 days/year]

Nitrate Loading

Number of Lots, L	1	Lots	
Daily Effluent Flow per lot, Q_e	1000	L/day	*Default as per MOEE Technical Guideline*
Total Effluent Flow, Q_E	1000	L/day	[$Q_T = L \times Q_e$]
Nitrate Concentration in Effluent, N_E	40	mg/L	*Default concentration without treatment as per MOEE Technical Guideline*
Nitrate Reduction with Advanced Treatment	30	%	*Nitrate reduction using Level IV Advanced Treatment Unit*
Nitrate Concentration in Effluent, N_E	28	mg/L	
Background Nitrate Concentration, N_B	0.15	mg/L	*Assumed background concentration*

Predictive Assessment

Nitrate Concentration at Property Boundary, N_C

$$N_C = \frac{(N_E \times Q_E) + (N_B \times V_D)}{(Q_E + V_D)}$$

MOEE D-5-4 Guidelines for Residential Developments

N_C = 9.8 mg/L **O.K. - Meets ODWQ Guideline Limit of 10 mg/L**

Figure 2-7

MECP D-5-4 PREDICTIVE ASSESSMENT CALCULATIONS

CASE 1:

Minimum Lot Size assuming 5% impervious space serviced by an conventional treatment unit to meet 10 mg/L at property boundary.

Water Budget Calculations

Annual Precipitation, P	0.965	m/yr	*Environment Canada 1991 to 2020 Climate Normals, Delhi Station*
Evapotranspiration, E	0.618	m/yr	*Thornthwaite Mather Water Balance*
Water Surplus, S	0.348	m/yr	[S = P - E]

Infiltration Calculations

Infiltration Factors based on MOEE Hydrogeological Technical Information Requiremetns for Land Development Applications (April 1995)

Topography, I_T		Soil Type, I_S		Vegetative Cover, I_V	
Flat	0.3	Tight Impervious Clay	0.1	Cultivated	0.1
Rolling	0.2	Medium (Clay & Loam)	0.2	Woodland	0.2
Hilly	0.1	Open Sandy Loam	0.4		
Selected: I_T =	0.2	I_S =	0.3	I_V =	0.1

Combined Infiltration Factor, I	0.6		[$I = I_T + I_S + I_V$]
Infiltration Rate, IR	0.2086	m/yr	[IR = S x I]
Site Area, A_S	5600	m^2	
Percent Impervious Areas	5	%	
Impervious Areas, A_I	280	m^2	
Pervious Area, A_P	5320	m^2	[$A_P = A_S - A_I$]
Dilution Volume, V_D	3040	L/day	[V_D = IR x AP) x 1000 L/m^3 ÷ 365 days/year]

Nitrate Loading

Number of Lots, L	1	Lots	
Daily Effluent Flow per lot, Q_e	1000	L/day	*Default as per MOEE Technical Guideline*
Total Effluent Flow, Q_E	1000	L/day	[$Q_T = L \times Q_e$]
Nitrate Concentration in Effluent, N_E	40	mg/L	*Default concentration without treatment as per MOEE Technical Guideline*
Nitrate Reduction with Advanced Treatment	0	%	*Conventional treatment unit without Nitrate reduction*
Nitrate Concentration in Effluent, N_E	40	mg/L	
Background Nitrate Concentration, N_B	0.15	mg/L	*Assumed background concentration*

Predictive Assessment

Nitrate Concentration at Property Boundary, N_C

$$N_C = \frac{(N_E \times Q_E) + (N_B \times V_D)}{(Q_E + V_D)}$$

MOEE D-5-4 Guidelines for Residential Developments

N_C = 10.0 mg/L ***** Exceeds ODWQ Guideline Limit of 10 mg/L**

LIST OF ABBREVIATIONS

PENETRATION RESISTANCE

Standard Penetration Resistance N: - The number of blows required to advance a standard split spoon sampler 0.3 m into the subsoil. Driven by means of a 63.5 kg hammer falling freely a distance of 0.76 m.

Dynamic Penetration Resistance: - The number of blows required to advance a 51 mm, 60 degree cone, fitted to the end of drill rods, 0.3 m into the subsoil. The driving energy being 475 J per blow.

DESCRIPTION OF SOIL

The consistency of cohesive soils and the relative density or denseness of cohesionless soils are described in the following terms:

CONSISTENCY	N (blows/0.3 m)	c (kPa)	DENSENESS	N (blows/0.3 m)
Very Soft	0 - 2	0 - 12	Very Loose	0 - 4
Soft	2 - 4	12 - 25	Loose	4 - 10
Firm	4 - 8	25 - 50	Compact	10 - 30
Stiff	8 - 15	50 - 100	Dense	30 - 50
Very Stiff	15 - 30	100 - 200	Very Dense	> 50
Hard	> 30	> 200		

WTPL	Wetter Than Plastic Limit
APL	About Plastic Limit
DTPL	Drier Than Plastic Limit

TYPE OF SAMPLE

SS	Split Spoon	TW	Thinwall Open
WS	Washed Sample	TP	Thinwall Piston
SB	Scraper Bucket Sample	OS	Oesterberg Sample
AS	Auger Sample	FS	Foil Sample
CS	Chunk Sample	RC	Rock Core
ST	Slotted Tube Sample		

PH	Sample Advanced Hydraulically
PM	Sample Advanced Manually

SOIL TESTS

Qu	Unconfined Compression	LV	Laboratory Vane
Q	Undrained Triaxial	FV	Field Vane
Qcu	Consolidated Undrained Triaxial	C	Consolidation
Qd	Drained Triaxial		

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 1

1 of 1

PROJECT Laplante Road - 8 Lot Plan of Subdivision
OUR PROJECT NO. 20HF021
LOCATION Laplante Road, Tilsonburg
BORING DATE February 11, 2021
ENGINEER SJ
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN SM

ELEV / DEPTH in feet	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES
230.6 / 0.0	TOPSOIL: 670 mm Loose, brown sand topsoil, some silt, damp; occasional rootlet		1	SS	8
0.7	SILT: Loose, brown silt, some clay, trace sand, wet; occasional iron staining and clay seams		2	SS	5
1.4	becoming very loose, some sand, trace clay		3	SS	2
228.2			4A	SS	1
2.5	SAND: Very loose, brown sand, some silt, trace clay, moist		4B	SS	
			5	SS	3
226.6					
4.0	CLAYEY SILT: Very stiff, brown clayey silt, trace sand WTPL		6	SS	15
225.1					
5.5	becoming hard, grey		7	SS	36
6.5	BOREHOLE TERMINATED AT 6.5 m				

ELEVATION SCALE: 230, 229, 228, 227, 226, 225

SHEAR STRENGTH ksf
○ UNCONFINED + FIELD VANE
▲ POCKET PENETROMETER
1 2 3 4
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

GAS READINGS ppm

REMARKS & GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

Stickup Well Protector Set
Bentonite Seal
50 mm Diameter PVC Pipe
Filter Sand
Screen
Upon completion of augering, free water and cave at 5.1 m.

5.0
10.0

DOFASCO 20HF021 BOREHOLE LOGS.GPJ ON_MOT.GDT 11/19/2024 4:00:57 PM

+7, ×5 : Numbers refer to Sensitivity

20
15 5
10
(%) STRAIN AT FAILURE

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 2

1 of 1

PROJECT Laplante Road - 8 Lot Plan of Subdivision
OUR PROJECT NO. 20HF021
LOCATION Laplante Road, Tilsonburg
BORING DATE February 11, 2021
ENGINEER SJ
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN SM

ELEV / DEPTH in feet	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES
234.9					
0.0	TOPSOIL: 200 mm compact, dark brown sand topsoil, some silt damp; occasional rootlet		1A	SS	13
0.2	SAND: Loose, brown sand, some silt, damp		1B	SS	
			2	SS	7
			3	SS	8
232.8					
2.1	becoming compact		4	SS	13
			5	SS	13
230.9					
4.0	CLAYEY SILT: Stiff, brown clayey silt, trace sand DTPL; occasional clay layers		6	SS	10
5.0					
229.4					
5.5	SAND: Compact, brown and grey sand, trace silt, damp; occasional oxidation staining		7	SS	27
6.5	BOREHOLE TERMINATED AT 6.5 m				
10.0					

ELEVATION SCALE: 234, 233, 232, 231, 230, 229

SHEAR STRENGTH ksf
○ UNCONFINED + FIELD VANE
▲ POCKET PENETROMETER
1 2 3 4
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

GAS READINGS ppm

REMARKS & GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL
0 87 11 2

Upon completion of augering, no free water, cave at 5.2 m

+7, ×5 : Numbers refer to Sensitivity

20
15 — 5
10

(%) STRAIN AT FAILURE

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 3

1 of 1

PROJECT Laplante Road - 8 Lot Plan of Subdivision
OUR PROJECT NO. 20HF021
LOCATION Laplante Road, Tilsonburg
BORING DATE February 11, 2021
ENGINEER SJ
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN SM

ELEV / DEPTH in feet	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	ELEVATION SCALE	SHEAR STRENGTH ksf (○ UNCONFINED + FIELD VANE ▲ POCKET PENETROMETER; DYNAMIC CONE PENETRATION / STANDARD PENETRATION TEST ×/●)	WATER CONTENT (%) (PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L)	GAS READINGS ppm	REMARKS & GRAIN SIZE DISTRIBUTION (%) GR SA SI CL
229.8										
0.0	TOPSOIL: 680 mm Loose, brown sand topsoil, trace silt, damp; occasional rootlet		1	SS	6					
0.7	SAND: Loose, light brown silt, some clay, trace sand, moist		2	SS	7	229				
			3	SS	4	228				
227.7										
2.1	becoming compact, wet		4	SS	11					
2.9	becoming saturated		5	SS	14	227				
225.8						226				
4.0	CLAYEY SILT: Stiff, grey clayey silt, trace sand, WTPL		6	SS	8	225	>> ▲			
5.0										
224.4						224				
5.5	becoming very stiff		7	SS	25		>> ▲			0 7 73 20
6.5	BOREHOLE TERMINATED AT 6.5 m									Upon completion of augering, free water and cave at 3.7 m
10.0										

DOFASCO 20HF021 BOREHOLE LOGS.GPJ ON_MOT.GDT 11/19/2024 4:01:00 PM

+7, ×5 : Numbers refer to Sensitivity

(%) STRAIN AT FAILURE

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 4

1 of 1

PROJECT Laplante Road - 8 Lot Plan of Subdivision
OUR PROJECT NO. 20HF021
LOCATION Laplante Road, Tilsonburg
BORING DATE February 11, 2021
ENGINEER SJ
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN SM

ELEV / DEPTH in feet	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	TYPE	"N" VALUES
231.7 / 0.0	TOPSOIL: 250 mm Loose, brown sand topsoil, damp; occasional rootlet		1	SS	7
0.3	SAND: Loose, brown sand, trace silt, wet		2A	SS	4
			2B	SS	
			3A	SS	9
230.0 / 1.7	CLAYEY SILT: Stiff, brown clayey silt, trace sand, DTPL; occasional sand lenses		3B	SS	
2.1	becoming firm		4	SS	7
2.9	becoming stiff		5	SS	12
227.7 / 4.0	SAND: Dense, brown and grey sand, trace silt, damp; occasional oxidation staining		6	SS	35
5.0 / 226.3 / 5.5	becoming compact, saturated		7	SS	12
6.5	BOREHOLE TERMINATED AT 6.5 m				

ELEVATION SCALE: 231, 230, 229, 228, 227, 226

SHEAR STRENGTH ksf
○ UNCONFINED + FIELD VANE
▲ POCKET PENETROMETER
1 2 3 4
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

GAS READINGS (ppm)

REMARKS & GRAIN SIZE DISTRIBUTION (%)

	GR	SA	SI	CL
4	0	3	76	20

Upon completion of augering, no free water, cave at 0.9 m

10.0

DOFASCO 20HF021 BOREHOLE LOGS.GPJ ON_MOT.GDT 11/19/2024 4:01:01 PM

+7, ×5 : Numbers refer to Sensitivity

20
15 — 5
10

(%) STRAIN AT FAILURE

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 5

PROJECT Laplante Road - 8 Lot Plan of Subdivision
OUR PROJECT NO. 20HF021
LOCATION Laplante Road, Tilsonburg
BORING DATE February 11, 2021
ENGINEER SJ
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN SM

ELEV / DEPTH in feet	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES
230.4 / 0.0	TOPSOIL: 200 mm very loose, dark brown sand topsoil, some silt damp; occasional rootlet		1A	SS	3
0.2	SAND: Very loose, brown sand, some silt, damp		1B	SS	
0.7	becoming wet; occasional silt seams		2	SS	4
			3A	SS	3
			3B	SS	
			4	SS	1
			5	SS	2
226.4 / 4.0	becoming compact, saturated		6	SS	30
224.2 / 6.2	CLAYEY SILT: Stiff, grey clayey silt, trace sand, WTPL		7A	SS	10
6.5	BOREHOLE TERMINATED AT 6.5 m		7B	SS	

ELEVATION SCALE: 230, 229, 228, 227, 226, 225, 224

SHEAR STRENGTH ksf
○ UNCONFINED + FIELD VANE
▲ POCKET PENETROMETER
1 2 3 4

DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

GAS READINGS ppm

REMARKS & GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

Stickup Well Protector Set
Bentonite Seal
50 mm Diameter PVC Pipe
Filter Sand
Screen
Upon completion of augering, free water and cave at 2.1 m

5.0
10.0

DOFASCO 20HF021 BOREHOLE LOGS.GPJ ON_MOT.GDT 11/19/2024 4:01:03 PM

+7 , ×5 : Numbers refer to Sensitivity

20 / 15 5 / 10 (%) STRAIN AT FAILURE

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 6

1 of 1

PROJECT Laplante Road - 8 Lot Plan of Subdivision
OUR PROJECT NO. 20HF021
LOCATION Laplante Road, Tilsonburg
BORING DATE February 11, 2021
ENGINEER SJ
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN SM

ELEV / DEPTH in feet	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	TYPE	"N" VALUES
230.2 / 0.0	TOPSOIL: 250 mm Compact, brown sandy silt topsoil, damp; occasional rootlet		1A	SS	8
0.3	SAND: Loose, brown sand, trace silt, damp		1B	SS	
			2	SS	10
			3	SS	9
228.1 / 2.1	becoming compact		4	SS	19
			5	SS	29
226.2 / 4.0	becoming loose, saturated		6	SS	5
224.8 / 5.5	CLAYEY SILT: Very stiff, grey clayey silt, WTPL		7	SS	28
6.5	BOREHOLE TERMINATED AT 6.5 m				

ELEVATION SCALE: 230, 229, 228, 227, 226, 225, 224

SHEAR STRENGTH ksf
○ UNCONFINED + FIELD VANE
▲ POCKET PENETROMETER
1 2 3 4
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

GAS READINGS ppm

REMARKS & GRAIN SIZE DISTRIBUTION (%)
GR SA SI CL

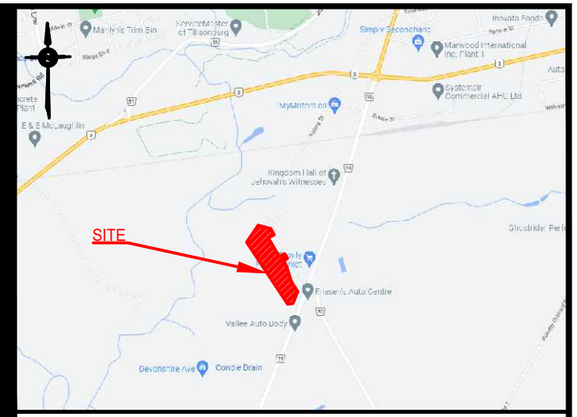
Stickup Well Protector Set
Bentonite Seal
50 mm Diameter PVC Pipe
Filter Sand
Screen
Upon completion of augering, free water and cave at 2.1 m

5.0
10.0

DOFASCO 20HF021 BOREHOLE LOGS.GPJ ON_MOT.GDT 11/19/2024 4:01:04 PM

+7 , ×5 : Numbers refer to Sensitivity

(%) STRAIN AT FAILURE



KEY PLAN

NORFOLK COUNTY, ONTARIO

LEGEND:

BH 6
EL. 230.24 — PETO MACCALLUM LTD. (PML) BOREHOLE (BH) LOCATION
ELEVATION (METRIC, GEODETIC)

DEVELOPMENT BOUNDARY

REFERENCE:

PLAN PRODUCED FROM DRAWING LABELED "116933-1", DATED SEPTEMBER 17, 2024AND FROM GIS INFORMATION FROM THE COUNTY OF NORFOLK ONLINE INTERACTIVE MAPPING SERVICE.

NOTE:

1. THE INFERRED STRATIGRAPHY REFERRED TO IN THE REPORT IS BASED ON THE DATA FROM THESE BOREHOLES SUPPLEMENTED BY GEOLOGICAL EVIDENCE. THE ACTUAL STRATIGRAPHY BETWEEN THE BOREHOLES MAY VARY.
2. GEODETIC GROUND SURFACE ELEVATIONS AND UTM CO-ORDINATES AT THE BOREHOLE LOCATIONS WERE DETERMINED BY PML USING A GLOBAL NAVIGATION SATELLITE SYSTEM (GNSS). THE SURVEY EQUIPMENT COMPRISED A SOKKIA CANADA GCX-3 NETWORK REAL TIME KINEMATIC (RTK) ROVER SYSTEM.

0m 25 50 75 100 150

SCALE
(1:2000)

MR. JOE OLIVEIRA

HYDROGEOLOGICAL SITE ASSESSMENT
SUBDIVISION
LAPLANTE ROAD, NORFOLK COUNTY ONTARIO

BOREHOLE LOCATION PLAN

Peto MacCallum Ltd.
CONSULTING ENGINEERS

		DATE	SCALE	PML REF.	DRAWING NO.
DRAWN	SM	NOV 2024	AS SHOWN	20HF021	2-1
CHECKED	SJ				
APPROVED	SJ				

Appendix A

Water Well Records

Peto MacCallum Ltd.
CONSULTING ENGINEERS

PML Number	TOWNSHIP CON LOT	UTM ZONE	EASTING	NORTHING		DATE CNTR	CASING DIA	WATER	PUMP TEST	WELL USE	SCREEN	WELL	FORMATION
1	MIDDLETON TOWNSHIP TR N 04 004	17	522155	4742600	W	2020/12 7090						7377669 (Z350447) A276468 P	
2	MIDDLETON TOWNSHIP TR N 04 006	17	522370	4743197	W	2020/11 6824						7373349 (Z351474) A297003 P	
3	MIDDLETON TOWNSHIP TR N 04 006	17	522322	4743017	W	2016/06 4634	5	FR 0065	42/60/3/12:	DO	0065 4	7265716 (Z228419) A201162	BLCK LOAM 0002 BRWN SAND 0012 GREY CLAY SAND 0021 GREY CLAY DNSE 0050 GREY CLAY SLTY 0062 GREY FSND 0066 GREY STNS CLAY 0070
4	MIDDLETON TOWNSHIP TR N 04 006	17	522561	4743171	W	2016/05 7090	6 6	FR 0015	26/28/20/1:0	DO	0058 12	7264284 (Z217643) A176899	BLCK LOAM LOAM 0001 BRWN SAND LOOS 0015 GREY LOOS 0071 GREY CLAY STKY 0076
5	MIDDLETON TOWNSHIP TR N 04 006	17	522600	4743113	W	2016/05 7090	6 6	FR 0013	24/26/20/1:0	OT	0056 13	7264283 (Z217640) A176898	BLCK LOAM LOAM 0001 BRWN SAND LOOS 0013 GREY SAND LOOS 0069 GREY GRVL CLAY HARD 0074
6	MIDDLETON TOWNSHIP TR N 04 006	17	522588	4742485	W	2015/06 7090		UT	30/37/9/1:30	DO	0058 12	7254821 (Z201690) A170119	BRWN SAND 0029 GREY SAND PCKD 0070 GREY CLAY 0071
7	MIDDLETON TOWNSHIP TR N 04 006	17	522432	4742966	W	2015/06 7090		UT	39/48/9/1:30	DO	0055 16	7254823 (Z201685) A170113	BRWN LOAM 0002 BRWN SAND 0021 GREY CLAY 0049 GREY SAND 0072 GREY CLAY 0076
8	MIDDLETON TOWNSHIP TR N 04 006	17	522086	4743318	W	2013/06 7090	36			DO		7214087 (Z171020) A	
9	MIDDLETON TOWNSHIP TR N 04 006	17	522091	4743324	W	2013/04 7090	6.61	UT 0154	67/72/40/1:30	DO		7214065 (Z160156) A129700	BLCK LOAM 0001 BRWN SAND 0035 GREY CLAY 0062 GREY SAND SLTY 0071 GREY HPAN 0152 GREY LMSN 0156
10	MIDDLETON TOWNSHIP TR N 04 005	17	522164	4742592	W	2012/11 4634				OT		7194952 (Z145016) A127866 A	BLCK LOAM 0002 BRWN SAND 0015 GREY CLAY SOFT 0030
11	MIDDLETON TOWNSHIP TR N 04 004	17	522280	4743104	W	2012/02 5466	5.19 4.11 4.11	FR 0055 OT 0015	50/69/11/72:	DO	0061 5 0066 3	7180832 (Z145148) A108876	BRWN SAND 0015 GREY CLAY 0055 GREY SAND CLAY LYRD 0060 GREY FSND 0066 GREY CLAY 0067 GREY FSND 0069 GREY CLAY 0073
12	MIDDLETON TOWNSHIP TR N 04 006	17	522459	4743000	W	2011/07 3563	6.25	FR 0053	31/50/6/2:0	DO	0053 10	7168262 (Z133522) A109534	BRWN SAND 0010 BRWN CLAY 0048 GREY SAND 0063
13	MIDDLETON TOWNSHIP TR N 04 004	17	522121	4743266	W	2009/03 5466	5.19					7128034 (Z67064) A080565 A	
14	MIDDLETON TOWNSHIP TR N 04 006	17	522474	4743071	W	2008/10 3563	6.25	FR 0049 UT 0059	31/49/5/1:30	CO	0049 10	7114403 (Z85047) A080135	BRWN SAND 0010 BLUE CLAY STKY 0049 GREY SAND FSND 0059
15	MIDDLETON TOWNSHIP TR N 04 004	17	522127	4743266	W	2008/06 5466	5.19 4.25 4.25	FR	58/68/7/2:	DO	0064 3	7118927 (Z71583) A067852	BLCK LOAM 0001 BRWN SAND 0027 GREY CLAY 0060 GREY CLAY SAND 0065 GREY FSND 0071 GREY CLAY 0074
16		17	522179	4742644	W	2007/08 6808	5	SU 0138 FR 0059	34/49/7/24:0	DO		7051482 (Z69363) A049278	BRWN SAND LOAM 0007 BRWN SAND 0011 GREY CLAY SILT 0060 GREY FSND 0070 GREY CLAY STNS 0140 GREY LMSN FCRD 0142
17	MIDDLETON TOWNSHIP 004	17	522018	4742533	W	2007/06 3030	48 36	0006 0025	6///:	DO		7046355 (Z70784) A056288	BRWN LOAM 0001 BRWN SAND 0006 BRWN SAND 0012 GREY CLAY 0025 GREY SILT CLAY 0040
18	MIDDLETON TOWNSHIP 04 005	17	522178	4742645	W	2006/12 6808	5 4	FR 0056	49/49/4/8:0	DO	0056 8	7045103 (Z73717) A024827	BRWN SAND 0010 BRWN CLAY HARD 0023 GREY CLAY SILT SAND 0056 GREY FSND 0064 GREY CLAY SILT SAND 0068
19	MIDDLETON TOWNSHIP TR N 04 006	17	522199	4743134	W	2003/01 5466	5 4 4	FR 0065	45/58/6/2:0	DO	0059 6	4407865 (228434)	BRWN SAND PCKD 0016 GREY CLAY DNSE 0050 GREY CLAY SAND 0058 GREY FSND LOOS 0065 GREY CLAY STNS DNSE 0069
20	MIDDLETON TOWNSHIP TR N 04 005	17	522214	4742783	W	1984/08 5413	1	FR 0012	12/12/5/2:0	DO	0014 42	4404942 ()	YLLW SAND SOFT 0018
21	MIDDLETON TOWNSHIP TR N 04 006	17	522274	4743043	W	1982/05 1361	1	FR 0010	10/10/7/1:0	DO	0015 3	4404612 ()	LOAM 0001 YLLW SAND 0005 GREY CLAY HARD 0008 GREY SAND LOOS 0010 GREY FSND 0012 GREY CLAY SOFT 0014 GREY FSND 0018
22	MIDDLETON TOWNSHIP TR N 04 006	17	522334	4743223	W	1979/07 3913	30	FR 0018	18///:	DO		4404235 ()	BRWN LOAM 0001 BRWN SAND 0018 BRWN CSND 0022 BLUE CLAY 0036
23	MIDDLETON TOWNSHIP TR N 04 006	17	522374	4742903	W	1978/09 1361	1	UK 0007	7//12/1:0	DO	0011 4	4404044 ()	BLCK LOAM 0002 YLLW SAND 0007 GREY SAND 0015
24	MIDDLETON TOWNSHIP TR N 04 006	17	522434	4743383	W	1977/10 5413	5	SU 0162	60/60/10/5:0	DO		4403903 ()	YLLW SAND 0009 GREY CLAY STNS SOFT 0160 BLCK SHLE SOFT 0162
25	MIDDLETON TOWNSHIP TR N 04 006	17	522237	4743084	W	1975/10 2519	30 24	FR 0005 FR 0019	5/30/4/:	DO		4403582 ()	BRWN SAND 0010 GREY CLAY 0019 GREY SAND 0022 GREY CLAY 0030
26	MIDDLETON TOWNSHIP TR N 04 006	17	522198	4743329	W	1975/04 3030	36	UK 0025	25///:	DO		4403462 ()	BRWN SAND 0002 BRWN CLAY 0010 BRWN SAND 0022 BRWN SAND 0028 GREY CLAY 0030 BRWN SAND 0035
27	MIDDLETON TOWNSHIP TR N 04 006	17	522133	4743245	W	1974/05 5413	2	FR 0032	28//2/10:0	DO	0032 2	4403399 ()	YLLW CLAY SAND 0033 YLLW SAND 0034
28	MIDDLETON TOWNSHIP TR N 04 006	17	522314	4743123	W	1972/06 2623	1	FR 0003	3//10/2:0	DO	0008 2	4403027 ()	YLLW LOAM 0003 GREY FSND 0010
29	MIDDLETON TOWNSHIP TR N 04 006	17	522244	4743203	W	1972/03 5413	5	SU 0146	48/132/10/97:30	NU		4402910 () A	BLCK LOAM 0001 YLLW SAND STNS 0017 GREY CLAY STNS 0054 GREY SAND CLAY 0055 GREY CLAY STNS 0146
30	MIDDLETON TOWNSHIP TR N 04 006	17	522264	4743173	W	1972/02 5413	5					4402911 () A	BLCK LOAM 0001 YLLW SAND STNS 0017 GREY CLAY STNS 0054 GREY SAND STNS CLAY 0055 GREY CLAY STNS 0085
31	MIDDLETON TOWNSHIP TR N 04 005	17	522174	4742598	W	1971/12 2623	1	FR 0008	8//5/:	DO	0011 2	4402821 ()	BRWN MSND 0008 GREY MSND 0013
32	MIDDLETON TOWNSHIP TR N 04 006	17	522214	4743143	W	1971/11 2607	36 27	FR 0010	10/26/0/:	DO		4402839 ()	YLLW MSND 0010 CLAY QSND 0026
33	MIDDLETON TOWNSHIP TR N 04 006	17	522334	4743178	W	1970/09 2622	3	FR 0013	10//4/8:0	PS	0013 4	4402661 ()	BRWN MSND 0010 RED MSND 0017
34	MIDDLETON TOWNSHIP TR N 04 006	17	522529	4743353	W	1970/07 5413	5	FR 0051 SU 0143	55/57/5/8:0	DO		4402518 ()	YLLW MSND 0003 YLLW CLAY STNS 0018 GREY CLAY 0036 GREY MSND SILT CLAY 0051 GREY FSND 0053 GREY CLAY STNS 0061 GREY CLAY MSND 0142 BLCK SHLE 0143
35	MIDDLETON TOWNSHIP TR N 04 006	17	522364	4743373	W	1970/03 3904	4	SU 0143	50/50/6/24:0	DO		4402462 ()	BRWN LOAM MSND 0003 BLUE CLAY GRVL 0030 BRWN MUCK 0090 GREY CLAY 0140 GREY ROCK 0143
36	MIDDLETON TOWNSHIP TR N 04 006	17	522114	4743263	W	1970/01 2607	36	FR 0021	21/32/1/:	DO		4402455 ()	BRWN MSND 0022 BLUE CLAY 0032
37	MIDDLETON TOWNSHIP TR N 04 006	17	522454	4743408	W	1968/09 1408	5	FR 0143	75/110/4/3:0	DO		4402239 ()	RED MSND 0005 MSND 0007 CLAY 0046 MSND 0054 CLAY 0140 LMSN 0143
38	MIDDLETON TOWNSHIP TR N 04 006	17	522364	4743373	W	1966/12 1611	5	FR 0050	30/50/3/2:0	DO	0055 5	4400776 ()	BLCK LOAM 0001 YLLW MSND 0012 CLAY 0048 UNKN UNKN UNKN 0052 BLCK MSND 0060
39	MIDDLETON TOWNSHIP TR N 04 005	17	522189	4742743	W	1962/09 5424	1	FR 0009	9//4/1:0	DO	0011 3	4400774 ()	LOAM 0001 YLLW MSND 0008 HPAN 0009 MSND 0014

MINISTRY OF THE ENVIRONMENT

The Ontario Water Resources Act

WATER WELL RECORD

40-1/19e

Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 4403399 | MUNICIP. 4400 | CON. N | 04

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Norfolk	Middleton	4 TV	006

[redacted] RR6 Tillsonburg

DATE COMPLETED: DAY 24 MO 05 YR 74

HING	RC	ELEVATION	RC	BASIN CODE	II	III	IV
4743022	5	750	5	23	JUN 17, 1977		279

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
yellow	clay	sand	soft	0	33½
yellow		sand	wet	33½	34

8" Gravelpack

OWRC P.8

31 | 003350528 | 0034528

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0032	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
32-34	
15-18	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
20-23	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
25-28	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
30-33	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
1¼ 02	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE		-8	32 0032
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
008	03 000 INCHES	02 FEET
MATERIAL AND TYPE: Johnson Stainless	DEPTH TO TOP OF SCREEN: 0032 FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
10-13	14-17	
18-21	22-25	
26-29	30-33	

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	0002 1½ GPM	10 HOURS 00 MINS

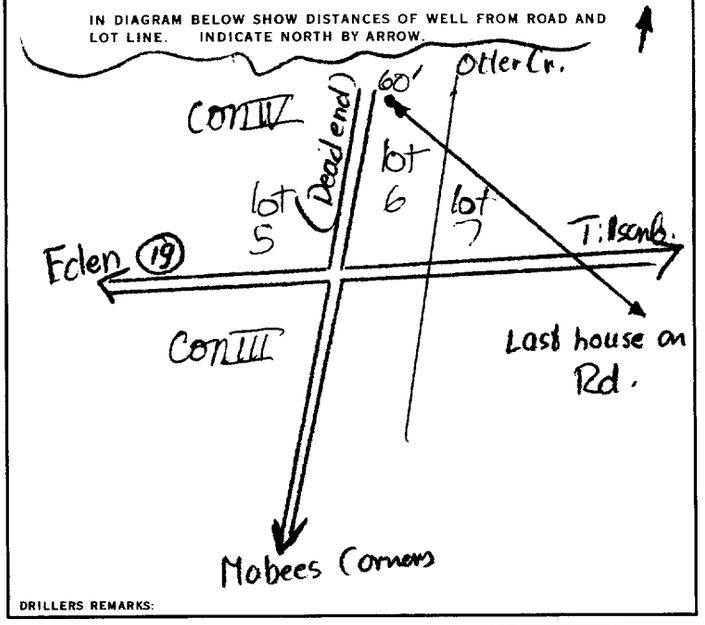
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☐ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
028 FEET	[illegible] FEET	FEET	FEET	FEET	FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	8 FEET	1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☒ SHALLOW ☐ DEEP	RECOMMENDED PUMP SETTING: 8 FEET	RECOMMENDED PUMPING RATE: 0002 GPM

GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL 2243

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL 54: 1

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE 55-56: 01

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING 57: 1

1 ☒ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Warren Water Wells — LICENCE NUMBER: 5413

ADDRESS: RR 7 Tillsonburg

NAME OF DRILLER OR BORER: Gus Holzhey — LICENCE NUMBER: 5413

SIGNATURE OF CONTRACTOR: [signature] — SUBMISSION DATE: DAY ____ MO. ____ YR. ____

OFFICE USE ONLY

DATA SOURCE 58: 1 — CONTRACTOR 59-62: 5413 — DATE RECEIVED 63-68: 060375

DATE OF INSPECTION — INSPECTOR

REMARKS: CSS.S8

P KP

WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 MOE 07-091

Ontario Ministry of the Environment

Well' ... t number below)
A 067852
A067852

Well Record
Regulation 903 Ontario Water Resources Act

page ___ of ___

Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.
- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Help Desk (Toll Free) at 1-888-396-9355.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only
MUN | CON | LOT

Well Owner's Information and Location of Well Information

[redacted]

NORFOLK | NORFOLK WEST (MIDDLETON) | 9 | 5

RR#/Street Number/Name: 1068 LAPLANTE RD. , RR #6
City/Town/Village: TILLSONBURG
Site/Compartment/Block/Tract etc.:

GPS Reading | NAD: 8 3 | Zone: 17 | Easting: 522127 | Northing: 4743266
Unit Make/Model: MAGELLAN
Mode of Operation: ☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From (FT)	Depth To (FT)
BLACK	TOPSOIL			0'	1'
BROWN	SAND			1'	27'
GREY	CLAY			27'	60'
GREY	CLAY	SAND		60'	65'
GREY	FINE SAND			65'	71'
GREY	CLAY			71'	74'

Hole Diameter

Depth From (FT)	Depth To (FT)	Diameter (Centimetres)
0'	74'	8 5/8"

Water Record

Water found at (FT)	Kind of Water	
	☒ Fresh	☐ Sulphur
	☐ Salty	☐ Minerals
	☐ Other:	
m	☐ Fresh	☐ Sulphur
	☐ Salty	☐ Minerals
	☐ Other:	
m	☐ Fresh	☐ Sulphur
	☐ Salty	☐ Minerals
	☐ Other:	

After test of well yield, water was
☒ Clear and sediment free
☒ Other, specify
Chlorinated ☒ Yes ☐ No

Construction Record

Casing

Inside diam (IN.)	Material	Wall thickness (IN.)	Depth From (FT)	Depth To (FT)
5 3/16	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	0.188"	+1.5'	56'
4 1/4"	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	0.188"	56	64
4 1/4"	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	0.188"	70	72'

Screen

Outside diam		Slot No.		
4 3/4"	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	A- 10 B- 12	A-64 B-67	67 70

No Casing or Screen
☐ Open hole

Test of Well Yield

Pumping test method: SUBMERSIBLE PUMP

	Draw Down Time min	Draw Down Water Level (FT)	Recovery Time min	Recovery Water Level (FT)
Pump intake set at -	Static Level	58.4'		67.5'
Pumping rate - 7 GPM	1	63.9'	1	61.3'
Duration of pumping 2 hrs + ___ min	2	65.5'	2	59.7'
Final water level end of pumping 67.5' metres	3	66.2'	3	59.3'
Recommended pump type. ☐ Shallow ☒ Deep	4	66.5'	4	59.1'
Recommended pump depth. ___ metres	5	66.8'	5	58.9
Recommended pump rate. 7 GPM	10	67.1	10	58.6'
	15	67.4	15	58.5'
If flowing give rate - (litres/min)	20	67.5	20	58.4'
	25		25	
If pumping discontinued, give reason.	30		30	
	40		40	
	50		50	
	60		60	

Plugging and Sealing Record
☒ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0'	62'	BENTONITE	
62'	72'	WELL SAND	

Method of Construction
☒ Cable Tool ☐ Rotary (air) ☐ Diamond ☐ Digging
☐ Rotary (conventional) ☐ Air percussion ☐ Jetting ☐ Other
☐ Rotary (reverse) ☐ Boring ☐ Driving

Water Use
☒ Domestic ☐ Industrial ☐ Public Supply ☐ Other
☐ Stock ☐ Commercial ☐ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

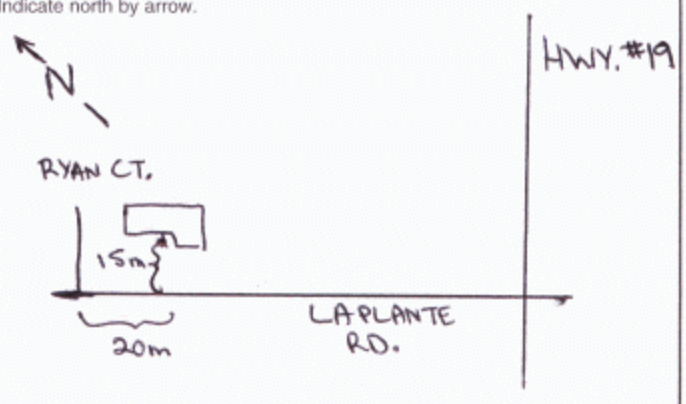
Final Status of Well
☒ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☐ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☐ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Well Contractor/Technician Information

Name of Well Contractor: J.B. WILSON & SON LTD
Well Contractor's Licence No.: 5466
Business Address (street name, number, city etc.): RR #1 SPRINGFIELD
Name of Well Technician (last name, first name): WILSON, JOHN H.
Well Technician's Licence No.: T-2668
Signature of Technician/Contractor: X [signature]
Date Submitted YYYY MM DD:

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.



Audit No. Z 71583
Date Well Completed YYYY MM DD: 2008 06 26
Was the well owner's information package delivered? ☒ Yes ☐ No
Date Delivered YYYY MM DD:

Ministry Use Only

Data Source | Contractor
Date Received YYYY MM DD: FEB 2 2009 | Date of Inspection YYYY MM DD
Remarks: FEB 2 2009 | Well Record Number

0506E (08/2006)

Ministry's Copy

Cette formule est disponible en français

Ontario — Ministry of the Environment

Measurements recorded in: ☐ Metric ☒ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* A129700

Tag#: A129700

Well Record

Regulation 903 Ontario Water Resources Act

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
1080 Laplante Road RR # 6	Middleton Township	10	4

County/District/Municipality	City/Town/Village	Province	Postal Code
Norfolk	Tillsonburg	Ontario	N4G 4G9

UTM Coordinates NAD 83	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
	17	522091	4743324		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (*m/ft*) From	To
Black	Top Soil			0	1
Brown	Sand			1	35
Grey	Clay			35	62
Grey	Sand		Silty	62	71
Grey	Hardpan			71	152
Grey	Limestone			152	156

Annular Space

Depth Set at (*m/ft*) From	To	Type of Sealant Used (*Material and Type*)	Volume Placed (m^3/ft^3)
0	24	Bentonite Grout	
24	152	Bentonite Slurry	

Method of Construction

☐ Cable Tool ☐ Diamond
☒ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☐ Other, *specify* _____

Well Use

☐ Public ☐ Commercial ☐ Not used
☒ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, *specify* _____

Construction Record - Casing

Inside Diameter (*cm/in*)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (*cm/in*)	Depth (*m/ft*) From	To
5 5/8"	Steel	0.188 Wall	+2	152
Open Hole			152	156

Construction Record - Screen

Outside Diameter (*cm/in*)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (*m/ft*) From	To

Status of Well

☒ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, *specify*
☐ Other, *specify*

Water Details

Water found at Depth (*m/ft*)	Kind of Water	
154	☐ Fresh ☒ Untested	☐ Gas ☐ Other, *specify*
	☐ Fresh ☐ Untested	☐ Gas ☐ Other, *specify*
	☐ Fresh ☐ Untested	☐ Gas ☐ Other, *specify*

Hole Diameter

Depth (*m/ft*) From	To	Diameter (*cm/in*)
0	156	9

Results of Well Yield Testing

After test of well yield, water was:
☒ Clear and sand free
☐ Other, *specify* _____

If pumping discontinued, give reason: CLEAR

Pump intake set at (*m/ft*) 85

Pumping rate (*l/min / GPM*) 40

Duration of pumping 1 hrs + 30 min

Final water level end of pumping (*m/ft*) 72

If flowing give rate (*l/min / GPM*) NOT FLOWING

Recommended pump depth (*m/ft*) ~~40~~ 85

Recommended pump rate (*l/min / GPM*) 10+

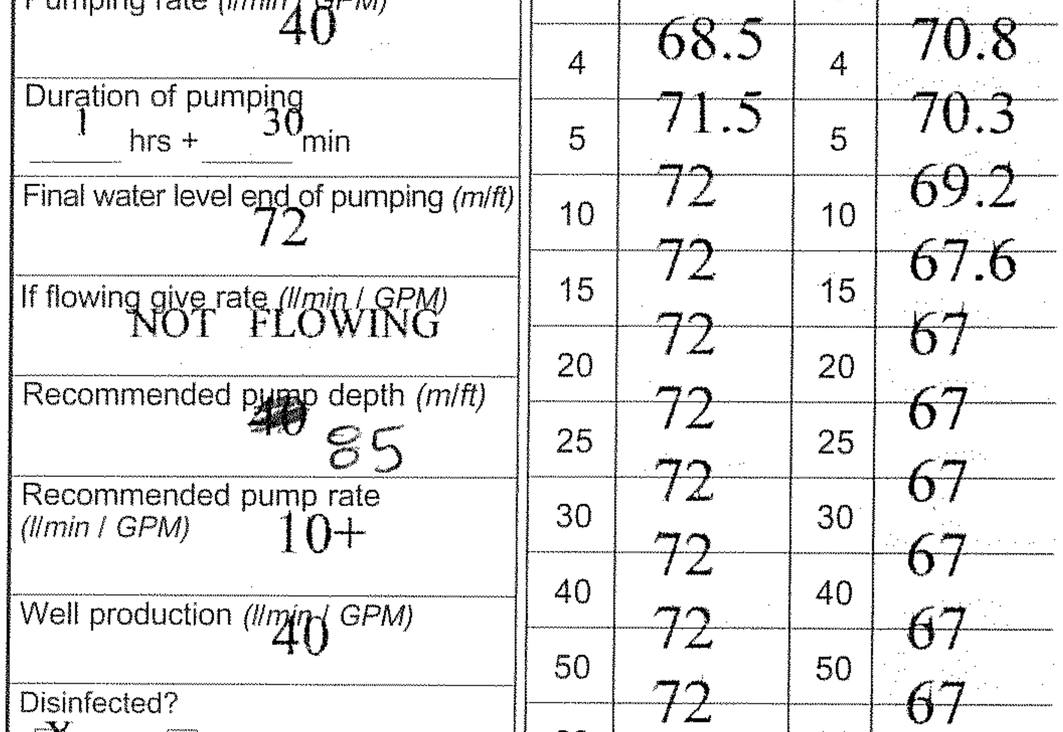
Well production (*l/min / GPM*) 40

Disinfected? ☒ Yes ☐ No

Draw Down Time (*min*)	Water Level (*m/ft*)	Recovery Time (*min*)	Water Level (*m/ft*)
Static Level	67		72
1	67.4	1	71.9
2	67.8	2	71.6
3	67.11	3	71.3
4	68.5	4	70.8
5	71.5	5	70.3
10	72	10	69.2
15	72	15	67.6
20	72	20	67
25	72	25	67
30	72	30	67
40	72	40	67
50	72	50	67
60		60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:
Well is 75 feet off the road

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
HAYDEN WATER WELLS CO.,INC.	7090

Business Address (Street Number/Name)	Municipality
5339 Saintsbury Line RR # 1	Lucan

Province	Postal Code	Business E-mail Address
Ontario	N0M2J0	haydenwaterwells@on.aibn.com

Business Telephone No. (*inc. area code*)	Name of Well Technician (Last Name, First Name)
1922700357	Hayden, Jay

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
0334		

Well owner's information package delivered: ☒ Yes ☐ No

Date Package Delivered: 2013 04 18

Date Work Completed: 2013 04 18

Ministry Use Only

Audit No. Z160156

RECEIVED 02 2014

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Appendix B

SGS Laboratories - Certificate of Analysis

FINAL REPORT

CA40109-APR22 R

20HF021

Prepared for

Peto MacCallum Ltd

FINAL REPORT

CA40109-APR22 R

First Page

CLIENT DETAILS

Client	Peto MacCallum Ltd
Address	45 Burford Road Hamilton, ON L8E 3C6. Canada
Contact	Alonzo Rowe
Telephone	(905) 561-2231
Facsimile	(905) 561-6366
Email	arowe@petomaccallum.com;smacdonald@petomaccallum.con
Project	20HF021
Order Number	
Samples	Ground Water (4)

LABORATORY DETAILS

Project Specialist	Maarit Wolfe, Hon.B.Sc
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-652-2000
Facsimile	705-652-6365
Email	Maarit.Wolfe@sgs.com
SGS Reference	CA40109-APR22
Received	04/07/2022
Approved	04/12/2022
Report Number	CA40109-APR22 R
Date Reported	04/12/2022

COMMENTS

MAC - Maximum Acceptable Concentration
Half MAC - Half of the Maximum Acceptable Concentration
MDL - SGS Method Detection Limit

Temperature of Sample upon Receipt: 7 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: 016944

SIGNATORIES

Maarit Wolfe, Hon.B.Sc

TABLE OF CONTENTS

Client: Peto MacCallum Ltd
Project: 20HF021
Project Manager: Alonzo Rowe
Samplers: SM

MATRIX: WATER

Sample Number	9	10	11	12
Sample Name	20HF021 GW-1	20HF021 GW-2	20HF021 GW-3	20HF021 GW-4
Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water
Sample Date	06/04/2022	06/04/2022	06/04/2022	06/04/2022

Parameter	Units	RL	Result	Result	Result	Result
General Chemistry						
Turbidity	NTU	0.10	1110	---	---	---
Metals and Inorganics						
Hardness	mg/L as CaCO3	0.05	3130	---	---	---
Antimony	µg/L	0.6	< 0.6	---	---	---
Arsenic	µg/L	0.2	1.9	---	---	---
Barium	µg/L	0.02	199	---	---	---
Boron	µg/L	2	22	---	---	---
Cadmium	µg/L	0.003	0.634	---	---	---
Chromium	µg/L	0.08	2.02	---	---	---
Mercury	µg/L	0.01	0.02	---	---	---
Selenium	µg/L	0.04	0.14	---	---	---
Uranium	µg/L	0.002	0.682	---	---	---
Nitrite (as N)	as N mg/L	0.003	0.003#<MDL	0.003#<MDL	0.003#<MDL	0.003#<MDL
Nitrate (as N)	as N mg/L	0.006	5.97	6.04	6.03	6.02
Nitrate + Nitrite (as N)	as N mg/L	0.006	5.97	6.04	6.03	6.02

Client: Peto MacCallum Ltd
Project: 20HF021
Project Manager: Alonzo Rowe
Samplers: SM

MATRIX: WATER

Sample Number	9	10	11	12
Sample Name	20HF021 GW-1	20HF021 GW-2	20HF021 GW-3	20HF021 GW-4
Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water
Sample Date	06/04/2022	06/04/2022	06/04/2022	06/04/2022

Parameter	Units	RL		Result	Result	Result	Result
Microbiology							
E. Coli	cfu/100mL	0		< 2↑	---	---	---
Total Coliform	cfu/100mL	0		< 2↑	---	---	---
Other (ORP)							
pH	No unit	0.05		8.26	---	---	---

QC SUMMARY

QCR_SubCategory

Method: SM 2130 I Internal ref.: ME-CA-[ENVIEWL-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Turbidity	EWL0134-APR22	NTU	0.10	< 0.10	0	10	99	90	110	NA		

Anions by IC

Method: EPA300/MA300-Ions1.3 I Internal ref.: ME-CA-[ENVIIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrate + Nitrite (as N)	DIO0165-APR22	mg/L	0.006	<0.006	NA		NA			NA		
Nitrite (as N)	DIO0165-APR22	mg/L	0.003	<0.003	6	20	99	90	110	98	75	125
Nitrate (as N)	DIO0165-APR22	mg/L	0.006	<0.006	0	20	98	90	110	93	75	125

QC SUMMARY

Mercury by CVAAS

Method: SM3112/EPA 245 | Internal ref.: ME-CA-IENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury	EHG0021-APR22	ug/L	0.01	< 0.01	ND	20	100	80	120			

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Arsenic	EMS0066-APR22	ug/L	0.2	<0.0002	7	20	100	90	110	95	70	130
Barium	EMS0066-APR22	ug/L	0.02	<0.00002	2	20	98	90	110	99	70	130
Boron	EMS0066-APR22	ug/L	2	< 2	20	20	107	90	110	97	70	130
Cadmium	EMS0066-APR22	ug/L	0.003	<0.000003	ND	20	96	90	110	94	70	130
Chromium	EMS0066-APR22	ug/L	0.08	<0.00008	14	20	92	90	110	78	70	130
Antimony	EMS0066-APR22	ug/L	0.6	<0.0009	4	20	110	90	110	114	70	130
Selenium	EMS0066-APR22	ug/L	0.04	<0.00004	8	20	104	90	110	124	70	130
Uranium	EMS0066-APR22	ug/L	0.002	< 0.002	14	20	99	90	110	99	70	130

QC SUMMARY

Microbiology

Method: SM 9222D | Internal ref.: ME-CA-IENVIMIC-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
E. Coli	BAC9129-APR22	cfu/100mL	-	ACCEPTED	ACCEPTED							
Total Coliform	BAC9129-APR22	cfu/100mL	-	ACCEPTED	ACCEPTED							

pH

Method: SM 4500 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
pH	EWL0232-APR22	No unit	0.05	NA	1		100			NA		

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates 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.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.
"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

This report supersedes all previous versions.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

No: 016944

Page _____ of _____

SGS Environment, Health & Safety - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

Laboratory Information Section - Lab use only

Received By: 2D
Received Date: 4 / 7 / 22 (mm/dd/yy)
Received Time: 11 : 20 (hr : min)
Received By (signature): [signature]
Custody Seal Present: Yes ☑ No ☐
Custody Seal Intact: Yes ☑ No ☐
Cooling Agent Present: Yes ☑ No ☐ Type: Prck
Temperature Upon Receipt (°C) 2.3
LAB LIMS #: CA40109-Apr22

REPORT INFORMATION	INVOICE INFORMATION
Company: Peto MacCallum	☒ (same as Report Information)
Contact: A. Rowe	Company:
Address: 41 Burford	Contact:
Hamilton	Address:
Phone: 905-536-7305	
Fax: smacdonald@petomaccallum.com	Phone:
Email: arowe@petomaccallum.com	Email:

Quotation #: _____ P.O. #: _____
Project #: 20HF021 Site Location/ID:

TURNAROUND TIME (TAT) REQUIRED

☒ Regular TAT (5-7days) — TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day

RUSH TAT (Additional Charges May Apply): ☐1 Day ☐2 Days ☐3 Days ☐4 Days

PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date: _____

***NOTE**: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS

☐ O.Reg 153/04 ☐ O.Reg 406/19

☐ Table 1 ☐ Res/Park Soil Texture: ☐ Coarse
☐ Table 2 ☐ Ind/Com ☐ Medium/Fine
☐ Table 3 ☐ Agri/Other
☐ Table _____
Soil Volume ☐ <350m3 ☐ >350m3

Other Regulations: ☐ Reg 347/558 (3 Day min TAT) ☐ PWQO ☐ MMER ☐ CCME ☐ Other: ☐ MISA _____ ☐ ODWS Not Reportable *See note

Sewer By-Law: ☐ Sanitary ☐ Storm Municipality: _____

RECORD OF SITE CONDITION (RSC) ☐ YES ☒ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	Field Filtered (Y/N)	M&I: Metals & Inorganics (incl CrVI, CN, Hg pH, (B(HWS),EC,SAR–soil) (Cl, Na–water)	M&I: Full Metals Suite (ICP metals plus B(HWS-soil only) Hg, CrVI	M&I: ICP Metals only Sb,As,Ba,Be,B,Cd,Cr,Co,Cu,Pb,Mo,Ni,	SVOC: PAHs only	SVOC: SVOCs all incl PAHs, ABNs, CPs	PCB: PCBs ☐ Total ☐ Aroclor	PHC: F1-F4 + BTEX	PHC: F1-F4 only no BTEX	VOC: VOCs all incl BTEX	VOC: BTEX only	Pest: Pesticides Organochlorine or specify other	Other: Nitrates	Other: Turbidity, hardness, pH, E.Coli, Total Coliforms	Other: Sched. 13 O.Reg 170/03	Other: Appendix 2: 406/19 Leachate Screening Levels Table :	Other: Sewer Use: Specify pkg:	Other: Water Characterization Pkg General ☐ Extended	TCLP: Specify TCLP tests ☐M&I ☐VOC ☐PCB ☐B(a)P ☐ABN ☐Ignit.	COMMENTS:
1	20HF021 GW-1	06/04/2022	2PM	6	GW	N												X	X	X					
2	20HF021 GW 2	↓	↓	1	↓	N												X							
3	20HF021 GW 3			1		N												X							
4	20HF021 GW 4			1		N												X							
5																									
6																									
7																									
8																									
9																									
10																									
11																									
12																									

Observations/Comments/Special Instructions

Sampled By (NAME): SM	**Signature:** [signature]	Date: 04 / 06 / 2022 (mm/dd/yy)	Pink Copy - Client
Relinquished by (NAME): AR	**Signature:** [signature]	Date: 04 / 06 / 2022 (mm/dd/yy)	Yellow & White Copy - SGS

PLANNING JUSTIFICATION BRIEF
1045 Laplante Road, Norfolk West
Roll Number: 3310541010055100000

INTRODUCTION

The purpose of this planning report is to demonstrate that it is appropriate for the development of the subject site to an eight- unit single family residential subdivision. The site will be serviced with onsite private septic and well.

SUBJECT LANDS AND CONTEXT

The subject lands are located on the south side of Laplante Road in the Hamlet of Norfolk West. Legal description of Part of Lot 5, Concession 4, Geographic Township of Middleton, Norfolk County. The lands are adjacent to single family residential homes along Laplante Road, (ie: RH to the east and south and agriculture to the west The subject site is within the settlement area boundary.

THE PROPOSAL

The Owner is applying for a Zoning By-law Amendment requesting a change in use of the land from RH(H) to R1-A with a specific provision to allow for this use whilst using private individual serving system (water and septic).
The current Official Plan designation is Hamlet OP, and this allows for Residential Development, therefore No Official Plan Amendment is required. As such, the requested ZBA is tantamount to a conformity exercise.
As requested by Development Engineering in pre consultation notes of January 17, 2024, the entrance road has been repositioned to be adjacent to the Storm Water Management Pond located in Part A. This alteration would allow for Block A (SWM) to have legal frontage and access without obstructions. Furthermore, the redesign of the site allowed for an alteration in lot numbers from six to eight with a more cohesive appearance.

STUDIES AND REPORT ANALYSIS

Studies undertaken by Applicant to the support the request are as follows:

- ARCHAEOLOGICAL ASSESMENT

  Stage 1 & Stage 2 Archaeological Assessment completed by Lincoln Environmental Consulting May 2024. *Conclusion: No material findings detected*
- ENVIRONMENTAL IMPACT STUDY (EIS)

  Site visit and Data Collected in July 2017 and Updated in July 2024 by GeoProcess Research Associates. *Conclusion: The four butternut trees have died, and no further assessment is required. Recommendations are suggested for the implementation of a 10 m setback from the dripline and these measures would have no negative impact to the ANSI after implemented.*
- GEOTECHNICAL INVESTIGATION REPORT

  Data collected and report submitted by Peto MacCallum Ltd. February 8, 2022
- HYDROGEOLOGICAL SITE ASSESSMENT

  Data collected and report submitted by Peto MacCallum Ltd. November 24, 2022
  Conclusion: the proposed eight-unit lot configuration will be suitable for the subject site with enhanced septic system (Waterloo Biofilter Septic system).

PROVINCIAL POLICY STATEMENT (PPS) 2020

The PPS, which is issued by the Province of Ontario under Section 3 of the Planning Act, provides policy direction on matters of Provincial interest in relation to land use planning matters to ensure efficient development. All planning applications and decisions by local governments are required to be consistent with these policies. The request proposed is consistent with the Provincial Policy Statement.

SUMMARY AND CONCLUSIONS

The purpose of this report is to demonstrate that the proposed Bi Law Amendment with the eight lot configuration, each with its own single family residential dwelling and private servicing will meet the intent of the Zoning Provisions of the Official Plan.
The proposal is therefore consistent with the PPS and is in conformity with both the County of Norfolk and the Municipality of Tillsonburg Official Plans and it is our request that the Council include these lands as proposed development to proceed in a timely manner.

PHIL RUGGERI
Applicant
November 10, 2024

J.H. COHOON ENGINEERING LIMITED
CONSULTING ENGINEERS
440 Hardy Road, Unit #1, Brantford, ON N3T 5L8
Tel: (519) 753-2656 Fax: (519) 753-4263
www.cohooneng.com

PROPOSED RESIDENTIAL SUBDIVISION

1045 LAPLANTE RD

TILLSONBURG, ONTARIO

STORMWATER MANAGEMENT REPORT

PREPARED FOR:

JOSE OLIVEIRA

PREPARED BY:

J.H. COHOON ENGINEERING LIMITED

440 HARDY ROAD UNIT 1

BRANTFORD, ONTARIO, N3T 5L8

PHONE: 519 - 753-2656 FAX: 519 - 753-4263

PROJECT NO. 16933 FEBRUARY 2025

Table of Contents

List of Tables

Appendices

1 Introduction

J.H. Cohoon Engineering Limited has been retained to prepare the following Stormwater Management (SWM) report in support of the proposed zoning by-law amendment for the residential subdivision located on Laplante Road in the community of Tillsonburg, Norfolk County.

1.1 Site Description

The subject site currently consists of undeveloped RH (rural hamlet) lands that are proposed to be rezoned as R1A. The proposed development consists of a residential subdivision with 8 lots and a SWM pond block. Access to the proposed lots will be provided via proposed rural road with a connection out to Laplante Rd. Details of the proposed development have been provided on the attached Site Plans (Drawings 16933-1 – 16933-4).

1.2 Objectives

The purpose of this SWM report is to document the preliminary SWM strategy for the site, demonstrating the proposed development will not adversely affect local surface water conditions. The SWM report will evaluate the effect of the proposed development on local drainage conditions and where necessary, provide solutions to mitigate any adverse impacts.

1.3 Guidelines and Background Information

This report was prepared in accordance with the following municipal, provincial and agency guideline documents:

- The Ministry of Transportation Drainage Management Manual (1997)
- The Ministry of the Environment, Conservation and Parks (MECP, formerly known as the Ministry of Environment) SWM Practices Planning and Design Manual (2003);
- The CVC/TRCA Low Impact Development SWM Planning and Design Guide (2010); and
- Norfolk County Development and Engineering Standards.

2 Pre-Development Conditions

Information regarding the existing topography, ground cover and drainage patterns was obtained through collection of detailed topographic survey data.

Under pre-development conditions, the subject lands are 3.96 ha in area and consist of agricultural land use. The subject lands drain to three drainage outlets, located at the east property line at Laplante Rd (Outlet #1), at the north property line (Outlet #2), and at the south property line (Outlet #3).

Based on the Peto McCallum soil reports, it is anticipated that the soils consist of upper silts ad top soil, underlain by a 1m-3m sand layer. All the site soils are noted to be either rapid or well-draining and therefore are expected to be conducive to infiltration.

2.1 Pre-Development Conditions Hydrology

For the purpose of generating pre-development peak flow rates, the US Environmental Protection Agency (EPA) Stormwater Management Model (SWMM) hydrologic and hydraulic software has been used.

Under pre-development catchments, the subject site has been delineated into three catchments as described below:

- Catchment 101 is 0.603 ha in area, 0% impervious
- Catchment 102 is 1.974 ha in area, 0% impervious
- Catchment 103 is 1.383 ha in area, 0% impervious

Peak flow rates have been assessed at each outlet, as shown on the Pre-Development Storm Drainage Areas plan attached. The SWMM input parameters for the pre-development catchments were calculated based on the collected detailed topographic survey data, soil information, aerial photography and are summarized in Appendix A for reference.

In accordance with Norfolk County Design Guidelines, the 2-year through 100-year 3-hour Chicago design storms have been used to model precipitation. The design storm hyetographs utilized in the SWMM model have been developed using Norfolk IDF parameters and are provided in Appendix A.

The pre-development peak flow rates have been assessed at each outlet and are summarized in Table 1 below, while detailed modelling output is provided in Appendix A.

Table 1: Pre-Development Peak Flow Rate Summary

Design Storm Event	Total Discharge (m^3/s)
2	0.325
5	0.501
10	0.626
25	0.790
50	0.918
100	1.046

3 Proposed Stormwater Management Plan

The proposed SWM Plan has been developed to address any potential adverse impacts from the proposed development to local surface water features and surface water quality.

Water quantity and quality controls for the proposed development will consist of a combination of Low Impact Development (LID) devices and an infiltration-based SWM Pond Facility to encourage infiltration of stormwater and attenuate peak flows from the proposed development works to the greatest extent possible. Sediment and erosion controls will be specified to ensure that surrounding properties are not impacted during construction.

3.1 Design Criteria

This SWM report is subject to the review and approval of Norfolk County. Applicable SWM design criteria for the proposed development are presented below:

- Water Quantity Control – post-development peak flow rates must be controlled to pre-development rates for rainfall events to ensure no adverse impacts for downstream landowners;
- Water Quality Control – controls must be provided to satisfy the MECP SWM Practices Planning and Design Manual. Enhanced water quality control corresponding to 80% total suspended solids (TSS) removal is required; and
- Siltation and Erosion Control – recommendations for a siltation and erosion control strategy during construction are required.

3.2 Proposed Conditions Hydrology

Details of the proposed development have been provided on the attached Lot Grading Control Plans. A Post-Development Storm Drainage Areas plan is also enclosed in Appendix B for reference.

The proposed condition site plan has been modelled as five catchments in EPA SWMM, and are summarized in the detailed modelling inputs for each post-development catchment, in Appendix B.

3.3 Water Quantity Control

As discussed, water quantity controls for the subject site will be provided via a combination of LID devices and an infiltration-based SWM pond facility to encourage infiltration of stormwater and attenuate peak flows from the proposed development works to the greatest extent possible. Details with respect to each proposed LID device and the proposed SWM Pond Facility are summarized below, while detailed design calculations and modelling inputs are provided in Appendix B. LID sections and details are provided on the Lot Grading Control Plan (Drawing 13024-4) enclosed.

3.3.1 Low Impact Development Devices

Typical drywell configurations have been specified to provide peak flow attenuation in Catchment 203, as described below:

Rear Yard Drywell – 3 drywells consisting of a catch basin and infiltration gallery designed to collect and infiltrate rooftop and rear yard runoff have been specified. Each drywell will consist of a 1.83 m depth catch basin with a 600 mm depth sump, 150 mm diameter subdrain, and fitted with a 1.0 m depth 24 m^2 infiltration gallery consisting of 50 mm diameter clear stone. The drawdown time of the infiltration gallery located was calculated using the assumed infiltration rate based on well sorted sands and glacial outwash soils (50 mm/hr) as 8 hours, which indicates that the gallery will drain into the native site soils within 48 hours, as recommended by the CVC/TRCA LID Planning and Design Guide. The rear yard drywells have been modelled as an infiltration trench LID Controls assigned to in EPA SWMM.

3.3.2 SWM Pond Facility

Water quality controls for the majority of the proposed development will be provided by a SWM Pond Facility, as shown on the Lot Grading Control Plan. The pond will feature an infiltration basin, which allows the 10-year runoff volume from these areas to attenuate and infiltrate into the ground, emulating pre-development conditions. Above the top of the infiltration basin, an active storage volume of 1993 m^3 will control the 10-year to 100-year discharge released from the SWM pond facility.

The infiltration basin function of the pond has been modelled in EPA SWMM as a rain garden LID Control assigned to Catchment 202. Excess peak flows released from Catchment 202 are then routed to a storage node to model the active storage function of the pond. Detailed supporting calculations and stage-storage-discharge tables are provided in Appendix B for reference.

The total active storage volume required to control the 100-year storm (Catchment 202 runoff) is 1,670 m^3. This volume is provided at elevation 229.80 m, allowing for 0.70 m of freeboard. The proposed dry pond is controlled by the following outlet infrastructure:

- A 300 mm diameter outlet pipe, and a 150mm diameter hickenbottom fitted with a 75 mm diameter orifice plate located in the proposed outlet control structure at elevation 257.82 m

3.3.3 Post-Development Peak Flow Summary

Post-Development peak flow rates incorporating the proposed SWM controls are summarized in Table 2. Detailed modelling output is provided in Appendix C.

Table 2: Post-Development Peak Flow Rate Summary (With Controls)

Design Storm Event	Peak Flow Rate (m^3/s) Outlet
2-year	0.252 (*0.325*)
5-year	0.357 (*0.501*)
10-year	0.428 (*0.626*)
25-year	0.517 (*0.790*)
50-year	0.583 (*0.918*)
100-year	0.647 (1.046)

Note: (*Values*) represent pre-development peak flow rates

As shown, peak flow rates have been controlled to less than pre-development peak flow rates.

3.4 Major and Minor Flow Conveyance

Minor and major storm runoff from Catchments 201, 202, and 203 will be directed to their respective outlets via sheet flow.

Storm runoff from Catchment 202 will be directed to the proposed SWM Pond Facility via roadside ditches and a conveyance spillway that flows to the pond.

3.5 Water Quality Control

To achieve Enhanced level water quality protection corresponding to 80% total suspended solids (TSS) removal, proposed drywells (infiltration trenches), enhanced grass swales and an infiltration basin have been proposed.

The required water quality volume for the infiltration basin is based on Table 3.2 of the MECP SWM Planning and Design Manual for Catchment 202 and Catchment 203 is 596.5 m^3 and is provided in the infiltration basin of the proposed SWM Pond Facility. The proposed infiltration volume will achieve Basic level water quality protection, corresponding to 60% TSS removal.

Detailed water quality calculations for the proposed pond are provided in Appendix C for reference.

The proposed roadside ditches and conveyance spillway in the development will function as enhanced grass swales as part of the proposed development for the purpose of water quality controls. Based on the CVC/TRCA Low Impact Development SWM Planning and Design Guide, the enhanced grass swales are anticipated to achieve 50% TSS removal, which is appropriate given that the proposed roadside ditch slopes are anticipated to exceed the recommended channel slope.

The drywells will function as infiltration trenches as part of the proposed development for the purpose of water quality controls. Based on the CVC/TRCA Low Impact Development SWM Planning and Design Guide, 80% TSS removal efficiency is applicable for infiltration trenches (drywells).

3.6 Siltation and Erosion Control

A construction erosion and sediment control plan shall be implemented on this site for all construction activities, including earthworks, material stockpiling, pavement construction and grading operations to ensure no impact on the adjacent lands and or municipal infrastructure. The erosion control measures proposed include:

- Heavy duty siltation control fences to prevent transport of sediment to adjacent properties;
- Temporary rock flow check dams installed in proposed ditching to prevent sediment transport;
- Silt sacks installed in catch basin structures to prevent sediment from entering the proposed drywells; and
- Stone mud mat at the construction entrance from Laplante Rd.

