AECOM Canada Ltd.

GENERAL STATEMENT

NORMAL VARIABILITY OF SUBSURFACE CONDITIONS

The scope of the investigation presented herein is limited to an investigation of the subsurface conditions as to suitability for the proposed project. This report has been prepared to aid in the evaluation of the site and to assist the engineer in the design of the facilities. Our description of the project represents our understanding of the significant aspects of the project relevant to the design and construction of earth work, foundations and similar. In the event of any changes in the basic design or location of the structures as outlined in this report or plan, we should be given the opportunity to review the changes and to modify or reaffirm in writing the conclusions and recommendations of this report.

The analysis and recommendations presented in this report are based on the data obtained from the borings and test pit excavations made at the locations indicated on the site plans and from other information discussed herein. This report is based on the assumption that the subsurface conditions everywhere are not significantly different from those disclosed by the borings and excavations. However, variations in soil conditions may exist between the excavations and, also, general groundwater levels and conditions may fluctuate from time to time. The nature and extent of the variations may not become evident until construction. If subsurface conditions differ from those encountered in the exploratory borings and excavations, are observed or encountered during construction, or appear to be present beneath or beyond excavations, we should be advised at once so that we can observe and review these conditions and reconsider our recommendations where necessary.

Since it is possible for conditions to vary from those assumed in the analysis and upon which our conclusions and recommendations are based, a contingency fund should be included in the construction budget to allow for the possibility of variations which may result in modification of the design and construction procedures.

In order to observe compliance with the design concepts, specifications or recommendations and to allow design changes in the event that subsurface conditions differ from those anticipated, we recommend that all construction operations dealing with earth work and the foundations be observed by an experienced soils engineer. We can be retained to provide these services for you during construction. In addition, we can be retained to review the plans and specifications that have been prepared to check for substantial conformance with the conclusions and recommendations contained in our report.

EXPLANATION OF FIELD & LABORATORY TEST DATA

The field and laboratory test results, as shown for each hole, are described below.

1. NATURAL MOISTURE CONTENT

The relationship between the natural moisture content and depth is significant in determining the subsurface moisture conditions. The Atterberg Limits for a sample should be compared to its natural moisture content and plotted on the Plasticity Chart in order to determine the soil classification.

2. SOIL PROFILE AND DESCRIPTION

Each soil stratum is classified and described noting any special conditions. The Modified Unified Classification System (MUCS) is used. The soil profile refers to the existing ground level at the time the hole was done. Where available, the ground elevation is shown. The soil symbols used are shown in detail on the soil classification chart.

3. TESTS ON SOIL SAMPLES

Laboratory and field tests are identified by the following and are on the logs:

N - Standard Penetration Test (SPT) Blow Count. The SPT is conducted in the field to assess the in-situ consistency of cohesive soils and the relative density of non-cohesive soils. The N value recorded is the number of blows from a 63.5 kg hammer dropped 760 mm which is required to drive a 51 mm split spoon sampler 300 mm into the soil.

SO_4 - Water Soluble Sulphate Content. Expressed in percent. Conducted primarily to determine requirements for the use of sulphate resistant cement. Further details on the water-soluble sulphate content are given in Section 6.

γ_D - Dry Unit Weight. Usually expressed in kN/m^3.

γ_T - Total Unit Weight. Usually expressed in kN/m^3.

Q_U - Unconfined Compressive Strength. Usually expressed in kPa and may be used in determining allowable bearing capacity of the soil.

C_U - Undrained Shear Strength. Usually expressed in kPa. This value is determined by either a direct shear test or by an unconfined compression test and may also be used in determining the allowable bearing capacity of the soil.

C_{PEN} - Pocket Penetrometer Reading. Usually expressed in kPa. Estimate of the undrained shear strength as determined by a pocket penetrometer.

