GEOTECHNICAL INVESTIGATION

INFILTRATION TESTING
260 WAYDOM DRIVE,
AYR, ONTARIO

CMT Project 20-225(b).R01

Prepared For:

Tacoma Engineers Inc.

July 25, 2025

CMT Engineering Inc.
1011 Industrial Crescent, Unit 1
St. Clements, Ontario N0B 2M0
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www.cmtinc.net

July 25, 2025 20-225(b).R01

Tacoma Engineers Inc.
155 Frobisher Drive,
Waterloo, Ontario
N2V 1G2

Attention: Brandon Martin

Re: Infiltration Testing
260 Waydom Drive,
Ayr, Ontario

As requested, CMT Engineering Inc. conducted a geotechnical investigation which included in-situ infiltration testing at the above-referenced site, and we are pleased to present the enclosed report.

We trust that this information meets your present requirements, and we thank you for allowing us to undertake this project. Should you have any questions, please do not hesitate to contact our office.

Yours truly,

Shawn Wheatley, M.Eng., LEL

tb

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1.0 INTRODUCTION

The services of CMT Engineering Inc. (CMT Inc.) were retained by Brandon Martin of Tacoma Engineers Inc. to conduct a geotechnical investigation at 260 Waydom Drive, Ayr, Ontario. It is understood that an addition was previously constructed on the building in 2020, and due to the change in zoning, it has been requested that a stormwater management plan be provided. As part of the storm water management plan, CMT Inc. was requested to conduct in-situ infiltration testing for the purpose of the potential construction of infiltration galleries.

The purpose of the geotechnical investigation was to assess the existing soil and groundwater conditions encountered in the borehole advanced in the general location of the proposed stormwater infiltration galleries. Included in the assessment are the soil classification and groundwater observations; soil parameters for design of infiltration galleries; and a summary of the laboratory test results. The location of the site is shown on Drawing 1.

The recommendations in this report are solely based on the soil conditions encountered in the boreholes located at the subject site.

2.0 EXISTING SITE CONDITIONS

The property currently comprises an existing building including a previously constructed addition, with a gravel and RAP surfaced truck and trailer driveway and parking lot. The site is bounded by Waydom Drive to the south, and existing commercial/industrial properties on all remaining sides. In general, the site topography is relatively flat in elevation throughout the site, sloping gently down to the north towards the back of the property.

3.0 FIELD AND LABORATORY PROCEDURES

Prior to the commencement of the field drilling program, underground service locates were organized by CMT Inc. to ensure that underground utilities would not be damaged.

The field investigation was conducted on May 27, 2025, and comprised the advancement of one (1) borehole (referenced as Borehole 1), utilizing a Geoprobe 7822DT drillrig operated by CMT Drilling Inc. The borehole was advanced to an approximate depth of 4.57 m (15.0 ft) below the existing grade in the area of the proposed infiltration galleries.

Standard penetration testing (SPT) and sampling was carried out in the borehole using 38-millimeter (mm) inside diameter split spoon sampling equipment and an automatic hammer, in accordance with ASTM D 1586 "*Standard Test Method for Standard Penetration Test (SPT) and Split-Barrel Sampling of Soils*". SPT soil sampling was generally conducted at 0.76 m (2.5 ft) intervals to approximately 3.0 m (10.0 ft) and about every 1.52 m (5.0 ft) thereafter to borehole termination. Macro core (MC5) direct push soil sampling was typically conducted below the deepest SPT sample.

Representative samples from the following depths were submitted to the CMT Inc. laboratory in St. Clements, Ontario for grain size analyses:

- Borehole 1 – approximate depth 1.22 m (4.0 ft),
- Borehole 1 – approximate depth 2.44 m (8.0 ft), and
- Borehole 1 – approximate depth 3.96 m (13.0 ft).

The borehole log is provided in Appendix A and the grain size analyses are provided in Appendix B.

CMT Inc. surveyed the ground surface elevations at the borehole location using laser survey equipment on May 27, 2025. A nail in the hydro pole on Waydom Drive, directly across from the property, was utilized as a temporary benchmark with an assumed elevation of 100.00 m. The ground surface elevation at Borehole 1 was determined to be approximately 97.97 m. The locations of the borehole and the temporary benchmark are shown on Drawing 2.

4.0 SUBSOIL CONDITIONS

The soils encountered in the boreholes are described briefly below and a more detailed stratigraphic description is provided on the borehole logs in Appendix A. The following paragraphs have been simplified into terms of major soil strata. The soil boundaries indicated have been inferred from observations of sampling and drilling resistance and typically represent transitions from one soil type to another rather than exact planes of geological change. Further, the subsurface conditions are anticipated to vary beyond the borehole location.