Regular inspection of control measures will be completed during construction and repairs made as necessary. Following the completion of construction, erosion control measures shall remain in place and maintained by the Contractor until vegetation cover is established.

4 Summary

This SWM report demonstrates that the proposed Residential Subdivision on Laplante Road in the community of Tillsonburg, Norfolk County will not adversely affect local surface water conditions.

Water quantity and quality controls will be provided via a combination of LID controls and an infiltration-based SWM Pond Facility.

The proposed SWM plan demonstrates that the proposed development will not negatively impact landowners adjacent to or downstream of the subject site. Siltation and erosion controls will be provided to mitigate erosion and sedimentation impacts during construction.

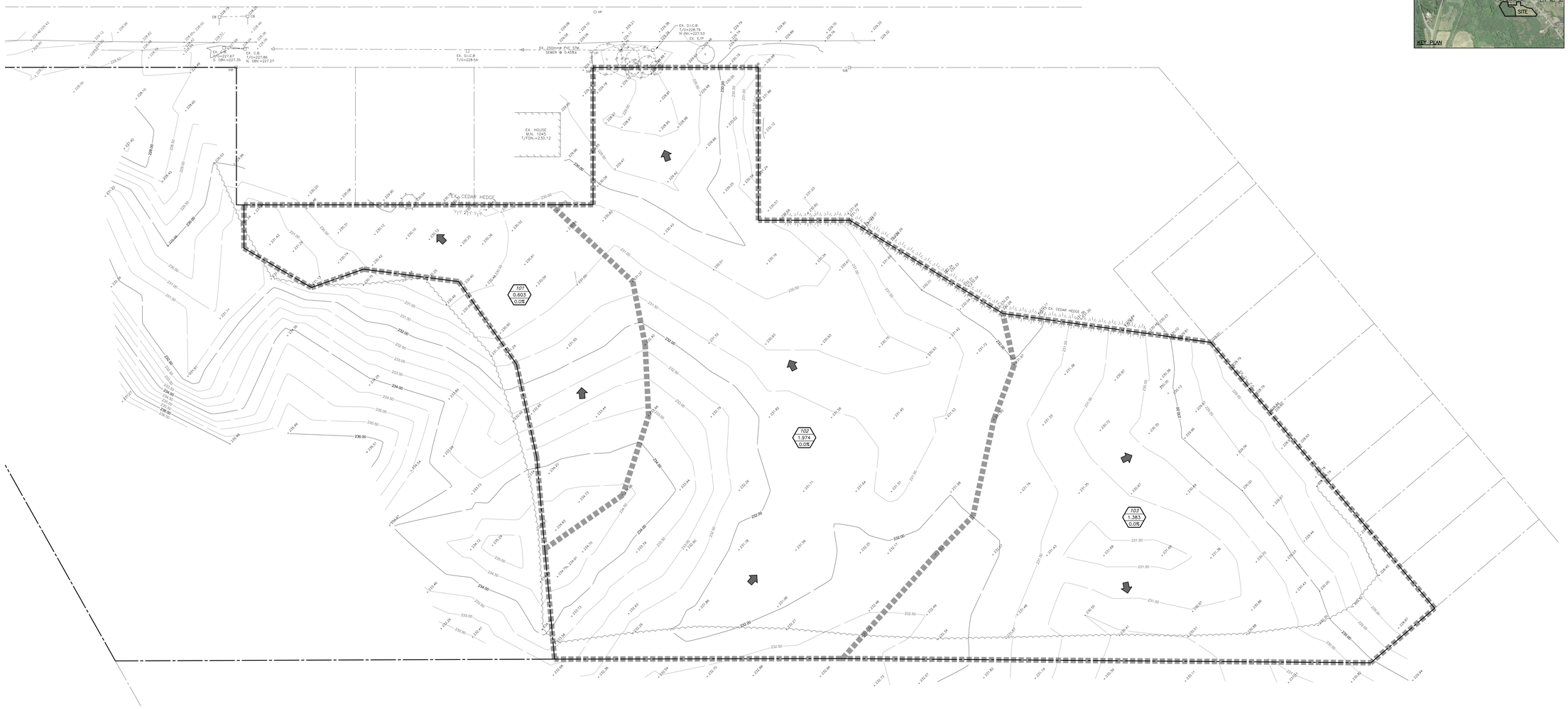
We trust this SWM report is sufficient to satisfy the requirements of Norfolk County.

Report prepared by:

J.H. COHOON ENGINEERING LIMITED

Matthew J Whyte, P.Eng.

APPENDIX A: PRE-DEVELOPMENT CONDITIONS HYDROLOGY



LEGEND:

- STORM DRAINAGE BOUNDARY
- 701 / 1.121 / 0.05 — STORM DRAINAGE NUMBER / STORM AREA IN HECTARES / COEFFICIENT OF RUNOFF (% IMPERVIOUS)
- OVERLAND FLOW ROUTE

NO.	REVISION	DATE (MM/DD/YY)	BY
1	SWM POND OUTLET AND OVERLAND FLOW	02/24/25	K.P.B.

J.H. COHOON ENGINEERING LIMITED
CONSULTING ENGINEERS
440 HARDY ROAD , UNIT #1 , BRANTFORD — ONTARIO , N3T 5L8
TEL. (519) 753-2656 FAX. (519) 753-4263 www.cohooneng.com

PROJECT:

PROPOSED RESIDENTIAL SUBDIVISION

1045 LAPLANTE ROAD, TILLSONBURG
NORFOLK COUNTY

CLIENT: JOSE OLIVEIRA

PRE-DEVELOPMENT STORM DRAINAGE AREAS

DESIGN:	R.W.P.	SCALE:	1:500
DRAWN:	K.P.B.	JOB No:	16933
CHECKED:	R.W.P.		
SHEET:	5 of 6	DWG. No:	16933-A
DATE:	NOV. 13/24		

J.H. COHOON ENGINEERING LIMITED
SWMM HYDROLOGIC MODEL PARAMETERS
PRE-DEVELOPMENT CATCHMENTS

PROJECT: Laplante Rd
PROJECT #: 16933
DATE: November 2024

INPUT PARAMETERS

Catchment ID:	**101**	**102**	**103**
Catchment Area (ha):	0.603	1.974	1.383
Max. Catchment Elevation (m)	234.83	232.96	231.68
Min. Catchment Elevation (m)	229.95	228.89	230.11
Catchment Length (m)	109.0	207	36.0
Catchment Width (m)	55	95	384
Slope (%)	4.48%	1.97%	4.36%
Impervious %:	0.00%	0.00%	0.00%
Roughness Coefficient (Imp.)	0.013	0.013	0.013
Roughness Coefficient (Perv.)	0.200	0.200	0.200
Imp. Depression Storage (mm)	2	2	2
Perv. Depression Storage (mm)	5	5	5
% Zero Imp. Depression Storage	0%	0%	0%
Subarea Routing	Outlet	Outlet	Outlet
Percent Routed	100%	100%	100%
Green-Ampt: Soil Texture	Sandy Loam	Sandy Loam	Sandy Loam
Green-Ampt: Suction Head (mm)	109.982	109.982	109.982
Green-Ampt: Conductivity (mm/hr)	10.922	10.922	10.922
Green-Ampt: Initial Deficit	0.33	0.33	0.33

DATA SOURCES: Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997), United States Department of Agriculture Technical Release 55: Urban Hydrology for Small Watersheds (1986), Storm Water Management Model Reference Manual Volume I - Hydrology (Revised) (2016).

J.H. COHOON ENGINEERING LIMITED
CHICAGO STORM HYETOGRAPHS

PROJECT: Laplante Rd
PROJECT #: 16933
DATE: November 2024

A	**529.711**	**583.017**	**670.324**	**721.533**	**766.038**	**801.041**
B	**4.501**	**3.007**	**3.007**	**2.253**	**1.898**	**1.501**
C	**0.745**	**0.703**	**0.698**	**0.679**	**0.668**	**0.657**

A,B,C parameters per Norfolk County Development and Engineering Standards

r = 0.38 *where r represents the ratio of time of peak intensity divided by the storm duration*
td = 10 *where td represents the time step increment, in minutes*

3-HOUR CHICAGO STORM HYETOGRAPHS

2-Year		5- Year		10-Year		25-Year		50-Year		100-Year	
Time Step	Rainfall Intensity	Time Step	Rainfall Intensity	Time Step	Rainfall Intensity	Time Step	Rainfall Intensity	Time Step	Rainfall Intensity	Time Step	Rainfall Intensity
min	mm/hr	min	mm/hr	min	mm/hr	min	mm/hr	min	mm/hr	min	mm/hr
0:00	0.00	0:00	0.00	0:00	0.00	0:00	0.00	0:00	0.00	0:00	0.00
0:10	3.29	0:10	5.08	0:10	6.09	0:10	7.60	0:10	8.78	0:10	9.99
0:20	3.81	0:20	5.81	0:20	6.95	0:20	8.63	0:20	9.95	0:20	11.29
0:30	4.57	0:30	6.85	0:30	8.19	0:30	10.10	0:30	11.60	0:30	13.12
0:40	5.79	0:40	8.50	0:40	10.14	0:40	12.39	0:40	14.16	0:40	15.93
0:50	8.16	0:50	11.58	0:50	13.78	0:50	16.59	0:50	18.82	0:50	21.02
1:00	14.99	1:00	20.02	1:00	23.69	1:00	27.75	1:00	31.02	1:00	34.10
1:10	72.24	1:10	96.03	1:10	111.84	1:10	131.63	1:10	146.50	1:10	160.97
1:20	23.20	1:20	29.83	1:20	35.17	1:20	40.40	1:20	44.66	1:20	48.50
1:30	12.51	1:30	17.00	1:30	20.15	1:30	23.80	1:30	26.73	1:30	29.53
1:40	8.77	1:40	12.36	1:40	14.69	1:40	17.64	1:40	19.98	1:40	22.27
1:50	6.86	1:50	9.91	1:50	11.80	1:50	14.32	1:50	16.31	1:50	18.28
2:00	5.69	2:00	8.36	2:00	9.98	2:00	12.20	2:00	13.95	2:00	15.70
2:10	4.89	2:10	7.30	2:10	8.71	2:10	10.72	2:10	12.30	2:10	13.88
2:20	4.31	2:20	6.50	2:20	7.78	2:20	9.61	2:20	11.05	2:20	12.51
2:30	3.87	2:30	5.89	2:30	7.05	2:30	8.75	2:30	10.09	2:30	11.44
2:40	3.52	2:40	5.40	2:40	6.47	2:40	8.06	2:40	9.30	2:40	10.57
2:50	3.24	2:50	5.00	2:50	5.99	2:50	7.48	2:50	8.66	2:50	9.85
3:00	3.00	3:00	4.67	3:00	5.60	3:00	7.00	3:00	8.11	3:00	9.24
Depth (mm)	32.12	Depth (mm)	44.35	Depth (mm)	52.34	Depth (mm)	62.44	Depth (mm)	70.33	Depth (mm)	78.03

PRE-DEVELOPMENT - 2 YEAR STORM
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

WARNING 04: minimum elevation drop used for Conduit DUMMY2

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 3
Number of nodes 2
Number of links 1
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
NorfolkRain	2-year	INTENSITY	10 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
101	0.60	55.00	0.00	4.4800	NorfolkRain	Out
102	1.97	95.00	0.00	1.9700	NorfolkRain	Out
103	1.38	384.00	0.00	4.3600	NorfolkRain	Out

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
DUMMY1	JUNCTION	0.00	1.00	0.0	
Out	OUTFALL	0.00	1.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
DUMMY2	DUMMY1	Out	CONDUIT	400.0	0.0001	0.0130

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
DUMMY2	CIRCULAR	1.00	0.79	0.25	1.00	1	0.02

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO

```
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Flow Routing Method ..... KINWAVE
Starting Date ..... 11/07/2023 00:00:00
Ending Date ..... 11/07/2023 06:00:00
Antecedent Dry Days ..... 0.0
Report Time Step ..... 00:02:30
Wet Time Step ..... 00:01:00
Dry Time Step ..... 01:00:00
Routing Time Step ..... 30.00 sec


**********
Control Actions Taken
**********


**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
Total Precipitation ......         0.127        32.118
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.053        13.337
Surface Runoff ...........         0.074        18.786
Final Storage ............         0.000         0.000
Continuity Error (%) .....        -0.016


**************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.074         0.744
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         0.074         0.744
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.000


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :    30.00 sec
Average Time Step           :    30.00 sec
Maximum Time Step           :    30.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.00
Percent Not Converging      :     0.00


***************************
Subcatchment Runoff Summary
***************************

-----------------------------------------------------------------------------------------------------------------------
                        Total      Total      Total      Total     Imperv       Perv      Total       Total      Peak  Runoff
                       Precip      Runon       Evap      Infil     Runoff     Runoff     Runoff      Runoff    Runoff   Coeff
Subcatchment               mm         mm         mm         mm         mm         mm         mm    10^6 ltr       CMS
-----------------------------------------------------------------------------------------------------------------------
101                     32.12       0.00       0.00      21.75       0.00      10.37      10.37        0.06      0.02   0.323
102                     32.12       0.00       0.00      13.79       0.00      18.33      18.33        0.36      0.09   0.571
103                     32.12       0.00       0.00       9.02       0.00      23.11      23.11        0.32      0.22   0.719


******************
```

Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
DUMMY1	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
Out	OUTFALL	0.00	0.00	0.00	0 00:00	0.00

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent	
DUMMY1	JUNCTION	0.000	0.000	0 00:00	0	0	0.000	ltr
Out	OUTFALL	0.325	0.325	0 01:20	0.744	0.744	0.000	

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Out	77.36	0.045	0.325	0.744
System	77.36	0.045	0.325	0.744

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
DUMMY2	CONDUIT	0.000	0 00:00	0.00	0.00	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Tue Nov 19 15:45:13 2024
Analysis ended on: Tue Nov 19 15:45:13 2024
Total elapsed time: < 1 sec

PRE-DEVELOPMENT - 5 YEAR STORM
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

WARNING 04: minimum elevation drop used for Conduit DUMMY2

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 3
Number of nodes 2
Number of links 1
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
NorfolkRain	5-year	INTENSITY	10 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
101	0.60	55.00	0.00	4.4800	NorfolkRain	Out
102	1.97	95.00	0.00	1.9700	NorfolkRain	Out
103	1.38	384.00	0.00	4.3600	NorfolkRain	Out

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
DUMMY1	JUNCTION	0.00	1.00	0.0	
Out	OUTFALL	0.00	1.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
DUMMY2	DUMMY1	Out	CONDUIT	400.0	0.0001	0.0130

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
DUMMY2	CIRCULAR	1.00	0.79	0.25	1.00	1	0.02

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO

```
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Flow Routing Method ..... KINWAVE
Starting Date ..... 11/07/2023 00:00:00
Ending Date ..... 11/07/2023 06:00:00
Antecedent Dry Days ..... 0.0
Report Time Step ..... 00:02:30
Wet Time Step ..... 00:01:00
Dry Time Step ..... 01:00:00
Routing Time Step ..... 30.00 sec


**********
Control Actions Taken
**********


**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
Total Precipitation ......         0.176        44.348
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.057        14.508
Surface Runoff ...........         0.118        29.774
Final Storage ............         0.000         0.074
Continuity Error (%) .....        -0.017


**************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.118         1.179
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         0.118         1.179
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.000


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :    30.00 sec
Average Time Step           :    30.00 sec
Maximum Time Step           :    30.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.00
Percent Not Converging      :     0.00


***************************
Subcatchment Runoff Summary
***************************

-----------------------------------------------------------------------------------------------------------------------
                        Total      Total      Total      Total     Imperv       Perv      Total       Total      Peak  Runoff
                       Precip      Runon       Evap      Infil     Runoff     Runoff     Runoff      Runoff    Runoff   Coeff
Subcatchment               mm         mm         mm         mm         mm         mm         mm   10^6 ltr       CMS
-----------------------------------------------------------------------------------------------------------------------
101                     44.35       0.00       0.00      22.75       0.00      21.13      21.13        0.13      0.04   0.476
102                     44.35       0.00       0.00      15.34       0.00      29.01      29.01        0.57      0.15   0.654
103                     44.35       0.00       0.00       9.73       0.00      34.63      34.63        0.48      0.31   0.781


******************
```

Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
DUMMY1	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
Out	OUTFALL	0.00	0.00	0.00	0 00:00	0.00

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent	
DUMMY1	JUNCTION	0.000	0.000	0 00:00	0	0	0.000	ltr
Out	OUTFALL	0.501	0.501	0 01:20	1.18	1.18	0.000	

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Out	86.94	0.063	0.501	1.179
System	86.94	0.063	0.501	1.179

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
DUMMY2	CONDUIT	0.000	0 00:00	0.00	0.00	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Tue Nov 19 15:45:24 2024
Analysis ended on: Tue Nov 19 15:45:24 2024
Total elapsed time: < 1 sec

PRE-DEVELOPMENT - 10 YEAR STORM
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

WARNING 04: minimum elevation drop used for Conduit DUMMY2

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 3
Number of nodes 2
Number of links 1
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
NorfolkRain	10-year	INTENSITY	10 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
101	0.60	55.00	0.00	4.4800	NorfolkRain	Out
102	1.97	95.00	0.00	1.9700	NorfolkRain	Out
103	1.38	384.00	0.00	4.3600	NorfolkRain	Out

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
DUMMY1	JUNCTION	0.00	1.00	0.0	
Out	OUTFALL	0.00	1.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
DUMMY2	DUMMY1	Out	CONDUIT	400.0	0.0001	0.0130

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
DUMMY2	CIRCULAR	1.00	0.79	0.25	1.00	1	0.02

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO

```
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Flow Routing Method ..... KINWAVE
Starting Date ..... 11/07/2023 00:00:00
Ending Date ..... 11/07/2023 06:00:00
Antecedent Dry Days ..... 0.0
Report Time Step ..... 00:02:30
Wet Time Step ..... 00:01:00
Dry Time Step ..... 01:00:00
Routing Time Step ..... 30.00 sec


**********
Control Actions Taken
**********


**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
Total Precipitation ......         0.207        52.345
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.060        15.030
Surface Runoff ...........         0.147        37.187
Final Storage ............         0.001         0.137
Continuity Error (%) .....        -0.018


**************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.147         1.473
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         0.147         1.473
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.000


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :    30.00 sec
Average Time Step           :    30.00 sec
Maximum Time Step           :    30.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.00
Percent Not Converging      :     0.00


***************************
Subcatchment Runoff Summary
***************************

-----------------------------------------------------------------------------------------------------------------------
                        Total      Total      Total      Total     Imperv       Perv      Total       Total      Peak  Runoff
                       Precip      Runon       Evap      Infil     Runoff     Runoff     Runoff      Runoff    Runoff   Coeff
Subcatchment               mm         mm         mm         mm         mm         mm         mm    10^6 ltr       CMS
-----------------------------------------------------------------------------------------------------------------------
101                     52.35       0.00       0.00      22.96       0.00      28.54      28.54        0.17      0.05   0.545
102                     52.34       0.00       0.00      16.09       0.00      36.24      36.24        0.72      0.20   0.692
103                     52.34       0.00       0.00      10.06       0.00      42.30      42.30        0.59      0.37   0.808


******************
```

Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
DUMMY1	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
Out	OUTFALL	0.00	0.00	0.00	0 00:00	0.00

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent	
DUMMY1	JUNCTION	0.000	0.000	0 00:00	0	0	0.000	ltr
Out	OUTFALL	0.626	0.626	0 01:20	1.47	1.47	0.000	

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Out	90.83	0.075	0.626	1.473
System	90.83	0.075	0.626	1.473

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
DUMMY2	CONDUIT	0.000	0 00:00	0.00	0.00	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Tue Nov 19 15:45:33 2024
Analysis ended on: Tue Nov 19 15:45:33 2024
Total elapsed time: < 1 sec

PRE-DEVELOPMENT - 25 YEAR STORM
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

WARNING 04: minimum elevation drop used for Conduit DUMMY2

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 3
Number of nodes 2
Number of links 1
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
NorfolkRain	25-year	INTENSITY	10 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
101	0.60	55.00	0.00	4.4800	NorfolkRain	Out
102	1.97	95.00	0.00	1.9700	NorfolkRain	Out
103	1.38	384.00	0.00	4.3600	NorfolkRain	Out

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
DUMMY1	JUNCTION	0.00	1.00	0.0	
Out	OUTFALL	0.00	1.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
DUMMY2	DUMMY1	Out	CONDUIT	400.0	0.0001	0.0130

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
DUMMY2	CIRCULAR	1.00	0.79	0.25	1.00	1	0.02

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO

```
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Flow Routing Method ..... KINWAVE
Starting Date ..... 11/07/2023 00:00:00
Ending Date ..... 11/07/2023 06:00:00
Antecedent Dry Days ..... 0.0
Report Time Step ..... 00:02:30
Wet Time Step ..... 00:01:00
Dry Time Step ..... 01:00:00
Routing Time Step ..... 30.00 sec


**********
Control Actions Taken
**********


**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
Total Precipitation ......         0.247        62.445
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.062        15.546
Surface Runoff ...........         0.185        46.642
Final Storage ............         0.001         0.268
Continuity Error (%) .....        -0.018


**************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.185         1.847
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         0.185         1.847
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.000


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :    30.00 sec
Average Time Step           :    30.00 sec
Maximum Time Step           :    30.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.00
Percent Not Converging      :     0.00


***************************
Subcatchment Runoff Summary
***************************

-----------------------------------------------------------------------------------------------------------------------------
                        Total      Total      Total      Total     Imperv       Perv      Total       Total      Peak  Runoff
                       Precip      Runon       Evap      Infil     Runoff     Runoff     Runoff      Runoff    Runoff   Coeff
Subcatchment               mm         mm         mm         mm         mm         mm         mm    10^6 ltr       CMS
-----------------------------------------------------------------------------------------------------------------------------
101                     62.45       0.00       0.00      23.17       0.00      38.05      38.05        0.23      0.08   0.609
102                     62.44       0.00       0.00      16.80       0.00      45.49      45.49        0.90      0.26   0.728
103                     62.45       0.00       0.00      10.43       0.00      52.03      52.03        0.72      0.45   0.833


******************
```

Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
DUMMY1	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
Out	OUTFALL	0.00	0.00	0.00	0 00:00	0.00

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent	
DUMMY1	JUNCTION	0.000	0.000	0 00:00	0	0	0.000	ltr
Out	OUTFALL	0.790	0.790	0 01:20	1.85	1.85	0.000	

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Out	94.31	0.091	0.790	1.847
System	94.31	0.091	0.790	1.847

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
DUMMY2	CONDUIT	0.000	0 00:00	0.00	0.00	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Tue Nov 19 15:46:26 2024
Analysis ended on: Tue Nov 19 15:46:26 2024
Total elapsed time: < 1 sec

PRE-DEVELOPMENT - 50 YEAR STORM
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

WARNING 04: minimum elevation drop used for Conduit DUMMY2

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 3
Number of nodes 2
Number of links 1
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
NorfolkRain	50-year	INTENSITY	10 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
101	0.60	55.00	0.00	4.4800	NorfolkRain	Out
102	1.97	95.00	0.00	1.9700	NorfolkRain	Out
103	1.38	384.00	0.00	4.3600	NorfolkRain	Out

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
DUMMY1	JUNCTION	0.00	1.00	0.0	
Out	OUTFALL	0.00	1.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
DUMMY2	DUMMY1	Out	CONDUIT	400.0	0.0001	0.0130

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
DUMMY2	CIRCULAR	1.00	0.79	0.25	1.00	1	0.02

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO

```
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Flow Routing Method ..... KINWAVE
Starting Date ..... 11/07/2023 00:00:00
Ending Date ..... 11/07/2023 06:00:00
Antecedent Dry Days ..... 0.0
Report Time Step ..... 00:02:30
Wet Time Step ..... 00:01:00
Dry Time Step ..... 01:00:00
Routing Time Step ..... 30.00 sec


**********
Control Actions Taken
**********


**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
Total Precipitation ......         0.279        70.328
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.063        15.898
Surface Runoff ...........         0.214        54.094
Final Storage ............         0.001         0.349
Continuity Error (%) .....        -0.019


**************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.214         2.142
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         0.214         2.142
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.000


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :    30.00 sec
Average Time Step           :    30.00 sec
Maximum Time Step           :    30.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.00
Percent Not Converging      :     0.00


***************************
Subcatchment Runoff Summary
***************************

-----------------------------------------------------------------------------------------------------------------------------
                        Total      Total      Total      Total     Imperv       Perv      Total       Total      Peak  Runoff
                       Precip      Runon       Evap      Infil     Runoff     Runoff     Runoff      Runoff    Runoff   Coeff
Subcatchment               mm         mm         mm         mm         mm         mm         mm    10^6 ltr       CMS
-----------------------------------------------------------------------------------------------------------------------------
101                     70.33       0.00       0.00      23.30       0.00      45.58      45.58        0.27      0.10   0.648
102                     70.33       0.00       0.00      17.29       0.00      52.79      52.79        1.04      0.31   0.751
103                     70.33       0.00       0.00      10.68       0.00      59.67      59.67        0.83      0.51   0.848


******************
```

Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
DUMMY1	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
Out	OUTFALL	0.00	0.00	0.00	0 00:00	0.00

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent	
DUMMY1	JUNCTION	0.000	0.000	0 00:00	0	0	0.000	ltr
Out	OUTFALL	0.918	0.918	0 01:20	2.14	2.14	0.000	

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Out	95.00	0.104	0.918	2.142
System	95.00	0.104	0.918	2.142

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
DUMMY2	CONDUIT	0.000	0 00:00	0.00	0.00	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Tue Nov 19 15:46:39 2024
Analysis ended on: Tue Nov 19 15:46:39 2024
Total elapsed time: < 1 sec

PRE-DEVELOPMENT - 100 YEAR STORM
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

WARNING 04: minimum elevation drop used for Conduit DUMMY2

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 3
Number of nodes 2
Number of links 1
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
NorfolkRain	100-year	INTENSITY	10 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
101	0.60	55.00	0.00	4.4800	NorfolkRain	Out
102	1.97	95.00	0.00	1.9700	NorfolkRain	Out
103	1.38	384.00	0.00	4.3600	NorfolkRain	Out

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
DUMMY1	JUNCTION	0.00	1.00	0.0	
Out	OUTFALL	0.00	1.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
DUMMY2	DUMMY1	Out	CONDUIT	400.0	0.0001	0.0130

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
DUMMY2	CIRCULAR	1.00	0.79	0.25	1.00	1	0.02

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.
****

****
Analysis Options
****
Flow Units ..... CMS
Process Models:
  Rainfall/Runoff ..... YES
  RDII ..... NO
  Snowmelt ..... NO
  Groundwater ..... NO

```
  Flow Routing ..... YES
  Ponding Allowed ..... NO
  Water Quality ..... NO
Infiltration Method ..... GREEN_AMPT
Flow Routing Method ..... KINWAVE
Starting Date ..... 11/07/2023 00:00:00
Ending Date ..... 11/07/2023 06:00:00
Antecedent Dry Days ..... 0.0
Report Time Step ..... 00:02:30
Wet Time Step ..... 00:01:00
Dry Time Step ..... 01:00:00
Routing Time Step ..... 30.00 sec


**********
Control Actions Taken
**********


**************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
**************************     ---------       -------
Total Precipitation ......         0.309        78.032
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.064        16.212
Surface Runoff ...........         0.243        61.418
Final Storage ............         0.002         0.416
Continuity Error (%) .....        -0.019


**************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
**************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.243         2.432
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         0.243         2.432
Flooding Loss ............         0.000         0.000
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.000


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :    30.00 sec
Average Time Step           :    30.00 sec
Maximum Time Step           :    30.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.00
Percent Not Converging      :     0.00


***************************
Subcatchment Runoff Summary
***************************

-----------------------------------------------------------------------------------------------------------------------
                        Total      Total      Total      Total     Imperv       Perv      Total       Total      Peak  Runoff
                       Precip      Runon       Evap      Infil     Runoff     Runoff     Runoff      Runoff    Runoff   Coeff
Subcatchment               mm         mm         mm         mm         mm         mm         mm   10^6 ltr       CMS
-----------------------------------------------------------------------------------------------------------------------
101                     78.03       0.00       0.00      23.41       0.00      53.00      53.00        0.32      0.12   0.679
102                     78.03       0.00       0.00      17.73       0.00      59.97      59.97        1.18      0.36   0.769
103                     78.03       0.00       0.00      10.90       0.00      67.16      67.16        0.93      0.56   0.861


******************
```

Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
DUMMY1	JUNCTION	0.00	0.00	0.00	0 00:00	0.00
Out	OUTFALL	0.00	0.00	0.00	0 00:00	0.00

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent	
DUMMY1	JUNCTION	0.000	0.000	0 00:00	0	0	0.000	ltr
Out	OUTFALL	1.046	1.046	0 01:20	2.43	2.43	0.000	

****
Node Flooding Summary
****

No nodes were flooded.

****
Outfall Loading Summary
****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Out	95.42	0.118	1.046	2.432
System	95.42	0.118	1.046	2.432

****
Link Flow Summary
****

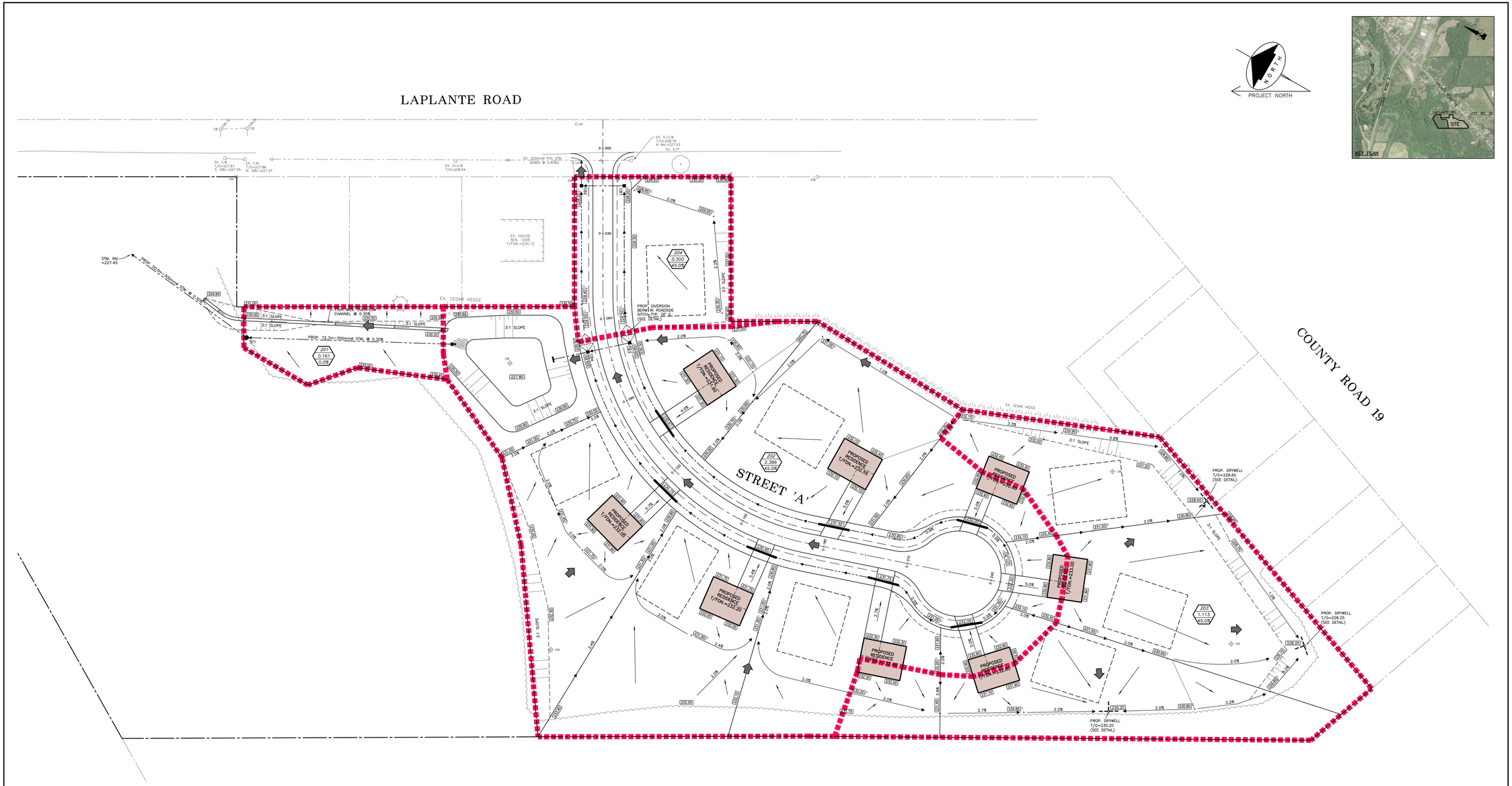
Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
DUMMY2	CONDUIT	0.000	0 00:00	0.00	0.00	0.00

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Tue Nov 19 15:46:53 2024
Analysis ended on: Tue Nov 19 15:46:53 2024
Total elapsed time: < 1 sec

APPENDIX B: POST-DEVELOPMENT CONDITIONS HYDROLOGY AND WATER QUANTITY CONTROL CALCULATIONS



NO.	REVISION	DATE (MM/DD/YY)	BY
1	SWM POND OUTLET AND OVERLAND FLOW	02/24/25	K.P.B.

J.H. COHOON ENGINEERING LIMITED
CONSULTING ENGINEERS
440 HARDY ROAD , UNIT #1 , BRANTFORD — ONTARIO , N3T 5L8
TEL. (519) 753-2656 FAX. (519) 753-4263 www.cohooneng.com

PROJECT:

PROPOSED RESIDENTIAL SUBDIVISION

1045 LAPLANTE ROAD, TILLSONBURG
NORFOLK COUNTY

CLIENT: JOSE OLIVEIRA

POST–DEVELOPMENT STORM DRAINAGE AREAS

DESIGN:	R.W.P.	SCALE:	1:500
DRAWN:	K.P.B.	JOB No:	16933
CHECKED:	R.W.P.		
SHEET:	6 of 6	DWG. No:	16933–B
DATE:	NOV. 13/24		

J.H. COHOON ENGINEERING LIMITED
SWM POND VOLUME TABLE

PROJECT: Laplante Rd
PROJECT #: 16933
DATE: November 2024

POND CHARACTERISTICS:

Side Slopes: 3 :1
Bottom Elev: 227.80 m
Top Elev: 230.50 m
Water Surface Elev: N/A (Dry Pond)

Extended Detention Volume = 596.5 m^3
Extended Detention Surface Area = 809.38 m^2
Extended Detention Elev. = 228.72 m

Pond Geometry				Pond Volumes			
Elevation	**Depth**	**Area**	**Avg. Area**	**Dead**	**Accum. Dead**	**Live**	**Accum. Live**
m	**m**	**m^2**	**m^2**	**m^3**	**m^3**	**m^3**	**m^3**
227.80	0.00	**492.20**	492.20	-	-	0.00	0.00
227.90	0.10	526.82	509.51	-	-	50.95	50.95
228.00	0.20	561.44	544.13	-	-	54.41	105.36
228.10	0.30	596.06	578.75	-	-	57.87	163.24
228.20	0.40	630.67	613.36	-	-	61.34	224.57
228.30	0.50	665.29	647.98	-	-	64.80	289.37
228.40	0.60	699.91	682.60	-	-	68.26	357.63
228.50	0.70	734.53	717.22	-	-	71.72	429.36
228.60	0.80	769.15	751.84	-	-	75.18	504.54
228.70	0.90	803.77	786.46	-	-	78.65	583.18
228.80	1.00	838.39	821.08	-	-	82.11	665.29
228.90	1.10	873.00	855.69	-	-	85.57	750.86
229.00	1.20	907.62	890.31	-	-	89.03	839.89
229.10	1.30	942.24	924.93	-	-	92.49	932.39
229.20	1.40	976.86	959.55	-	-	95.95	1028.34
229.30	1.50	1011.48	994.17	-	-	99.42	1127.76
229.40	1.60	1046.10	1028.79	-	-	102.88	1230.64
229.50	1.70	1080.71	1063.41	-	-	106.34	1336.98
229.60	1.80	1115.33	1098.02	-	-	109.80	1446.78
229.70	1.90	1149.95	1132.64	-	-	113.26	1560.04
229.80	2.00	1184.57	1167.26	-	-	116.73	1676.77
229.90	2.10	1219.19	1201.88	-	-	120.19	1796.96
230.00	2.20	1253.81	1236.50	-	-	123.65	1920.61
230.10	2.30	1288.43	1271.12	-	-	127.11	2047.72
230.20	2.40	1323.04	1305.74	-	-	130.57	2178.29
230.30	2.50	1357.66	1340.35	-	-	134.04	2312.33
230.40	2.60	1392.28	1374.97	-	-	137.50	2449.83
230.50	2.70	**1426.90**	1323.04	-	-	793.83	2590.78

J.H. COHOON ENGINEERING LIMITED
SWM POND DISCHARGE TABLE

PROJECT: Laplante Rd
PROJECT #: 16933
DATE: November 2024

ORIFICE #1 *75 mm Orifice Plate*			DICB GRATE			OUTLET PIPE			WEIR CONTROL *Emergency Spillway*		
Diameter =	75	mm				Diameter =	300	mm	Length of Weir Sill =	1.5	m
Area =	0.004	m^2	Grate Width:	1.465	m	Area =	0.071	m^2	Weir Sill Elevation =	230.20	m
Orifice C =	0.63		Grate Slope:	3	:1	Orifice C =	0.63		Weir Constant K =	1.6	
Invert =	227.82	m	Grate Invert:	230.00	m	Invert =	227.82	m	Side Slope (H:V) =	3	:1

Orifice Equation
Q = C x A x (2gH)^0.5
where
Q = flow rate (m^3/s)
C = constant
A = area of opening (m^2)
H = net head on the orifice
g = acceleration due to gravity (9.81 m/s^2)

Ditch Inlet Catch Basin (DICB)
Discharge calculated as per MTO Drainage Management Manual Design Chart 4.20, see attached.

Highlighted Cells have been calculated to account for pipe flow under partially full conditions, per Hydraulic Structures, C.D. Smith, see attached.

Weir Formula
Q = K x L x H^1.5
where
Q = flow rate (m^3/s)
K = constant
L = length of weir sill (m)
H = head on the weir (m)

Elevation	HICKENBOTTOM WEIR		ORIFICE #1		DICB GRATE		OUTLET PIPE		WEIR CONTROL		HYDRAULIC CONTROL	TOTAL DISCHARGE
	Head	Discharge	Head	Discharge	Head	Discharge	Head	Discharge	Head	Discharge		
m	m	m^3/s	m	m^3/s	m	m^3/s	m	m^3/s	m	m^3/s		m^3/s
227.80	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	0.00	0.000	HICKENBOTTOM WEIR	0.000
227.90	0.08	0.003	0.04	0.003	0.00	0.000	0.00	0.006	0.00	0.000	ORIFICE #1	0.003
228.00	0.18	0.006	0.14	0.005	0.00	0.000	0.03	0.025	0.00	0.000	ORIFICE #1	0.005
228.10	0.28	0.009	0.24	0.006	0.00	0.000	0.13	0.053	0.00	0.000	ORIFICE #1	0.006
228.20	0.38	0.014	0.34	0.007	0.00	0.000	0.23	0.081	0.00	0.000	ORIFICE #1	0.007
228.30	0.48	0.020	0.44	0.008	0.00	0.000	0.33	0.113	0.00	0.000	ORIFICE #1	0.008
228.40	0.58	0.026	0.54	0.009	0.00	0.000	0.43	0.129	0.00	0.000	ORIFICE #1	0.009
228.50	0.68	0.033	0.64	0.010	0.00	0.000	0.53	0.144	0.00	0.000	ORIFICE #1	0.010
228.60	0.78	0.041	0.74	0.011	0.00	0.000	0.63	0.157	0.00	0.000	ORIFICE #1	0.011
228.70	0.88	0.049	0.84	0.011	0.00	0.000	0.73	0.169	0.00	0.000	ORIFICE #1	0.011
228.80	0.98	0.058	0.94	0.012	0.00	0.000	0.83	0.180	0.00	0.000	ORIFICE #1	0.012
228.90	1.08	0.067	1.04	0.013	0.00	0.000	0.93	0.190	0.00	0.000	ORIFICE #1	0.013
229.00	1.18	0.076	1.14	0.013	0.00	0.000	1.03	0.200	0.00	0.000	ORIFICE #1	0.013
229.10	1.28	0.086	1.24	0.014	0.00	0.000	1.13	0.210	0.00	0.000	ORIFICE #1	0.014
229.20	1.38	0.096	1.34	0.014	0.00	0.000	1.23	0.219	0.00	0.000	ORIFICE #1	0.014
229.30	1.48	0.106	1.44	0.015	0.00	0.000	1.33	0.227	0.00	0.000	ORIFICE #1	0.015
229.40	1.58	0.116	1.54	0.015	0.00	0.000	1.43	0.236	0.00	0.000	ORIFICE #1	0.015
229.50	1.68	0.127	1.64	0.016	0.00	0.000	1.53	0.244	0.00	0.000	ORIFICE #1	0.016
229.60	1.78	0.140	1.74	0.016	0.00	0.000	1.63	0.252	0.00	0.000	ORIFICE #1	0.016
229.70	1.88	0.151	1.84	0.017	0.00	0.000	1.73	0.259	0.00	0.000	ORIFICE #1	0.017
229.80	1.98	0.163	1.94	0.017	0.00	0.000	1.83	0.267	0.00	0.000	ORIFICE #1	0.017
229.90	2.08	0.174	2.04	0.018	0.00	0.000	1.93	0.274	0.00	0.000	ORIFICE #1	0.018
230.00	2.18	0.186	2.14	0.018	0.00	0.000	2.03	0.281	0.00	0.000	ORIFICE #1	0.018
230.10	2.28	0.197	2.24	0.018	0.10	0.031	2.13	0.288	0.00	0.000	DICB GRATE	0.050
230.20	2.38	0.209	2.34	0.019	0.20	0.098	2.23	0.295	0.00	0.000	DICB GRATE	0.117
230.30	2.48	0.220	2.44	0.019	0.30	0.202	2.33	0.301	0.10	0.076	DICB GRATE	0.297
230.40	2.58	0.231	2.54	0.020	0.40	0.342	2.43	0.307	0.20	0.215	OUTLET PIPE	0.522
230.50	2.68	0.243	2.64	0.020	0.50	0.520	2.53	0.314	0.30	0.394	WEIR CONTROL	0.708

J.H. COHOON ENGINEERING LIMITED
HICKENBOTTOM CAPACITY CALCULATION

PROJECT: Laplante Rd
PROJECT #: 16933
DATE: November 2024

Data Source: Hickenbottom Drain Inlets website (http://hickenbottom.ca/products_6.php)
Grate Invert: 227.82 m
Drain Type: Stock 6" Inlet with 40 - 1" Holes

Elevation m	Head m	Design Ditch Inlet Capacity (50% of Holes Blocked) m^3/s
227.80	0.00	0.000
227.90	0.08	0.003
228.00	0.18	0.006
228.10	0.28	0.009
228.20	0.38	0.014
228.30	0.48	0.020
228.40	0.58	0.026
228.50	0.68	0.033
228.60	0.78	0.041
228.70	0.88	0.049
228.80	0.98	0.058
228.90	1.08	0.067
229.00	1.18	0.076
229.10	1.28	0.086
229.20	1.38	0.096
229.30	1.48	0.106
229.40	1.58	0.116
229.50	1.68	0.127
229.60	1.78	0.140
229.70	1.88	0.151
229.80	1.98	0.163
229.90	2.08	0.174
230.00	2.18	0.186
230.10	2.28	0.197
230.20	2.38	0.209
230.30	2.48	0.220
230.40	2.58	0.231
230.50	2.68	0.243

J.H. COHOON ENGINEERING LIMITED
DITCH INLET CAPACITY CALCULATION

PROJECT: Laplante Rd
PROJECT #: 16933
DATE: November 2024

Data Source: MTO Drainage Management Manual Design Chart 4:20

Grate Invert:	230.00	m
Grate Length:	1.465	m
Grate Width:	0.768	m
Grate Slope:	3	:1

Elevation	Head	Ditch Inlet Capacity	Design Ditch Inlet Capacity (50% Blocked)
m	m	m^3/s	m^3/s
227.80	0.00	0.000	0.000
227.90	0.00	0.000	0.000
228.00	0.00	0.000	0.000
228.10	0.00	0.000	0.000
228.20	0.00	0.000	0.000
228.30	0.00	0.000	0.000
228.40	0.00	0.000	0.000
228.50	0.00	0.000	0.000
228.60	0.00	0.000	0.000
228.70	0.00	0.000	0.000
228.80	0.00	0.000	0.000
228.90	0.00	0.000	0.000
229.00	0.00	0.000	0.000
229.10	0.00	0.000	0.000
229.20	0.00	0.000	0.000
229.30	0.00	0.000	0.000
229.40	0.00	0.000	0.000
229.50	0.00	0.000	0.000
229.60	0.00	0.000	0.000
229.70	0.00	0.000	0.000
229.80	0.00	0.000	0.000
229.90	0.00	0.000	0.000
230.00	0.00	0.000	0.000
230.10	0.10	0.063	0.031
230.20	0.20	0.196	0.098
230.30	0.30	0.403	0.202
230.40	0.40	0.685	0.342
230.50	0.50	1.040	0.520

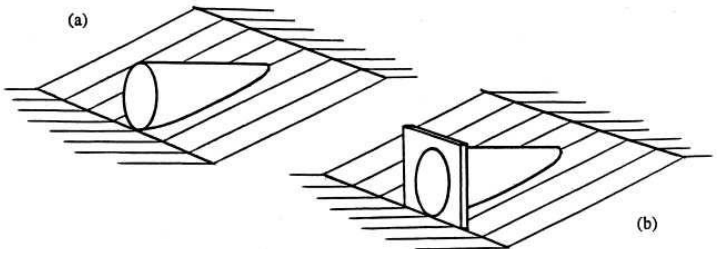
J.H. COHOON ENGINEERING LIMITED
STORMWATER POND OUTLET HYDRAULICS

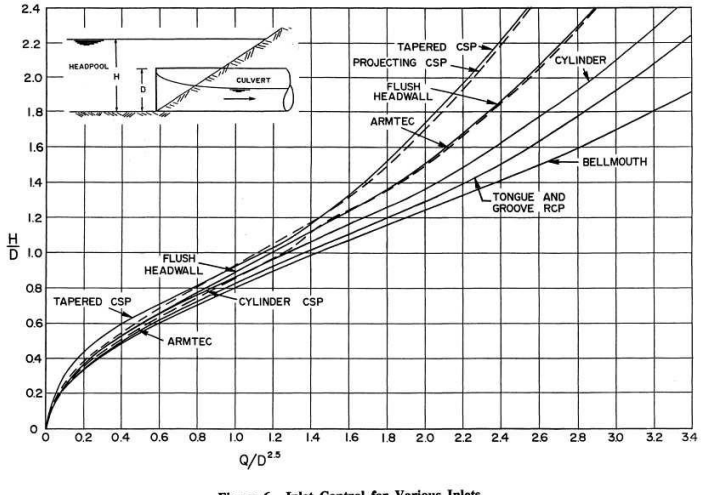
PROJECT: Laplante Rd
PROJECT #: 16933
DATE: November 2024

Data Source: Hydraulic Structures, C.D. Smith, University of Saskatchewan

Pipe Flowing Partially Full or Full

Pipe Diameter (m)	0.3
Elevation (m)	227.82
Inlet Type:	(b) Flush Headwall





Water Elevation	Depth from Min Elev.	Pipe Partially Full Inlet Control
m	m	m^3/s
227.80	-	-
227.90	0.08	0.006
228.00	0.18	0.025
228.10	0.28	0.053
228.20	0.38	0.081
228.30	0.48	ORIFICE
228.40	0.58	ORIFICE
228.50	0.68	ORIFICE
228.60	0.78	ORIFICE
228.70	0.88	ORIFICE
228.80	0.98	ORIFICE
228.90	1.08	ORIFICE
229.00	1.18	ORIFICE
229.10	1.28	ORIFICE
229.20	1.38	ORIFICE
229.30	1.48	ORIFICE
229.40	1.58	ORIFICE
229.50	1.68	ORIFICE
229.60	1.78	ORIFICE
229.70	1.88	ORIFICE
229.80	1.98	ORIFICE
229.90	2.08	ORIFICE
230.00	2.18	ORIFICE

J.H. COHOON ENGINEERING LIMITED
SWM POND SUMMARY TABLES

PROJECT: Laplante Rd
PROJECT #: 16933
DATE: November 2024

STAGE STORAGE DISCHARGE TABLE

Elevation	Depth	Hydraulic Control	Total Discharge	Active Storage Volume
m	m		m^3/s	m^3
227.80	0.00	HICKENBOTTOM	0.000	0.00
227.90	0.10	HICKENBOTTOM	0.003	50.95
228.00	0.20	HICKENBOTTOM	0.005	105.36
228.10	0.30	ORIFICE #1	0.006	163.24
228.20	0.40	ORIFICE #1	0.007	224.57
228.30	0.50	ORIFICE #1	0.008	289.37
228.40	0.60	ORIFICE #1	0.009	357.63
228.50	0.70	ORIFICE #1	0.010	429.36
228.60	0.80	ORIFICE #1	0.011	504.54
228.70	0.90	ORIFICE #1	0.011	583.18
228.80	1.00	ORIFICE #1	0.012	665.29
228.90	1.10	ORIFICE #1	0.013	750.86
229.00	1.20	ORIFICE #1	0.013	839.89
229.10	1.30	ORIFICE #1	0.014	932.39
229.20	1.40	ORIFICE #1	0.014	1028.34
229.30	1.50	ORIFICE #1	0.015	1127.76
229.40	1.60	ORIFICE #1	0.015	1230.64
229.50	1.70	ORIFICE #1	0.016	1336.98
229.60	1.80	ORIFICE #1	0.016	1446.78
229.70	1.90	ORIFICE #1	0.017	1560.04
229.80	2.00	ORIFICE #1	0.017	1676.77
229.90	2.10	ORIFICE #1	0.018	1796.96
230.00	2.20	ORIFICE #1	0.018	1920.61
230.10	2.30	DICB GRATE	0.050	2047.72
230.20	2.40	DICB GRATE	0.117	2178.29
230.30	2.50	DICB GRATE	0.297	2312.33
230.40	2.60	OUTLET PIPE	0.522	2449.83
230.50	2.70	WEIR CONTROL	0.708	2590.78

SWMM MODEL INPUTS

STORAGE CURVE

Depth	Area
m	m^2
0.00	492.20
0.10	526.82
0.20	561.44
0.30	596.06
0.40	630.67
0.50	665.29
0.60	699.91
0.70	734.53
0.80	769.15
0.90	803.77
1.00	838.39
1.10	873.00
1.20	907.62
1.30	942.24
1.40	976.86
1.50	1011.48
1.60	1046.10
1.70	1080.71
1.80	1115.33
1.90	1149.95
2.00	1184.57
2.10	1219.19
2.20	1253.81
2.30	1288.43
2.40	1323.04
2.50	1357.66
2.60	1392.28
2.70	1426.90

RATING CURVE

Depth	Outflow
m	m^3/s
0.00	0.0000
0.10	0.0025
0.20	0.0047
0.30	0.0061
0.40	0.0072
0.50	0.0082
0.60	0.0091
0.70	0.0099
0.80	0.0106
0.90	0.0113
1.00	0.0120
1.10	0.0126
1.20	0.0132
1.30	0.0137
1.40	0.0143
1.50	0.0148
1.60	0.0153
1.70	0.0158
1.80	0.0163
1.90	0.0167
2.00	0.0172
2.10	0.0176
2.20	0.0180
2.30	0.0498
2.40	0.1169
2.50	0.2969
2.60	0.5221
2.70	0.7081

J.H. COHOON ENGINEERING LIMITED
SWMM HYDROLOGIC MODEL PARAMETERS
POST-DEVELOPMENT CATCHMENTS

PROJECT: Laplante Rd
PROJECT #: 16933
DATE: November 2024

INPUT PARAMETERS

Catchment ID:	**201**	**202**	**203**	**204**
Catchment Area (ha):	0.161	2.386	1.113	0.300
Max. Catchment Elevation (m)	231.13	232.80	231.80	230.30
Min. Catchment Elevation (m)	229.95	229.60	228.25	228.10
Catchment Length (m)	29.0	181.0	86.0	67.0
Catchment Width (m)	55.52	131.82	129.42	44.78
Slope (%)	4.07%	1.77%	4.13%	3.28%
Impervious %:	0.0%	45.0%	45.0%	45.0%
Roughness Coefficient (Imp.)	0.013	0.013	0.013	0.013
Roughness Coefficient (Perv.)	0.200	0.200	0.200	0.200
Imp. Depression Storage (mm)	2	2	2	2
Perv. Depression Storage (mm)	5	5	5	5
% Zero Imp. Depression Storage	0%	0%	0%	0%
Subarea Routing	OUTLET	OUTLET	OUTLET	OUTLET
Percent Routed	100%	100%	100%	100%
Green-Ampt: Soil Texture	Sandy Loam	Sandy Loam	Sandy Loam	Sandy Loam
Green-Ampt: Suction Head (mm)	109.982	109.982	109.982	109.982
Green-Ampt: Conductivity (mm/hr)	10.922	10.922	10.922	10.922
Green-Ampt: Initial Deficit	0.33	0.33	0.33	0.33

DATA SOURCES: Detailed Soil Survey Reports for Ontario, MTO Drainage Management Manual (1997), United States Department of Agriculture Technical Release 55: Urban Hydrology for Small Watersheds (1986), Storm Water Management Model Reference Manual Volume I - Hydrology (Revised) (2016).

POST-DEVELOPMENT - 2 YEAR STORM
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 4
Number of nodes 3
Number of links 2
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
NorfolkRain	2-year	INTENSITY	10 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
201	0.16	55.52	0.00	4.0700	NorfolkRain	Out
202	2.39	131.82	45.00	1.7700	NorfolkRain	Pond
203	1.11	129.45	45.00	4.1300	NorfolkRain	Out
204	0.30	44.78	45.00	3.2800	NorfolkRain	Out

****
LID Control Summary
****

Subcatchment	LID Control	No. of Units	Unit Area	Unit Width	% Area Covered	% Imperv Treated	% Perv Treated
203	Drywell	3	24.00	16.00	0.65	100.00	100.00

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
DUMMY1	JUNCTION	227.80	1.00	0.0	
Out	OUTFALL	227.76	1.00	0.0	
Pond	STORAGE	227.80	0.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
DUMMY2	DUMMY1	Out	CONDUIT	400.0	0.0100	0.0130
PondOut	Pond	Out	OUTLET			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
DUMMY2	CIRCULAR	1.00	0.79	0.25	1.00	1	0.24

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.

```
****************************************************

***************
Analysis Options
***************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... KINWAVE
Starting Date ............ 11/07/2023 00:00:00
Ending Date .............. 11/07/2023 06:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:02:30
Wet Time Step ............ 00:01:00
Dry Time Step ............ 01:00:00
Routing Time Step ........ 30.00 sec


*********************
Control Actions Taken
*********************


*************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
*************************     ---------       -------
Total Precipitation ......         0.127        32.118
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.027         6.914
Surface Runoff ...........         0.096        24.195
Final Storage ............         0.004         1.023
Continuity Error (%) .....        -0.042


*************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
*************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.096         0.958
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         0.035         0.346
Flooding Loss ............         0.061         0.612
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.000


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :    30.00 sec
Average Time Step           :    30.00 sec
Maximum Time Step           :    30.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.00
Percent Not Converging      :     0.00


**************************
Subcatchment Runoff Summary
**************************
```

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
201	32.12	0.00	0.00	20.21	0.00	11.92	11.92	0.02	0.01	0.371
202	32.12	0.00	0.00	6.44	14.43	11.22	25.66	0.61	0.31	0.799
203	32.12	0.00	0.00	6.49	14.35	12.41	22.07	0.25	0.19	0.687
204	32.12	0.00	0.00	5.08	14.45	12.59	27.04	0.08	0.05	0.842

****
LID Performance Summary
****

Subcatchment	LID Control	Total Inflow mm	Evap Loss mm	Infil Loss mm	Surface Outflow mm	Drain Outflow mm	Initial Storage mm	Final Storage mm	Continuity Error %
203	Drywell	4170.16	0.00	209.23	3411.38	0.00	0.00	550.16	-0.01

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
DUMMY1	JUNCTION	0.00	0.00	227.80	0 00:00	0.00
Out	OUTFALL	0.00	0.00	227.76	0 00:00	0.00
Pond	STORAGE	0.00	0.00	227.80	0 00:00	0.00

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
DUMMY1	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
Out	OUTFALL	0.252	0.252	0 01:20	0.346	0.346	0.000
Pond	STORAGE	0.314	0.314	0 01:20	0.612	0.612	0.000

****
Node Flooding Summary
****

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Volume 1000 m3
Pond	5.83	0.311	0 01:20	0.612	0.000

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
Pond	0.000	0	0	0	0.000	0	0 00:00	0.000

****
Outfall Loading Summary

****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Out	58.61	0.027	0.252	0.346
System	58.61	0.027	0.252	0.346

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
DUMMY2	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
PondOut	DUMMY	0.000	0 00:00			

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Tue Nov 19 15:38:41 2024
Analysis ended on: Tue Nov 19 15:38:41 2024
Total elapsed time: < 1 sec

POST-DEVELOPMENT - 5 YEAR STORM
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 4
Number of nodes 3
Number of links 2
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
NorfolkRain	5-year	INTENSITY	10 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
201	0.16	55.52	0.00	4.0700	NorfolkRain	Out
202	2.39	131.82	45.00	1.7700	NorfolkRain	Pond
203	1.11	129.45	45.00	4.1300	NorfolkRain	Out
204	0.30	44.78	45.00	3.2800	NorfolkRain	Out

****
LID Control Summary
****

Subcatchment	LID Control	No. of Units	Unit Area	Unit Width	% Area Covered	% Imperv Treated	% Perv Treated
203	Drywell	3	24.00	16.00	0.65	100.00	100.00

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
DUMMY1	JUNCTION	227.80	1.00	0.0	
Out	OUTFALL	227.76	1.00	0.0	
Pond	STORAGE	227.80	0.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
DUMMY2	DUMMY1	Out	CONDUIT	400.0	0.0100	0.0130
PondOut	Pond	Out	OUTLET			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
DUMMY2	CIRCULAR	1.00	0.79	0.25	1.00	1	0.24

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.

```
************************************************************

***************
Analysis Options
***************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... KINWAVE
Starting Date ............ 11/07/2023 00:00:00
Ending Date .............. 11/07/2023 06:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:02:30
Wet Time Step ............ 00:01:00
Dry Time Step ............ 01:00:00
Routing Time Step ........ 30.00 sec


**********************
Control Actions Taken
**********************


*************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
*************************     ---------       -------
Total Precipitation ......         0.176        44.348
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.030         7.509
Surface Runoff ...........         0.142        35.828
Final Storage ............         0.004         1.030
Continuity Error (%) .....        -0.044


*************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
*************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.142         1.419
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         0.053         0.530
Flooding Loss ............         0.089         0.888
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.000


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :    30.00 sec
Average Time Step           :    30.00 sec
Maximum Time Step           :    30.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.00
Percent Not Converging      :     0.00


**************************
Subcatchment Runoff Summary
**************************
```

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
201	44.35	0.00	0.00	21.39	0.00	22.98	22.98	0.04	0.02	0.518
202	44.35	0.00	0.00	7.10	19.94	17.30	37.24	0.89	0.45	0.840
203	44.35	0.00	0.00	6.93	19.83	18.67	33.85	0.38	0.26	0.763
204	44.35	0.00	0.00	5.49	19.96	18.91	38.87	0.12	0.07	0.876

****
LID Performance Summary
****

Subcatchment	LID Control	Total Inflow mm	Evap Loss mm	Infil Loss mm	Surface Outflow mm	Drain Outflow mm	Initial Storage mm	Final Storage mm	Continuity Error %
203	Drywell	5995.37	0.00	209.63	5232.33	0.00	0.00	554.01	-0.01

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
DUMMY1	JUNCTION	0.00	0.00	227.80	0 00:00	0.00
Out	OUTFALL	0.00	0.00	227.76	0 00:00	0.00
Pond	STORAGE	0.00	0.00	227.80	0 00:00	0.00

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
DUMMY1	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
Out	OUTFALL	0.357	0.357	0 01:20	0.53	0.53	0.000
Pond	STORAGE	0.448	0.448	0 01:20	0.888	0.888	0.000

****
Node Flooding Summary
****

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Volume 1000 m3
Pond	5.83	0.445	0 01:20	0.888	0.000

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
Pond	0.000	0	0	0	0.000	0	0 00:00	0.000

****
Outfall Loading Summary

****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Out	60.56	0.041	0.357	0.530
System	60.56	0.041	0.357	0.530

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
DUMMY2	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
PondOut	DUMMY	0.000	0	00:00			

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Tue Nov 19 15:39:12 2024
Analysis ended on: Tue Nov 19 15:39:12 2024
Total elapsed time: < 1 sec

POST-DEVELOPMENT - 10 YEAR STORM
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 4
Number of nodes 3
Number of links 2
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
NorfolkRain	10-year	INTENSITY	10 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
201	0.16	55.52	0.00	4.0700	NorfolkRain	Out
202	2.39	131.82	45.00	1.7700	NorfolkRain	Pond
203	1.11	129.45	45.00	4.1300	NorfolkRain	Out
204	0.30	44.78	45.00	3.2800	NorfolkRain	Out

****
LID Control Summary
****

Subcatchment	LID Control	No. of Units	Unit Area	Unit Width	% Area Covered	% Imperv Treated	% Perv Treated
203	Drywell	3	24.00	16.00	0.65	100.00	100.00

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
DUMMY1	JUNCTION	227.80	1.00	0.0	
Out	OUTFALL	227.76	1.00	0.0	
Pond	STORAGE	227.80	0.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
DUMMY2	DUMMY1	Out	CONDUIT	400.0	0.0100	0.0130
PondOut	Pond	Out	OUTLET			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
DUMMY2	CIRCULAR	1.00	0.79	0.25	1.00	1	0.24

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.

```
***************************************************

***************
Analysis Options
***************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... KINWAVE
Starting Date ............ 11/07/2023 00:00:00
Ending Date .............. 11/07/2023 06:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:02:30
Wet Time Step ............ 00:01:00
Dry Time Step ............ 01:00:00
Routing Time Step ........ 30.00 sec


*********************
Control Actions Taken
*********************


*************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
*************************     ---------       -------
Total Precipitation ......         0.207        52.345
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.031         7.792
Surface Runoff ...........         0.172        43.544
Final Storage ............         0.004         1.033
Continuity Error (%) .....        -0.045


*************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
*************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.172         1.724
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         0.065         0.653
Flooding Loss ............         0.107         1.072
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.000


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :    30.00 sec
Average Time Step           :    30.00 sec
Maximum Time Step           :    30.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.00
Percent Not Converging      :     0.00


**************************
Subcatchment Runoff Summary
**************************
```

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
201	52.35	0.00	0.00	21.85	0.00	30.52	30.52	0.05	0.03	0.583
202	52.35	0.00	0.00	7.42	23.54	21.38	44.92	1.07	0.54	0.858
203	52.34	0.00	0.00	7.13	23.41	22.84	41.64	0.46	0.31	0.795
204	52.34	0.00	0.00	5.68	23.56	23.11	46.68	0.14	0.09	0.892

****
LID Performance Summary
****

Subcatchment	LID Control	Total Inflow mm	Evap Loss mm	Infil Loss mm	Surface Outflow mm	Drain Outflow mm	Initial Storage mm	Final Storage mm	Continuity Error %
203	Drywell	7201.32	0.00	209.73	6436.63	0.00	0.00	555.56	-0.01

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
DUMMY1	JUNCTION	0.00	0.00	227.80	0 00:00	0.00
Out	OUTFALL	0.00	0.00	227.76	0 00:00	0.00
Pond	STORAGE	0.00	0.00	227.80	0 00:00	0.00

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
DUMMY1	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
Out	OUTFALL	0.428	0.428	0 01:20	0.653	0.653	0.000
Pond	STORAGE	0.540	0.540	0 01:20	1.07	1.07	0.000

****
Node Flooding Summary
****

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Volume 1000 m3
Pond	5.83	0.535	0 01:20	1.072	0.000

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
Pond	0.000	0	0	0	0.000	0	0 00:00	0.000

****
Outfall Loading Summary

****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Out	61.39	0.049	0.428	0.653
System	61.39	0.049	0.428	0.653

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
DUMMY2	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
PondOut	DUMMY	0.000	0	00:00			

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Tue Nov 19 15:39:22 2024
Analysis ended on: Tue Nov 19 15:39:22 2024
Total elapsed time: < 1 sec

POST-DEVELOPMENT - 25 YEAR STORM
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 4
Number of nodes 3
Number of links 2
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
NorfolkRain	25-year	INTENSITY	10 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
201	0.16	55.52	0.00	4.0700	NorfolkRain	Out
202	2.39	131.82	45.00	1.7700	NorfolkRain	Pond
203	1.11	129.45	45.00	4.1300	NorfolkRain	Out
204	0.30	44.78	45.00	3.2800	NorfolkRain	Out

****
LID Control Summary
****

Subcatchment	LID Control	No. of Units	Unit Area	Unit Width	% Area Covered	% Imperv Treated	% Perv Treated
203	Drywell	3	24.00	16.00	0.65	100.00	100.00

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
DUMMY1	JUNCTION	227.80	1.00	0.0	
Out	OUTFALL	227.76	1.00	0.0	
Pond	STORAGE	227.80	0.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
DUMMY2	DUMMY1	Out	CONDUIT	400.0	0.0100	0.0130
PondOut	Pond	Out	OUTLET			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
DUMMY2	CIRCULAR	1.00	0.79	0.25	1.00	1	0.24

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.

```
****************************************************

***************
Analysis Options
***************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... KINWAVE
Starting Date ............ 11/07/2023 00:00:00
Ending Date .............. 11/07/2023 06:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:02:30
Wet Time Step ............ 00:01:00
Dry Time Step ............ 01:00:00
Routing Time Step ........ 30.00 sec


*********************
Control Actions Taken
*********************


*************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
*************************     ---------       -------
Total Precipitation ......         0.247        62.445
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.032         8.109
Surface Runoff ...........         0.211        53.328
Final Storage ............         0.004         1.037
Continuity Error (%) .....        -0.047


*************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
*************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.211         2.112
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         0.081         0.808
Flooding Loss ............         0.130         1.304
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.000


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :    30.00 sec
Average Time Step           :    30.00 sec
Maximum Time Step           :    30.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.00
Percent Not Converging      :     0.00


**************************
Subcatchment Runoff Summary
**************************
```

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
201	62.44	0.00	0.00	22.31	0.00	40.16	40.16	0.06	0.04	0.643
202	62.45	0.00	0.00	7.78	28.09	26.57	54.66	1.30	0.66	0.875
203	62.44	0.00	0.00	7.36	27.93	28.13	51.51	0.57	0.37	0.825
204	62.45	0.00	0.00	5.90	28.11	28.45	56.57	0.17	0.10	0.906

****
LID Performance Summary
****

Subcatchment	LID Control	Total Inflow mm	Evap Loss mm	Infil Loss mm	Surface Outflow mm	Drain Outflow mm	Initial Storage mm	Final Storage mm	Continuity Error %
203	Drywell	8728.55	0.00	209.92	7961.90	0.00	0.00	557.33	-0.01

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
DUMMY1	JUNCTION	0.00	0.00	227.80	0 00:00	0.00
Out	OUTFALL	0.00	0.00	227.76	0 00:00	0.00
Pond	STORAGE	0.00	0.00	227.80	0 00:00	0.00

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
DUMMY1	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
Out	OUTFALL	0.517	0.517	0 01:20	0.808	0.808	0.000
Pond	STORAGE	0.656	0.656	0 01:20	1.3	1.3	0.000

****
Node Flooding Summary
****

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Volume 1000 m3
Pond	5.83	0.651	0 01:20	1.304	0.000

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
Pond	0.000	0	0	0	0.000	0	0 00:00	0.000

****
Outfall Loading Summary

****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Out	62.22	0.060	0.517	0.808
System	62.22	0.060	0.517	0.808

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days	hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
DUMMY2	CONDUIT	0.000	0	00:00	0.00	0.00	0.00
PondOut	DUMMY	0.000	0	00:00			

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Tue Nov 19 15:40:59 2024
Analysis ended on: Tue Nov 19 15:40:59 2024
Total elapsed time: < 1 sec

POST-DEVELOPMENT - 50 YEAR STORM
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 4
Number of nodes 3
Number of links 2
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
NorfolkRain	50-year	INTENSITY	10 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
201	0.16	55.52	0.00	4.0700	NorfolkRain	Out
202	2.39	131.82	45.00	1.7700	NorfolkRain	Pond
203	1.11	129.45	45.00	4.1300	NorfolkRain	Out
204	0.30	44.78	45.00	3.2800	NorfolkRain	Out

****
LID Control Summary
****

Subcatchment	LID Control	No. of Units	Unit Area	Unit Width	% Area Covered	% Imperv Treated	% Perv Treated
203	Drywell	3	24.00	16.00	0.65	100.00	100.00

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
DUMMY1	JUNCTION	227.80	1.00	0.0	
Out	OUTFALL	227.76	1.00	0.0	
Pond	STORAGE	227.80	0.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
DUMMY2	DUMMY1	Out	CONDUIT	400.0	0.0100	0.0130
PondOut	Pond	Out	OUTLET			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
DUMMY2	CIRCULAR	1.00	0.79	0.25	1.00	1	0.24

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.

```
****************************************************

***************
Analysis Options
***************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... KINWAVE
Starting Date ............ 11/07/2023 00:00:00
Ending Date .............. 11/07/2023 06:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:02:30
Wet Time Step ............ 00:01:00
Dry Time Step ............ 01:00:00
Routing Time Step ........ 30.00 sec


*********************
Control Actions Taken
*********************


*************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
*************************     ---------       -------
Total Precipitation ......         0.279        70.328
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.033         8.324
Surface Runoff ...........         0.242        60.999
Final Storage ............         0.004         1.039
Continuity Error (%) .....        -0.047


*************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
*************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.242         2.416
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         0.093         0.929
Flooding Loss ............         0.149         1.486
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.000


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :    30.00 sec
Average Time Step           :    30.00 sec
Maximum Time Step           :    30.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.00
Percent Not Converging      :     0.00


**************************
Subcatchment Runoff Summary
**************************
```

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
201	70.33	0.00	0.00	22.58	0.00	47.77	47.77	0.08	0.05	0.679
202	70.33	0.00	0.00	8.03	31.64	30.66	62.30	1.49	0.75	0.886
203	70.33	0.00	0.00	7.51	31.46	32.29	59.23	0.66	0.42	0.842
204	70.33	0.00	0.00	6.05	31.67	32.64	64.31	0.19	0.11	0.914

****
LID Performance Summary
****

Subcatchment	LID Control	Total Inflow mm	Evap Loss mm	Infil Loss mm	Surface Outflow mm	Drain Outflow mm	Initial Storage mm	Final Storage mm	Continuity Error %
203	Drywell	9924.25	0.00	210.00	9156.40	0.00	0.00	558.45	-0.01

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
DUMMY1	JUNCTION	0.00	0.00	227.80	0 00:00	0.00
Out	OUTFALL	0.00	0.00	227.76	0 00:00	0.00
Pond	STORAGE	0.00	0.00	227.80	0 00:00	0.00

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
DUMMY1	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
Out	OUTFALL	0.583	0.583	0 01:20	0.929	0.929	0.000
Pond	STORAGE	0.746	0.746	0 01:20	1.49	1.49	0.000

****
Node Flooding Summary
****

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Volume 1000 m3
Pond	5.83	0.740	0 01:20	1.486	0.000

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
Pond	0.000	0	0	0	0.000	0	0 00:00	0.000

****
Outfall Loading Summary

****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Out	62.78	0.069	0.583	0.929
System	62.78	0.069	0.583	0.929

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
DUMMY2	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
PondOut	DUMMY	0.000	0 00:00			

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Tue Nov 19 15:41:10 2024
Analysis ended on: Tue Nov 19 15:41:10 2024
Total elapsed time: < 1 sec

POST-DEVELOPMENT - 100 YEAR STORM
EPA STORM WATER MANAGEMENT MODEL - VERSION 5.1 (Build 5.1.013)

****
Element Count
****
Number of rain gages 1
Number of subcatchments ... 4
Number of nodes 3
Number of links 2
Number of pollutants 0
Number of land uses 0

****
Raingage Summary
****

Name	Data Source	Data Type	Recording Interval
NorfolkRain	100-year	INTENSITY	10 min.

