

AUGUST 29, 2022
PROJECT NO: 2353-6500
SENT VIA: EMAIL

Ferguson Farms
7994 Mill Street, Garden Hill, ON
LOA 1B0

Attention: Jamie Ferguson

**RE: DESKTOP HYDROGEOLOGICAL ASSESSMENT
PLANNING REVIEW – 3402 GANARASKA ROAD
MUNICIPALITY OF PORT HOPE**

Dear Jamie,

C.F. Crozier and Associates (Crozier) was retained by Ferguson Farms (Owner) to prepare a desktop hydrogeological assessment to support a Zoning By-Law Amendment (ZBA) application as noted in the Planning Review comments dated August 25, 2022 (Municipality of Port Hope). The following desktop hydrogeological assessment has been completed to support the development of a farmer's market on the parcel of land located at 3402 Ganaraska Road in the hamlet of Garden Hill, Municipality of Port Hope.

Site Description

The subject property (the site) is approximately 4.15 hectares (10.26 acres) located at the Northeast corner of Ganaraska Road and Hammill Road. The site is bounded by woods to the north, residential and wooded areas to the east, Ganaraska Road to the south, and Hamill Road to the west. The site is currently only occupied by active agricultural fields with trees separating the property from the neighbors. Please refer to Figure 1.

The proposed development includes the construction of a market building to be used as a farmer's market complete with 18 parking spaces. The site will be serviced with a private onsite sewage system and domestic drilled water supply well.

Physiography

The site is located in the physiographic region known as the South Slope, wedged between the Oak Ridges Moraine physiographic region to the north and The Iroquois Plains physiographic region to the south.

Chapman and Putnam (1984) describe the South Slopes as the southern slope of the Oak Ridges Moraine rising to the line of contact with the moraine at 245 to 300 metres above sea level. The South Slopes extend from the Niagara Escarpment to the Trent River, and it covers approximately 2400 square miles. In addition, numerous gullies have been cut by intermittent drainage so that the east-west side-roads cross a succession of valleys. Bare grey slopes where soil is actively eroding are common in this area, and the extension of gullies into otherwise unbroken fields is a critical problem. It is a particularly important problem because the land affected is otherwise of high quality.

The eastern portion of the physiographic region (where the site lies) tend to be fill that is highly calcareous and the cultivated soils are often sandier than the more clayey soils to the west and tend to contain free lime carbonates on the surface.

Surficial Geology

Published surficial geology mapping (OGS) indicates that the property is located in an area of older alluvial deposits of clay, silt, sand, gravel, and organic deposits and a small portion of the property has modern alluvial deposits with similar materials to the older alluvial deposits as these are materials deposited from the Ganaraska river.

Source Protection

The site is located within the Ganaraska Region Source Protection Area. A review of the Source Protection Information Atlas indicates that the property is located within a Significant Groundwater Recharge Area (SGRA) with a vulnerability score of 2.

The site is not located in a Wellhead Protection Area, nor is it located in an Intake Protection Zone and therefore there are no specific policies within the Ganaraska Region Source Protection Plan that would apply to the lands. This should be confirmed with the municipality's Risk Management Official (RMO).

MECP Well Records

A review of the Ministry of Environment, Conservation and Parks well record database was completed to identify all recorded water wells within 1 km of the subject property. According to the database, a total of sixty (60) well records are located within 1 km of site. A summary of these wells is displayed in Appendix A and are shown spatially in Figure 2.

The majority of the wells were drilled for domestic purposes and three (3) wells are reportedly used for municipal or public/institutional purposes. Well ID 4514115 corresponds to a municipal well completed to a depth of approximately 40.2 meters below ground surface (mbgs) within a silty sand to sandy silt overburden unit. Short term pump testing revealed the well can produce 20 gallons per minute (GPM) or 90.9 liters per minute (LPM).

The domestic wells in the area are constructed within an overburden sand and gravel unit located from approximately 18 mbgs to 25 mbgs or a deeper sand and gravel unit located between 45 mbgs to 55 mbgs. Of the sixty (60) wells identified, all but two (2) wells reportedly produce in excess of 13.7 L/min. Only one (1) well record (well ID: 4508925) reports abandonment due to poor water quality (salt) although this well is completed within limestone bedrock approximately 44 mbgs.

In general, a flow rate of 13.62 LPM is considered the minimum that the Canadian Mortgage Housing Council will accept in order to approve a mortgage loan. Although not applicable for this application, MECP Procedure D-5-5 (1996) specifies that a minimum peak demand flow rate of 13.7 LPM be utilized for domestic water demand calculations. For the purposes of discussion, we will consider the minimum well yield required for this development to be 13.7 LPM. Based on the well records in the area, the aquifers in the general area of the subject property can meet a minimum flow rate of 13.7 LPM to support the proposed development.

