King EPCM
3780 14th Ave, Unit 211
Markham, ON, L3R 9Y5
www.KingEPCM.com
647-459-5647
Twang@KingEPCM.com

Geotechnical Report

Soil Stratigraphy

at

0th Forks Rd, Port Colborne

PREPARED:

May 06th, 2026

Background

A geotechnical investigation was conducted on Mars 5th, at 0th Forks Road, Port Colborne, Ontario. The purpose of this investigation is to classify the in-situ soil and to determine the septic infiltration rate of the soil. The investigation is for a proposed industrial dwelling addition and a new proposed on-site sewage septic system. The borehole was drilled by a field technician of King EPCM, and the Engineer supervising the investigation is Tony Wang, Principal Engineer of King EPCM.

Borehole location

For this investigation, one borehole was drilled on the west side of the property, while an in-situ permeameter test was conducted next to the borehole location, as shown in the image below:

Figure 1 - Location of the borehole at 0th Forks Road, Port Colborne, ON

Method One – Soil Characterization using USCS.

BH101 was drilled down to 0.5m below grade.
Generally, the soil is comprised of moist brown silty clay without any groundwater:

Borehole:

0 – 0.5 m:	Brown silty clay mixed with gravel
0.5 – 0.5 m:	End of the hole – Auger refusal

Groundwater was not encountered during drilling.

Method Two – In-situ Permeameter Test (Perc-Test)

An in-situ permeameter test was conducted on the west side of the property (near BH101), with the entire site soil relatively moist. A 0.5m infiltration test borehole was dug at a locally moist grassy area and conducted the in-situ test.

An in-situ permeameter test results showed the steady-state rate of fall = 0.01 cm/min. Based on most structured soils from clay through loams, the field-saturated permeability value of Kfs = 1.3 x 10^-8 m/sec = 1.3 x 10^-6cm/sec.

DYNAMIC MONITORS.COM

Toll Free 1-888-747-7645 (SOIL)

ETC SLOW SOILS PASK CONSTANT HEAD WELL PERMEAMETER SINGLE PONDED HEIGHT METHOD

Most structured soils from clays through loams; Also includes unstructured medium and fine sands. The first choice for most soils.

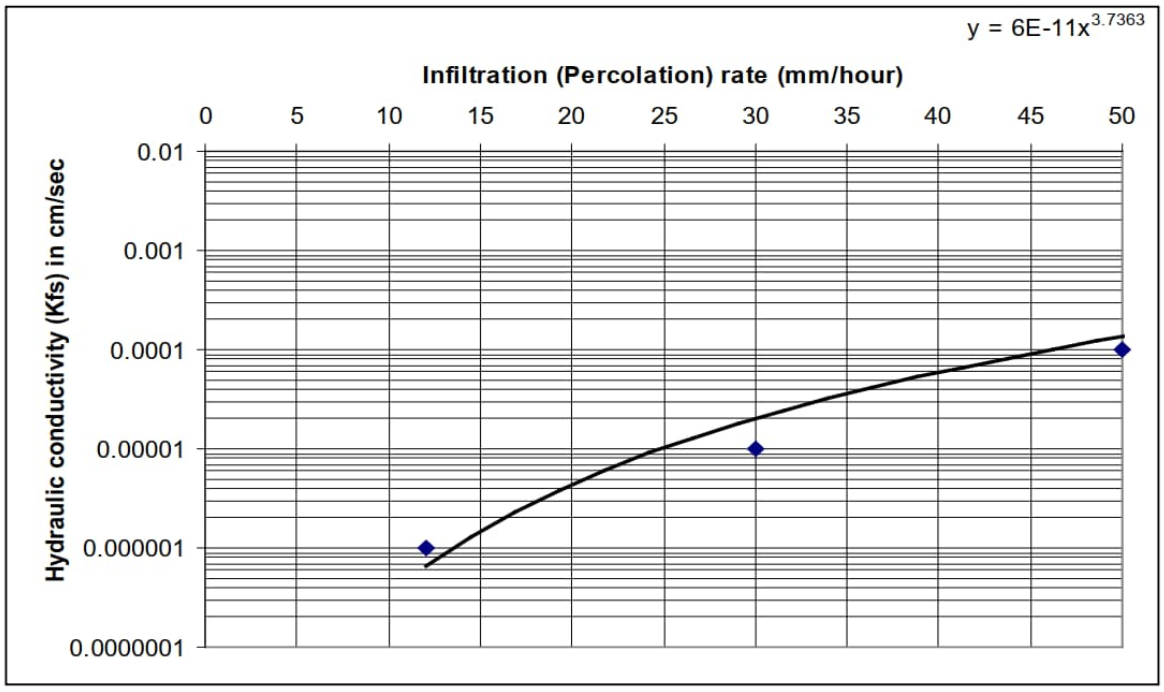
d – well hole diameter (cm)	8.3	**α* - sat/unsat flow ratio (cm-1)**	0.12
H – height of water in well (cm)	15.0	**C – shape factor**	1.36