The following tests may also be performed on selected soil samples and the results are given on separate sheets enclosed with the logs:

- Grain Size Analysis
- Standard or Modified Proctor Compaction Test
- California Bearing Ratio Test
- Direct Shear Test
- Permeability Test
- Consolidation Test
- Triaxial Test

4. SOIL DENSITY AND CONSISTENCY

The SPT test described above may be used to estimate the consistency of cohesive soils and the density of cohesionless soils. These approximate relationships are summarized in the following tables:

Table 1 Cohesive Soils

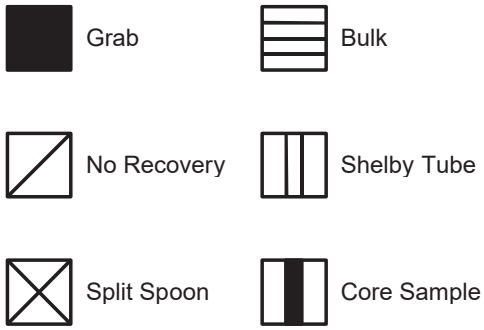
N	Consistency	C_u (kPa) approx.
0 - 1	Very Soft	<10
1 - 4	Soft	10 - 25
4 - 8	Firm	25 - 50
8 - 15	Stiff	50 - 100
15 - 30	Very Stiff	100 - 200
30 - 60	Hard	200 - 300
>60	Very Hard	>300

Table 2 Cohesionless Soils

N	Density
0 - 5	Very Loose
5 - 10	Loose
10 - 30	Compact
30 - 50	Dense
>50	Very Dense

5. SAMPLE CONDITION AND TYPE

The depth, type, and condition of samples are indicated on the logs by the following symbols:



6. WATER SOLUBLE SULPHATE CONCENTRATION

The following table, from CSA Standard A23.1-14, indicates the requirements for concrete subjected to sulphate attack based upon the percentage of water-soluble sulphate as presented on the logs. CSA Standard A23.1-14 should be read in conjunction with the table.

Table 3 Requirements for Concrete Subjected to Sulphate Attack*

Class of exposure	Degree of exposure	Water-soluble sulphate (SO_4)† in soil sample, %	Sulphate (SO_4) in groundwater samples, mg/L‡	Water soluble sulphate (SO_4) in recycled aggregate sample, %	Cementing materials to be used§††	Performance requirements§,§§		
						Maximum expansion when tested using CSA A3004-C8 Procedure A at 23 °C, %		Maximum expansion when tested using CSA A3004-C8 Procedure B at 5 °C, % †††
						At 6 months	At 12 months††	At 18 months‡‡
S-1	Very severe	> 2.0	> 10 000	> 2.0	HS** ,HSb, HSLb*** or HSe	0.05	0.10	0.10
S-2	Severe	0.20–2.0	1500–10 000	0.60–2.0	HS**, HSb, HSLb*** or HSe	0.05	0.10	0.10
S-3	Moderate (including seawater exposure*)	0.10–0.20	150–1500	0.20–0.60	MS, MSb, MSe, MSLb***, LH, LHb, HS**, HSb, HSLb*** or HSe	0.10		0.10

*For sea water exposure, also see Clause 4.1.1.5.
†In accordance with CSA A23.2-3B.
‡In accordance with CSA A23.2-2B.
§Where combinations of supplementary cementing materials and portland or blended hydraulic cements are to be used in the concrete mix design instead of the cementing materials listed, and provided they meet the performance requirements demonstrating equivalent performance against sulphate exposure, they shall be designated as MS equivalent (MSe) or HS equivalent (HSe) in the relevant sulphate exposures (see Clauses 4.1.1.6.2, 4.2.1.1, and 4.2.1.3, and 4.2.1.4).
**Type HS cement shall not be used in reinforced concrete exposed to both chlorides and sulphates, including seawater. See Clause 4.1.1.6.3.

††The requirement for testing at 5 °C does not apply to MS, HS, MSb, HSb, and MSe and HSe combinations made without portland limestone cement.
‡‡ If the increase in expansion between 12 and 18 months exceeds 0.03%, the sulphate expansion at 24 months shall not exceed 0.10% in order for the cement to be deemed to have passed the sulphate resistance requirement.
§§For demonstrating equivalent performance, use the testing frequency in Table 1 of CSA A3004-A1 and see the applicable notes to Table A3 in A3001 with regard to re-establishing compliance if the composition of the cementing materials used to establish compliance changes.
***Where MSLb or HSLb cements are proposed for use, or where MSe or HSe combinations include Portland-limestone cement, they must also contain a minimum of 25% Type F fly ash or 40% slag or 15% metakaolin (meeting Type N pozzolan requirements) or a combination of 5% Type SF silica fume with 25% slag or a combination of 5% Type SF silica fume with 20% Type F fly ash. For some proposed MSLb, HSLb, and MSe or HSe combinations that include Portland-limestone cement, higher SCM replacement levels may be required to meet the A3004-C8 Procedure B expansion limits. Due to the 18-month test period, SCM replacements higher than the identified minimum levels should also be tested. In addition, sulphate resistance testing shall be run on MSLb and HSLb cement and MSe or HSe combinations that include Portland-limestone cement at both 23 °C and 5 °C as specified in the table.
†††If the expansion is greater than 0.05% at 6 months but less than 0.10% at 1 year, the cementing materials combination under test shall be considered to have passed.