****
Subcatchment Summary
****

Name	Area	Width	%Imperv	%Slope	Rain Gage	Outlet
201	0.16	55.52	0.00	4.0700	NorfolkRain	Out
202	2.39	131.82	45.00	1.7700	NorfolkRain	Pond
203	1.11	129.45	45.00	4.1300	NorfolkRain	Out
204	0.30	44.78	45.00	3.2800	NorfolkRain	Out

****
LID Control Summary
****

Subcatchment	LID Control	No. of Units	Unit Area	Unit Width	% Area Covered	% Imperv Treated	% Perv Treated
203	Drywell	3	24.00	16.00	0.65	100.00	100.00

****
Node Summary
****

Name	Type	Invert Elev.	Max. Depth	Ponded Area	External Inflow
DUMMY1	JUNCTION	227.80	1.00	0.0	
Out	OUTFALL	227.76	1.00	0.0	
Pond	STORAGE	227.80	0.00	0.0	

****
Link Summary
****

Name	From Node	To Node	Type	Length	%Slope	Roughness
DUMMY2	DUMMY1	Out	CONDUIT	400.0	0.0100	0.0130
PondOut	Pond	Out	OUTLET			

****
Cross Section Summary
****

Conduit	Shape	Full Depth	Full Area	Hyd. Rad.	Max. Width	No. of Barrels	Full Flow
DUMMY2	CIRCULAR	1.00	0.79	0.25	1.00	1	0.24

****
NOTE: The summary statistics displayed in this report are
based on results found at every computational time step,
not just on results from each reporting time step.

```
***************************************************

***************
Analysis Options
***************
Flow Units ............... CMS
Process Models:
  Rainfall/Runoff ........ YES
  RDII ................... NO
  Snowmelt ............... NO
  Groundwater ............ NO
  Flow Routing ........... YES
  Ponding Allowed ........ NO
  Water Quality .......... NO
Infiltration Method ...... GREEN_AMPT
Flow Routing Method ...... KINWAVE
Starting Date ............ 11/07/2023 00:00:00
Ending Date .............. 11/07/2023 06:00:00
Antecedent Dry Days ...... 0.0
Report Time Step ......... 00:02:30
Wet Time Step ............ 00:01:00
Dry Time Step ............ 01:00:00
Routing Time Step ........ 30.00 sec


*********************
Control Actions Taken
*********************


*************************        Volume         Depth
Runoff Quantity Continuity     hectare-m            mm
*************************     ---------       -------
Total Precipitation ......         0.309        78.032
Evaporation Loss .........         0.000         0.000
Infiltration Loss ........         0.034         8.513
Surface Runoff ...........         0.271        68.515
Final Storage ............         0.004         1.040
Continuity Error (%) .....        -0.048


*************************        Volume        Volume
Flow Routing Continuity        hectare-m      10^6 ltr
*************************     ---------     ---------
Dry Weather Inflow .......         0.000         0.000
Wet Weather Inflow .......         0.271         2.713
Groundwater Inflow .......         0.000         0.000
RDII Inflow ..............         0.000         0.000
External Inflow ..........         0.000         0.000
External Outflow .........         0.105         1.048
Flooding Loss ............         0.167         1.665
Evaporation Loss .........         0.000         0.000
Exfiltration Loss ........         0.000         0.000
Initial Stored Volume ....         0.000         0.000
Final Stored Volume ......         0.000         0.000
Continuity Error (%) .....         0.000


*******************************
Highest Flow Instability Indexes
*******************************
All links are stable.


************************
Routing Time Step Summary
************************
Minimum Time Step           :    30.00 sec
Average Time Step           :    30.00 sec
Maximum Time Step           :    30.00 sec
Percent in Steady State     :     0.00
Average Iterations per Step :     1.00
Percent Not Converging      :     0.00


**************************
Subcatchment Runoff Summary
**************************
```

Subcatchment	Total Precip mm	Total Runon mm	Total Evap mm	Total Infil mm	Imperv Runoff mm	Perv Runoff mm	Total Runoff mm	Total Runoff 10^6 ltr	Peak Runoff CMS	Runoff Coeff
201	78.03	0.00	0.00	22.79	0.00	55.27	55.27	0.09	0.06	0.708
202	78.03	0.00	0.00	8.25	35.11	34.68	69.79	1.67	0.83	0.894
203	78.03	0.00	0.00	7.65	34.91	36.36	66.80	0.74	0.46	0.856
204	78.03	0.00	0.00	6.18	35.14	36.75	71.89	0.22	0.13	0.921

****
LID Performance Summary
****

Subcatchment	LID Control	Total Inflow mm	Evap Loss mm	Infil Loss mm	Surface Outflow mm	Drain Outflow mm	Initial Storage mm	Final Storage mm	Continuity Error %
203	Drywell	11094.76	0.00	210.00	10325.96	0.00	0.00	559.39	-0.01

****
Node Depth Summary
****

Node	Type	Average Depth Meters	Maximum Depth Meters	Maximum HGL Meters	Time of Max Occurrence days hr:min	Reported Max Depth Meters
DUMMY1	JUNCTION	0.00	0.00	227.80	0 00:00	0.00
Out	OUTFALL	0.00	0.00	227.76	0 00:00	0.00
Pond	STORAGE	0.00	0.00	227.80	0 00:00	0.00

****
Node Inflow Summary
****

Node	Type	Maximum Lateral Inflow CMS	Maximum Total Inflow CMS	Time of Max Occurrence days hr:min	Lateral Inflow Volume 10^6 ltr	Total Inflow Volume 10^6 ltr	Flow Balance Error Percent
DUMMY1	JUNCTION	0.000	0.000	0 00:00	0	0	0.000 ltr
Out	OUTFALL	0.647	0.647	0 01:20	1.05	1.05	0.000
Pond	STORAGE	0.833	0.833	0 01:20	1.67	1.67	0.000

****
Node Flooding Summary
****

Flooding refers to all water that overflows a node, whether it ponds or not.

Node	Hours Flooded	Maximum Rate CMS	Time of Max Occurrence days hr:min	Total Flood Volume 10^6 ltr	Maximum Ponded Volume 1000 m3
Pond	5.83	0.827	0 01:20	1.665	0.000

****
Storage Volume Summary
****

Storage Unit	Average Volume 1000 m3	Avg Pcnt Full	Evap Pcnt Loss	Exfil Pcnt Loss	Maximum Volume 1000 m3	Max Pcnt Full	Time of Max Occurrence days hr:min	Maximum Outflow CMS
Pond	0.000	0	0	0	0.000	0	0 00:00	0.000

****
Outfall Loading Summary

****

Outfall Node	Flow Freq Pcnt	Avg Flow CMS	Max Flow CMS	Total Volume 10^6 ltr
Out	63.19	0.077	0.647	1.048
System	63.19	0.077	0.647	1.048

****
Link Flow Summary
****

Link	Type	Maximum |Flow| CMS	Time of Max Occurrence days hr:min	Maximum |Veloc| m/sec	Max/ Full Flow	Max/ Full Depth
DUMMY2	CONDUIT	0.000	0 00:00	0.00	0.00	0.00
PondOut	DUMMY	0.000	0 00:00			

****
Conduit Surcharge Summary
****

No conduits were surcharged.

Analysis begun on: Tue Nov 19 15:41:29 2024
Analysis ended on: Tue Nov 19 15:41:29 2024
Total elapsed time: < 1 sec

APPENDIX C: WATER QUALITY CONTROL CALCULATIONS

J.H. COHOON ENGINEERING LIMITED
CONSULTING ENGINEERS
440 Hardy Road, Unit #1, Brantford, ON N3T 5L8
Tel: (519) 753-2656 Fax: (519) 753-4263
www.cohooneng.com

WATER QUALITY REQUIREMENTS
DRY POND

PROJECT: Laplante Rd
PROJECT #: 16933
DATE: November 2024

TABLE 3.2, MINISTRY OF ENVIRONMENT SWM PLANNING AND DESIGN MANUAL (MARCH 2003)

PROTECTION LEVEL	SWM TYPE	% IMPERVIOUS			
		35	55	70	85
60	Dry Pond	90	150	200	240

CONTRIBUTING CATCHMENTS

Catchment ID	Area (ha)	% Impervious
202	2.386	45.00
Total	2.386	45.00

TREATMENT METHOD DETAILS

SWM Facility Type	Dry Pond
Target Treatment Level	Basic Level
Treatment Percentage	60%

TREATMENT REQUIREMENTS

Water Quality Storage Requirement	120.00	m^3/ha
Water Quality Volume	286.32	m^3
Extended Detention Volume (40 m3/ha)	95.44	m^3
25 mm Storm Runoff Volume	596.5	m^3
Required Extended Detention Volume	596.5	m^3

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND OVERHEAD UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE COMMENCING WORK, THE CONTRACTOR SHALL FAMILIARIZE HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

LEGEND:

- EXISTING ELEVATIONS
- 200.00 PROPOSED ELEVATIONS
- 200.00 PROPOSED SWALE ELEVATIONS
- 200.00 PROPOSED DITCH ELEVATIONS
- PROPOSED SWALE
- GENERAL DRAINAGE
- EXISTING CONIFEROUS TREES
- EXISTING DECIDUOUS TREES
- EXISTING TREES TO BE REMOVED

NOTES:

1. ALL ELEVATIONS SHOWN ARE METRIC.
2. BUILDER/OWNER TO VERIFY COMPLIANCE WITH ZONING BYLAWS (ie. SIDEYARDS, SETBACKS, REARYARDS ETC.)

T.B.M. No. 1 ELEV. = 229.15m (GEO)
NAIL IN HYDRO POLE ON THE EAST SIDE OF LAPLANTE ROAD AS SHOWN.

NO.	REVISION	DATE (MM/DD/YY)	BY
1	SWM POND OUTLET AND OVERLAND FLOW	02/24/25	K.P.B.

J.H. COHOON ENGINEERING LIMITED
CONSULTING ENGINEERS
440 HARDY ROAD , UNIT #1 , BRANTFORD — ONTARIO , N3T 5L8
TEL. (519) 753-2656 FAX. (519) 753-4263 www.cohooneng.com

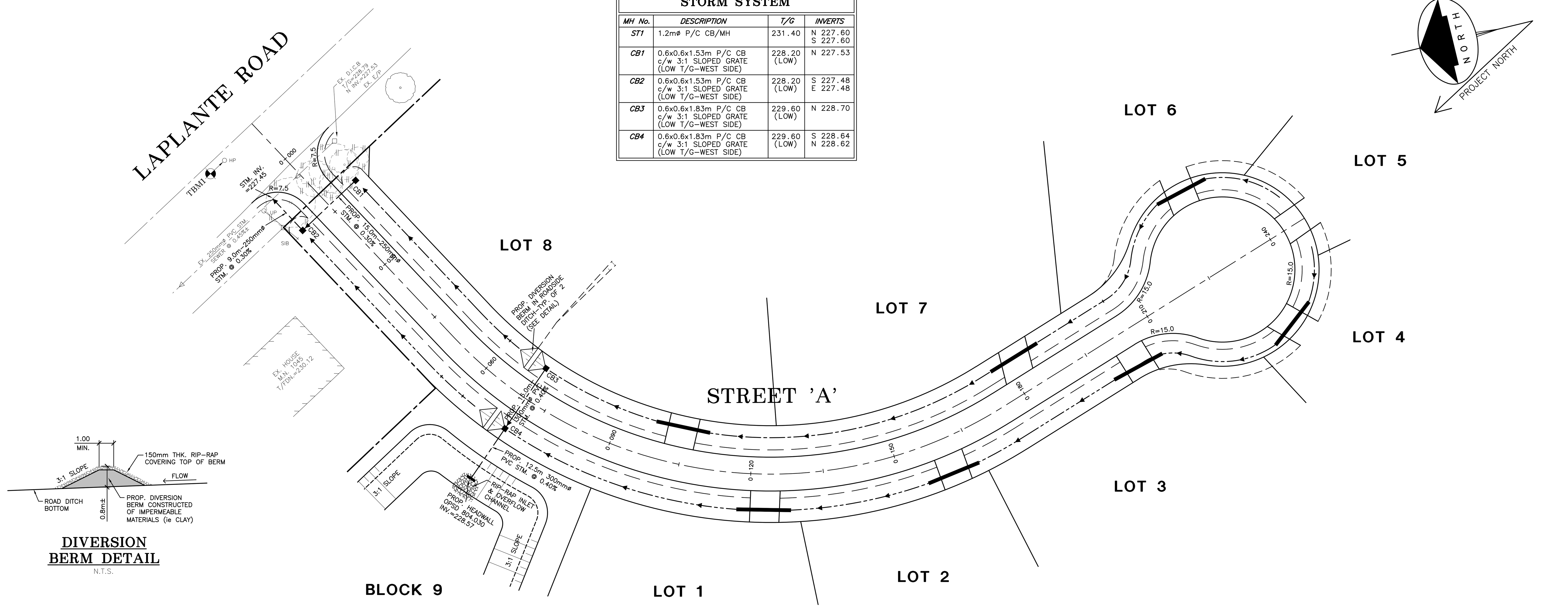
PROJECT:

PROPOSED RESIDENTIAL SUBDIVISION
1045 LAPLANTE ROAD, TILLSONBURG
NORFOLK COUNTY

CLIENT: JOSE OLIVEIRA

GRADING PLAN

DESIGN:	R.W.P.	SCALE:	1:500
DRAWN:	K.P.B.	JOB No:	16933
CHECKED:	R.W.P.		
SHEET:	1 of 6	DWG. No:	16933–1
DATE:	NOV. 13/24		

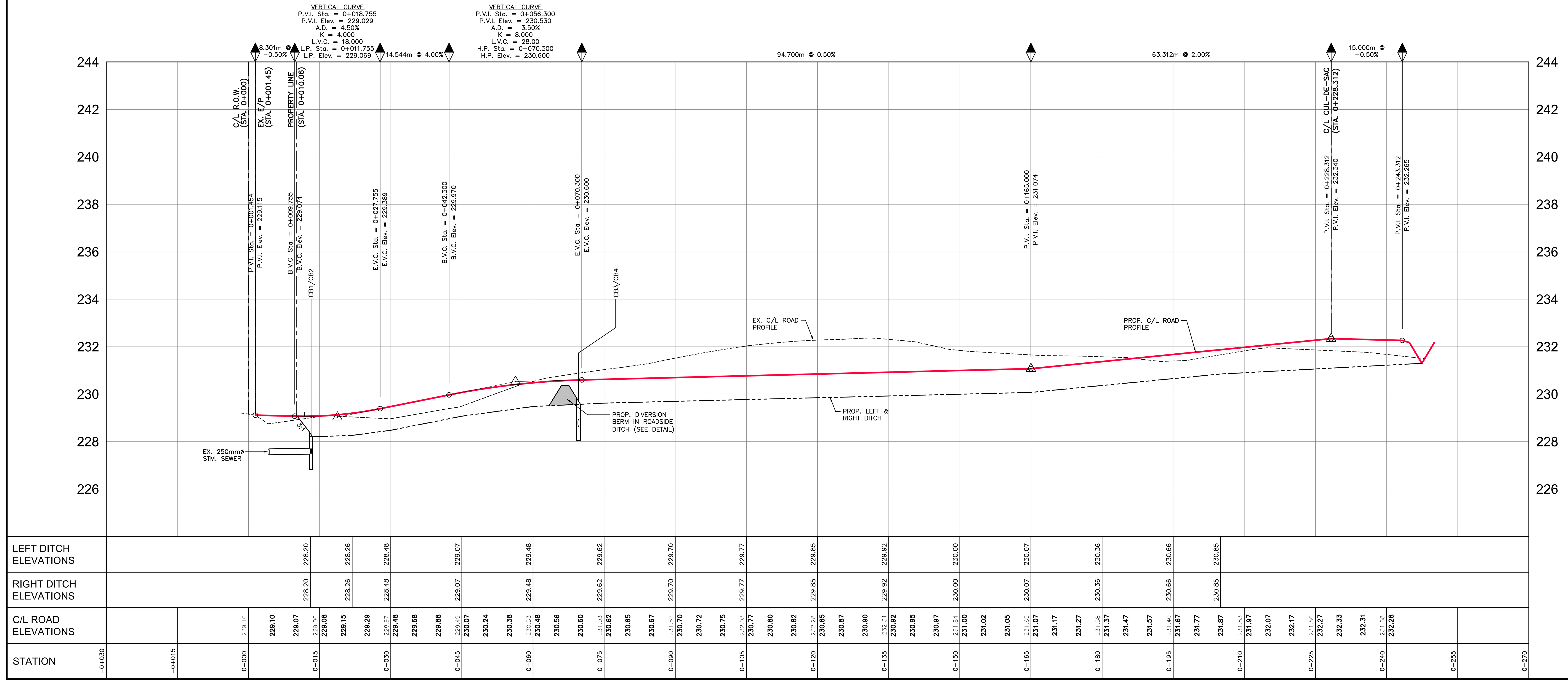


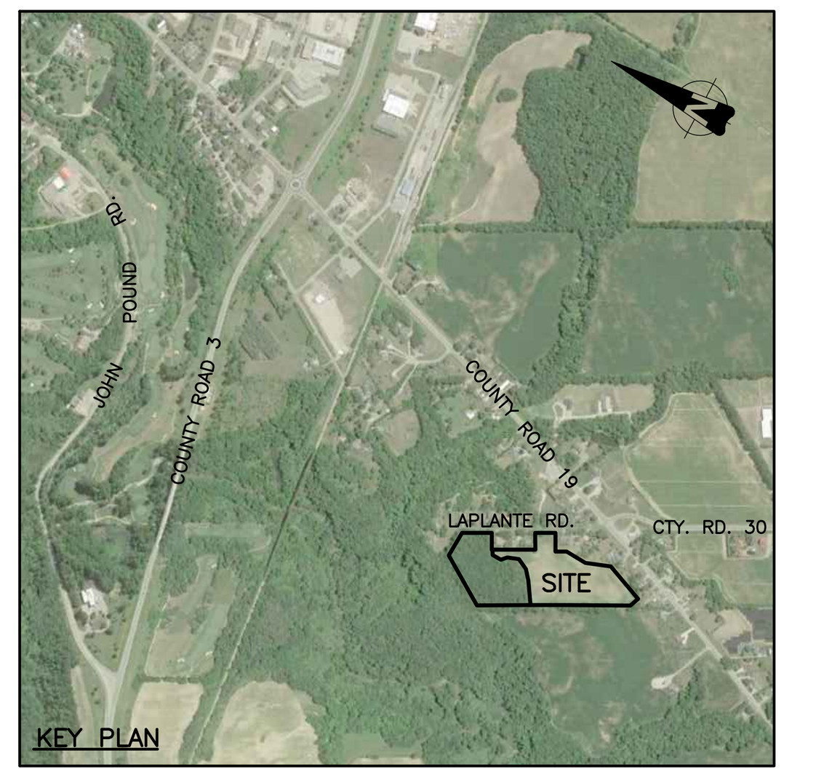
STORM SYSTEM

MH No.	DESCRIPTION	T/G	INVERTS
ST1	1.2mø P/C CB/MH	231.40	N 227.60 S 227.60
CB1	0.6x0.6x1.53m P/C CB c/w 3:1 SLOPED GRATE (LOW T/G–WEST SIDE)	228.20 (LOW)	N 227.53
CB2	0.6x0.6x1.53m P/C CB c/w 3:1 SLOPED GRATE (LOW T/G–WEST SIDE)	228.20 (LOW)	S 227.48 E 227.48
CB3	0.6x0.6x1.83m P/C CB c/w 3:1 SLOPED GRATE (LOW T/G–WEST SIDE)	229.60 (LOW)	N 228.70
CB4	0.6x0.6x1.83m P/C CB c/w 3:1 SLOPED GRATE (LOW T/G–WEST SIDE)	229.60 (LOW)	S 228.64 N 228.62

DIVERSION BERM DETAIL

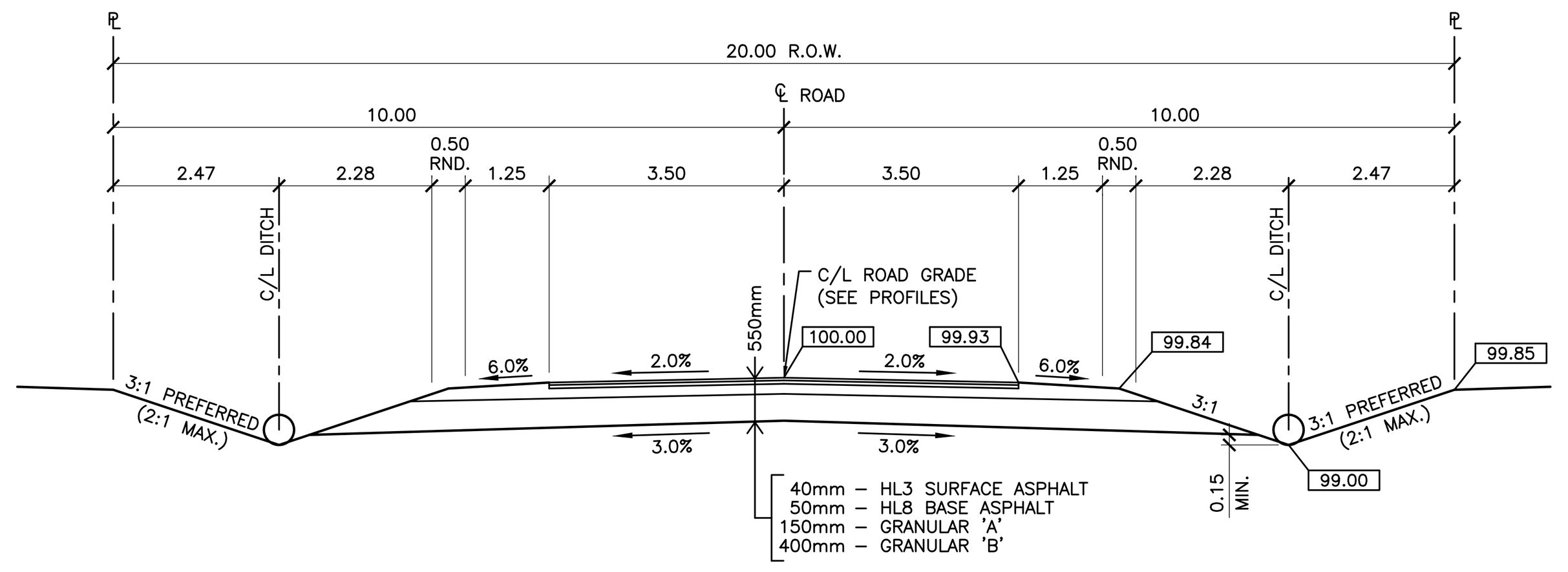
N.T.S.





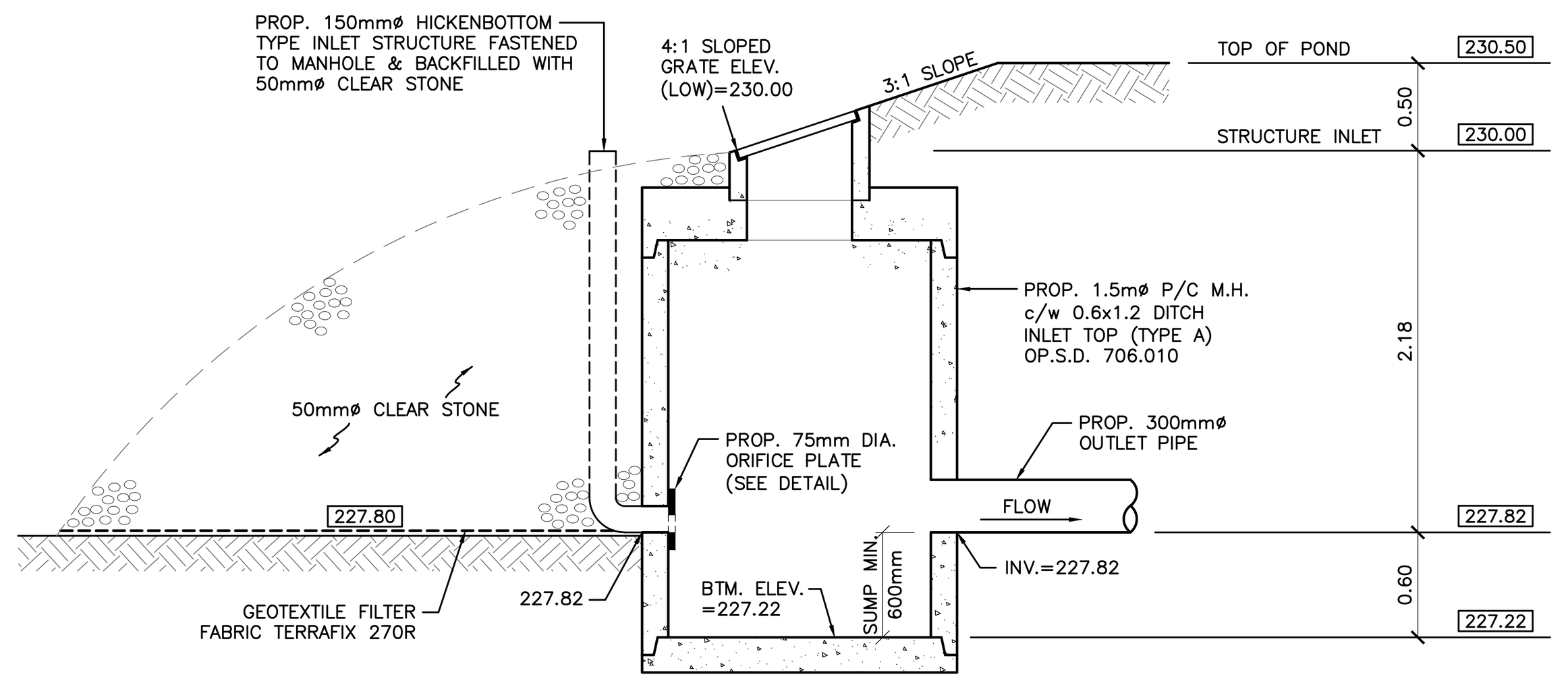
GENERAL NOTES:

1. ROADWAYS & RELATED WORKS SHALL BE DESIGNED AND CONSTRUCTED SO AS TO COMPLY WITH APPLICABLE LAW, TO BE CONSISTENT WITH NORFOLK COUNTY DEVELOPMENT AND ENGINEERING STANDARDS AND IN ACCORDANCE WITH CURRENT GUIDELINES, CODES, REGULATIONS, BEST PRACTICES AND STANDARDS PRESCRIBED BY THE COUNTY.
2. CONSTRUCTION OF SEWERS, AND RELATED APPURTENANCES SHALL BE UNDERTAKEN IN ACCORDANCE WITH THE CURRENT STANDARD DRAWINGS OF NORFOLK COUNTY, AND THE ONTARIO PROVINCIAL STANDARDS DRAWINGS (OPSD). NORFOLK COUNTY DRAWINGS SHALL TAKE PRECEDENCE OVER THE OPSD DRAWINGS.
3. INFORMATION REGARDING ANY EXISTING SERVICES AND/OR UTILITIES SHOWN ON THE APPROVED SET OF CONSTRUCTION DRAWINGS IS FURNISHED AS THE BEST AVAILABLE INFORMATION. THE CONTRACTOR SHALL INTERPRET THIS INFORMATION AS THEY SEE FIT WITH THE UNDERSTANDING THAT THE OWNER AND HIS AGENTS DISCLAIM ALL RESPONSIBILITY FOR ITS ACCURACY AND/OR SUFFICIENCY.
4. APPROVED PUBLIC WORKS PERMITS ARE REQUIRED PRIOR TO COMMENCING WORKS WITHIN THE MUNICIPAL ROAD ALLOWANCE.
5. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION AND HE SHALL REPORT ANY DISCREPANCIES IMMEDIATELY TO THE ENGINEER.
6. RELOCATION OF EXISTING SERVICES AND/OR UTILITIES SHALL BE CONSTRUCTED AS SHOWN ON THE DRAWINGS OR AS DIRECTED BY THE ENGINEER.
7. THE CONTRACTOR SHALL OBTAIN ALL PERMITS FOR CONSTRUCTION.
8. NO SUBSTITUTIONS WILL BE ALLOWED WITHOUT WRITTEN APPROVAL FROM NORFOLK COUNTY OR THE ENGINEER.
9. ALL EXCAVATIONS TO BE BACKFILLED WITH SELECT NATIVE MATERIAL, APPROVED BY THE ENGINEER, TO 95% S.P.D.
10. TREE PROTECTION PROCEDURES TO BE IMPLEMENTED IN ACCORDANCE WITH NORFOLK COUNTY STANDARDS.
11. ALL TRENCH BACKFILL UNDER EXISTING ROADWAYS SHALL BE COMPACTED IN MINIMUM 230mm LIFTS TO 98% STANDARD PROCTOR DENSITY. A GEOTECHNICAL ENGINEER'S REPRESENTATIVE SHALL BE ON SITE DURING THE WORK TO VERIFY THE COMPACTION OF EACH LIFT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS OF RE-TESTING.
12. FINAL ROADWAY CROSSFALL TO BE 2.0%
13. ALL CURB RETURNS TO BE 7.5m RAD. TO E/P UNLESS OTHERWISE NOTED.
14. STANDARD DEEP STRENGTH PAVEMENT 40mm HL3, 50mm HL8, 150mm GRANULAR 'A' & 400mm GRANULAR 'B'. (ALL DEPTHS COMPACTED THICKNESSES)
15. FINAL ASPHALT COURSE (HL3) SHALL BE PLACED IN ACCORDANCE WITH APPROVED NORFOLK COUNTY STANDARDS FOR TIMING.
16. ALL DRIVEWAY CULVERTS TO BE 450mmø (2mm THK.) CSP. PROVIDE 0.30m MIN. COVER OVER PIPE.
17. ALL BOULEVARD AREAS TO BE RESTORED WITH #1 NURSERY SOD ON A MINIMUM 150mm OF SELECT TOPSOIL.
18. DRIVEWAY RAMPS TO BE 50mm HL3 FINE ON 150mm GRANULAR 'A' FROM EDGE OF PAVEMENT TO PROPERTY LINE. DRIVEWAYS TO BE CONSTRUCTED OF SAME OR APPROVED EQUAL.
19. THE DEVELOPER AND/OR CONTRACTOR IS RESPONSIBLE FOR INSTALLING AND MAINTAINING (UNTIL ROAD CONSTRUCTION IS FINISHED) SILT CONTROL DEVICES AS SHOWN ON THE DRAWINGS AND AS DIRECTED BY THE ENGINEER.
20. ADDITIONAL SILT CONTROL LOCATIONS MAY BE REQUIRED AS DETERMINED BY THE COUNTY AND/OR THE ENGINEER.
21. SILTATION CONTROL BARRIERS SHALL BE PLACED AS DETAILED ON THE SILTATION AND EROSION CONTROL PLAN.
22. THE SILTATION AND EROSION CONTROL (SEC) MEASURES ILLUSTRATED ON THESE PLANS ARE CONSIDERED TO BE THE MINIMUM REQUIREMENT. SITE CONDITIONS MAY REQUIRE ADDITIONAL MEASURES WHICH WILL BE IDENTIFIED BY THE ENGINEER DURING CONSTRUCTION.
23. ALL SEC MEASURES ARE TO BE IN PLACE PRIOR TO COMMENCEMENT OF CONSTRUCTION.
24. OWNER/CONTRACTOR TO MAINTAIN EROSION CONTROL MEASURES THROUGHOUT SITE UNTIL A COMPLETE GRASS/VEGETATION COVER IS ACHIEVED.
25. ONLY AT THE DIRECTION OF THE ENGINEER ARE THE SEC MEASURES TO BE REMOVED.
26. CONTRACTOR TO PROVIDE SILT FENCE AROUND PERIMETER OF ALL ON SITE STOCKPILES.
27. RESTORE LAPLANTE ROAD AS PER NORFOLK COUNTY STANDARDS.



TYPICAL ROAD X-SECTION

SCALE: HORZ: 1:100 VERT: 1:100



S.W.M. POND OUTLET STRUCTURE DETAIL

SCALE: 1:40

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND ABOVEGROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE COMMENCING WORK, THE CONTRACTOR SHALL FAMILIARIZE HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

LEGEND:

+200.00	EXISTING ELEVATIONS
SIB	EXISTING STANDARD IRON BAR
IB	EXISTING IRON BAR
HP	EXISTING HYDRO POLE
UP	EXISTING UTILITY POLE
	EXISTING GUY
OW	EXISTING OBSERVATION WELL
DICB	EXISTING DITCH INLET CATCHBASIN
TBM	EXISTING TEMPORARY BENCHMARK
	EXISTING CHAIN LINK FENCE
	EXISTING DITCH
	EXISTING CONIFEROUS TREES
	EXISTING DECIDUOUS TREES
	EXISTING TREES TO BE REMOVED
	PROPOSED LEFT DITCH
	PROPOSED RIGHT DITCH
	PROPOSED CULVERT
ST1	PROPOSED CATCHBASIN MANHOLE
189.71	PROPOSED C/L ROAD ELEVATION
ST1	PROPOSED STORM MANHOLE
CB	PROPOSED CATCHBASIN
	PROPOSED STORM SEWER

T.B.M. No. 1 ELEV. = 229.15m (GEO)

NAIL IN HYDRO POLE ON THE EAST SIDE OF LAPLANTE ROAD AS SHOWN.

NO.	REVISION	DATE (MM/DD/YY)	BY
1	SWM POND OUTLET AND OVERLAND FLOW	02/24/25	K.P.B.

J.H. COHOON ENGINEERING LIMITED
CONSULTING ENGINEERS

440 HARDY ROAD, UNIT #1, BRANTFORD – ONTARIO, N3T 5L8
TEL. (519) 753–2656 FAX. (519) 753–4263 www.cohooneng.com

PROJECT:

PROPOSED RESIDENTIAL SUBDIVISION

1045 LAPLANTE ROAD, TILLSONBURG

NORFOLK COUNTY

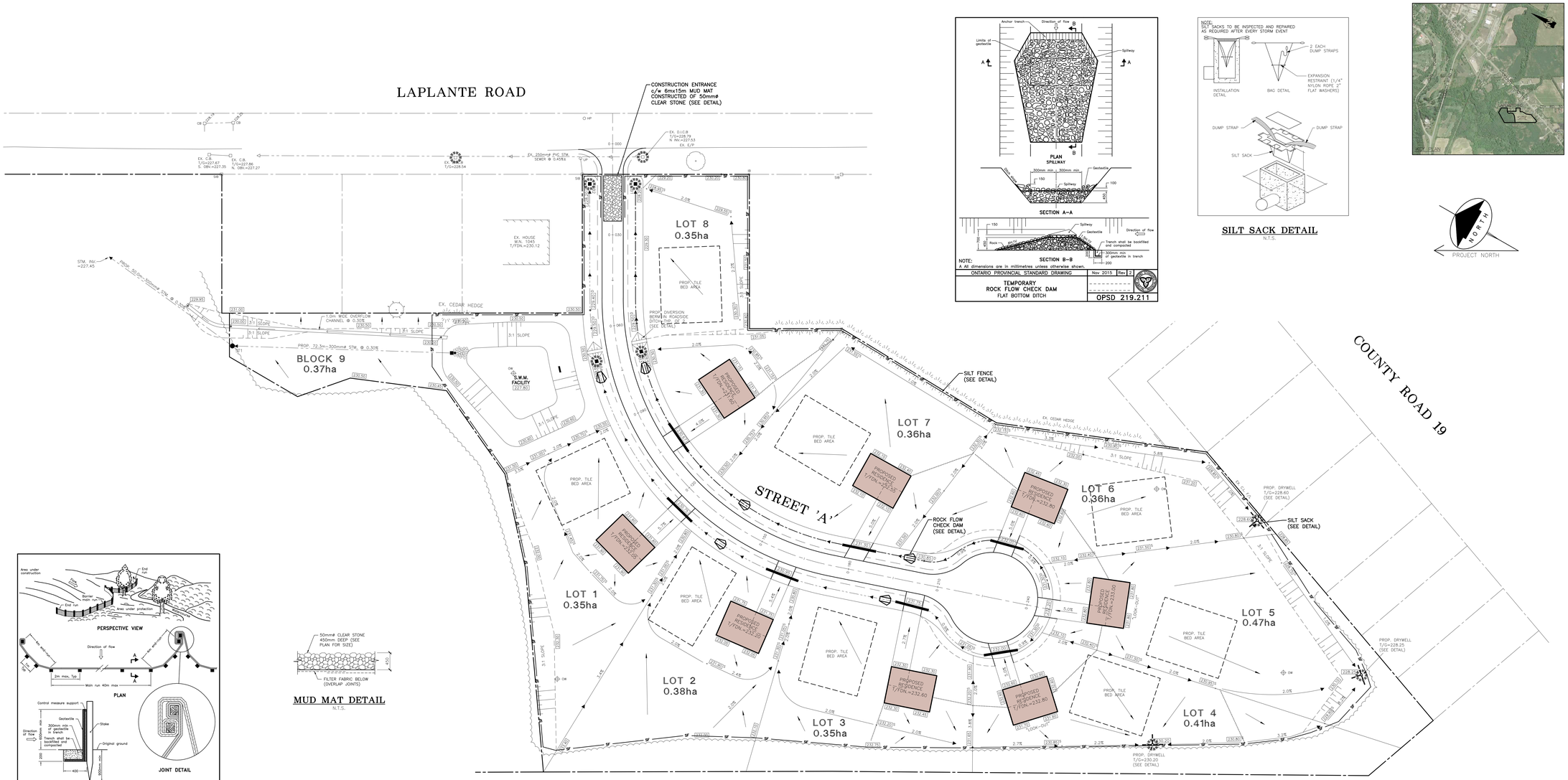
CLIENT: JOSE OLIVEIRA

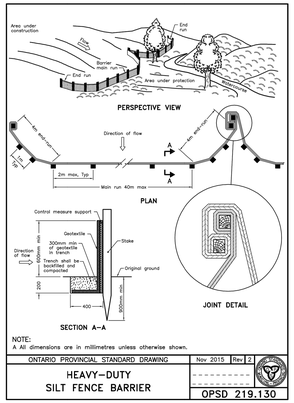
STREET 'A'

PLAN AND PROFILE

STA. 0+000 to STA. 0+240

DESIGN:	R.W.P.	SCALE:	HORZ: 1:500 VERT: 1:100
DRAWN:	K.P.B.	JOB No:	16933
CHECKED:	R.W.P.		
SHEET:	2 of 6	DWG. No:	16933–2
DATE:	NOV. 13/24		





NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev.	2
HEAVY-DUTY SILT FENCE BARRIER			OPSD 219.130

MUD MAT DETAIL
N.T.S.

NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev.	2
TEMPORARY ROCK FLOW CHECK DAM FLAT BOTTOM DITCH			OPSD 219.211

SILT SACK DETAIL
N.T.S.

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND APPURTENANCES OR OTHER UNDERGROUND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE COMMENCING WORK, THE CONTRACTOR SHALL FAMILIARIZE HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

LEGEND:

- 200.00 — EXISTING ELEVATIONS
- 200.00 — PROPOSED ELEVATIONS
- 200.00 — PROPOSED SWALE ELEVATIONS
- 200.00 — PROPOSED DITCH ELEVATIONS
- PROPOSED SWALE
- GENERAL DRAINAGE
- SF — PROPOSED SILT CONTROL FENCING
- SILT SACK AS SHOWN
- ROCK FLOW CHECK DAM

NOTES:

1. ALL ELEVATIONS SHOWN ARE METRIC.
2. THE SILTATION & EROSION CONTROL (SEC) MEASURES ILLUSTRATED ON THIS PLAN ARE CONSIDERED TO BE THE MINIMUM REQUIREMENT. SITE CONDITIONS MAY REQUIRE ADDITIONAL MEASURES WHICH WILL BE IDENTIFIED BY THE ENGINEER DURING CONSTRUCTION.
3. ALL SEC MEASURES ARE TO BE IN PLACE PRIOR TO COMMENCEMENT OF CONSTRUCTION.
4. OWNER/CONTRACTOR TO MAINTAIN EROSION CONTROL MEASURES THROUGHOUT SITE UNTIL A COMPLETE GRASS/VEGETATION COVER IS ACHIEVED.
5. ONLY AT THE DIRECTION OF THE ENGINEER ARE THE SEC MEASURES TO BE REMOVED.
6. SITE WORKS ARE TO BE STAGED IN SUCH A MANNER THAT EROSION WILL BE MINIMIZED, AND THE CONSULTANT MUST APPROVE EACH STAGE OF WORK. ALL SEDIMENT AND EROSION CONTROL FACILITIES HAVE BEEN INSTALLED PRIOR TO THE COMMENCEMENT OF ANY GRADING, EXCAVATION OR DEMOLITION.
7. CLEARING AND GRUBBING OF THE SITE SHOULD BE KEPT TO A MINIMUM AND VEGETATION REMOVED ONLY IN ADVANCE OF IMMEDIATE CONSTRUCTION.
8. STOCKPILES OF EARTH OR TOPSOIL ARE TO BE LOCATED AND PROTECTED TO MINIMIZE ENVIRONMENTAL INTERFERENCE. EROSION CONTROL FENCING IS TO BE INSTALLED AROUND THE BASE OF ALL STOCKPILES.
9. THE OWNER IS RESPONSIBLE TO ENSURE THE MUNICIPAL ROADWAYS ARE CLEANED OF ALL SEDIMENTS FROM VEHICULAR TRACKING ETC. TO AND FROM THE SITE, AT THE END OF EACH WORKDAY.
10. ALL EXISTING AND PROPOSED CATCHBASINS ON THE SUBJECT PROPERTY, PLUS ANY CATCHBASINS WITHIN THE INFLUENCE OF RUNOFF FROM THE SITE, ARE TO BE PROTECTED WITH FILTER CLOTH OR APPROVED EQUIVALENT.

NO.	REVISION	DATE (MM/DD/YY)	BY
1	SWM POND OUTLET AND OVERLAND FLOW	02/24/25	K.P.B.

J.H. COHOON ENGINEERING LIMITED
CONSULTING ENGINEERS
440 HARDY ROAD , UNIT #1 , BRANTFORD — ONTARIO , N3T 5L8
TEL. (519) 753-2656 FAX. (519) 753-4263 www.cohooneng.com

PROJECT:

PROPOSED RESIDENTIAL SUBDIVISION

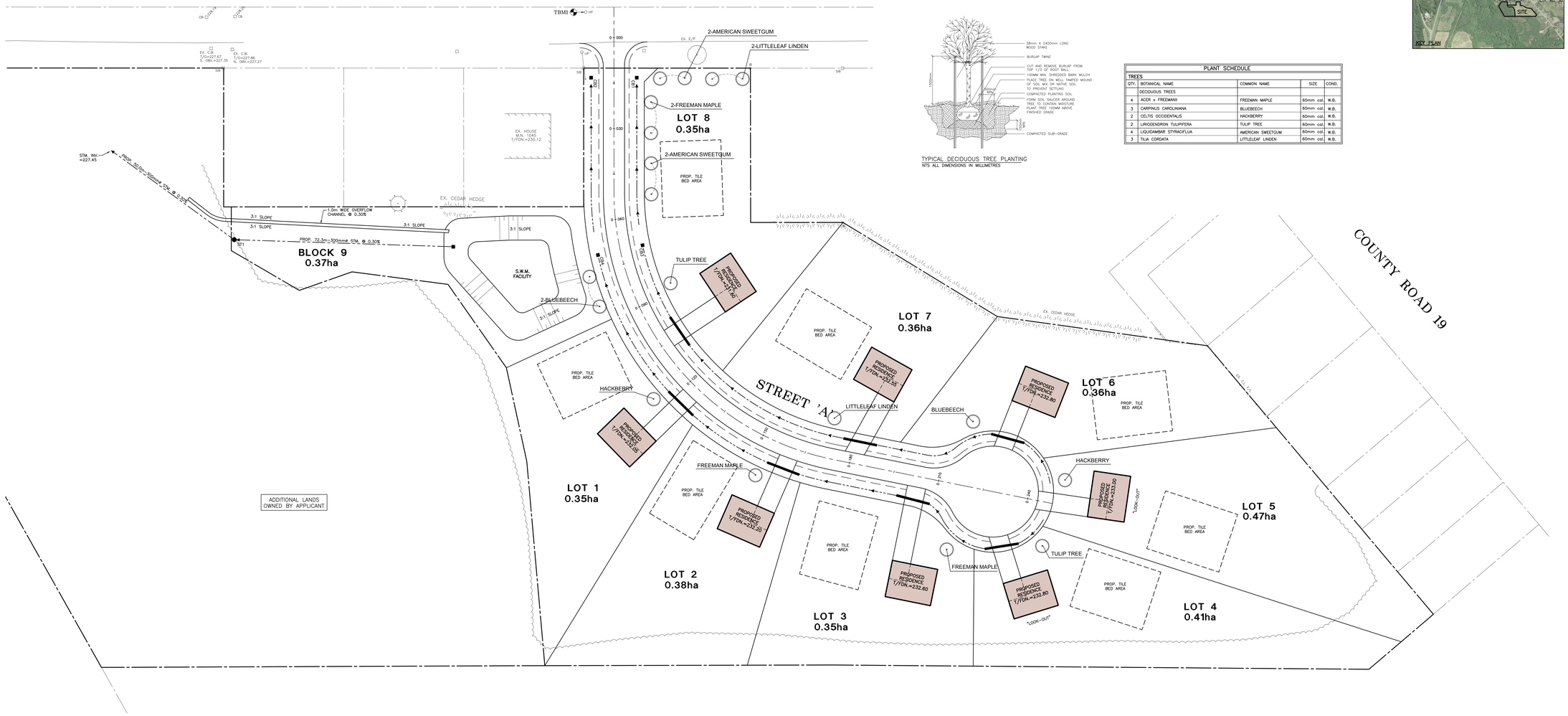
1045 LAPLANTE ROAD, TILLSONBURG
NORFOLK COUNTY

CLIENT:

JOSE OLIVEIRA

SILTATION & EROSION CONTROL PLAN

DESIGN:	R.W.P.	SCALE:	1:500
DRAWN:	K.P.B.	JOB No:	16933
CHECKED:	R.W.P.		
SHEET:	3 of 6	DWG. No:	16933-3
DATE:	NOV. 13/24		

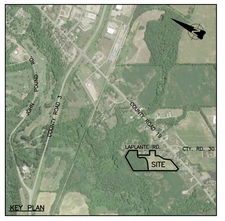


TYPICAL DECIDUOUS TREE PLANTING
NTS ALL DIMENSIONS IN MILLIMETRES

PLANT SCHEDULE

TREES

QTY.	BOTANICAL NAME	COMMON NAME	SIZE	COND.
	DECIDUOUS TREES			
4	ACER x FREEMANI	FREEMAN MAPLE	60mm cal.	W.B.
3	CARPINUS CAROLINIANA	BLUEBEECH	60mm cal.	W.B.
2	CELTIS OCCIDENTALIS	HACKBERRY	60mm cal.	W.B.
2	LIRIODENDRON TULIPIFERA	TULIP TREE	60mm cal.	W.B.
4	LIQUIDAMBAR STYRACIFLUA	AMERICAN SWEETGUM	60mm cal.	W.B.
3	TILIA CORDATA	LITTLELEAF LINDEN	60mm cal.	W.B.



THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND SERVICES, UNDERGROUND STRUCTURES, UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE COMMENCING WORK, THE CONTRACTOR SHALL FAMILIARIZE HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

LANDSCAPE NOTES:

1. THE LANDSCAPE PLAN HAS BEEN PREPARED IN COORDINATION WITH SITE PLAN & ENGINEERING PLANS.
2. THE LANDSCAPE CONTRACTOR SHALL VERIFY ALL CONDITIONS IN THE FIELD AND REPORT ANY DISCREPANCIES TO THE LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION.
3. LIMIT OF WORK TO BE THE PROPERTY LINE SHOWN.
4. ANY AREAS OUTSIDE THE LIMIT OF WORK DAMAGED BY THE CONTRACTOR SHALL BE RESTORED BY THE CONTRACTOR TO CITY OF BRANTFORD STANDARDS AT NO ADDITIONAL COST TO THE OWNER.
5. ALL UNDERGROUND UTILITIES TO BE LOCATED BY THE LANDSCAPE CONTRACTOR PRIOR TO THE COMMENCEMENT OF ANY WORK.
6. ALL DIMENSIONS ARE IN METRES.
7. ALL PLANT MATERIAL TO BE No. 1 GRADE, NURSERY GROWN IN ACCORDANCE WITH THE CANADIAN NURSERY TRADES ASSOCIATION.
8. PLANT MATERIAL QUANTITIES ON THE DRAWING SHALL TAKE PRECEDENT OVER THOSE IN THE PLANT LIST.
9. ANY PLANT MATERIAL WHICH COMES OVER OR UNDER ANY UTILITY WILL BE RELOCATED AS DIRECTED BY THE LANDSCAPE ARCHITECT.
10. SUPPLY & INSTALL A SHREDDED BARK MULCH ON ALL PLANTING BED TO BE A 100mm DEPTH.
11. NORFOLK COUNTY IS RESPONSIBLE FOR PLANTING TREES ON PUBLIC PROPERTY. THE DEVELOPER SHALL PAY TO THE COUNTY THE APPLICABLE FEE, AS PER NORFOLK COUNTY'S USER FEE BYLAW, FOR ALL TREES BEING PLANTED WITHIN THE COUNTY ROAD ALLOWANCE ON STANLEY STREET AND METCALFE STREET.
12. FOR ON SITE LANDSCAPING, THE DEVELOPER IS RESPONSIBLE FOR TREE PLANTING AND SHALL PAY A SECURITY DEPOSIT TO THE COUNTY WHICH WILL BE RELEASED UPON FINAL ACCEPTANCE OF THE TREES.

NO.	REVISION	DATE (MM/DD/YY)	BY
1	SWM POND OUTLET AND OVERLAND FLOW	02/24/25	K.P.B.

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PROJECT:

PROPOSED RESIDENTIAL SUBDIVISION

1045 LAPLANTE ROAD, TILLSONBURG
NORFOLK COUNTY

CLIENT: JOSE OLIVEIRA

TREE PLANTING PLAN

DESIGN:	R.W.P.	SCALE:	1:500
DRAWN:	K.P.B.	JOB No:	16933
CHECKED:	R.W.P.		
SHEET:	4 of 6	DWG. No:	16933-4
DATE:	NOV. 13/24		

STAGE 1-2 ARCHAEOLOGICAL ASSESSMENT OF 1045 LAPLANTE ROAD, IN PART OF LOTS 5, CONCESSION 4 NORTH OF TALBOT ROAD EAST, TOWNSHIP OF MIDDLETON, NOW TOWN OF TILLSONBURG, NORFOLK COUNTY, ONTARIO

SUBMITTED TO

JOE OLIVEIRA

AND

THE ONTARIO MINISTRY OF CITIZENSHIP AND MULTICULTURALISM

REPORT TYPE: ORIGINAL

ARCHAEOLOGICAL LICENSE NUMBER: P1289, KARA ADAMS, PHD

PIF P1289-0496-2024

JULY 24 2024

LINCOLN ENVIRONMENTAL CONSULTING

Table of Contents

Executive Summary

Lincoln Environmental Consulting Corp. (LEC) was retained by Joe Oliveira to complete a Stage 1-2 archaeological assessment of 1045 Laplante Road to meet the requirements of the *Planning Act* (Government of Ontario 2014) in advance of a planning permit. The study area measures approximately 6.75 hectares in size and is located in part of Lot 5, Concession 4 North of Talbot Road East, Township of Middleton, Now Town of Tillsonburg, Norfolk County, Ontario.

This assessment was triggered by the Provincial Policy Statement that is informed by the *Planning Act* (Government of Ontario 1990a), which states that decisions affecting planning matters must be consistent with the policies outlined in the larger *Ontario Heritage Act* (1990b). According to Section 2.6.2 of the PPS, "*development* and *site alteration* shall not be permitted on lands containing *archaeological resources* or *areas of archaeological potential* unless *significant archaeological resources* have been *conserved*."

In accordance with Section 1.3.1 of the Ministry of Tourism, Culture and Sport's (MHSTCI) 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), the Stage 1 archaeological assessment of 1045 Laplante Road has determined that the study area exhibits high potential for the identification and recovery of archaeological resources and a Stage 2 archaeological assessment is recommended.

The Stage 2 assessment was conducted on April 27th, 28th and 29th, 2024 under archaeological consulting license P1289 issued to Kara Adams, PhD, of LEC by the MHSTCI. No archaeological resources were identified during the Stage 2 archaeological assessment of the study area, and as such **no further archaeological assessment of the study area is recommended.**

The MHSTCI is asked to review the results presented and accept this report into the Ontario Public Register of Archaeological Reports.

Project Personnel

Licensed Archaeologist:	Kara Adams, PhD (P1289)
Project Manager:	Kara Adams, PhD (P1289)
Licensed Field Director:	Carley Adams, MSc (R1319)
Field Technicians:	Derek Lincoln, MA (P344), Michael Bagnall, Jayden Duncan, Sherisse Lancaster, Aaron Kearns
GIS Specialist:	Derek Lincoln, MA (P344)
Report Writer:	Kara Adams, PhD (P1289)
Senior Review:	Derek Lincoln, MA (P344)

Acknowledgements

Proponent Contact:	Joe Oliveira, property owner.

1.0 PROJECT CONTEXT

1.1 DEVELOPMENT CONTEXT

Lincoln Environmental Consulting Corp. (LEC) was retained by Joe Oliveira to complete a Stage 1-2 archaeological assessment of 1045 Laplante Road to meet the requirements of the *Planning Act* (Government of Ontario 2014) in advance of a planning permit. The study area measures approximately 3.05 hectares in size and is located in part of Lot 5, Concession 4 North of Talbot Road East, Township of Middleton, Now Town of Tillsonburg, Norfolk County, Ontario.

This assessment was triggered by the PPS that is informed by the *Planning Act* (Government of Ontario 1990a), which states that decisions affecting planning matters must be consistent with the policies outlined in the larger *Ontario Heritage Act* (1990b). According to Section 2.6.2 of the PPS, "*development* and *site alteration* shall not be permitted on lands containing *archaeological resources* or *areas of archaeological potential* unless *significant archaeological resources* have been *conserved*."

Permission to enter the study area and document archaeological resources was provided Joe Oliveira, the property owner.

1.1.1 Objectives

In compliance with the provincial standards and guidelines set out in the Ministry of Heritage, Sport, Tourism, and Culture Industries' (MHSTCI) 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), the objectives of the Stage 1 Archaeological Overview/Background Study are as follows:

- To provide information about the study area's geography, history, previous archaeological fieldwork, and current land conditions;
- To evaluate in detail the study area's archaeological potential which will support recommendations for Stage 2 survey for all or parts of the property; and
- To recommend appropriate strategies for Stage 2 survey.

To meet these objectives LEC archaeologists employed the following research strategies:

- A review of relevant archaeological, historic and environmental literature pertaining to the study area;
- A review of the land use history, including pertinent historic maps;
- An examination of the Ontario Archaeological Sites Database (ASDB) to determine the presence of known archaeological sites in and around the project area.

The objective of the Stage 2 assessment was to provide an overview of archaeological resources on the property and to determine whether any of the resources might be archaeological sites with cultural heritage value or interest and to provide specific direction for the protection, management and/or recovery of these resources. In compliance with the provincial standards and guidelines set out in the MHSTCI' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), the objectives of the Stage 2 Property Assessment are as follows:

- To document all archaeological resources within the study area;
- To determine whether the study area contains archaeological resources requiring further assessment; and
- To recommend appropriate Stage 3 assessment strategies for archaeological sites identified.

1.2 HISTORICAL CONTEXT

The study area measures 6.75 hectares which consists of agricultural field, lawn, woodlot and residential structures. The study area is located in Lot 5, Concession 4 North of Talbot Road East, Township of Middleton, Now Town of Tillsonburg, Norfolk County, Ontario.

1.2.1 Pre and Early Post-Contact Aboriginal Resources

Our knowledge of past First Peoples settlement and land use in Norfolk County is incomplete. Nonetheless, using province-wide (MCCR 1997) and region-specific archaeological data, a generalized cultural chronology for native settlement in the area can be proposed. The following paragraphs provide a basic textual summary of the known general cultural trends and a tabular summary appears in Table 1.

The Paleoindian Period

The first human populations to inhabit Ontario came to the region between 12,000 and 10,000 years ago, coincident with the end of the last period of glaciation. Climate and environmental conditions were significantly different than they are today; local environs would not have been welcoming to anything but short-term settlement. Termed Paleoindians by archaeologists, Ontario first peoples would have crossed the landscape in small groups (i.e., bands or family units) searching for food, particularly migratory game species. In the area, caribou may have provided the staple of the Paleoindian diet, supplemented by wild plants, small game, birds and fish. Given the low density of populations on the landscape at this time and their mobile nature, Paleoindian sites are small and ephemeral. They are usually identified by the presence of fluted projectile points and other finely made stone tools.

Archaic

The archaeological record of early native life in Southern Ontario indicates a change in lifeways beginning circa 10,000 years ago at the start of what archaeologists call the Archaic Period. The Archaic populations are better known than their Paleoindian predecessors, with numerous sites found throughout the area. The

characteristic projectile points of early Archaic populations appear similar in some respects to early varieties and are likely a continuation of early trends. Archaic populations continued to rely heavily on game, particularly caribou, but diversified their diet and exploitation patterns with changing environmental conditions. A seasonal pattern of warm season riverine or lakeshore settlements and interior cold weather occupations has been documented in the archaeological record. Since the large cold weather mammal species that formed the basis of the Paleoindian subsistence pattern became extinct or moved northward with the onset of warmer climates, Archaic populations had a more varied diet, exploiting a range of plant, bird, mammal and fish species. Reliance on specific food resources like fish, deer and nuts becomes more pronounced through time and the presence of more hospitable environs and resource abundance led to the expansion of band and family sizes. In the archaeological record, this is evident in the presence of larger sites and aggregation camps, where several families or bands would come together in times of resource abundance. The change to more preferable environmental circumstances led to a rise in population density. As a result, Archaic sites are more abundant than those from the earlier period. Artifacts typical of these occupations include a variety of stemmed and notched projectile points, chipped stone scrapers, ground stone tools (e.g. celts, adzes) and ornaments (e.g. bannerstones, gorgets), bifaces or tool blanks, animal bone and waste flakes, a by-product of the tool making process.

Woodland Period

Significant changes in cultural and environmental patterns are witnessed in the Woodland Period (circa 950 B.C to historic times). The coniferous forests of earlier times were replaced by stands of mixed and deciduous species. Occupations became increasingly more permanent in this period, culminating in major semi-permanent villages by 1,000 years ago. Archaeologically, the most significant changes by Woodland times are the appearance of artifacts manufactured from modeled clay and the construction of house structures. The Woodland Period is often defined by the occurrence of pottery, storage facilities and residential areas similar to those that define the incipient agricultural or Neolithic period in Europe. The earliest pottery was rather crudely made by the coiling method and house structures were simple enclosures.

Iroquoian Period

The primary Late Woodland occupants of the area were the Neutral Nation, an Iroquoian speaking population described by European missionaries. Like other known Iroquoian groups including the Huron (Wendat) and Petun, the Neutral practiced a system of intensive horticulture based on three primary subsistence crops (corn, beans and squash). Neutral villages incorporated a number of longhouses, multi-family dwellings that contained several families related through the female line. The Jesuit Relations describe several Neutral centres in existence in the 17th century, including a number of sites where missions were later established. While precontact Neutral sites may be identified by a predominance of well-made pottery decorated with various simple and geometric motifs, triangular stone projectile points, clay pipes and ground stone implements, sites post-dating European contact are recognized through the appearance of various items of European manufacture. The latter include materials acquired by trade (e.g., glass beads, copper/brass kettles, iron axes, knives and other metal implements) in addition to the personal items of European visitors and Jesuit priests (e.g., finger rings, stoneware, rosaries, glassware). The Neutral were

dispersed, and their population decimated by the arrival of epidemic European diseases and inter-tribal warfare.

Table 1: Cultural Chronology for Native Settlement within Norfolk County

Period			Time Range (circa)	Diagnostic Features	Complexes
Paleoindian	Early		9000 – 8400 B.C.	fluted projectile points	Gainey, Barnes, Crowfield
	Late		8400 – 8000 B.C.	non-fluted and lanceolate points	Holcombe, Hi-Lo, Lanceolate
Archaic	Early		8000 – 6000 B.C.	serrated, notched, bifurcate base points	Nettling, Bifurcate Base Horizon
	Middle		6000 – 2500 B.C.	stemmed, side & corner notched points	Brewerton, Otter Creek, Stanly/Neville
	Late		2000 – 1800 B.C.	narrow points	Lamoka
			1800 – 1500 B.C.	broad points	Genesee, Adder Orchard, Perkiomen
			1500 – 1100 B.C.	small points	Crawford Knoll
	Terminal		1100 – 850 B.C.	first true cemeteries	Hind
Woodland	Early		800 – 400 B.C.	expanding stemmed points, Vinette pottery	Meadowood
	Middle		400 B.C. – A.D. 600	thick coiled pottery, notched rims; cord marked	Couture
	Late	Western Basin	A.D. 600 – 900	Wayne ware, vertical cord marked ceramics	Riviere au Vase-Algonquin
			A.D. 900 – 1200	first corn; ceramics with multiple band impressions	Young- Algonquin
			A.D. 1200 – 1400	longhouses; bag shaped pots, ribbed paddle	Springwells-Algonquin
			A.D 1400-1600	villages with earthworks; Parker Festoon pots	Wolf- Algonquin
Contact		Aboriginal	A.D. 1600 – 1700	early historic native settlements	Neutral Huron, Odawa, Wenro
		Euro-Canadian	A.D. 1700-1760	fur trade, missionization, early military establishments	French
			A.D. 1760-1900	Military establishments, pioneer settlement	British colonials, UELs

1.2.2 Historic Euro-Canadian Resources

The 1877 Illustrated Historical Atlas of Norfolk County's map of the Township of Middleton depicts a rural landscape with several landowners, structures, early transportation routes, and early town sites. A portion of the 1877 historic map of the Township of Middleton is depicted in Figure 3, and this part of the Lot is listed as being owned by J. Cowen with no structures depicted within or near the study area.