Newly Constructed Well

The Owner retained the services of an MECP licenced well contractor (Robert Ruth Well Drilling) to complete the construction of a new well to supply water to the proposed facility.

A 150 mm (6-inch) diameter drilled well was constructed into the grey sand aquifer to a total depth of 39.63 m below grade (bg). A #8 slot stainless steel well screen was installed from 36.28 to 39.63 m bg. The well was pump tested for a total of 3 hours at a rate of 22.7 Lpm. The static water level of the well was 12.80 m below measuring point (bmp) and dropped to 36.59 m bmp after 3 hours of pumping. The water level recovered to 91.1% of the static water level within 1 hour of the end of pumping. Ruth recommended a long term pumping rate of 22. Lpm and indicated that the well production was 31.8 Lpm.

Conclusions

Crozier is of the opinion that the water demands of the development can be supported via the newly constructed water supply well without impacting existing water wells in the area.

Yours truly,

C.F. CROZIER & ASSOCIATES INC.



Chris Gerrits, M.Sc. P. Eng.
Senior Project Manager

Cc:

J:\2300\2353- Ferguson Farms\6500 - Ferguson Farms Desktop HydroG\Reports

APPENDIX A

Well Record Summary Table

MECP WATER WELL RECORDS

Project Number: 2353 - 6500

Address: 3402 Ganaraska Road, Garden Hill

Prepared by: CM

Date completed: 2022 - 08 -29

Well ID	Diameter (cm)	Depth (m)	Static Level (m)	Quantity (Lpm)	Materials	Aquifer ¹	Use	Date Completed
4506532	15.2	40.8	9.10	68.2	silty clay/sand/sandy clay/gravel & clay	OB	domestic	1980-05-09
4507613	76.2	7.9	1.20	18.2	silty clay/clay/gravel & clay	OB	domestic	1989-01-12
4508926	15.9	17.7	7.90	54.6	clay/sand & gravel	OB	domestic	1990-08-23
4505522	15.2	51.5	0.00	45.5	sand & clay/clay/sand & gravel	OB	domestic	1980-12-05
4507614	76.2	10.7	3.00	18.2	sandy clay/clay	OB	domestic	1989-01-12
4509092	17.1	42.7	6.10	22.7	sand/clay/sand	OB	domestic	1990-01-18
1902173	15.9	39.9	6.10	13.6	clay/sand & clay/sand & clay & gravel	OB	domestic	1964-06-09
4507063	15.9	47.2	4.60	13.6	clay/silt/clay/gravel/limestone	BR	domestic	1988-03-28
4505035	76.2	13.7	4.60	27.3	clay	OB	domestic	1978-08-22
4507011	15.9	21.0	7.90	36.4	clay/sand & gravel	OB	domestic	1988-03-10
4505112	15.2	18.3	3.70	13.6	clay/sand/gravel	OB	domestic	1978-04-06
4512159	15.9	42.7	6.40	22.7	clay/sand	OB	domestic	1999-10-22
7121498	15.9	43.9	9.50	22.7	sandy clay/sand & gravel/limestone	BR	domestic	2008-06-16
4509875	15.9	38.7	22.90	22.7	sand/clay/sand	OB	domestic	1992-04-27
4505584	15.2	41.1	12.20	45.5	clay/gravel & sand	OB	domestic	1980-01-17
4514115	25.4	132.0	37.30	90.9	silty sand/clay/gravel/silty sand/silty clay	OB	municipal	2004-11-02
4512361	15.9	11.0	0.30	13.6	clay/gravel	OB	domestic	2000-01-25
4510211	15.2	24.4	13.70	13.6	sand/clay/gravel/clay/sand	OB	municipal	1993-04-26
1902697	15.9	24.1	6.10	11.4	clay/sand & gravel	OB	domestic	1969-04-08
1902178	15.9	50.3	24.40	22.7	sandy clay/sand/sand & gravel	OB	institutional	1961-12-27
4507123	15.9	15.2	9.80	22.7	clay/gravel	OB	domestic	1988-01-12
4514784	-	-	-	-	-	OB	municipal abandonment	2005-11-23
4510412	15.9	23.5	6.10	45.5	clay/sand	OB	domestic	1994-10-07
1902177	15.9	51.2	44.80	13.6	sand/limestone	BR	domestic	1966-12-22
1902131	91.4	14.9	10.40	-	clay/sand	OB	domestic	1963-06-18