7. SOIL CORROSIVITY

The following table, from the Handbook of Corrosion Engineering (Roberge, 1999) indicates the corrosivity rating can be obtained from the soil resistivity, presented on the logs.

Table 4 Corrosivity Ratings Based on Soil Resistivity

Soil Resistivity (ohm-cm)	Corrosivity Rating
>20,000	Essentially non-corrosive
10,000 – 20,000	Mildly corrosive
5,000 – 10,000	Moderately corrosive
3,000 – 5,000	Corrosive
1,000 – 3,000	Highly corrosive
<1,000	Extremely corrosive

8. GROUNDWATER TABLE

The groundwater table is indicated by the equilibrium level of water in a standpipe installed in a testhole or test pit. This level is generally taken at least 24 hours after installation of the standpipe. The groundwater level is subject to seasonal variations and is usually highest in the spring. The symbol on the logs indicating the groundwater level is an inverted solid triangle (▼).

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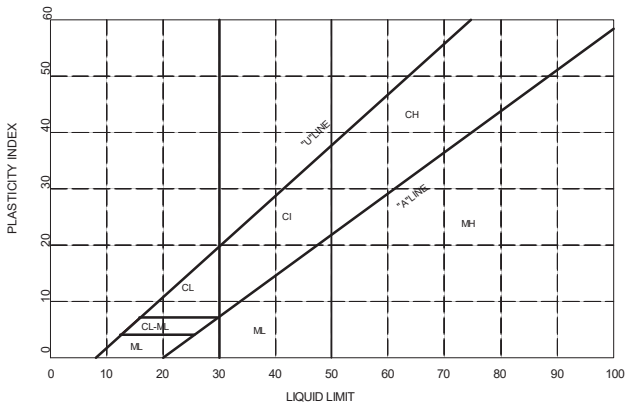
MAJOR DIVISION			LOG SYMBOLS	UCS	TYPICAL DESCRIPTION	LABORATORY CLASSIFICATION CRITERIA	
COARSE GRAINED SOILS	GRAVELS (MORE THAN HALF COARSE GRAINS LARGER THAN 4.75 mm)	CLEAN GRAVELS (LITTLE OR NO FINES)		GW	WELL GRADED GRAVELS, LITTLE OR NO FINES	$C_u = \frac{D_{60}}{D_{10}} > 4$ $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1 \text{ to } 3$	
				GP	POORLY GRADED GRAVELS AND GRAVEL-SAND MIXTURES, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS	
		GRAVELS WITH FINES		GM	SILTY GRAVELS, GRAVEL-SAND-SILT MIXTURES	CONTENT OF FINES EXCEEDS 12%	ATTERBERG LIMITS BELOW 'A' LINE W_P LESS THAN 4
				GC	CLAYEY GRAVELS, GRAVEL-SAND-CLAY MIXTURES		ATTERBERG LIMITS ABOVE 'A' LINE W_P MORE THAN 7
	SANDS (MORE THAN HALF COARSE GRAINS SMALLER THAN 4.75 mm)	CLEAN SANDS (LITTLE R NO FINES)		SW	WELL GRADED SANDS, GRAVELLY SANDS, LITTLE OR NO FINES	$C_u = \frac{D_{60}}{D_{10}} > 6$ $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}} = 1 \text{ to } 3$	
				SP	POORLY GRADED SANDS, LITTLE OR NO FINES	NOT MEETING ABOVE REQUIREMENTS	
		SANDS WITH FINES		SM	SILTY SANDS, SAND-SILT MIXTURES	CONTENT OF FINES EXCEEDS 12%	ATTERBERG LIMITS BELOW 'A' LINE W_P LESS THAN 4
				SC	CLAYEY SANDS, SAND-CLAY MIXTURES		ATTERBERG LIMITS ABOVE 'A' LINE W_P MORE THAN 7
FINE GRAINED SOILS	SILTS (BELOW 'A' LINE NEGLIGIBLE ORGANIC CONTENT)	$W_L < 50$		ML	INORGANIC SILTS AND VERY FINE SANDS, ROCK FLOUR, SILTY SANDS OF SLIGHT PLASTICITY	CLASSIFICATION IS BASED UPON PLASTICITY CHART (SEE BELOW)	
		$W_L > 50$		MH	INORGANIC SILTS, MICACEOUS OR DIATOMACEOUS FINE SANDY OR SILTY SOILS		
	CLAYS (ABOVE 'A' LINE NEGLIGIBLE ORGANIC CONTENT)	$W_L < 30$		CL	INORGANIC CLAYS OF LOW PLASTICITY, GRAVELLY, SANDY, OR SILTY CLAYS, LEAN CLAYS	WHENEVER THE NATURE OF THE FINE CONTENT HAS NOT BEEN DETERMINED, IT IS DESIGNATED BY THE LETTER 'F'. E.G. SF IS A MIXTURE OF SAND WITH SILT OR CLAY	
		$30 < W_L < 50$		CI	INORGANIC CLAYS OF MEDIUM PLASTICITY, SILTY CLAYS		
		$W_L > 50$		CH	INORGANIC CLAYS OF HIGH PLASTICITY, FAT CLAYS		
	ORGANIC SILTS & CLAYS (BELOW 'A' LINE)	$W_L < 50$		OL	ORGANIC SILTS AND ORGANIC SILTY CLAYS OF LOW PLASTICITY		
		$W_L > 50$		OH	ORGANIC CLAYS OF HIGH PLASTICITY		
HIGHLY ORGANIC SOILS				Pt	PEAT AND OTHER HIGHLY ORGANIC SOILS	STRONG COLOUR OR ODOUR, AND OFTEN FIBROUS TEXTURE	
BEDROCK				BR	SEE REPORT DESCRIPTION		
FILL				FILL	SEE REPORT DESCRIPTION		