4.1. Recycled Asphalt

Compact, dark brown/black recycled asphalt (RAP) was encountered at the surface of Borehole 1. The recycled asphalt was observed to be approximately 50 mm in thickness at Borehole 1, though some variations in thickness should be expected throughout the site.

4.2. Granular Fill

Brown sand and gravel granular fill with some silt was encountered underlying the recycled asphalt in Borehole 1. The granular fill was considered to be compact, with an SPT N-value of 29 blows per 0.30 m. The granular fill was considered to be moist, with a moisture content of about 3.9%. The granular fill was observed to be approximately 180 mm in thickness at Borehole 1, though some variations in thickness should be expected throughout the site.

4.3. Silty Sand fill

Dark brown silty sand fill with trace gravel and clay was encountered underlying the granular fill in Borehole 1. The silty sand fill was considered to be loose to compact, with SPT N-values ranging from 6 to 29 blows per 0.30 m. The silty sand fill was considered to be moist, with moisture contents ranging from about 3.9% to 7.0% (average 5.5%).

4.4. Sand

Brown sand with trace silt and gravel was encountered underlying the silty sand fill in Borehole 1. The sand was considered compact, with an SPT N-values of 16 blows per 0.30 m. The sand was considered to be moist, with a moisture content of about 3.7%.

4.5. Sand and Gravel

Brown sand and gravel, (or gravelly sand) with some silt and trace clay, was encountered underlying the sand in Borehole 1. The sand and gravel was considered to be compact to very dense, with SPT N-values ranging from 22 to 54 blows per 0.30 m (average 38 blows per 0.30 m). The sand and gravel was considered to be moist, with moisture contents ranging from about 1.7% to 3.9% (average 2.6%).

4.6. Groundwater

Accumulated groundwater was not observed in the borehole conducted as part of this investigation. It should also be noted that the relatively dense/hard soils have the have the potential to create perched water conditions in any less dense overlying soils. Groundwater conditions (particularly perched water) are generally dependent on the amount of precipitation, control of surface water, as well as the time of year, and can fluctuate significantly in elevation and volume.

5.0 DISCUSSION AND RECOMMENDATIONS

This section of the report provides an interpretation of the factual geotechnical data obtained during the investigation and is intended for the guidance of the owner and design engineer. Where comments are made on construction, they are provided only to highlight those aspects which could affect the design of the project. Contractors bidding on or undertaking the work should make their own independent interpretation of the factual subsurface information provided as it affects their proposed construction means and methods, equipment selection, scheduling, pricing, and the like.

Utilizing the information gathered during the geotechnical investigation and assuming that the borehole information is representative of the subsoil conditions throughout the site, the following comments and recommendations are provided.

5.1. Serviceability and Ultimate Limit Pressure

Based on the information obtained from the boreholes, the following table provides a summary of the estimated geotechnical reaction at the Serviceability Limit State (SLS) and the factored geotechnical resistance at the Ultimate Limit State (ULS) at the various elevations, including soil type:

MW No.	Ground Surface Elevation (m)	SLS kPa (psf)	ULS kPa (psf)	Estimated Highest Founding Elevations (m)	Depth Below Existing Grade to Founding Elevation (m)	Soil Type
1	97.97	150 (3,000)	225 (4,500)	96.45 to 93.40 (termination)	1.52	Sand, Sand and Gravel

Should any footings be designed to be constructed at elevations higher than the elevations indicated in the table above, then structural fill will be required in order to achieve the design grades for any proposed foundations. The serviceability limit pressure for good quality granular structural fill (Granular 'B' – Type I, II or III) placed and compacted, and constructed on approved competent native soil is estimated to be at least 150 kPa (3,000 psf) at SLS and 225 kPa (4,500 psf) at ULS. Lean mix concrete fill could be utilized for this application. Alternatively, footings could be stepped down to bear on approved undisturbed founding soils.

Footings founded on soil may be placed at a higher elevation relative to another footing provided that the slope between the outside face of the footings is separated by a minimum slope of 10 horizontal to 7 vertical (10H:7V) with an imaginary line projected from the underside of the footings. This must be taken into account for any deep structures such as elevator pits, sump pits and/or pump chambers.

With respect to the Serviceability Limit State (SLS), the total and differential footing settlements are not expected to exceed the generally acceptable limits of 25 mm (1") and 19 mm (3/4") respectively.

5.2. Soil Design Parameters

The following table provides the estimated soil design parameters for imported granular fill, as well as the existing native soils encountered on-site. It should be noted that earth pressure coefficients (Ka, Kp, Ko) provided are for flat ground surface conditions and will differ for areas with slopes or embankments.