1.3 ARCHAEOLOGICAL CONTEXT

The study area measures 6.75 hectares which consists of agricultural field, lawn, woodlot and residential structures. The study area is located in Lot 5, Concession 4 North of Talbot Road East, Township of Middleton, Now Town of Tillsonburg, Norfolk County, Ontario.

1.3.1 The Natural Environment

The project area is located in the Oxford Till Plains physiographic region as identified by Chapman and Putnam (1984:146).

The Oxford Till Plain occupies a central position in the peninsula of southwestern Ontario. This plain covers approximately 156,000 ha and has a drumlinized surface.

(Chapman and Putnam 1984:143)

The soils here are comprised of sandy loam, ideal for agricultural practices and aboriginal settlement.

Potable water is the single most important resource for any extended human occupation or settlement and since water sources in southwestern Ontario have remained relatively stable over time, proximity to drinkable water is regarded as a useful index for the evaluation of archaeological site potential. In fact, distance to water is one of the most commonly used variables for predictive modeling of archaeological site location in Ontario. The closest extant source of potable water is Otter creek which passes North of the study area.

1.3.2 Previously Known Archaeological Sites and Surveys

In order to compile an inventory of archaeological resources, the registered archaeological site records kept by the MHSTCI were consulted. In Ontario, information concerning archaeological sites stored in the ASDB is maintained by the MHSTCI. This database contains archaeological sites registered according to the Borden system. Under the Borden system, Canada is divided into grid blocks based on latitude and longitude. A Borden Block is approximately 13 kilometers east to west and approximately 18.5 kilometers north to south. Each Borden Block is referenced by a four-letter designator and sites within a block are numbered sequentially as they are found.

Information concerning specific site locations is protected by provincial policy and is not fully subject to the *Freedom of Information and Protection of Privacy 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 MHSTCI 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.

An examination of the ASDB has shown that there are no archaeological sites registered within a one-kilometer radius of the study area (Sites Data Search, Government of Ontario, December 20th, 2023).

1.3.3 Summary of Past Archaeological Investigations within 50 Metres

There have been no documented archaeological investigations within 50 metres of the study area. However, it should be noted that the Ministry of Citizenship and Multiculturalism currently does not provide a complete inventory of archaeological assessments carried out within 50 metres of a property, so a complete inventory of assessments on lands adjacent to the subject property cannot be provided.

1.3.5 Archaeological Potential

Archaeological potential is established by determining the likelihood that archaeological resources may be present on a subject property. LEC applied archaeological potential criteria commonly used by MHSTCI (Government of Ontario 2011) to determine areas of archaeological potential within the region under study. These variables 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.

Distance to modern or ancient water sources is generally accepted as the most important determinant of past human settlement patterns and, considered alone, may result in a determination of archaeological potential. However, any combination of two or more other criteria, such as well-drained soils or topographic variability, may also indicate archaeological potential. Finally, extensive land disturbance can eradicate archaeological potential (Wilson and Horne 1995).

As discussed above, distance to water is an essential factor in archaeological potential modeling. When evaluating distance to water it is important to distinguish between water and shoreline, as well as natural and artificial water sources, as these features affect sites' locations and types to varying degrees. The MHSTCI categorizes water sources in the following manner:

- Primary water sources: lakes, rivers, streams, creeks;
- Secondary water sources: intermittent streams and creeks, springs, marshes and swamps;
- Past water sources: glacial lake shorelines, relic river or stream channels, cobble beaches, shorelines of drained lakes or marshes; and
- Accessible or inaccessible shorelines: high bluffs, swamp or marshy lake edges, sandbars stretching into marsh.

The closest extant source of potable water is Otter Creek which passes North of the study area. The water resources that exist and existed close to the study area indicate archaeological potential.

Soil texture can be an important determinant of past settlement, usually in combination with other factors such as topography. As indicated previously, the soils within the study area are variable, but include pockets of well-drained and sandy soils that would be suitable for pre-contact Aboriginal agriculture.

An examination of the ASDB has shown that there are no archaeological sites registered within a one-kilometer radius of the study area.

For Euro-Canadian sites, archaeological potential can be extended to areas of early Euro-Canadian settlement, including places of military or pioneer settlements; early transportation routes; and properties listed on the municipal register or designated under the *Ontario Heritage Act* or property that local histories or informants have identified with possible historical events. The *Illustrated Historical Atlas of Norfolk County* demonstrates that the study area and its environs were densely occupied by Euro-Canadian settlers

by the later 19th century. Much of the established road system and agricultural settlement from that time is still visible today.

When the above listed criteria are applied to the study area, the archaeological potential for pre-contact Aboriginal, post-contact Aboriginal, and Euro-Canadian sites is deemed to be moderate to high. Thus, in accordance with Section 1.3.1 of the MHSTCI' 2011 *Standards and Guidelines for Consultant Archaeologists* (Government of Ontario 2011), the Stage 1 archaeological assessment 1045 Laplante Road has determined that the study area exhibits moderate to high potential for the identification and recovery of archaeological resources and a Stage 2 archaeological assessment is recommended.

2.0 FIELD METHODS

The Stage 2 assessment of 1045 Laplante Road was conducted on April 27th and 28th, 2024 under PIF # P1289-0496-2024 issued to Kara Adams, PhD, of LEC by the MHSTCI. The study area measures 6.75 hectares which consists of agricultural field, lawn, woodlot and residential structures. The study area is located in Lot 5, Concession 4 North of Talbot Road East, Township of Middleton, Now Town of Tillsonburg, Norfolk County, Ontario.

During the Stage 2 survey, assessment conditions were excellent and at no time were the field, weather, or lighting conditions detrimental to the recovery of archaeological material (Table 3). Photos 1 to 4 confirm that field conditions met the requirements for a Stage 2 archaeological assessment, as per the MHSTCI' 2011 *Standards and Guidelines for Consultant Archaeologists* (Section 7.8.6 Standard 1a; Government of Ontario 2011). Figure 4 provides an illustration of the Stage 2 assessment methods, as well as photograph locations and directions.

Table 3: Field and Weather Conditions

Date	Activity	Weather	Field Conditions
April 27th 2024	Pedestrian Survey; test pit survey	Mild, sunny	Visibility > 85%; soils friable and screens well
April 28th 2024	Test pit survey	Mild, sunny	soils friable and screens well
April 29th 2024	Test Pit Survey	Mild Sunny	Soils friable and screens well

Approximately 45% of the study area consists of agricultural field. These areas were subject to pedestrian survey at 5-metre intervals in accordance with Section 2.1.1 of the MCM's 2011 Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011). The fields were ploughed and allowed to weather sufficiently. Conditions were optimal and visibility at the time of the assessment was greater than 85%.

Approximately 50% of the study area consists of lawn and woodlot. These areas were subject to test pit survey at 5-metre intervals in accordance with Section 2.1.2 of the MCM's 2011 Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011). Each test pit was at least 30 centimeters in diameter and excavated five centimeters into sterile subsoil. Test pitting was conducted within one meter of built structures in accordance with Section 2.1.1 Standard 4 of the MCM's 2011 Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011). The soils and test pits were then examined for stratigraphy, cultural features, or evidence of fill. All soil was screened through six-millimeter (mm) mesh hardware cloth to facilitate the recovery of small artifacts and then used to backfill the pit. No further archaeological methods were employed since no artifacts were recovered during the test pit survey.

Approximately 5% of the study area consists of residential structures deemed to be visually disturbed. These areas were not assessed but were subject to photo documentation.

3.0 RECORD OF FINDS

The Stage 2 archaeological assessment was conducted employing the methods described in Section 2.0. An inventory of the documentary record generated by fieldwork is provided in Table 4 below. No archaeological resources were identified during the Stage 2 archaeological assessment of the study area.

Table 4: Inventory of Documented Record

Document Type	Current Location of Document Type	Additional Comments
1 Page of field notes	LEC office, London	In original field book and photocopied in project file
1 Hand drawn map	LEC office, London	In original field book and photocopied in project file
1 Map provided by Client	LEC office, London	Hard and digital copies in project file
19 Digital photographs	LEC office, London	Stored digitally in project file

4.0 ANALYSIS AND CONCLUSION

Approximately 45% of the study area consists of agricultural field. These areas were subject to pedestrian survey at 5-metre intervals in accordance with Section 2.1.1 of the MCM's 2011 Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011). The fields were ploughed and allowed to weather sufficiently. Conditions were optimal and visibility at the time of the assessment was greater than 85%. Approximately 50% of the study area consists of lawn and woodlot. These areas were subject to test pit survey at 5-metre intervals in accordance with Section 2.1.2 of the MCM's 2011 Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011). Each test pit was at least 30 centimeters in diameter and excavated five centimeters into sterile subsoil. Test pitting was conducted within one meter of built structures in accordance with Section 2.1.1 Standard 4 of the MCM's 2011 Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011). The soils and test pits were then examined for stratigraphy, cultural features, or evidence of fill. All soil was screened through six-millimeter (mm) mesh hardware cloth to facilitate the recovery of small artifacts and then used to backfill the pit. No further archaeological methods were employed since no artifacts were recovered during the test pit survey. Approximately 5% of the study area consists of residential structures deemed to be visually disturbed. These areas were not assessed but were subject to photo documentation.

No archaeological resources were identified during the Stage 2 archaeological assessment of the study area.

5.0 RECOMMENDATIONS

The Stage 2 archaeological assessment was carried out in accordance with the Ministry of Heritage, Sport, Tourism, and Culture Industries' Standards and Guidelines for Consultant Archaeologists (Government of Ontario 2011).

All work met provincial standards and no archaeological sites were identified during the Stage 2 assessment. If construction plans change to incorporate new areas that were not subject to a Stage 2 field survey, these must be assessed prior to the initiation of construction. In keeping with legislative stipulations, all construction, and demolition-related impacts (including, for example, machine travel, material storage and stockpiling, earth moving) must be restricted to the areas that were archaeologically assessed and cleared by the Ministry of Heritage, Sport, Tourism, and Culture Industries through acceptance of the assessment report into the provincial register.

No archaeological resources were identified during the Stage 2 archaeological assessment of the study area, and as such **no further archaeological assessment of the study area is recommended**.

The MTCS is asked to review the results presented and to accept this report into the Ontario Public Register of Archaeological Reports.

6.0 ADVICE ON COMPLIANCE WITH LEGISLATION

This report is submitted to the Minister of Tourism, Culture and Sport as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, 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 Archaeological 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 Ministry of Consumer Services.

Archaeological sites recommended for further archaeological fieldwork or protection remain subject to Section 48(1) of the *Ontario Heritage Act* and may not be altered, or have artifacts removed from them, except by a person holding an archaeological license.

7.0 BIBLIOGRAPHY AND RESOURCES

Adams, Nick. 1994. *Field Manual for Avocational Archaeologists in Ontario.* Ontario Archaeological Society Inc., Archaeological Stewardship Project.

Brock, Daniel. 1972. *History of the County of Middlesex, Canada.* Belleville: Mika Studio.

Caston, Wayne A. 1997. Evolution in the Mapping of Southern Ontario and Wellington County.*Wellington County History* 10:91-106.

Chapman, Lyman John and Donald F. Putnam. 1984. *The Physiography of Southern Ontario.*3rd ed. Ontario Geological Survey Special Volume 2. Toronto: Ministry of Natural Resources.

Eley, Betty E. and Peter H. von Bitter 1989. *Cherts of Southern Ontario*. Toronto: Royal Ontario Museum.

Ellis, Chris J. and Neal Ferris (editors). 1990. *The Archaeology of Southern Ontario to A.D. 1650.* Occasional Publication of the London Chapter, Ontario Archaeological Society, Number 5.

Feest, Johanna E. and Christian F. Feest 1978. The Ottawa. In *Handbook of North American Indians.* Vol.15 Northeast, pp. 772-786. B.G. Trigger, ed. Washington: Smithsonian Institute.

Ferris, Neal. 2009. *The Archaeology of Native-Lived Colonialism: Challenging History in the Great Lakes*. Tucson: University of Arizona Press.

Fisher, Jacqueline A. 1997. *The Adder Orchard Site: Lithic Technology and Spatial Organization in the Broadpoint Late Archaic*. Occasional Publications of the London Chapter, OAS, Number 3, 1997.

Gentilcore, Louis R. and C. Grant Head. 1984. *Ontario's History in Maps*. Toronto: University of Toronto Press.

Government of Ontario.1990a. *Ontario Planning Act*, R.S.O. 1990, CHAPTER P.13. Last amendment: 2011, c. 6, Sched. 2.

Government of Ontario. 1990b. *Ontario Heritage Act*, R.S.O. 1990, CHAPTER O.18. Last amendment: 2009, c. 33, Sched. 11, s. 6.

Government of Ontario. 2011. *Standards and Guidelines for Consultant Archaeologists.* Toronto: Ministry of Tourism, Culture and Sport.

Government of Ontario. n.d. *Archaeological Sites Database Files*. Toronto: Archaeology Programs Unit, Ministry of Tourism, Culture and Sport.

Konrad, Victor. 1981. An Iroquois Frontier: The North Shore of Lake Ontario during the Late Seventeenth Century. *Journal of Historical Geography* 7(2).

Middleton, Jess Edgar and Fred Landon. 1927. *Province of Ontario – A History 1615 to 1927*. Toronto: Dominion Publishing Company.

Morris, J.L. 1943. *Indians of Ontario.*1964 reprint. Toronto: Department of Lands and Forests.

Page & Co. H.R. 1878. *Illustrated Historical Atlas of the County of Middlesex, Ont.* Toronto: H.R. Page &Co.

Rogers, Edward S. 1978. Southeastern Ojibwa. In *Handbook of North American Indians*, Vol. 15 Northeast, pp. 760-771. B.G. Trigger, ed. Washington: Smithsonian Institute Press.

Schmalz, Peter S. 1991.*The Ojibwa of Southern Ontario*. Toronto: University of Toronto Press.

Smith, W.H. 1946. *Smith's Canadian Gazetteer: Comprising Statistical and General Information Respecting all Parts of the Upper Province, or Canada West.* Toronto: H. & W. Rowsell.

Wilson, J.A. and M. Horne. 1995. *City of London Archaeological Master Plan*. London: City of London, Department of Planning and Development.

Williamson et. al. 2017 *City of London Archaeological Management Plan.* London: City of London.

8.0 IMAGES

8.1 PHOTOGRAPHS

Photo 1: Assessed by 5m Pedestrian Survey Facing south.

Photo 2: Assessed by 5m Pedestrian Survey Facing north

Photo 3: Assessed by 5m Pedestrian Survey Facing south

Photo 4: Assessed by 5m Pedestrian Survey Facing west.

Photo 5: Field Conditions Facing north.

Photo 6: Grassed Area Assessed by 5m Test Pit Survey Facing west.

Photo 7: Assessed by 5m Test Pit Survey Facing north.

Photo 8: Assessed by 5m Test Pit Survey Facing north.

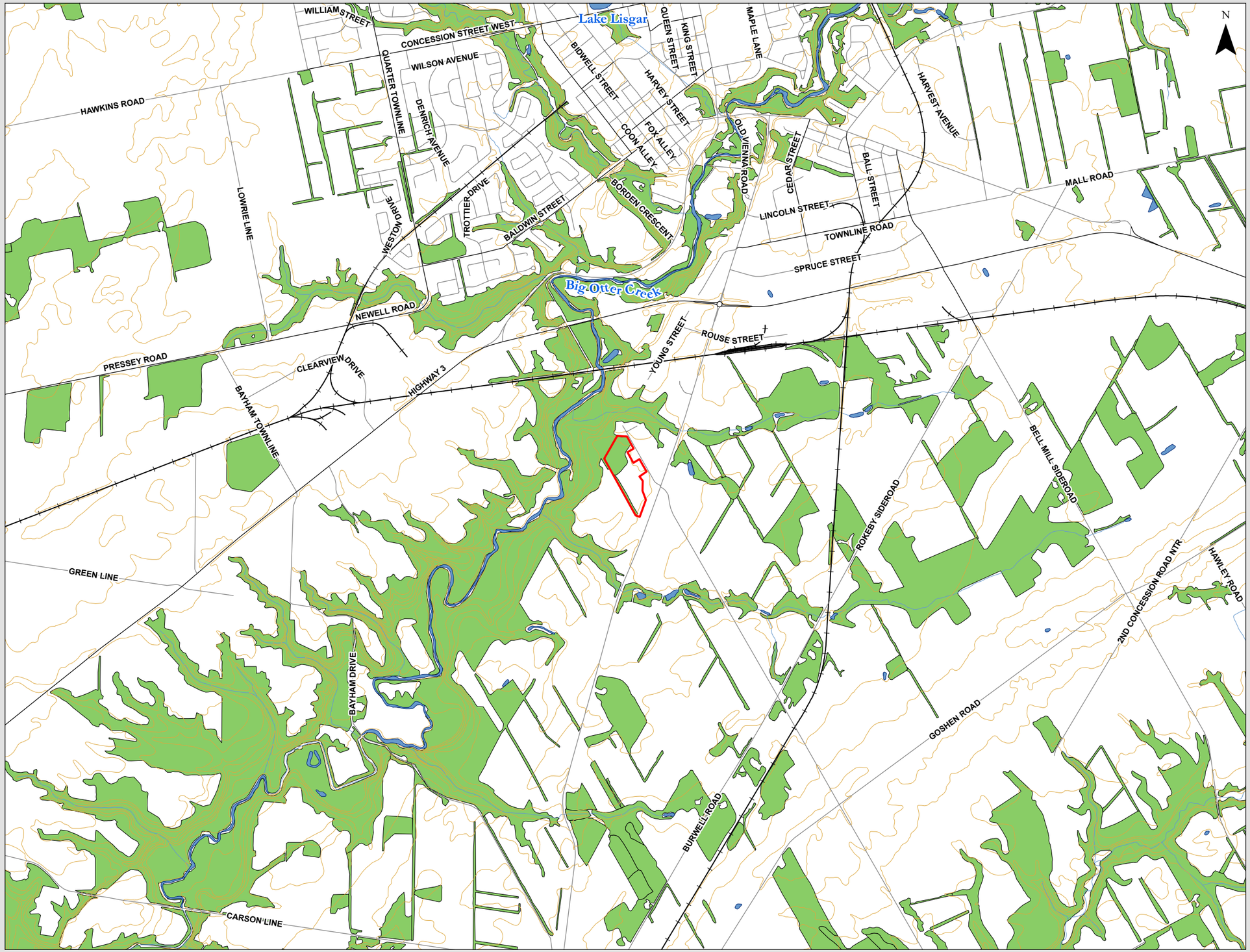
Photo 9: Assessed by 5m Test Pit Survey Facing west.

Photo 10: Assessed by 5m Test Pit Survey Facing north.

Photo 11: Typical Test Pit Facing north.

Photo 12: Typical Test Pit Facing north.

9.0 MAPS



LINCOLN ENVIRONMENTAL CONSULTING

Stage 1-2 Archaeological Assessment of 1045 Laplante Road, Tillsonburg, Ontario

Figure 1: Topographic Map of Study Area

Date: July, 2024

Source: OBM
http://www.geographynetwork.ca/website/obm/viewer.htm

Scale 1:25,000

Datum: NAD 1983 UTM Zone 17N

Legend

- Study Area
- Local Road
- Major Road
- Railroad
- Contour Lines
- Watercourse
- Waterbody
- Wooded Area

Metres
0 500 1,000

LINCOLN ENVIRONMENTAL CONSULTING

Stage 1-2 Archaeological Assessment of 1045 Laplante Road, Tillsonburg, Ontario

Figure 2: Study Area

Date: July, 2024

Source: Bing Maps

Scale 1:2,400

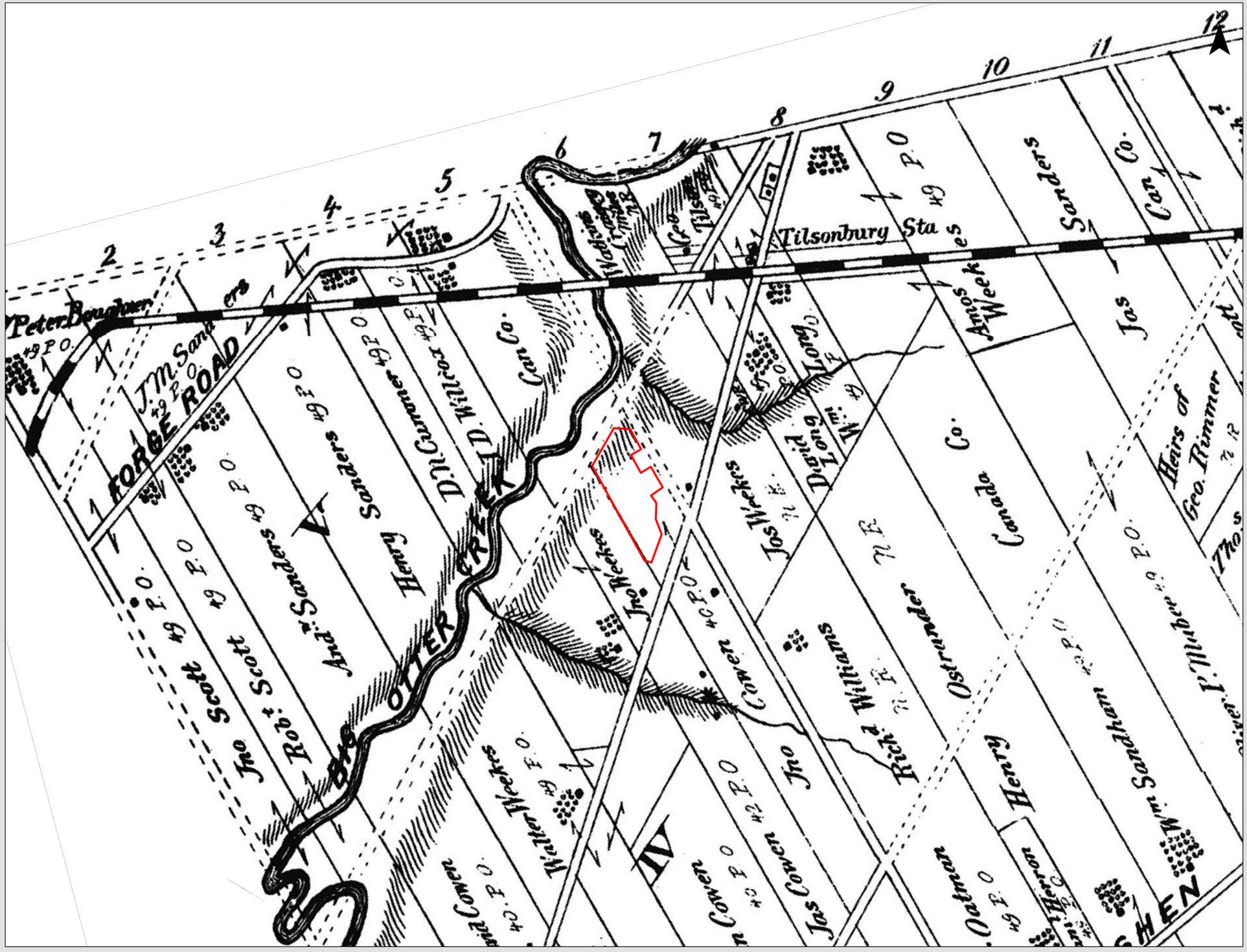
Datum: NAD 1983 UTM Zone 17N

Legend

Study Area

Metres

0 50 100



LINCOLN ENVIRONMENTAL CONSULTING

Stage 1-2 Archaeological Assessment of 1045 Laplante Road, Tillsonburg, Ontario

Figure 3: Portion of the 1877 Illustrated Historical Atlas of the County of Norfolk, MiddletonTownship

Date: July, 2024

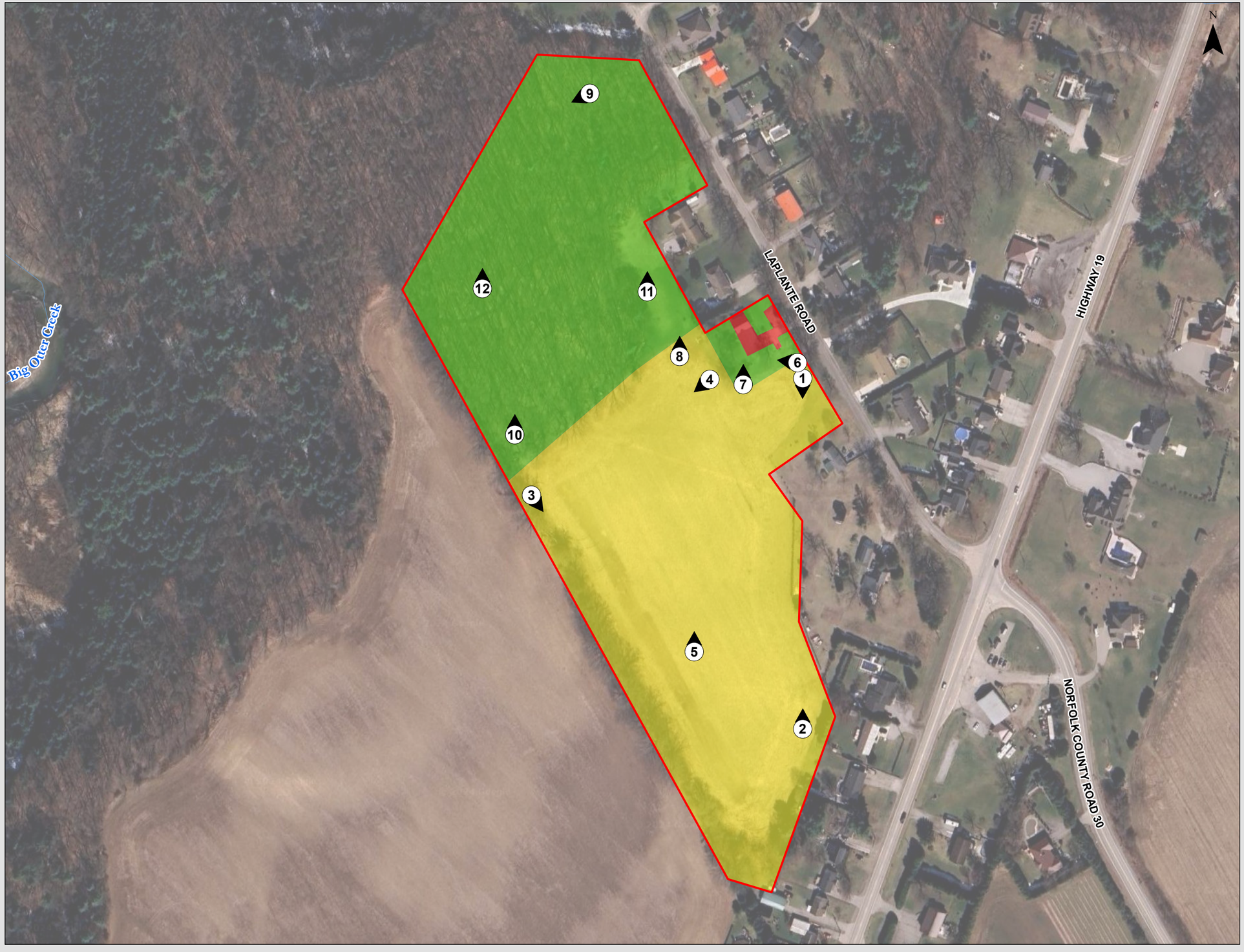
Illustrated historical atlas of the county of Norfolk, Ont. Toronto : H.R. Page & Co., 1877.

NOT TO SCALE

Datum: NAD 1983 UTM Zone 17N

Legend

Study Area



LINCOLN ENVIRONMENTAL CONSULTING

Stage 1-2 Archaeological Assessment of 1045 Laplante Road, Tillsonburg, Ontario

Figure 4: Assessment Strategies and Results

Date: July, 2024

Source: Bing Maps

Scale 1:2,400

Datum: NAD 1983 UTM Zone 17N

Legend

- Photo Location
- Study Area
- Assessed by Pedestrian Survey at 5m Intervals
- Assessed by Test Pit Survey at 5m Intervals
- Visually Disturbed, Not Assessed

Metres
0 50 100

Ministry of Citizenship and Multiculturalism (MCM)

Archaeology Program Unit
Heritage Branch
Citizenship, Inclusion and Heritage Division
5th Floor, 400 University Ave.
Toronto ON M7A 2R9
Tel.: (416) 414-7787
Email: Jessica.Marr@ontario.ca

Ministère des Affaires civiques et du Multiculturalisme (MCM)

Unité des programme d'archéologie
Direction du patrimoine
Division de la citoyenneté, de l'inclusion et du patrimoine
5e étage, 400 ave. University
Toronto ON M7A 2R9
Tél. : (416) 414-7787
Email: Jessica.Marr@ontario.ca

Aug 6, 2024

Kara Adams (P1289)
Lincoln Environmental Consulting Corp
6807 Calvert Strathroy ON N7G 3H5

RE: Entry into the Ontario Public Register of Archaeological Reports: Archaeological Assessment Report Entitled, "STAGE 1-2 ARCHAEOLOGICAL ASSESSMENT OF 1045 LAPLANTE ROAD, IN PART OF LOTS 5, CONCESSION 4 NORTH OF TALBOT ROAD EAST, TOWNSHIP OF MIDDLETON, NOW TOWN OF TILLSONBURG, NORFOLK COUNTY, ONTARIO", Dated Jul 24, 2024, Filed with MCM on N/A, MCM Project Information Form Number P1289-0496-2024, MCM File Number 0021424

Dear Dr. Adams:

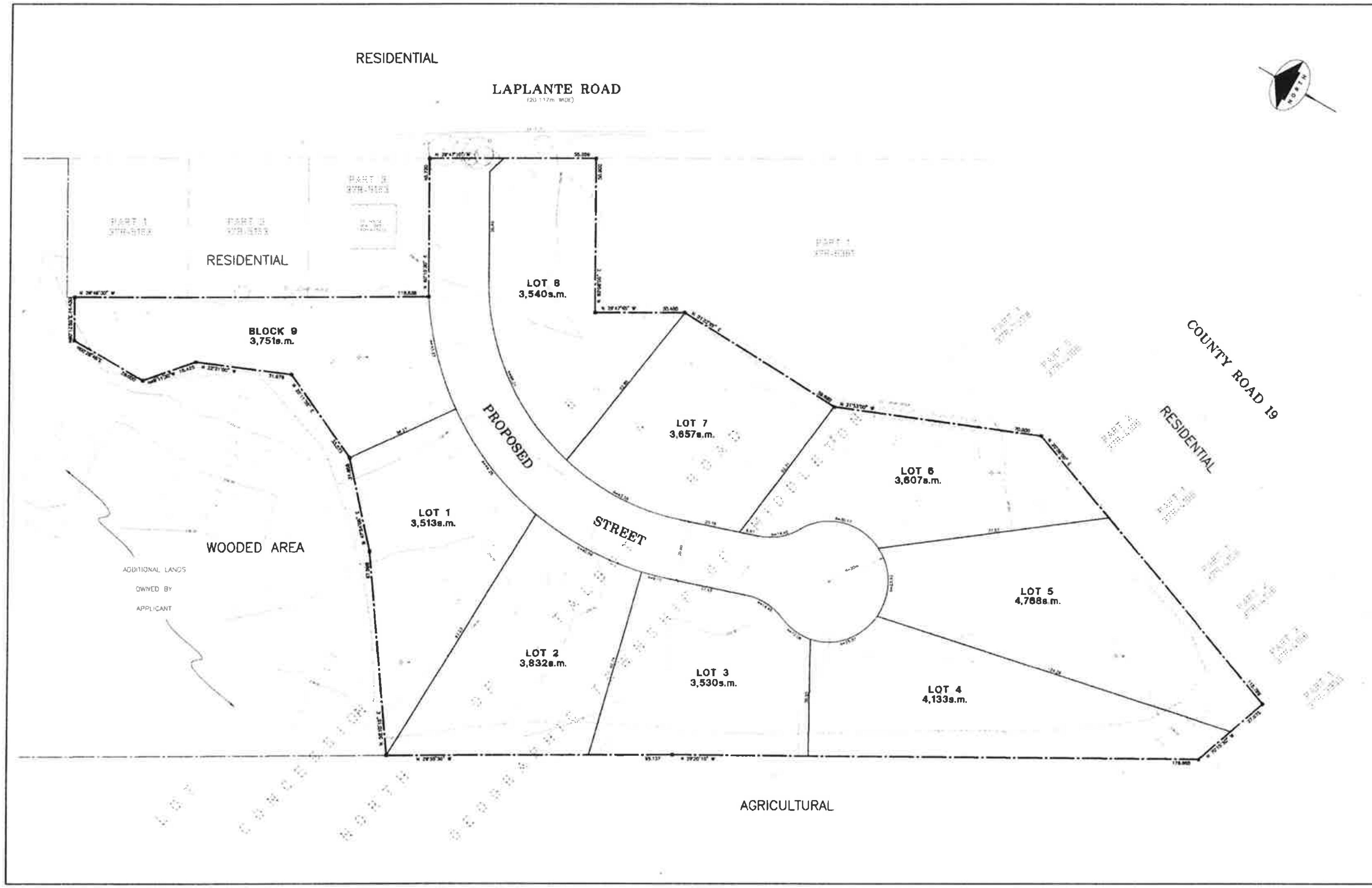
The above-mentioned report, which has been submitted to this ministry as a condition of licensing in accordance with Part VI of the *Ontario Heritage Act*, R.S.O. 1990, c 0.18, has been entered into the Ontario Public Register of Archaeological Reports without technical review.[1]

Please note that the ministry makes no representation or warranty as to the completeness, accuracy or quality of reports in the register.

Should you require further information, please do not hesitate to send your inquiry to Archaeology@Ontario.ca

cc. Archaeology Licensing Officer
Joe Oliveira,private
tbd tbd,tbd

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.*



DRAFT PLAN OF SUBDIVISION

PART OF LOT 5
CONCESSION 4
NORTH OF TALBOT ROAD
GEOGRAPHIC TOWNSHIP OF MIDDLETON
NORFOLK COUNTY

KEY PLAN

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE

OWNER'S CERTIFICATE

I HEREBY AUTHORIZE J.H. COHOON ENGINEERING LTD. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE CORPORATION OF NORFOLK COUNTY FOR APPROVAL.

11/15/24 [signature]

DATE

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT

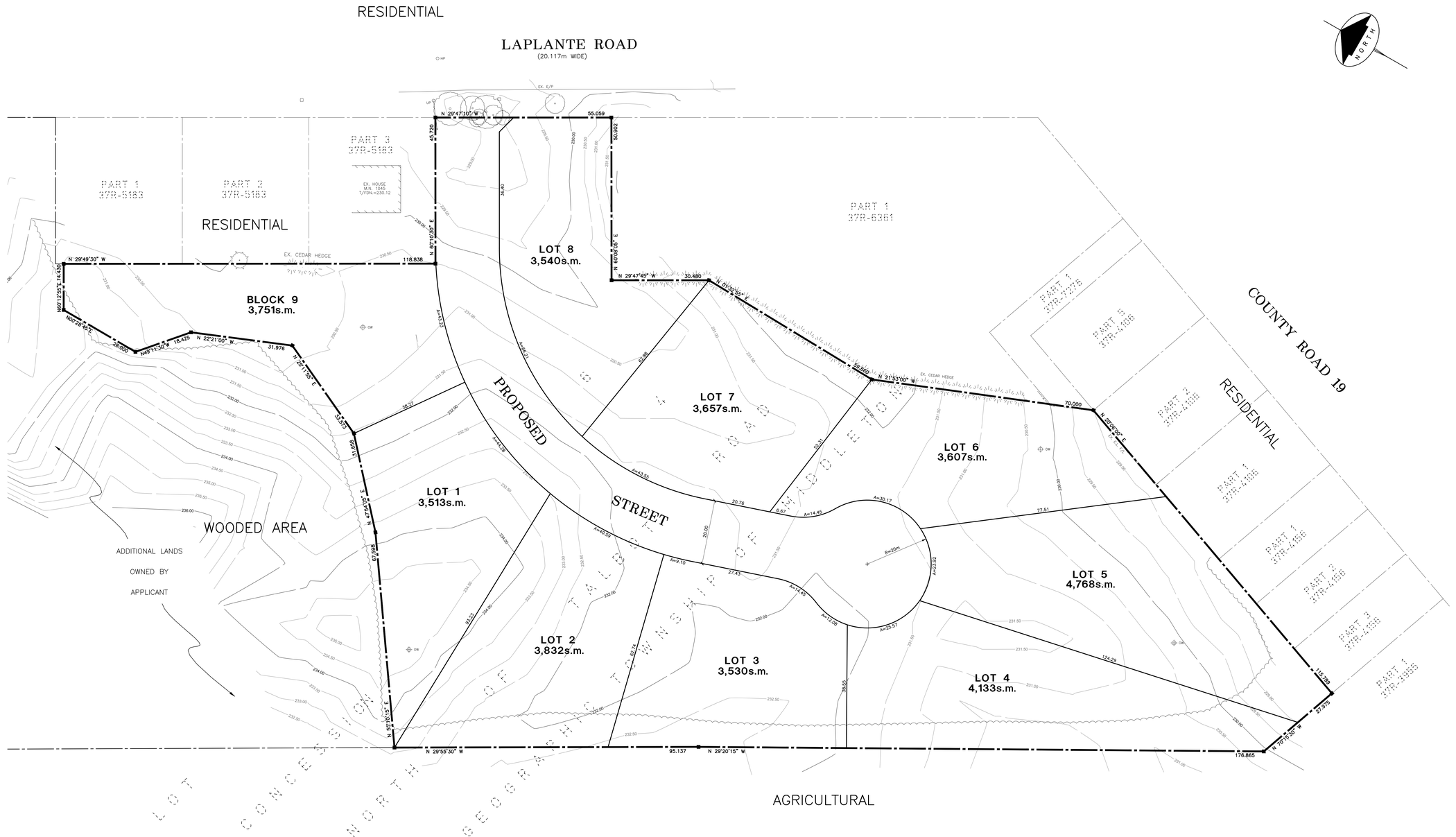
A – SEE PLAN
B – SEE PLAN
C – SEE PLAN
D – RESIDENTIAL
E – SEE PLAN
F – SEE PLAN
G – SEE PLAN
H – INDIVIDUAL WELLS
I – SANDY SILT
J – SEE PLAN
K – INDIVIDUAL SEPTIC SYSTEMS
L – NONE

AREA SCHEDULE

LOTS 1–8	[illegible]
BLOCK 9	3,751s.m.
ROADS	[illegible]
TOTAL	[illegible]

J.H. COHOON ENGINEERING LIMITED

RWP		16933
KPB		
1:500		DP1
NOV 5/24		



DRAFT PLAN OF SUBDIVISION

PART OF LOT 5
CONCESSION 4
NORTH OF TALBOT ROAD
GEOGRAPHIC TOWNSHIP OF MIDDLETON
NORFOLK COUNTY

KEY PLAN

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE

KIM HUSTED, O.L.S.
JEWITT & DIXON LTD.

OWNER'S CERTIFICATE

I HEREBY AUTHORIZE J.H. COHOON ENGINEERING LTD. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE CORPORATION OF NORFOLK COUNTY FOR APPROVAL.

DATE

JOSE OLIVEIRA

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT

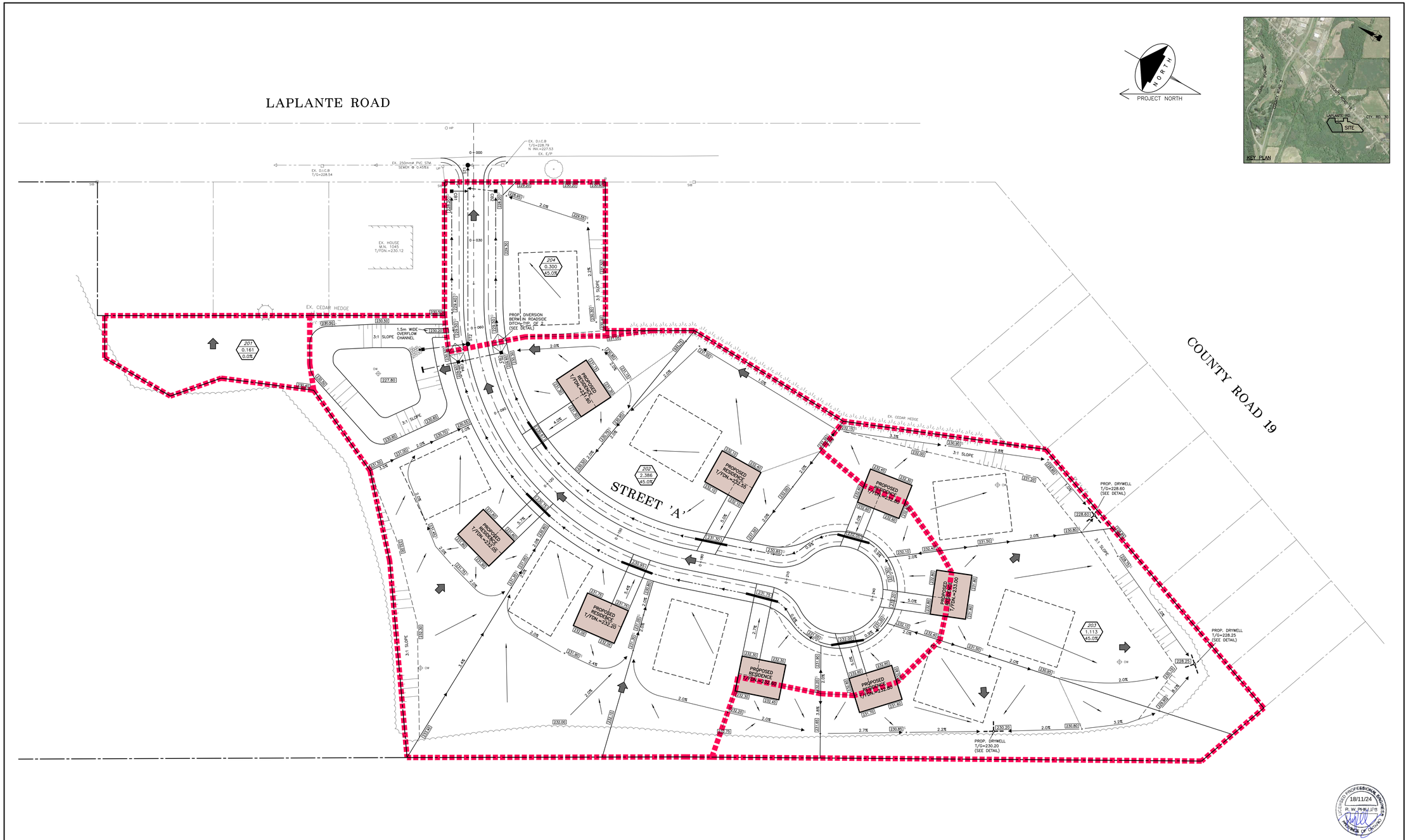
A – SEE PLAN
B – SEE PLAN
C – SEE PLAN
D – RESIDENTIAL
E – SEE PLAN
F – SEE PLAN
G – SEE PLAN
H – INDIVIDUAL WELLS
I – SANDY SILT
J – SEE PLAN
K – INDIVIDUAL SEPTIC SYSTEMS
L – NONE

AREA SCHEDULE

LOTS 1–8	30,584s.m.
BLOCK 9	3,751s.m.
ROADS	5,268s.m.
TOTAL	39,603s.m.

J.H. COHOON ENGINEERING LIMITED
CONSULTING ENGINEERS
440 HARDY ROAD, UNIT #1, BRANTFORD – ONTARIO, N3T 5L8
TEL. (519) 753-2656 FAX. (519) 753-4263 www.cohoonengr.com

DESIGN:	R.W.P.	JOB No:	16933
DRAWN:	K.P.B.		
SCALE:	1:500	DWG. No:	DP1
DATE:	NOV. 5/24		



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- STORM DRAINAGE BOUNDARY
- 201 / 1.121 / 45.0% — STORM DRAINAGE NUMBER / STORM AREA IN HECTARES / % IMPERVIOUS
- OVERLAND FLOW ROUTE

NO.	REVISION	DATE (MM/DD/YY)	BY

J.H. COHOON ENGINEERING LIMITED
CONSULTING ENGINEERS
440 HARDY ROAD , UNIT #1 , BRANTFORD – ONTARIO , N3T 5L8
TEL. (519) 753-2656 FAX. (519) 753-4263 www.cohooneng.com

PROJECT:

PROPOSED RESIDENTIAL SUBDIVISION

1045 LAPLANTE ROAD, TILLSONBURG
NORFOLK COUNTY

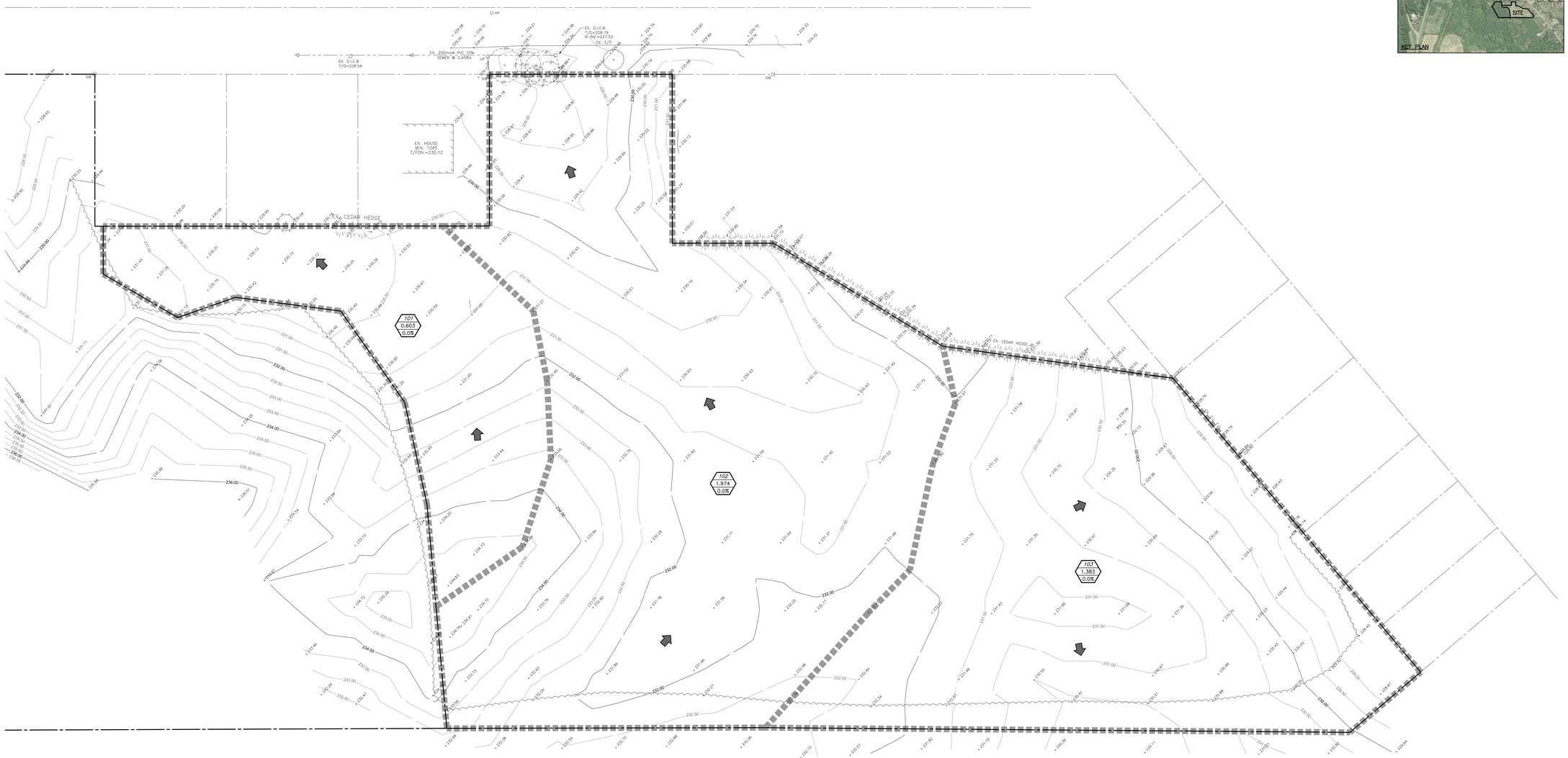
CLIENT:

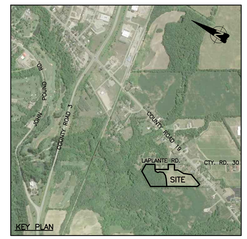
JOSE OLIVEIRA

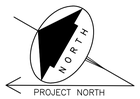
POST–DEVELOPMENT STORM DRAINAGE AREAS

DESIGN:	R.W.P.	SCALE:	1:500
DRAWN:	K.P.B.	JOB No:	16933
CHECKED:	R.W.P.		
SHEET:	6 of 6	DWG. No:	16933–B
DATE:	NOV. 13/24		

LICENSED PROFESSIONAL ENGINEER
18/11/24
R. W. PEARCE
PROVINCE OF ONTARIO







LEGEND:

- STORM DRAINAGE BOUNDARY
- 101 / 1.121 / 0.0% — STORM DRAINAGE NUMBER; STORM AREA IN HECTARES; COEFFICIENT OF RUNOFF (% IMPERVIOUS)
- OVERLAND FLOW ROUTE

NO.	REVISION	DATE (MM/DD/YY)	BY

J.H. COHOON ENGINEERING LIMITED
CONSULTING ENGINEERS
440 HARDY ROAD , UNIT #1 , BRANTFORD – ONTARIO , N3T 5L8
TEL. (519) 753-2656 FAX. (519) 753-4263 www.cohooneng.com

PROJECT:

PROPOSED RESIDENTIAL SUBDIVISION

1045 LAPLANTE ROAD, TILLSONBURG
NORFOLK COUNTY

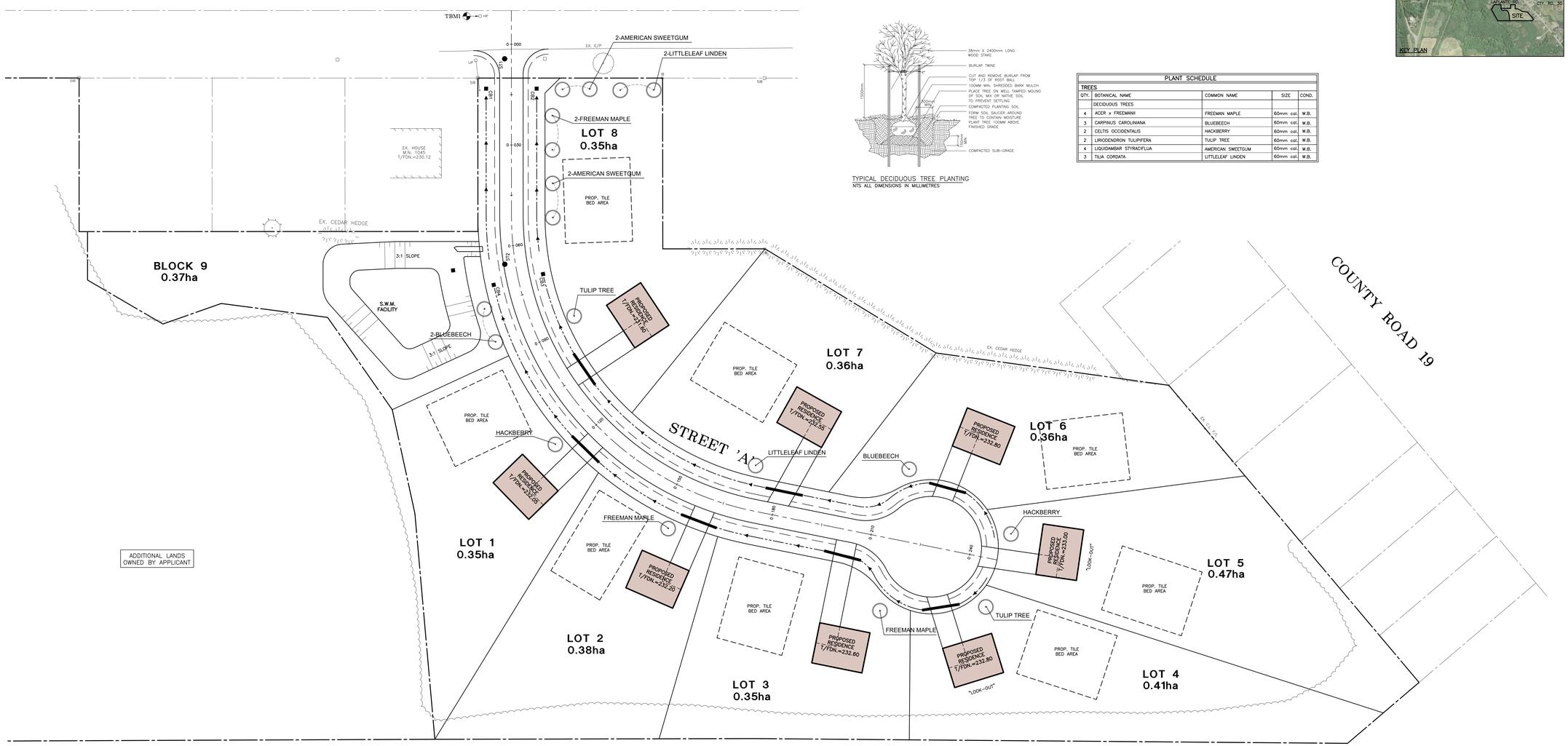
CLIENT:

JOSE OLIVEIRA

PRE–DEVELOPMENT STORM DRAINAGE AREAS

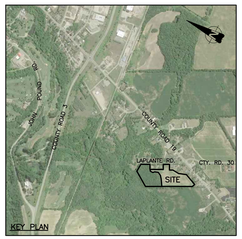
DESIGN:	R.W.P.	SCALE:	1:500
DRAWN:	K.P.B.	JOB No:	16933
CHECKED:	R.W.P.		
SHEET:	5 of 6	DWG. No:	16933–A
DATE:	NOV. 13/24		

LICENSED PROFESSIONAL ENGINEER
18/11/24
R. W. PEARCE
PROVINCE OF ONTARIO



TYPICAL DECIDUOUS TREE PLANTING
NTS ALL DIMENSIONS IN MILLIMETRES

PLANT SCHEDULE				
TREES				
QTY.	BOTANICAL NAME	COMMON NAME	SIZE	COND.
	DECIDUOUS TREES			
4	ACER x FREEMANII	FREEMAN MAPLE	60mm cal.	W.B.
3	CARPINUS CAROLINIANA	BLUEBEECH	60mm cal.	W.B.
2	CELTIS OCCIDENTALIS	HACKBERRY	60mm cal.	W.B.
2	LIRODENDRON TULIPIFERA	TULIP TREE	60mm cal.	W.B.
4	LIQUIDAMBAR STYRACIFLUA	AMERICAN SWEETGUM	60mm cal.	W.B.
3	TILIA CORDATA	LITTLELEAF LINDEN	60mm cal.	W.B.



THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND ABOVEGROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE COMMENCING WORK, THE CONTRACTOR SHALL FAMILIARIZE HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

LANDSCAPE NOTES:

1. THE LANDSCAPE PLAN HAS BEEN PREPARED IN COORDINATION WITH SITE PLAN & ENGINEERING PLANS.
2. THE LANDSCAPE CONTRACTOR SHALL VERIFY ALL CONDITIONS IN THE FIELD AND REPORT ANY DISCREPANCIES TO THE LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION.
3. LIMIT OF WORK TO BE THE PROPERTY LINE SHOWN.
4. ANY AREAS OUTSIDE THE LIMIT OF WORK DAMAGED BY THE CONTRACTOR SHALL BE RESTORED BY THE CONTRACTOR TO CITY OF BRANTFORD STANDARDS AT NO ADDITIONAL COST TO THE OWNER.
5. ALL UNDERGROUND UTILITIES TO BE LOCATED BY THE LANDSCAPE CONTRACTOR PRIOR TO THE COMMENCEMENT OF ANY WORK.
6. ALL DIMENSIONS ARE IN METRES.
7. ALL PLANT MATERIAL TO BE No. 1 GRADE, NURSERY GROWN IN ACCORDANCE WITH THE CANADIAN NURSERY TRADES ASSOCIATION.
8. PLANT MATERIAL QUANTITIES ON THE DRAWING SHALL TAKE PRECEDENT OVER THOSE IN THE PLANT LIST.
9. ANY PLANT MATERIAL WHICH COMES OVER OR UNDER ANY UTILITY WILL BE RELOCATED AS DIRECTED BY THE LANDSCAPE ARCHITECT.
10. SUPPLY & INSTALL A SHREDDED BARK MULCH ON ALL PLANTING BED TO BE A 100mm DEPTH.
11. NORFOLK COUNTY IS RESPONSIBLE FOR PLANTING TREES ON PUBLIC PROPERTY. THE DEVELOPER SHALL PAY TO THE COUNTY THE APPLICABLE FEE, AS PER NORFOLK COUNTY'S USER FEE BY-LAW, FOR ALL TREES BEING PLANTED WITHIN THE COUNTY ROAD ALLOWANCE ON STANLEY STREET AND METCALFE STREET.
12. FOR ON SITE LANDSCAPING, THE DEVELOPER IS RESPONSIBLE FOR TREE PLANTING AND SHALL PAY A SECURITY DEPOSIT TO THE COUNTY WHICH WILL BE RELEASED UPON FINAL ACCEPTANCE OF THE TREES.

NO.	REVISION	DATE (MM/DD/YY)	BY

J.H. COHOON ENGINEERING LIMITED
CONSULTING ENGINEERS
440 HARDY ROAD , UNIT #1 , BRANTFORD – ONTARIO , N3T 5L8
TEL. (519) 753-2656 FAX. (519) 753-4263 www.cohooneng.com

PROJECT:

PROPOSED RESIDENTIAL SUBDIVISION

1045 LAPLANTE ROAD, TILLSONBURG
NORFOLK COUNTY

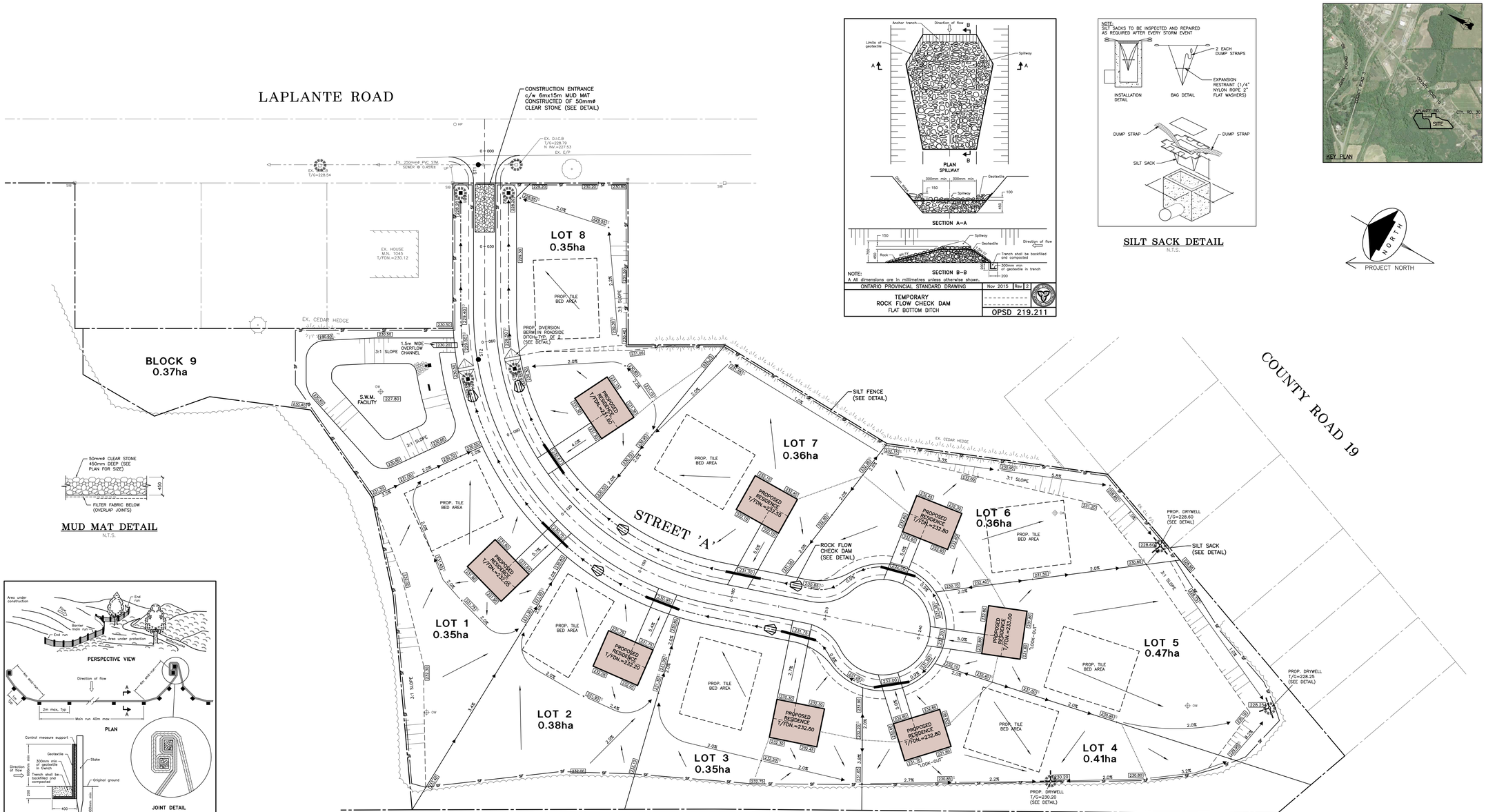
CLIENT:

JOSE OLIVEIRA

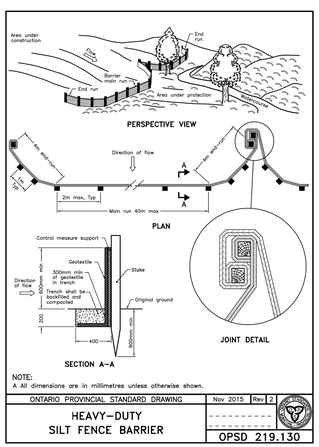
TREE PLANTING PLAN

DESIGN:	R.W.P.	SCALE:	1:500
DRAWN:	K.P.B.	JOB No:	16933
CHECKED:	R.W.P.		
SHEET:	4 of 6	DWG. No:	16933–4
DATE:	NOV. 13/24		

LICENSED PROFESSIONAL ENGINEER
R. W. PHILLIPS
18/11/24
PROVINCE OF ONTARIO



MUD MAT DETAIL
N.T.S.



NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 2
HEAVY-DUTY SILT FENCE BARRIER		OPSD 219.130

NOTE:
A All dimensions are in millimetres unless otherwise shown.

ONTARIO PROVINCIAL STANDARD DRAWING	Nov 2015	Rev 2
TEMPORARY ROCK FLOW CHECK DAM FLAT BOTTOM DITCH		OPSD 219.211

SILT SACK DETAIL
N.T.S.

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND ABOVEGROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE COMMENCING WORK, THE CONTRACTOR SHALL FAMILIARIZE HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

LEGEND:

230.00	EXISTING ELEVATIONS
200.00	PROPOSED ELEVATIONS
200.00 S	PROPOSED SWALE ELEVATIONS
200.00 D	PROPOSED DITCH ELEVATIONS
	PROPOSED SWALE
	GENERAL DRAINAGE
SF	PROPOSED SILT CONTROL FENCING
	SILT SACK AS SHOWN
	ROCK FLOW CHECK DAM

NOTES:

1. ALL ELEVATIONS SHOWN ARE METRIC.
2. THE SILTATION & EROSION CONTROL (SEC) MEASURES ILLUSTRATED ON THIS PLAN ARE CONSIDERED TO BE THE MINIMUM REQUIREMENT. SITE CONDITIONS MAY REQUIRE ADDITIONAL MEASURES WHICH WILL BE IDENTIFIED BY THE ENGINEER DURING CONSTRUCTION.
3. ALL SEC MEASURES ARE TO BE IN PLACE PRIOR TO COMMENCEMENT OF CONSTRUCTION.
4. OWNER/CONTRACTOR TO MAINTAIN EROSION CONTROL MEASURES THROUGHOUT SITE UNTIL A COMPLETE GRASS/VEGETATION COVER IS ACHIEVED.
5. ONLY AT THE DIRECTION OF THE ENGINEER ARE THE SEC MEASURES TO BE REMOVED.
6. SITE WORKS ARE TO BE STAGED IN SUCH A MANNER THAT EROSION WILL BE MINIMIZED, AND THE CONSULTANT MUST PROVIDE CONFIRMATION THAT ALL APPROVED SILTATION AND EROSION CONTROL FACILITIES HAVE BEEN INSTALLED PRIOR TO THE COMMENCEMENT OF ANY GRADING, EXCAVATION OR DEMOLITION.
7. CLEARING AND GRUBBING OF THE SITE SHOULD BE KEPT TO A MINIMUM AND VEGETATION REMOVED ONLY IN ADVANCE OF IMMEDIATE CONSTRUCTION.
8. STOCKPILES OF EARTH OR TOPSOIL ARE TO BE LOCATED AND PROTECTED TO MINIMIZE ENVIRONMENTAL INTERFERENCE. EROSION CONTROL FENCING IS TO BE INSTALLED AROUND THE BASE OF ALL STOCKPILES.
9. THE OWNER IS RESPONSIBLE TO ENSURE THE MUNICIPAL ROADWAYS ARE CLEANED OF ALL SEDIMENTS FROM VEHICULAR TRACKING ETC. TO AND FROM THE SITE, AT THE END OF EACH WORKDAY.
10. ALL EXISTING AND PROPOSED CATCHBASINS ON THE SUBJECT PROPERTY, PLUS ANY CATCHBASINS WITHIN THE INFLUENCE OF RUNOFF FROM THE SITE, ARE TO BE PROTECTED WITH FILTER CLOTH OR APPROVED EQUIVALENT.

