Hydrogeological Assessment – Park Meadow Court Subdivision, Belleville, Ontario

November 12, 2024

Prepared for:
Geertsma Homes

Cambium Reference: 21025-001

CAMBIUM INC.

866.217.7900

cambium-inc.com

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1.0 Introduction

Cambium Inc. (Cambium) was retained by Geertsma Homes (the Client) to complete a hydrogeological assessment for a property located in Bellville Ontario. The legal address of the subject property is Part of Park Lots 8 & 9 Plan 124 Thurlow as in QR298449, except parts 1, 2, 3, 4, 5 & 6, 21R26096; City of Belleville (the Site). Cambium understands that the Client intends on constructing a new subdivision at the Site, named the Park Meadow Court Subdivision, which will involve 3 phases of development: Phase 1 will consist of 35 residential units and is what is proposed to be constructed at this time, while Phases 2 and 3 will consist of 64 and 4 residential units respectively and are proposed as future developments. Cambium understands that a hydrogeological assessment is required to evaluate the impact of the proposed subdivision on the groundwater resources of the surrounding area, including existing wells.

The Site is approximately 4.64 hectares (11.47 acres) in size. The Site is currently relatively flat agricultural land, which is bordered to west and south by agricultural fields, to the north by residential properties, and to the east by an agricultural field and residential properties. Phases 1 to 3 of the proposed development include plans to construct one-unit detached, one-unit semi-detached, and multi-story one-unit townhouses along with a stormwater management pond and parkland. The proposed development includes the construction of a new, municipally serviced residential subdivision and associated underground infrastructure. The regional location of the Site is illustrated in Figure 1. A site plan showing property boundaries and surrounding areas is provided in Figure 2. The proposed development plan is presented in Appendix A.

While there are no immediate plans to construct the dwellings and infrastructure associated with Phases 2 and 3, this assessment considers the potential hydrogeological impacts from all development phases together. The scope of work for this hydrogeological assessment includes 1) a desktop review to assess the geological and hydrogeological setting for the Site along with a summary of vulnerable areas, 2) a borehole investigation and the installation of monitoring wells, 3) water level measurements from the monitoring wells, and 4) estimates the dewatering requirements for the construction of buildings foundations and underground services for Phases 1 to 3 of the proposed development.

2.0 Physical Setting

The physical environment of the Site is detailed in the following subsections.

2.1 Topography and Drainage

The Site is located within the Palliser Creek – Moira River Outlet subwatershed area. Based on the topography maps presented in Appendix A, the Site has ground elevations between approximately 112 and 115 masl, with the land gradually sloping to the east. Precipitation falling on the Site is expected to either infiltrate the shallow aquifer underlying the Site or runoff over the surface towards the Moira River to the east (with the Moira River subsequently flowing south into Lake Ontario, located approximately 7 km south of the Site).

2.2 Vulnerable and Regulated Areas

The Site is situated within the Quinte Source Protection Area, under jurisdiction of the Quinte Conservation, as per the Source Water Protection Information Atlas from the Ministry of the Environment, Conservation and Parks (MECP) (2024). The Site is within a Highly Vulnerable Aquifer (HVA). HVAs are aquifers that are more sensitive to contamination as a result of their proximity to surface (i.e. shallow aquifers). By default, all HVA's have a vulnerability score of 6. Best management practices should be used to minimize the potential for the release of chemicals to the subsurface environment during future operations at the Site.

A review of the Natural Heritage System database from the Ministry of Natural Resources and Forestry (2024) indicates the Site is not located within any Areas of Natural and Scientific Interest. The Site contains no wetlands and no woodlands, other than the tree line around the property boundary.

The Site does not fall under a regulated area, as per Quinte Conservation or O.Reg. 41/24.

No other vulnerable areas are identified at the Site.

The source protection, natural heritage, and conservation area mapping is attached in Appendix A.

2.3 Physiography

The Site is located in the physiographic region known as the Napanee Plains (Appendix A). The Napanee Plains are characterized by a flat to undulated plain of limestone from which most of the overburden was stripped during the last glaciation. Soils in much of the plains are only a few inches deep, but scattered drumlins can be found in the region along with shallow deposits of stratified clay in the south and thicker deposits of till in the north and within stream valleys (Chapman & Putnam, 1984).

2.4 Overburden Geology

According to Miscellaneous Release – Data 128 from the Ontario Geological Survey (2010), the majority of the Site is characterized as being fine-textured glaciolacustrine deposits consisting of silt and clay with minor sand and gravel, with a small portion in the southeast corner of the Site defined as being Paleozoic bedrock (Appendix A).

2.5 Bedrock Geology

According to Miscellaneous Release – Data 219 from the Ontario Geological Survey (Armstrong & Dodge, 2007), the Site is underlain by limestone and shale of the Gull River Formation (Middle Ordovician Simcoe Group rocks) (Appendix A).

3.0 MECP Well Records Assessment

A review of the MECP Water Well Information System identified 41 water well records, installed between the years 1961 to 2022, found within approximately 500 m of the Site (Appendix B; Figure 3).

A summary of the information outlined in the well records is provided below:

- Well use information indicated: 31 wells are used for water supply, 7 wells were abandoned, 2 are test holes, and 1 well is of unknown use.
- Of the 41 well records, 6 wells were installed in overburden and 35 wells were installed in bedrock.
- No depth information was provided for any of the 6 wells installed in overburden. Well depths in bedrock range from 5.0 to 39.0 mbgs, with an average depth of 15.9 mbgs.
- Overburden was primarily reported as clay, with a few wells reporting sand and/or gravel layers. Bedrock was primarily reported as limestone and/or shale, with one well encountering granite.
- Static water levels in the overburden wells ranged from 2.0 to 10.0 mbgs, with an average of 5.3 mbgs. Static water levels in the bedrock wells ranged from 1.0 to 12.0 mbgs, with an average of 5.4 mbgs.
- There were no depths to water reported in the overburden wells. The depth to water found in the bedrock wells ranged from 5.2 to 34.7 mbgs, with an average of 10.9 mbgs.
- The recommended pumping rates for the overburden wells ranged from 14 to 23 LPM, with an average of 19 LPM. The recommended pumping rates for the bedrock wells ranged from 9 to 136 LPM, with an average recommended pumping rate of 40 LPM.

The depths, static water levels, and pumping rates for the bedrock wells and overburden wells are shown in Table 1.

Table 1 Summary of Surrounding Water Well Record Information

Well Type		Depth (mbgs)	Water First Found (mbgs)	Static Water Level (mbgs)	Recommended Pumping Rate (L/min)
Overburden Wells Count = 6	Maximum	N.D.(1)	N.D.(1)	10.0	23
	Minimum	N.D.(1)	N.D.(1)	2.0	14
	Average	N.D.(1)	N.D.(1)	5.3	19
Bedrock Wells Count = 35	Maximum	39.0	34.7	12.0	136
	Minimum	5.0	5.2	1.0	9
	Average	15.9	10.9	5.4	40

(1) N.D. = No data.

4.0 Methodology and Results of On-Site Investigation

4.1 Borehole Investigation

Cambium completed a drilling investigation on September 10, 2024, to assess the subsurface conditions at the Site and to install monitoring wells. A total of four boreholes, designated as MW01-24 to MW04-24, were advanced to termination depths of 3.0 to 5.2 meters below ground surface (mbgs), with all four of the boreholes being outfitted with monitoring wells. The locations of the borehole / monitoring well are presented in Figure 2.

Drilling and sampling were completed using a track-mounted drill rig operating under the supervision of a Cambium technician. The boreholes were advanced to auger refusal with the use of continuous flight solid stem augers with 50 mm outer diameter split spoon samplers, whereafter the boreholes were advanced to their target depth using air hammer drilling. Standard Penetration Test (SPT) N values were recorded for the sampled intervals as the number of blows required to drive a split spoon sampler 305 mm into the soil, using a 63.5 kg drop hammer falling 750 mm, as per ASTM D1586 procedures. The encountered soil units were logged in the field using visual and tactile methods, and samples were placed in labelled plastic bags for transport, future reference, and storage. Monitoring wells were installed in all boreholes in accordance with Ontario Regulation (O.Reg.) 903, with MW01-24 and MW03-24 being screened from 1.5 to 3.0 mbgs, and MW02-24 and MW04-24 being screened from 3.7 to 5.2 mbgs. Borehole logs are provided in Appendix C.

Auger refusal was encountered in all boreholes at depths between 2.3 and 3.0 mbgs. A rubble layer was generally noted below the depth of auger refusal in the four boreholes, with competent bedrock being encountered at MW02-24 and MW04-24. A summary of general lithological details is presented below.

4.1.1 Topsoil

Topsoil was observed at the surface of each borehole location. The thickness of the topsoil ranges approximately between 0.3 to 0.7 m.

4.1.2 Sandy Silt to Silty Sand (Glacial Till)

Deposits of sandy silt to silty sand were encountered below the topsoil at all four borehole locations, ranging in thickness from 1.7 to 2.7 m. The deposits had traces of gravel/clay and boulders were encountered at all four borehole locations; therefore, these sandy silt to silty sand deposits are inferred to be glacial till.

4.1.3 Gravel

A layer of gravel was encountered below the sandy silt to silty sand deposits at MW01-24 and MW03-24. The gravel deposits in both boreholes were found from 2.3 to 3.1 mbgs and extended to the bedrock surface. Both gravel deposits contained sand and/or silt.

4.1.4 Bedrock

Bedrock drilling was conducted at MW02-24 and MW04-24. Bedrock was encountered at 2.4 and 3.4 mbgs in MW02-24 and MW04-24 respectively, with the bedrock consisting of grey limestone.

4.2 Well Construction Details

The well construction details of the four monitoring wells installed are summarized in Table 2.

Table 2 Well Construction Details

Monitoring Well	Borehole Termination Depth (mbgs)	Screen Details	
		Screen Top (masl)	Screen Bottom (masl)
MW01-24	3.0	1.5	3.0
MW02-24	5.2	3.7	5.2
MW03-24	3.0	1.5	3.0
MW04-24	5.2	3.7	5.2

4.3 Groundwater Elevations

The Site was visited on September 24, 2024, to measure water levels in the four wells on-site. During the site visit, all four wells were dry. As all four wells were dry on September 24, 2024, no well development, sampling, or single well hydraulic tests could be performed.

4.4 Percolation Time and Hydraulic Conductivity

Due to all four wells being dry upon completion and when they were visited on September 24, 2024, no in-situ estimates of hydraulic conductivity could be obtained. Therefore, to approximate the percolation time and hydraulic conductivity of the soils, a soil sample was collected from the native silty sand deposits at MW03-24 and submitted for grain size analysis. Analysis results are based on the Unified Soil Classification System scale. A summary of results is provided in Table 3. Complete laboratory analysis reports are provided in Appendix D.

Table 3 Particle Size Distribution

Borehole	Depth (mbgs)	Description	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Percolation Time (min/cm)
MW03-24 SS2	1.5 – 2.1	Gravelly Silty Sand, trace Clay	27	41	26	6	20

Based on the grain size results, the soil percolation rate of the silty sand material collected from MW03-24 at a depth of 1.5 to 2.1 mbgs (sample SS2) was estimated to be 20 min/cm, indicating a moderate infiltration potential in the deeper subsurface. Using the Hazen formula (Powers, Corwin, Schmall, & Kaeck, 2007) the hydraulic conductivity is on the order of $2x10^{-7}$ m/s, which is relatively consistent with published values for silty sand.

5.0 Construction Dewatering Requirements

The proposed development is expected to include a variety of detached and semi-detached houses and townhouses with one-level basements. Excavation is therefore expected to be required for the construction of the one-level basements and for the linear infrastructure that will service the subdivision.

The requirements for construction dewatering from open-cut excavations generally depend on a Site's soil and groundwater conditions including soil type, soil permeability or hydraulic conductivity, local groundwater levels, and the design of the proposed works, such as the foundation and/or basement elevation, as well as the size of proposed structure/excavation.

Specific details for the development are not currently available, however, the dwelling's basements and the maximum depth of excavation for the construction of one-level basements and for the placement of linear infrastructure are not expected to exceed 3.0 mbgs. All four wells installed during this investigation extended down to depths of 3.0 mbgs or more, and all wells were dry on September 24, 2024.

Cambium notes that the time of year at which the wells were installed and monitored is when groundwater elevations are typically near their low point. Therefore, it is recommended that the wells are monitored on one or more instances during the spring, when groundwater elevations are typically highest.

If the monitoring wells are still dry during the spring, then construction dewatering is not expected to be required. However, if springtime groundwater elevations are at or above 3 mbgs, hydraulic testing of the wells, groundwater sampling, a dewatering assessment, and an update of this report's conclusions is recommended.

6.0 Assessment of Potential Impacts

The potential impacts of such a development are discussed below.

6.1 Natural Features and Considerations on Drinking Water Quality

The Site does not contain any woodlands, wetlands, watercourses, areas of natural or scientific interest, or regulated areas (as per O.Reg. 41/24). Therefore, no negative impacts to natural features are expected from the proposed development. The Site does overlie an HVA, however, if dewatering is not required, no adverse impacts to the HVA are anticipated.