The estimated soil design parameters can be utilized for the design of perimeter shoring, foundations and retaining walls, lateral earth pressure calculations, as required:

Soil Type	Soil Density (kg/m^3)	Friction Angle (Degree)	Coefficient of Active Pressure (K_a)	Coefficient of Passive Pressure (K_p)	Coefficient of At-Rest Pressure (K_o)	Coefficient of Friction (μ)	Cohesion (kPa)
Imported Granular 'A' (OPSS 1010)	2,100	34°	0.28	3.54	0.44	0.45	0
Imported Granular 'B' (OPSS 1010)	2,050	32°	0.31	3.25	0.47	0.41	0
Silty Sand Fill	1,750	28°	0.36	2.77	0.53	0.35	0
Sand	1,800	32°	0.31	3.25	0.47	0.41	0
Sand and Gravel	1,900	34°	0.28	3.54	0.44	0.45	0

5.4 Excavations

All excavations must be carried out in accordance with Ontario Regulation 213/91 (Reg 213/91) of the Occupational Health and Safety Act and Regulations for Construction Projects.

Type 3 Soils - In general, the fill and native soils encountered on the site, in a drained state (not wet or saturated), would be classified as Type 3 soils under Reg 213/91. The Type 3 soils must be sloped from the bottom of the excavation at a minimum gradient of 1 horizontal to 1 vertical. All saturated soils encountered must be treated as Type 4 soils, as described below.

Type 4 Soils - In general, any wet to saturated soils would be classified as Type 4 soils under Reg 213/91. Type 4 soils must be sloped from the bottom of the excavation at a minimum gradient of 3 horizontal to 1 vertical.

If it is not practical to excavate according to the above requirements, then a trench support system (designed in accordance with the Ontario Health and Safety Act Regulations) may be utilized. When using a temporary trench support system consisting of trench boxes to reduce the lateral extent of the excavations, it should be noted that the support system is intended primarily for the protection of workers as opposed to controlling lateral soil movement. Any voids between the excavation walls and the support system should be immediately filled to reduce the potential for loss of ground and to provide support to existing adjacent utilities and structures, and it is recommended that the excavation be carried out in short sections, with the support system installed immediately upon excavation completion.

5.5 Infiltration Testing

It is understood that in-situ testing be completed in the location of the proposed infiltration structures as per Appendix C of the Low Impact Development Stormwater Management Planning and Design Guide (LIDSWMP).

Appendix C of the LIDSWMP recommends that at least one infiltration test should be conducted at the bottom elevation of the infiltration pit, plus one additional test at every soil horizon encountered within 1.5 m below the bottom elevation (a minimum of two tests per infiltration pit). Appendix C of the LIDSWMP also recommends that one test hole should be advanced for an infiltration pit with a footprint of less than 50 m^2.

The infiltration testing program was conducted on May 27, 2025, and comprised of three (3) Guelph Permeameter Constant Head infiltration tests in Borehole 1, in accordance with ASTM D5126 Section 4.1.6, conducted by engineering staff of CMT Engineering Inc. The infiltration testing was conducted in Borehole 1 at depths of about 1.22 m (4.0 ft), 2.44 m (8.0 ft), and 3.96 m (13.0 ft) below existing ground surface. The test hole diameter was approximately 5.72 cm (2.25 in). Constant head permeability testing was conducted using a constant head setting of 10 cm.

The field hydraulic conductivity was converted to infiltration rates using Figure C1 of the LIDSWMP. Based on information gathered from the permeameter testing and borehole data, the following table provides the field saturated hydraulic conductivity, infiltration rate, test location and soil type for each test:

Test Location and Depth (m)	Approx. Elevation of Test (m)	Guelph Permeameter Field Hydraulic Conductivity (K_{fs}) (cm/sec)	No Safety Factor Applied - Infiltration Rate (mm/hour)	Estimated Zone of Saturation (m)	Soil Type
BH 1 (1.22)	96.75	1.97×10^{-5}	32.15	-	Silty Sand Fill
BH 1 (2.44)	95.53	1.68×10^{-4}	51.9	-	Sand and Gravel
BH 1 (3.96)	94.01	4.38×10^{-4}	59.4	-	Gravelly Sand

To determine the design infiltration rate, the ratio of the infiltration rate at the proposed bottom of the infiltration pit and the infiltration rate of the least permeable soil horizon within 1.5 m below the proposed bottom elevation of the infiltration gallery is calculated. As per LIDSWMP, the applicable safety factor from Table C2 is applied to the infiltration rate at the proposed base of the infiltration pit. As per Table 3.4.1 of the LIDSWMP, the minimum distance between the base of the infiltration trench and the elevation of the high-water table or bedrock is 1.0 m.

The following table provides the ratio of infiltration rates, safety correction factor and design infiltration rate for the proposed infiltration pit locations:

Proposed Infiltration Pit Location	Proposed Bottom of Infiltration Pit Elevation (m)	Ratio of Infiltration Rates	Safety Correction Factor	Design Infiltration Rate (mm/hour)
BH 1	96.75	0.62	2.5	12.86
BH 1	95.53	0.87	2.5	20.76

It is required that an inspection of the infiltration gallery base be conducted prior to backfilling to ensure that the soils encountered are consistent with the borehole data so suitable infiltration rates are achieved.