NOTE:
1. BOUNDARY CLASSIFICATION POSSESSING CHARACTERISTICS OF TWO GROUPS ARE GIVEN GROUP SYMBOLS, E.G. GW-GC IS A WELL GRADED GRAVEL MIXTURE WITH CLAY BINDER BETWEEN 5% AND 12%

SOIL COMPONENTS

FRACTION		SIEVE SIZE (mm)		DEFINING RANGES OF PERCENTAGE BY WEIGHT OF MINOR COMPONENTS	
		PASSING	RETAINED	PERCENT	IDENTIFIER
GRAVEL	COARSE	75	19	50 - 35	AND
	FINE	19	4.75		
SAND	COARSE	4.75	2.00	35 – 20	_____Y
	MEDIUM	2.00	0.425		
	FINE	0.425	0.080	20 – 10	SOME
SILT (non-plastic) or CLAY (plastic)		0.080		10 - 1	TRACE
OVERSIZE MATERIALS					
ROUNDED OR SUB-ROUNDED COBBLES 75 mm TO 200 mm BOULDERS >200 mm		ANGULAR ROCK FRAGMENTS ROCKS > 0.75 m3 IN VOLUME			

MODIFIED UNIFIED SOIL CLASSIFICATION SYSTEM

August 2015

PROJECT: Jefferson East CSR Works (Contract 7)	CLIENT: City of Winnipeg	TESTHOLE NO: **TH22-06**
LOCATION: UTM 14 - 5533236 m N, 634597 m E		PROJECT NO.: 60599385
CONTRACTOR: Maple Leaf Drilling	METHOD: Acker MP5 - 125 mm SSA	ELEVATION (m): 230.99