6.2 Water Supply Wells near the Site

Municipal water and wastewater services will be provided for the proposed development, and little to no construction dewatering is expected to be required. Therefore, water supply wells near the Site are not expected to be impacted by water withdrawals or nitrate loading from wastewater disposal.

6.3 Ground Settlement/Subsidence

As little to no dewatering is expected, effects of ground settlement/subsidence are expected to be negligible

7.0 Conclusions and Recommendations

Cambium was retained by Geertsma Homes to complete a hydrogeological assessment of the property located at Part of Park Lots 8 & 9 Plan 124 Thurlow as in QR298449, except parts 1, 2, 3, 4, 5 & 6, 21R26096; City of Belleville. The hydrogeological assessment was required to evaluate the impact of the proposed subdivision on the groundwater resources of the surrounding area, including existing wells.

The Site is located primarily within the Palliser Creek – Moira River Outlet watershed. The Site sits between 112 and 115 masl and is relatively flat with the land sloping gently to the east. The Site overlies a Highly Vulnerable Aquifer, but contains no other vulnerable areas, wetlands, woodlands, watercourses, or areas of natural or scientific interest.

Four boreholes were drilled at the Site, with all four boreholes being completed as monitoring wells. Native overburden encountered during drilling primarily of topsoil, sandy silt to silty sand, and gravel, while bedrock encountered consisted of limestone. The Site was visited on September 24, 2024, but all monitoring wells were dry, precluding well development, groundwater sampling, or in-situ single-well hydraulic testing to be completed at the monitoring wells. One soil sample was collected and submitted for grain size analysis from a silty sand deposit, where the percolation time was estimated to be 20 min/cm and the hydraulic conductivity was estimated to be $2x10^{-7}$ m/s.

All four wells installed during this investigation extended down to depths of 3.0 mbgs or more, and all wells were dry on September 24, 2024. Cambium notes that the time of year at which the wells were installed and monitored is when groundwater elevations are typically near their low point. Therefore, it is recommended that the wells are monitored on one or more instances during the spring, when groundwater elevations are typically highest.

If the monitoring wells are still dry during the spring, then construction dewatering is not expected to be required. However, if springtime groundwater elevations are at or above 3 mbgs, hydraulic testing of the wells, groundwater sampling, a dewatering assessment, and an update of this report's conclusions is recommended.

The Site does overly an HVA, however, as no dewatering activities are likely to be required, no adverse impacts are anticipated to the HVA during construction. As the Site contains no

wetlands, woodlands, watercourses, or other vulnerable areas, no impacts from the development on natural features are expected. As no dewatering is anticipated, no impacts to surrounding water supply wells or land subsidence are expected.

8.0 Closing

We trust that the information in this submission meets your current requirements. If you have any questions regarding the contents of this report, please contact the undersigned.

Respectfully submitted,

Cambium Inc.

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9.0 References

Armstrong, D., & Dodge, J. (2007). *Paleozoic Geology of Southern Ontario, Miscellaneous Release – Data 219.* Ontario Geological Survey.

Chapman, L., & Putnam, D. (1984). *The Physiography of Southern Ontario: Ontario Geological Survey, Special Volume 2.*

Ministry of Natural Resources and Forestry. (2024). *Natural Heritage System Areas*. Retrieved from https://www.lioapplications.lrc.gov.on.ca/Natural_Heritage/index.html

Ministry of the Environment, Conservation and Parks. (2024). *Source Protection Information Atlas*. Retrieved from https://www.lioapplications.lrc.gov.on.ca/SourceWaterProtection/index.html

Ontario Geological Survey. (2010). *Surficial Geology of Southern Ontario; Miscellaneous Release – Data 128 – Revised.*

Powers, J. P., Corwin, A. B., Schmall, P. C., & Kaeck, W. E. (2007). *Construction Dewatering and Groundwater Control.*

10.0 Standard Limitations

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A site assessment is created using data and information collected during the investigation of a site and based on conditions encountered at the time and particular locations at which fieldwork is conducted. The information, sample results and data collected represent the conditions only at the specific times at which and at those specific locations from which the information, samples and data were obtained and the information, sample results and data may vary at other locations and times. To the extent that Cambium's work or report considers any locations or times other than those from which information, sample results and data was specifically received, the work or report is based on a reasonable extrapolation from such information, sample results and data but the actual conditions encountered may vary from those extrapolations.

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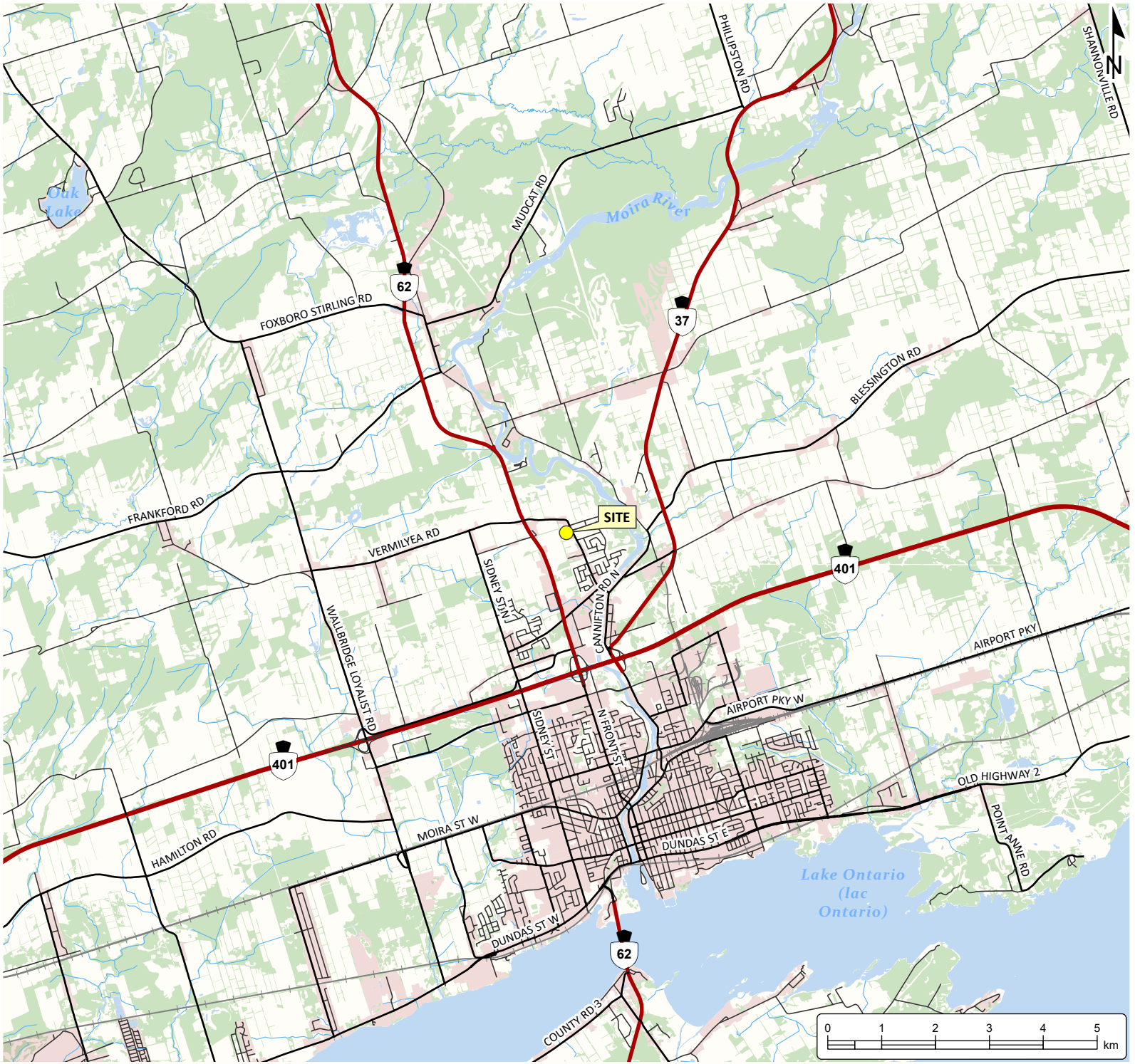
Appended Figures



HYDROGEOLOGICAL ASSESSMENT

GEERTSMA HOMES
Part of Park Lots 8 & 9 Plan 124 Thurlow
as in QR298449 Except Parts 1-6, 21R26096
Belleville, Ontario

LEGEND

- Highway
- Major Road
- Minor Road
- Railway
- Watercourse
- Water Area
- Wooded Area
- Built Up Area

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SITE LOCATION PLAN

Project No.:	21025-001	Date:	October 2024
		Rev.:	
Scale:	1:100,000	Projection:	NAD 1983 UTM Zone 18N
Created by:	NLB	Checked by:	KH
Figure:	1		

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HYDROGEOLOGICAL ASSESSMENT

GEERTSMA HOMES
Part of Park Lots 8 & 9 Plan 124 Thurlow
as in QR298449 Except Parts 1-6, 21R26096
Belleville, Ontario

LEGEND

- Monitoring Well
- Site (approximate)
- City of Belleville Parcels (approximate)

Notes:
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SITE PLAN AND MONITORING WELL LOCATIONS

Project No.: 21025-001		Date: October 2024	Rev.:
Scale: 1:2,000		Projection: NAD 1983 UTM Zone 18N	
Created by: NLB	Checked by: KH	Figure: 2	

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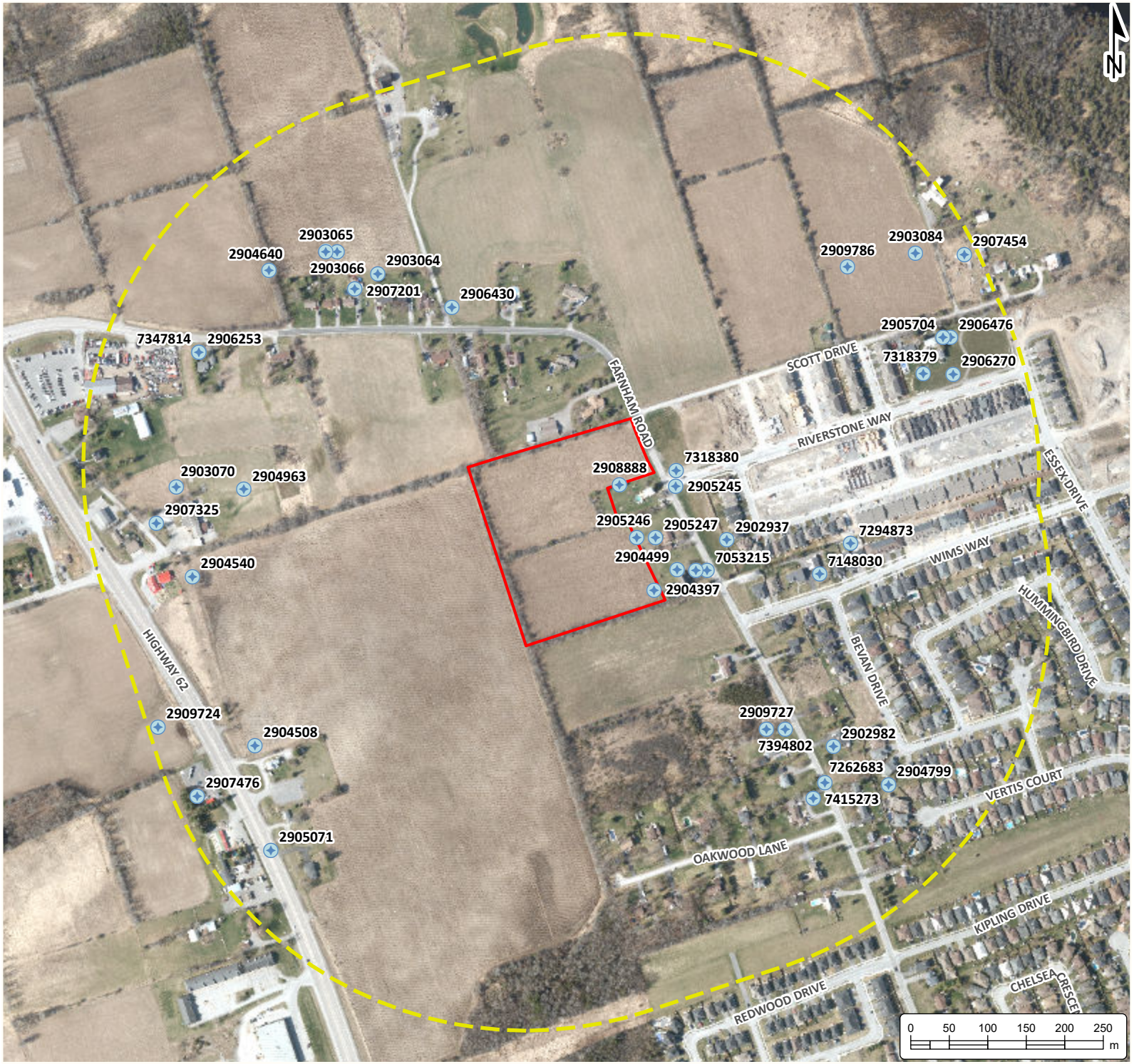

HYDROGEOLOGICAL ASSESSMENT

GEERTSMA HOMES
Part of Park Lots 8 & 9 Plan 124 Thurlow
as in QR298449 Except Parts 1-6, 21R26096
Belleville, Ontario

LEGEND

- Ministry Water Well Record
- Site (approximate)
- 500m Study Area

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SITE PLAN AND MONITORING WELL LOCATIONS

Project No.: 21025-001		Date: October 2024	Rev.:
Scale: 1:7,000		Projection: NAD 1983 UTM Zone 18N	
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Appendix A

Proposed Development Plan and Land Information

PARK MEADOW COURT SUBDIVISION

CLIENT: ANDY GEERTSMA, GCL DEVELOPMENTS LTD.