NO.	REVISION	DATE (MM/DD/YY)	BY

J.H. COHOON ENGINEERING LIMITED
CONSULTING ENGINEERS
440 HARDY ROAD , UNIT #1 , BRANTFORD – ONTARIO , N3T 5L8
TEL. (519) 753-2656 FAX. (519) 753-4263 www.cohooneng.com

PROJECT:

PROPOSED RESIDENTIAL SUBDIVISION

1045 LAPLANTE ROAD, TILLSONBURG
NORFOLK COUNTY

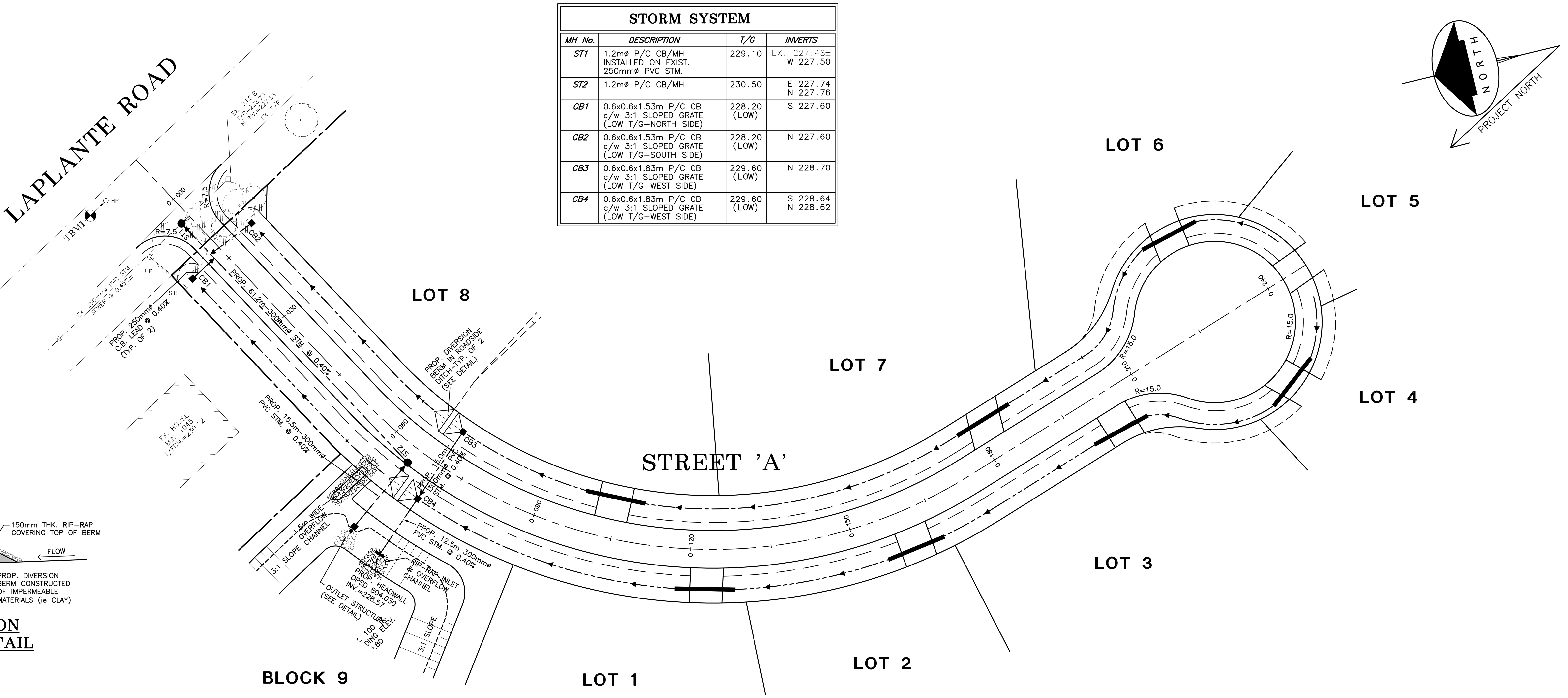
CLIENT:

JOSE OLIVEIRA

SILTATION & EROSION CONTROL PLAN

DESIGN:	R.W.P.	SCALE:	1:500
DRAWN:	K.P.B.	JOB No:	16933
CHECKED:	R.W.P.		
SHEET:	3 of 6	DWG. No:	16933-3
DATE:	NOV. 13/24		

LICENSED PROFESSIONAL ENGINEER
R. W. PEARCE
18/11/24
PROVINCE OF ONTARIO



STORM SYSTEM

MH No.	DESCRIPTION	T/G	INVERTS
ST1	1.2mø P/C CB/MH INSTALLED ON EXIST. 250mmø PVC STM.	229.10	EX. 227.48± W 227.50
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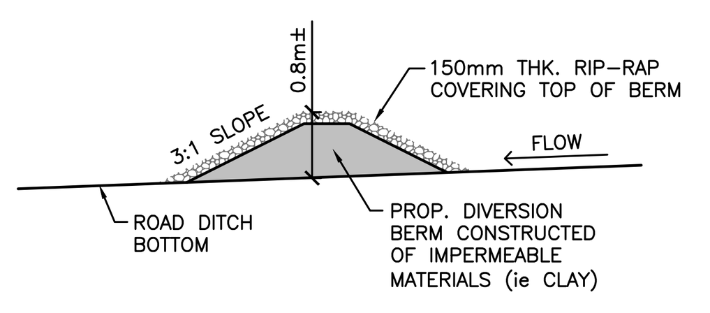
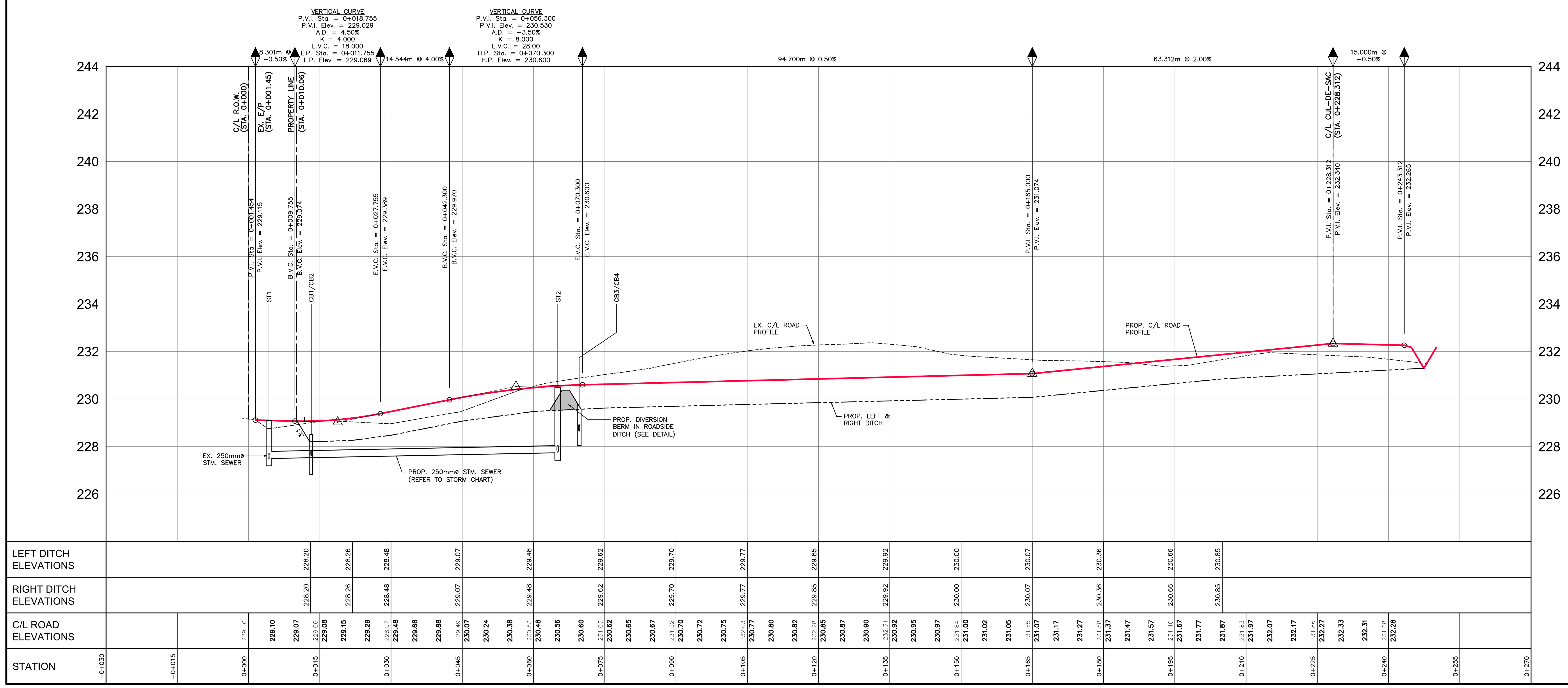
CB3	0.6x0.6x1.83m P/C CB c/w 3:1 SLOPED GRATE (LOW T/G–WEST SIDE)	229.60 (LOW)	N 228.70
CB4	0.6x0.6x1.83m P/C CB c/w 3:1 SLOPED GRATE (LOW T/G–WEST SIDE)	229.60 (LOW)	S 228.64 N 228.62



DIVERSION BERM DETAIL
N.T.S.



GENERAL NOTES:

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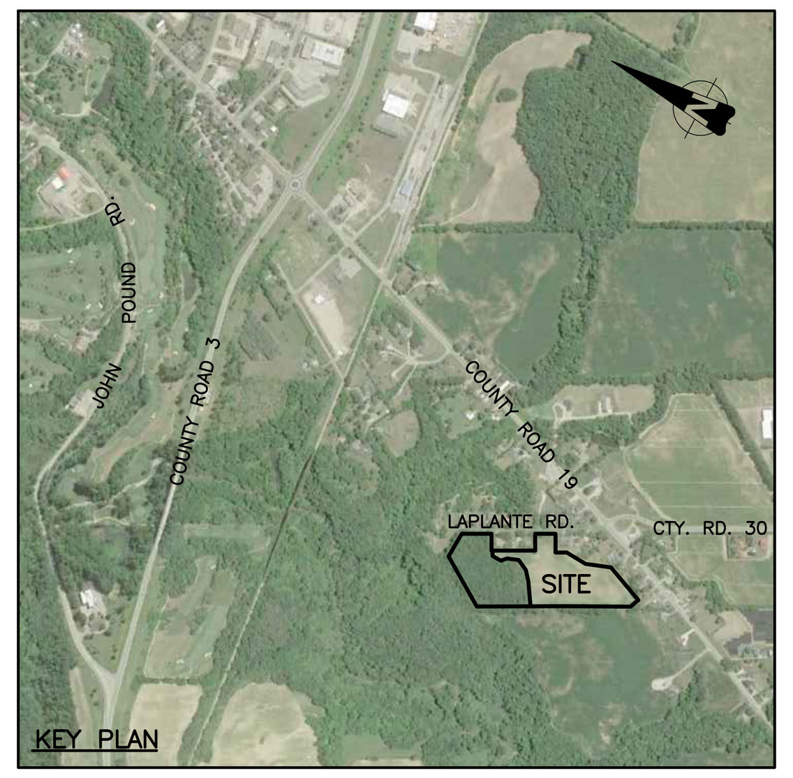
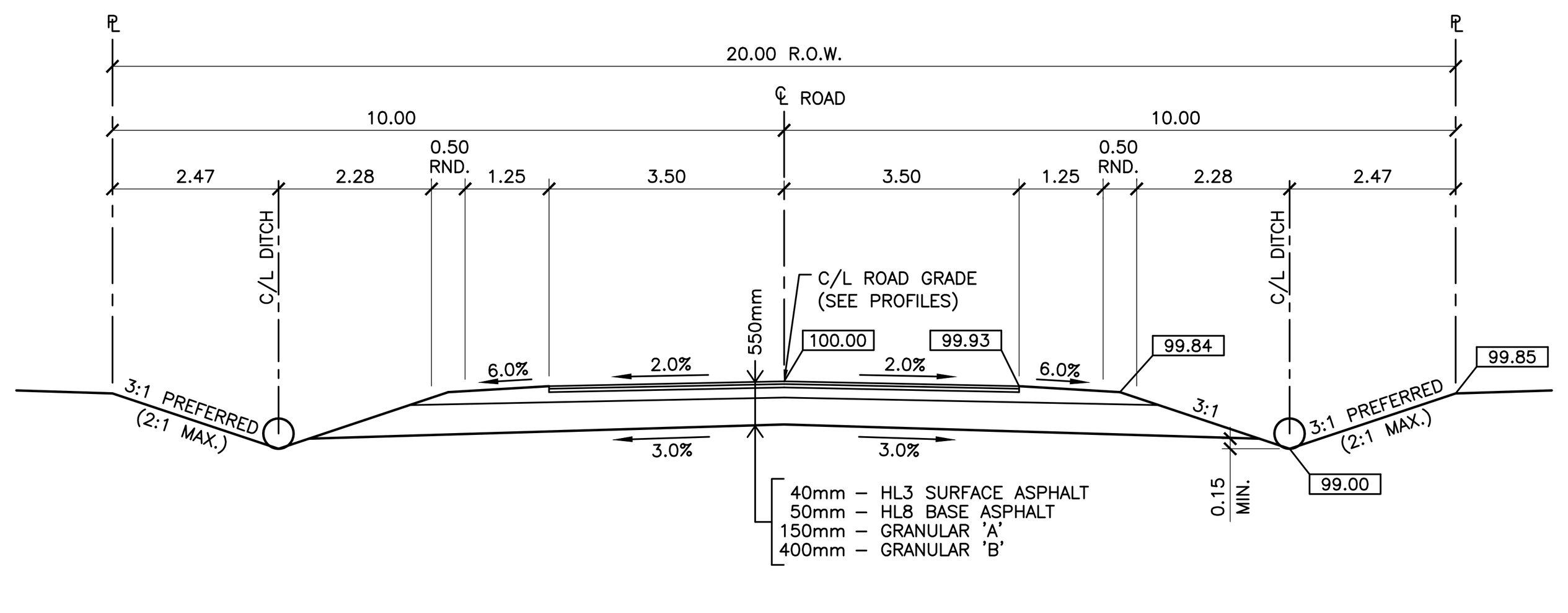
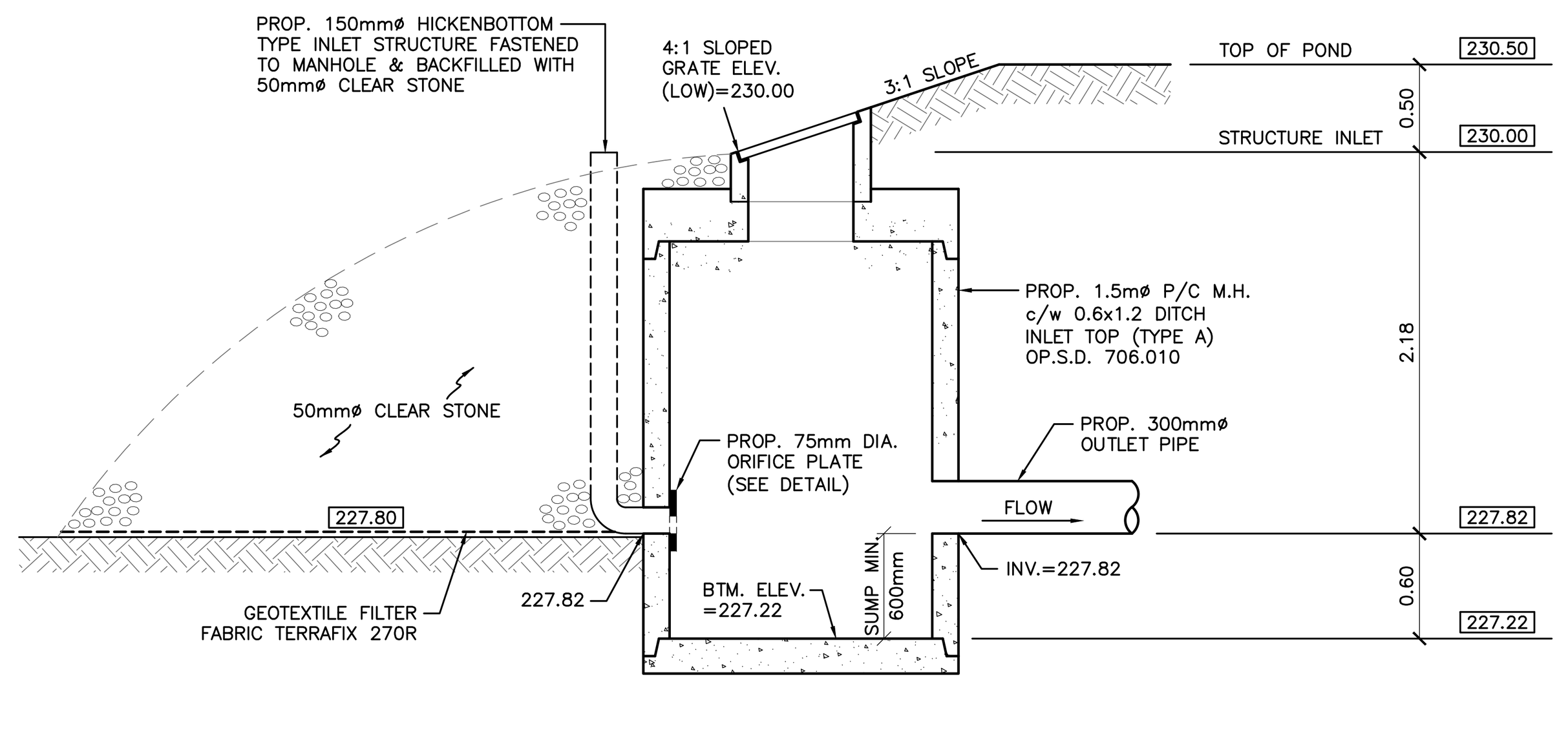
7. THE CONTRACTOR SHALL OBTAIN ALL PERMITS FOR CONSTRUCTION.
8. NO SUBSTITUTIONS WILL BE ALLOWED WITHOUT WRITTEN APPROVAL FROM NORFOLK COUNTY OR THE ENGINEER.
9. ALL EXCAVATIONS TO BE BACKFILLED WITH SELECT NATIVE MATERIAL, APPROVED BY THE ENGINEER, TO 95% S.P.D.
10. TREE PROTECTION PROCEDURES TO BE IMPLEMENTED IN ACCORDANCE WITH NORFOLK COUNTY STANDARDS.
11. ALL TRENCH BACKFILL UNDER EXISTING ROADWAYS SHALL BE COMPACTED IN MINIMUM 230mm LIFTS TO 98% STANDARD PROCTOR DENSITY. A GEOTECHNICAL ENGINEER'S REPRESENTATIVE SHALL BE ON SITE DURING THE WORK TO VERIFY THE COMPACTION OF EACH LIFT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS OF RE–TESTING.
12. FINAL ROADWAY CROSSFALL TO BE 2.0%
13. ALL CURB RETURNS TO BE 7.5m RAD. TO E/P UNLESS OTHERWISE NOTED.
14. STANDARD DEEP STRENGTH PAVEMENT 40mm HL3, 50mm HL8, 150mm GRANULAR 'A' & 400mm GRANULAR 'B'. (ALL DEPTHS COMPACTED THICKNESSES)
15. FINAL ASPHALT COURSE (HL3) SHALL BE PLACED IN ACCORDANCE WITH APPROVED NORFOLK COUNTY STANDARDS FOR TIMING.
16. ALL DRIVEWAY CULVERTS TO BE 450mmø (2mm THK.) CSP. PROVIDE 0.30m MIN. COVER OVER PIPE.
17. ALL BOULEVARD AREAS TO BE RESTORED WITH #1 NURSERY SOD ON A MINIMUM 150mm OF SELECT TOPSOIL.
18. DRIVEWAY RAMPS TO BE 50mm HL3 FINE ON 150mm GRANULAR 'A' FROM EDGE OF PAVEMENT TO PROPERTY LINE. DRIVEWAYS TO BE CONSTRUCTED OF SAME OR APPROVED EQUAL.
19. THE DEVELOPER AND/OR CONTRACTOR IS RESPONSIBLE FOR INSTALLING AND MAINTAINING (UNTIL ROAD CONSTRUCTION IS FINISHED) SILT CONTROL DEVICES AS SHOWN ON THE DRAWINGS AND AS DIRECTED BY THE ENGINEER.
20. ADDITIONAL SILT CONTROL LOCATIONS MAY BE REQUIRED AS DETERMINED BY THE COUNTY AND/OR THE ENGINEER.
21. SILTATION CONTROL BARRIERS SHALL BE PLACED AS DETAILED ON THE SILTATION AND EROSION CONTROL PLAN.
22. THE SILTATION AND EROSION CONTROL (SEC) MEASURES ILLUSTRATED ON THESE PLANS ARE CONSIDERED TO BE THE MINIMUM REQUIREMENT. SITE CONDITIONS MAY REQUIRE ADDITIONAL MEASURES WHICH WILL BE IDENTIFIED BY THE ENGINEER DURING CONSTRUCTION.
23. ALL SEC MEASURES ARE TO BE IN PLACE PRIOR TO COMMENCEMENT OF CONSTRUCTION.
24. OWNER/CONTRACTOR TO MAINTAIN EROSION CONTROL MEASURES THROUGHOUT SITE UNTIL A COMPLETE GRASS/VEGETATION COVER IS ACHIEVED.
25. ONLY AT THE DIRECTION OF THE ENGINEER ARE THE SEC MEASURES TO BE REMOVED.
26. CONTRACTOR TO PROVIDE SILT FENCE AROUND PERIMETER OF ALL ON SITE STOCKPILES.
27. RESTORE LAPLANTE ROAD AS PER NORFOLK COUNTY STANDARDS.





TYPICAL ROAD X-SECTION
SCALE: HORZ: 1:100 VERT: 1:100



S.W.M. POND
OUTLET STRUCTURE DETAIL
SCALE: 1:40

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND ABOVEGROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE COMMENCING WORK, THE CONTRACTOR SHALL FAMILIARIZE HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

LEGEND:

Symbol	Description
+200.00	EXISTING ELEVATIONS
SIB	EXISTING STANDARD IRON BAR
IB	EXISTING IRON BAR
HP	EXISTING HYDRO POLE
UP	EXISTING UTILITY POLE
	EXISTING GUY
OW	EXISTING OBSERVATION WELL
DICB	EXISTING DITCH INLET CATCHBASIN
TBM	EXISTING TEMPORARY BENCHMARK
	EXISTING CHAIN LINK FENCE
	EXISTING DITCH
	EXISTING CONIFEROUS TREES
	EXISTING DECIDUOUS TREES
	EXISTING TREES TO BE REMOVED
	PROPOSED LEFT DITCH
	PROPOSED RIGHT DITCH
	PROPOSED CULVERT
ST1	PROPOSED CATCHBASIN MANHOLE
189.71	PROPOSED C/L ROAD ELEVATION
ST1	PROPOSED STORM MANHOLE
CB	PROPOSED CATCHBASIN
	PROPOSED STORM SEWER

T.B.M. No. 1 ELEV. = 229.15m (GEO)
NAIL IN HYDRO POLE ON THE EAST SIDE OF LAPLANTE ROAD AS SHOWN.

NO.	REVISION	DATE (MM/DD/YY)	BY

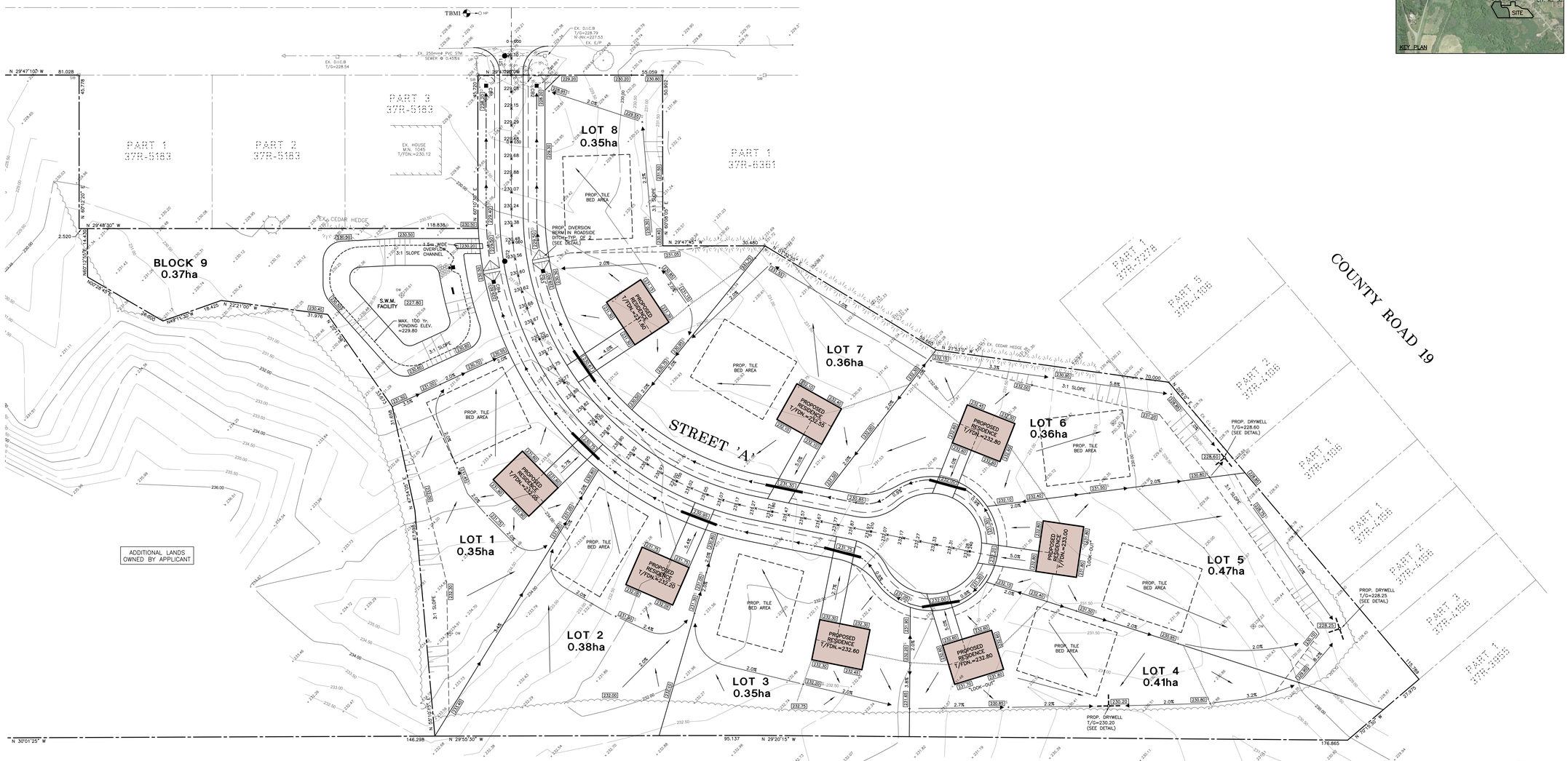
J.H. COHOON ENGINEERING LIMITED
CONSULTING ENGINEERS
440 HARDY ROAD, UNIT #1, BRANTFORD – ONTARIO, N3T 5L8
TEL. (519) 753–2656 FAX. (519) 753–4263 www.cohooneng.com

PROJECT:
PROPOSED RESIDENTIAL SUBDIVISION
1045 LAPLANTE ROAD, TILLSONBURG
NORFOLK COUNTY

CLIENT: JOSE OLIVEIRA

STREET 'A'
PLAN AND PROFILE
STA. 0+000 to STA. 0+240

DESIGN:	R.W.P.	SCALE:	HORZ: 1:500 VERT: 1:100
DRAWN:	K.P.B.	JOB No:	16933
CHECKED:	R.W.P.		
SHEET:	2 of 6	DWG. No:	16933–2
DATE:	NOV. 13/24		



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LEGEND:

- 200.00 — EXISTING ELEVATIONS
- [200.00] — PROPOSED ELEVATIONS
- [200.00]ˢ — PROPOSED SWALE ELEVATIONS
- [200.00]ᵈ — PROPOSED DITCH ELEVATIONS
- PROPOSED SWALE
- GENERAL DRAINAGE
- EXISTING CONIFEROUS TREES
- EXISTING DECIDUOUS TREES
- EXISTING TREES TO BE REMOVED

NOTES:

1. ALL ELEVATIONS SHOWN ARE METRIC.
2. BUILDER/OWNER TO VERIFY COMPLIANCE WITH ZONING BYLAWS (ie. SIDEYARDS, SETBACKS, REARYARDS ETC.)

T.B.M. No. 1 ELEV. = 229.15m (GEO)
NAIL IN HYDRO POLE ON THE EAST SIDE OF LAPLANTE ROAD AS SHOWN.

NO.	REVISION	DATE (MM/DD/YY)	BY

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PROJECT:

PROPOSED RESIDENTIAL SUBDIVISION

1045 LAPLANTE ROAD, TILLSONBURG
NORFOLK COUNTY

CLIENT: JOSE OLIVEIRA

GRADING PLAN

DESIGN:	R.W.P.	SCALE:	1:500
DRAWN:	K.P.B.	JOB No:	16933
CHECKED:	R.W.P.		
SHEET:	1 of 6	DWG. No:	16933–1
DATE:	NOV. 13/24		

16933

J.H. COHOON ENGINEERING LIMITED

CONSULTING ENGINEERS
440 Hardy Road, Unit #1, Brantford, ON N3T 5L8
Tel: (519) 753-2656 Fax: (519) 753-4263
www.cohooneng.com

November 14, 2024

Norfolk County
Gilbertson administration Building
12 Gilbertson Drive
Simcoe, Ontario
N3Y 4N5

Attention: Mr. S. Gradish
Development Technologist
Engineering
Environmental and Infrastructure Services Division

Re: Proposed Residential Development
MN 1045 Laplante Road
Tillsonburg, Ontario
Norfolk County
Traffic Considerations

Dear Sir:

In response to request from Mr. P. Ruzz representing the owner, Mr. J. Oliveira, our firm has reviewed the traffic impacts of the proposed development to be located at MN 1045 Laplante Road in Tillsonburg, Ontario, Norfolk County.

In support of an application for re-zoning and for draft plan of subdivision, to create eight (8) single family lots on the subject property, a traffic brief was requested as part of the pre-consultation notes. The proposed site development has been included within Appendix 'A' of this report.

Existing Transportation Network

The subject property is located on the south side of Laplante Road in a semi built up area in Norfolk West in Tillsonburg, Ontario in Norfolk County. The attached aerial photograph and the key plan presented within Figure No. 1, illustrates the existing transportation network in the area.

The site is located in a predominantly rural area of Norfolk County with no municipal services on the existing streets (Laplante Road) adjacent to the property. Our firm reached out to Norfolk County and determined that no existing traffic volumes were available for LaPlante Road in the vicinity of the site.

The current zoning for the site is Residential Hamlet (RH) which is proposed to be changed to R1-A within the settlement boundary of the area. A land use plan illustrating the existing land uses in the area has been included within Appendix 'B' of this report.

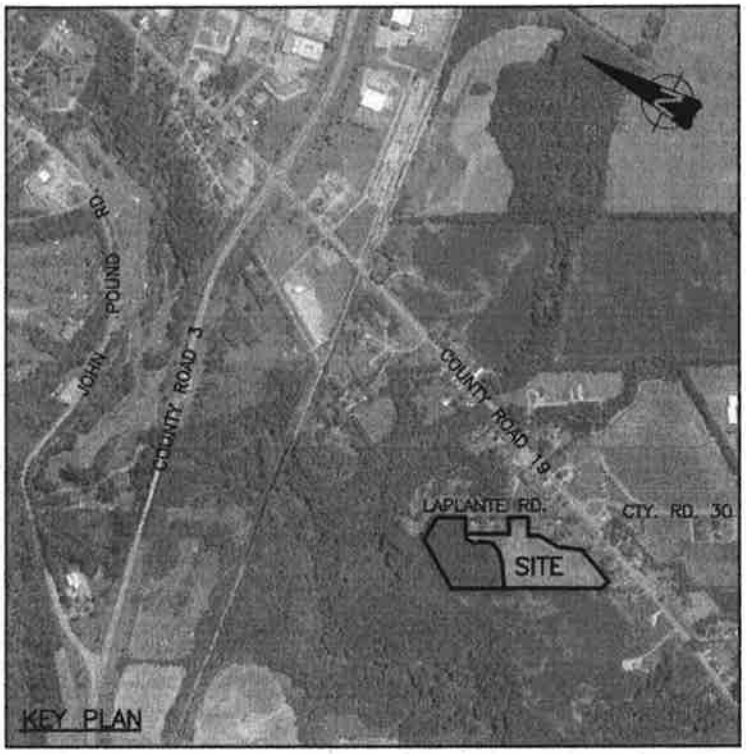

Figure No. 1
Key Plan

Development Proposal

In consideration of the impacts of the traffic generated on the subject property and utilizing the ITE manual for trip generations during the peak hours, we have estimated the following trip generations for this site during the peak hours

Residential
Eight (8) Single Family Homes / Units
= Approximately 0.6 trips per unit for the peak pm hour – this trip generation for single family homes is 1.0. For the purpose of this analysis, a trip generation of 1.0 was utilized.

In this case, this would translate into about 8 peak hour trips relating to this site.

In review of the requirements for the typical TIS report, a full TIS is usually only required when the trip generation exceed 75 peak hour vehicles generated. As such, a traffic brief is being proposed in support of this application.

The site is anticipated to operate without any impacts to the existing road network. The addition of 8 peak hour trips associated with the development on LaPlante Road will not have an impact on the existing road infrastructure network.

Site Access

The proposed site plan has been reviewed with consideration of access for all types of vehicles on this property.

In the review of the site plan in conjunction with the road network, the proposed driveway access locations have sufficient site lines on the existing LaPlante Road right-of-way. The location of the entrance would not have any impact on the operation of the municipal rights-of-way.

Fire protection for this development will be provided directly from the LaPlante Road right-of-way to meet the requirements of the Ontario Building Code.

Conclusions:

The findings of our analysis of the site complete with considerations of the overall development are as follows:

- The development proposal to redevelop the subject property to allow for approximately eight (8) single family homes.
- The access to the site is intended to be a full movement driveway onto LaPlante Road.
- The development is going to generate only a maximum of eight (8) peak pm hour movements as a result of the increased development
- The anticipated increased traffic from the development would be considered insignificant as it relates to the overall capacity of existing infrastructure in the area.

I trust that this information will be sufficient to allow the re-zoning application to proceed.

Yours truly,

J.H. COHOON ENGINEERING LIMITED

R.W. Phillips, P.Eng.

Appendix 'A'

J H Cohoon Engineering Limited – Site Development Plan
Being drawing 15296-1

RESIDENTIAL

LAPLANTE ROAD
(20.117m WIDE)

NORTH

RESIDENTIAL

BLOCK 9
3,751s.m.

LOT 8
3,540s.m.

LOT 7
3,657s.m.

LOT 6
3,607s.m.

COUNTY ROAD 19

RESIDENTIAL

PROPOSED

STREET

LOT 1
3,513s.m.

LOT 2
3,832s.m.

LOT 3
3,530s.m.

LOT 4
4,133s.m.

LOT 5
4,768s.m.

WOODED AREA

ADDITIONAL LANDS
OWNED BY
APPLICANT

N 29°58'30" W 95.137 N 29°20'15" W 170.885

AGRICULTURAL

DRAFT PLAN OF SUBDIVISION

PART OF LOT 5
CONCESSION 4
NORTH OF TALBOT ROAD
GEOGRAPHIC TOWNSHIP OF MIDDLETON
NORFOLK COUNTY

KEY PLAN

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN

DATE — KIM HUSTED, O.L.S.
JEWITT & DIXON LTD.

OWNER'S CERTIFICATE

I HEREBY AUTHORIZE J.H. COHOON ENGINEERING LTD. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE CORPORATION OF NORFOLK COUNTY FOR APPROVAL

DATE — JOSE OLIVEIRA

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT

A – SEE PLAN
B – SEE PLAN
C – SEE PLAN
D – RESIDENTIAL
E – SEE PLAN
F – SEE PLAN
G – SEE PLAN
H – INDIVIDUAL WELLS
I – SANDY SILT
J – SEE PLAN
K – INDIVIDUAL SEPTIC SYSTEMS
L – NONE

AREA SCHEDULE

LOTS 1–8	33.586± m
BLOCK 9	3.751± m
ROADS	5.268± m
TOTAL	39.603± m

J.H. COHOON ENGINEERING LIMITED
CONSULTING ENGINEERS

DESIGN: RWP
DRAWN: KPB
SCALE: 1:500
DATE: NOV 5/24
JOB No: 16933
DWG No: DP1

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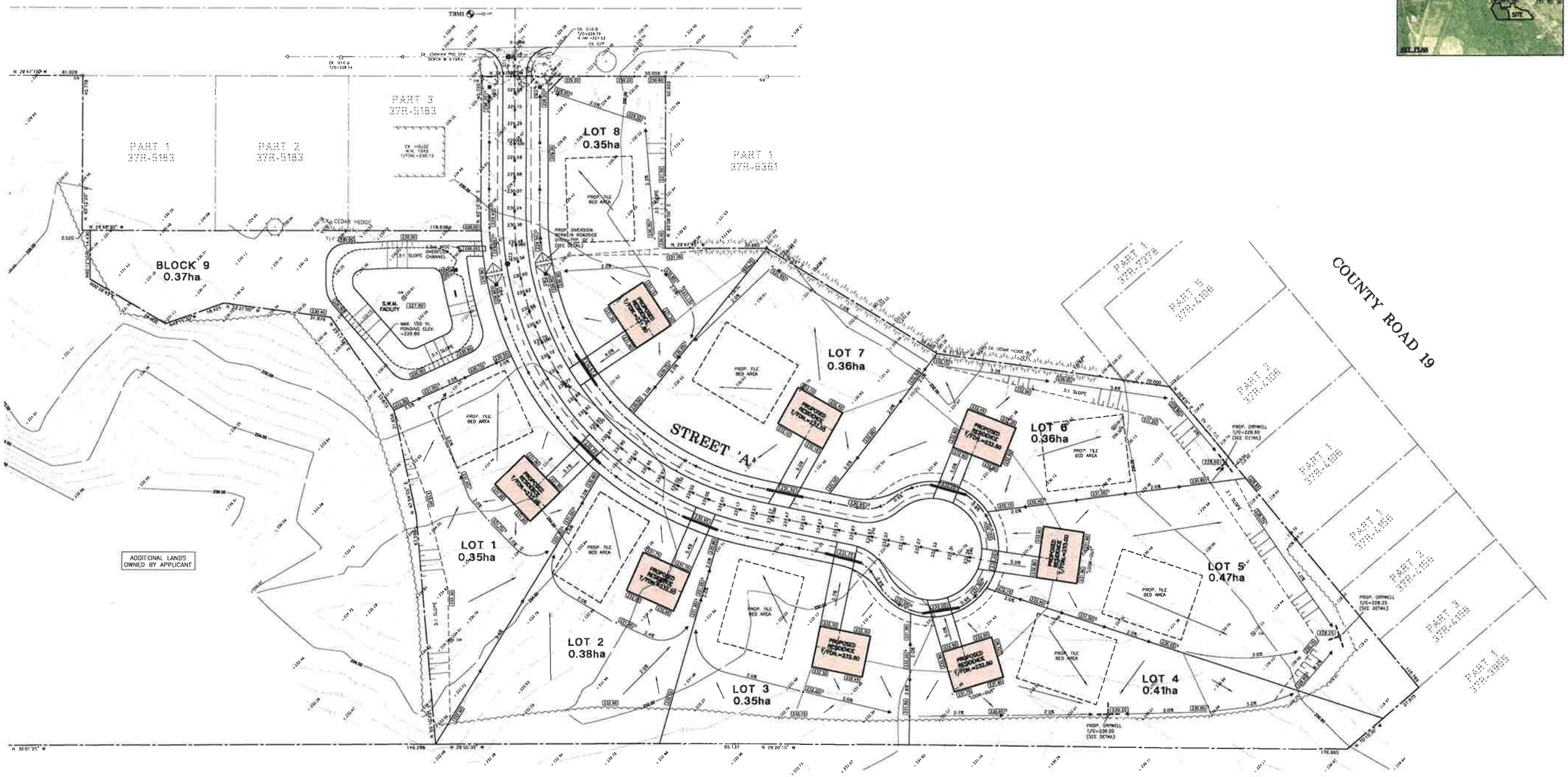

LEGEND:

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- GENERAL DRAINAGE
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NAIL IN WOOD POLE ON THE EAST SIDE OF LAPLANTE ROAD AS SHOWN.

NO.	REVISION	DATE (YY/MM/DD)	BY

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PROJECT:
PROPOSED RESIDENTIAL SUBDIVISION
1045 LAPLANTE ROAD, TILLSONBURG
NORFOLK COUNTY

CLIENT:
JOSE OLIVEIRA

GRADING PLAN

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DRAWN:	K.P.B.	JOB No.	16933
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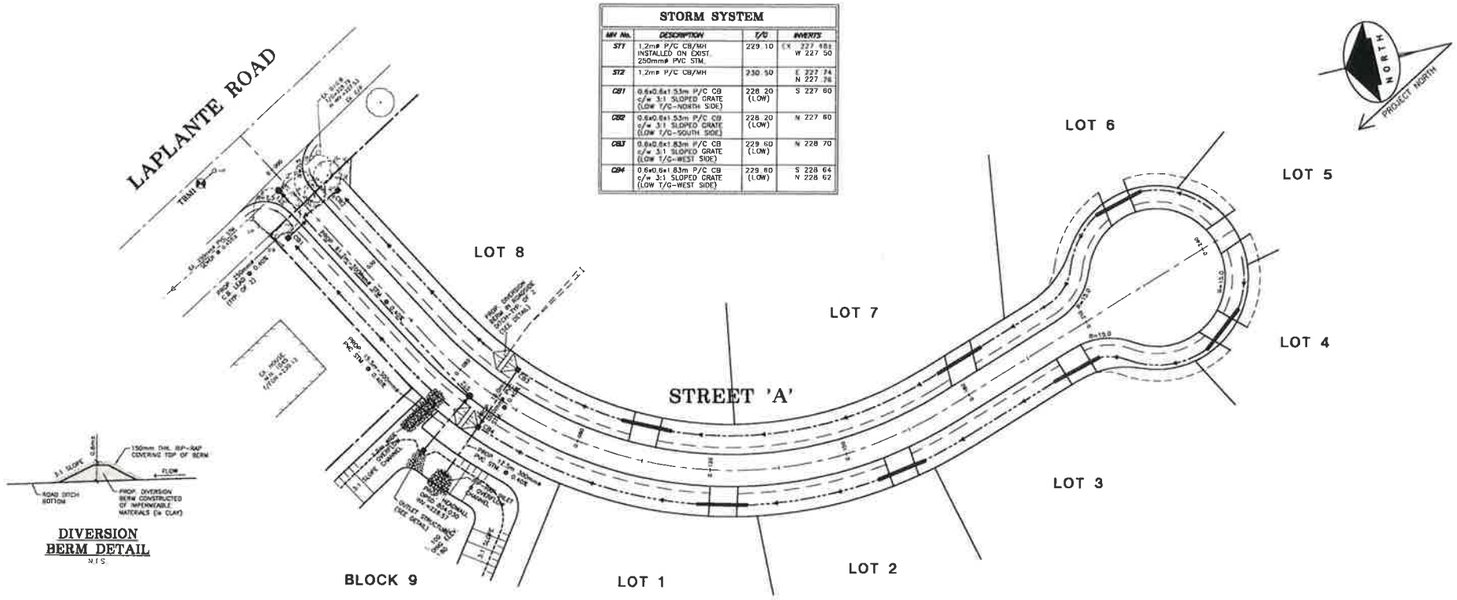

STORM SYSTEM

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CB4	0.6x0.6x1.83m P/C CB c/w 3:1 SLOPED GRATE (LOW T/G-WEST SIDE)	229.80 (LOW)	S 228.64 N 228.62

DIVERSION BERM DETAIL
N.T.S.

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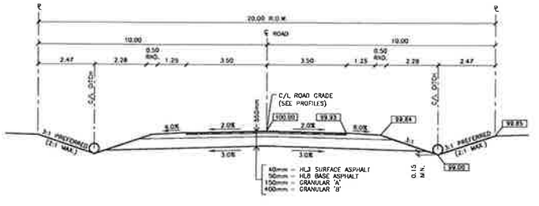
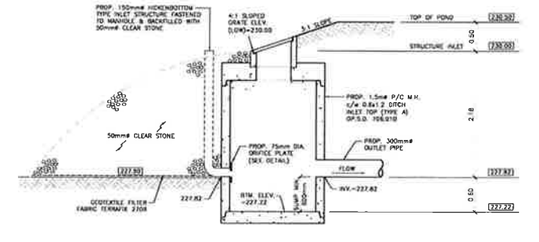
7. THE CONTRACTOR SHALL OBTAIN ALL PERMITS FOR CONSTRUCTION.
8. NO SUBSTITUTIONS WILL BE ALLOWED WITHOUT WRITTEN APPROVAL FROM NORFOLK COUNTY OR THE ENGINEER.
9. ALL EXCAVATIONS TO BE BACKFILLED WITH SELECT NATIVE MATERIAL, APPROVED BY THE ENGINEER, TO SOE S.P.D.
10. TREE PROTECTION PROCEDURES TO BE IMPLEMENTED IN ACCORDANCE WITH NORFOLK COUNTY STANDARDS.
11. ALL TRENCH BACKFILL UNDER EXISTING ROADWAYS SHALL BE COMPACTED IN MINIMUM 230mm LIFTS TO 98% STANDARD PROCTOR DENSITY. A GEOTECHNICAL ENGINEER'S REPRESENTATIVE SHALL BE ON SITE DURING THE WORK TO VERIFY THE COMPACTION OF EACH LIFT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS OF RE-TESTING.
12. FINAL ROADWAY CROSSFALL TO BE 2.0%
13. ALL CURB RETURNS TO BE 7.5m RAD. TO C/P UNLESS OTHERWISE NOTED.
14. STANDARD DEEP STRENGTH PAVEMENT 40mm HL3, 50mm HL8, 150mm GRANULAR 'A' & 400mm GRANULAR 'B'. (ALL DEPTHS COMPACTED THICKNESSES)
15. FINAL ASPHALT COURSE (HL3) SHALL BE PLACED IN ACCORDANCE WITH APPROVED NORFOLK COUNTY STANDARDS FOR THERE.
16. ALL DRIVEWAY CULVERTS TO BE 450mm# (2mm THK.) CSP. PROVIDE 0.30m MIN. COVER OVER PIPE.
17. ALL BOULEVARD AREAS TO BE RESTORED WITH #1 NURSERY SOD ON A MINIMUM 150mm OF SELECT TOPSOIL.
18. DRIVEWAY RAMPS TO BE 50mm HL3 FINE ON 150mm GRANULAR 'A' FROM EDGE OF PAVEMENT TO PROPERTY LINE. DRIVEWAYS TO BE CONSTRUCTED OF SAME OR APPROVED EQUAL.
19. THE DEVELOPER AND/OR CONTRACTOR IS RESPONSIBLE FOR INSTALLING AND MAINTAINING (UNTIL ROAD CONSTRUCTION IS FINISHED) SILT CONTROL DEVICES AS SHOWN ON THE DRAWINGS AND AS DIRECTED BY THE ENGINEER.
20. ADDITIONAL SILT CONTROL LOCATIONS MAY BE REQUIRED AS DETERMINED BY THE COUNTY AND/OR THE ENGINEER.
21. SILTATION CONTROL BARRIERS SHALL BE PLACED AS DETAILED ON THE SILTATION AND EROSION CONTROL PLAN.
22. THE SILTATION AND EROSION CONTROL (SEC) MEASURES ILLUSTRATED ON THESE PLANS ARE CONSIDERED TO BE THE MINIMUM REQUIREMENT. SITE CONDITIONS MAY REQUIRE ADDITIONAL MEASURES WHICH WILL BE IDENTIFIED BY THE ENGINEER DURING CONSTRUCTION.
23. ALL SEC MEASURES ARE TO BE IN PLACE PRIOR TO COMMENCEMENT OF CONSTRUCTION.
24. OWNER/CONTRACTOR TO MAINTAIN EROSION CONTROL MEASURES THROUGHOUT SITE UNTIL A COMPLETE GRASS/VEGETATION COVER IS ACHIEVED.
25. ONLY AT THE DIRECTION OF THE ENGINEER ARE THE SEC MEASURES TO BE REMOVED.
26. CONTRACTOR TO PROVIDE SILT FENCE AROUND PERIMETER OF ALL ON SITE STOCKPILES.
27. RESTORE LAPLANTE ROAD AS PER NORFOLK COUNTY STANDARDS.



TYPICAL ROAD X-SECTION
SCALE: HORZ: 1:100 VERT: 1:100



S.W.M. POND OUTLET STRUCTURE DETAIL
SCALE: 1:40

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND ABOVEGROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION IS NOT GUARANTEED. BEFORE ANY WORK IS COMMENCED, BEFORE CONNECTING WORK, THE CONTRACTOR SHALL FAMILIARIZE HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

LEGEND:

- EXISTING ELEVATIONS
- EXISTING STANDARD IRON BAR
- EXISTING IRON BAR
- EXISTING HYDRO POLE
- EXISTING UTILITY POLE
- EXISTING GUY
- EXISTING OBSERVATION WELL
- EXISTING DITCH INLET CATCHBASIN
- EXISTING TEMPORARY BENCHMARK
- EXISTING CHAIN LINK FENCE
- EXISTING DITCH
- EXISTING CONIFEROUS TREES
- EXISTING DECIDUOUS TREES
- EXISTING TREES TO BE REMOVED
- PROPOSED LEFT DITCH
- PROPOSED RIGHT DITCH
- PROPOSED CULVERT
- PROPOSED CATCHBASIN MANHOLE
- PROPOSED C/L ROAD ELEVATION
- PROPOSED STORM MANHOLE
- PROPOSED CATCHBASIN
- PROPOSED STORM SEWER

T.B.M. No. 1 ELEV. = **229.15m** (GEO)
SAW CUT ON TOP NUT ON THE EAST SIDE OF LAPLANTE ROAD AS SHOWN.

NO.	REVISION	DATE (YY/MM/DD)	BY

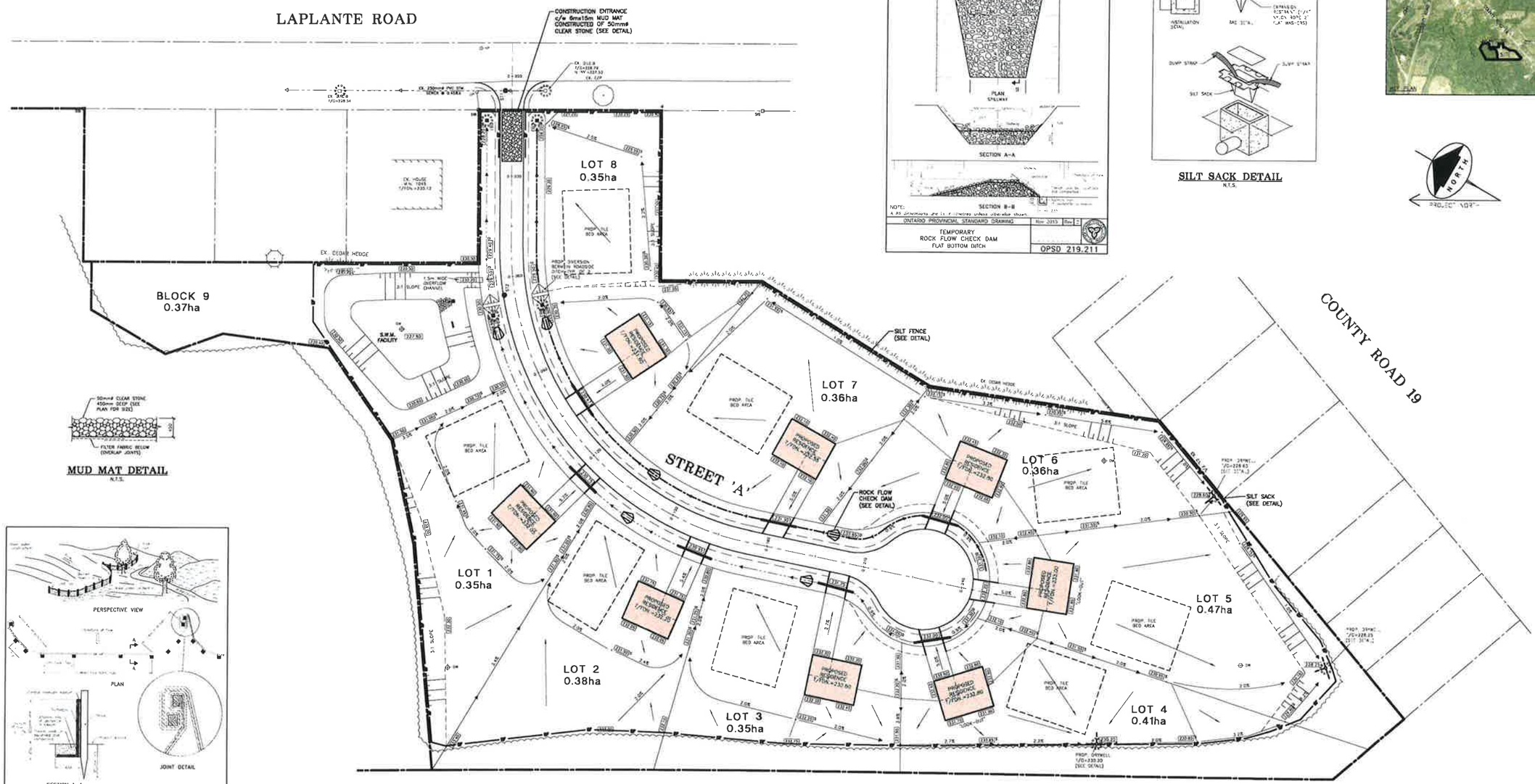
J.H. COHOON ENGINEERING LIMITED
CONSULTING ENGINEERS
440 HARDY ROAD - UNIT #1 - BRANTFORD - ONTARIO - N3T 5L8
TEL. (519) 753-2656 FAX (519) 753-4263 www.cohooneng.com

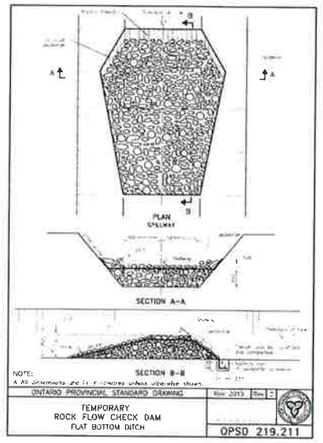
PROJECT:
PROPOSED RESIDENTIAL SUBDIVISION
1045 LAPLANTE ROAD, TILLSONBURG
NORFOLK COUNTY

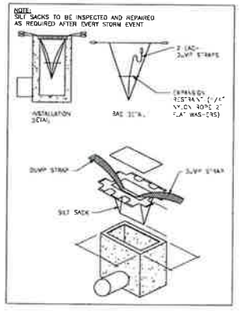
CLIENT: JOSE OLIVEIRA

STREET 'A'
PLAN AND PROFILE
STA. 0+000 to STA. 0+240

DESIGN:	R.W.P.	SCALE:	HORZ: 1:500 VERT: 1:100
DRAWN:	K.P.B.	JOB No:	16933
CHECKED:	R.W.P.		
SHEET:	2 of 6	DWG No:	16933-2
DATE:	NOV. 13/24		

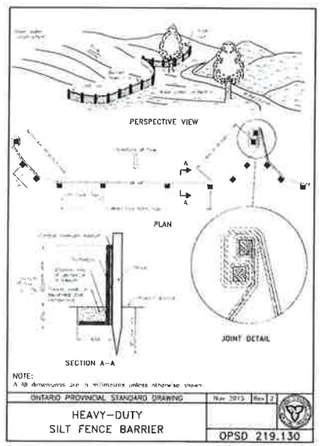






SILT SACK DETAIL
N.T.S.

MUD MAT DETAIL
N.T.S.



THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND ABOVEGROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE COMMENCING WORK, THE CONTRACTOR SHALL FAMILIARIZE HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

LEGEND:

- 230 — EXISTING ELEVATIONS
- 230.60 — PROPOSED ELEVATIONS
- 230.65 S — PROPOSED SWALE ELEVATIONS
- 230.50 D — PROPOSED DITCH ELEVATIONS
- PROPOSED SWALE
- GENERAL DRAINAGE
- PROPOSED SILT CONTROL FENCING
- SILT SACK AS SHOWN
- ROCK FLOW CHECK DAM

NOTES:

1. ALL ELEVATIONS SHOWN ARE METRIC.
2. THE SILTATION & EROSION CONTROL (SEC) MEASURES ILLUSTRATED ON THIS PLAN ARE CONSIDERED TO BE THE MINIMUM REQUIREMENT. SITE CONDITIONS MAY REQUIRE ADDITIONAL MEASURES WHICH WILL BE IDENTIFIED BY THE ENGINEER DURING CONSTRUCTION.
3. ALL SEC MEASURES ARE TO BE IN PLACE PRIOR TO COMMENCEMENT OF CONSTRUCTION.
4. OWNER/CONTRACTOR TO MAINTAIN EROSION CONTROL MEASURES THROUGHOUT SITE UNTIL A COMPLETE GRASS/VEGETATION COVER IS ACHIEVED.
5. ONLY AT THE DIRECTION OF THE ENGINEER ARE THE SEC MEASURES TO BE REMOVED.
6. SITE WORKS ARE TO BE STAGED IN SUCH A MANNER THAT EROSION WILL BE MINIMIZED, AND THE CONSULTANT MUST PROVIDE CONFIRMATION THAT ALL APPROVED SILTATION AND EROSION CONTROL FACILITIES HAVE BEEN INSTALLED PRIOR TO THE COMMENCEMENT OF ANY GRADING, EXCAVATION OR DEMOLITION.
7. CLEARING AND GRUBBING OF THE SITE SHOULD BE KEPT TO A MINIMUM AND VEGETATION REMOVED ONLY IN ADVANCE OF IMMEDIATE CONSTRUCTION.
8. STOCKPILES OF EARTH OR TOPSOIL ARE TO BE LOCATED AND PROTECTED TO MINIMIZE ENVIRONMENTAL INTERFERENCE. EROSION CONTROL FENCING IS TO BE INSTALLED AROUND THE BASE OF ALL STOCKPILES.
9. THE OWNER IS RESPONSIBLE TO ENSURE THE MUNICIPAL ROADWAYS ARE CLEANED OF ALL SEGMENTS FROM VEHICULAR TRACKING ETC. TO AND FROM THE SITE, AT THE END OF EACH WORKDAY.
10. ALL EXISTING AND PROPOSED CATCHBASINS ON THE SUBJECT PROPERTY, PLUS ANY CATCHBASINS WITHIN THE INFLUENCE OF RUNOFF FROM THE SITE, ARE TO BE PROTECTED WITH FILTER CLOTH OR APPROVED EQUIVALENT.

NO.	REVISION	DATE (MM/DD/YY)	BY

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CONSULTING ENGINEERS
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TEL. (519) 753-2856 FAX (519) 753-4263 www.cohoonenng.com

PROJECT:

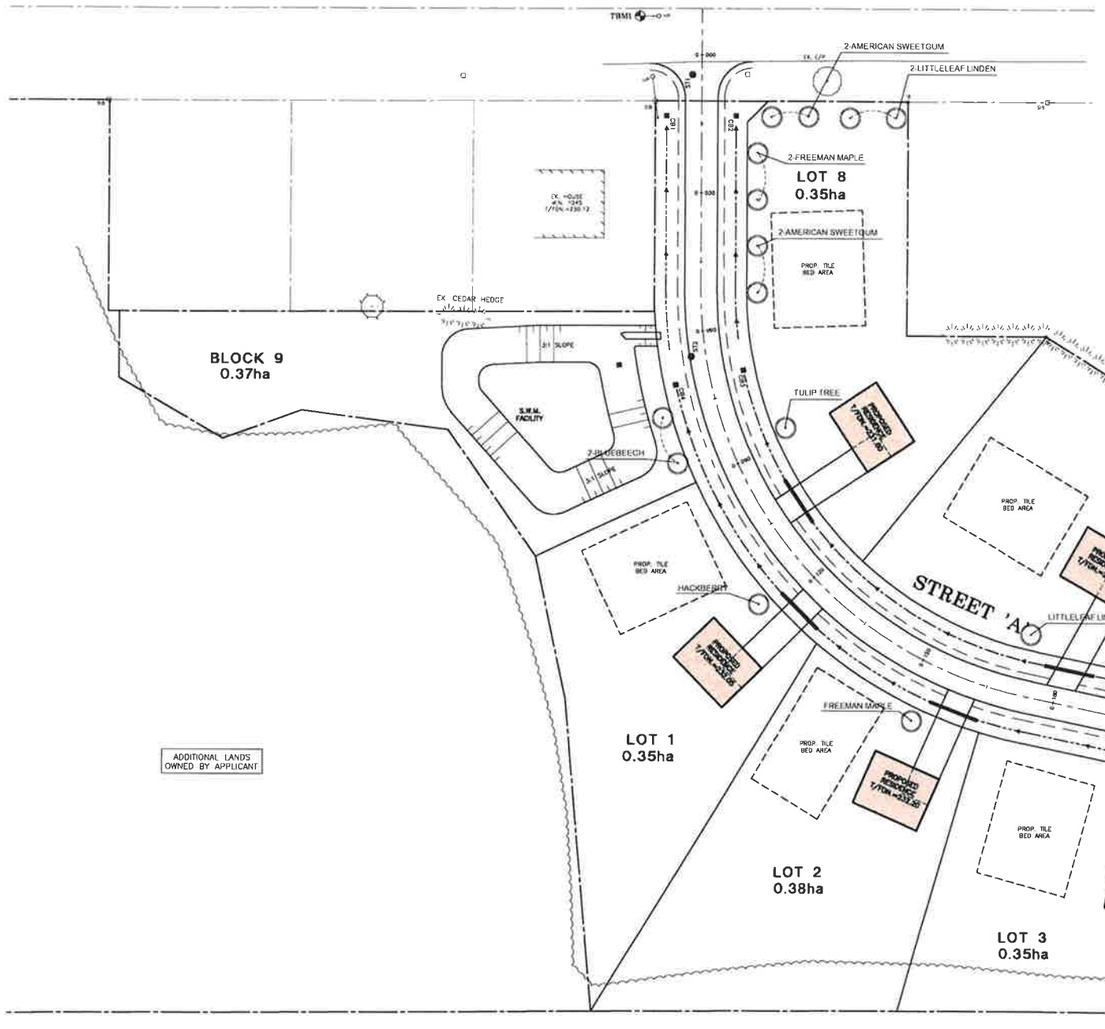
PROPOSED RESIDENTIAL SUBDIVISION
1045 LAPLANTE ROAD, TILLSONBURG
NORFOLK COUNTY

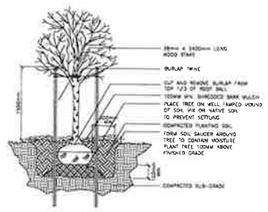
CLIENT: JOSE OLIVEIRA

SILTATION & EROSION CONTROL PLAN

DESIGN:	R.W.P.	SCALE:	1:500
DRAWN:	K.P.B.	JOB No:	16933
CHECKED:	R.W.P.		
SHEET:	3 of 6	DWG. No:	16933-3
DATE:	NOV. 13/24		

LAPLANTE ROAD





TYPICAL DECIDUOUS TREE PLANTING
NTS ALL DIMENSIONS IN MILLIMETRES

PLANT SCHEDULE				
TREES				
QTY.	BOTANICAL NAME	COMMON NAME	SIZE	CONDITION
	DECIDUOUS TREES			
4	ACER x FREEMANII	FREEMAN MAPLE	60mm cal.	W.B.
3	CARPINUS CAROLINIANA	BLUEBEECH	60mm cal.	W.B.
2	CELTIS OCCIDENTALIS	HACKBERRY	60mm cal.	W.B.
2	LIRIODENDRON TULIPIFERA	TULIP TREE	60mm cal.	W.B.
4	LIQUIDAMBAR STYRACIFLUA	AMERICAN SWEETGUM	60mm cal.	W.B.
3	TILIA CORDATA	LITTLELEAF LINDEN	60mm cal.	W.B.

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND ABOVEGROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE COMMENCING WORK, THE CONTRACTOR SHALL INFORM HIMSELF/HERSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

LANDSCAPE NOTES:

1. THE LANDSCAPE PLAN HAS BEEN PREPARED IN COORDINATION WITH SITE PLAN & ENGINEERING PLANS.
2. THE LANDSCAPE CONTRACTOR SHALL VERIFY ALL CONDITIONS IN THE FIELD AND REPORT ANY DISCREPANCIES TO THE LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION.
3. LIMIT OF WORK TO BE THE PROPERTY LINE SHOWN.
4. ANY AREAS OUTSIDE THE LIMIT OF WORK DAMAGED BY THE CONTRACTOR SHALL BE RESTORED BY THE CONTRACTOR TO CITY OF BRANTFORD STANDARDS AT NO ADDITIONAL COST TO THE OWNER.
5. ALL UNDERGROUND UTILITIES TO BE LOCATED BY THE LANDSCAPE CONTRACTOR PRIOR TO THE COMMENCEMENT OF ANY WORK.
6. ALL DIMENSIONS ARE IN METRES.
7. ALL PLANT MATERIAL TO BE No. 1 GRADE, NURSERY GROWN IN ACCORDANCE WITH THE CANADIAN NURSERY TRADES ASSOCIATION.
8. PLANT MATERIAL QUANTITIES ON THE DRAWING SHALL TAKE PRECEDENT OVER THOSE IN THE PLANT LIST.
9. ANY PLANT MATERIAL WHICH COMES OVER OR UNDER ANY UTILITY WILL BE RELOCATED AS DIRECTED BY THE LANDSCAPE ARCHITECT.
10. SUPPLY & INSTALL A SHREDDED BARK MULCH ON ALL PLANTING BED TO BE A 100mm DEPTH.
11. NORFOLK COUNTY IS RESPONSIBLE FOR PLANTING TREES ON PUBLIC PROPERTY. THE DEVELOPER SHALL PAY TO THE COUNTY THE APPLICABLE FEE, AS PER NORFOLK COUNTY'S USER FEE BYLAW, FOR ALL TREES BEING PLANTED WITHIN THE COUNTY ROAD ALLOWANCE ON STANLEY STREET AND METCALFE STREET.
12. FOR ON SITE LANDSCAPING THE DEVELOPER IS RESPONSIBLE FOR TREE PLANTING AND SHALL PAY A SECURITY DEPOSIT TO THE COUNTY WHICH WILL BE RELEASED UPON FINAL ACCEPTANCE OF THE TREES.