4507062	15.9	45.7	6.10	18.2	clay/sand/clay/gravel/limestone	BR	domestic	1988-03-18
1902133	15.9	41.1	6.10	13.6	clay/clay & gravel/limestone	BR	domestic	1964-05-14
4506631	15.9	15.8	11.60	22.7	clay/sand	OB	domestic	1986-11-06
4505581	15.2	42.7	7.90	22.7	clay/gravel & sand	OB	domestic	1979-11-14
4514511	15.2	44.4	6.90	17.6	sand/clay/sand/clay/sand/gravel	OB	domestic	2006-01-03
4506542	15.2	39.6	10.70	36.4	sand/clay/gravel	OB	domestic	1979-08-17
1903628	15.2	49.7	0.00	22.7	clay/sand/clay/sand/gravel	OB	domestic	1973-07-20
1902721	15.2	44.2	11.60	22.7	clay/gravel	OB	domestic	1969-08-04
4504798	15.2	22.9	6.10	45.5	clay/gravel & sand	OB	domestic	1977-09-29
4512679	15.9	23.8	8.50	13.6	clay/clay & sand	OB	domestic	2001-04-11
1902129	15.9	43.3	6.10	13.6	clay/sand/sand & gravel/shale	BR	domestic	1960-12-29
4507693	15.9	27.4	19.80	18.2	clay/sand	OB	domestic	1988-10-31
4508925	15.9	44.5	-	-	clay/sand/clay/limestone	BR	abandoned	1990-08-23
1902134	15.9	42.7	7.60	18.2	clay/sand/limestone	OB	domestic	1964-09-16
4510271	15.9	15.2	7.30	27.3	clay/sand	OB	domestic	1994-06-09
4508462	15.9	23.2	16.80	13.6	clay/sand	OB	domestic	1990-01-26
4511424	15.9	14.0	5.50	18.2	clay/sand	OB	domestic	1997-01-08
4507810	15.9	46.9	7.60	18.2	sandy clay/gravel clay/sand/clay/limestone	BR	domestic	1989-04-03
7143693	15.5	30.0	14.70	12.0	clay/sand/clay/sand	OB	domestic	2009-05-25
4512271	15.9	48.8	21.90	45.5	clay/sand/clay/gravel	OB	domestic	2000-07-14
4514785	-	-	-	-	-	-	abandoned	2005-11-23
7177004	15.9	40.2	3.00	27.3	clayey sand/clay/gravel/limestone	BR	domestic	2011-12-19
1903703	76.2	11.0	7.30	13.6	clay/sand	OB	domestic	1973-10-10
4504754	76.2	9.1	2.40	13.6	sand/clay/sand	OB	domestic	1977-06-22
1902179	15.2	22.6	5.50	22.7	clay/sand	OB	domestic	1959-09-16
4505914	15.2	8.8	1.50	-	clay/sand/gravel	OB	domestic	1982-11-10
4509876	-	44.2	-	-	sand/clay/limestone	BR	abandoned	1992-09-20
4509418	15.9	28.6	13.70	22.7	clay/sand	OB	domestic	1991-07-11
1902175	15.2	17.7	5.50	22.7	clay/gravel	OB	public	1962-06-17
1902132	15.9	31.1	-	22.7	clay/gravel	OB	domestic	1963-07-04
1902174	15.9	24.1	4.60	22.7	clay/gravel & sand	OB	domestic	1968-01-31
7233168	15.9	40.5	5.50	18.2	clay/gravel/limestone	BR	domestic	2014-07-23
4514159	15.9	41.8	9.20	13.6	sand & clay/clay & gravel/gravel/limestone	OB	domestic	2005-03-07
4507127	76.2	13.4	6.70	18.2	clay/sand/clay/gravel/clay	OB	domestic	1988-04-26
1902136	15.2	42.7	-	-	sand & clay	OB	abandoned	1962-06-25
4508675	15.9	24.1	11.60	9.1	sandy clay/clay/sand	OB	domestic	1990-06-21

Data Source: Ministry of the Environment, Conservation, and Parks, retrieved August 29th, 2022.

1. OB = Overburden Aquifer, BR = Bedrock Aquifer

FIGURES



Proposed Garden Market
 3402 Ganaraska Road
 Municipality of Port Hope



LEGEND

- Site Limits
- Road
- Watercourse
- Waterbody

DRAWING NOTES:

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ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

Project
**3402 GANARASKA ROAD
 MUNICIPALITY OF PORT HOPE**

Drawing
SITE LOCATION PLAN

CROZIER
 CONSULTING ENGINEERS

2800 High Point Drive
 Suite 100
 Milton, ON L9T 6P4
 905-875-0026 T
 905-875-4915 F
 www.cfcrozier.ca

Drawn	C.M.	Design	C.G.	Project No.	2353-6500
Date	2022-08-26	Projection	EPSG:26917	Scale	1:20,000
				Dwg.	FIG. 01