PROJECT LOCATION

MAP SCALE: N/A

CONTENTS	
PAGE	TITLE
ENG-DP	DRAFT PLAN OF SUBDIVISION
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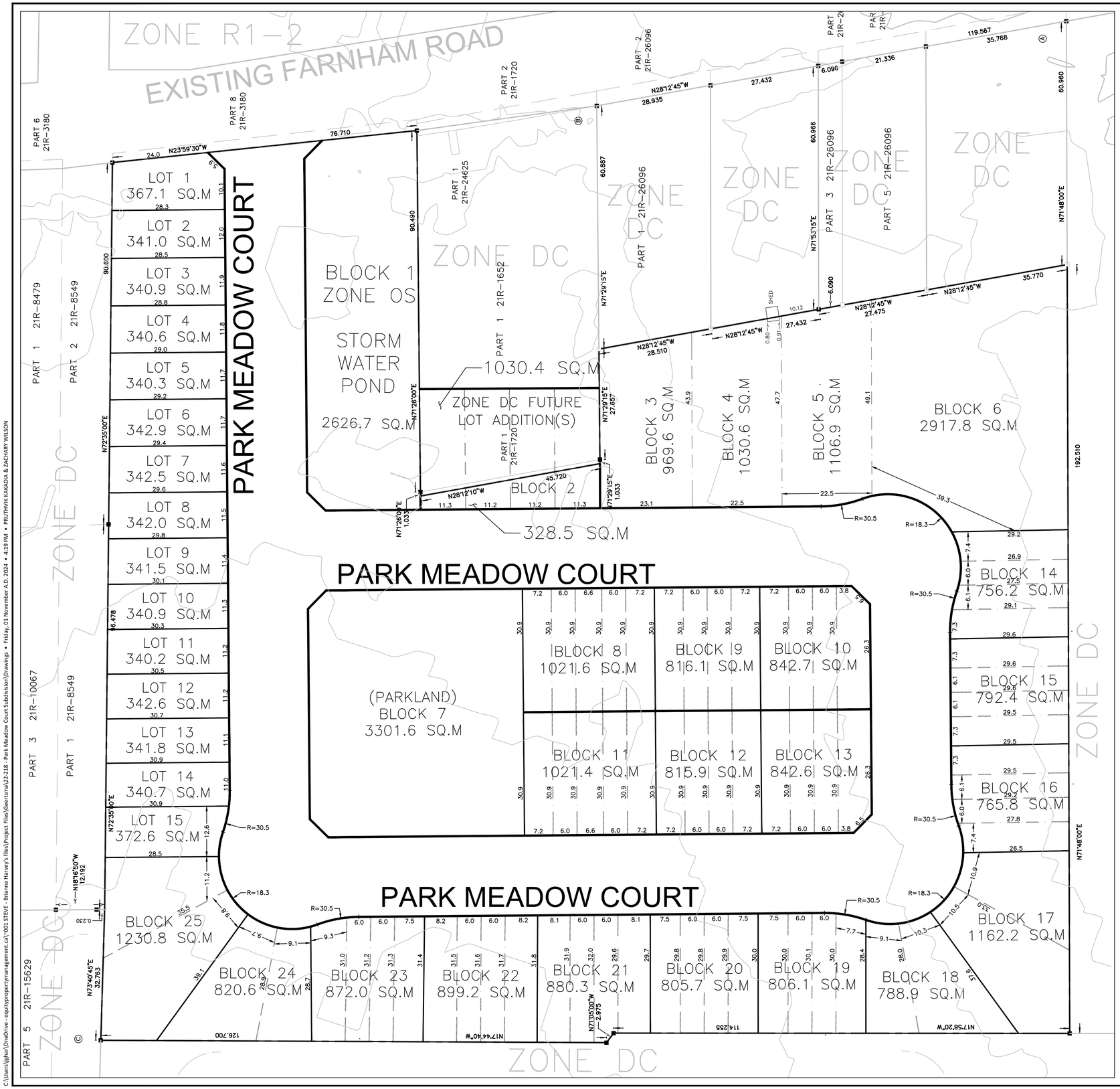
ENG-GR	SITE GRADING
ENG-002	GENERAL SUBDIVISION LAYOUT - DIMENSIONS
ENG-003	SERVICING LAYOUT
ENG-004	SERVICING LAYOUT - CONNECTION TO RIVERSTONE
ENG-005	SANITARY DRAINAGE AREAS
ENG-006	STORMWATER MANAGEMENT - WET POND - SITE PLAN

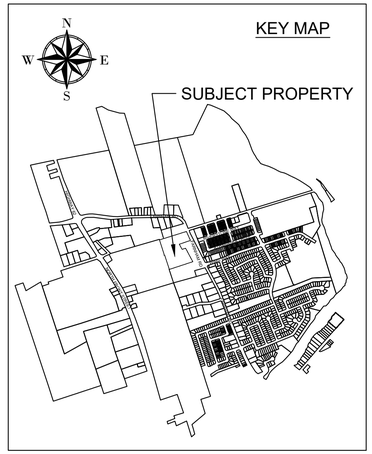
ACADIA ENGINEERING

EMPTY FIELD, BELLEVILLE, ON K8N 4Z5
PART OF PARK LOTS 8 & 9 PLAN 124 THURLOW AS IN QR298449, EXCEPT
PARTS 1, 2, 3, 4, 5 & 6, 21R26096; CITY OF BELLEVILLE; COUNTY OF HASTINGS

PROJECT NO. 22 - 218

07 - NOVEMBER - 2022





DRAFT PLAN OF SUBDIVISION

PARK MEADOW COURT SUBDIVISION

PART 1, REGISTERED PLAN 21R - 6106

PART 5, REGISTERED PLAN 21R - 15629

PART OF PART 3, REGISTERED PLAN 21R - 10067

PART 1, REGISTERED PLAN 21R - 8549

PART OF PART 1, REGISTERED PLAN 21R - 8479

PART 2, REGISTERED PLAN 21R - 8549

PART OF PART 6 & 8, REGISTERED PLAN 21R - 3180

PART 1 & 2, REGISTERED PLAN 21R - 1720

PART 1, REGISTERED PLAN 21R - 1652

PART 1,2,3,4,5 & 6, REGISTERED PLAN 21R - 26096

PART 13, REGISTERED PLAN 21R - 3180

GEOGRAPHIC TOWNSHIP OF THURLOW, NOW IN THE
CITY OF BELLEVILLE,
COUNTY OF HASTINGS

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

(a) SEE SURVEYORS CERTIFICATE
(b) AS SHOWN ON DRAFT PLAN
(c) AS SHOWN ON DRAFT PLAN
(d) SEE LAND USE SUMMARY
(e) SEE DRAFT PLAN
(f) AS SHOWN ON DRAFT PLAN
(g) AS SHOWN ON DRAFT PLAN
(h) MUNICIPAL WATER AND SANITARY SEWER
(i) SILTY SAND WITH TRACE GRAVEL
(j) AS SHOWN ON THE DRAFT PLAN
(k) GARBAGE COLLECTION,FIRE PROTECTION,ROAD MAINTENANCE, SCHOOL BUSES, ETC.
(l)AS SHOWN ON DRAFT PLAN

METRIC NOTE:

DISTANCES SHOWN ON THIS PLAN ARE IN METERS AND CAN BE CONVERTED TO FEET BY DIVIDING BY 0.3048

CONTOURS NOTE:

CONTOURS PREPARED USING LIDAR DATA. CONTOURS DRAWN AT INTERVALS OF 1.0m x 5.0m

LAND USE SUMMARY

LAND USE	AREA	AREA (%)	UNITS
SINGLE DETACHED UNITS LOTS 1-10 (MIN. 440.3m²)	3,439.7m²	7.5	10
STORM WATER POND BLOCK 1	2,626.7m²	5.7	-
SINGLE MULTI-STOREY TOWNHOUSES BLOCK 8-10 (MIN. 605.9m²)	2,680.4m²	5.9	13
FOUR-UNIT DWELLING BLOCKS 3-5 (MIN. 910.0m²)	3,107.1m²	6.8	12
STACKED TOWNHOUSES BLOCKS 6 (MIN. 2,584.0m²)	2,917.8m²	6.4	16
FUTURE SINGLE DETACHED UNITS LOTS 11-15 & BLOCK 2 (MIN. 420.5m²)	2,066.4m²	4.5	9
PARKLAND BLOCK 7	3,301.6m²	7.2	-
FUTURE SINGLE MULTI-STOREY TOWNHOUSES BLOCKS 11-16,19-23 (MIN. 2,584.0m²)	9,257.6m²	20.2	45
FUTURE SINGLE SEMI DETACHED UNITS BLOCKS 17,18,24 & 25 (MIN. 803.1m²)	4,002.5m²	8.8	8
MUNICIPAL ROAD ALLOWANCE STREET A & B - 20.0m (LENGTH 604.6m)	12,349.7m²	27.0	-
TOTAL	45,749.5m²	100.0	113

SURVEYOR'S CERTIFICATE :

I CERTIFY THAT :

1. THIS SURVEY AND PLAN ARE CORRECT AND IN ACCORDANCE WITH THE SURVEYS ACT, THE SURVEYORS ACT AND THE LAND TITLES ACT AND THE REGULATIONS MADE UNDER THEM.
2. THE SURVEY WAS COMPLETED ON THE

KEITH WATSON
ONTARIO LAND SURVEYOR

THIS PLAN OF SURVEY RELATES TO AOLS PLAN SUBMISSION FORM NUMBER

218 CHURCH STREET, BELLEVILLE, ONTARIO
WATSON LAND SURVEYORS Ltd.
K8N – 3C3 (613) 962 – 9521
PROJECT N 2

ARROW:

STAMP:

001	SUBMITTED FOR CLIENT REVIEW	ZAW	2024/11/01
000	SUBMITTED FOR CLIENT REVIEW	PPK	2024/10/01
REV:	DESCRIPTION:	BY:	YYYY/MM/DD

STATUS: REVIEW

ACADIA ENGINEERING
121 Dundas St E, Suite 103A,
Belleville, Ontario K8N 1C3
1 (613) 921-8656

CLIENT:
ANDY GEERTSMA, GCL DEVELOPMENTS LTD.
UNIT 3, MAITLAND PLAZA, 406 MAITLAND DRIVE, BELLEVILLE, ON K8N 0N3

ENGINEER:
Steve Harvey, P.Eng

SITE:
PARK MEADOW COURT SUBDIVISION,
BELLEVILLE, ON K8N 4Z5

TITLE:
DRAFT PLAN OF SUBDIVISION

SCALE AT 22in x 34in:	DATE:	DRAWN:	CHECKED:
1:500	2024/01/12	PPK	SGH

PROJECT NO:	REVISION:	DRAWING NO:
22-218	000	ENG-DP

C:\Users\jghan\OneDrive - equitypropertymanagement.ca\~001 STEVE - Brianne Harvey's files\Project Files\Geertsma\22-218 - Park Meadow Court Subdivision\Drawings • Friday, 01 November A.D. 2024 • 4:19 PM • PRUTHVIK KAKADIA & ZACHARY WILSON

ALL UNITS ARE IN METRES UNLESS OTHERWISE NOTED. PAGE SIZE: ANSI D - 22in. X 34in.

NOT FOR CONSTRUCTION

FARNHAM RD

SCOTT DR

OAKWOOD DR

FARNHAM RD

4A

7A

4B

SA27

SA26

SA25

SA20

EXISTING LEGEND PROPOSED

DRAINAGE AREA

SUBJECT SITE

DRAINAGE DIRECTION

ARROW:

N

W E

S

STAMP:

LICENSED PROFESSIONAL ENGINEER
J. G. S. HARVEY
100164934
PROVINCE OF ONTARIO
March 26, 24

REV:	DESCRIPTION:	BY:	YYYY/MM/DD
005	SUBMITTED FOR MUNICIPAL REVIEW	ACB	2024/03/26
004	SUBMITTED FOR CLIENT REVIEW	ACB	2024/03/13
003	SUBMITTED FOR MUNICIPAL REVIEW	ACB	2024/02/27
002	SUBMITTED FOR MUNICIPAL REVIEW	ACB	2024/01/24
001	SUBMITTED FOR CLIENT REVIEW	ACB	2024/01/12

STATUS: REVIEW

ACADIA ENGINEERING
121 Dundas St E, Suite 103A,
Belleville, Ontario K8N 1C3
1 (613) 921-8656

CLIENT:
ANDY GEERTSMA, GCL DEVELOPMENTS LTD.
UNIT 3, MAITLAND PLAZA, 406 MAITLAND DRIVE, BELLEVILLE, ON K8N 0N3

ENGINEER:
Steve Harvey, P.Eng

SITE:
HOGAN SUBDIVISION, BELLEVILLE, ON K8N 4Z5

TITLE:
LIDAR CONTOURS

SCALE AT 22in x 34in:	DATE:	DRAWN:	CHECKED:
1:2000	2023/03/10	PPK & ACB	SGH

PROJECT NO.	REVISION:	DRAWING NO.
22-218	005	LID - 001

ALL UNITS ARE IN METRES UNLESS OTHERWISE NOTED. PAGE SIZE: ANSI D - 22in. X 34in.