NO.	REVISION	DATE (YYYY/MM/DD)	BY

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PROJECT
PROPOSED RESIDENTIAL SUBDIVISION
1045 LAPLANTE ROAD, TILLSONBURG
NORFOLK COUNTY

CLIENT
JOSE OLIVEIRA

TREE PLANTING PLAN

DESIGN	R.W.P.	SCALE	1:500
DRAWN	K.P.B.	JOB No.	16933
CHECKED	R.W.P.		
SHEET	6 of 6	DWG No.	16933-4
DATE	NOV. 13/24		

Appendix 'B'
Land Use Aerial Photo of Subject Area

Google Maps

1045 Laplante Rd

Laplante Subdivision (Norfolk County)

Imagery ©2024 Airbus, CNES / Airbus, Maxar Technologies, Map data ©2024 Google 200 m

MEMO

GeoProcess RESEARCH ASSOCIATES
Knowledge Research Consulting

July 17, 2024

Re: Condition of Natural Heritage Features Memo
LaPlante Road

1. Introduction

GeoProcess Research Associates (GRA) was retained by G. Douglas Vallee Ltd. to complete an Environmental Impact Statement [EIS] for a property located between 1045 and 1035 LaPlante Road in the Hamlet of Norfolk West, adjacent to the County of Norfolk and Oxford boundary and the town of Tillsonburg in 2016 (Map 1). Field investigation identified six Natural Heritage (NH) features within the Subject Property: four Butternut trees (*Juglans cinerea*) (one located in the woodland and three located in the hedgerow), one mature White Oak tree (*Quercus alba*) (located in the hedgerow), and a Woodland classified as FOD-7 (Map 2).

The following memo provides an update to the 2016 work, which included a site visit to reassess the condition of the six primary NH features identified in 2016.

2. Field Work

Date: 26/06/2024

Time: 1:45 pm

Weather: Precipitation: none, Beaufort Wind Scale: 1/10, Temperature: 23˚C, Cloud Cover: 10/10

GRA reassessed the condition of the six NH features identified in 2016 on June 26, 2024. The results of the reassessment are as follows:

- All four butternut trees were dead (Figure 1-4), with only one still standing.
- The white oak was in good condition (Figure 5).
- The woodland was present, and the FOD-7 Fresh-Moist Lowland Deciduous Forest Ecosite classification continues to be valid (Figures can be found in Appendix A).
- A species list for the hedgerow and woodland is provided in Appendix B.
- Two large cottonwoods were observed in the hedgerow. These trees are in decline, with portions of their crown either dead or dying. These trees represent potential snag trees and, therefore, could provide maternity roosting habitat for bats. As these trees also represent a hazard to future

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DUNDAS, ON, L9H 6Y6
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www.geoprocessresearch.com

development on the site, if they are to be removed, they should be cut outside of the bat roosting season which is from April 1st to October 31st.

- Multiple Oak (*Quercus sp.*) and Hickory (*Carya sp.*) trees in the hedgerow exceeded 50 cm in diameter at breast height (DBH). It is recommended to provide a 5 m setback from the dripline of the hedgerow trees to protect their root zone.
- A 10 m setback from the dripline of the FOD-7 woodland community is recommended to protect this feature. Grading is not recommended within the woodland setback.

3. Conclusion

The reassessment of the natural heritage features within the subject property found that all four butternuts have died, and as a result, no further assessments, such as a Butternut Health Assessment or communications with the MECP under the Species at Risk Act, are required. The hedgerow was found to still be supporting a variety of large-diameter trees that are recommended to be protected with a 5 m setback from their driplines. The larger woodland community associated with the Big Otter Creek Areas of Natural Scientific Interest (ANSI) and Significant Woodland to the north of the subject property continues to be in good condition. Its protection is recommended through the implementation of a 10 m setback from its dripline. If these mitigation measures are implemented, no negative impacts to the ANSI are anticipated.

Regards,

GEOPROCESS RESEARCH ASSOCIATES INC

Lauren Barnett, B.Sc.
Ecologist

Reviewed

Ken Glasbergen, MSc., ERPG
Principal, Senior Ecologist

Maps

GeoProcess RESEARCH ASSOCIATES

EIS STUDY AREA

ANSI and HAZARD LANDS

PROPOSED RESIDENTIAL DEVELOPMENT AREA

LAPLANTE ROAD EIS
EIS STUDY AREA

Scale: NTS	Drawn By: KG
Date Issued: JUNE 2016	Checked By: KG

Map 1

GeoProcess RESEARCH ASSOCIATES

Bn1 Butternut

Ow Large White Oak

LePlante Road Natural Heritage Assessment
Development Envelope

Scale: 1:2,000	Drawn By: KG	Map 2
Date Issued: June 2017	Checked By: JR	

Appendix A

NH Feature Figures

Figure 1. Butternut 1

Figure 2. Butternut 2

Figure 3. Butternut 3

Figure 4. Butternut 4

Figure 5. White Oak

Figure 6. Hedgerow (left) and Woodland (right)

Figure 7. Hedgerow

Figure 8. Woodland

Figure 9. 2x eastern Cottonwood snags in Hedgerow

Figure 10. 1x eastern cottonwood snag in woodland

Appendix B

Species Master List

Species List for Hedgerow	Species List for Woodland
Pignut Hickory (*Carya glabra*)	Black walnut (*Juglans nigra*)
Common Moonseed (*Menispermum canadense*)	Basswood (*Tilia americana*)
White Oak (*Quercus alba*)	Pin Oak (*Quercus palustrus*)
Red Oak (*Quercus rubra*)	Trembling Aspen (*Populus tremuloides*)
Manitoba Maple (*Acer negundo*)	Garlic Mustard (*Alliaria petiolata*)
Black Cherry (*Prunus serotina*)	Red Maple (*Acer rubra*)
Shagbark Hickory (*Carya ovata*)	American Pokeweed (*Phytolacca decandra*)
Grape Vine (*Vitis riparia*)	False Solomon's Seal (*Myanthemum racemosum*)
Stinging Nettle (*Urtica dioica*)	Swamp White Oak (*Quercus bicolor*)
Goldenrod sp. (*Solidago sp.*)	Musclewood (*Carpinus caroliniana*)
White Ash (*Fraxinus americana*)	American Beech (*Fagus grandifolia*)
Staghorn Sumac (*Rhus typhina*)	Black Cherry (*Prunus serotina*)
Red Raspberry (*Rubus idaeus*)	Black Pine (*Pinus nigra*)
Bracken Fern (*Pteridium aquilinum*)	White Oak (*Querus alba*)
Eastern Cottonwood (*Populus deltoides*)	Red Oak (*Quercus rubra*)
Virginia Creeper (*Parthenocissus inserta*)	Shagbark Hickory (*Carya ovata*)

Dame's Rocket (*Hesperia matronalis*)	Manitoba Maple (*Acer negundo*)
Black Raspberry (*Rubus occidentalis*)	Grape Vine (*Vitis riparia*)
	Virginia Creeper (*Parthenocissus inserta*)
	Goldenrod sp. (*Solidago sp.*)
	Aster sp. (*Aster sp.*)
Snags:	**Snags:**
2x Eastern Cottonwood (35 cm + DBH)	1x Eastern cottonwood (20 cm DBH)

Appendix C

Fieldwork Completed

SURVEY	TIME	DATE (dd-mm-yr)	STAFF	TEMP. (°C)	WIND (Beaufort)	CLOUD COVER (%)	PRECIP.	NOISE CODE
NH Feature Survey 2024	12:30-13:45	26-06-2024	Lauren Barnett, Scott Dowle	23	1	100	n/a	n/a

MINISTRY OF THE ENVIRONMENT

The Ontario Water Resources Act

WATER WELL RECORD

40-1/19e

Ontario

1. PRINT ONLY IN SPACES PROVIDED
2. CHECK ☒ CORRECT BOX WHERE APPLICABLE

11 | 4403399 | MUNICIP. 4400 | CON. N | 04

COUNTY OR DISTRICT	TOWNSHIP, BOROUGH, CITY, TOWN, VILLAGE	CON., BLOCK, TRACT, SURVEY, ETC.	LOT
Norfolk	Middleton	4 TV	006

[redacted] RR6 Tillsonburg

DATE COMPLETED: DAY 24 MO 05 YR 74

HING	RC	ELEVATION	RC	BASIN CODE	II	III	IV
4743022	5	750	5	23	JUN 17, 1977		279

LOG OF OVERBURDEN AND BEDROCK MATERIALS (SEE INSTRUCTIONS)

GENERAL COLOUR	MOST COMMON MATERIAL	OTHER MATERIALS	GENERAL DESCRIPTION	DEPTH - FEET FROM	DEPTH - FEET TO
yellow	clay	sand	soft	0	33½
yellow		sand	wet	33½	34

8" Gravelpack

OWRC P.8

31 | 003350528 | 0034528

32

41 WATER RECORD

WATER FOUND AT - FEET	KIND OF WATER
0032	1 ☒ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
32-34	
15-18	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
20-23	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
25-28	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL
30-33	1 ☐ FRESH 2 ☐ SALTY 3 ☐ SULPHUR 4 ☐ MINERAL

51 CASING & OPEN HOLE RECORD

INSIDE DIAM. INCHES	MATERIAL	WALL THICKNESS INCHES	DEPTH - FEET FROM	DEPTH - FEET TO
1¼ 02	1 ☒ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE		-8	32 0032
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			
	1 ☐ STEEL 2 ☐ GALVANIZED 3 ☐ CONCRETE 4 ☐ OPEN HOLE			

SCREEN

SIZE(S) OF OPENING (SLOT NO.)	DIAMETER	LENGTH
008	03 000 INCHES	02 FEET
MATERIAL AND TYPE: Johnson Stainless	DEPTH TO TOP OF SCREEN: 0032 FEET	

61 PLUGGING & SEALING RECORD

DEPTH SET AT - FEET FROM	DEPTH SET AT - FEET TO	MATERIAL AND TYPE (CEMENT GROUT, LEAD PACKER, ETC.)
10-13	14-17	
18-21	22-25	
26-29	30-33	

71 PUMPING TEST

PUMPING TEST METHOD	PUMPING RATE	DURATION OF PUMPING
1 ☒ PUMP 2 ☐ BAILER	0002 1½ GPM	10 HOURS 00 MINS

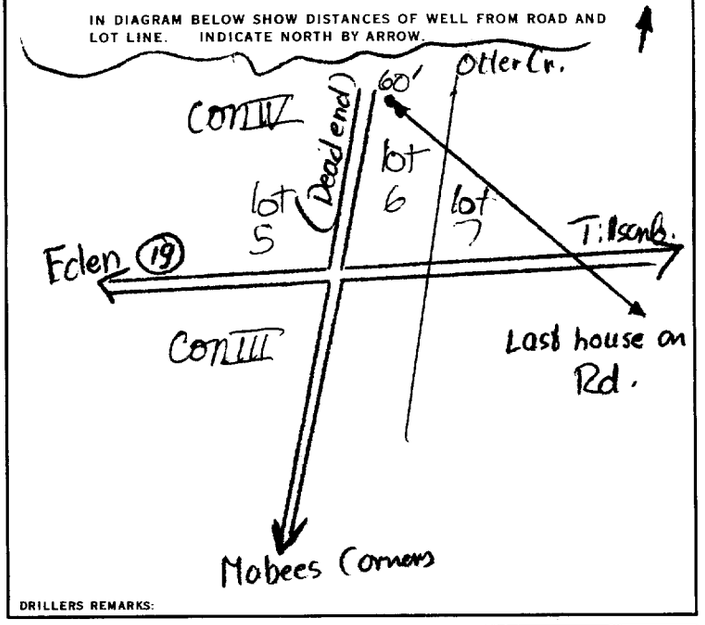
STATIC LEVEL	WATER LEVEL END OF PUMPING	WATER LEVELS DURING: 1 ☐ PUMPING 2 ☐ RECOVERY			
		15 MINUTES	30 MINUTES	45 MINUTES	60 MINUTES
028 FEET	[illegible] FEET	FEET	FEET	FEET	FEET

IF FLOWING, GIVE RATE	PUMP INTAKE SET AT	WATER AT END OF TEST
GPM	8 FEET	1 ☒ CLEAR 2 ☐ CLOUDY
RECOMMENDED PUMP TYPE: ☒ SHALLOW ☐ DEEP	RECOMMENDED PUMP SETTING: 8 FEET	RECOMMENDED PUMPING RATE: 0002 GPM

GPM./FT. SPECIFIC CAPACITY

LOCATION OF WELL 2243

IN DIAGRAM BELOW SHOW DISTANCES OF WELL FROM ROAD AND LOT LINE. INDICATE NORTH BY ARROW.



DRILLERS REMARKS:

FINAL STATUS OF WELL 54: 1

1 ☒ WATER SUPPLY 2 ☐ OBSERVATION WELL 3 ☐ TEST HOLE 4 ☐ RECHARGE WELL 5 ☐ ABANDONED, INSUFFICIENT SUPPLY 6 ☐ ABANDONED, POOR QUALITY 7 ☐ UNFINISHED

WATER USE 55-56: 01

1 ☒ DOMESTIC 2 ☐ STOCK 3 ☐ IRRIGATION 4 ☐ INDUSTRIAL ☐ OTHER 5 ☐ COMMERCIAL 6 ☐ MUNICIPAL 7 ☐ PUBLIC SUPPLY 8 ☐ COOLING OR AIR CONDITIONING 9 ☐ NOT USED

METHOD OF DRILLING 57: 1

1 ☒ CABLE TOOL 2 ☐ ROTARY (CONVENTIONAL) 3 ☐ ROTARY (REVERSE) 4 ☐ ROTARY (AIR) 5 ☐ AIR PERCUSSION 6 ☐ BORING 7 ☐ DIAMOND 8 ☐ JETTING 9 ☐ DRIVING

CONTRACTOR

NAME OF WELL CONTRACTOR: Warren Water Wells — LICENCE NUMBER: 5413

ADDRESS: RR 7 Tillsonburg

NAME OF DRILLER OR BORER: Gus Holzhey — LICENCE NUMBER: 5413

SIGNATURE OF CONTRACTOR: [signature] — SUBMISSION DATE: DAY ____ MO. ____ YR. ____

OFFICE USE ONLY

DATA SOURCE 58: 1 — CONTRACTOR 59-62: 5413 — DATE RECEIVED 63-68: 060375

DATE OF INSPECTION — INSPECTOR

REMARKS: CSS.S8

P KP

WI

MINISTRY OF THE ENVIRONMENT COPY

FORM 7 MOE 07-091

Ontario Ministry of the Environment

Well' ... t number below)
A 067852
A067852

Well Record
Regulation 903 Ontario Water Resources Act

page ___ of ___

Instructions for Completing Form

- For use in the **Province of Ontario** only. This document is a permanent **legal** document. Please retain for future reference.
- All Sections **must** be completed in full to avoid delays in processing. Further instructions and explanations are available on the back of this form.
- Questions regarding completing this application can be directed to the Water Well Help Desk (Toll Free) at 1-888-396-9355.
- **All metre measurements shall be reported to 1/10th of a metre.**
- Please print clearly in blue or black ink only.

Ministry Use Only
MUN | CON | LOT

Well Owner's Information and Location of Well Information

[redacted]

NORFOLK | NORFOLK WEST (MIDDLETON) | 9 | 5

RR#/Street Number/Name: 1068 LAPLANTE RD. , RR #6
City/Town/Village: TILLSONBURG
Site/Compartment/Block/Tract etc.:

GPS Reading | NAD: 8 3 | Zone: 17 | Easting: 522127 | Northing: 4743266
Unit Make/Model: MAGELLAN
Mode of Operation: ☐ Undifferentiated ☒ Averaged ☐ Differentiated, specify

Log of Overburden and Bedrock Materials (see instructions)

General Colour	Most common material	Other Materials	General Description	Depth From (FT)	Depth To (FT)
BLACK	TOPSOIL			0'	1'
BROWN	SAND			1'	27'
GREY	CLAY			27'	60'
GREY	CLAY	SAND		60'	65'
GREY	FINE SAND			65'	71'
GREY	CLAY			71'	74'

Hole Diameter

Depth From (FT)	Depth To (FT)	Diameter (Centimetres)
0'	74'	8 5/8"

Water Record

Water found at (FT)	Kind of Water	
	☒ Fresh	☐ Sulphur
	☐ Salty	☐ Minerals
	☐ Other:	
m	☐ Fresh	☐ Sulphur
	☐ Salty	☐ Minerals
	☐ Other:	
m	☐ Fresh	☐ Sulphur
	☐ Salty	☐ Minerals
	☐ Other:	

After test of well yield, water was
☒ Clear and sediment free
☒ Other, specify
Chlorinated ☒ Yes ☐ No

Construction Record

Casing

Inside diam (IN.)	Material	Wall thickness (IN.)	Depth From (FT)	Depth To (FT)
5 3/16	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	0.188"	+1.5'	56'
4 1/4"	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	0.188"	56	64
4 1/4"	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	0.188"	70	72'

Screen

Outside diam		Slot No.		
4 3/4"	☒ Steel ☐ Fibreglass ☐ Plastic ☐ Concrete ☐ Galvanized	A- 10 B- 12	A-64 B-67	67 70

No Casing or Screen
☐ Open hole

Test of Well Yield

Pumping test method: SUBMERSIBLE PUMP

	Draw Down Time min	Draw Down Water Level (FT)	Recovery Time min	Recovery Water Level (FT)
Pump intake set at -	Static Level	58.4'		67.5'
Pumping rate - 7 GPM	1	63.9'	1	61.3'
Duration of pumping 2 hrs + ___ min	2	65.5'	2	59.7'
Final water level end of pumping 67.5' metres	3	66.2'	3	59.3'
Recommended pump type. ☐ Shallow ☒ Deep	4	66.5'	4	59.1'
Recommended pump depth. ___ metres	5	66.8'	5	58.9
Recommended pump rate. 7 GPM	10	67.1	10	58.6'
	15	67.4	15	58.5'
If flowing give rate - (litres/min)	20	67.5	20	58.4'
	25		25	
If pumping discontinued, give reason.	30		30	
	40		40	
	50		50	
	60		60	

Plugging and Sealing Record
☒ Annular space ☐ Abandonment

Depth set at - Metres From	To	Material and type (bentonite slurry, neat cement slurry) etc.	Volume Placed (cubic metres)
0'	62'	BENTONITE	
62'	72'	WELL SAND	

Method of Construction
☒ Cable Tool ☐ Rotary (air) ☐ Diamond ☐ Digging
☐ Rotary (conventional) ☐ Air percussion ☐ Jetting ☐ Other
☐ Rotary (reverse) ☐ Boring ☐ Driving

Water Use
☒ Domestic ☐ Industrial ☐ Public Supply ☐ Other
☐ Stock ☐ Commercial ☐ Not used
☐ Irrigation ☐ Municipal ☐ Cooling & air conditioning

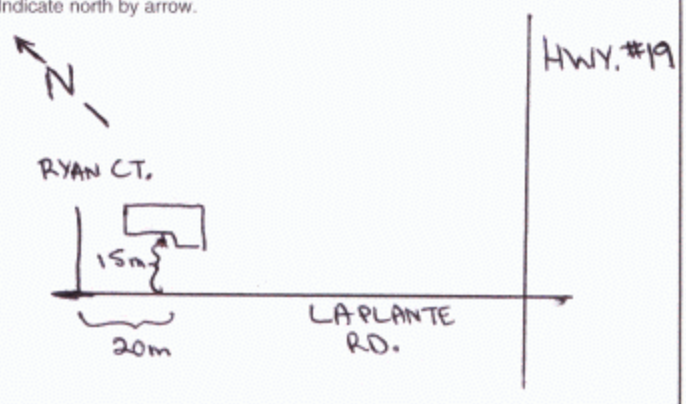
Final Status of Well
☒ Water Supply ☐ Recharge well ☐ Unfinished ☐ Abandoned, (Other)
☐ Observation well ☐ Abandoned, insufficient supply ☐ Dewatering
☐ Test Hole ☐ Abandoned, poor quality ☐ Replacement well

Well Contractor/Technician Information

Name of Well Contractor: J.B. WILSON & SON LTD
Well Contractor's Licence No.: 5466
Business Address (street name, number, city etc.): RR #1 SPRINGFIELD
Name of Well Technician (last name, first name): WILSON, JOHN H.
Well Technician's Licence No.: T-2668
Signature of Technician/Contractor: X [signature]
Date Submitted YYYY MM DD:

Location of Well

In diagram below show distances of well from road, lot line, and building. Indicate north by arrow.



Audit No. Z 71583
Date Well Completed YYYY MM DD: 2008 06 26
Was the well owner's information package delivered? ☒ Yes ☐ No
Date Delivered YYYY MM DD:

Ministry Use Only

Data Source | Contractor
Date Received YYYY MM DD: FEB 2 2009 | Date of Inspection YYYY MM DD
Remarks: FEB 2 2009 | Well Record Number

0506E (08/2006)

Ministry's Copy

Cette formule est disponible en français

Ontario — Ministry of the Environment

Measurements recorded in: ☐ Metric ☒ Imperial

Well Tag No. *(Place Sticker and/or Print Below)* A129700

Tag#: A129700

Well Record

Regulation 903 Ontario Water Resources Act

[redacted]

Address of Well Location (Street Number/Name)	Township	Lot	Concession
1080 Laplante Road RR # 6	Middleton Township	10	4

County/District/Municipality	City/Town/Village	Province	Postal Code
Norfolk	Tillsonburg	Ontario	N4G 4G9

UTM Coordinates NAD 83	Zone	Easting	Northing	Municipal Plan and Sublot Number	Other
	17	522091	4743324		

Overburden and Bedrock Materials/Abandonment Sealing Record *(see instructions on the back of this form)*

General Colour	Most Common Material	Other Materials	General Description	Depth (*m/ft*) From	To
Black	Top Soil			0	1
Brown	Sand			1	35
Grey	Clay			35	62
Grey	Sand		Silty	62	71
Grey	Hardpan			71	152
Grey	Limestone			152	156

Annular Space

Depth Set at (*m/ft*) From	To	Type of Sealant Used (*Material and Type*)	Volume Placed (m^3/ft^3)
0	24	Bentonite Grout	
24	152	Bentonite Slurry	

Method of Construction

☐ Cable Tool ☐ Diamond
☒ Rotary (Conventional) ☐ Jetting
☐ Rotary (Reverse) ☐ Driving
☐ Boring ☐ Digging
☐ Air percussion
☐ Other, *specify* _____

Well Use

☐ Public ☐ Commercial ☐ Not used
☒ Domestic ☐ Municipal ☐ Dewatering
☐ Livestock ☐ Test Hole ☐ Monitoring
☐ Irrigation ☐ Cooling & Air Conditioning
☐ Industrial
☐ Other, *specify* _____

Construction Record - Casing

Inside Diameter (*cm/in*)	Open Hole OR Material (Galvanized, Fibreglass, Concrete, Plastic, Steel)	Wall Thickness (*cm/in*)	Depth (*m/ft*) From	To
5 5/8"	Steel	0.188 Wall	+2	152
Open Hole			152	156

Construction Record - Screen

Outside Diameter (*cm/in*)	Material (Plastic, Galvanized, Steel)	Slot No.	Depth (*m/ft*) From	To

Status of Well

☒ Water Supply
☐ Replacement Well
☐ Test Hole
☐ Recharge Well
☐ Dewatering Well
☐ Observation and/or Monitoring Hole
☐ Alteration (Construction)
☐ Abandoned, Insufficient Supply
☐ Abandoned, Poor Water Quality
☐ Abandoned, other, *specify*
☐ Other, *specify*

Water Details

Water found at Depth (*m/ft*)	Kind of Water	
154	☐ Fresh ☒ Untested	☐ Gas ☐ Other, *specify*
	☐ Fresh ☐ Untested	☐ Gas ☐ Other, *specify*
	☐ Fresh ☐ Untested	☐ Gas ☐ Other, *specify*

Hole Diameter

Depth (*m/ft*) From	To	Diameter (*cm/in*)
0	156	9

Results of Well Yield Testing

After test of well yield, water was:
☒ Clear and sand free
☐ Other, *specify* _____

If pumping discontinued, give reason: CLEAR

Pump intake set at (*m/ft*) 85

Pumping rate (*l/min / GPM*) 40

Duration of pumping 1 hrs + 30 min

Final water level end of pumping (*m/ft*) 72

If flowing give rate (*l/min / GPM*) NOT FLOWING

Recommended pump depth (*m/ft*) ~~40~~ 85

Recommended pump rate (*l/min / GPM*) 10+

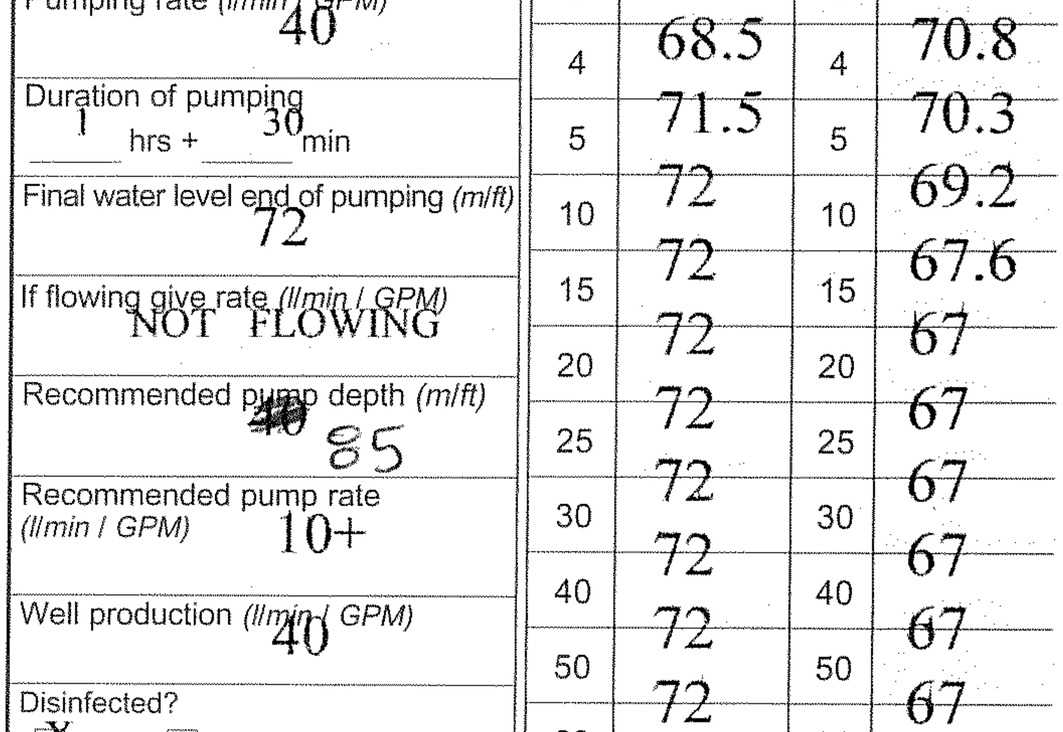
Well production (*l/min / GPM*) 40

Disinfected? ☒ Yes ☐ No

Draw Down Time (*min*)	Water Level (*m/ft*)	Recovery Time (*min*)	Water Level (*m/ft*)
Static Level	67		72
1	67.4	1	71.9
2	67.8	2	71.6
3	67.11	3	71.3
4	68.5	4	70.8
5	71.5	5	70.3
10	72	10	69.2
15	72	15	67.6
20	72	20	67
25	72	25	67
30	72	30	67
40	72	40	67
50	72	50	67
60		60	

Map of Well Location

Please provide a map below following instructions on the back.



Comments:
Well is 75 feet off the road

Well Contractor and Well Technician Information

Business Name of Well Contractor	Well Contractor's Licence No.
HAYDEN WATER WELLS CO.,INC.	7090

Business Address (Street Number/Name)	Municipality
5339 Saintsbury Line RR # 1	Lucan

Province	Postal Code	Business E-mail Address
Ontario	N0M2J0	haydenwaterwells@on.aibn.com

Business Telephone No. (*inc. area code*)	Name of Well Technician (Last Name, First Name)
1922700357	Hayden, Jay

Well Technician's Licence No.	Signature of Technician and/or Contractor	Date Submitted
0334		

Well owner's information package delivered: ☒ Yes ☐ No

Date Package Delivered: 2013 04 18

Date Work Completed: 2013 04 18

Ministry Use Only

Audit No. Z160156

RECEIVED 02 2014

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Appendix B

SGS Laboratories - Certificate of Analysis

FINAL REPORT

CA40109-APR22 R

20HF021

Prepared for

Peto MacCallum Ltd

FINAL REPORT

CA40109-APR22 R

First Page

CLIENT DETAILS

Client	Peto MacCallum Ltd
Address	45 Burford Road Hamilton, ON L8E 3C6. Canada
Contact	Alonzo Rowe
Telephone	(905) 561-2231
Facsimile	(905) 561-6366
Email	arowe@petomaccallum.com;smacdonald@petomaccallum.con
Project	20HF021
Order Number	
Samples	Ground Water (4)

LABORATORY DETAILS

Project Specialist	Maarit Wolfe, Hon.B.Sc
Laboratory	SGS Canada Inc.
Address	185 Concession St., Lakefield ON, K0L 2H0
Telephone	705-652-2000
Facsimile	705-652-6365
Email	Maarit.Wolfe@sgs.com
SGS Reference	CA40109-APR22
Received	04/07/2022
Approved	04/12/2022
Report Number	CA40109-APR22 R
Date Reported	04/12/2022

COMMENTS

MAC - Maximum Acceptable Concentration
Half MAC - Half of the Maximum Acceptable Concentration
MDL - SGS Method Detection Limit

Temperature of Sample upon Receipt: 7 degrees C
Cooling Agent Present: Yes
Custody Seal Present: Yes

Chain of Custody Number: 016944

SIGNATORIES

Maarit Wolfe, Hon.B.Sc

TABLE OF CONTENTS

Client: Peto MacCallum Ltd
Project: 20HF021
Project Manager: Alonzo Rowe
Samplers: SM

MATRIX: WATER

Sample Number	9	10	11	12
Sample Name	20HF021 GW-1	20HF021 GW-2	20HF021 GW-3	20HF021 GW-4
Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water
Sample Date	06/04/2022	06/04/2022	06/04/2022	06/04/2022

Parameter	Units	RL	Result	Result	Result	Result
General Chemistry						
Turbidity	NTU	0.10	1110	---	---	---
Metals and Inorganics						
Hardness	mg/L as CaCO3	0.05	3130	---	---	---
Antimony	µg/L	0.6	< 0.6	---	---	---
Arsenic	µg/L	0.2	1.9	---	---	---
Barium	µg/L	0.02	199	---	---	---
Boron	µg/L	2	22	---	---	---
Cadmium	µg/L	0.003	0.634	---	---	---
Chromium	µg/L	0.08	2.02	---	---	---
Mercury	µg/L	0.01	0.02	---	---	---
Selenium	µg/L	0.04	0.14	---	---	---
Uranium	µg/L	0.002	0.682	---	---	---
Nitrite (as N)	as N mg/L	0.003	0.003#<MDL	0.003#<MDL	0.003#<MDL	0.003#<MDL
Nitrate (as N)	as N mg/L	0.006	5.97	6.04	6.03	6.02
Nitrate + Nitrite (as N)	as N mg/L	0.006	5.97	6.04	6.03	6.02

Client: Peto MacCallum Ltd
Project: 20HF021
Project Manager: Alonzo Rowe
Samplers: SM

MATRIX: WATER

Sample Number	9	10	11	12
Sample Name	20HF021 GW-1	20HF021 GW-2	20HF021 GW-3	20HF021 GW-4
Sample Matrix	Ground Water	Ground Water	Ground Water	Ground Water
Sample Date	06/04/2022	06/04/2022	06/04/2022	06/04/2022

Parameter	Units	RL		Result	Result	Result	Result
Microbiology							
E. Coli	cfu/100mL	0		< 2↑	---	---	---
Total Coliform	cfu/100mL	0		< 2↑	---	---	---
Other (ORP)							
pH	No unit	0.05		8.26	---	---	---

QC SUMMARY

QCR_SubCategory

Method: SM 2130 I Internal ref.: ME-CA-[ENVIEWL-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Turbidity	EWL0134-APR22	NTU	0.10	< 0.10	0	10	99	90	110	NA		

Anions by IC

Method: EPA300/MA300-Ions1.3 I Internal ref.: ME-CA-[ENVIIC-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Nitrate + Nitrite (as N)	DIO0165-APR22	mg/L	0.006	<0.006	NA		NA			NA		
Nitrite (as N)	DIO0165-APR22	mg/L	0.003	<0.003	6	20	99	90	110	98	75	125
Nitrate (as N)	DIO0165-APR22	mg/L	0.006	<0.006	0	20	98	90	110	93	75	125

QC SUMMARY

Mercury by CVAAS

Method: SM3112/EPA 245 | Internal ref.: ME-CA-IENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury	EHG0021-APR22	ug/L	0.01	< 0.01	ND	20	100	80	120			

Metals in aqueous samples - ICP-MS

Method: SM 3030/EPA 200.8 | Internal ref.: ME-CA-IENVISPE-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Arsenic	EMS0066-APR22	ug/L	0.2	<0.0002	7	20	100	90	110	95	70	130
Barium	EMS0066-APR22	ug/L	0.02	<0.00002	2	20	98	90	110	99	70	130
Boron	EMS0066-APR22	ug/L	2	< 2	20	20	107	90	110	97	70	130
Cadmium	EMS0066-APR22	ug/L	0.003	<0.000003	ND	20	96	90	110	94	70	130
Chromium	EMS0066-APR22	ug/L	0.08	<0.00008	14	20	92	90	110	78	70	130
Antimony	EMS0066-APR22	ug/L	0.6	<0.0009	4	20	110	90	110	114	70	130
Selenium	EMS0066-APR22	ug/L	0.04	<0.00004	8	20	104	90	110	124	70	130
Uranium	EMS0066-APR22	ug/L	0.002	< 0.002	14	20	99	90	110	99	70	130

QC SUMMARY

Microbiology

Method: SM 9222D | Internal ref.: ME-CA-IENVIMIC-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
E. Coli	BAC9129-APR22	cfu/100mL	-	ACCEPTED	ACCEPTED							
Total Coliform	BAC9129-APR22	cfu/100mL	-	ACCEPTED	ACCEPTED							

pH

Method: SM 4500 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High	Spike Recovery (%)	Recovery Limits (%) Low	Recovery Limits (%) High
pH	EWL0232-APR22	No unit	0.05	NA	1		100			NA		

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates 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.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS	Insufficient sample for analysis.
RL	Reporting Limit.
↑	Reporting limit raised.
↓	Reporting limit lowered.
NA	The sample was not analysed for this analyte
ND	Non Detect

Data reported represent the sample as submitted to SGS. Solid samples expressed on a dry weight basis.
"Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.
Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the "Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act and Excess Soil Quality" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated.

SGS Canada Inc. statement of conformity decision rule does not consider uncertainty when analytical results are compared to a specified standard or regulation.

This report supersedes all previous versions.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

No: 016944

Page _____ of _____

SGS Environment, Health & Safety - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

Laboratory Information Section - Lab use only

Received By: 2D
Received Date: 4 / 7 / 22 (mm/dd/yy)
Received Time: 11 : 20 (hr : min)
Received By (signature): [signature]
Custody Seal Present: Yes ☑ No ☐
Custody Seal Intact: Yes ☑ No ☐
Cooling Agent Present: Yes ☑ No ☐ Type: Prck
Temperature Upon Receipt (°C) 2.3
LAB LIMS #: CA40109-Apr22

REPORT INFORMATION	INVOICE INFORMATION
Company: Peto MacCallum	☒ (same as Report Information)
Contact: A. Rowe	Company:
Address: 41 Burford	Contact:
Hamilton	Address:
Phone: 905-536-7305	
Fax: smacdonald@petomaccallum.com	Phone:
Email: arowe@petomaccallum.com	Email:

Quotation #: _____ P.O. #: _____
Project #: 20HF021 Site Location/ID:

TURNAROUND TIME (TAT) REQUIRED

☒ Regular TAT (5-7days) — TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day

RUSH TAT (Additional Charges May Apply): ☐1 Day ☐2 Days ☐3 Days ☐4 Days

PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date: _____

***NOTE**: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS

☐ O.Reg 153/04 ☐ O.Reg 406/19

☐ Table 1 ☐ Res/Park Soil Texture: ☐ Coarse
☐ Table 2 ☐ Ind/Com ☐ Medium/Fine
☐ Table 3 ☐ Agri/Other
☐ Table _____
Soil Volume ☐ <350m3 ☐ >350m3

Other Regulations: ☐ Reg 347/558 (3 Day min TAT) ☐ PWQO ☐ MMER ☐ CCME ☐ Other: ☐ MISA _____ ☐ ODWS Not Reportable *See note

Sewer By-Law: ☐ Sanitary ☐ Storm Municipality: _____

RECORD OF SITE CONDITION (RSC) ☐ YES ☒ NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	Field Filtered (Y/N)	M&I: Metals & Inorganics (incl CrVI, CN, Hg pH, (B(HWS),EC,SAR–soil) (Cl, Na–water)	M&I: Full Metals Suite (ICP metals plus B(HWS-soil only) Hg, CrVI	M&I: ICP Metals only Sb,As,Ba,Be,B,Cd,Cr,Co,Cu,Pb,Mo,Ni,	SVOC: PAHs only	SVOC: SVOCs all incl PAHs, ABNs, CPs	PCB: PCBs ☐ Total ☐ Aroclor	PHC: F1-F4 + BTEX	PHC: F1-F4 only no BTEX	VOC: VOCs all incl BTEX	VOC: BTEX only	Pest: Pesticides Organochlorine or specify other	Other: Nitrates	Other: Turbidity, hardness, pH, E.Coli, Total Coliforms	Other: Sched. 13 O.Reg 170/03	Other: Appendix 2: 406/19 Leachate Screening Levels Table :	Other: Sewer Use: Specify pkg:	Other: Water Characterization Pkg General ☐ Extended	TCLP: Specify TCLP tests ☐M&I ☐VOC ☐PCB ☐B(a)P ☐ABN ☐Ignit.	COMMENTS:
1	20HF021 GW-1	06/04/2022	2PM	6	GW	N												X	X	X					
2	20HF021 GW 2	↓	↓	1	↓	N												X							
3	20HF021 GW 3			1		N												X							
4	20HF021 GW 4			1		N												X							
5																									
6																									
7																									
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9																									
10																									
11																									
12																									

Observations/Comments/Special Instructions

Sampled By (NAME): SM	**Signature:** [signature]	Date: 04 / 06 / 2022 (mm/dd/yy)	Pink Copy - Client
Relinquished by (NAME): AR	**Signature:** [signature]	Date: 04 / 06 / 2022 (mm/dd/yy)	Yellow & White Copy - SGS

GEOTECHNICAL INVESTIGATION AND LIMITED CHEMICAL TESTING LAPLANTE ROAD – 6 LOT PLAN OF SUBDIVISION LAPLANTE ROAD NORFOLK COUNTY, ONTARIO

for

MR. JOE OLIVEIRA

C/O G. DOUGLAS VALLEE LIMITED

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1 cc: PML Hamilton

PML Ref.: 20HF021
Report: 1
February 8, 2022

Peto MacCallum Ltd.
CONSULTING ENGINEERS

February 8, 2022

PML Ref.: 20HF021
Report: 1

Mr. Joe Oliveira
c/o Mr. Eldon Darbyson, BES, MCIP, RPP
G. Douglas Vallee Limited
Consulting Engineers, Architect & Planners
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Simcoe, Ontario
N3Y 2W4

Dear Mr. Darbyson

Geotechnical Investigation and
Limited Chemical Testing Program
Laplante Road – 6 Lot Plan of Subdivision
Laplante Road
Norfolk County, Ontario

Peto MacCallum Ltd. (PML) is pleased to present the results of the geotechnical investigation recently completed for this project. Authorization to proceed with this assignment was provided by Mr. Joe Oliveira in a signed Engineering Services Agreement (ESA) dated July 3, 2020.

It is understood that a development of a 6 lot subdivision with new access roads is planned at Laplante Road, near Tilsonburg in Norfolk County, Ontario. The combined boundaries of the site are a total of 6.9 hectares.

The purpose of the geotechnical investigation was to determine the subsurface soil and ground water conditions at the site and based on the findings, provide geotechnical comments and recommendations for the design and construction of the proposed development.

A limited chemical testing program was included with the geotechnical work to check the geoenvironmental quality of the site soil in order to provide comments regarding on-site or off-site re-use and/or disposal options of excess soil.

The subsurface stratigraphy in the boreholes typically comprised a topsoil, over native sand, over clayey silt, underlain by sand.

Based on the findings of this investigation and assessment, it is considered feasible to construct the house foundations using shallow foundations (strip/spread) on compact, native sand or engineered fill.

The results of the limited chemical testing program indicate that the chemical quality of the tested soil samples meets the applicable O. Reg. 153/04 Site Condition Standards (SCSs) for Table 2 (T2) Residential/Parkland/ Institutional.

Detailed comments and recommendations concerning the design and construction of the proposed lot development and pavement structures as well as the results of the limited chemical testing program are provided in the attached report.

Since final details of the project have not been established, the comments and recommendations provided in this report are considered to be preliminary and suitable for planning and design purposes only. When final details of the foundation loads and founding levels are known, the recommendations provided in this report should be reviewed to ensure their applicability.

Due to the variable subsurface and foundation conditions across the site, it would be prudent to drill a supplemental borehole at each lot within the building envelopes to clearly define the specific foundation type or construction that would be required for each building lot.

We trust this report has been completed within our terms of reference and is sufficient for your current needs.

Should you have further questions, please do not hesitate to contact our office.

Sincerely

Peto MacCallum Ltd.

Scott Jeffrey, P.Eng., QP_{ESA}, $LEED_{GA}$
Senior Associate
Regional Manager, Geotechnical and Geoenvironmental Services

SM/SJ:ld

TABLE OF CONTENTS

1. INTRODUCTION

Peto MacCallum Ltd. (PML) is pleased to present the results of the geotechnical investigation recently completed for this project. Authorization to proceed with this assignment was provided by Mr. Joe Oliveira in a signed ESA dated July 3, 2020.

It is understood that a development of a 6 lot subdivision with new access roads and individual tile beds is planned at Laplante Road, near Tilsonburg in Norfolk County, Ontario. The combined boundaries of the site are a total of 6.9 hectares.

The purpose of the geotechnical investigation was to determine the subsurface soil and ground water conditions at the site and based on the findings, provide geotechnical comments and recommendations for the design and construction of the proposed development.

A limited chemical testing program was included with the geotechnical work to check the geoenvironmental quality of the on-site soil in order to provide preliminary comments regarding on-site or off-site re-use and/or off-site disposal options for excess soil which may be generated during the demolition/construction phase of the project. It should be noted that ground water sampling and testing was not part of the Terms of Reference for this assignment and no work was carried out in this regard.

The comments and recommendations provided in this report are based on the site conditions at the time of the investigation and are applicable only to the proposed development as described in the report. Any changes in development, including finished grades and layout will require review by PML to assess the validity of the report and may require modified recommendations, additional investigation and/or analysis.

2. INVESTIGATION PROCEDURES

Drilling field work was carried out on February 11, 2021 and consisted of six boreholes (Boreholes 1 to 6) drilled to 6.5 m termination depths. The borehole locations are shown on Drawing 1, appended.

The borehole location was selected by the Client and established in the field by PML. Geodetic, metric ground surface elevations and UTM co-ordinates at the borehole locations were determined by PML using a Sokkia GCX3 GNSS Receiver.

The boreholes were advanced using continuous flight solid stem augers, powered by a track-mounted CME75 drill rig, supplied and operated by a specialist drilling contractor, working under the full-time supervision of a member of PML's engineering staff.

Representative samples of the overburden were recovered at frequent depth intervals using a conventional split-spoon sampler during drilling. Standard penetration tests along with pocket penetrometer tests were conducted where applicable with the sampling operation to assess the strength characteristics of the substrata. Additionally, a Dynamic Cone Penetration Test was conducted at Borehole 5.

The ground water conditions at the borehole locations were assessed during drilling by visual examination of the soil, the sampler and the drill rods as the samples were retrieved and when appropriate by measurement of the water level in the open borehole.

Ground water monitoring wells were installed in Boreholes 1, 2, 5 and 6 comprising clean 50 mm diameter screened and solid PVC Schedule 40 pipe. The wells were installed to depths of 6.5 m and were screened at the bottom over a length of 1.5 m. The annular space of the borehole around the screen was backfilled with clean filter sand covered by a bentonite seal and stick-up protective cover set in concrete. The details of the monitoring well construction are shown on the appended Log of Borehole/Monitoring Well sheets. Well records will be kept on file by PML for future reference in accordance with O. Reg. 903/90, as amended.

The recovered soil samples were returned to our laboratory for detailed visual examination and classification, and routine moisture content determinations.

Selected soil samples were submitted to SGS Canada Inc. for laboratory testing to assess the geoenvironmental properties of the soil. Details concerning the geoenvironmental chemical testing program including procedures and results of chemical testing are provided in Appendix B.

3. SUMMARIZED SUBSURFACE CONDITIONS

Reference is made to the appended Log of Borehole sheets for details of the subsurface conditions including soil classifications, inferred stratigraphy, standard penetration test N values, ground water observations, and the results of laboratory moisture content determinations.

Due to the soil sampling procedures and limited sample size, the depth demarcations on the borehole logs must be viewed as transitional zones between layers and cannot be construed as exact geologic boundaries between layers. PML would be pleased to assist in defining geologic boundaries during construction if required.

The subsurface stratigraphy in the boreholes typically comprised a topsoil, over native sand, over silty clay, underlain by sand.

3.1 Topsoil

A 200 to 680 mm topsoil veneer was encountered at the surface of the boreholes. The topsoil generally consisted of sand had some to trace silt with the occasional rootlet. The topsoil was loose to compact and was damp with moisture content determinations ranging from 5 to 12%.

3.2 Silt

Locally, a 1.8 m silt layer was contacted below the topsoil in Borehole 1. The silt was penetrated at 2.5 m (elevation 228.1). The silt consists of some to trace clay and sand with occasional iron staining and clay seams. The silt was generally loose to very loose with N-values of 1 to 5 and was wet with moisture contents ranging between 26 to 30%.

3.3 Upper Sand

A 1.5 m to 6.0 m native sand layer was contacted below the isolated silt layer in Borehole 1 and below the topsoil of Boreholes 2 to 6 and penetrated at 1.7 to 6.2 m (elevation 224.2 to 230.9). The sand generally contained some silt and was occasionally silty. The sand was loose to compact with N-values of 4 to 30 in the boreholes and locally very loose in Borehole 1 from 1.4 to 4.0 (elevations 226.6 to 229.2) and Borehole 5 from 0.0 to 4.0 (elevations 230.4 to 226.4) with N-values of 1 to 4. In Borehole 5, a dynamic cone test was performed confirming the very loose conditions of the sand above 3.6 m with dynamic cone values from 2 to 6 and becoming loose below 3.6 m with dynamic cone values of 16 and 17. The sand was damp to wet with moisture content determinations ranging from 6 to 23% and becoming saturated locally in Boreholes 3, 5 and 6 at 2.9 to 4.0 m (elevations 226.2 to 226.9) in a perched condition above the underlying impervious layer.

The results of a particle size distribution test consisting of sieve and hydrometer testing is shown in Figure 1. The soil sample Borehole 2 SS4 from 2.3 m comprised 87% sand, 7% silt and 6% clay.

3.4 Clayey Silt

A 300 mm to 2.5 m clayey silt layer was contacted below the upper sand in the boreholes and was penetrated at 4.0 and 5.5 m (elevations 227.7 and 229.4) in Boreholes 2 and 4 and extended to termination of 6.5 m (elevations 223.3 to 224.1) in the remaining boreholes. The clayey silt was firm to stiff with N-values of 7 to 12 in Boreholes 2 to 5 and becoming very stiff to hard with N-Values of 15 to 36 in Boreholes 1, 3 and 6 below 4.0 to 5.5 m (elevations 224.3 to 225.1). The clayey silt was DTPL to WTPL with moisture content determinations ranging from 15 to 27%.

The result of a particle size distribution test consisting of sieve and hydrometer testing is shown in Figures 2 and 3. The soil samples from Borehole 3 SS7 sampled at 3.0 m and Borehole 4 SS5 sampled at 2.3 m comprised 3 and 7% sand, 73 and 78% silt and 19 and 20% clay.

3.5 Lower Sand

A second 1.0 and 2.5 m thick sand layer was encountered below the silty clay in Boreholes 2 and 4. The sand extended to termination depths of 6.5 m (elevations 225.2 and 228.4) in Boreholes 2 and 4 respectively. The sand was silty to containing trace silt and trace clay. The sand was generally compact to dense with N-values of 12, 27, and 35 recorded. The sand was damp to saturated with moisture content determinations of 9 to 18%.

3.6 Ground Water Conditions

Upon completion of auguring, cave was observed at 0.9 to 5.2 m (elevations 225.5 to 230.8) in Boreholes 1 to 6. Free water was observed at 3.7 and 5.1 m (elevations 225.5 and 226.1) in Boreholes 1 and 3. Monitoring wells were installed in Boreholes 1, 2, 5 and 6. The most recent water levels taken at the wells were taken on March 10, 2021. Water levels were observed from 3.8 to 4.5 m (elevation 226.2 to 226.5 and elevation 230.4 in Borehole 2). Ground water levels may fluctuate subject to seasonal variations and precipitation patterns.

4. ENGINEERING DISCUSSION AND RECOMMENDATIONS

It is understood that a development of a 6 lot subdivision with new access roads is planned at Laplante Road, near Tilsonburg in Norfolk County, Ontario. The combined boundaries of the site are a total of 6.9 hectares. The purpose of the geotechnical investigation was to determine the subsurface soil and ground water conditions at the site and based on the findings, provide geotechnical comments and recommendations for the design and construction of the proposed development.

The subsurface stratigraphy in the boreholes typically comprised a topsoil, over native sand or silt, underlain by sand, or clayey silt.

4.1 Site Preparation

The Site comprises farm land with tilled soil. Based on a review of borehole elevations and preliminary site servicing plan "16-046 Draft Plan" dated July, 2018, it is anticipated that minor cut and fill operations will be required to achieve final grades. For the purposes of this report it is assumed that footings will be at approximately 2.5 m below grade near elevations 226.9 to 231.9 (m, geodetic).

Preparation of the site should consist of removal of topsoil and proofrolling the exposed subgrade under geotechnical supervision to expose soft/loose or unstable areas. Any soft/loose or unstable material should be excavated, removed and replaced with well compacted, approved soil with a moisture content adjusted to within 3% of the optimum moisture content. Approved material should comprise of debris free, inorganic material.

Bulk fill placed to raise the grades should be placed as an engineered fill in uniform 200 to 300 mm thick lifts within 3% of the optimum moisture content. Engineered fill in the building envelope should be compacted to at least 98% standard Proctor maximum dry density (SPMDD).

Compaction to 95% SPMDD should be suitable in other areas. In this regard, trench backfill would also be considered as engineered fill. In landscaped areas where post construction settlement may not be a concern, compaction to 90% SPMDD may be suitable. Further recommendations regarding placement of engineered fill are presented in Appendix A.

Based on the borehole information, the in situ native soils should be suitable for re-use as engineered fill subject to geotechnical review and approval during construction. However, depending on seasonal conditions at the time of construction, some moisture content adjustments may be necessary.

If construction is scheduled during the winter months, temporary gravel roads may have to be constructed to allow access for heavy construction equipment. A crushed limestone material would be suitable for this purpose. The need for temporary gravel construction roads should be determined by site review during construction.

The native soils are considered to be frost susceptible, and should not be used where frost related movements or heave could present a concern.

Organic soil, topsoil, deleterious or excessively wet material should not be used as backfill.

Full time site observation should be carried out by PML to examine and approve backfill material, to review placement operations, and to verify the specified compaction is achieved.

4.2 Underground services

4.2.1 Trench Excavation

Open cut trench excavations for services are anticipated to extend through the topsoil, and into the native sand up to a depth of 3.0 m. Subject to adequate ground water being achieved, excavations through the soil are expected to be relatively straightforward using conventional equipment.

Provided adequate ground water control is achieved, the in situ soil is classified as Type 3 soil according to the Occupational Health and Safety Act criteria. Therefore, for open cut excavations, the sideslopes should be cut at an inclination of 1 horizontal to 1 vertical (1H:1V) from the bottom of the excavation.

It may be necessary to further flatten the trench side slopes if excessively loose/soft conditions or concentrated seepage zones are encountered locally.

Trench side slopes should be continuously examined for evidence of instability, particularly following periods of heavy rain, thawing or when the trench has been left open for extended periods of time. When required, appropriate remedial action must be taken to ensure the continued stability of the trench slope and the safety of workers in the trench.

All work should be carried out in accordance with the Occupational Health and Safety Act (Ontario Regulation 213/91) and with local regulations.

4.2.2 Ground Water Control

Upon completion of augering, cave was observed at 0.9 to 5.2 m (elevations 225.5 to 230.8) in Boreholes 1 to 6. Free water was observed at 3.7 and 5.1 m (elevations 225.5 and 226.1) in Boreholes 1 and 3.

Monitoring wells were installed in Boreholes 1, 2, 5 and 6. The most recent water levels taken at the wells was taken on March 10, 2021. Water levels were observed from 3.8 to 4.5 m (elevation 226.2 to 230.4). Ground water levels may fluctuate subject to seasonal variations and precipitation patterns.

In general, it is expected that seepage or surface water that enters the excavations above the observed ground water table will be adequately handled by conventional sump pumping techniques. The possibility of encountering concentrated seepage from permeable layers within the native soil and/or localized perched ground water requiring additional pumps, should not be overlooked.

If excavations extend below the observed ground water table, it will be necessary to implement measures to control ground water in the excavation.

It is recommended that test pits should be excavated and pump tests conducted prior to tendering to confirm the volume of water to be handled and the preferred means of ground water control and so that prospective contractors may familiarize themselves with soil and ground water conditions. The dewatering system should meet a performance specification to maintain and control the ground water to at least 1.0 m below the excavation base.

The design and installation of the dewatering system and shoring should be carried out by specialists in these fields. Shop drawings should be submitted to PML for review to verify the design is consistent with the subsurface conditions identified during this investigation.

The contractor must ensure the dewatering is fully operational until the backfilling operations are completed. There must be adequate provisions for backup power for standby conditions to ensure the continuous operation of the dewatering system.

Dewatering at rates greater than 50,000 L/day and less than 400,000 L/day would require a water taking and discharge plan prepared by a Qualified Person (QP) (P.Geo. or P.Eng.) and submitted to the Environmental Activity Sector Registry (EASR) system for approval from provincial authorities. If dewatering rates are to exceed 400,000 litres per day, then under the Ontario Water Resources Act, the Water Taking and Transfer Regulation 387/04, a Permit to Take Water (PTTW) from the Ministry of Environment and Climate Change (MOECC) will be required together with a Hydrogeological Site Assessment report in support of the PTTW application.

Final design and construction details should be submitted to PML for review to assess the ground water control requirements and determine if EASR approval and/or a PTTW are required.

4.2.3 Bedding Material

It is anticipated the subgrade for the underground services will comprise engineered fill or native sand. In general, the compact sand or engineered fill are considered suitable for conduit support. However, in localized areas, loose/soft zones of the subgrade may require subexcavation or compaction prior to the placement of the granular pipe bedding material.

The normal 150 mm bedding thickness of granular material as per Ontario Provincial Standard (OPS) and/or local requirements should be satisfactory. Local subexcavation and thickening of the bedding layer may be necessary where unstable conditions are encountered. The need for subgrade improvement or thickening of bedding is best determined by geotechnical review during construction.

The bedding material should be carried up as backfill for at least 300 mm above the pipe obvert, and should be placed in 150 mm lifts compacted to 95% SPMDD.

4.2.4 Trench Backfill

The industry standard normally calls for service trenches to be backfilled with inorganic, debris free material placed in uniform 200 to 300 mm thick lifts within 3% of the optimum moisture content and compacted to at least 95% SPMDD.

Organic soil, topsoil, deleterious or excessively wet material should not be used as backfill.

It is anticipated that the excavated material will generally consist of topsoil and native sand.

Re-use of portions of the excavated native sand from above the water table is considered feasible from a geotechnical perspective, depending on the moisture content of the excavated material at time of construction relative to its optimum moisture content. Depending on seasonal conditions, some moisture content adjustments to the backfill materials may be required. The on site soils are frost susceptible and are considered unsuitable for use where free draining backfill is required. It is anticipated that portions of the overburden from below the observed water levels will be wetter than its optimum moisture content and will be unsuitable for backfill unless allowed to air dry prior to reuse.

The trenching and backfilling operations should be carried out in a manner which minimizes the length of trench left open yet accommodates efficient pipe laying and compaction activities.

Full time site observation should be carried out by PML to examine and approve backfill material, to carefully inspect placement operations, and to verify the compaction by in situ density testing using nuclear gauges

4.3 Residential Houses

4.3.1 Foundation Considerations

Based on a review of borehole elevations, the ground surface elevation on the site ranges from about elevation 229.8 to 234.9 9 m. The proposed founding level and foundation loads of the houses were not known at the time of this report. For the purposes of this report, it is assumed that footings will be approximately 2.5 m below surface, near elevations 226.9 to 231.9.

Strip and spread footings founded on adequately prepared engineered fill or competent native sand and silt should be proportioned for a factored net bearing resistance at Ultimate Limit State (ULS) of 115 kPa and bearing pressure at Serviceability Limit State (SLS) of 75 kPa.

In general, where founding levels of adjacent footings vary, the founding elevation between footings should be stepped in maximum 600 mm steps at a maximum inclination of 10 horizontal to 7 vertical (10H:7V).

Prior to placement of structural concrete, all foundation excavations should be examined by geotechnical personnel from PML to verify that the founding stratum is in accordance with the assumptions and recommendations of this report.

All footings subject to frost action should be provided with a minimum of 1.2 m of soil cover or equivalent thermal insulation. A 25 mm thick layer of polystyrene insulation is thermally equivalent to 600 mm of soil cover.

The native subgrade is prone to disturbance and loosening from exposure to weather and construction traffic. Accordingly, a 50 mm skim slab of lean concrete should be provided over the base of the approved subgrade if structural concrete cannot be provided within 24 hours of approval of the foundation base.

Due to the variable subsurface and foundation conditions across the site, it would be prudent to drill a supplemental borehole at each lot within the building envelopes to clearly define the specific foundation type or construction that would be required for each building lot. The table below summarizes the foundation recommendations required at the locations of the boreholes.

Borehole Location	Anticipated Excavation Depth (m) (Elevation)	Groundwater Depth (m) (Elevation)	Foundation Recommendations
1	4.0 (226.6)	4.5 (226.1)	Replace very loose sand with engineered fill to 2.5 m depth
2	2.5 (232.4)	4.5 (230.4)	Proofroll native compact sand subgrade
3	2.5 (227.3)	3.7 (226.1)	Proofroll native compact sand subgrade; seasonal water to be addressed if foundation is below 2.0 m due to wet/saturated conditions
4	2.5 (229.2)	5.9 (225.7)	Proofroll native compact sand subgrade
5	3.5 (226.9)	3.9 (226.5)	Replace very loose sand with engineered fill to 2.5 m depth
6	2.5 (227.7)	3.8 (226.4)	Proofroll native compact sand subgrade

The total settlement of foundations designed in accordance with the foregoing recommendations is not expected to exceed 25 mm. Differential settlement is expected to be less than 75% of this value.

All work should be carried out in accordance with the Occupational Health and Safety Act (Ontario Regulation 213/91) and with local regulations.

4.3.2 Earthquake Considerations

Design provisions for earthquake loading should also be applied. Based on the characteristics of the subsoils encountered in the boreholes at this site, the subject property would be classified as Site Class D per The Ontario Building Code Act, (2012) Section 4.1.8.4.

4.3.3 Floor Slab

Construction of the floor slab as a conventional slab-on-grade on competent native sand or engineered fill is considered feasible. Loose sands and silt will need to be removed and replaced with engineered fill.

Preparation of the floor slab subgrade should include stripping of the loose sand and otherwise deleterious material followed by proofrolling of the exposed subgrade with a heavy roller to ensure uniform adequate support. Excessively loose/soft or compressible materials revealed during the proofrolling operations should be subexcavated and replaced with well compacted approved material.

Fill placed under the floor slab to achieve finished subgrade levels or as foundation excavation backfill should comprise approved inorganic material having a moisture content within 3% of the optimum value, placed in maximum 200 mm thick lifts, and compacted to at least 95% of standard Proctor maximum dry density (SPMDD).

A minimum 150 mm thick layer of well compacted free draining Granular A type material meeting OPSS 1010 specifications should be provided directly beneath the slab-on-grade. A polyethylene vapour barrier should be placed under the slab if a moisture sensitive finish is to be placed on the floor.

Exterior grades should be maintained at least 150 mm below the ground floor level and sloped to promote drainage away from the building. If finished floor levels cannot be maintained at least 150 mm above surrounding grades then perimeter foundation drains are recommended.

It would be prudent to install a sump pump and/or drains within the basements of the houses due to the perched condition of groundwater occurring across the site.

4.3.4 Subsurface Walls

Provided free-draining granular backfill is employed and hydrostatic pressure is not allowed to develop, the lateral earth pressure, p, acting on the subsurface walls should be computed using the following equation, assuming a triangular pressure distribution:

$$p = K(\gamma h + q)$$

where K = lateral earth pressure coefficient
= 0.5 for wall restrained at both top and bottom
γ = unit weight of free-draining granular material
= 21.0 kN/m^3
h = depth below final grade (m)
q = surcharge load (kPa), if present

The excavation adjacent to the basement walls should be backfilled with free-draining granular material satisfying the OPS Granular B gradation specification and a weeping tile system installed to minimize the build-up of hydrostatic pressure behind the wall. Alternatively, an approved drainage board product may be provided. The in situ soil would not be classified as “free draining”, but may be re-used as exterior foundation backfill if a drainage board product is installed as per Ontario Building Code requirements.

The perforated drainage pipe should be surrounded by a properly designed graded granular filter or wrapped with approved geotextile to prevent migration of fines into the system. The perforated drainage pipe should be placed on a positive grade and lead to a frost-free sump or outlet.

The backfill adjacent to the subsurface walls should be compacted to at least 95% of SPMDD. The backfill should be compacted using light equipment to minimize potential damage to the wall. It is imperative that the excavation is of sufficient width to enable operation of suitable compaction equipment; use of a hoepac is not suitable for this application.

The exterior grade should be sloped to promote surface drainage away from the house.

4.4 Pavement Construction

The subgrade for pavement construction is anticipated to consist of native overburden and engineered structural fill. Based on typical traffic patterns for local residential streets, the estimated strength and frost susceptibility of the anticipated subgrade and assuming adequate drainage, the following pavement structure is specified in the Norfolk County Standards:

Pavement Component	Thickness (mm)
Surface Course (HL3)	40
Binder Course (HL8)	50
Granular A Base Course	150
Granular B Subbase Course	300

The granular materials should conform to the OPS specifications and should be placed in maximum 200 mm thick lifts and compacted to 100% of SPMDD. The asphalt should be placed in accordance with current OPS specifications and compacted to at least 92% of the material's maximum relative density. Reference is made to OPS Specification 310 revised November, 2010.

Preparation of the subgrade for pavement construction should involve stripping obvious deleterious materials followed by proofrolling of the subgrade with a heavy roller. Excessively wet or deleterious material revealed by the proofrolling operations should be subexcavated and replaced. The subgrade surface should be compacted to at least 95% SPMDD.

The pavement design considers that construction will be carried out during the drier time of the year and that the subgrade is stable, as determined by proofrolling operations. If the subgrade should become excessively wet or rutted during construction activities, additional subbase material may be required. The need for additional subbase is best determined during construction.

For the pavement to function properly, provision must be made for water to drain out of, and not collect in, the granular courses. In this regard, the pavement subgrade should be sloped to promote drainage towards catch basins, manholes, or roadside ditches. Catch basins and manholes should be provided with stub drains just above the drain level to permit drainage of the backfill.

5. GEOENVIRONMENTAL CONSIDERATIONS

PML understands that excess soil may be generated during construction; the volume of which is unknown at this time. A limited chemical testing program was carried out to check the geoenvironmental quality of the soil at selected sampling locations in order to provide comments regarding on site or off-site re-use and/or disposal options of excess soil.

A Phase One Environmental Site Assessment (ESA) completed in accordance with Ontario Regulation (O. Reg.) 153/04, as amended or Canadian Standards Association (CSA) Standard Z768-01 (re-affirmed 2016), or an Assessment of Past Uses (APU) Report per O. Reg. 406/19 was not within the scope of work for this assignment. Accordingly, soil and ground water impairment that has not been identified by this limited chemical testing program may exist elsewhere at the site.

5.1 Excess Soil Regulation

The Ministry of the Environment, Conservation and Parks (MECP) has introduced a new On-Site and Excess Soil Management Regulation (O. Reg. 406/19). This regulation changes the definition of soil as a waste unless it is being transported for beneficial reuse. Soil quality must meet the new Excess Soil Quality Standards (ESQSs) and the quantity of soil must be consistent with the beneficial reuse specified for the reuse site (Receiving Site).

As of January 1, 2022, for certain projects additional requirements including project planning documentation, tracking and registration are in force.

The limited soil sampling and chemical testing program presented herein, does not fulfill all regulatory requirements of O. Reg. 406/19 and is intended for preliminary planning purposes only. Additional, review and excess soil management planning, including additional sampling and testing will be required.

5.2 Chemical Testing Protocol

Representative samples collected during the geotechnical investigation were returned to our laboratory for detailed visual examination. Soil samples were submitted for chemical analysis to SGS Canada Inc. (SGS), a Canadian Association for Laboratory Accreditation Inc. (CALA) accredited laboratory in Lakefield, Ontario. The chemical analyses conducted by SGS were in accordance with the O. Reg. 153/04, as amended Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act dated March 9, 2004, amended as of July 1, 2011.

As part of the geoenvironmental procedural protocol, all recovered soil samples were examined for visual and olfactory evidence of potential contamination.

Since a Phase One ESA or APU were not completed to identify project specific Contaminants of Potential Concern (COPCs) samples were reviewed and selected for chemical testing in accordance with the proposal whereby ten soil samples were selected and analyzed for common contaminant groups including general testing for metals and Other Regulated Parameters (ORPs). It should be noted that additional sampling and testing for additional parameters will be required to meet the requirements of O. Reg. 406/19.

The rationale for sample selection was also based on materials exhibiting visual and/or olfactory evidence of contamination, material most likely to be contaminated (i.e. fill materials), site coverage and materials most likely to be excavated during construction.

A list of all samples submitted for analysis is included as Table B1, appended.

5.3 Site Condition Standards

The Ontario Ministry of the Environment, Conservation and Parks (MECP) has developed a set of Soil, Ground water and Sediment Standards for Use Under Part XV.1 of the Environmental Protection Act (April 15, 2011) and O. Reg. 153/04, as amended. The standards consist of nine tables (Table 1 through Table 9) that provide criteria for maximum concentrations of various contaminants. In general, the applicable O. Reg. 153/04, as amended Site Condition Standards (SCSs) depend on the site location, land use, soil texture, bedrock depth, soil pH and source of potable water at the investigation site. In order to determine the Site Sensitivity, Sections 41 and 43.1 of O. Reg. 153/04, as amended were evaluated by PML as per the following table:

Site Condition Standard and Site Sensitivity Analysis

Criteria	Result
Proposed Property Use O. Reg. 153/04, as amended Part I Section 1	Residential
Potable vs. Non-Potable Ground Water O. Reg. 153/04, as amended Part IX Section 35	Potable
Proximity to Areas of Natural Significance O. Reg. 153/04, as amended Part IX Section 41 (1) (a)	> 30 m
Soil pH O. Reg. 15/04, as amended Section 41 (1) b	Surface Soil: 5 to 9 Subsurface Soil: 5 to 11

Site Condition Standard and Site Sensitivity Analysis

Criteria	Result
Soil Texture O. Reg. 153/04, as amended Part IX Section 42	Coarse
Proximity to a Water Body O. Reg. 153/04, as amended Part IX Section 43.1	> 30 m
Shallow Soil O. Reg. 153/04, as amended Part IX Section 43.1	No
Site Condition Standards	Table 2 (T2) Site Condition Standards (SCSs) for Residential/Parkland/Institutional (ICC)

For preliminary evaluation of off-Site beneficial reuse options for excess soil, the generic Excess Soil Quality Standards (ESQS) of O. Reg. 406/19 were used. These standards consist of nine tables (Table 1 and Tables 2.1 through Table 9.1) that provide criteria for maximum concentrations of various contaminants. Similar to O. Reg. 153/04, as amended, the O. Reg. 406/19 ESQSs depend on the site location, land use, soil texture, bedrock depth, soil pH and source of potable water at the investigation site.