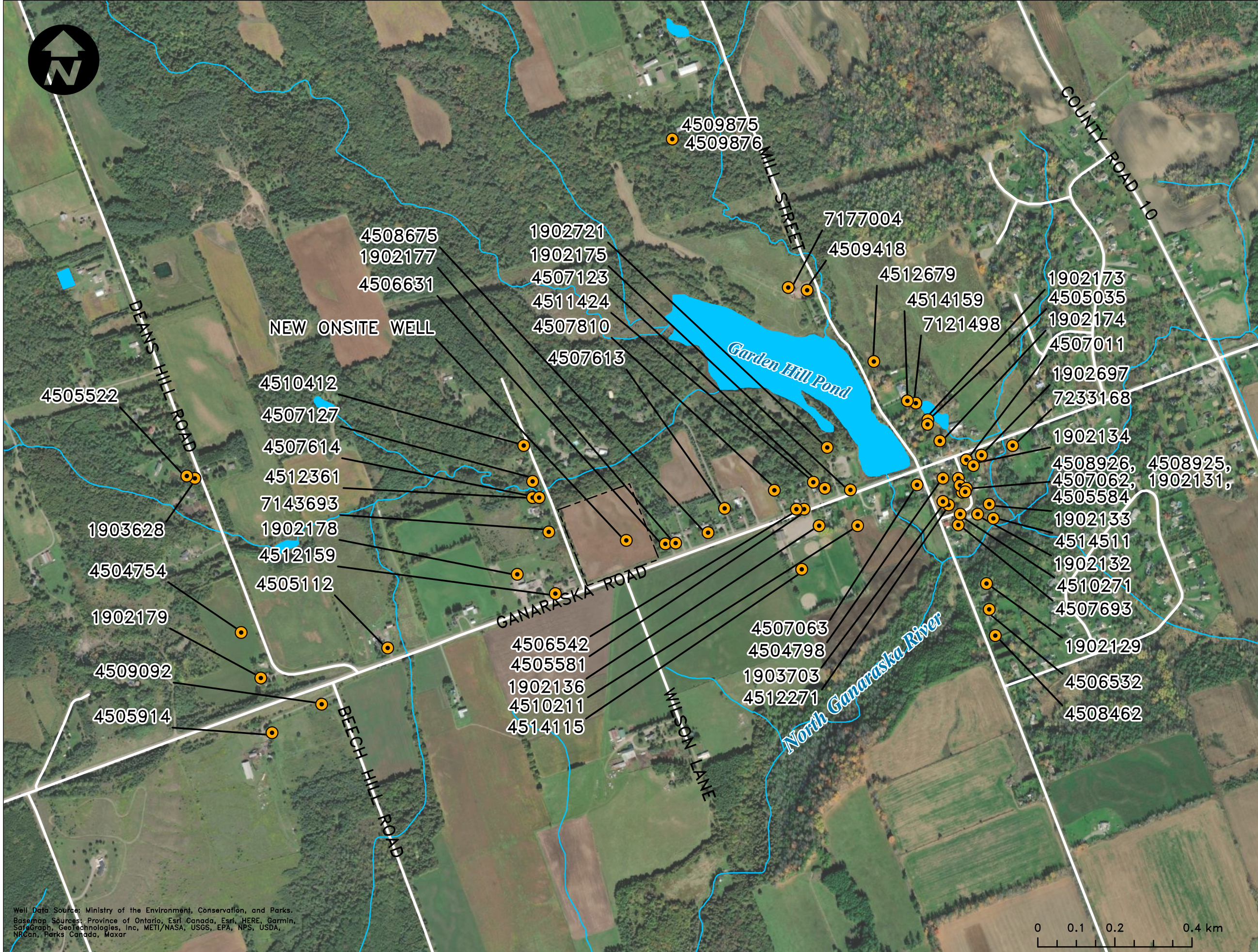
Basemap Sources: Province of Ontario, Esri Canada, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, US Census Bureau, USDA, NRCAN, Parks Canada, Province of Ontario, Esri Canada, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/



LEGEND

- Site Limits
- MECP Wells
- Road
- Watercourse
- Waterbody
- AA** Road Name
- Aa*** Watercourse/Waterbody Name

1234567 Well ID



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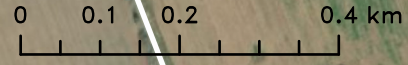
ALL EXISTING UNDERGROUND UTILITIES TO BE VERIFIED IN THE FIELD BY THE CONTRACTOR PRIOR TO CONSTRUCTION.

Project
**3402 GANARASKA ROAD
MUNICIPALITY OF PORT HOPE**

Drawing
MECP WELL LOCATION PLAN

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Drawn	C.M.	Design	C.G.	Project No.	2353-6500
Date	2022-08-26	Projection	EPSG:26917	Scale	1:9,500
				Dwg.	FIG. 02



Well Data Source: Ministry of the Environment, Conservation, and Parks.
 Basemap Sources: Province of Ontario, Esri Canada, Esri, HERE, Garmin, SafeGraph, GeoTechnologies, Inc, METI/NASA, USGS, EPA, NPS, USDA, NRCan, Parks Canada, Maxar