NOT FOR CONSTRUCTION

EXISTING FARNHAM ROAD

STREET 'A'

PHASE 3: 0.14 HECTARES
4 UNITS

PHASE 1: 2.32 HECTARES
STREET 'B'
35 UNITS

STREET 'B'

PROP. PHASE 1 & 2 BOUNDARY LINE

STREET 'A'

PHASE 2: 2.19 HECTARES
STREET 'B'
64 UNITS

EXISTING LEGEND PROPOSED

- PHASE 1 (35 UNITS)
- PHASE 2 (65 UNITS, FUTURE)
- PHASE 3 (4 UNITS, FUTURE)

ARROW:

STAMP: LICENSED PROFESSIONAL ENGINEER — J. G. S. HARVEY — 100164994 — PROVINCE OF ONTARIO

004	SUBMITTED FOR MUNICIPAL REVIEW	ACB	2024/03/26
003	SUBMITTED FOR CLIENT REVIEW	ACB	2024/03/13
002	SUBMITTED FOR MUNICIPAL REVIEW	ACB	2024/02/27
001	SUBMITTED FOR MUNICIPAL REVIEW	ACB	2024/01/24
000	SUBMITTED FOR CLIENT REVIEW	ACB	2024/01/12
REV:	DESCRIPTION:	BY:	YYYY/MM/DD

STATUS: REVIEW

ACADIA ENGINEERING
121 Dundas St E, Suite 103A,
Belleville, Ontario K8N 1C3
1 (613) 921-8656

CLIENT: ANDY GEERTSMA, GCL DEVELOPMENTS LTD. UNIT 3, MAITLAND PLAZA, 406 MAITLAND DRIVE, BELLEVILLE, ON K8N 0N3

ENGINEER: Steve Harvey, P.Eng

SITE: HOGAN SUBDIVISION, BELLEVILLE, ON K8N 4Z5

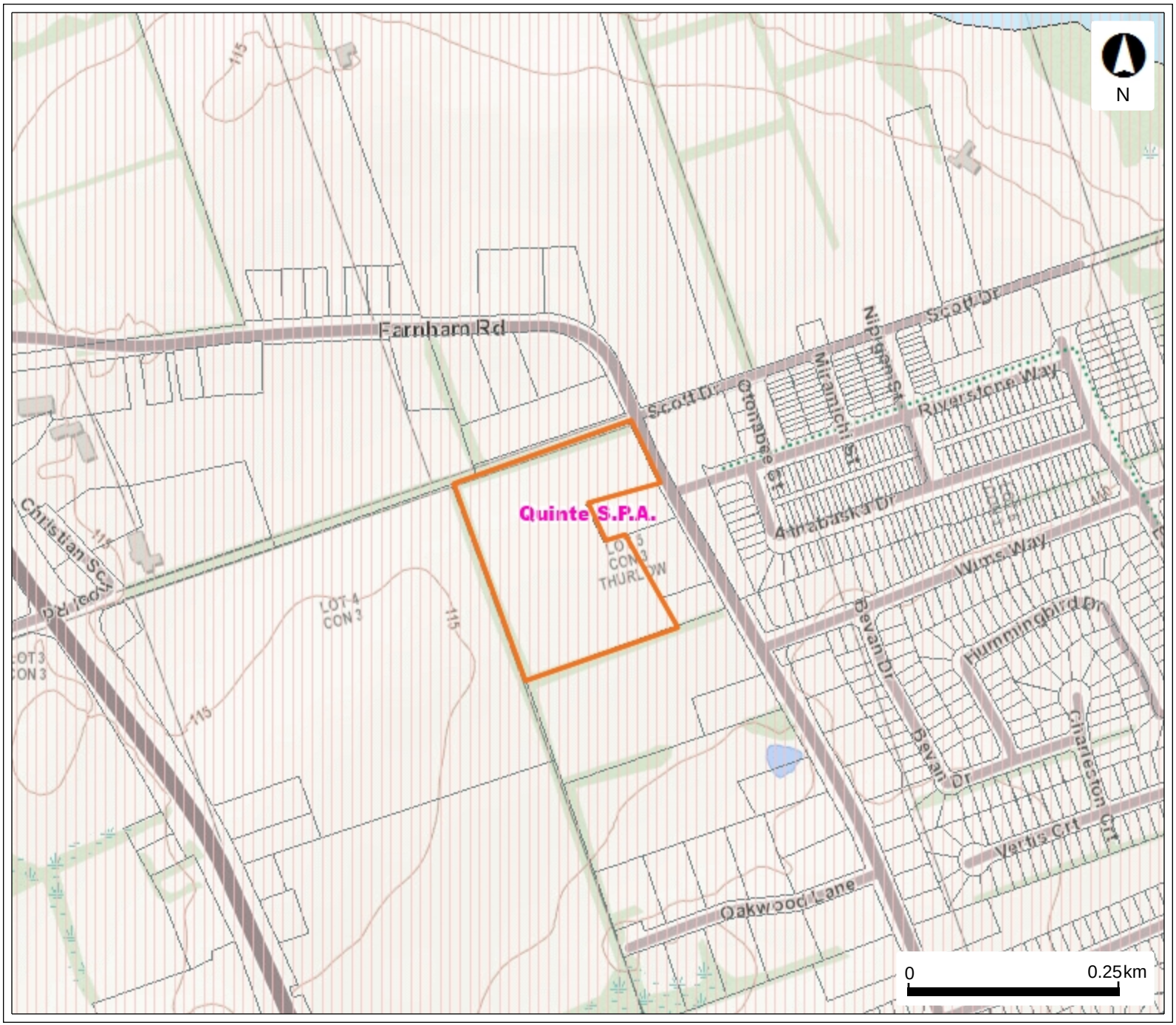
TITLE: PHASING LAYOUT

SCALE AT 22in x 34in:	DATE:	DRAWN:	CHECKED:
1:500	2024/01/12	ACB,PPK, MAH	SGH

PROJECT NO:	REVISION:	DRAWING NO:
22-218	004	PHL-001

ALL UNITS ARE IN METRES UNLESS OTHERWISE NOTED. PAGE SIZE: ANSI D - 22in. X 34in.

MECP SPIA Map (orange polygon denotes the site boundary)



Legend

- Intake Protection Zone Q
- Wellhead Protection Area Q1
- Wellhead Protection Area Q2
- Significant Groundwater Recharge Area
  - N/A
  - 0
  - 2
  - 4
  - 6
- Issue Contributing Areas
- Highly Vulnerable Aquifers
- WHPA-E
- Wellhead Protection Area
  - A
  - B
  - C
  - C1
  - D
  - F
- Intake Protection Zone 1
- Event Based Areas
- Intake Protection Zone 2
- Intake Protection Zone 3
- Source Protection Areas
- Assessment Parcel

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Environment, Conservation and Parks (MECP) shall not be liable in any way for the use or any information on this map. of, or reliance upon, this map.

Ontario

Map Created: 10/3/2024
Map Center: 44.21552 N, -77.40226 W

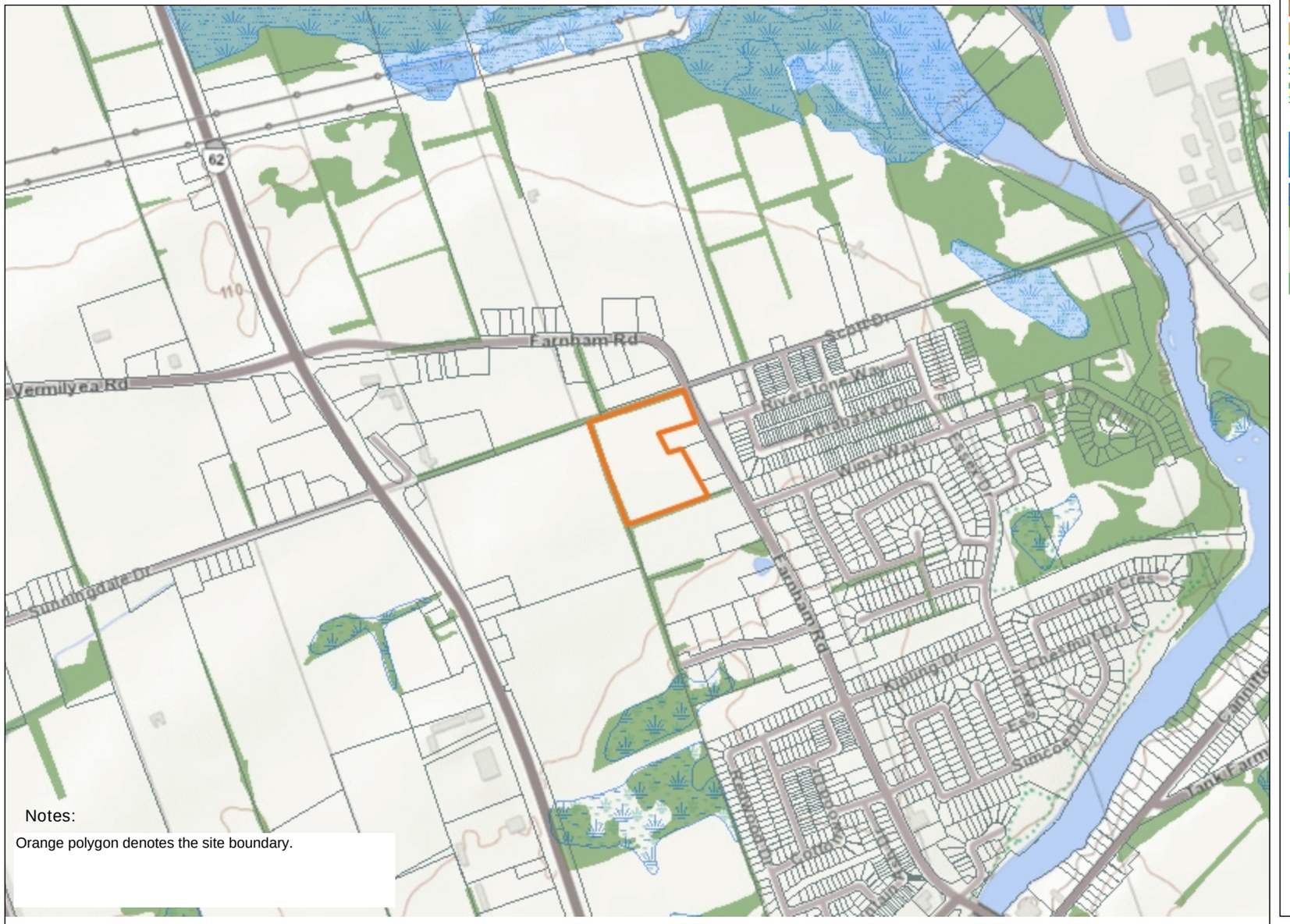
Ontario

Ministry of Natural Resources

Make-a-Map: Natural Heritage Areas

MNRF Natural Heritage Areas Map

Map created:10/3/2024



Notes:

Orange polygon denotes the site boundary.