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

DEPTH (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	COMMENTS	ELEVATION
0	TOPSOIL (100 mm) - black, moist					230
1	CLAY - silty, some sand, trace gravel - dark greyish-brown, stiff, moist - high plasticity		G1			
2	SILT - some clay, trace sand - light brown, soft, moist - low plasticity - sandy below 1.5 m		S2	7	SPT Blows: [4/4/3], Spoon Recovery: 44%	229
			G3			
3	CLAY - silty - brown mottled grey, firm, moist - high plasticity		T4		Tube Recovery: 100%	228
4						227
5			G5		(G5): Gravel 0.0%, Sand 0.0%, Silt 23.3%, Clay 76.7%	226
6			S6	7	SPT Blows: [3/4/3], Spoon Recovery: 100%	225
7						224
8			G7			223
	- grey below 8.2 m					
9						222
	- trace till inclusions from 9.1 m to 12.2 m		T8		Tube Recovery: 100%	
10						221
11	- trace sand below 10.5 m		G9		(G9): Gravel 0.0%, Sand 6.3%, Silt 24.9%, Clay 68.8%	220
12						219
	- some till inclusions below 12.2 m		S10	5	SPT Blows: [2/2/3], Spoon Recovery: 100%	
13						218
14			G11			217
15	SILT (Till) - clayey, some sand, trace gravel - light brown, stiff, moist - low plasticity		S12	12	SPT Blows: [5/7/5], Spoon Recovery: 100%	216
16						215
17						214
18			G14			213
	END OF TEST HOLE AT 18.29 m ON AUGER REFUSAL					
19	Notes: 1. Seepage not observed during augering. 2. Sloughing not observed during augering. 3. Auger refusal met at 18.3 m. 4. Test hole backfilled with sand from 18.3 m to 17.1 m, bentonite from 17.1 m to 0.3 m, and sand from 0.3 m to 0.2 m. Flush-mount cover installed. 5. Groundwater monitoring: - July 13, 2022 at elev. 226.11 m (4.88 m bgs)					212
20						211
21						210
22						

PENETRATION TESTS: ✳ Becker ✳ | ◇ Dynamic Cone ◇ | ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100 | ■ Total Unit Wt ■ (kN/m^3) 16 17 18 19 20 21 | Plastic MC Liquid 20 40 60 80 100

UNDRAINED SHEAR STRENGTH: + Torvane + | × QU/2 × | □ Lab Vane □ | △ Pocket Pen. △ | ⬘ Field Vane ⬘ (kPa) 50 100 150 200

LOGGED BY: Ryan Harras		COMPLETION DEPTH: 18.29 m
REVIEWED BY: Faris Alobaidy		COMPLETION DATE: 6/21/22
PROJECT ENGINEER: J. Thompson		Page 1 of 1

AECOM

LOG OF TEST HOLE 60680190 - TEST HOLE LOGS - CONTRACT 7.GPJ UMA WINN.GDT 7/27/22

PROJECT: Jefferson East CSR Works (Contract 7)	CLIENT: City of Winnipeg	TESTHOLE NO: **TH22-07**
LOCATION: UTM 14 - 5533328 m N, 634603 m E		PROJECT NO.: 60599385
CONTRACTOR: Maple Leaf Drilling	METHOD: Acker MP5 - 125 mm SSA	ELEVATION (m): 230.82

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ⊘ NO RECOVERY ◧ CORE

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TESTS: ✳ Becker ✳, ◇ Dynamic Cone ◇, ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ (kN/m^3) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100	UNDRAINED SHEAR STRENGTH: + Torvane +, × QU/2 ×, □ Lab Vane □, △ Pocket Pen. △, ⬘ Field Vane ⬘ (kPa) 50 100 150 200	COMMENTS	ELEVATION
0		TOPSOIL (125 mm) - black, moist							
		CLAY - silty, some sand - dark grey, stiff, moist - high plasticity		G1		●			230
1		SILT - some clay, trace sand - light brown, soft, moist to wet - low plasticity		S2	7	◆ ●		SPT Blows: [3/3/4], Spoon Recovery: 50%	229
2		CLAY - silty - brown mottled grey, firm to stiff, moist - high plasticity		G3		●			
3				G4		●		(G4): Gravel 0.0%, Sand 0.0%, Silt 18.0%, Clay 82.0%	228
4									227
5				T5		■ ●	× △	Tube Recovery: 100%	226
6				G6		●			225
7									224
8		- grey, firm below 7.6 m		S7	7	◆ ●		SPT Blows: [3/4/3], Spoon Recovery: 100%	223
9				G8		●			222
10									221
11				T9		● ■	×	Tube Recovery: 100%	220
12				G10		●			219
		END OF TEST HOLE AT 12.19 m IN CLAY Notes: 1. Seepage not observed during augering. 2. Sloughing not observed during augering. 3. Test hole backfilled with auger cuttings and bentonite upon completion.							218
13									217
14									216
15									

AECOM

LOGGED BY: Ryan Harras	COMPLETION DEPTH: 12.19 m
REVIEWED BY: Faris Alobaidy	COMPLETION DATE: 6/22/22
PROJECT ENGINEER: J. Thompson	Page 1 of 1