All infiltration structures must be designed as per the Low Impact Development Stormwater Management Planning and Design Guide (LIDSWMP), as required.

Select excerpts from the Development Engineering Manual (DEM) which may be helpful for the proposed project site are provided below:

Excerpts from Section 4.2.8.4 of the DEM indicates the following:
- *Roof runoff must be directed to infiltration systems (i.e. infiltration galleries, bio-retention basins, rain gardens, grassed swales, vegetated filter strips, etc.) to encourage groundwater recharge to meet recharge targets.*
- *Infiltration devices are acceptable in soils with percolation rates of at least 15 mm/hr for the drainage of grassed and roofed areas. For less permeable soils, an overflow and/or under-drain connection to the storm conveyance system must be provided.*
- *Infiltration devices must be designed to fully infiltrate within a 24–48-hour period.*
- *Infiltration systems should be located a minimum of 4.0 m from any building foundation and 2.0 m away from any property line.*

Excerpts from Section 5.5.3 Roof Leaders of the DEM indicates the following:
- *All roof leaders that discharge to the ground via splash pads shall have flows directed away from the building onto grass filter strips or infiltration galleries.*
- *All roof leaders shall discharge to the elevation of the splash pad, not exceeding 100 mm above grade.*

Excerpts from Section 5.7.9 Low Impact Development Implementation of the DEM indicates the following:
- *Low impact development (LID) and Green Infrastructure (GI) footprints shall not cross property boundaries.*
- *Maintain a minimum of 1.0 m separation from the seasonal high groundwater level.*
- *An overflow bypass or splitter should be incorporated in the design.*
- *Maintain a minimum setback distance from building foundations (contradicts with Section 4.2.8.4 of the DEM - minimum of 4.0 m from any building foundation; however, the 5.0 m setback distance from building foundations is in conformance with the OBC); mounding calculations may also be required to set larger setbacks as appropriate.*
- *Maintain a minimum 1.2 m depth of cover to protect from frost action.*
- *All infiltration-based features should be designed to mitigate soil compaction to ensure long-term viability of design infiltration rates.*

Based on the soil and groundwater data obtained during the geotechnical investigation, there was no evidence of groundwater conditions (grey soil, wet soil conditions, etc.). It is of the opinion of CMT Inc. that groundwater conditions are unlikely to be a major concern for the installation and operation of the proposed infiltration gallery.

In addition to the above requirements of the DEM, CMT Engineering Inc. recommends the following:

- That each downspout entering the infiltration gallery be fitted with a strainer/leaf deflector as well as a rainwater leader overflow outlet just above grade that is equipped with a splash pad to direct water away from the foundation.

- That regular inspection/maintenance of the downspout strainer/leaf deflector is performed to ensure continuous operation and reduce the potential for the accumulation of sediment that can impede the functionality of the infiltration gallery.

The field data sheets for the permeameter tests can be found in Appendix C of this report.

5.12 Excess Soil Management

5.12.1. Chemical Testing was NOT Undertaken by CMT Engineering Inc.

Generally, if surplus soils are to be exported off-site, it will be necessary to perform chemical analysis of the soils. Chemical analysis was not undertaken as part of this geotechnical investigation. Should chemical analysis tests be required, the required tests vary and will be dependent on the disposal site utilized by the general contractor.

5.12.2. Leachate Testing Requirement

If soils are transported to a landfill facility, additional chemical testing in accordance with Ontario Regulation 347, Schedule 4, as amended to Ontario Regulation 558/00, dated March 2001, Toxicity Characteristic Leaching Procedure (TCLP) will be required.

When transporting soils off-site, the following is recommended:

- All chemical analyses and environmental assessment reports must be fully disclosed to the receiving site owners/authorities, who must agree to receive the material.
- An environmental consultant must confirm the land use at the receiving site is compatible to receive the material.
- An environmental consultant must monitor the transportation and placement of the materials to ensure that the material is placed appropriately at the pre-approved site.
- The excess materials may not be transported to a site that has previously had a Record of Site Condition (RSC) filed, unless the material meets the criteria outlined in the RSC.

It should be noted that landfill sites will generally only accept laboratory test results that have been completed within 30 days of exporting. Therefore, it is recommended that provisions for chemical analysis be included in the tender documents. It should also be noted that the laboratory testing generally takes five (5) working days to process with a regular turnaround time.

6.0 LIMITATIONS OF THE INVESTIGATION

The recommendations made in this report are in accordance with our present understanding of the project. We request that we be permitted to review our recommendations when the drawings and specifications are complete, or if the proposed construction should differ from that mentioned in this report.