Legend

- Assessment Parcel
- ANSI
- Earth Science Provincially Significant/sciences de la terre d'importance provinciale
- Earth Science Regionally Significant/sciences de la terre d'importance régionale
- Life Science Provincially Significant/sciences de la vie d'importance provinciale
- Life Science Regionally Significant/sciences de la vie d'importance régionale
- Evaluated Wetland
- Provincially Significant/considérée d'importance provinciale
- Non-Provincially Significant/non considérée d'importance provinciale
- Unevaluated Wetland
- Woodland
- Conservation Reserve
- Provincial Park
- Natural Heritage System

0.7 0 0.33 0.7 Kilometres

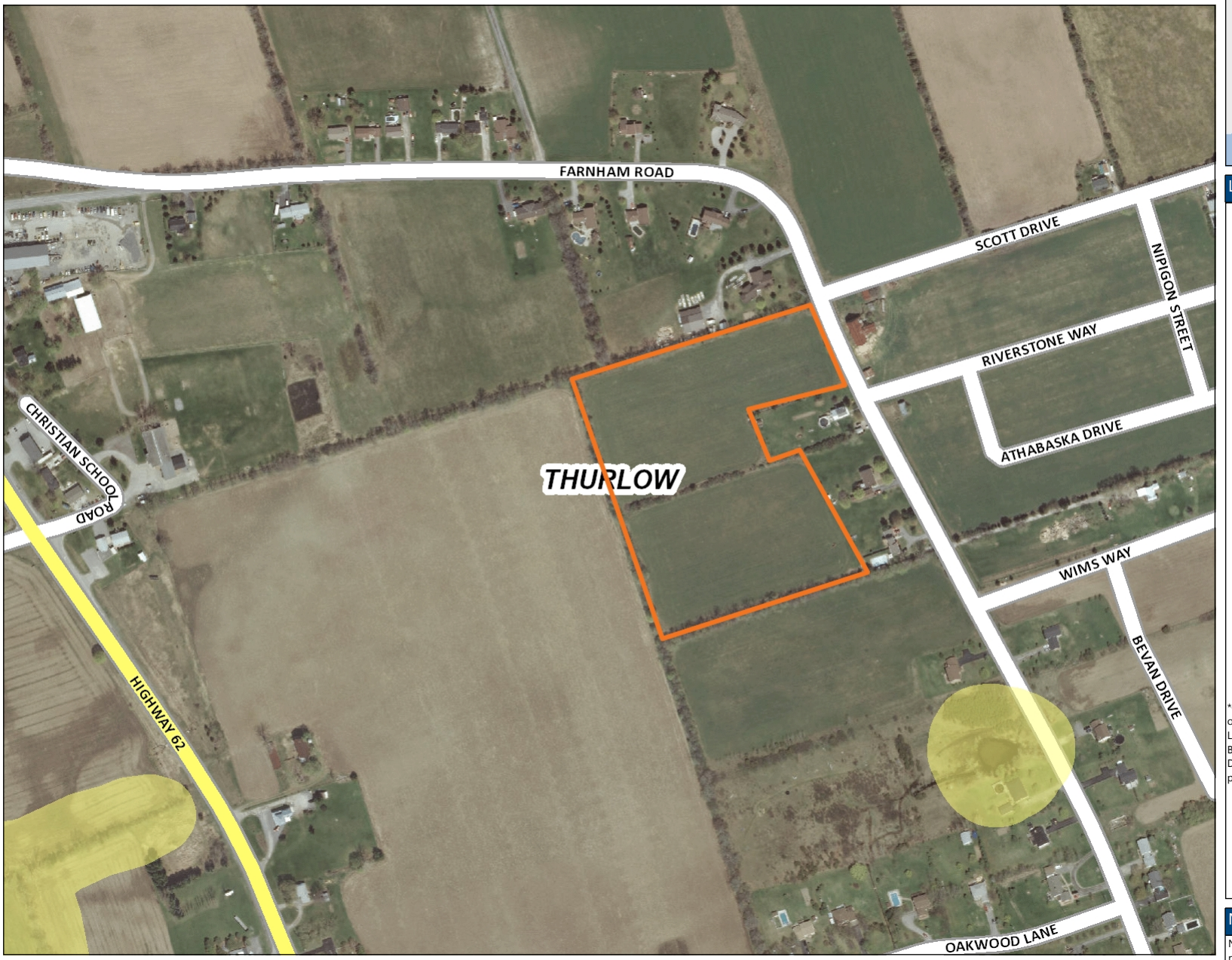
Absence of a feature in the map does not mean they do not exist in this area.

This map should not be relied on as a precise indicator of routes or locations, nor as a guide to navigation. The Ontario Ministry of Natural Resources(OMNR) shall not be liable in any way for the use of, or reliance upon, this map or any information on this map.

Quinte CONSERVATION

SCREENING LIMIT GIS VIEWER

O. REG. 41/24



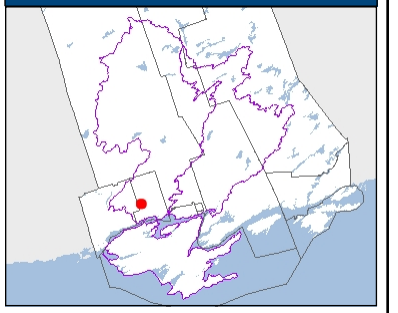
254.0 0 127.00 254.0 Meters

Projection: NAD_1983_UTM_Zone_18N 1: 5,000

Generated: October 03, 2024 @ 12:09 PM Original Document: 8.5" x 11"

NORTH

Key Map



Legend

- Conceptual Regulated Area*
- Quinte Conservation Jurisdiction
- Lower and Single Tier Municipality
- Watercourse

*Conceptual Regulated Area: The Regulated Area includes one or more of the following hazards: Great Lakes, Inland Lakes, Watercourses, Wetlands, Floodplains, Unstable Bedrock, Dynamic Beaches and Areas Subject to Erosion. Development activity is prohibited in these areas without a permit from Quinte Conservation.

Air Photo Capture Year(s):

2008

Notes

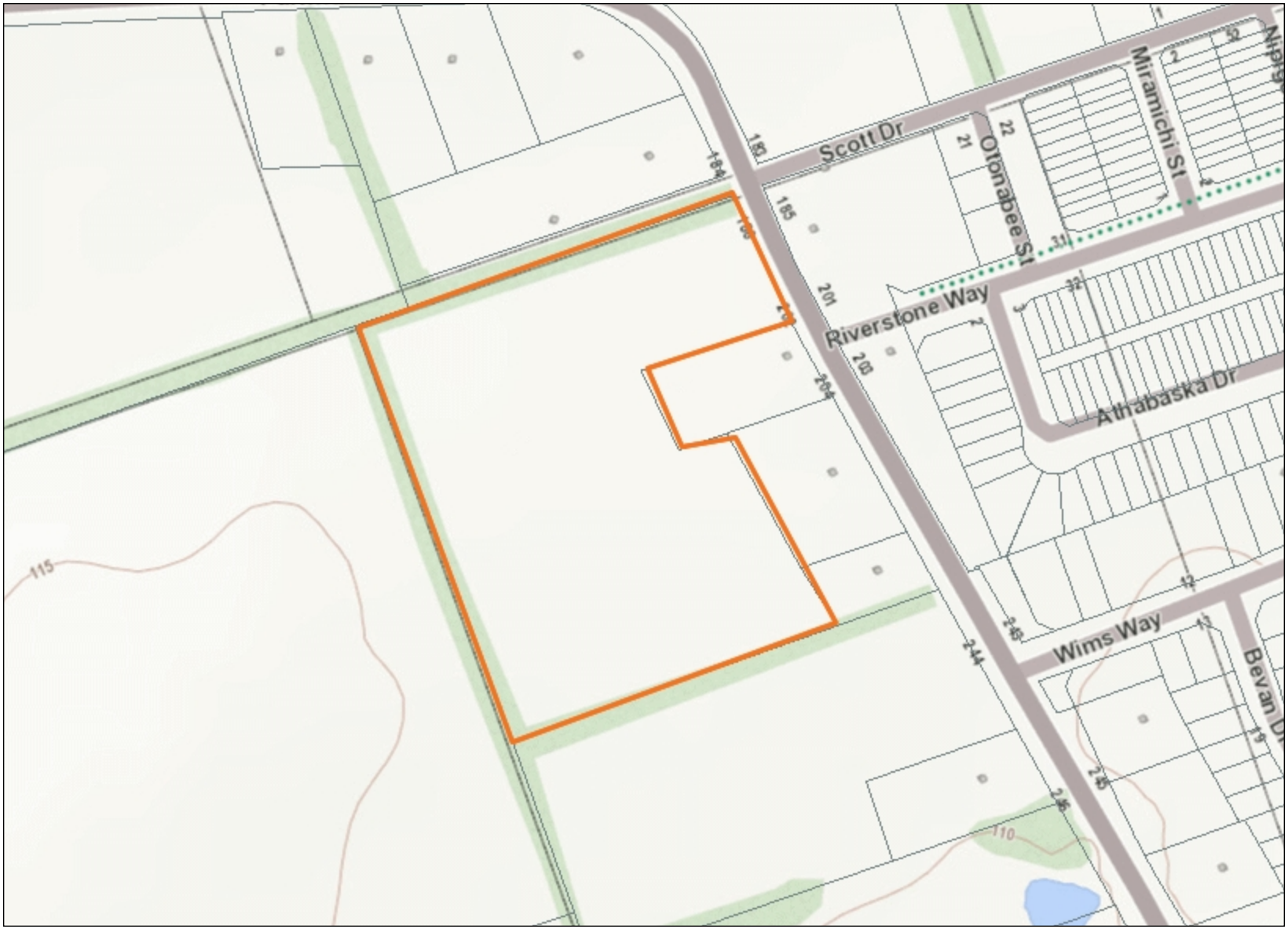
Note: As per Sec. 4. (5) of O. Reg. 41/24, in case of conflict regarding the boundaries of the areas where development activities are prohibited under paragraph 2 of subsection 21 (1) of the Conservation Authorities Act, the description of those areas in that paragraph and in section 2 of this Regulation prevail over the depiction of the areas in the maps referred to in subsection (1) of this section.

Ontario Ministry of Natural Resources

Make a Topographic Map

MNRF Topography Map

Notes:
Orange polygon denotes the site boundary



Legend

- Building as Symbol
- Building to Scale
- Airport
- Heliport \ Hospital Heliport
- Seaplane Base
- Ferry Route
- Trail
- Bruce Trail
- Greenbelt Route
- Rideau Trail
- Trans Canada Trail
- Voyageur Trail
- Waterfront Trail
- Railway \ Train Station
- Railway with Bridge
- Railway with Tunnel
- Road (Major → Minor)
- Winter Road
- Road with Bridge
- Road with Tunnel
- Primary, Kings or 400 Series Highway
- Secondary Highway
- Tertiary Highway
- District, County, Regional or Municipal Road
- Toll Highway
- One Way Road
- Road with Permanent Blocked Passage
- Road with Address Ranges
- Hydro Line, Communication Line or Unknown Transmission Line
- Natural Gas Pipeline, Water Pipeline or Unknown Pipeline
- Spot Height
- Index Contour
- Contour
- Wooded Area
- Wetland
- Waterbody
- Waterbody Elevation
- Watercourse
- Falls
- Rapids
- Rapids \ Falls
- Rapids
- Rocks
- Lock Gate
- Dam \ Hydro Wall
- Dam \ Hydro Wall
- Provincial \ State Boundary
- International Boundary
- Upper Tier \ District Municipal Boundary
- Lower Tier \ Single Tier Municipal Boundary
- Lot Line
- Indian Reserve
- Provincial Park
- National Park
- Conservation Reserve
- Military Lands

0 0.2 km

Projection: Web Mercator

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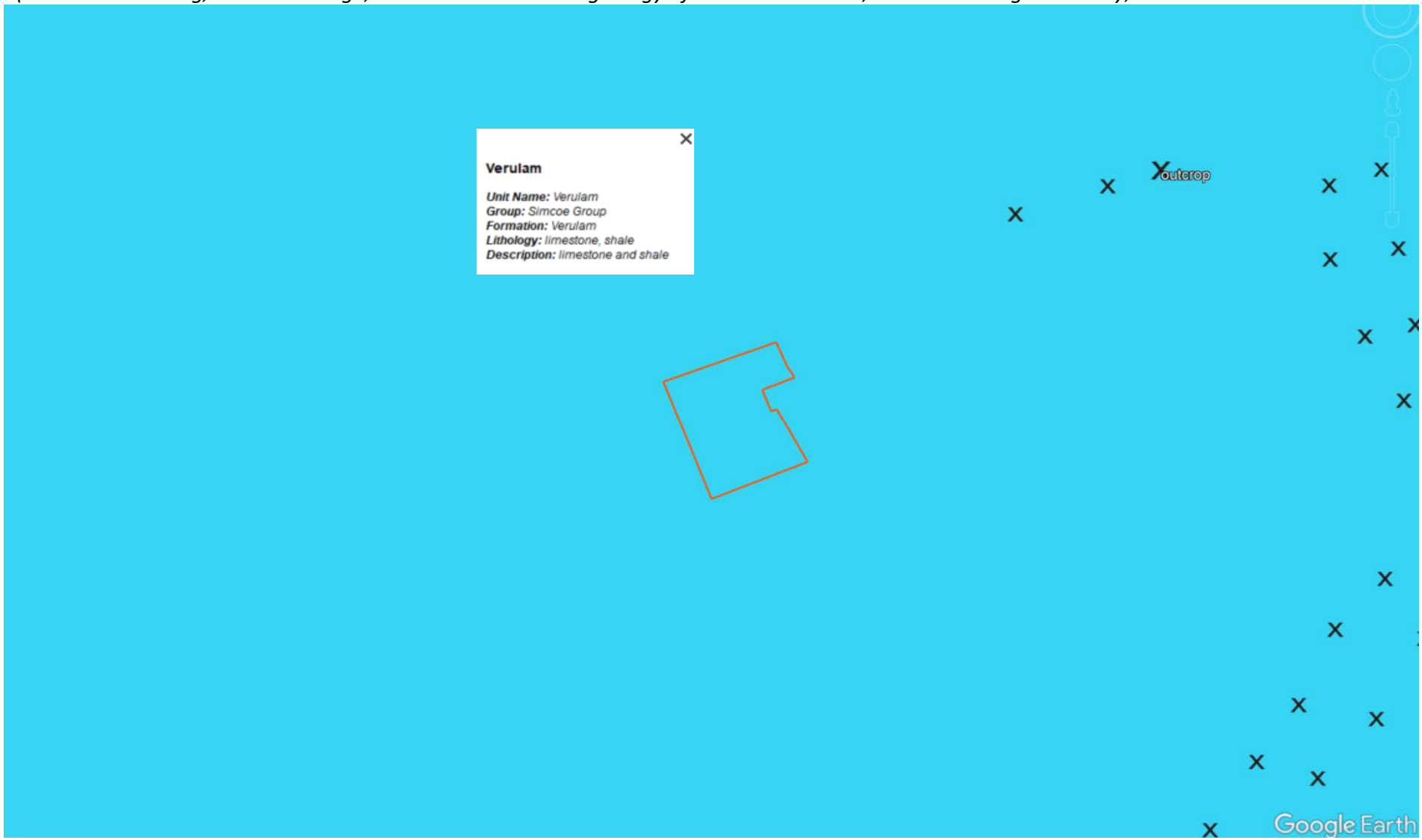
Imagery Copyright Notices: Ontario Ministry of Natural Resources; NASA Landsat Program; First Base Solutions Inc.; Aéro-Photo (1961) Inc.; DigitalGlobe Inc.; U.S. Geological Survey.