LOG OF TEST HOLE 60680190 - TEST HOLE LOGS - CONTRACT 7.GPJ UMA WINN.GDT 7/27/22

PROJECT: Jefferson East CSR Works (Contract 7)	CLIENT: City of Winnipeg	TESTHOLE NO: **TH22-08**
LOCATION: UTM 14 - 5533399 m N, 634453 m E		PROJECT NO.: 60599385
CONTRACTOR: Maple Leaf Drilling	METHOD: Acker MP5 - 125 mm SSA	ELEVATION (m): 230.90

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ▨ SPLIT SPOON ▤ BULK ▨ NO RECOVERY ◧ CORE

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TESTS ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100 ■ Total Unit Wt ■ (kN/m^3) 16 17 18 19 20 21 Plastic MC Liquid 20 40 60 80 100	UNDRAINED SHEAR STRENGTH + Torvane + × QU/2 × □ Lab Vane □ △ Pocket Pen. △ ⬘ Field Vane ⬘ (kPa) 50 100 150 200	COMMENTS	ELEVATION
0		TOPSOIL (100 mm) - black, moist							
		CLAY - silty, some sand - dark grey, stiff, moist		G1					
1		- high plasticity							230
		SILT - some clay, trace sand - light brown, soft to firm, moist		G2				(G2): Gravel 0.0%, Sand 8.4%, Silt 74.2%, Clay 17.4%	
2		- low plasticity CLAY - silty, trace sand - brown mottled grey, stiff, moist		G3					229
		- high plasticity							
3				S4	8			SPT Blows: [3/4/4], Spoon Recovery: 100%	228
4									
				G5					227
5									
6									226
				T6				Tube Recovery: 100%	225
7									
				G7					224
8		- grey below 7.6 m							
									223
9									
				S8	8			SPT Blows: [3/4/4], Spoon Recovery: 100%	222
10									
				G9					221
11		- firm, trace till inclusions below 10.7 m							
									220
12									
				T10				Tube Recovery: 100%	219
13		END OF TEST HOLE AT 12.80 m IN CLAY							
		Notes: 1. Seepage observed below 9.1 m during augering. 2. Sloughing not observed during augering. 3. Test hole backfilled with auger cuttings and bentonite upon completion.							218
14									217
15									216

AECOM

LOGGED BY: Ryan Harras	COMPLETION DEPTH: 12.80 m
REVIEWED BY: Faris Alobaidy	COMPLETION DATE: 6/22/22
PROJECT ENGINEER: J. Thompson	Page 1 of 1

LOG OF TEST HOLE 60680190 - TEST HOLE LOGS - CONTRACT 7.GPJ UMA WINN.GDT 7/27/22

PROJECT: Jefferson East CSR Works (Contract 7)	CLIENT: City of Winnipeg	TESTHOLE NO: **TH22-09**
LOCATION: UTM 14 - 5533484 m N, 634716 m E		PROJECT NO.: 60599385
CONTRACTOR: Maple Leaf Drilling	METHOD: Acker MP5 - 125 mm SSA	ELEVATION (m): 231.26

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ⊘ NO RECOVERY ◧ CORE

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TESTS ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100 ■ Total Unit Wt ■ (kN/m³) 16 17 18 19 20 21 Plastic MC Liquid 20 40 60 80 100	UNDRAINED SHEAR STRENGTH + Torvane + × QU/2 × □ Lab Vane □ △ Pocket Pen. △ ⬘ Field Vane ⬘ (kPa) 50 100 150 200	COMMENTS	ELEVATION
0		TOPSOIL (150 mm) - black, moist							231
		CLAY - silty - dark grey, stiff, moist - high plasticity - brown below 0.6 m		G1					
1									230
				G2				(G2): Gravel 0.0%, Sand 0.0%, Silt 27.8%, Clay 72.2%	
2		SILT - some clay, trace sand - light brown, soft to firm, moist to wet - low plasticity - clayey below 1.8 m		G3					229
		CLAY - silty - brown mottled grey, soft, moist - high plasticity							
3				S4	3			SPT Blows: [2/1/2], Spoon Recovery: 67%	228
4									
				G5					227
5									
									226
6		- grey, firm below 6.1 m							
				T6				Tube Recovery: 100%	225
7									
				G7				(G7): Gravel 0.0%, Sand 0.0%, Silt 30.9%, Clay 69.1%	224
8									
									223
9				S8	5			SPT Blows: [2/2/3], Spoon Recovery: 100%	
									222
10									
				G9					221
11									
									220
12				G10					
		END OF TEST HOLE AT 12.19 m IN CLAY Notes: 1. Seepage observed below 6.1 m during augering. 2. Water to 1.8 m bgs upon completion of augering. 3. Sloughing not observed during augering. 4. Test hole backfilled with auger cuttings and bentonite upon completion.							219
13									
									218
14									
									217
15									