It is important to emphasize that a soil investigation is, in fact, a random sampling of a site and the comments are based on the results obtained at the test locations only. It is therefore assumed that these results are representative of the subsoil conditions across the site. Should any conditions at the site be encountered which differ from those found at the test locations, we request that we be notified immediately in order to permit a reassessment of our recommendations.

It should be noted that this report specifically addresses geotechnical aspects of the project and does not include any investigations or assessments relating to potential subsurface contamination. As such, there should be no assumptions or conclusions derived from this report with respect to potential soil or water contamination. Soil or water contamination is generally caused by the presence of xenobiotic (human-made) chemicals or other alteration processes in the natural soil and groundwater environment. If necessary, the investigation, assessment and rehabilitation of soil and water contaminants should be undertaken by qualified environmental specialists.

The samples obtained during the geotechnical investigation will be stored for a period of three months, after which time they will be disposed of unless alternative arrangements are made.

This report is intended solely for the client named. Any use which a third party makes of this report, or any reliance on or decisions to be made based on it, are the reliability of such third parties. The factual data, interpretation, and recommendations in this report pertain to a specific project as described in this report and are not applicable to any other project or site location. If the project is modified in concept, location or elevation, deviates from the assumptions stated herein, CMT Inc. should be given an opportunity to confirm that the recommendations are still valid. The subject geotechnical exploration and this report address only the geotechnical aspects of the proposed project; potential environmental impacts or related issues are beyond the defined scope of this work and have not been addressed.

We trust that this report meets your present requirements. Should you have any questions, please do not hesitate to contact our office.

Prepared by:

Shawn Wheatley, M.Eng, LEL
tb

Reviewed by:

Nathan Chortos, P.Eng.
Senior Geotechnical Engineer

NOTES:

Base map provided by Region of Waterloo

N

NO.	DESCRIPTION	DATE

REVISIONS

CMT ENGINEERING INC.
1011 Industrial Crescent, Unit 1
St. Clements, Ontario N0B 2M0
Tel.: 519-699-5775
Fax: 519-699-4664
www.cmtinc.net

PROJECT:

GEOTECHNICAL INVESTIGATION
260 Waydom Drive,
Ayr, Ontario

DRAWING TITLE:

SITE LOCATION MAP

PROJECT NO.:	DATE:
20-225(b)	July 18, 2025
SCALE:	DRAWING NO.
N.T.S.	1

NOTES:

1. This drawing is for information purposes only. Locations and sizes of existing and proposed structures are approximate only, and should not be used for construction.
2. Base drawing provided by Region of Waterloo
3. Temporary Benchmark: Nail in HP on Waydom Drive
   Assumed Elevation = 100.00 m

LEGEND

- Approximate Borehole Location (2025)
- Benchmark Location

N

NO.	DESCRIPTION	DATE

REVISIONS

CMT ENGINEERING INC.
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Tel.: 519-699-5775
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PROJECT:

GEOTECHNICAL INVESTIGATION
260 Waydom Drive,
Ayr, Ontario

DRAWING TITLE:

SITE PLAN SHOWING
BOREHOLE LOCATIONS

PROJECT NO.:	DATE:
20-225(b)	July 18, 2025
SCALE:	DRAWING NO.
N.T.S.	2

APPENDIX A

BOREHOLE LOG

CMT Engineering Inc.
1011 Industrial Crescent. St. Clements
N0B 2M0
Telephone: 519-699-5775
Fax: 519-699-4664