- For the option of re-using the excess soils with minimal environmental restrictions, the O. Reg. 406/19 Full Depth Background Table 1 (T1) SCSs for Residential/ Parkland/Institutional/Industrial/Commercial/Community (RPI/ICC) property uses was considered.

- For the option of re-using the excess soils at a property (or properties) with a potable ground water condition, results were compared to the O. Reg. 406/19 Table 2.1 (T2.1) ESQSs for both RPI and ICC land uses.

- For the option of re-using the excess soils at a property (or properties) with a non-potable ground water condition, results were compared to the O. Reg. 406/19 Table 3.1 (T3.1) ESQSs for both RPI and ICC land uses.

It is noted that a comparison to other ESQS Tables was not conducted as part of this assignment. If the potential receiving site for excess soil falls within one of these other categories, additional evaluation by PML will be required to confirm conformance.

5.4 Analytical Findings

Laboratory Certificates of Analysis compared to T1 RPI/ICC and T3 ICC SCSs are included in Appendix B. The measured values and corresponding SCSs are shown on the certificates of analysis. In the event of an exceedance of the SCSs, the level is shown highlighted in orange, where applicable.

5.3.1 On-Site Reuse

Based on the results of chemical testing, the measured concentration of the tested parameters complied with the applicable T2 RPI SCSs.

5.3.2 Off-Site Beneficial Reuse

A comparison of the results was carried out against the more common ESQSs of T1, T2.1 and T3.1 of O. Reg. 406/19. The following table indicates whether the test results meet (yes) or do not meet (no) the ESQSs:

Table 1 (RPI/ICC)	Table 2.1 (RPI)	Table 2.1 (ICC)	Table 3.1 (RPI)	Table 3.1 (ICC)	Licensed Landfill
Yes	Yes	Yes	Yes	Yes	TCLP[1] Testing may be required

Notes:
1. TCLP - Toxicity Characteristic Leaching Procedure.
2. Results are for metals and other regulated parameters only. Additional testing is required to confirm suitability for off-Site beneficial reuse.

5.5 Discussion and Recommendations

If the excess soil is to be removed from the site for off-site re-use, the following conditions must be met:

- Once excess soil quantities are known, additional soil sampling and chemical testing will be required to meet the minimum requirements of O. Reg. 406/19 in order to confirm suitability for off-Site beneficial reuse.
- The work must be completed in accordance with local by-laws governing soil movement and/or placement at other sites;

- All analytical results and environmental assessment reports must be fully disclosed to the receiving site owners/authorities and they have agreed to receive the material;
- The applicable ESQSs for the receiving site have been determined, as confirmed by the environmental consultant and the ESQSs are consistent with the chemical quality of the soil originating at the Source Site;
- Transportation and placement of the excess soil is monitored by the environmental consultant to check the material is appropriately placed at the pre-approved site;
- The Receiving Site must be arranged and/or approved well in advance of excavation in order to avoid delays during construction. As well, it is noted the chemical testing requirements for various Receiving Sites is site-specific and additional testing may be required, beyond that provided in this report.

It should be noted that the soil conditions between and beyond the sampled locations may differ from those encountered during this assignment. PML should be contacted if impacted soil conditions become apparent during future development to further assess and appropriately handle the materials, if any, and evaluate whether modifications to the conclusions documented in this report are necessary.

We trust the information presented in this report is sufficient for your present purposes. If you have any questions, please do not hesitate to contact our office.

Sincerely

Peto MacCallum Ltd.

Sam MacDonald, BASc., EIT
Project Supervisor
Geotechnical Services

LICENSED PROFESSIONAL ENGINEER
S. A. JEFFREY
2022/02/08
PROVINCE OF ONTARIO

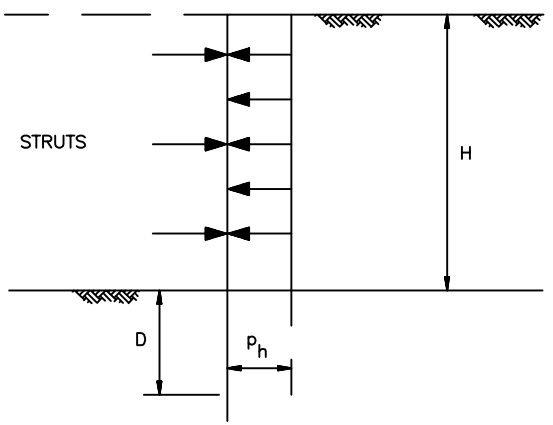
Scott Jeffrey, P.Eng., QP_{ESA}, $LEED_{GA}$
Senior Associate
Regional Manager, Geotechnical and Geoenvironmental Services, Hamilton

SM/SJ:ld

NOTES

1. The actual magnitude and distribution of the horizontal earth pressures which will act on the bracing system are dependent upon the permissible lateral/vertical movements adjacent to the excavation, the soil type, groundwater conditions, drainage provisions, temporary/permanent surcharge loads, the type of bracing system adopted, weather conditions, quality of workmanship and length of time the excavation will be supported. Hence, the recommended pressure diagram and design parameters should be reviewed when construction details, schedule and type of support system are established.
2. Stability of base of excavation must be confirmed when bracing system design, excavation geometry and surcharge loads are established. If groundwater table is well above base of excavation and/or artesian conditions exist, local lowering of the groundwater level will be necessary to prevent bottom heave/piping of the base of the excavation.
3. Earth pressure diagram is applicable to maximum depth of cut of 12m (40 ft.).
4. Structural components of bracing system should be confirmed adequate for each level of excavation.
5. If sheeting will not permit drainage, bracing system must be designed to resist water pressure.
6. Surcharge loads such as street/construction traffic, supported utilities, adjacent foundations, temporary stockpiles and other loads carried by bracing system are not included in earth pressure diagram.
7. Temporary surcharge loading should not be closer to the face of the excavation than half the depth of excavation unless accounted for in bracing design.
8. If settlement sensitive structures are located near the excavation, special measures should be undertaken to control settlements. A condition survey should be conducted prior to construction and apppropriate monitoring (surface and insitu) carried out during construction.
9. Earth pressure diagram is applicable for relatively short construction periods. If excavation is to be open for long periods, monitoring of deformation is essential, earth pressure diagram must be reviewed, and remedial works may be required.
10. Earth pressure diagram does not account for extended periods of exposure of the excavation to freezing temperatures.
11. Bracing system should be regularly examined for signs of distress.
12. All work should be carried out in accordance with the Occupational Health and Safety Act and local regulations. Good quality workmanship and construction practices are to be employed.
13. This sheet should be read in conjunction with text of report for this project. Additional comments and recommendations concerning these general guidelines will be provided if required.

EARTH PRESSURE DIAGRAM



p_h = design lateral earth pressure
= $0.65K\gamma H$

K = lateral earth pressure coefficient

γ = unit weight of soil

H = depth of excavation

D = depth of embedment of soldier piles (if used).

RECOMMENDED DESIGN PARAMETERS

γ = 18.0 kN/m^3

K = 0.30 (movement of retained soil acceptable)
0.50 (movement of adjacent structures/facilities unacceptable)

LATERAL EARTH PRESSURE DISTRIBUTION

MULTI–BRACED CUTS IN COHESIONLESS SOILS

Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN: SM	DATE	SCALE	JOB NO.	FIGURE NO.
CHECKED: SJ	JAN 2021	N.T.S.	20HF021	1
APPROVED: SJ				

NOTES

1. The actual magnitude and distribution of the horizontal earth pressures which will act on the bracing system are dependent upon the permissible lateral/vertical movements adjacent to the excavation, the soil type, groundwater conditions, drainage provisions, temporary/permanent surcharge loads, the type of bracing system adopted, weather conditions, quality of workmanship and length of time the excavation will be supported. Hence, the recommended pressure diagram and design parameters should be reviewed when construction details, schedule and type of support system are established.
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3. Earth pressure diagram is applicable to maximum depth of cut of 12m (40 ft.).
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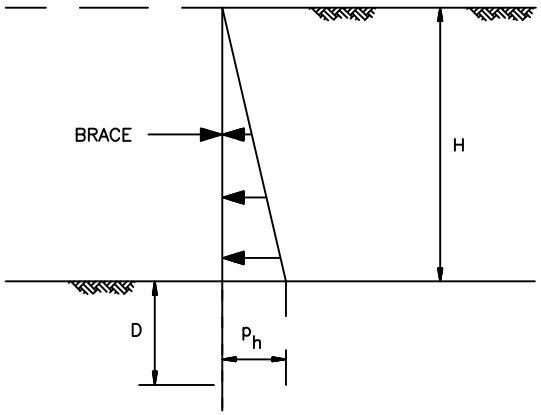
9. Earth pressure diagram is applicable for relatively short construction periods. If excavation is to be open for long periods, monitoring of deformation is essential, the earth pressure diagram must be reviewed, and remedial works may be required.
10. Earth pressure diagram does not account for extended periods of exposure of the excavation to freezing temperatures.
11. Bracing system should be regularly examined for signs of distress.
12. All work should be carried out in accordance with the Occupational Health and Safety Act and local regulations. Good quality workmanship and construction practices are to be employed.
13. This sheet should be read in conjunction with text of report for this project. Additional comments and recommendations concerning these general guidelines will be provided if required.

EARTH PRESSURE DIAGRAM



p_h = design lateral earth pressure
= $K\gamma H$

K = lateral earth pressure coefficient

γ = unit weight of soil

H = depth of excavation

D = depth of embedment of soldier piles (if used).

RECOMMENDED DESIGN PARAMETERS

γ = 18.0 kN/m^3

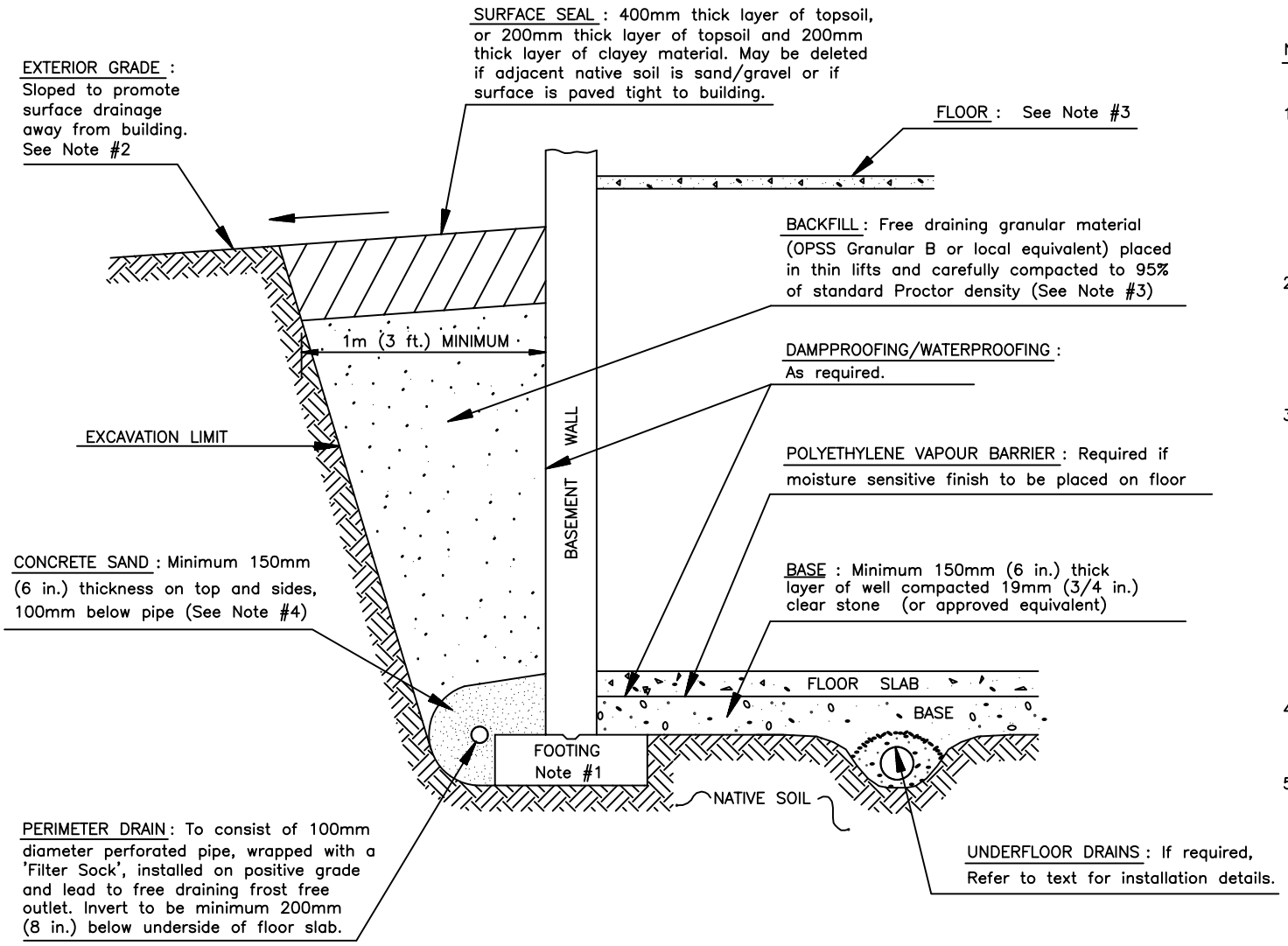
K = 0.30 (movement of retained soil acceptable)
0.50 (movement of adjacent structures/facilities unacceptable)

LATERAL EARTH PRESSURE DISTRIBUTION

SINGLY–BRACED CUTS IN COHESIONLESS SOILS

PML Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN:	SM	DATE	SCALE	JOB NO.	FIGURE NO.
CHECKED:	SJ	JAN. 2022	N.T.S.	20HF021	2
APPROVED:	SJ				



NOTES

1. Footing may be constructed by placement of structural concrete neat against natural soil. Drain to be installed in a similar manner immediately above footing maintaining 200mm (8 in.) distance between top of drain and underside of floor slab.
2. Exterior grade to be minimum 300mm (12 in.) below interior floor slab, or other means established to prevent entry of surface water into building through building openings.
3. Basement wall to be supported by floor system or interior bracing prior to commencement of backfill placement. Heavy construction equipment should not be permited within a distance from the foundation wall equivalent to half the wall height. Overcompaction of backfill to be avoided as excessive lateral earth pressure may result. Approved drainage board product may be used in lieu of free draining granular.
4. Concrete sand may be replaced with clear stone, if wrapped in approved geotextile.
5. Refer to text for details regarding founding levels, competent bearing material and construction details specific to particular site.

STANDARD DRAWING

GENERAL RECOMMENDATIONS REGARDING DRAINAGE AND BACKFILL REQUIREMENTS FOR BASEMENT WALLS AND FLOOR SLABS

Peto MacCallum Ltd.
CONSULTING ENGINEERS

DRAWN:	SM	DATE	SCALE	JOB NO.	FIGURE NO.
CHECKED:	SJ	JAN. 2022	N.T.S.	20HF021	3
APPROVED:	SJ				

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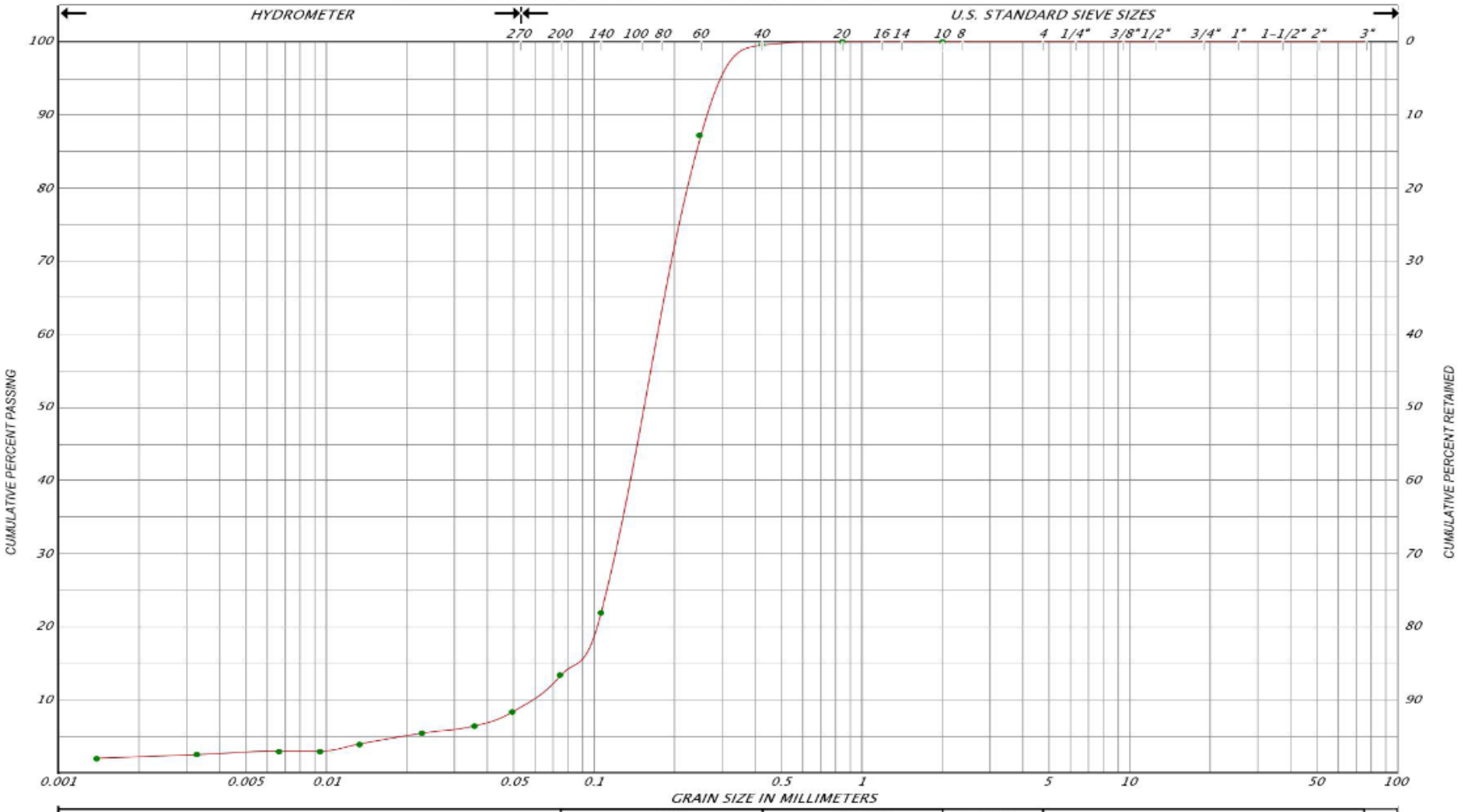
PROJECT NO.20HF021
FIGURE NO. 4

PARTICLE SIZE DISTRIBUTION CHART



SILT & CLAY				FINE	MEDIUM	COARSE	GRAVEL			COB BLES	UNIFIED
				SAND							
CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	GRAVEL			COBBLES	M.I.T
	SILT			SAND							
CLAY	SILT			V.FINE	FINE	MED.	COARSE	GRAVEL			US BUREAU
				SAND							

REMARKS: Bore Hole 2, Sample No.4, 2.25 m, Sand, some silt, trace clay

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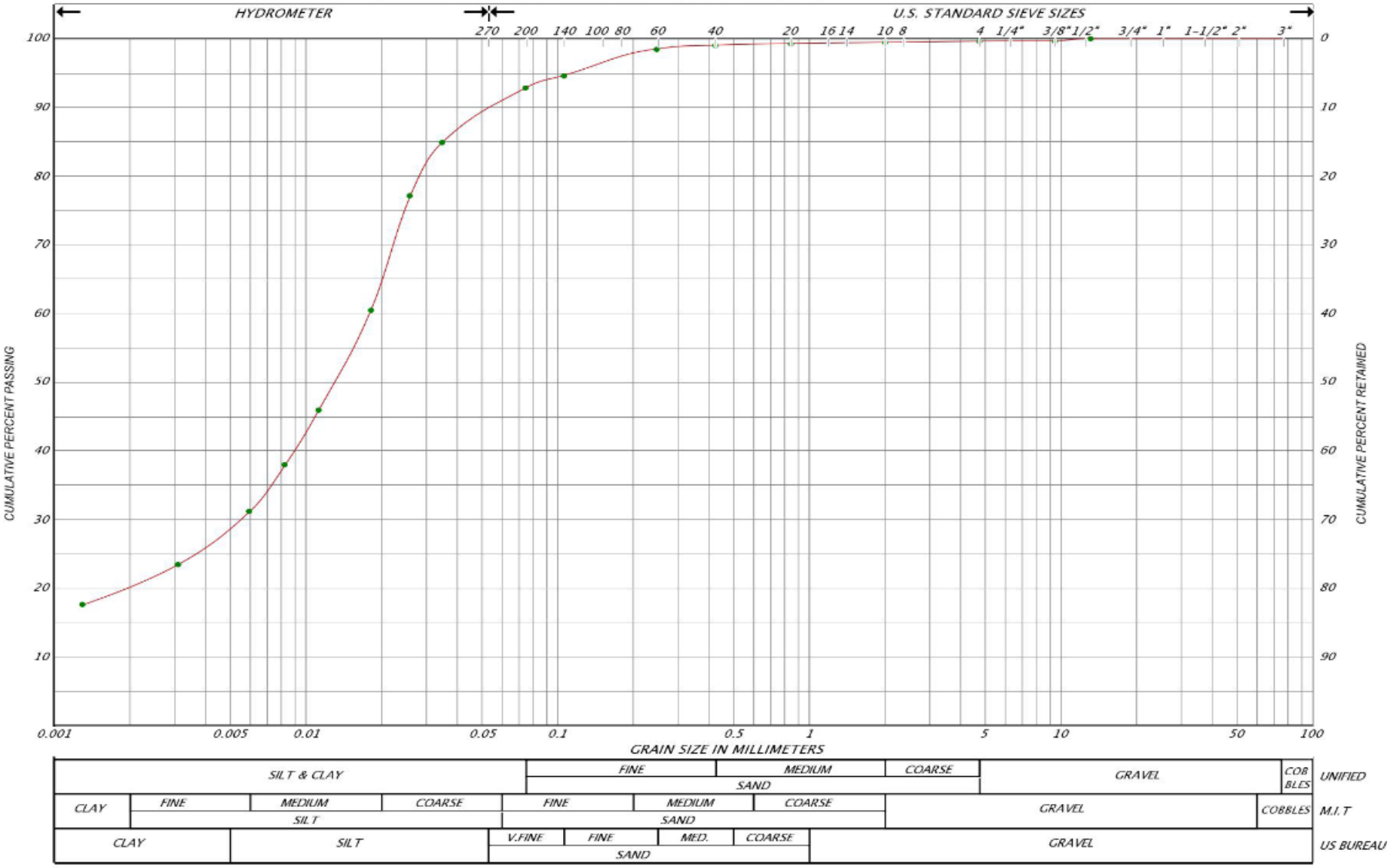
PROJECT NO.20HF021
FIGURE NO. 5

PARTICLE SIZE DISTRIBUTION CHART



REMARKS: Bore Hole 3, Sample No.7, 6.0 m, Clayey silt, trace sand

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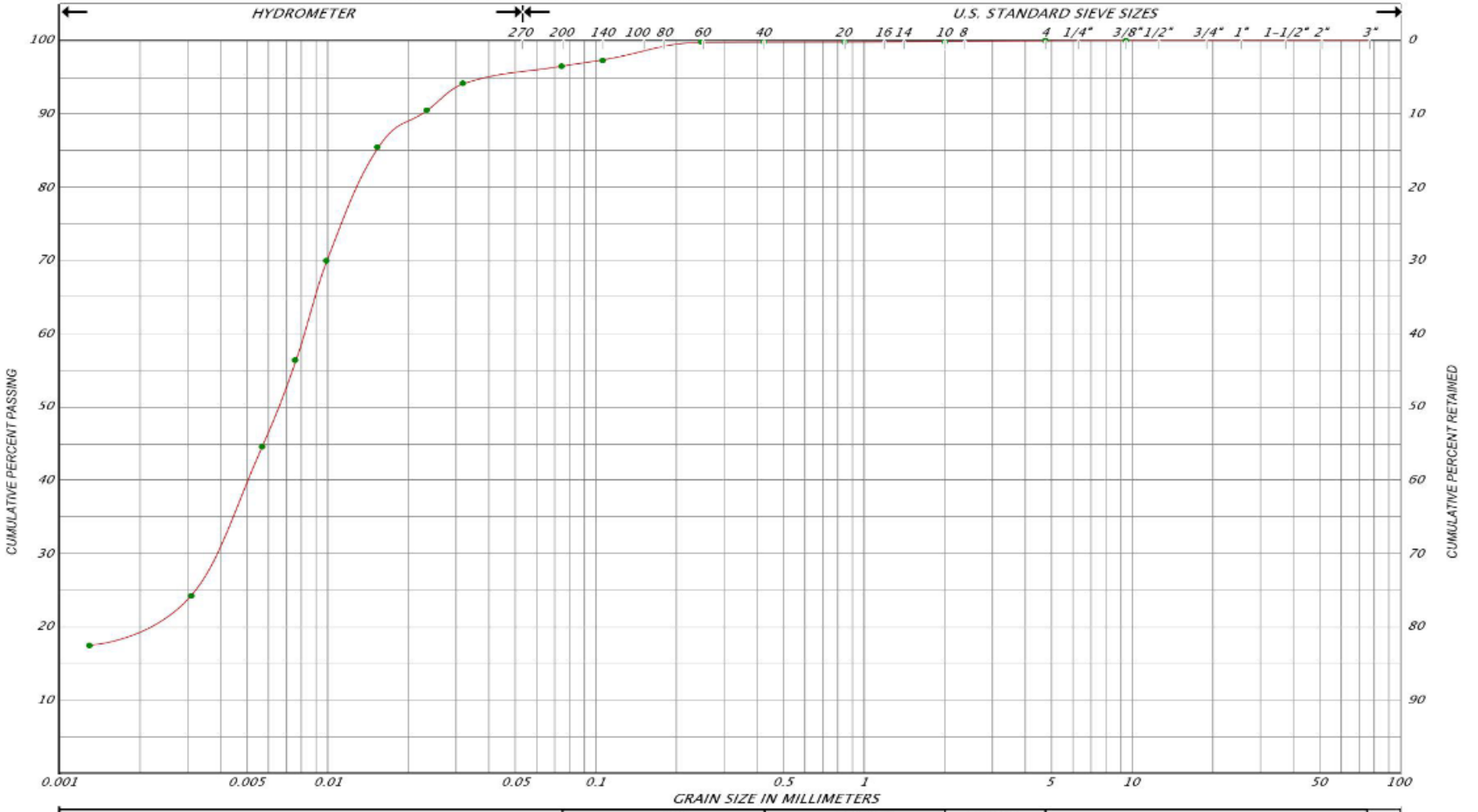
CONSULTING ENGINEERS

PROJECT NO.20HF021
FIGURE NO. 6

PARTICLE SIZE DISTRIBUTION CHART



SILT & CLAY				FINE	MEDIUM	COARSE	GRAVEL			COBBLES	UNIFIED
				SAND							
CLAY	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	GRAVEL			COBBLES	M.I.T
	SILT			SAND							
CLAY	SILT			V.FINE	FINE	MED.	COARSE	GRAVEL			US BUREAU
				SAND							

REMARKS: Bore Hole 4, Sample No.5, 3.0 m, Clayey silt, trace sand

LIST OF ABBREVIATIONS

PENETRATION RESISTANCE

Standard Penetration Resistance N: - The number of blows required to advance a standard split spoon sampler 0.3 m into the subsoil. Driven by means of a 63.5 kg hammer falling freely a distance of 0.76 m.

Dynamic Penetration Resistance: - The number of blows required to advance a 51 mm, 60 degree cone, fitted to the end of drill rods, 0.3 m into the subsoil. The driving energy being 475 J per blow.

DESCRIPTION OF SOIL

The consistency of cohesive soils and the relative density or denseness of cohesionless soils are described in the following terms:

CONSISTENCY	N (blows/0.3 m)	c (kPa)	DENSENESS	N (blows/0.3 m)
Very Soft	0 - 2	0 - 12	Very Loose	0 - 4
Soft	2 - 4	12 - 25	Loose	4 - 10
Firm	4 - 8	25 - 50	Compact	10 - 30
Stiff	8 - 15	50 - 100	Dense	30 - 50
Very Stiff	15 - 30	100 - 200	Very Dense	> 50
Hard	> 30	> 200		

WTPL	Wetter Than Plastic Limit
APL	About Plastic Limit
DTPL	Drier Than Plastic Limit

TYPE OF SAMPLE

SS	Split Spoon	TW	Thinwall Open
WS	Washed Sample	TP	Thinwall Piston
SB	Scraper Bucket Sample	OS	Oesterberg Sample
AS	Auger Sample	FS	Foil Sample
CS	Chunk Sample	RC	Rock Core
ST	Slotted Tube Sample		

PH	Sample Advanced Hydraulically
PM	Sample Advanced Manually

SOIL TESTS

Qu	Unconfined Compression	LV	Laboratory Vane
Q	Undrained Triaxial	FV	Field Vane
Qcu	Consolidated Undrained Triaxial	C	Consolidation
Qd	Drained Triaxial		

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE/MONITORING WELL NO. 1

17T 522131.1E 4743056N

PROJECT Laplante Road - 6 Lot Plan of Subdivision
PML REF. 20HF021
LOCATION Laplante Road, Tilsonburg
BORING DATE February 11, 2021
ENGINEER B. R. Gray
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN S. MacDonald

DEPTH (metres) / ELEV	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES
	SURFACE ELEVATION 230.62				
0.0 / 230.62	TOPSOIL: 670 mm Loose, brown sand topsoil, some silt, damp; occasional rootlet		1	SS	8
0.67 / 229.95	SILT: Loose, brown silt, some clay, trace sand, wet; occasional iron staining and clay seams		2[1]	SS	5
1.4 / 229.2	becoming very loose, some sand, trace clay		3	SS	2
2.5 / 228.1	SAND: Very loose, brown sand, some silt, trace clay, moist		4A 4B	SS	1
			5	SS	3
4.0 / 226.6	CLAYEY SILT: Very stiff, brown clayey silt, trace sand WTPL		6	SS	15
5.5 / 225.1	becoming hard, grey		7	SS	36
6.5 / 224.1	BOREHOLE TERMINATED AT 6.5 m				

ELEVATION SCALE: 230, 229, 228, 227, 226, 225

SHEAR STRENGTH (kPa)
+FIELD VANE △TORVANE ○ Qu
▲POCKET PENETROMETER ○ Q
50 100 150 200
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

UNIT WEIGHT kN/m³

GROUND WATER OBSERVATIONS AND REMARKS
GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL

Stickup Well Protector Set
Bentonite Seal
50 mm Diameter PVC Pipe
Filter Sand
El. 226.1
Screen

Upon completion of augering, free water and cave at 5.1 m.

Water Level Readings:

Date	Depth	Elev.
2021-03-10	4.4	226.2

NOTES 1. Sample submitted for chemical testing

▼ GROUND WATER STRIKE

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE/MONITORING WELL NO. 2

17T 522051E 4742994N

PROJECT Laplante Road - 6 Lot Plan of Subdivision
PML REF. 20HF021
LOCATION Laplante Road, Tilsonburg
BORING DATE February 11, 2021
ENGINEER B. R. Gray
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN S. MacDonald

DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES
	SURFACE ELEVATION 234.87				
0.0					
0.20 / 234.67	TOPSOIL: 200 mm compact, dark brown sand topsoil, some silt damp; occasional rootlet		1A		
	SAND: Loose, brown sand, some silt, damp		1B	SS	13
1.0			2	SS	7
			3[1]	SS	8
2.1 / 232.8	becoming compact		4	SS	13
3.0			5	SS	13
4.0 / 230.9	CLAYEY SILT: Stiff, brown clayey silt, trace sand DTPL; occasional clay layers		6	SS	10
5.0					
5.5 / 229.4	SAND: Compact, brown and grey sand, trace silt, damp; occasional oxidation staining		7	SS	27
6.5 / 228.4	BOREHOLE TERMINATED AT 6.5 m				
7.0					
8.0					
9.0					
10.0					

ELEVATION SCALE: 234, 233, 232, 231, 230, 229

SHEAR STRENGTH (kPa)
+FIELD VANE △TORVANE ○ Qu
▲POCKET PENETROMETER ○ Q
50 100 150 200
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

UNIT WEIGHT kN/m³

GROUND WATER OBSERVATIONS AND REMARKS

GRAIN SIZE DISTRIBUTION (%)
GR SA SI&CL

Stickup Well Protector Set
Bentonite Seal
50 mm Diameter PVC Pipe
0 87 13
Filter Sand
Screen

Upon completion of augering, no free water, cave at 5.2 m

Water Level Readings:

Date	Depth	Elev.
2021-03-10	4.5	230.4

NOTES 1. Sample submitted for chemical testing

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 3

17T 522176.4E 4743016N

PROJECT Laplante Road - 6 Lot Plan of Subdivision
PML REF. 20HF021
LOCATION Laplante Road, Tilsonburg
BORING DATE February 11, 2021
ENGINEER B. R. Gray
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN S. MacDonald

DEPTH (metres)	ELEV	DESCRIPTION	STRAT PLOT	NUMBER	TYPE	"N" VALUES
		SURFACE ELEVATION 229.84				
0.0	229.84	TOPSOIL: 680 mm Loose, brown sand topsoil, trace silt, damp; occasional rootlet		1	SS	6
0.68	229.16	SAND: Loose, light brown silt, some clay, trace sand, moist		2	SS	7
1.0				3	SS	4
2.1	227.7	becoming compact, wet		4	SS	11
2.9	226.9	becoming saturated		5[1]	SS	14
4.0	225.8	CLAYEY SILT: Stiff, grey clayey silt, trace sand, WTPL		6	SS	8
5.5	224.3	becoming very stiff		7	SS	25
6.5	223.3	BOREHOLE TERMINATED AT 6.5 m				

ELEVATION SCALE: 229, 228, 227, 226, 225, 224

SHEAR STRENGTH (kPa): + FIELD VANE △ TORVANE ○ Qu ▲ POCKET PENETROMETER ○ Q; DYNAMIC CONE PENETRATION × STANDARD PENETRATION TEST ●
50 100 150 200
20 40 60 80

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

UNIT WEIGHT kN/m³

GROUND WATER OBSERVATIONS AND REMARKS

GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL

▼ El. 226.3

0 7 93

Upon completion of augering, free water and cave at 3.7 m

NOTES 1. Sample submitted for chemical testing

▼ GROUND WATER STRIKE

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE NO. 4

17T 522131.6E 4742901N

PROJECT Laplante Road - 6 Lot Plan of Subdivision
PML REF. 20HF021
LOCATION Laplante Road, Tilsonburg
BORING DATE February 11, 2021
ENGINEER B. R. Gray
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN S. MacDonald

DEPTH ELEV (metres)	DESCRIPTION	STRAT PLOT	SAMPLES NUMBER	SAMPLES TYPE	SAMPLES "N" VALUES	ELEVATION SCALE
	SURFACE ELEVATION 231.74					
0.25 / 231.49	TOPSOIL: 250 mm Loose, brown sand topsoil, damp; occasional rootlet		1	SS	7	
	SAND: Loose, brown sand, trace silt, wet		2A / 2B	SS	4	231
1.7 / 230.0	CLAYEY SILT: Stiff, brown clayey silt, trace sand, DTPL; occasional sand lenses		3A / 3B	SS	9	230
2.1 / 229.6	becoming firm		4[1]	SS	7	229
2.9 / 228.8	becoming stiff		5	SS	12	228
4.0 / 227.7	SAND: Dense, brown and grey sand, trace silt, damp; occasional oxidation staining		6	SS	35	227
5.5 / 226.2	becoming compact, saturated		7	SS	12	226
6.5 / 225.2	BOREHOLE TERMINATED AT 6.5 m					

SHEAR STRENGTH (kPa)
+FIELD VANE △TORVANE ○ Qu
▲POCKET PENETROMETER ○ Q
50 100 150 200
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P | NATURAL MOISTURE CONTENT w | LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

UNIT WEIGHT kN/m³

GROUND WATER OBSERVATIONS AND REMARKS

GRAIN SIZE DISTRIBUTION (%)
GR SA SI&CL

0 3 96

▼ El. 225.7

Upon completion of augering, no free water, cave at 0.9 m

NOTES 1. Sample submitted for chemical testing

▼ GROUND WATER STRIKE

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE/MONITORING WELL NO. 5

17T 522202.3E 4742854N

PROJECT Laplante Road - 6 Lot Plan of Subdivision
PML REF. 20HF021
LOCATION Laplante Road, Tilsonburg
BORING DATE February 11, 2021
ENGINEER B. R. Gray
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN S. MacDonald

DEPTH ELEV (metres)	DESCRIPTION	NUMBER	TYPE	"N" VALUES
	SURFACE ELEVATION 230.41			
0.20 / 230.21	TOPSOIL: 200 mm very loose, dark brown sand topsoil, some silt damp; occasional rootlet	1A	SS	3
		1B		
0.67 / 229.74	SAND: Very loose, brown sand, some silt, damp becoming wet; occasional silt seams	2[1]	SS	4
		3A	SS	3
		3B		
		4	SS	1
		5	SS	2
4.0 / 226.4	becoming compact, saturated	6	SS	30
6.2		7A	SS	10
6.5 / 223.9	CLAYEY SILT: Stiff, grey clayey silt, trace sand, WTPL BOREHOLE TERMINATED AT 6.5 m	7B		

SHEAR STRENGTH (kPa)
+FIELD VANE △TORVANE ○ Qu
▲POCKET PENETROMETER ● Q
50 100 150 200
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

UNIT WEIGHT kN/m³

GROUND WATER OBSERVATIONS AND REMARKS
GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL

Stickup Well Protector Set
Bentonite Seal
50 mm Diameter PVC Pipe
Filter Sand
El. 225.9
Screen

Upon completion of augering, free water and cave at 2.1 m

Water Level Readings:

Date	Depth	Elev.
2021-03-10	3.9	226.5

NOTES 1. Sample submitted for chemical testing
2. Dynamic Cone Penetration Test conducted at 1 m offset from borehole.

▼ GROUND WATER STRIKE

Peto MacCallum Ltd.
CONSULTING ENGINEERS

LOG OF BOREHOLE/MONITORING WELL NO. 6

17T 522171.9E 4742787N

PROJECT Laplante Road - 6 Lot Plan of Subdivision
PML REF. 20HF021
LOCATION Laplante Road, Tilsonburg
BORING DATE February 11, 2021
ENGINEER B. R. Gray
BORING METHOD Continuous Flight Solid Stem Augers
TECHNICIAN S. MacDonald

DEPTH (metres) / ELEV	DESCRIPTION	NUMBER	TYPE	"N" VALUES
	SURFACE ELEVATION 230.24			
0.25 / 229.99	TOPSOIL: 250 mm Compact, brown sandy silt topsoil, damp; occasional rootlet	1A	SS	8
	SAND: Loose, brown sand, trace silt, damp	1B		
		2	SS	10
		3	SS	9
2.1 / 228.1	becoming compact	4	SS	19
		5	SS	29
4.0 / 226.2	becoming loose, saturated	6	SS	5*
5.5 / 224.7	CLAYEY SILT: Very stiff, grey clayey silt, WTPL	7	SS	28
6.5 / 223.7	BOREHOLE TERMINATED AT 6.5 m			

SHEAR STRENGTH (kPa)
+FIELD VANE △TORVANE ○ Qu
▲POCKET PENETROMETER ○ Q
50 100 150 200
DYNAMIC CONE PENETRATION ×
STANDARD PENETRATION TEST ●
20 40 60 80

PLASTIC LIMIT w_P — NATURAL MOISTURE CONTENT w — LIQUID LIMIT w_L
WATER CONTENT (%)
10 20 30 40

UNIT WEIGHT kN/m³

GROUND WATER OBSERVATIONS AND REMARKS
GRAIN SIZE DISTRIBUTION (%) GR SA SI&CL

Stickup Well Protector Set
Bentonite Seal
50 mm Diameter PVC Pipe
Filter Sand
El. 225.7
Screen

Upon completion of augering, free water and cave at 2.1 m

Water Level Readings:

Date	Depth	Elev.
2021-03-10	3.8	226.4

NOTES 1. Sample submitted for chemical testing

▼ GROUND WATER STRIKE

Appendix A

Engineered Fill

ENGINEERED FILL

The information presented in this appendix is intended for general guidance only. Site specific conditions and prevailing weather may require modification of compaction standards, backfill type or procedures. Each site must be discussed, and procedures agreed with Peto MacCallum Ltd. prior to the start of the earthworks and must be subject to ongoing review during construction. This appendix is not intended to apply to embankments. Steeply sloping ravine residential lots require special consideration.

For fill to be classified as engineered fill suitable for supporting structural loads, a number of conditions must be satisfied, including but not necessarily limited to the following:

1. Purpose

The site specific purpose of the engineered fill must be recognized. In advance of construction, all parties should discuss the project and its requirements and agree on an appropriate set of standards and procedures.

2. Minimum Extent

The engineered fill envelope must extend beyond the footprint of the structure to be supported. The minimum extent of the envelope should be defined from a geotechnical perspective by:

- at founding level, extend a minimum 1.0 m beyond the outer edge of the foundations, greater if adequate layout has not yet been completed as noted below; and
- extend downward and outward at a slope no greater than 45° to meet the subgrade

All fill within the envelope established above must meet the requirements of engineered fill in order to support the structure safely. Other considerations such as survey control, or construction methods may require an envelope that is larger, as noted in the following sections.

Once the minimum envelope has been established, structures must not be moved or extended without consultation with Peto MacCallum Ltd. Similarly, Peto MacCallum Ltd. should be consulted prior to any excavation within the minimum envelope.

3. Survey Control

Accurate survey control is essential to the success of an engineered fill project. The boundaries of the engineered fill must be laid out by a surveyor in consultation with engineering staff from Peto MacCallum Ltd. Careful consideration of the maximum building envelope is required.

During construction it is necessary to have a qualified surveyor provide total station control on the three dimensional extent of filling.

4. Subsurface Preparation

Prior to placement of fill, the subgrade must be prepared to the satisfaction of Peto MacCallum Ltd. All deleterious material must be removed and in some cases, excavation of native mineral soils may be required.

Particular attention must be paid to wet subgrades and possible additional measures required to achieve sufficient compaction. Where fill is placed against a slope, benching may be necessary and natural drainage paths must not be blocked.

5. Suitable Fill Materials

All material to be used as fill must be approved by Peto MacCallum Ltd. Such approval will be influenced by many factors and must be site and project specific. External fill sources must be sampled, tested and approved prior to material being hauled to site.

6. Test Section

In advance of the start of construction of the engineered fill pad, the Contractor should conduct a test section. The compaction criterion will be assessed in consultation with Peto MacCallum Ltd. for the various fill material types using different lift thicknesses and number of passes for the compaction equipment proposed by the Contractor.

Additional test sections may be required throughout the course of the project to reflect changes in fill sources, natural moisture content of the material and weather conditions.

The Contractor should be particularly aware of changes in the moisture content of fill material. Site review by Peto MacCallum Ltd. is required to ensure the desired lift thickness is maintained and that each lift is systematically compacted, tested and approved before a subsequent lift is commenced.

7. Inspection and Testing

Uniform, thorough compaction is crucial to the performance of the engineered fill and the supported structure. Hence, all subgrade preparation, filling and compacting must be carried out under the full time inspection by Peto MacCallum Ltd.

All founding surfaces for all buildings and residential dwellings or any part thereof (including but not limited to footings and floor slabs) on structural fill or native soils must be inspected and approved by PML engineering personnel prior to placement of the base/subbase granular material and/or concrete. The purpose of the inspection is to ensure the subgrade soils are capable of supporting the building/house foundation and floor slab loads and to confirm the building/house envelope does not extend beyond the limits of any structural fill pads.

8. Protection of Fill

Fill is generally more susceptible to the effects of weather than natural soil. Fill placed and approved to the level at which structural support is required must be protected from excessive wetting, drying, erosion or freezing. Where adequate protection has not been provided, it may be necessary to provide deeper footings or to strip and recompact some of the fill.

9. Construction Delay Time Considerations

The integrity of the fill pad can deteriorate due to the harsh effects of our Canadian weather. Hence, particular care must be taken if the fill pad is constructed over a long time period.

It is necessary therefore, that all fill sources are tested to ensure the material compactability prior to the soil arriving at site. When there has been a lengthy delay between construction periods of the fill pad, it is necessary to conduct subgrade proof rolling, test pits or boreholes to verify the adequacy of the exposed subgrade to accept new fill material.

When the fill pad will be constructed over a lengthy period of time, a field survey should be completed at the end of each construction season to verify the areal extent and the level at which the compacted fill has been brought up to, tested and approved.

In the following spring, subexcavation may be necessary if the fill pad has been softened attributable to ponded surface water or freeze/thaw cycles.

A new survey is required at the beginning of the next construction season to verify that random dumping and/or spreading of fill has not been carried out at the site.

10. Approved Fill Pad Surveillance

It should be appreciated that once the fill pad has been brought to final grade and documented by field survey, there must be ongoing surveillance to ensure that the integrity of the fill pad is not threatened.

Grading operations adjacent to fill pads can often take place several months or years after completion of the fill pad.

It is imperative that all site management and supervision staff, the staff of Contractors and earthwork operators be fully aware of the boundaries of all approved engineered fill pads.

Excavation into an approved engineered fill pad should never be contemplated without the full knowledge, approval and documentation by the geotechnical consultant.

If the fill pad is knowingly built several years in advance of ultimate construction, the areal limits of the fill pad should be substantially overbuilt laterally to allow for changes in possible structure location and elevation and other earthwork operations and competing interests on the site. The overbuilt distance required is project and/or site specified.

Iron bars should be placed at the corner/intermediate points of the fill pad as a permanent record of the approved limits of the work for record keeping purposes.

11. Unusual Working Conditions

Construction of fill pads may at times take place at night and/or during periods of freezing weather conditions because of the requirements of the project schedule. It should be appreciated therefore, that both situations present more difficult working conditions. The Owner, Contractor, Design Consultant and Geotechnical Engineer must be willing to work together to revise site construction procedures, enhance field testing and surveillance, and incorporate design modifications as necessary to suit site conditions.

When working at night there must be sufficient artificial light to properly illuminate the fill pad and borrow areas.

Placement of material to form an engineered fill pad during winter and freezing temperatures has its own special conditions that must be addressed. It is imperative that each day prior to placement of new fill, the exposed subgrade must be inspected and any overnight snow or frozen material removed. Particular attention should be given to the borrow source inspection to ensure only nonfrozen fill is brought to the site.

The Contractor must continually assess the work program and have the necessary spreading and compacting equipment to ensure that densification of the fill material takes place in a minimum amount of time. Changes may be required to the spreading methods, lift thickness, and compaction techniques to ensure the desired compaction is achieved uniformly throughout each fill lift.

The Contractor should adequately protect the subgrade at the end of each shift to minimize frost penetration overnight. Since water cannot be added to the fill material to facilitate compaction, it is imperative that densification of the fill be achieved by additional compaction effort and an appropriate reduced lift thickness. Once the fill pad has been completed, it must be properly protected from freezing temperatures and ponding of water during the spring thaw period.

If the pad is unusually thick or if the fill thickness varies dramatically across the width or length of the fill pad, Peto MacCallum Ltd. should be consulted for additional recommendations. In this case, alternative special provisions may be recommended, such as providing a surcharge preload for a limited time or increase the degree of compaction of the fill.

Appendix B

Limited Chemical Testing Program

Table B1 – Soil Samples Submitted for Geoenvironmental Chemical Testing

SGS Canada Inc., Certificates of Analysis

TABLE B1

Summary of Samples Submitted for Geoenvironmental Chemical Testing

Location	Sample ID	Approx. Depth (m)	Description
Borehole 1	BH1 SS2	0.8 – 1.2	Silt
Borehole 2	BH2 SS3	1.5 – 1.9	Sand
Borehole 3	BH3 SS5	3.0 – 3.4	Sand
Borehole 4	BH4 SS4	2.2 – 2.6	Clay
Borehole 5	BH5 SS2	0.8 – 1.2	Sand
Borehole 6	BH6 SS1B	0.3 – 0.8	Sand

Note**:** All samples submitted for O. Reg. 153/04, as amended metals and inorganics package chemical testing.

FINAL REPORT

CA14368-FEB21 R

20HF021

Prepared for

Peto MacCallum Ltd

FINAL REPORT

CA14368-FEB21 R

First Page

CLIENT DETAILS		LABORATORY DETAILS	
Client	Peto MacCallum Ltd	Project Specialist	Brad Moore Hon. B.Sc
		Laboratory	SGS Canada Inc.
Address	45 Burford Road Hamilton, ON L8E 3C6. Canada	Address	185 Concession St., Lakefield ON, K0L 2H0
Contact	Sam MacDonald	Telephone	705-652-2143
Telephone	(905) 561-2231	Facsimile	705-652-6365
Facsimile	(905) 561-6366	Email	brad.moore@sgs.com
Email	smacdonald@petomaccallum.com;arowe@petomaccallum.con	SGS Reference	CA14368-FEB21
Project	20HF021	Received	02/12/2021
Order Number		Approved	02/18/2021
Samples	Soil (6)	Report Number	CA14368-FEB21 R
		Date Reported	02/18/2021

COMMENTS

Temperature of Sample upon Receipt: 8 degrees C
Cooling Agent Present:Yes
Custody Seal Present:Yes

Chain of Custody Number:019703

CR6 spike recovery low due to sample matrix interference.

SIGNATORIES

Brad Moore Hon. B.Sc

TABLE OF CONTENTS

Client: Peto MacCallum Ltd
Project: 20HF021
Project Manager: Sam MacDonald
Samplers: Sam MacDonald

PACKAGE: **REG153 - Hydrides** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 1 - Residential/Parkland/Industrial - UNDEFINED
L2 = REG153 / SOIL / COARSE - TABLE 3 - Industrial/Commercial - UNDEFINED

					Sample Number	10	11	12	13	14	15
					Sample Name	Feb11 BH1 SS2	Feb11 BH2 SS3	Feb11 BH3 SS5	Feb11 BH4 SS4	Feb11 BH5 SS2	Feb11 BH6 SS1B
					Sample Matrix	Soil	Soil	Soil	Soil	Soil	Soil
					Sample Date	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Hydrides											
Antimony	µg/g	0.8	1.3	40	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8	< 0.8
Arsenic	µg/g	0.5	18	18	3.7	0.7	1.6	3.9	1.1	1.7
Selenium	µg/g	0.7	1.5	5.5	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7	< 0.7

PACKAGE: **REG153 - Metals and Inorganics** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 1 - Residential/Parkland/Industrial - UNDEFINED
L2 = REG153 / SOIL / COARSE - TABLE 3 - Industrial/Commercial - UNDEFINED

					Sample Number	10	11	12	13	14	15
					Sample Name	Feb11 BH1 SS2	Feb11 BH2 SS3	Feb11 BH3 SS5	Feb11 BH4 SS4	Feb11 BH5 SS2	Feb11 BH6 SS1B
					Sample Matrix	Soil	Soil	Soil	Soil	Soil	Soil
					Sample Date	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics											
Moisture Content	%	-			24.2	5.6	20.7	19.2	16.6	8.8
Barium	µg/g	0.1	220	670	58	7.1	6.5	66	21	18
Beryllium	µg/g	0.02	2.5	8	0.65	0.10	0.15	0.59	0.20	0.19
Boron	µg/g	1	36	120	7	2	3	8	1	1
Cadmium	µg/g	0.02	1.2	1.9	0.10	0.04	0.07	0.07	0.09	0.12
Chromium	µg/g	0.5	70	160	22	3.1	4.5	20	7.3	6.0
Cobalt	µg/g	0.01	21	80	11	1.3	2.1	10	3.2	2.3
Copper	µg/g	0.1	92	230	25	5.0	8.1	22	4.7	4.9
Lead	µg/g	0.1	120	120	9.8	3.2	5.7	9.1	6.2	9.0
Molybdenum	µg/g	0.1	2	40	0.3	0.1	0.1	0.2	0.1	0.1
Nickel	µg/g	0.5	82	270	25	3.1	4.0	22	5.7	4.7
Silver	µg/g	0.05	0.5	40	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

Client: Peto MacCallum Ltd
Project: 20HF021
Project Manager: Sam MacDonald
Samplers: Sam MacDonald

PACKAGE: **REG153 - Metals and Inorganics** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 1 - Residential/Parkland/Industrial - UNDEFINED
L2 = REG153 / SOIL / COARSE - TABLE 3 - Industrial/Commercial - UNDEFINED

				Sample Number	10	11	12	13	14	15
				Sample Name	Feb11 BH1 SS2	Feb11 BH2 SS3	Feb11 BH3 SS5	Feb11 BH4 SS4	Feb11 BH5 SS2	Feb11 BH6 SS1B
				Sample Matrix	Soil	Soil	Soil	Soil	Soil	Soil
				Sample Date	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Metals and Inorganics (continued)										
Thallium	µg/g	0.02	1	3.3	0.13	< 0.02	0.05	0.14	0.03	0.04
Uranium	µg/g	0.002	2.5	33	0.55	0.20	0.28	0.55	0.33	0.52
Vanadium	µg/g	3	86	86	31	6	9	27	16	11
Zinc	µg/g	0.7	290	340	51	21	26	50	19	26
Water Soluble Boron	µg/g	0.5		2	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5	< 0.5

PACKAGE: **REG153 - Other (ORP)** (SOIL)

L1 = REG153 / SOIL / COARSE - TABLE 1 - Residential/Parkland/Industrial - UNDEFINED
L2 = REG153 / SOIL / COARSE - TABLE 3 - Industrial/Commercial - UNDEFINED

				Sample Number	10	11	12	13	14	15
				Sample Name	Feb11 BH1 SS2	Feb11 BH2 SS3	Feb11 BH3 SS5	Feb11 BH4 SS4	Feb11 BH5 SS2	Feb11 BH6 SS1B
				Sample Matrix	Soil	Soil	Soil	Soil	Soil	Soil
				Sample Date	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021	11/02/2021
Parameter	**Units**	**RL**	**L1**	**L2**	**Result**	**Result**	**Result**	**Result**	**Result**	**Result**
Other (ORP)										
Mercury	ug/g	0.05	0.27	3.9	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05
Sodium Adsorption Ratio	No unit	0.2	2.4	12	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
SAR Calcium	mg/L	0.09			28.3	17.3	18.2	23.9	14.5	29.0
SAR Magnesium	mg/L	0.02			1.2	1.8	1.6	3.4	1.2	4.6
SAR Sodium	mg/L	0.15			2.1	0.84	1.3	1.5	0.38	1.0
Conductivity	mS/cm	0.002	0.57	1.4	0.16	0.09	0.10	0.15	0.09	0.19
pH	pH Units	0.05			7.52	7.91	7.88	7.79	7.24	7.57
Chromium VI	µg/g	0.2	0.66	8	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2	< 0.2
Free Cyanide	µg/g	0.05	0.051	0.051	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05	< 0.05

EXCEEDANCE SUMMARY

No exceedances are present above the regulatory limit(s) indicated

QC SUMMARY

Conductivity

Method: EPA 6010/SM 2510 | Internal ref.: ME-CA-IENVIEWL-LAK-AN-006

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Conductivity	EWL0243-FEB21	mS/cm	0.002	<0.002	0	10	101	90	110	NA		

Cyanide by SFA

Method: SM 4500 | Internal ref.: ME-CA-IENVISFA-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Free Cyanide	SKA5051-FEB21	µg/g	0.05	<0.05	ND	20	105	80	120	NV	75	125

Hexavalent Chromium by SFA

Method: EPA218.6/EPA3060A | Internal ref.: ME-CA-IENVISKA-LAK-AN-012

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Chromium VI	SKA5054-FEB21	ug/g	0.2	<0.2	ND	20	89	80	120	63	75	125

QC SUMMARY

Mercury by CVAAS

Method: EPA 7471A/EPA 245 | Internal ref.: ME-CA-IENVISPE-LAK-AN-004

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Mercury	EMS0074-FEB21	ug/g	0.05	<0.05	ND	20	103	80	120	99	70	130

Metals in aqueous samples - ICP-OES

Method: MOE 4696e01/EPA 6010 | Internal ref.: ME-CA-IENVISPE-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
SAR Calcium	ESG0057-FEB21	mg/L	0.09	<0.09	0	20	98	80	120	95	70	130
SAR Magnesium	ESG0057-FEB21	mg/L	0.02	<0.02	0	20	95	80	120	102	70	130
SAR Sodium	ESG0057-FEB21	mg/L	0.15	<0.15	0	20	95	80	120	93	70	130

QC SUMMARY

Metals in Soil - Aqua-regia/ICP-MS

Method: EPA 3050/EPA 200.8 | Internal ref.: ME-CA-[ENVISPE-LAK-AN-005

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Silver	EMS0074-FEB21	ug/g	0.05	<0.05	ND	20	100	70	130	105	70	130
Arsenic	EMS0074-FEB21	µg/g	0.5	<0.5	2	20	105	70	130	87	70	130
Barium	EMS0074-FEB21	ug/g	0.1	<0.1	5	20	107	70	130	95	70	130
Beryllium	EMS0074-FEB21	µg/g	0.02	<0.02	5	20	101	70	130	99	70	130
Boron	EMS0074-FEB21	µg/g	1	<1	2	20	106	70	130	98	70	130
Cadmium	EMS0074-FEB21	µg/g	0.02	<0.02	ND	20	100	70	130	99	70	130
Cobalt	EMS0074-FEB21	µg/g	0.01	<0.01	0	20	103	70	130	104	70	130
Chromium	EMS0074-FEB21	µg/g	0.5	<0.5	1	20	105	70	130	103	70	130
Copper	EMS0074-FEB21	µg/g	0.1	<0.1	2	20	105	70	130	102	70	130
Molybdenum	EMS0074-FEB21	µg/g	0.1	<0.1	ND	20	100	70	130	102	70	130
Nickel	EMS0074-FEB21	ug/g	0.5	<0.5	1	20	104	70	130	105	70	130
Lead	EMS0074-FEB21	ug/g	0.1	<0.1	6	20	106	70	130	99	70	130
Antimony	EMS0074-FEB21	µg/g	0.8	<0.8	ND	20	108	70	130	94	70	130
Selenium	EMS0074-FEB21	µg/g	0.7	<0.7	ND	20	99	70	130	96	70	130
Thallium	EMS0074-FEB21	µg/g	0.02	<0.02	4	20	109	70	130	95	70	130
Uranium	EMS0074-FEB21	µg/g	0.002	<0.002	3	20	104	70	130	115	70	130
Vanadium	EMS0074-FEB21	µg/g	3	<3	3	20	105	70	130	107	70	130
Zinc	EMS0074-FEB21	µg/g	0.7	<0.7	2	20	99	70	130	96	70	130

QC SUMMARY

pH

Method: SM 4500 I Internal ref.: ME-CA-[ENV]EWL-LAK-AN-001

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
pH	ARD0067-FEB21	pH Units	0.05		0	20	100	80	120			

Water Soluble Boron

Method: O.Reg. 15 3/04 I Internal ref.: ME-CA-[ENV] SPE-LAK-AN-003

Parameter	QC batch Reference	Units	RL	Method Blank	Duplicate		LCS/Spike Blank			Matrix Spike / Ref.		
					RPD	AC (%)	Spike Recovery (%)	Recovery Limits (%)		Spike Recovery (%)	Recovery Limits (%)	
								Low	High		Low	High
Water Soluble Boron	ESG0044-FEB21	µg/g	0.5	<0.5	ND	20	91	80	120	102	70	130

QC SUMMARY

Method Blank: a blank matrix that is carried through the entire analytical procedure. Used to assess laboratory contamination.

Duplicate: Paired analysis of a separate portion of the same sample that is carried through the entire analytical procedure. Used to evaluate measurement precision.

LCS/Spike Blank: Laboratory control sample or spike blank refer to a blank matrix to which a known amount of analyte has been added. Used to evaluate analyte recovery and laboratory accuracy without sample matrix effects.

Matrix Spike: A sample to which a known amount of the analyte of interest has been added. Used to evaluate laboratory accuracy with sample matrix effects.

Reference Material: a material or substance matrix matched to the samples that contains a known amount of the analyte of interest. A reference material may be used in place of a matrix spike.

RL: Reporting limit

RPD: Relative percent difference

AC: Acceptance criteria

Multielement Scan Qualifier: as the number of analytes in a scan increases, so does the chance of a limit exceedance by random chance as opposed to a real method problem. Thus, in multielement scans, for the LCS and matrix spike, up to 10% of the analytes may exceed the quoted limits by up to 10% absolute and the spike is considered acceptable.

Duplicate Qualifier: for duplicates 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.

Matrix Spike Qualifier: for matrix spikes, as the concentration of the native analyte increases, the uncertainty of the matrix spike recovery increases. Thus, the matrix spike acceptance limits apply only when the concentration of the matrix spike is greater than or equal to the concentration of the native analyte.

LEGEND

FOOTNOTES

NSS Insufficient sample for analysis.
RL Reporting Limit.
↑ Reporting limit raised.
↓ Reporting limit lowered.
NA The sample was not analysed for this analyte
ND Non Detect

Samples analysed as received. Solid samples expressed on a dry weight basis. "Temperature Upon Receipt" is representative of the whole shipment and may not reflect the temperature of individual samples.

Analysis conducted on samples submitted pursuant to or as part of Reg. 153/04, are in accordance to the Protocol for Analytical Methods Used in the Assessment of Properties under Part XV.1 of the Environmental Protection Act" published by the Ministry and dated March 9, 2004 as amended.

SGS provides criteria information (such as regulatory or guideline limits and summary of limit exceedances) as a service. Every attempt is made to ensure the criteria information in this report is accurate and current, however, it is not guaranteed. Comparison to the most current criteria is the responsibility of the client and SGS assumes no responsibility for the accuracy of the criteria levels indicated. This document is issued, on the Client's behalf, by the Company under its General Conditions of Service available on request and accessible at http://www.sgs.com/terms_and_conditions.htm. The Client's attention is drawn to the limitation of liability, indemnification and jurisdiction issues defined therein. Any other holder of this document is advised that information contained hereon reflects the Company's findings at the time of its intervention only and within the limits of Client's instructions, if any. The Company's sole responsibility is to its Client and this document does not exonerate parties to a transaction from exercising all their rights and obligations under the transaction documents.

-- End of Analytical Report --

Request for Laboratory Services and CHAIN OF CUSTODY

SGS Environment, Health & Safety - Lakefield: 185 Concession St., Lakefield, ON K0L 2H0 Phone: 705-652-2000 Fax: 705-652-6365 Web: www.sgs.com/environment
- London: 657 Consortium Court, London, ON, N6E 2S8 Phone: 519-672-4500 Toll Free: 877-848-8060 Fax: 519-672-0361

No: 019703 Page ____ of ____

Laboratory Information Section - Lab use only

Received By: Majeed Al-mandalawi
Received By (signature): Majeed Al-mandalawi
Received Date: 02/12/2021 (mm/dd/yy)
Received Time: 11:00 (hr : min)
Custody Seal Present: Yes [/] No [ ]
Custody Seal Intact: Yes [/] No [ ]
Cooling Agent Present: Yes [/] No [ ] Type: ice pack
Temperature Upon Receipt (°C): 7.0, 8.2
LAB LIMS #: CA14368-feb21

REPORT INFORMATION	INVOICE INFORMATION
Company: Peto MacCallum	[X] (same as Report Information)
Contact: Sam MacDonald	Company:
Address: 41 Bucfood Rd Hamilton	Contact:
Phone: 905 536-7305	Address:
Fax: arowe@petomaccallum.com	Phone:
Email: SmacdonaldA@petomaccallum.com	Email:

Quotation #: P.O. #:
Project #: 20NF021 Site Location/ID:

TURNAROUND TIME (TAT) REQUIRED

[X] Regular TAT (5-7days) — TAT's are quoted in business days (exclude statutory holidays & weekends). Samples received after 6pm or on weekends: TAT begins next business day

RUSH TAT (Additional Charges May Apply): [ ] 1 Day [ ] 2 Days [ ] 3 Days [ ] 4 Days

PLEASE CONFIRM RUSH FEASIBILITY WITH SGS REPRESENTATIVE PRIOR TO SUBMISSION

Specify Due Date:

*NOTE: DRINKING (POTABLE) WATER SAMPLES FOR HUMAN CONSUMPTION MUST BE SUBMITTED WITH SGS DRINKING WATER CHAIN OF CUSTODY

REGULATIONS

[ ] O.Reg 153/04 [ ] O.Reg 406/19

[X] Table 1 Res/ICC [ ] Res/Park [ ] Soil Texture:
[ ] Table 2 [ ] Ind/Com [X] Coarse
[X] Table 3 ICC [ ] Agri/Other [ ] Medium/Fine
[ ] Table ____
Soil Volume [ ] <350m3 [ ] >350m3

Other Regulations:
[ ] Reg 347/558 (3 Day min TAT)
[ ] PWQO [ ] MMER
[ ] CCME [ ] Other:
[ ] MISA
[ ] ODWS Not Reportable *See note

Sewer By-Law:
[ ] Sanitary
[ ] Storm
Municipality:

RECORD OF SITE CONDITION (RSC) [ ] YES [X] NO

ANALYSIS REQUESTED

	SAMPLE IDENTIFICATION	DATE SAMPLED	TIME SAMPLED	# OF BOTTLES	MATRIX	Field Filtered (Y/N)	M&I: Metals & Inorganics (incl CrVI, CN, Hg pH, (B(HWS), EC, SAR–soil) (Cl, Na–water)	M&I: Full Metals Suite (ICP metals plus B(HWS–soil only) Hg, CrVI	M&I: ICP Metals only (Sb,As,Ba,Be,B,Cd,Cr,Co,Cu,Pb,Mo,Ni,	SVOC: PAHs only	SVOC: SVOCs (all incl PAHs, ABNs, CPs	PCB: PCBs [ ] Aroclor [ ] Total	PHC: F1-F4 + BTEX	PHC: F1-F4 only no BTEX	VOC: VOCs all incl BTEX	VOC: BTEX only	Pest: Pesticides (Organochlorine or specify other	Other (please specify)	TCLP: Specify TCLP tests [ ] M&I [ ] VOC [ ] PCB [ ] B(a)P [ ] ABN [ ] Ignit.
1	Feb11 BH1 SS2	Feb11/21	AM	1	Soil		X												
2	Feb11 BH2 SS3	Feb11/21	↓	↓	↓		X												
3	Feb11 BH3 SS5	↓	↓	↓	↓		X												
4	Feb11 BH4 SS4	↓	↓	↓	↓		X												
5	Feb11 BH5 SS2	↓	↓	↓	↓		X												
6	Feb11 BH6 SS1B	↓	↓	↓	↓		X												
7																			
8																			
9																			
10																			
11																			
12																			

COMMENTS:

Observations/Comments/Special Instructions

Sampled By (NAME): Sam MacDonald Signature: Date: Feb 11 / 2021 (mm/dd/yy)
Relinquished by (NAME): Sam MacDonald Signature: Date: 02 / 12 / 2021 (mm/dd/yy)

Pink Copy - Client
Yellow & White Copy - SGS

Revision #: 1.4
Date of Issue: 22 May. 2020

FUNCTIONAL SERVICING REPORT
PROPOSED RESIDENTIAL DEVELOPMENT
LAPLANTE ROAD SUBDIVISION

Norfolk County

Prepared By:

J.H. Cohoon Engineering Limited
440 Hardy Road, Unit 1
Brantford, Ontario
N3T 5L8
Phone (519) 753-2656
Fax (519) 753-4263

Job: 16933 **Nov 2024**

INTRODUCTION

The following Functional Servicing Report was prepared by J.H. Cohoon Engineering Limited for Mr. J. Olivera in support of future planning applications relating to the site located at MN 1045 LaPlante Road, in Tillsonburg, Ontario in Norfolk County. This report was prepared to demonstrate the servicing scheme for the proposed residential development that is to occur on the subject lands.