AECOM

LOGGED BY: Ryan Harras	COMPLETION DEPTH: 12.19 m
REVIEWED BY: Faris Alobaidy	COMPLETION DATE: 6/22/22
PROJECT ENGINEER: J. Thompson	Page 1 of 1

LOG OF TEST HOLE 60680190 - TEST HOLE LOGS - CONTRACT 7.GPJ UMA WINN.GDT 7/27/22

PROJECT: Jefferson East CSR Works (Contract 7)	CLIENT: City of Winnipeg	TESTHOLE NO: **TH22-10**
LOCATION: UTM 14 - 5533562 m N, 634517 m E		PROJECT NO.: 60599385
CONTRACTOR: Maple Leaf Drilling	METHOD: Acker MP5 - 125 mm SSA	ELEVATION (m): 231.14

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

DEPTH (m)	SOIL SYMBOL	SLOTTED PIEZOMETER	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	COMMENTS	ELEVATION
0			TOPSOIL (100 mm) - black, moist					231
1			CLAY - silty, some sand, trace gravel - dark grey, stiff, moist - high plasticity		G1			230
2			SILT - some clay, trace sand - light brown, soft, moist - low plasticity		S2	7	SPT Blows: [2/3/4], Spoon Recovery: 44%	229
3			CLAY - silty - brown mottled grey, firm to stiff, moist - high plasticity		G3			228
4					G4			227
5					T5		Tube Recovery: 100%, (T5): Gravel 0.0%, Sand 0.0%, Silt 10.3%, Clay 89.7%	226
6					G6			225
7								224
8			- grey below 7.6 m		S7	9	SPT Blows: [3/4/5], Spoon Recovery: 100%	223
9					G8			222
10								221
11			- trace till inclusions below 10.7 m		S9	8	SPT Blows: [3/4/4], Spoon Recovery: 100%	220
12			- firm below 12.2 m		G10			219
13								218
14					T11		Tube Recovery: 100%	217
15			SILT (Till) - clayey, some sand, trace gravel - light brown, stiff, moist to wet - low plasticity		G12			216
16			- some clay, moist below 15.2 m					215
17			- hard below 16.8		S13	48	SPT Blows: [14/20/28], Spoon Recovery: 67%	214
18			END OF TEST HOLE AT 17.68 m ON AUGER REFUSAL Notes: 1. Seepage observed below 15.2 m during augering. 2. Sloughing not observed during augering. 3. Auger refusal met at 17.7 m. 4. Test hole backfilled with sand from 17.7 m to 16.2 m, bentonite from 16.2 m to 0.3 m, and sand from 0.3 m to 0.2 m. Flush-mount cover installed. 5. Groundwater monitoring: - July 13, 2022 at elev. 225.78 m (5.36 m bgs)				213
19								212
20								211
21								210
22								

PENETRATION TESTS: ✳ Becker ✳ | ◇ Dynamic Cone ◇ | ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100 | ■ Total Unit Wt ■ (kN/m^3) 16 17 18 19 20 21 | Plastic MC Liquid 20 40 60 80 100

UNDRAINED SHEAR STRENGTH: + Torvane + | × QU/2 × | □ Lab Vane □ | △ Pocket Pen. △ | ⬘ Field Vane ⬘ (kPa) 50 100 150 200

LOG OF TEST HOLE 60680190 - TEST HOLE LOGS - CONTRACT 7.GPJ UMA WINN.GDT 7/27/22

AECOM

LOGGED BY: Ryan Harras	COMPLETION DEPTH: 17.68 m
REVIEWED BY: Faris Alobaidy	COMPLETION DATE: 6/22/22
PROJECT ENGINEER: J. Thompson	Page 1 of 1

PROJECT: Jefferson East CSR Works (Contract 7)	CLIENT: City of Winnipeg	TESTHOLE NO: **TH22-11**
LOCATION: UTM 14 - 5533756 m N, 634783 m E		PROJECT NO.: 60599385
CONTRACTOR: Maple Leaf Drilling	METHOD: Acker MP5 - 125 mm SSA	ELEVATION (m): 230.76