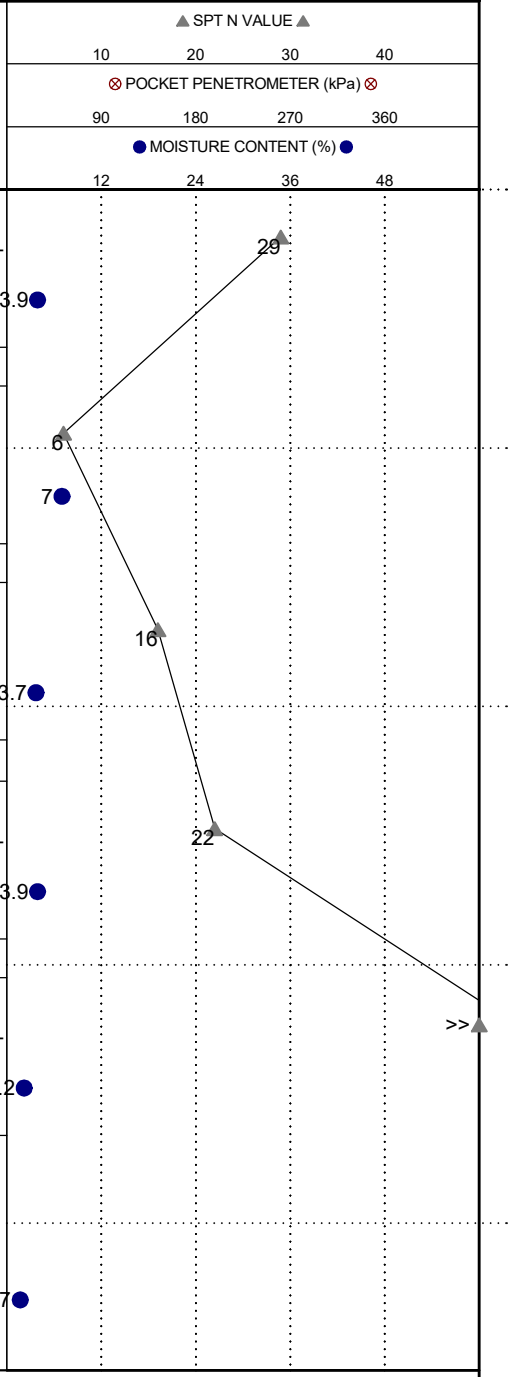
BOREHOLE NUMBER 1

PROJECT: Insitu Permeability Testing
PROJECT ADDRESS: 260 Waydom Drive,
PROJECT NUMBER: 20-225(b)
PROJECT LOCATION: Ayr, Ontario
DRILLING DATE: 25-5-27
GROUND ELEVATION: 97.97 m
DRILLING CONTRACTOR: CMT Drilling Inc.
LOGGED BY: SW
DRILLING EQUIPMENT: Geoprobe 7822DT
SAMPLING METHOD: SPT/MC5

DEPTH (m)	MATERIAL DESCRIPTION	Depth, Elevation (m)	SAMPLE TYPE NUMBER	RECOVERY %	BLOW COUNTS (N VALUE)
	RECYCLED ASPHALT PARTICLES (RAP) Compact, dark brown/black recycled asphalt, moist	0.00, 97.97			
		0.05, 97.92	SPT 1	61	12-15-14-10 (29)
	GRANULAR FILL Compact, brown, sand and gravel granular fill, some silt, moist	0.23, 97.74			
	SILTY SAND FILL Compact, dark brown, silty sand, trace gravel and clay, moist				
1	Becoming loose, some gravel	0.76, 97.21	SPT 2	80	9-3-3-5 (6)
	SAND Compact, brown sand, trace silt and gravel, moist	1.52, 96.45	SPT 3	49	6-7-9-9 (16)
2					
	SAND AND GRAVEL Compact, brown sand and gravel, some silt, trace clay, moist	2.41, 95.56	SPT 4	61	10-10-12-18 (22)
3	Becoming very dense, gravelly sand	3.05, 94.92	SPT 5	49	28-26-28-25 (54)
4			MC5 6	90	

Borehole caved to approximately 3.81 m. No accumulated groundwater encountered upon completion.

Bottom of borehole at 4.57 m, Elevation 93.40 m.



APPENDIX B

GRAIN SIZE ANALYSES

Particle Size Distribution Report

	% Cobbles	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	13.1	5.1	14.3	41.5	20.1	5.9

SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	BH1	2	1.22m	silty sand, some gravel, trace clay	SM
				Sampled by SW of CMT Engineering Inc. May 27, 2025	
				Tested by JM of CMT Engineering Inc. May 28, 2025	

CMT Engineering Inc.