R(cm/min)	Kfs (m/sec)	R(cm/min)	Kfs (m/sec)	R(cm/min)	Kfs (m/sec)
0.01	1.3E-08	2.7	3.4E-06	21.0	2.7E-05
0.02	2.5E-08	2.8	3.6E-06	22.0	2.8E-05
0.03	3.8E-08	2.9	3.7E-06	23.0	2.9E-05
0.04	5.1E-08	3.0	3.8E-06	24.0	3.1E-05
0.05	6.4E-08	3.1	4.0E-06	25.0	3.2E-05
0.06	7.6E-08	3.2	4.1E-06	26.0	3.3E-05
0.07	8.9E-08	3.3	4.2E-06	27.0	3.4E-05
0.08	1.0E-07	3.4	4.3E-06	28.0	3.6E-05
0.09	1.1E-07	3.5	4.5E-06	29.0	3.7E-05
0.10	1.3E-07	3.6	4.6E-06	30.0	3.8E-05
0.15	1.9E-07	3.7	4.7E-06	31.0	4.0E-05
0.20	2.5E-07	3.8	4.8E-06	32.0	4.1E-05
0.25	3.2E-07	3.9	5.0E-06	33.0	4.2E-05
0.30	3.8E-07	4.0	5.1E-06	34.0	4.3E-05
0.35	4.5E-07	4.1	5.2E-06	35.0	4.5E-05
0.40	5.1E-07	4.2	5.4E-06	36.0	4.6E-05
0.45	5.7E-07	4.3	5.5E-06	37.0	4.7E-05
0.50	6.4E-07	4.4	5.6E-06	38.0	4.8E-05
0.55	7.0E-07	4.5	5.7E-06	39.0	5.0E-05
0.60	7.6E-07	4.6	5.9E-06	40.0	5.1E-05

The temperature of the water moving through the soil can have a significant effect on the measured Kfs because of the different viscosities of water at different temperatures. Therefore, depending on the test and design operating temperatures, it may be necessary to adjust the measured Kfs to get permeability that is more representative of operating conditions. This adjusted value (Ka) can be calculated by multiplying Kfs by a temperature correction factor. Calculating the adjusted Ka value by using Equation: Ka = Kfs x μk/μa, the result is 1.3 x 10^-6 x 0.712 = 0.93 x 10^-6 cm/sec.

Based on OMMAH's (1997) interpolation, the measured infiltration (percolation) rate is beyond the curve, so by using the equation $y=6E\text{-}11x^{3.7363,}$ the infiltration rate can be interpolated as 13 mm/hour. Inversely, the septic T-Time is calculated as 46.2 min/cm.

Figure C 11: Approximate relationship between infiltration rate and hydraulic conductivity



Source: Ontario Ministry of Municipal Affairs and Housing (OMMAH). 1997. Supplementary Guidelines to the Ontario Building Code 1997. SG-6 Percolation Time and Soil Descriptions. Toronto, Ontario.

Method Three – Sieve Analysis

Based on a sieve analysis of soil samples obtained from 0.5m below grade, it is found to have an estimated T-time of 50 min/cm as per silt, ML envelope, based on OBC, MMAH supplementary standard SB-6.

Method Four – Footing Investigation

Purpose of Investigation:

The purpose of this investigation is to assess the condition and performance of the slab-on-grade& column footing concrete foundation located at 0th Forks Rd, Port Colborne for structural integrity and measurement.

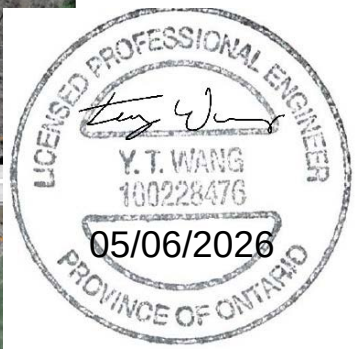


Figure 2 - Location of the foundation at 0th Forks Road, Port Colborne, ON

Measurement:

The thickness of the slab-on-grade foundation is 8 inches. No frost foundation walls were found.

Summary

It is in the engineer's opinion that:

- The septic design may use a T-time of 50 min/cm.
- Soil bearing capacity of 150kPa SLS and 250kPa ULS should be used, with 1.22m frost wall

For questions or concerns regarding this report, please contact Tony Wang, P. Eng at 647-459-5647 or Twang@KingEPCM.com. This report is an intellectual property of King EPCM and may only be used and relied upon by the property owner, its designers, engineers, or other personnel related to the project.

Appendix 1: Infiltration Field Record

Engineering Technologies Canada Ltd.

OWNER'S NAME:

SITE LOCATION: 0th Forks Rd,Port Colborne

PID #:

TEST PIT#:

TECHNICIAN: Leng

DATE: 3/5/2024

WEATHER/TEMPERATURE: Sunny/20c

FIELD PERMEABILITY TEST #:

D - reservoir diameter (cm)	Slow	Soil Texture	
d - well hole diameter (cm)		Soil Structure	
H - height of water in well (cm)		α*(cm-1)	
Depth below ground surface(cm)		C - Factor	

TIME (min)	(1)CHANGE IN TIME (min)	RESERVOIR WATER LEVEL (WL) (cm)	(2)CHANGE IN WL (cm)	(2) / (1) RATE OF FALL (R) (cm/min)
0		32		
5	5	31.6	0.4	0.08
10	5	31.2	0.4	0.08
15	5	30.1	1.1	0.22
20	5	29	1.1	0.22
25	5	28.5	0.5	0.1
30	5	28.2	0.3	0.06
35	5	27.7	0.5	0.1
40	5	27.2	0.5	0.1
45	5	26.7	0.5	0.1
50	5	26.7	0	0
55	5	26.7	0	0
60	5	26.7	0	0

Quasi Steady-State Rate of Fall(R) = **0.01** cm/min

Appendix 2: Sieve Analysis Report