Bedrock Geology Map

(Source: Armstrong, D.K. and Dodge, J.E.P. 2007. Paleozoic geology of Southern Ontario; Ontario Geological Survey, Miscellaneous Release – Data 219)

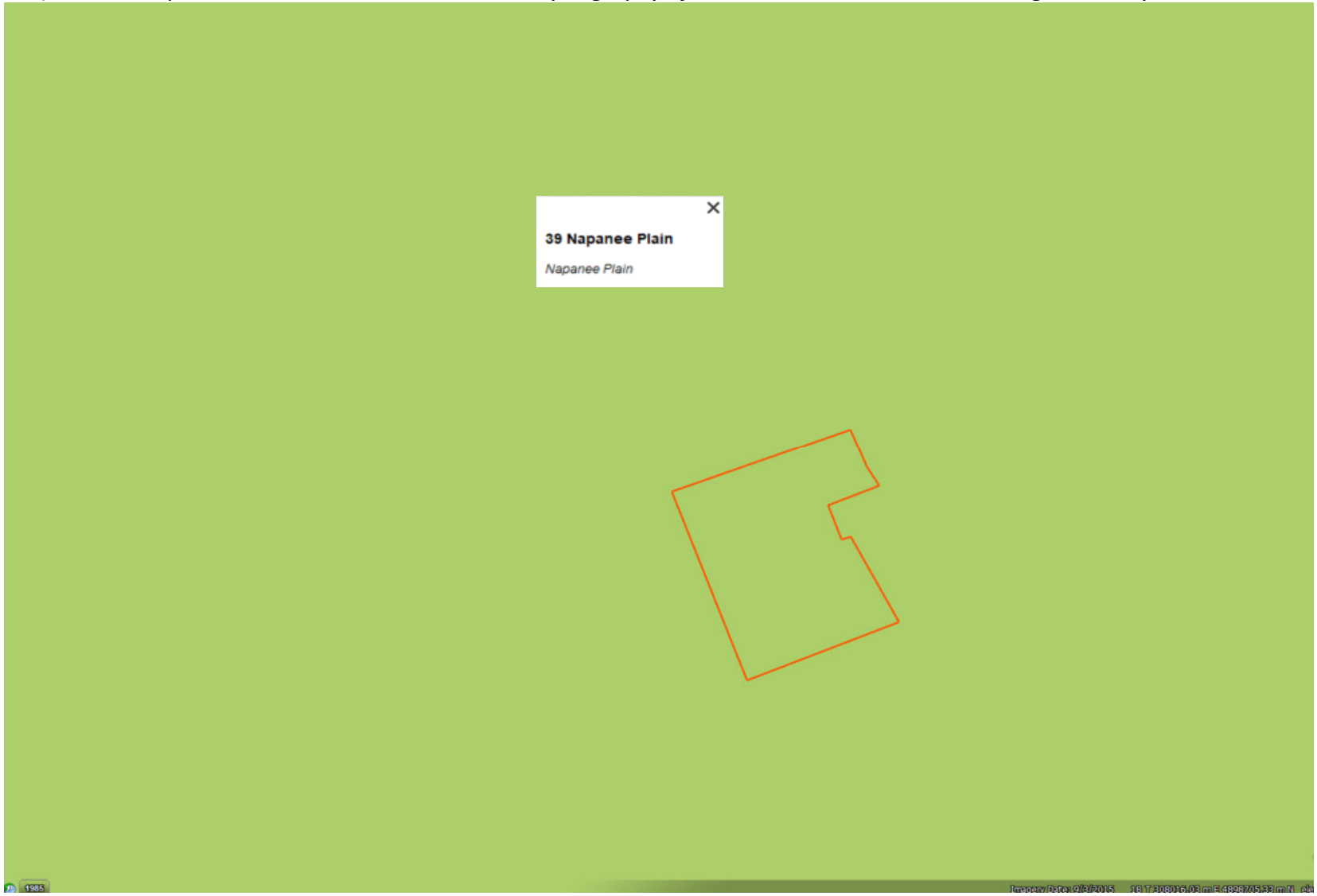


Overburden Geology Map

(Source: Ontario Geological Survey 2010. Surficial Geology of Southern Ontario; Ontario Geological Survey, Miscellaneous Release Data – 128 – REV)

Physiography Map

(Source: Chapman, L.J. and Putnam, D.F. 2007. Physiography of Southern Ontario; Ontario Geological Survey, Miscellaneous Release – Data 228)



Appendix B

MECP Well Records

Water Well Records Summary Repor

Produced by Cambium Inc. using MOECP Water Well Information System (WWIS)

All units in meters unless otherwise specified

Well ID: 2902937
Construction Date: 1965-07-12
Easting: 308277
Northing: 4898549
UTM Zone 18
Positional Accuracy: margin of error : 100 m - 300 m

Well Depth:	18.0	**Water Kind**	FRESH	**Pump Rate (LPM):**	45
Well Diameter (cm):	15.24	**Final Status**	Water Supply	**Recommended Pump Rate:**	23
Water First Found:	12.2	**Primary Water Use:**	Livestock	**Pumping Duration (h:m):**	1 : 0
Static Level:	6				

Layer:	Driller's Description:	Top:	Bottom:
1	GRAVEL	0.00	2.74
2	LIMESTONE	2.74	3.96
3	LIMESTONE	3.96	17.98

Well ID: 2902982
Construction Date: 1964-02-17
Easting: 308408
Northing: 4898279
UTM Zone 18
Positional Accuracy: margin of error : 100 m - 300 m

Well Depth:	17.1	**Water Kind**	FRESH	**Pump Rate (LPM):**	114
Well Diameter (cm):	15.24	**Final Status**	Water Supply	**Recommended Pump Rate:**	###
Water First Found:	15.9	**Primary Water Use:**	Domestic	**Pumping Duration (h:m):**	2 : 0
Static Level:	11				

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	1.22
2	LIMESTONE	1.22	17.07

Well ID: 2903064
Construction Date: 1962-04-09
Easting: 307822
Northing: 4898919
UTM Zone 18
Positional Accuracy: margin of error : 100 m - 300 m

Well Depth:	12.2	**Water Kind**	FRESH	**Pump Rate (LPM):**	14
Well Diameter (cm):	15.24	**Final Status**	Water Supply	**Recommended Pump Rate:**	9
Water First Found:	9.8	**Primary Water Use:**	Domestic	**Pumping Duration (h:m):**	1 : 0
Static Level:	1				

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	3.35
2	LIMESTONE	3.35	12.19

Well ID: 2903065
Construction Date: 1962-07-24
Easting: 307748
Northing: 4898927
UTM Zone 18
Positional Accuracy: margin of error : 100 m - 300 m

Well Depth:	8.5	**Water Kind**	FRESH	**Pump Rate (LPM):**	14
Well Diameter (cm):	12.70	**Final Status**	Water Supply	**Recommended Pump Rate:**	14
Water First Found:	8.5	**Primary Water Use:**	Domestic	**Pumping Duration (h:m):**	2 : 0
Static Level:	1				

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	3.96
2	LIMESTONE	3.96	8.53

Well ID: 2903066 **Easting:** 307766 **UTM Zone** 18
Construction Date: 1962-07-24 **Northing:** 4898927 **Positional Accuracy:** margin of error : 100 m - 300 m

Well Depth:	8.5	**Water Kind**	FRESH	**Pump Rate (LPM):**	14
Well Diameter (cm):	12.70	**Final Status**	Water Supply	**Recommended Pump Rate:**	14
Water First Found:	8.5	**Primary Water Use:**	Domestic	**Pumping Duration (h:m):**	1 : 0
Static Level:	1				

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	3.96
2	LIMESTONE	3.96	8.53

Well ID: 2903070 **Easting:** 307555 **UTM Zone** 18
Construction Date: 1964-09-14 **Northing:** 4898628 **Positional Accuracy:** margin of error : 100 m - 300 m

Well Depth:	31.1	**Water Kind**	FRESH	**Pump Rate (LPM):**	18
Well Diameter (cm):	15.24	**Final Status**	Water Supply	**Recommended Pump Rate:**	9
Water First Found:	9.1	**Primary Water Use:**	Public	**Pumping Duration (h:m):**	3 : 0
Static Level:	9				

Layer:	Driller's Description:	Top:	Bottom:
1	PREVIOUSLY DUG	0.00	4.57
2	LIMESTONE	4.57	31.09

Well ID: 2903084 **Easting:** 308515 **UTM Zone** 18
Construction Date: 1961-10-13 **Northing:** 4898933 **Positional Accuracy:** margin of error : 100 m - 300 m

Well Depth:	18.3	**Water Kind**	FRESH	**Pump Rate (LPM):**	91
Well Diameter (cm):	15.24	**Final Status**	Water Supply	**Recommended Pump Rate:**	45
Water First Found:	18.3	**Primary Water Use:**	Domestic	**Pumping Duration (h:m):**	1 : 0
Static Level:	5				

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	1.52
2	LIMESTONE	1.52	18.29

Well ID: 2904397 **Easting:** 308180 **UTM Zone** 18
Construction Date: 1970-01-13 **Northing:** 4898501 **Positional Accuracy:** margin of error : 30 m - 100 m

Well Depth:	11.0	**Water Kind**	FRESH	**Pump Rate (LPM):**	91
Well Diameter (cm):		**Final Status**	Water Supply	**Recommended Pump Rate:**	55
Water First Found:	5.5	**Primary Water Use:**	Domestic	**Pumping Duration (h:m):**	4 : 0
Static Level:	4				

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	2.13
	CLAY		
2	LIMESTONE	2.13	10.97
	LIMESTONE		

Well ID: 2904499 **Easting:** 308210 **UTM Zone** 18
Construction Date: 1970-05-25 **Northing:** 4898511 **Positional Accuracy:** margin of error : 30 m - 100 m

Well Depth:	34.4	**Water Kind**		**Pump Rate (LPM):**	
Well Diameter (cm):	15.24	**Final Status**	Abandoned-Su	**Recommended Pump Rate:**	
Water First Found:		**Primary Water Use:**		**Pumping Duration (h:m):**	
Static Level:					

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	2.13

2	LIMESTONE	2.13	34.44

Well ID: 2904508
Construction Date: 1970-05-25
Easting: 307660
Northing: 4898281
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 16.2
Well Diameter (cm): 15.24
Water First Found: 14.3
Static Level: 8
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 91
Recommended Pump Rate: 91
Pumping Duration (h:m): 1 : 30

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	1.22
2	HARDPAN	1.22	8.23
3	LIMESTONE	8.23	16.15

Well ID: 2904540
Construction Date: 1970-06-03
Easting: 307580
Northing: 4898521
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 13.4
Well Diameter (cm): 15.24
Water First Found: 12.2
Static Level: 4
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 91
Recommended Pump Rate: 45
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	MEDIUM SAND	0.00	0.91
	MEDIUM SAND		
2	CLAY	0.91	6.10
	CLAY		
3	LIMESTONE	6.10	13.41
	LIMESTONE		

Well ID: 2904640
Construction Date: 1970-12-16
Easting: 307680
Northing: 4898921
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 9.8
Well Diameter (cm):
Water First Found: 8.5
Static Level: 3
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 23
Recommended Pump Rate: 23
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	3.35
	CLAY		
2	SHALE	3.35	9.75
	SHALE		

Well ID: 2904799
Construction Date: 1971-02-25
Easting: 308480
Northing: 4898241
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 15.2
Well Diameter (cm): 15.24
Water First Found: 14.3
Static Level: 12
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 27
Recommended Pump Rate: 27
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	2.44
2	LIMESTONE	2.44	15.24