St. Clements, ON

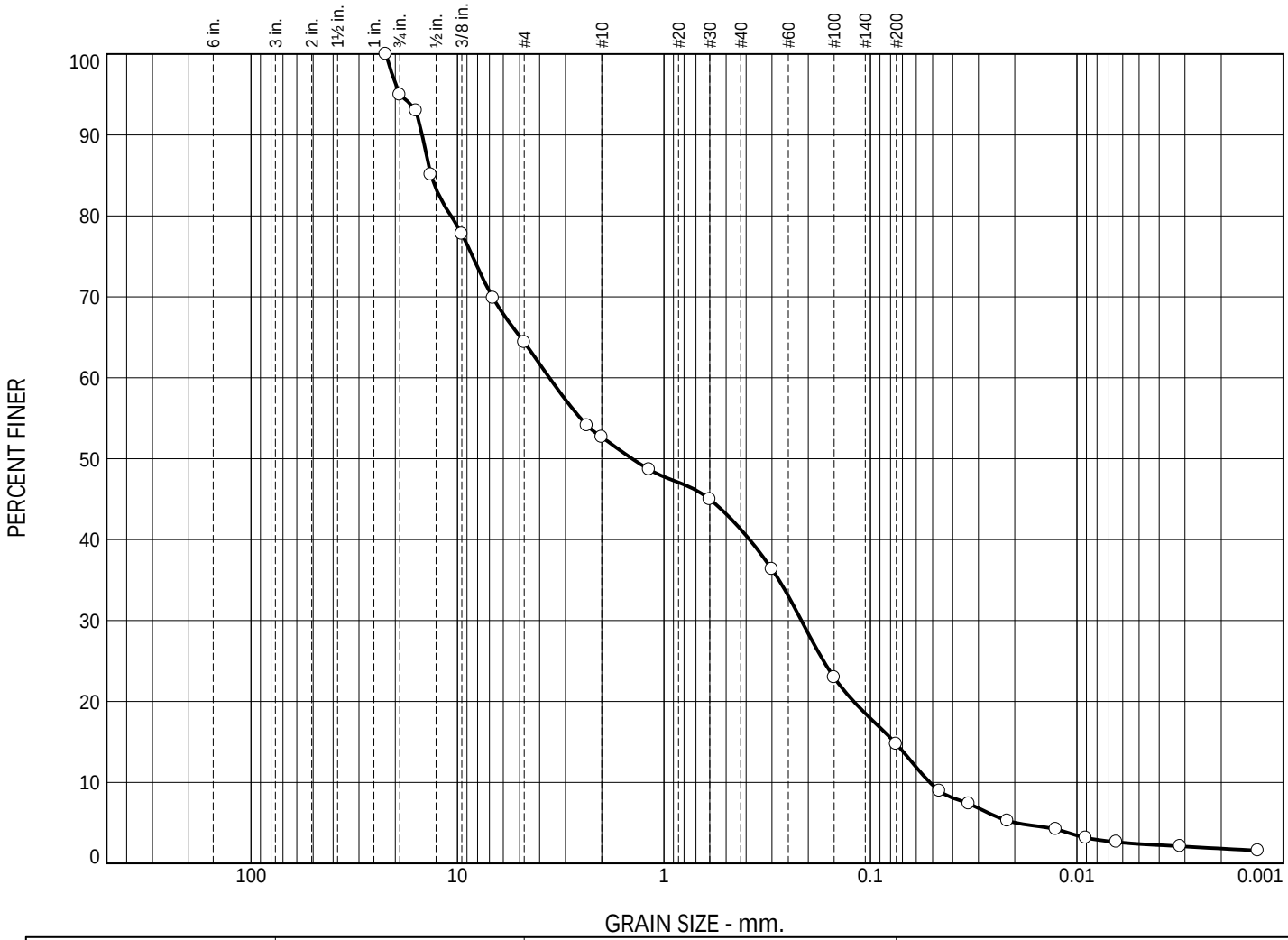
Client: Tacoma Engineers Inc.

Project: Monitoring Well Installation
260 Waydom Drive, Ayr, Ontario

Project No.: 20-225(b)

Figure 1

Particle Size Distribution Report



	% Cobbles	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	5.0	30.6	11.7	11.4	26.6	12.9	1.8

SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	BH1	4	2.44m	sand and gravel, some silt, trace clay	SM
				Sampled by SW of CMT Engineering Inc. May 27, 2025	
				Tested by JM of CMT Engineering Inc. May 28, 2025	

CMT Engineering Inc.

St. Clements, ON

Client: Tacoma Engineers Inc.

Project: Monitoring Well Installation
260 Waydom Drive, Ayr, Ontario

Project No.: 20-225(b)

Figure 2

Particle Size Distribution Report

	% Cobbles	% Gravel		% Sand			% Fines	
		Coarse	Fine	Coarse	Medium	Fine	Silt	Clay
○	0.0	0.0	27.8	17.4	19.3	21.9	10.7	2.9

SOIL DATA

	SOURCE	SAMPLE NO.	DEPTH (ft.)	Material Description	USCS
○	BH1	6	3.96m	gravelly sand, some silt, trace clay	SM
				Sampled by SW of CMT Engineering Inc. May 27, 2025	
				Tested by JM of CMT Engineering Inc. May 28, 2025	

CMT Engineering Inc.

St. Clements, ON

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260 Waydom Drive, Ayr, Ontario

Project No.: 20-225(b)

Figure 3

APPENDIX C

GUELPH PERMEAMETER FIELD SHEETS

Guelph Permeameter Field Data Sheet

Test #: 1 **upper**/middle/lower

Project:	Insitu Permeability Testing	Job No:	20-225(b)	
Address:	260 Waydom Drive, Ayr	Tech:	SW	
Depth of Test:	1.22 m (4.0 ft)	Date:	27-May-25	
Soil Type:	Silty Sand Fill, some gravel, trace clay	BH:	BH1	**notch up**/notch dwn
Water Height:	10 cm	Hole Diameter:	5.72	**35.22cm^2**/2.16cm^2