The development approach is to develop the site in a single-phase residential single-family development that will consist of eight (8) residential lots as illustrated on the draft plan of subdivision included within Appendix 'A' of this report.

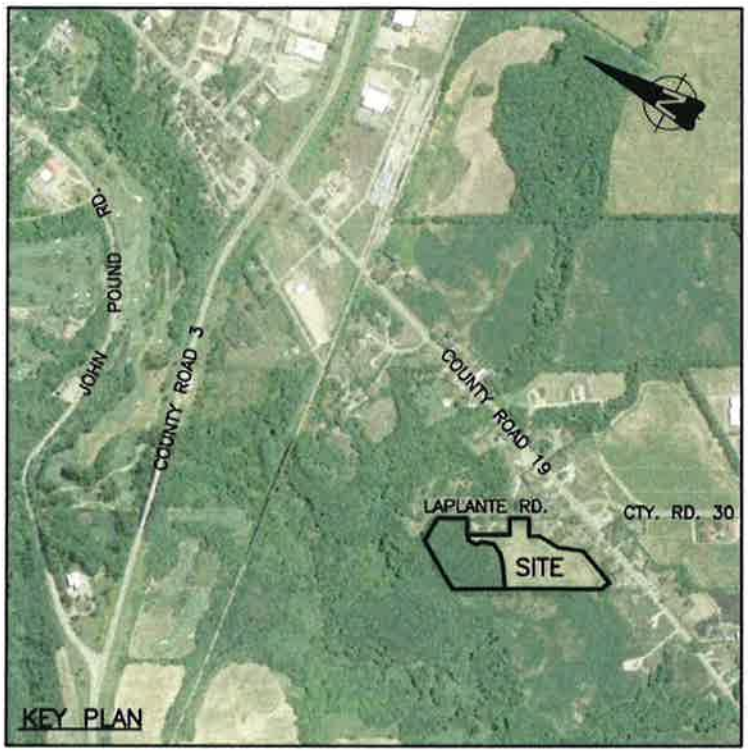
The site is located on the south side of LaPlante Road in the village of Tillsonburg, Ontario in Norfolk County. The overall subdivision area is 3.96 Ha in size

The objective of this report is to document the servicing strategy to be utilized for the site in a proposed initial development. Full services will not be installed (i.e., sanitary, storm and water) within the development and the development will be on private services. The owner will assume full responsibility for the installation and maintenance of the services on the property.

PROPOSED DEVELOPMENT CONCEPT

The proposed development is to be constructed on the east side of Nixon Road, being a small plan of subdivision. As indicated the parcel of land is some 3.96 hectares in size. A key map illustrating the site location is provided in Figure 1.

The anticipated development is intended to be a series of single-family homes on the property with a total of eight (8) single family units with no future development to occur on this site. The development is illustrated on the plans prepared by J H Cohoon Engineering Limited being drawings which have been included within Appendix 'A' of this report



Site Location – Key Plan
Figure No. 1

SANITARY SEWERS & APPURTENANCES

3.1 Design Flows

This site is proposed to be constructed on individual private services. The proposed lots are to be developed with individual septic systems designed in an accordance with the requirements of the Ontario Building Code.

The proposed septic systems are shown generically on the engineering plans included within Appendix 'A' of this report.

The design of the system(s) will be carried out in accordance with the requirements of the Ontario Building Code including the following assumptions for the design of the system

WATER SERVICING AND FIRE PROTECTION

The provision of water to the proposed residences will be provided through the provision of individual wells located on the subject lands in accordance with the requirements of the Ontario building Code.

In this case, fire protection will be provided from the Norfolk County Fire department through the use of rural fire-fighting techniques. The Norfolk Fire Department is located within a 4.0 km travel distance of the site.

STORM SEWERS & APPURTENANCES

Storm Sewers / Storm water Management

The site is intended to be serviced through the incorporation of a stormwater management facility to be located within Block 9 of the development. The site is intended to provide its own stormwater management controls on the property to reduce the impact of the site on the existing drainage system located on Laplante Road. The details of the stormwater management facility are presented in the stormwater management report as prepared by J H Cohoon Engineering Limited.

GRADING

Road grades will be established for the proposed development and are illustrated on the plans appended to the report. Minimum (0.50%) and maximum (6.0%) grades have been used in accordance with Norfolk County design criteria.

UTILITIES

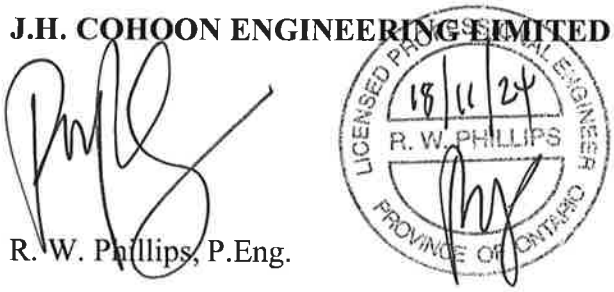
Coordination of these services will be required with Union Gas, the hydro utility, Bell, and the local cable tv provider (if available)

CONCLUSIONS

The preceding sections of this report outline the servicing and grading requirements for the proposed residential development on this site. Based on the work completed to date, it may be concluded that the proposed development may be developed with full municipal services.

Report Prepared By:

J.H. COHOON ENGINEERING LIMITED



R. W. Phillips, P.Eng.

Appendix 'A'
Proposed Draft Plan of Subdivision – Job 16933 – 1
As prepared by J H Cohoon Engineering Limited

DRAFT PLAN OF SUBDIVISION

PART OF LOT 5
CONCESSION 4
NORTH OF TALBOT ROAD
GEOGRAPHIC TOWNSHIP OF MIDDLETON
NORFOLK COUNTY

RESIDENTIAL

LAPLANTE ROAD
(20.117m WIDE)

NORTH

RESIDENTIAL

PART 1
57R-6183

PART 2
57R-6183

PART 3
57R-6183

PART 4
57R-6183

LOT 8
3,540s.m.

BLOCK 9
3,751s.m.

LOT 7
3,657s.m.

LOT 6
3,607s.m.

PROPOSED

STREET

COUNTY ROAD 19

RESIDENTIAL

LOT 1
3,513s.m.

LOT 2
3,832s.m.

LOT 3
3,530s.m.

LOT 4
4,133s.m.

LOT 5
4,768s.m.

WOODED AREA

ADDITIONAL LANDS
OWNED BY
APPLICANT

N 29°53'30" W 95.137 N 29°20'15" W

AGRICULTURAL

KEY PLAN

SURVEYOR'S CERTIFICATE

I HEREBY CERTIFY THAT THE BOUNDARIES OF THE LANDS TO BE SUBDIVIDED AS SHOWN ON THIS PLAN AND THEIR RELATIONSHIP TO THE ADJACENT LANDS ARE ACCURATELY AND CORRECTLY SHOWN.

DATE

KN HUSTED, O.L.S.
JEWITT & DIXON LTD.

OWNER'S CERTIFICATE

I HEREBY AUTHORIZE J.H. COHOON ENGINEERING LTD. TO PREPARE AND SUBMIT THIS DRAFT PLAN OF SUBDIVISION TO THE CORPORATION OF NORFOLK COUNTY FOR APPROVAL.

DATE

JOSE OLIVEIRA

ADDITIONAL INFORMATION REQUIRED UNDER SECTION 51(17) OF THE PLANNING ACT

A – SEE PLAN
B – SEE PLAN
C – SEE PLAN
D – RESIDENTIAL
E – SEE PLAN
F – SEE PLAN
G – SEE PLAN
H – INDIVIDUAL WELLS
I – SANDY SILT
J – SEE PLAN
K – INDIVIDUAL SEPTIC SYSTEMS
L – NONE

AREA SCHEDULE

LOTS 1-8	30.584± m
BLOCK 9	3.751± m
ROADS	5.288± m
TOTAL	39.603± m

J.H. COHOON ENGINEERING LIMITED
CONSULTING ENGINEERS

DESIGN: R.W.P.
DRAWN: K.P.B.
SCALE: 1:500
DATE: NOV. 5/24

JOB No. 16933
DWG. No. DP1

Appendix 'B'
Proposed Residential Development Engineering Plans as prepared by J H Cohoon Engineering Limited

LAPLANTE ROAD

COUNTY ROAD 19

STREET 'A'

PART 1
37R-5183

PART 2
37R-5183

PART 3
37R-5183

PART 1
37R-6381

PART 1
37R-4595

PART 2
37R-4595

PART 3
37R-4595

PART 4
37R-4595

PART 5
37R-4595

BLOCK 9
0.37ha

LOT 1
0.35ha

LOT 2
0.38ha

LOT 3
0.35ha

LOT 4
0.41ha

LOT 5
0.47ha

LOT 6
0.36ha

LOT 7
0.36ha

LOT 8
0.35ha

ADDITIONAL LANDS
OWNED BY APPLICANT

S.W.M.
FACILITY

PROPOSED
RESIDENCE

PROP. TILE
BED AREA

PROP. DRYWELL
(SEE DETAIL)

PROP. DIVERSION
BERM IN ROADSIDE
DITCH TO DIVERT
TO SWM FACILITY

NORTH

PROJECT NORTH

KEY PLAN

SITE

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND ABOVEGROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY ACCURATE. THE CONTRACTOR SHALL VERIFY THE LOCATION AND ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE COMMENCING WORK, THE CONTRACTOR SHALL FAMILIARIZE HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

LEGEND:

- 229.00 — EXISTING ELEVATIONS
- [230.00] — PROPOSED ELEVATIONS
- [230.00]S — PROPOSED SWALE ELEVATIONS
- [230.00]D — PROPOSED DITCH ELEVATIONS
- PROPOSED SWALE
- GENERAL DRAINAGE
- EXISTING CONIFEROUS TREES
- EXISTING DECIDUOUS TREES
- EXISTING TREES TO BE REMOVED

NOTES:

1. ALL ELEVATIONS SHOWN ARE METRIC.
2. BUILDER/OWNER TO VERIFY COMPLIANCE WITH ZONING BYLAWS (ie. SETBACKS, SETBACKS, REARYARDS ETC.)

T.B.M. No. 1 ELEV. = 229.15m (GEO)
MAG. MONUMENT SET ON THE EAST SIDE OF LAPLANTE ROAD AS SHOWN

NO.	REVISION	DATE (YY/MM/DD)	BY

J.H. COHOON ENGINEERING LIMITED
CONSULTING ENGINEERS

440 HARDY ROAD, UNIT #1, BRANTFORD - ONTARIO, N3T 5L8
TEL. (519) 753-2656 FAX (519) 753-4263 www.cohooneng.com

PROJECT

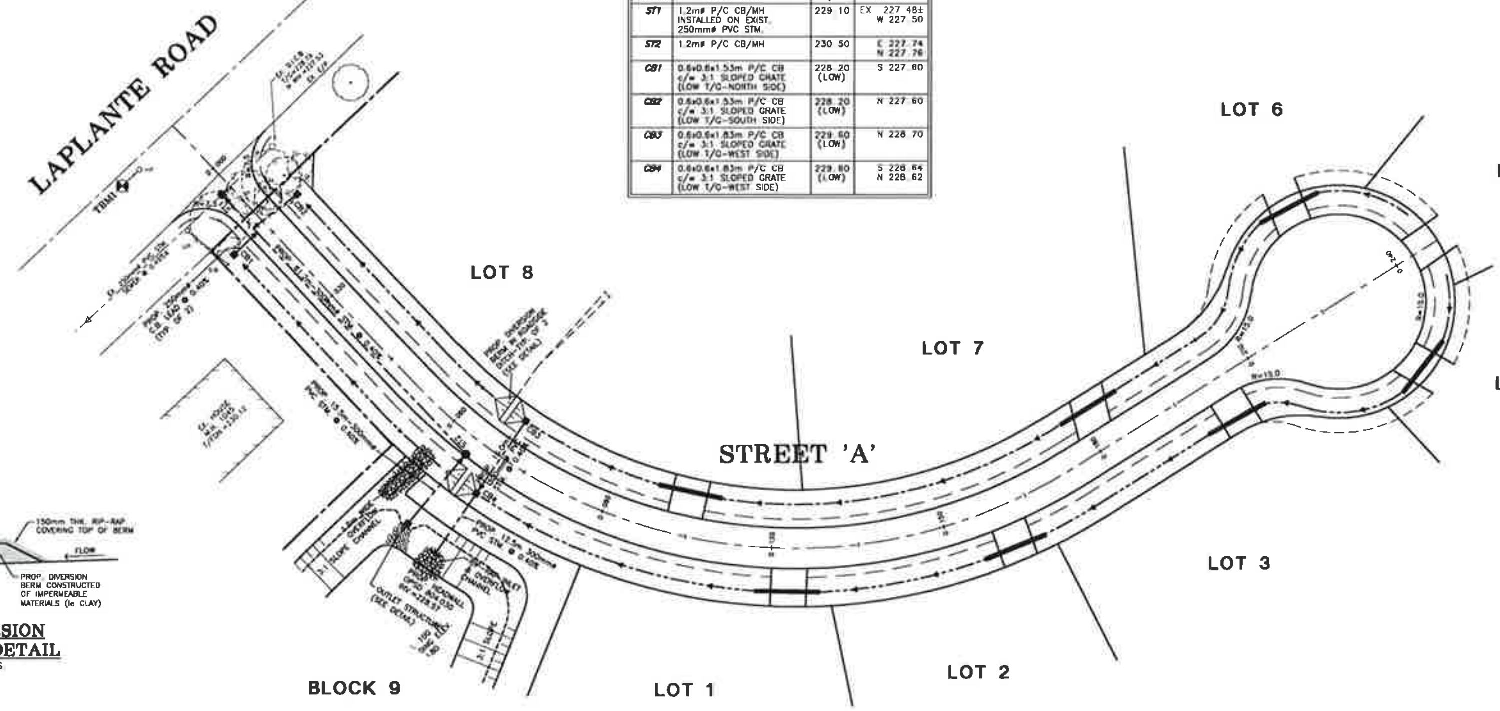
PROPOSED RESIDENTIAL SUBDIVISION
1045 LAPLANTE ROAD, TILLSONBURG
NORFOLK COUNTY

CLIENT

JOSE OLIVEIRA

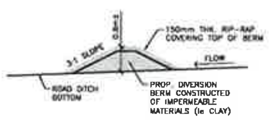
GRADING PLAN

DESIGN	R.W.P.	SCALE	1:500
DRAWN	K.P.B.	JOB No.	16933
CHECKED	R.W.P.		
SHEET	1 of 6	DWG No.	16933-1
DATE	NOV. 13/24		

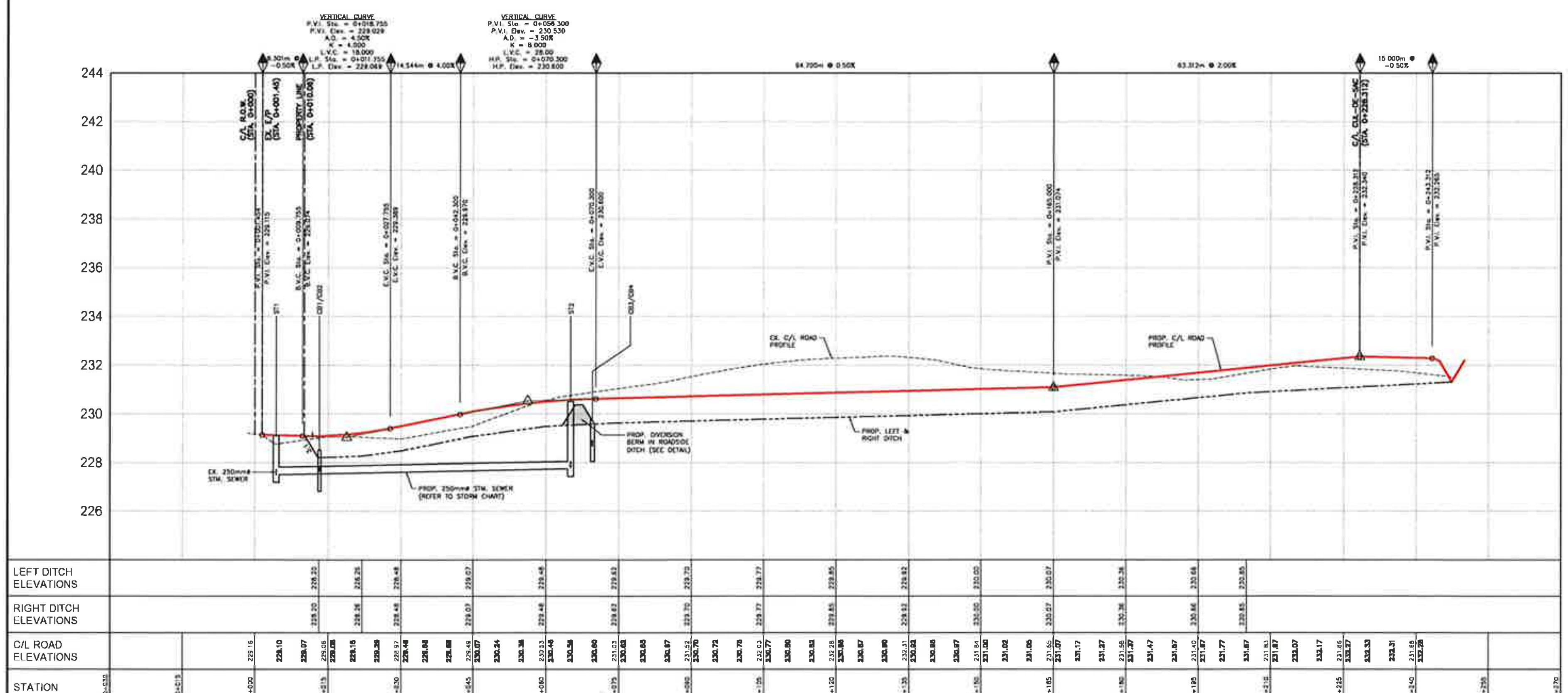


STORM SYSTEM

MH No.	DESCRIPTION	T/G	INVERTS
ST1	1.2mø P/C CB/MH INSTALLED ON EXIST. 250mmø PVC STM.	229.10	EX 227.48± W 227.50
ST2	1.2mø P/C CB/MH	230.50	E 227.74 N 227.76
CB1	0.6x0.6x1.53m P/C CB c/w 3:1 SLOPED GRATE (LOW T/G-NORTH SIDE)	228.20 (LOW)	S 227.60
CB2	0.6x0.6x1.53m P/C CB c/w 3:1 SLOPED GRATE (LOW T/G-SOUTH SIDE)	228.20 (LOW)	N 227.60
CB3	0.6x0.6x1.83m P/C CB c/w 3:1 SLOPED GRATE (LOW T/G-WEST SIDE)	229.60 (LOW)	N 228.70
CB4	0.6x0.6x1.83m P/C CB c/w 3:1 SLOPED GRATE (LOW T/G-WEST SIDE)	229.80 (LOW)	S 228.64 N 228.62

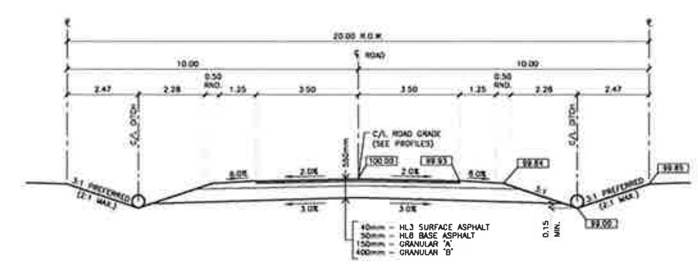


DIVERSION BERM DETAIL
N.T.S.

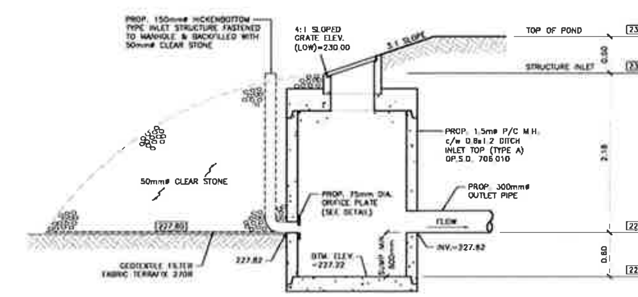


GENERAL NOTES:

1. ROADWAYS & RELATED WORKS SHALL BE DESIGNED AND CONSTRUCTED SO AS TO COMPLY WITH APPLICABLE LAW, TO BE CONSISTENT WITH NORFOLK COUNTY DEVELOPMENT AND ENGINEERING STANDARDS AND IN ACCORDANCE WITH CURRENT GUIDELINES, CODES, REGULATIONS, BEST PRACTICES AND STANDARDS PRESCRIBED BY THE COUNTY.
2. CONSTRUCTION OF SEWERS, AND RELATED APPURTENANCES SHALL BE UNDERTAKEN IN ACCORDANCE WITH THE CURRENT STANDARD DRAWINGS OF NORFOLK COUNTY, AND THE ONTARIO PROVINCIAL STANDARDS DRAWINGS (OPSD). NORFOLK COUNTY DRAWINGS SHALL TAKE PRECEDENCE OVER THE OPSD DRAWINGS.
3. INFORMATION REGARDING ANY EXISTING SERVICES AND/OR UTILITIES SHOWN ON THE APPROVED SET OF CONSTRUCTION DRAWINGS IS FURNISHED AS THE BEST AVAILABLE INFORMATION. THE CONTRACTOR SHALL INTERPRET THIS INFORMATION AS THEY SEE FIT WITH THE UNDERSTANDING THAT THE OWNER AND HIS AGENTS DISCLAIM ALL RESPONSIBILITY FOR ITS ACCURACY AND/OR SUFFICIENCY.
4. APPROVED PUBLIC WORKS PERMITS ARE REQUIRED PRIOR TO COMMENCING WORKS WITHIN THE MUNICIPAL ROAD ALLOWANCE.
5. ALL DIMENSIONS SHALL BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO ANY CONSTRUCTION AND HE SHALL REPORT ANY DISCREPANCIES IMMEDIATELY TO THE ENGINEER.
6. RELOCATION OF EXISTING SERVICES AND/OR UTILITIES SHALL BE CONSTRUCTED AS SHOWN ON THE DRAWINGS OR AS DIRECTED BY THE ENGINEER.
7. THE CONTRACTOR SHALL OBTAIN ALL PERMITS FOR CONSTRUCTION.
8. NO SUBSTITUTIONS WILL BE ALLOWED WITHOUT WRITTEN APPROVAL FROM NORFOLK COUNTY OR THE ENGINEER.
9. ALL EXCAVATIONS TO BE BACKFILLED WITH SELECT NATIVE MATERIAL, APPROVED BY THE ENGINEER, TO 95% S.P.D.
10. TREE PROTECTION PROCEDURES TO BE IMPLEMENTED IN ACCORDANCE WITH NORFOLK COUNTY STANDARDS.
11. ALL TRENCH BACKFILL UNDER EXISTING ROADWAYS SHALL BE COMPACTED IN MINIMUM 230mm LIFTS TO 98% STANDARD PROCTOR DENSITY. A GEOTECHNICAL ENGINEER'S REPRESENTATIVE SHALL BE ON SITE DURING THE WORK TO VERIFY THE COMPACTION OF EACH LIFT. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL COSTS OF RE-TESTING.
12. FINAL ROADWAY CROSSFALL TO BE 2.0%
13. ALL CURB RETURNS TO BE 7.5m RAD. TO E/P UNLESS OTHERWISE NOTED.
14. STANDARD DEEP STRENGTH PAVEMENT 40mm HL3, 50mm HL8, 150mm GRANULAR 'A' & 400mm GRANULAR 'B'. (ALL DEPTHS COMPACTED THICKNESSES)
15. FINAL ASPHALT COURSE (HL3) SHALL BE PLACED IN ACCORDANCE WITH APPROVED NORFOLK COUNTY STANDARDS FOR TIMING.
16. ALL DRIVEWAY CULVERTS TO BE 450mmø (2mm THK.) CSP. PROVIDE 0.30m MIN. COVER OVER PIPE.
17. ALL BOULEVARD AREAS TO BE RESTORED WITH #1 NURSERY SOD ON A MINIMUM 150mm OF SELECT TOPSOIL.
18. DRIVEWAY RAMPS TO BE 50mm HL3 FINE ON 150mm GRANULAR 'A' FROM EDGE OF PAVEMENT TO PROPERTY LINE. DRIVEWAYS TO BE CONSTRUCTED OF SAME OR APPROVED EQUAL.
19. THE DEVELOPER AND/OR CONTRACTOR IS RESPONSIBLE FOR INSTALLING AND MAINTAINING (UNTIL ROAD CONSTRUCTION IS FINISHED) SILT CONTROL DEVICES AS SHOWN ON THE DRAWINGS AND AS DIRECTED BY THE ENGINEER.
20. ADDITIONAL SILT CONTROL LOCATIONS MAY BE REQUIRED AS DETERMINED BY THE COUNTY AND/OR THE ENGINEER.
21. SILTATION CONTROL BARRIERS SHALL BE PLACED AS DETAILED ON THE SILTATION AND EROSION CONTROL PLAN.
22. THE SILTATION AND EROSION CONTROL (SEC) MEASURES ILLUSTRATED ON THESE PLANS ARE CONSIDERED TO BE THE MINIMUM REQUIREMENT. SITE CONDITIONS MAY REQUIRE ADDITIONAL MEASURES WHICH WILL BE IDENTIFIED BY THE ENGINEER DURING CONSTRUCTION.
23. ALL SEC MEASURES ARE TO BE IN PLACE PRIOR TO COMMENCEMENT OF CONSTRUCTION.
24. OWNER/CONTRACTOR TO MAINTAIN EROSION CONTROL MEASURES THROUGHOUT SITE UNTIL A COMPLETE GRASS/VEGETATION COVER IS ACHIEVED.
25. ONLY AT THE DIRECTION OF THE ENGINEER ARE THE SEC MEASURES TO BE REMOVED.
26. CONTRACTOR TO PROVIDE SILT FENCE AROUND PERIMETER OF ALL ON SITE STOCKPILES.
27. RESTORE LAPLANTE ROAD AS PER NORFOLK COUNTY STANDARDS.



TYPICAL ROAD X-SECTION
SCALE: HORZ: 1:100 VERT: 1:100



S.W.M. POND OUTLET STRUCTURE DETAIL
SCALE: 1:40

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND ABOVEGROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE COMMENCING WORK, THE CONTRACTOR SHALL FAMILIARIZE HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

LEGEND:

- EXISTING ELEVATIONS
- EXISTING STANDARD IRON BAR
- EXISTING IRON BAR
- EXISTING HYDRO POLE
- EXISTING UTILITY POLE
- EXISTING GUY
- EXISTING OBSERVATION WELL
- EXISTING DITCH INLET CATCHBASIN
- TBM — EXISTING TEMPORARY BENCHMARK
- EXISTING CHAIN LINK FENCE
- EXISTING DITCH
- EXISTING CONIFEROUS TREES
- EXISTING DECIDUOUS TREES
- EXISTING TREES TO BE REMOVED
- PROPOSED LEFT DITCH
- PROPOSED RIGHT DITCH
- PROPOSED CULVERT
- ST1 — PROPOSED CATCHBASIN MANHOLE
- 189.71 — PROPOSED C/L ROAD ELEVATION
- ST1 — PROPOSED STORM MANHOLE
- CB — PROPOSED CATCHBASIN
- PROPOSED STORM SEWER

T.B.M. No. 1 ELEV. = **229.15m** (GEO)
NAIL IN HYDRO POLE ON THE EAST SIDE OF LAPLANTE ROAD AS SHOWN.

NO.	REVISION	DATE (YY/DD/MM)	BY

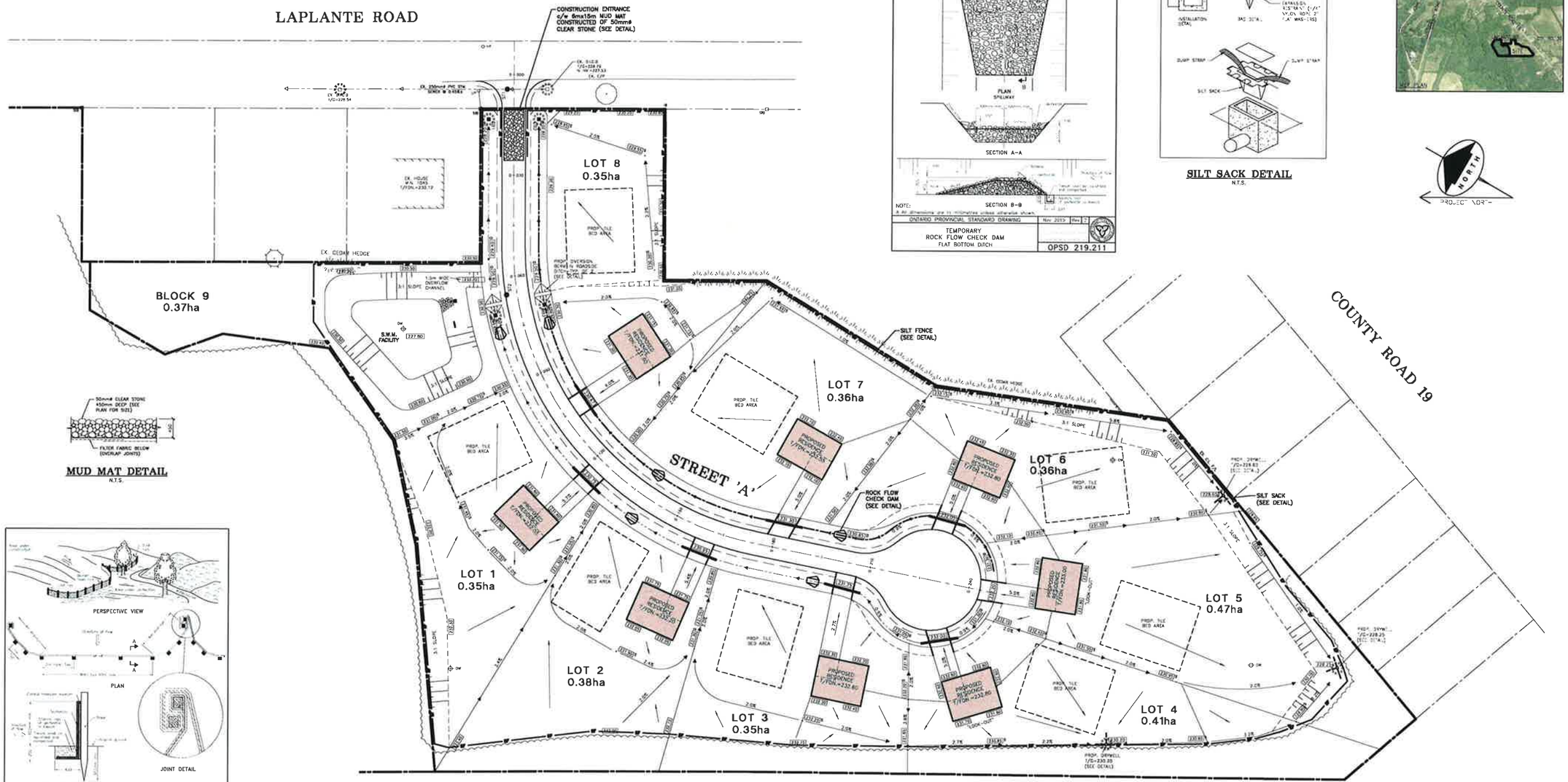
J.H. COHOON ENGINEERING LIMITED
CONSULTING ENGINEERS
440 HARDY ROAD, UNIT #1, BRANTFORD - ONTARIO, N3T 5L8
TEL. (519) 753-2656 FAX (519) 753-4263 www.cohooneng.com

PROJECT:
PROPOSED RESIDENTIAL SUBDIVISION
1045 LAPLANTE ROAD, TILLSONBURG
NORFOLK COUNTY

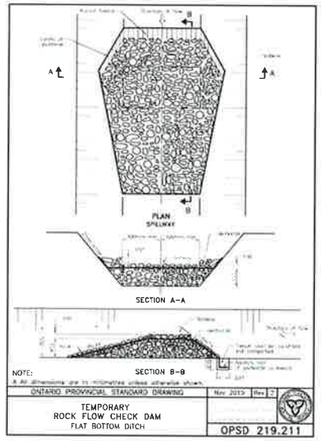
CLIENT:
JOSE OLIVEIRA

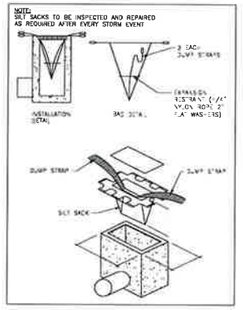
STREET 'A'
PLAN AND PROFILE
STA. 0+000 to STA. 0+240

DESIGN:	R.W.P.	SCALE:	HORZ: 1:500 VERT: 1:100
DRAWN:	K.P.B.	JOB No:	16933
CHECKED:	R.W.P.		
SHEET:	2 of 6	DWG No:	16933-2
DATE:	NOV. 13/24		

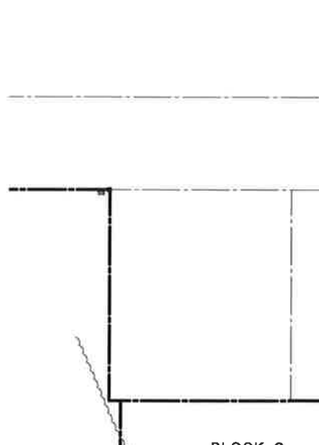


MUD MAT DETAIL
N.T.S.





SILT SACK DETAIL
N.T.S.



PROJECT LOCATION

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND ABOVEGROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE COMMENCING WORK, THE CONTRACTOR SHALL FAMILIARIZE HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

LEGEND:

- 230 — EXISTING ELEVATIONS
- 230.00 — PROPOSED ELEVATIONS
- 230.00 S — PROPOSED SWALE ELEVATIONS
- 230.00 D — PROPOSED DITCH ELEVATIONS
- PROPOSED SWALE
- GENERAL DRAINAGE
- PROPOSED SILT CONTROL FENCING
- SILT SACK AS SHOWN
- ROCK FLOW CHECK DAM

NOTES:

1. ALL ELEVATIONS SHOWN ARE METRIC.
2. THE SILTATION & EROSION CONTROL (SEC) MEASURES ILLUSTRATED ON THIS PLAN ARE CONSIDERED TO BE THE MINIMUM REQUIREMENT. SITE CONDITIONS MAY REQUIRE ADDITIONAL MEASURES WHICH WILL BE IDENTIFIED BY THE ENGINEER DURING CONSTRUCTION.
3. ALL SEC MEASURES ARE TO BE IN PLACE PRIOR TO COMMENCEMENT OF CONSTRUCTION.
4. OWNER/CONTRACTOR TO MAINTAIN EROSION CONTROL MEASURES THROUGHOUT SITE UNTIL A COMPLETE GRASS/VEGETATION COVER IS ACHIEVED.
5. ONLY AT THE DIRECTION OF THE ENGINEER ARE THE SEC MEASURES TO BE REMOVED.
6. SITE WORKS ARE TO BE STAGED IN SUCH A MANNER THAT EROSION WILL BE MINIMIZED, AND THE CONSULTANT MUST PROVIDE CONFIRMATION THAT ALL APPROVED SILTATION AND EROSION CONTROL FACILITIES HAVE BEEN INSTALLED PRIOR TO THE COMMENCEMENT OF ANY GRADING, EXCAVATION OR DEMOLITION.
7. CLEARING AND GRUBBING OF THE SITE SHOULD BE KEPT TO A MINIMUM AND VEGETATION REMOVED ONLY IN ADVANCE OF IMMEDIATE CONSTRUCTION.
8. STOCKPILES OF EARTH OR TOPSOIL ARE TO BE LOCATED AND PROTECTED TO MINIMIZE ENVIRONMENTAL INTERFERENCE. EROSION CONTROL FENCING IS TO BE INSTALLED AROUND THE BASE OF ALL STOCKPILES.
9. THE OWNER IS RESPONSIBLE TO ENSURE THE MUNICIPAL ROADWAYS ARE CLEANED OF ALL SEDIMENTS FROM VEHICULAR TRACKING ETC. TO AND FROM THE SITE, AT THE END OF EACH WORKDAY.
10. ALL EXISTING AND PROPOSED CATCHBASINS ON THE SUBJECT PROPERTY, PLUS ANY CATCHBASINS WITHIN THE INFLUENCE OF RUNOFF FROM THE SITE, ARE TO BE PROTECTED WITH FILTER CLOTH OR APPROVED EQUIVALENT.

NO.	REVISION	DATE (MM/DD/YY)	BY

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PROJECT:

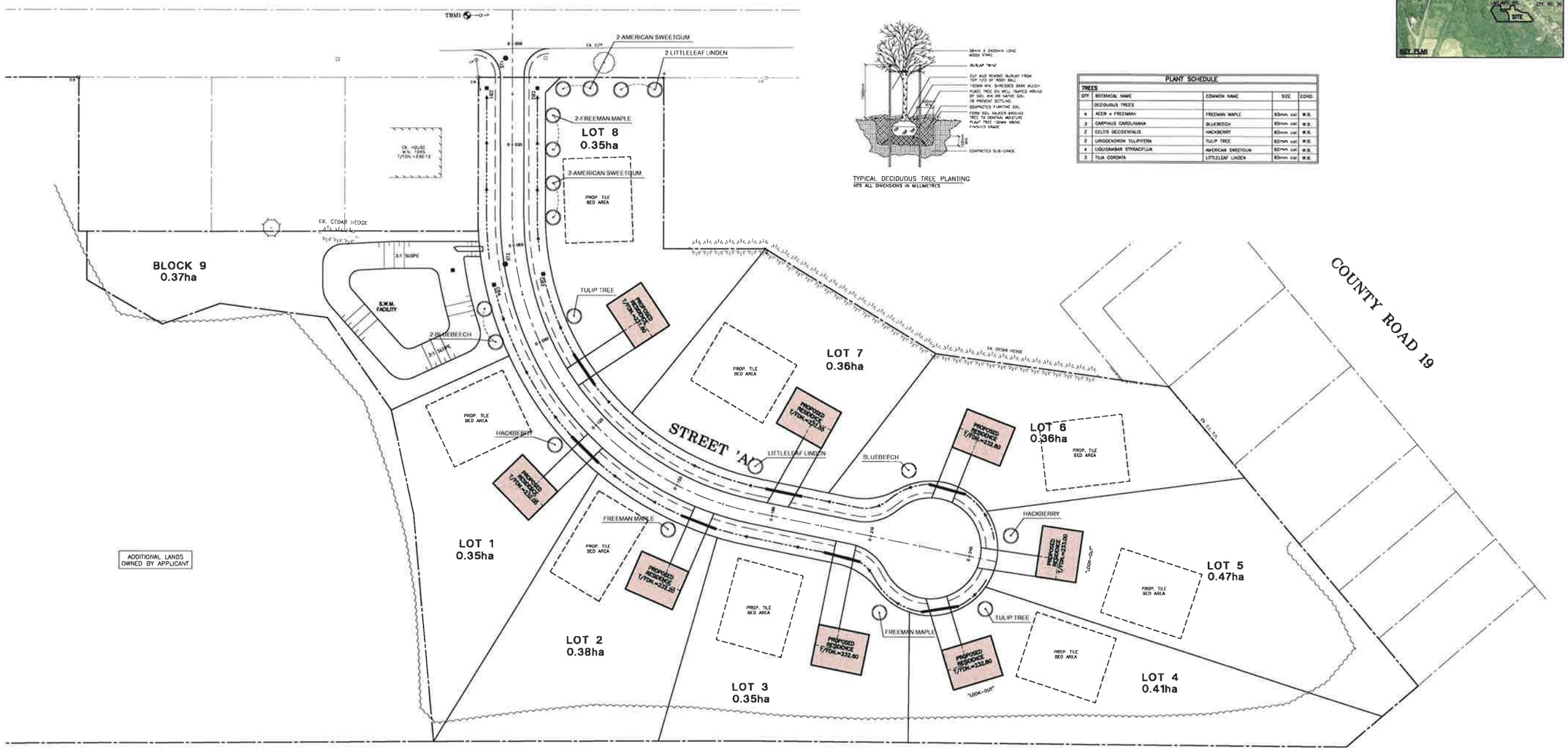
PROPOSED RESIDENTIAL SUBDIVISION
1045 LAPLANTE ROAD, TILLSONBURG
NORFOLK COUNTY

CLIENT:

JOSE OLIVEIRA

SILTATION & EROSION CONTROL PLAN

DESIGN:	R.W.P.	SCALE:	1:500
DRAWN:	K.P.B.	JOB No:	16933
CHECKED:	R.W.P.		
SHEET:	3 of 6	DWG. No:	16933-3
DATE:	NOV. 13/24		



TYPICAL DECIDUOUS TREE PLANTING
NTS ALL DIMENSIONS IN MILLIMETRES

PLANT SCHEDULE

TREES				
QTY	BOTANICAL NAME	COMMON NAME	SIZE	COND.
	DECIDUOUS TREES			
4	ACER x FREEMANI	FREEMAN MAPLE	60mm cal	W.B.
3	CARPINUS CAROLINIANA	BLUEBEECH	60mm cal	W.B.
2	CELTIS OCCIDENTALIS	HACKBERRY	60mm cal	W.B.
2	LIRIODENDRON TULIPIFERA	TULIP TREE	60mm cal	W.B.
4	LIQUIDAMBAR STYRACIFLUA	AMERICAN SWEETGUM	60mm cal	W.B.
3	TILIA CORDATA	LITTLELEAF LINDEN	60mm cal	W.B.

THE POSITION OF POLE LINES, CONDUITS, WATERMAINS, SEWERS AND OTHER UNDERGROUND AND ABOVEGROUND UTILITIES AND STRUCTURES ARE NOT NECESSARILY SHOWN ON THE CONTRACT DRAWINGS, AND WHERE SHOWN, THE ACCURACY OF THE POSITION OF SUCH UTILITIES AND STRUCTURES IS NOT GUARANTEED. BEFORE COMMENCING WORK, THE CONTRACTOR SHALL FAMILIARIZE HIMSELF OF THE EXACT LOCATION OF ALL SUCH UTILITIES AND STRUCTURES AND SHALL ASSUME ALL LIABILITY FOR DAMAGE TO THEM.

LANDSCAPE NOTES:

1. THE LANDSCAPE PLAN HAS BEEN PREPARED IN COORDINATION WITH SITE PLAN & ENGINEERING PLANS.
2. THE LANDSCAPE CONTRACTOR SHALL VERIFY ALL CONDITIONS IN THE FIELD AND REPORT ANY DISCREPANCIES TO THE LANDSCAPE ARCHITECT PRIOR TO CONSTRUCTION.
3. LIMIT OF WORK TO BE THE PROPERTY LINE SHOWN.
4. ANY AREAS OUTSIDE THE LIMIT OF WORK DAMAGED BY THE CONTRACTOR SHALL BE RESTORED BY THE CONTRACTOR TO CITY OF ERAMOSA STANDARDS AT NO ADDITIONAL COST TO THE OWNER.
5. ALL UNDERGROUND UTILITIES TO BE LOCATED BY THE LANDSCAPE CONTRACTOR PRIOR TO THE COMMENCEMENT OF ANY WORK.
6. ALL DIMENSIONS ARE IN METRES.
7. ALL PLANT MATERIAL TO BE No. 1 GRADE, NURSERY GROWN IN ACCORDANCE WITH THE CANADIAN NURSERY TRADES ASSOCIATION.
8. PLANT MATERIAL QUANTITIES ON THE DRAWING SHALL TAKE PRECEDENT OVER THOSE IN THE PLANT LIST.
9. ANY PLANT MATERIAL WHICH COMES OVER OR UNDER ANY UTILITY WILL BE RELOCATED AS DIRECTED BY THE LANDSCAPE ARCHITECT.
10. SUPPLY & INSTALL A SHREDDED BARK MULCH ON ALL PLANTING BED TO BE A 100mm DEPTH.
11. NORFOLK COUNTY IS RESPONSIBLE FOR PLANTING TREES ON PUBLIC PROPERTY. THE DEVELOPER SHALL PAY TO THE COUNTY THE APPLICABLE FEE, AS PER NORFOLK COUNTY'S USER FEE BYLAW, FOR ALL TREES BEING PLANTED WITHIN THE COUNTY ROAD ALLOWANCE ON STANLEY STREET AND METCALFE STREET.
12. FOR ON SITE LANDSCAPING, THE DEVELOPER IS RESPONSIBLE FOR TREE PLANTING AND SHALL PAY A SECURITY DEPOSIT TO THE COUNTY WHICH WILL BE RELEASED UPON FINAL ACCEPTANCE OF THE TREES.

NO.	REVISION	DATE (MM/DD/YY)	BY

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PROJECT
PROPOSED RESIDENTIAL SUBDIVISION
1045 LAPLANTE ROAD, TILLSONBURG
NORFOLK COUNTY

CLIENT
JOSE OLIVEIRA

TREE PLANTING PLAN

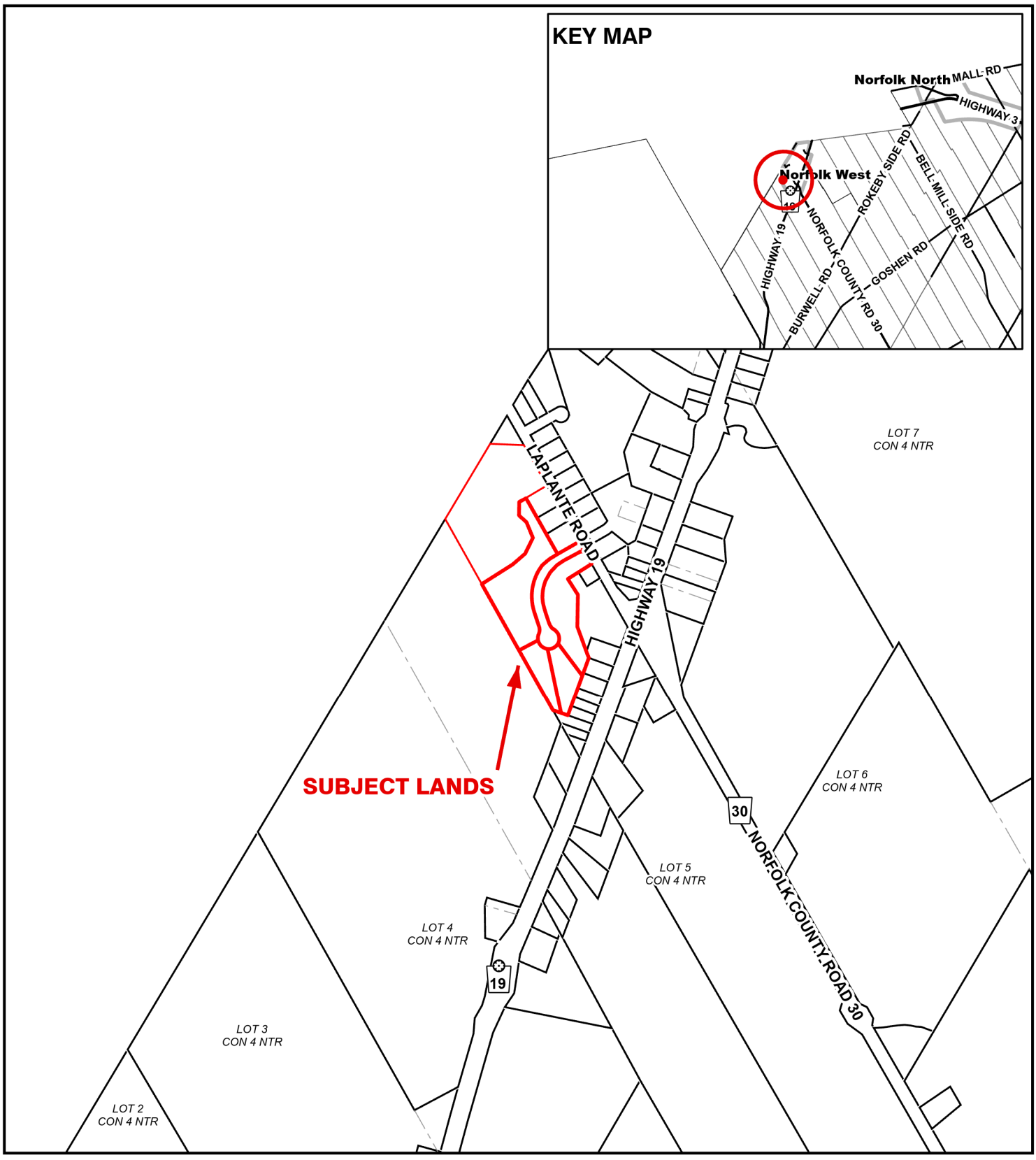
DESIGN	R.W.P.	SCALE	1:500
DRAWN	K.P.B.	JOB No.	16933
CHECKED	R.W.P.		
SHEET	4 of 8	DWG No.	16933-4
DATE	NOV. 13/24		

MAP A

CONTEXT MAP

Geographic Township of MIDDLETON

28TPL2024415
ZNPL2024407



Legend

- Subject Lands
- Lands Owned

2020 Air Photo

4/3/2025

N

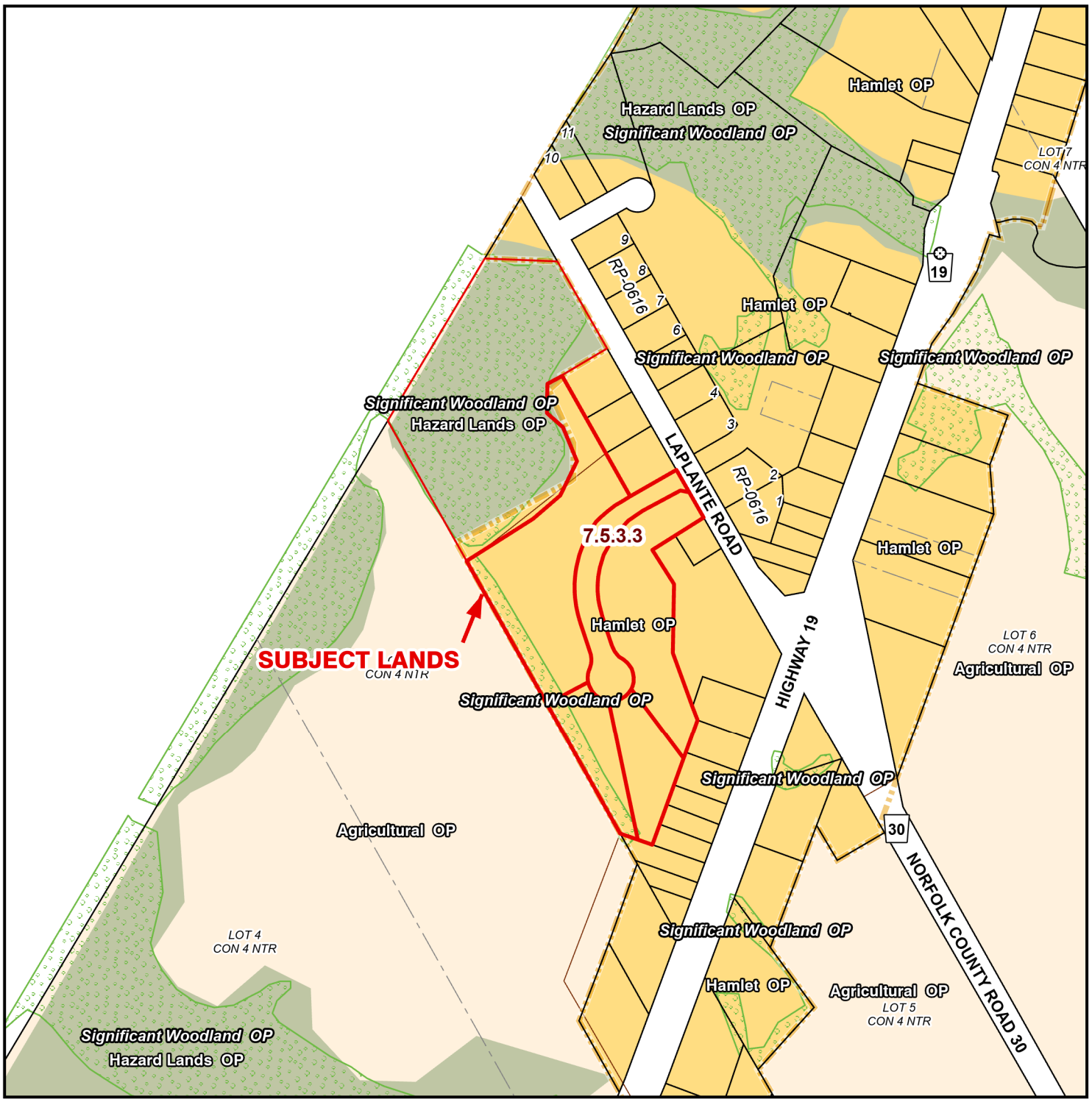
75 37.5 0 75 150 225 300 Meters

MAP B

OFFICIAL PLAN MAP

Geographic Township of MIDDLETON

28TPL2024415
ZNPL2024407



Legend

- Subject Lands
- Lands Owned

Official Plan Designations

- Agricultural
- Hazard Lands
- Hamlet
- Hamlet Area Boundary
- Significant Woodland

4/3/2025

N

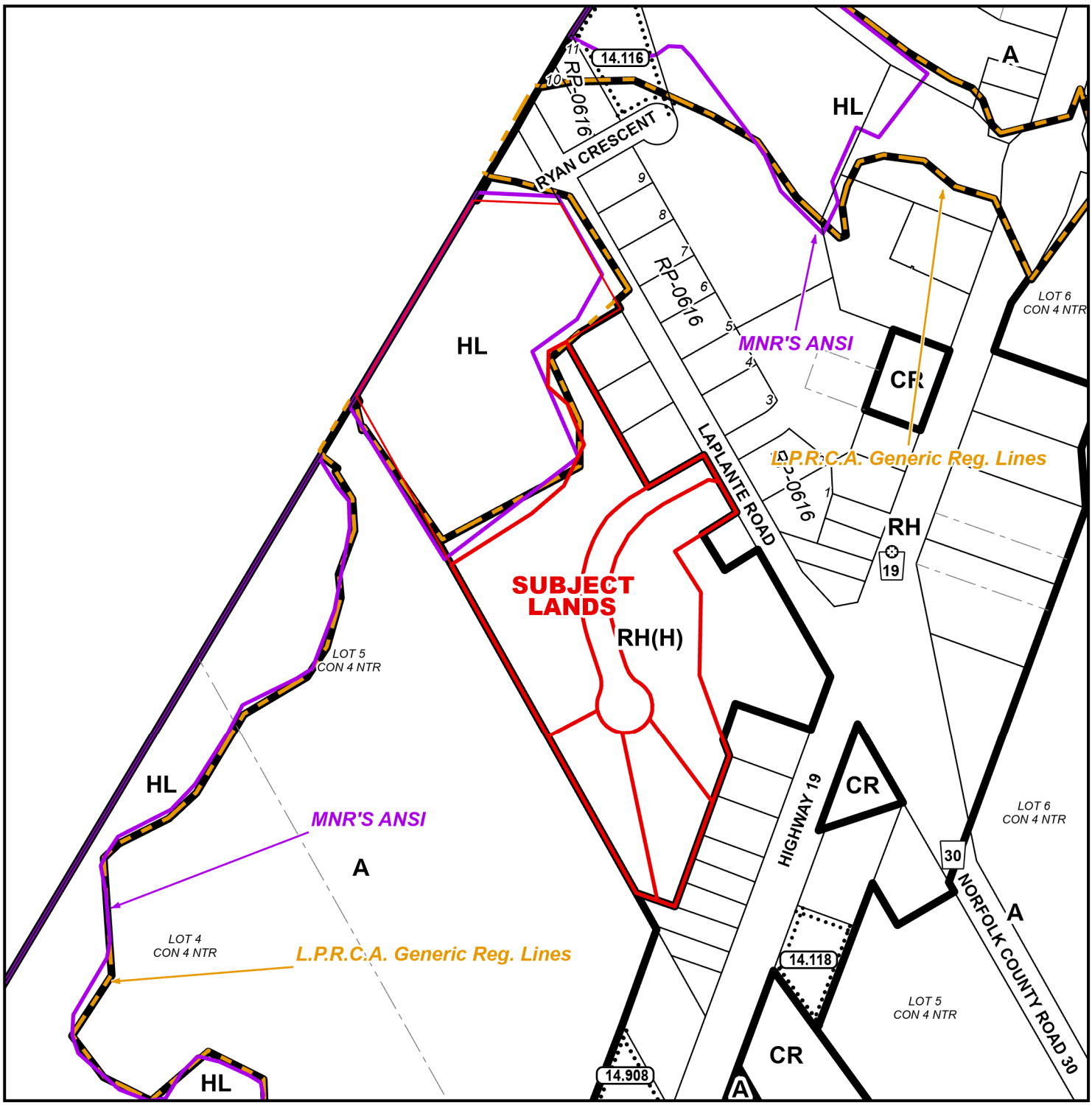
30 15 0 30 60 90 120 Meters

MAP C

PROPOSED ZONING BY-LAW AMENDMENT MAP

Geographic Township of MIDDLETON

28TPL2024415
ZNPL2024407



LEGEND

- Subject Lands
- Lands Owned
- MNR ANSI
- LPRCA Generic RegLines

ZONING BY-LAW 1-Z-2014

4/3/2025

(H) - Holding

A - Agricultural Zone

CR - Rural Commercial Zone

RH - Hamlet Residential Zone

HL - Hazard Land Zone

From: RH (H)
To: RH (H) with Special Provisions

N

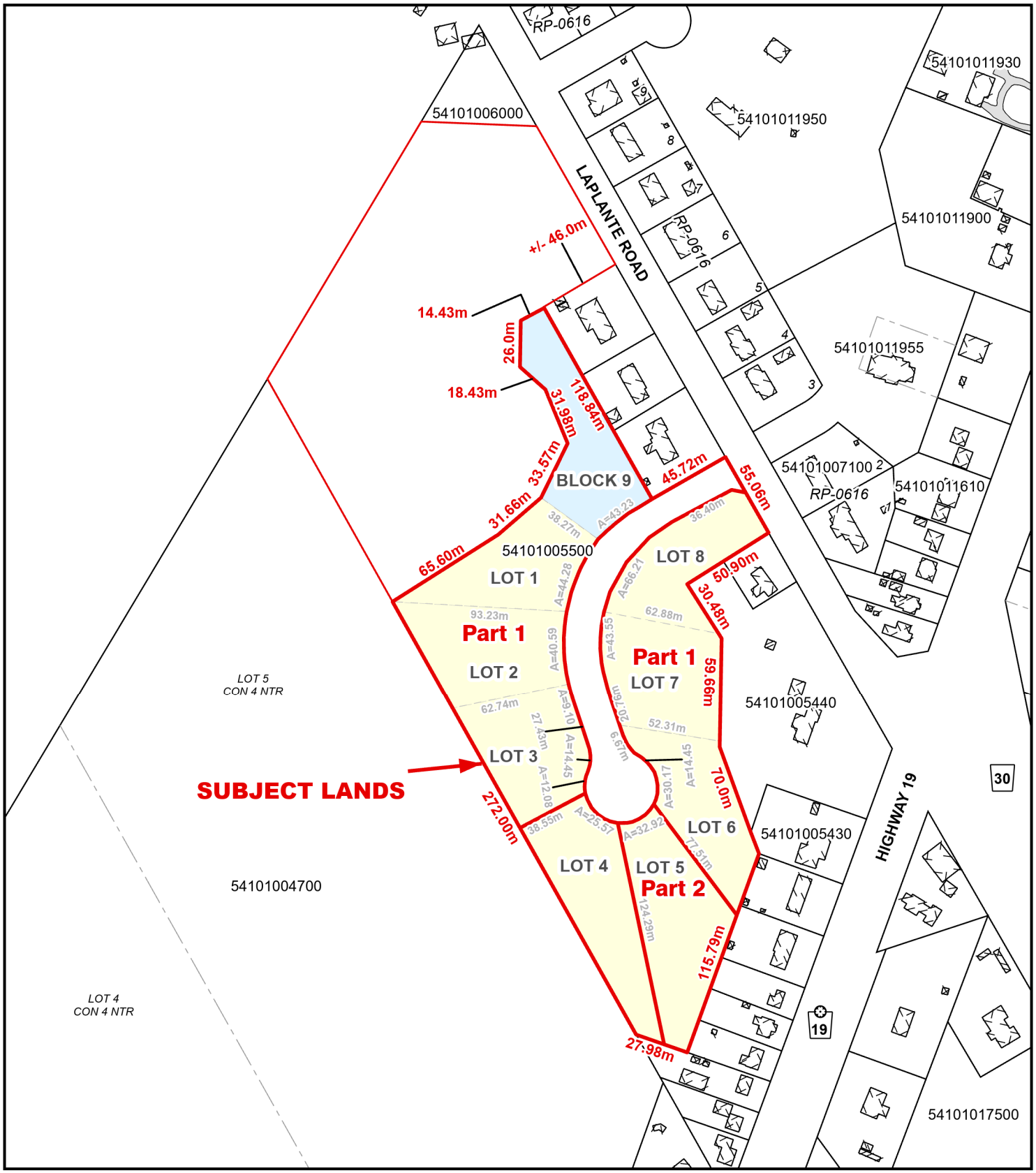
30 15 0 30 60 90 120 Meters

MAP D

CONCEPTUAL PLAN

Geographic Township of MIDDLETON

28TPL2024415
ZNPL2024407



Legend

- Subject Lands
- Lands Owned
- Storm Water Pond
- Single Detached Dwelling

4/3/2025

N

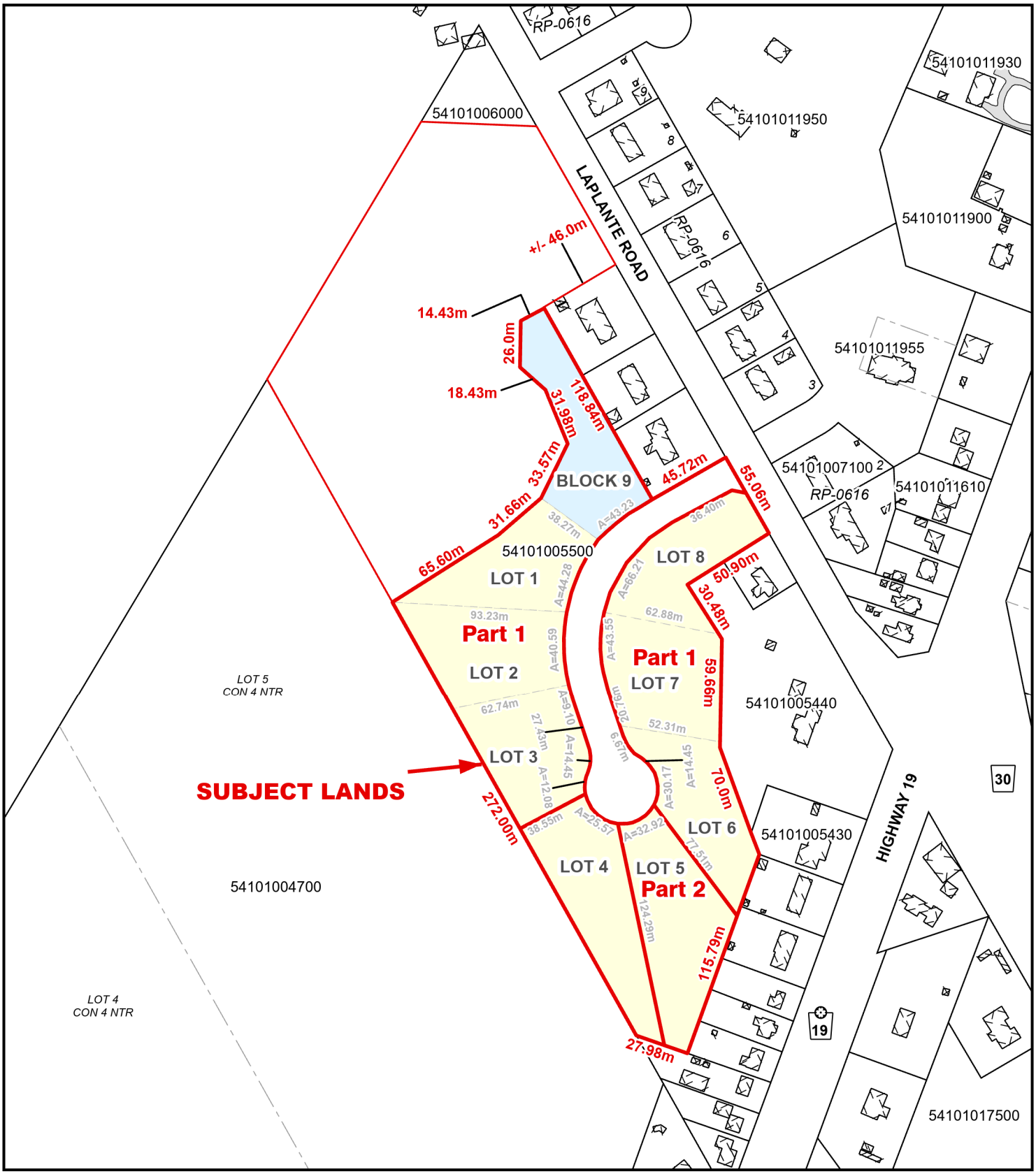
20 10 0 20 40 60 80 Meters

LOCATION OF LANDS AFFECTED

CONCEPTUAL PLAN

Geographic Township of MIDDLETON

28TPL2024415
ZNPL2024407



Legend

- Subject Lands
- Lands Owned
- Storm Water Pond
- Single Detached Dwelling

4/3/2025

N

20 10 0 20 40 60 80 Meters