Well ID: 2904963
Construction Date: 1971-06-02
Easting: 307650
Northing: 4898631
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 12.8
Well Diameter (cm): 15.24
Water First Found: 12.2
Static Level: 6
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 45
Recommended Pump Rate: 45
Pumping Duration (h:m): 0 : 30

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	5.79
2	LIMESTONE	5.79	12.80

Well ID: 2905071
Construction Date: 1971-11-29
Easting: 307680
Northing: 4898151
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 16.5
Well Diameter (cm): 15.24
Water First Found: 14.6
Static Level: 9
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 23
Recommended Pump Rate: 23
Pumping Duration (h:m): 2 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0.00	0.61
2	HARDPAN	0.61	6.10
3	LIMESTONE	6.10	16.46

Well ID: 2905245
Construction Date: 1972-05-11
Easting: 308205
Northing: 4898621
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 16.2
Well Diameter (cm): 15.24
Water First Found: 8.5
Static Level: 5
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 36
Recommended Pump Rate: 23
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	1.83
2	LIMESTONE	1.83	16.15

Well ID: 2905246
Construction Date: 1972-05-11
Easting: 308155
Northing: 4898571
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 22.9
Well Diameter (cm):
Water First Found:
Static Level:
Water Kind
Final Status Abandoned-Su
Primary Water Use:
Pump Rate (LPM):
Recommended Pump Rate:
Pumping Duration (h:m):

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	1.83
2	LIMESTONE	1.83	22.86

Well ID: 2905247
Construction Date: 1972-05-11
Easting: 308180
Northing: 4898571
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 35.1
Well Diameter (cm):
Water First Found:
Static Level:
Water Kind
Final Status Abandoned-Su
Primary Water Use:
Pump Rate (LPM):
Recommended Pump Rate:
Pumping Duration (h:m):

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	1.83
2	LIMESTONE	1.83	35.05

Well ID: 2905704
Construction Date: 1973-04-03
Easting: 308555
Northing: 4898821
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 9.1
Well Diameter (cm): 15.24
Water First Found: 7.9
Static Level: 4
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 91
Recommended Pump Rate: 45
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	0.91
2	LIMESTONE	0.91	9.14

Well ID: 2906253
Construction Date: 1974-02-27
Easting: 307590
Northing: 4898800
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 15.2
Well Diameter (cm): 15.24
Water First Found: 7.9
Static Level: 1
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 136
Recommended Pump Rate: ###
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	1.22
2	HARDPAN	1.22	3.35
3	BOULDERS	3.35	3.66
4	LIMESTONE	3.66	15.24

Well ID: 2906270
Construction Date: 1974-04-15
Easting: 308571
Northing: 4898768
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 11.3
Well Diameter (cm): 15.24
Water First Found: 5.5
Static Level: 5
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 91
Recommended Pump Rate: 91
Pumping Duration (h:m): :

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0.00	0.61
2	GRAVEL	0.61	1.22
3	LIMESTONE	1.22	5.49
4	LIMESTONE	5.49	11.28

Well ID: 2906430
Construction Date: 1974-07-11
Easting: 307916
Northing: 4898863
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 10.1
Well Diameter (cm): 15.24
Water First Found: 6.1
Static Level: 3
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 23
Recommended Pump Rate: 23
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	2.74
2	LIMESTONE	2.74	10.06

Well ID: 2906476 **Easting:** 308559 **UTM Zone** 18
Construction Date: 1974-08-12 **Northing:** 4898819 **Positional Accuracy:** margin of error : 30 m - 100 m

Well Depth:	13.7	**Water Kind**	FRESH	**Pump Rate (LPM):**	9
Well Diameter (cm):	15.24	**Final Status**	Water Supply	**Recommended Pump Rate:**	9
Water First Found:	11.6	**Primary Water Use:**	Domestic	**Pumping Duration (h:m):**	1 : 0
Static Level:	4				

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	1.52
2	LIMESTONE	1.52	13.72

Well ID: 2907201 **Easting:** 307785 **UTM Zone** 18
Construction Date: 1976-01-08 **Northing:** 4898880 **Positional Accuracy:** margin of error : 30 m - 100 m

Well Depth:	11.6	**Water Kind**	FRESH	**Pump Rate (LPM):**	14
Well Diameter (cm):	15.24	**Final Status**	Water Supply	**Recommended Pump Rate:**	9
Water First Found:	8.8	**Primary Water Use:**	Domestic	**Pumping Duration (h:m):**	1 : 15
Static Level:	5				

Layer:	Driller's Description:	Top:	Bottom:
1	PREVIOUSLY DUG	0.00	1.22
	PREVIOUSLY DUG		
2	CLAY	1.22	3.35
	CLAY		
3	LIMESTONE	3.35	11.58
	LIMESTONE		

Well ID: 2907325 **Easting:** 307530 **UTM Zone** 18
Construction Date: 1976-03-15 **Northing:** 4898571 **Positional Accuracy:** margin of error : 100 m - 300 m

Well Depth:	9.8	**Water Kind**	FRESH	**Pump Rate (LPM):**	91
Well Diameter (cm):		**Final Status**	Water Supply	**Recommended Pump Rate:**	91
Water First Found:	7.0	**Primary Water Use:**	Commerical	**Pumping Duration (h:m):**	1 : 0
Static Level:	5				

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	3.66
	CLAY		
2	CLAY	3.66	7.01
	CLAY		
3	LIMESTONE	7.01	9.75
	LIMESTONE		

Well ID: 2907454 **Easting:** 308580 **UTM Zone** 18
Construction Date: 1976-05-28 **Northing:** 4898921 **Positional Accuracy:** margin of error : 100 m - 300 m

Well Depth:	13.7	**Water Kind**	FRESH	**Pump Rate (LPM):**	14
Well Diameter (cm):	15.24	**Final Status**	Water Supply	**Recommended Pump Rate:**	14
Water First Found:	10.7	**Primary Water Use:**	Domestic	**Pumping Duration (h:m):**	1 : 0
Static Level:	6				

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0.00	1.52
2	LIMESTONE	1.52	13.72

Well ID: 2907476
Construction Date: 1976-06-09
Easting: 307580
Northing: 4898221
UTM Zone 18
Positional Accuracy: margin of error : 100 m - 300 m

Well Depth: 14.0
Well Diameter (cm): 15.24
Water First Found: 7.6
Static Level: 7
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Livestock
Pump Rate (LPM): 205
Recommended Pump Rate: 45
Pumping Duration (h:m): 1 : 15

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	7.62
2	GRANITE	7.62	14.02

Well ID: 2908888
Construction Date: 1979-01-25
Easting: 308130
Northing: 4898621
UTM Zone 18
Positional Accuracy: margin of error : 100 m - 300 m

Well Depth: 15.2
Well Diameter (cm): 15.24
Water First Found: 12.2
Static Level: 5
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 14
Recommended Pump Rate: 14
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0.00	3.96
2	LIMESTONE	3.96	15.24

Well ID: 2909727
Construction Date: 1981-01-22
Easting: 308329
Northing: 4898320
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 21.6
Well Diameter (cm): 15.24
Water First Found: 8.5
Static Level: 12
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 27
Recommended Pump Rate: 27
Pumping Duration (h:m): 2 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	1.22
2	HARDPAN	1.22	2.44
3	SHALE	2.44	3.35
4	LIMESTONE	3.35	21.64

Well ID: 2909786
Construction Date: 1981-04-23
Easting: 308429
Northing: 4898920
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 10.7
Well Diameter (cm): 15.24
Water First Found: 9.8
Static Level: 5
Water Kind FRESH
Final Status Water Supply
Primary Water Use: Livestock
Pump Rate (LPM): 68
Recommended Pump Rate: 45
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0.00	0.61
2	LIMESTONE	0.61	10.67

Well ID: 7053215
Construction Date: 2007-12-07
Easting: 308249
Northing: 4898507
UTM Zone 18
Positional Accuracy: margin of error : 10 - 30 m

Well Depth: 39.0
Well Diameter (cm):
Water First Found: 34.7
Static Level:
Water Kind SALTY
Final Status Abandoned-Su
Primary Water Use: Not Used
Pump Rate (LPM):
Recommended Pump Rate:
Pumping Duration (h:m): :

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0.00	0.15

2	CLAY	0.15	1.37
3	SHALE	1.37	2.28
4	LIMESTONE	2.28	39.02

Well ID: 7148030
Construction Date: 2010-07-09
Easting: 308394
Northing: 4898514
UTM Zone 18
Positional Accuracy: margin of error : 100 m - 300 m

Well Depth: 12.5
Well Diameter (cm): 15.56
Water First Found: 5.2
Static Level: 5
Water Kind Untested
Final Status Water Supply
Primary Water Use: Domestic
Pump Rate (LPM): 18
Recommended Pump Rate: 18
Pumping Duration (h:m): 1 : 0

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0.00	0.30
	TOPSOIL		
2	CLAY	0.30	0.91
	CLAY		
3	SHALE	0.91	1.22
	SHALE		
4	LIMESTONE	1.22	12.50
	LIMESTONE		

Well ID: 7175142
Construction Date: 2012-01-17
Easting: 308231
Northing: 4898525
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth: 19.8
Well Diameter (cm):
Water First Found:
Static Level:
Water Kind
Final Status Abandoned-Su
Primary Water Use: Not Used
Pump Rate (LPM):
Recommended Pump Rate:
Pumping Duration (h:m): :

Layer:	Driller's Description:	Top:	Bottom:
1	CLAY	0.00	1.22
2	SHALE	1.22	1.83
3	LIMESTONE	1.83	19.81

Well ID: 7255055
Construction Date: 2015-12-30
Easting: 308567
Northing: 4899020
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth:
Well Diameter (cm): 15.24
Water First Found:
Static Level: 2
Water Kind
Final Status Water Supply
Primary Water Use:
Pump Rate (LPM): 23
Recommended Pump Rate: 14
Pumping Duration (h:m): : 10

Layer:	Driller's Description:	Top:	Bottom:

Well ID: 7262683
Construction Date: 2016-05-09
Easting: 308404
Northing: 4898254
UTM Zone 18
Positional Accuracy: margin of error : 30 m - 100 m

Well Depth:
Well Diameter (cm):
Water First Found:
Static Level:
Water Kind
Final Status Abandoned-Ot
Primary Water Use:
Pump Rate (LPM):
Recommended Pump Rate:
Pumping Duration (h:m):

Layer:	Driller's Description:	Top:	Bottom:

Well ID: 7294873 **Easting:** 308434 **UTM Zone** 18
Construction Date: 2017-09-15 **Northing:** 4898568 **Positional Accuracy:** margin of error : 30 m - 100 m

Well Depth: **Water Kind** **Pump Rate (LPM):**
Well Diameter (cm): **Final Status** Abandoned-Ot **Recommended Pump Rate:**
Water First Found: **Primary Water Use:** **Pumping Duration (h:m):**
Static Level:

Layer:	Driller's Description:	Top:	Bottom:

Well ID: 7318379 **Easting:** 308522 **UTM Zone** 18
Construction Date: 2018-08-31 **Northing:** 4898779 **Positional Accuracy:** margin of error : 30 m - 100 m

Well Depth: 5.0 **Water Kind** **Pump Rate (LPM):**
Well Diameter (cm): 5.20 **Final Status** Test Hole **Recommended Pump Rate:**
Water First Found: **Primary Water Use:** Test Hole **Pumping Duration (h:m):**
Static Level:

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0.00	0.90
2	SAND	0.90	1.24
3	LIMESTONE	1.24	4.96

Well ID: 7318380 **Easting:** 308206 **UTM Zone** 18
Construction Date: 2018-08-31 **Northing:** 4898664 **Positional Accuracy:** margin of error : 30 m - 100 m

Well Depth: 6.2 **Water Kind** **Pump Rate (LPM):**
Well Diameter (cm): 5.20 **Final Status** Test Hole **Recommended Pump Rate:**
Water First Found: **Primary Water Use:** Test Hole **Pumping Duration (h:m):**
Static Level:

Layer:	Driller's Description:	Top:	Bottom:
1	TOPSOIL	0.00	0.90
2	SAND	0.90	1.80
3	LIMESTONE	1.80	6.20

Well ID: 7347814 **Easting:** 307584 **UTM Zone** 18
Construction Date: 2019-11-22 **Northing:** 4898798 **Positional Accuracy:** margin of error : 30 m - 100 m

Well Depth: **Water Kind** **Pump Rate (LPM):** 23
Well Diameter (cm): 15.24 **Final Status** Water Supply **Recommended Pump Rate:** 23
Water First Found: **Primary Water Use:** **Pumping Duration (h:m):** 1 :
Static Level: 4

Layer:	Driller's Description:	Top:	Bottom:

Well ID: 7394802 **Easting:** 308350 **UTM Zone** 18
Construction Date: 2021-08-12 **Northing:** 4898314 **Positional Accuracy:** margin of error : 30 m - 100 m

Well Depth: **Water Kind** **Pump Rate (LPM):** 5
Well Diameter (cm): 6.00 **Final Status** Water Supply **Recommended Pump Rate:**
Water First Found: **Primary Water Use:** **Pumping Duration (h:m):** : 20
Static Level: 10