[1] Elapsed Time min	[2] Reading cm	[3] Change in Height cm	[4] Change in time min	[5] = [3]/[4] Infiltration rate cm/min	Notes
0	0.0				
1:00	2.8	2.8	1	2.8	
2:00	2.9	0.1	1	0.1	
3:00	3.6	0.7	1	0.7	
4:00	3.7	0.1	1	0.1	
5:00	3.7	0	1	0	
6:00	3.8	0.1	1	0.1	
7:00	3.8	0	1	0	
8:00	3.9	0.1	1	0.1	
9:00	3.9	0	1	0	
10:00	4.0	0.1	1	0.1	
11:00	4.0	0	1	0	
12:00	4.1	0.1	1	0.1	
13:00	4.1	0	1	0	
14:00	4.2	0.1	1	0.1	
15:00	4.2	0	1	0	
			Steady Rate: 0.05 cm/min		

Notes:

1) If there is less than 4mm in 20 minutes (0.2 mm/minute) the field hydraulic conductivity is less than 1.0x10^-6 cm/sec. After 3 to 5 consistent infiltration rate readings the infiltration rate is at steady state.

a) Ensure tight seal before filling

b) Ensure rubber stopper is back in permeameter (after filling) before breaking seal

Guelph Permeameter Field Data Sheet

Test #: 2 upper/**middle**/lower

Project:	Insitu Permeability Testing	Job No:	20-225(b)	
Address:	260 Waydom Drive, Ayr	Tech:	SW	
Depth of Test:	2.44 m (8.0 ft)	Date:	27-May-25	
Soil Type:	Sand and gravel, some silt, trace clay	BH:	BH1	**notch up**/notch dwn
Water Height:	10 cm	Hole Diameter:	5.72	**35.22cm^2**/2.16cm^2

[1] Elapsed Time min	[2] Reading cm	[3] Change in Height cm	[4] Change in time min	[5] = [3]/[4] Infiltration rate cm/min	Notes
0	0.0				
0:30	5.5	5.5	0.5	11	
1:00	9.0	3.5	0.5	7	
1:30	12.0	3	0.5	6	
2:00	15.0	3	0.5	6	
2:30	18.0	3	0.5	6	
3:00	20.0	2	0.5	4	
3:30	22.5	2.5	0.5	5	
4:00	25.0	2.5	0.5	5	
4:30	27.5	2.5	0.5	5	
5:00	30.0	2.5	0.5	5	
5:30	32.5	2.5	0.5	5	
6:00	35.0	2.5	0.5	5	
6:30	37.5	2.5	0.5	5	
7:00	40.0	2.5	0.5	5	
7:30	42.5	2.5	0.5	5	
8:00	45.0	2.5	0.5	5	
			Steady Rate: 5.0 cm/min		

Notes:

1) If there is less than 4mm in 20 minutes (0.2 mm/minute) the field hydraulic conductivity is less than 1.0x10^-6 cm/sec. After 3 to 5 consistent infiltration rate readings the infiltration rate is at steady state.

a) Ensure tight seal before filling

b) Ensure rubber stopper is back in permeameter (after filling) before breaking seal

Guelph Permeameter Field Data Sheet

Test #: 3 upper/middle/**lower**

Project:	Insitu Permeability Testing	Job No:	20-225(b)	
Address:	260 Waydom Drive, Ayr	Tech:	SW	
Depth of Test:	3.96 m (13.0 ft)	Date:	27-May-25	
Soil Type:	Sand and gravel, some silt, trace clay	BH:	BH1	**notch up**/notch dwn
Water Height:	10 cm	Hole Diameter:	5.72	**35.22cm^2**/2.16cm^2

[1] Elapsed Time min	[2] Reading cm	[3] Change in Height cm	[4] Change in time min	[5] = [3]/[4] Infiltration rate cm/min	Notes
0	0.0				
0:30	15.5	15.5	0.5	31	
1:00	24.5	9	0.5	18	
1:30	38.0	13.5	0.5	27	
2:00	45.0	7	0.5	14	
2:30	51.5	6.5	0.5	13	
3:00	67.0	15.5	0.5	31	
3:30	73.5	6.5	0.5	13	
0:00	0.0				refill
0:30	8.0	8	0.5	16	
1:00	13.5	5.5	0.5	11	
1:30	18.0	4.5	0.5	9	
2:00	24.0	6	0.5	12	
2:30	30.5	6.5	0.5	13	
3:00	37.0	6.5	0.5	13	
3:30	42.5	5.5	0.5	11	
4:00	49.0	6.5	0.5	13	
4:30	55.5	6.5	0.5	13	
5:00	62.0	6.5	0.5	13	
5:30	68.5	6.5	0.5	13	
			Steady Rate: 13.0 cm/min		

Notes:

1) If there is less than 4mm in 20 minutes (0.2 mm/minute) the field hydraulic conductivity is less than 1.0x10^-6 cm/sec. After 3 to 5 consistent infiltration rate readings the infiltration rate is at steady state.

a) Ensure tight seal before filling

b) Ensure rubber stopper is back in permeameter (after filling) before breaking seal