Layer:	Driller's Description:	Top:	Bottom:

Well ID: 7415273 **Easting:** 308387 **UTM Zone** 18

Construction Date: 2022-04-19 **Northing:** 4898231 **Positional Accuracy:** margin of error : 30 m - 100 m

Well Depth: **Water Kind** **Pump Rate (LPM):**

Well Diameter (cm): **Final Status** **Recommended Pump Rate:**

Water First Found: **Primary Water Use:** **Pumping Duration (h:m):**

Static Level:

Layer:	Driller's Description:	Top:	Bottom:

Appendix C
Borehole Logs

Client: Geertsma Homes **Project Name:** Hydrogeological Assessment **Log of Borehole:** MW101-24

Contractor: Canadian Environmental Drilling **Method:** Track Mounted Solid Stem Auger Page: 1 of 1

Project No.: 21025-001 **Elevation:** 113.0 mASL **Date Completed:** 2024-09-10

Location: Farnham Rd, Belleville, ON **UTM:** 18T **N:** 4898694.1 **E:** 308145.9

Elevation (m)	Depth	Description	Elevation / Depth	Number	Type	CSV (ppm)	OV (ppm)	% Recovery	SPT (N)/DCPT	Atterberg Limits (%) LL PL PI (25 50 75) / % Moisture (25 50 75)	Shear Strength Cu, kPa nat V. rem V. (20 40 60 80) / SPT (N) / DCPT (20 40 60 80)	Well Installation	Log Notes
113	0	**TOPSOIL:** Dark brown sandy silt, trace clay, rootlets, moist, firm	112.39	SS1	SS			45	7		7	Concrete Seal	
112.5	0.5												
		(ML) SILT: Dark brown sandy silt, trace clay, trace gravel, moist, firm	0.61 / 112.03									Bentonite Plug	
112	1	**(SM) SILTY SAND:** Brown silty sand, trace clay, trace gravel, moist, compact	0.97	SS2				75	13		13	Riser	0.9m: Boulders encountered
111.5	1.5												1.6m: Boulders encountered
111	2		110.71									Sand Pack	
110.5	2.5	**(GW) GRAVEL:** Grey gravel and brown silty sand, moist, compact	2.29 / 109.90									PVC Screen	
110	3	Borehole terminated @ 3.1 mbgs due to auger refusal.	3.10									Cap	3.1m: MW dry upon completion on 2024-09-10
109.5	3.5												
109	4												
108.5	4.5												
108	5												
107.5	5.5												
107	6												
106.5	6.5												
106	7												
105.5													

GRAINSIZE DISTRIBUTION: SAMPLE | GRAVEL | SAND | SILT | CLAY

Logged By: MC **Input By:** JS

Client: Geertsma Homes **Project Name:** Hydrogeological Assessment **Log of Borehole:** MW102-24

Contractor: Canadian Environmental Drilling **Method:** Track Mounted Solid Stem Auger Page: 1 of 1

Project No.: 21025-001 **Elevation:** 113.6 mASL **Date Completed:** 2024-09-10

Location: Farnham Rd, Belleville, ON **UTM:** 18T **N:** 4898628 **E:** 308045.8

Elevation (m)	Depth	Description	Elevation / Depth
113.6	0	**TOPSOIL:** Dark brown sandy silt, trace clay, rootlets, moist, firm	112.98
113.1	0.5		0.61
112.6	1	**(SM) SILTY SAND:** Brown silty sand, trace gravel, moist	
112.1	1.5		
111.6	2		111.15
111.1	2.5	**Bedrock:** Grey limestone	2.44
110.6	3		
110.1	3.5		
109.6	4		
109.1	4.5		
108.6	5		
108.1	5.5		
107.6	6		
107.1	6.5		
106.6	7		
106.1			

SAMPLE: Number, Type, CSV (ppm), OV (ppm), % Recovery, SPT (N)/DCPT

Atterberg Limits (%) (LL, PL, PI) 25 50 75 | % Moisture 25 50 75

Shear Strength Cu, kPa (nat V., rem V.) 20 40 60 80 | SPT (N) / DCPT 20 40 60 80

Well Installation: Concrete Seal; Riser; Bentonite Plug; Sand Pack; PVC Screen; Cap

Log Notes:
- 1.2m: Boulders encountered
- 2.4m: Auger refusal
- 5.1m: MW dry upon completion on 2024-09-10

GRAINSIZE DISTRIBUTION: SAMPLE | GRAVEL | SAND | SILT | CLAY

Logged By: MC **Input By:** JS

Client: Geertsma Homes **Project Name:** Hydrogeological Assessment **Log of Borehole:** MW103-24

Contractor: Canadian Environmental Drilling **Method:** Track Mounted Solid Stem Auger Page: 1 of 1

Project No.: 21025-001 **Elevation:** 114.5 mASL **Date Completed:** 2024-09-10

Location: Farnham Rd, Belleville, ON **UTM:** 18T **N:** 4898464.3 **E:** 308034.3

SUBSURFACE PROFILE				SAMPLE									
Elevation (m) / Depth	Lithology	Description (Elevation / Depth)		Number	Type	CSV (ppm)	OV (ppm)	% Recovery	SPT (N)/DCPT	Atterberg Limits (%) LL PL PI; 25 50 75; % Moisture 25 50 75	Shear Strength Cu, kPa (nat V., rem V.); 20 40 60 80; SPT (N) / DCPT 20 40 60 80	Well Installation	Log Notes
114.5 / 0		**TOPSOIL:** Dark brown sandy silt, trace clay, rootlets, moist	114.24									Concrete Seal	
114 / 0.5		**(SM) SILTY SAND:** Light brown silty sand, trace gravel, moist, loose	0.30	SS1	SS			65	6		6	Bentonite Plug; Riser	
113.5 / 1													1.2m: Boulders encountered
113 / 1.5		Some gravel; Becomes very dense											
112.5 / 2				SS2	SS			70	85		85	Sand Pack; PVC Screen	
112 / 2.5		**(GW) GRAVEL:** Brown sandy gravel, moist, very dense	112.25 2.29										
111.5 / 3			111.49									Cap	3m: MW dry upon completion on 2024-09-10
111 / 3.5		Borehole terminated @ 3 mbgs due to auger refusal.	3.05										
110.5 / 4													
110 / 4.5													
109.5 / 5													
109 / 5.5													
108.5 / 6													
108 / 6.5													
107.5 / 7													
107													

GRAINSIZE DISTRIBUTION: SAMPLE | GRAVEL | SAND | SILT | CLAY

Logged By: MC **Input By:** JS

Peterborough, Barrie, Ottawa, Kingston, Whitby

Client: Geertsma Homes **Project Name:** Hydrogeological Assessment **Log of Borehole:** MW104-24

Contractor: Canadian Environmental Drilling **Method:** Track Mounted Solid Stem Auger Page: 1 of 1

Project No.: 21025-001 **Elevation:** 113.4 mASL **Date Completed:** 2024-09-10

Location: Farnham Rd, Belleville, ON **UTM:** 18T **N:** 4898575.6 **E:** 308115.4

Elevation (m)	Depth	Lithology	Description	Elevation / Depth	Number	Type	CSV (ppm)	OV (ppm)	% Recovery	SPT (N)/DCPT	Atterberg Limits (%) LL PL PI 25 50 75 / % Moisture 25 50 75	Shear Strength Cu, kPa nat V. rem V. 20 40 60 80 / SPT (N) / DCPT 20 40 60 80	Well Installation	Log Notes
113.4	0		**TOPSOIL:** Dark brown sandy silt, trace clay, rootlets, moist, firm	112.71	SS1	SS			35	8		8		
112.9	0.5			0.69										0.9m: Boulders encountered
112.4	1		**(ML) SILT:** Brown sandy silt, trace gravel, trace clay, moist, hard - till											
111.9	1.5												Bentonite Plug	1.7m: Boulders encountered
111.4	2												Riser	
110.9	2.5													2.3m: Auger refusal
110.4	3			110.05										
109.9	3.5		**Bedrock:** Grey limestone	3.35										
109.4	4												Sand Pack	
108.9	4.5												PVC Screen	
108.4	5												Cap	
107.9	5.5													MW dry upon completion on 2024-09-10
107.4	6													
106.9	6.5													
106.4	7													
105.9														

GRAINSIZE DISTRIBUTION: SAMPLE | GRAVEL | SAND | SILT | CLAY

Logged By: MC **Input By:** JS

Peterborough, Barrie, Ottawa, Kingston, Whitby

Appendix D
Grain Size Results

Grain Size Distribution Chart

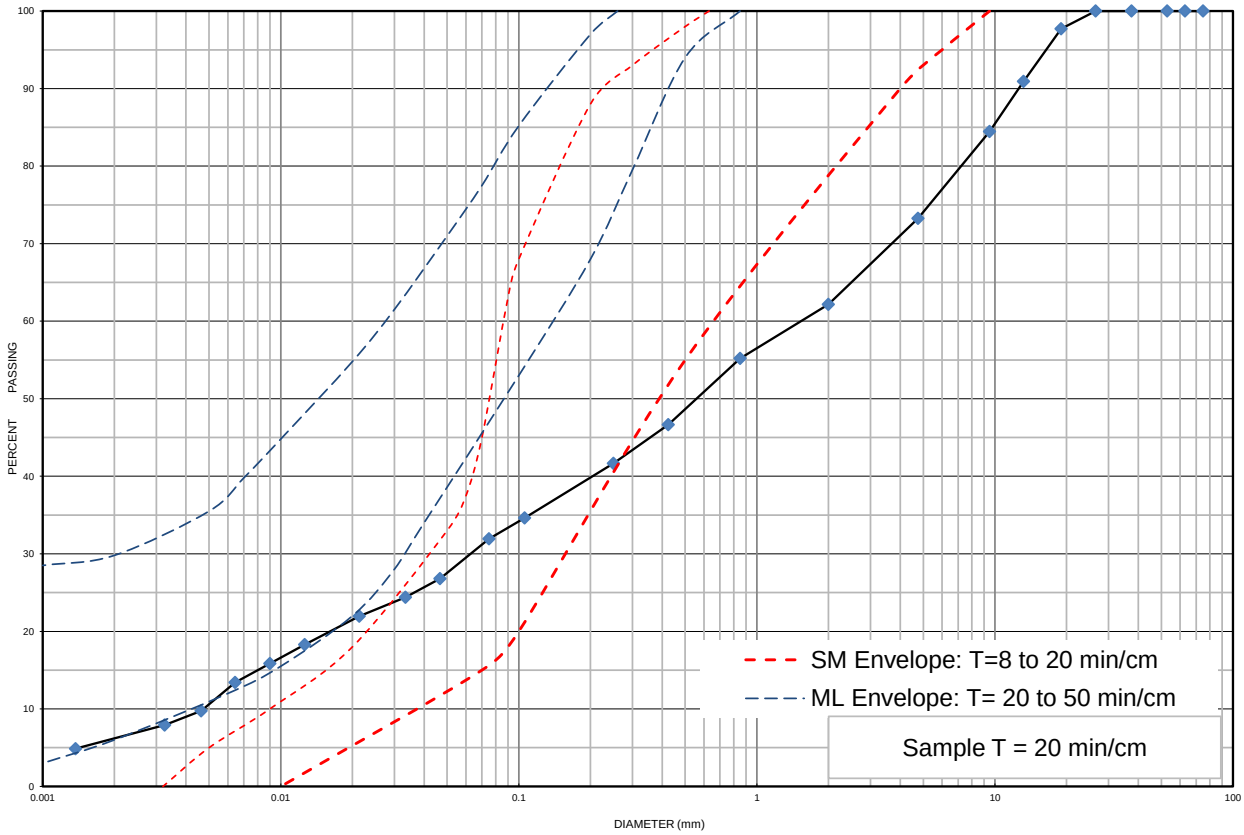
Project Number: *21025-001* **Client:** *Geertsma Homes Ltd.*

Project Name: *Hogan Subdivision*

Sample Date: *September 10, 2024* **Sampled By:** *Maren Catt - Cambium Inc.*

Location: *MW 03-24 SS 2* **Depth:** *1.5 m to 2.1 m* **Lab Sample No:** *S-24-1851*

UNIFIED SOIL CLASSIFICATION SYSTEM					
CLAY & SILT (<0.075 mm)	SAND (<4.75 mm to 0.075 mm)			GRAVEL (>4.75 mm)	
	FINE	MEDIUM	COARSE	FINE	COARSE



MIT SOIL CLASSIFICATION SYSTEM								
CLAY	SILT	FINE	MEDIUM	COARSE	FINE	MEDIUM	COARSE	BOULDERS
		SAND			GRAVEL			

Borehole No.	Sample No.	Depth	Gravel	Sand	Silt	Clay	Moisture
MW 03-24	SS 2	1.5 m to 2.1 m	27	41	26	6	5.0

Description	Classification	D_{60}	D_{30}	D_{10}	C_u	C_c
Gravelly Silty Sand trace Clay	SM	1.5500	0.0630	0.0048	322.92	0.53

Additional information availabe upon request

Issued By: _____ *Date Issued:* *October 24, 2024*

(Senior Project Manager)

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