SAMPLE TYPE ■ GRAB ▥ SHELBY TUBE ☒ SPLIT SPOON ▤ BULK ⊘ NO RECOVERY ◧ CORE

DEPTH (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	COMMENTS	ELEVATION
0	TOPSOIL (125 mm) - black, moist					230
	CLAY - silty, some sand - dark grey, stiff, moist - high plasticity		G1			
1	SILT - some clay, trace sand - light brown, soft, moist - low plasticity		S2	7	SPT Blows: [3/3/4], Spoon Recovery: 22%	229
2	CLAY - silty, trace sand - brown mottled grey, firm to stiff, moist - high plasticity		G3			
3			G4		(G4): Gravel 0.0%, Sand 1.3%, Silt 24.9%, Clay 73.8%	228
4						227
5			T5		Tube Recovery: 100%	226
6	- grey, firm below 6.1 m		G6			225
7						224
8			S7	6	SPT Blows: [2/3/3], Spoon Recovery: 100%	223
9	- trace till inclusions below 9.1 m		G8		(G8): Gravel 0.2%, Sand 5.5%, Silt21.8%, Clay 72.5%	222
10						221
11			T9		Tube Recovery: 100%	220
12	END OF TEST HOLE AT 12.19 m IN CLAY Notes: 1. Seepage observed below 4.6 m during augering. 2. Sloughing not observed during augering. 3. Test hole backfilled with auger cuttings and bentonite upon completion.		G10			219
13						218
14						217
15						216

PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ (kN/m^3) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100

UNDRAINED SHEAR STRENGTH: + Torvane + × QU/2 × ☐ Lab Vane ☐ △ Pocket Pen. △ ⬘ Field Vane ⬘ (kPa) 50 100 150 200

LOG OF TEST HOLE 60680190 - TEST HOLE LOGS - CONTRACT 7.GPJ UMA WINN.GDT 7/27/22

AECOM

LOGGED BY: Ryan Harras	COMPLETION DEPTH: 12.19 m
REVIEWED BY: Faris Alobaidy	COMPLETION DATE: 6/23/22
PROJECT ENGINEER: J. Thompson	Page 1 of 1

PROJECT: Jefferson East CSR Works (Contract 7)	CLIENT: City of Winnipeg	TESTHOLE NO: **TH22-12**
LOCATION: UTM 14 - 5533931 m N, 634690 m E		PROJECT NO.: 60599385
CONTRACTOR: Maple Leaf Drilling	METHOD: Acker MP5 - 125 mm SSA	ELEVATION (m): 230.66

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

DEPTH (m)	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	COMMENTS	ELEVATION
0	TOPSOIL (100 mm) - black, moist					230
	CLAY - silty, some sand - dark grey, stiff, moist - high plasticity - dark brown below 0.6 m		G1			
1			G2			229
	SILT - some clay, trace sand - light brown, soft, moist - low plasticity		G3			
2						228
	CLAY - silty - brown mottled grey, firm, moist - high plasticity		T4		Tube Recovery: 100%	
3						227
4			G5		(G5): Gravel 0.0%, Sand 0.0%, Silt 18.0%, Clay 82.0%	226
5						225
6			S6	6	SPT Blows: [3/3/3], Spoon Recovery: 100%	224
7			G7			223
8						222
9	- grey below 9.1 m		T8		Tube Recovery: 0%	221
10			G9			220
11						219
12	- trace sand below 11.9 m		G10		(G10): Gravel 0.6%, Sand 8.9%, Silt 27.4%, Clay 63.1%	218
	END OF TEST HOLE AT 12.19 m IN CLAY Notes: 1. Seepage not observed during augering. 2. Hole open to 8.8 m upon completion of augering. 3. Test hole backfilled with auger cuttings and bentonite upon completion.					
13						217
14						216
15						

PENETRATION TESTS: Becker | Dynamic Cone | SPT (Standard Pen Test) (Blows/300mm) 0 20 40 60 80 100 | Total Unit Wt (kN/m^3) 16 17 18 19 20 21 | Plastic MC Liquid 20 40 60 80 100

UNDRAINED SHEAR STRENGTH: Torvane | QU/2 | Lab Vane | Pocket Pen. | Field Vane (kPa) 50 100 150 200

AECOM

LOGGED BY: Ryan Harras	COMPLETION DEPTH: 12.19 m
REVIEWED BY: Faris Alobaidy	COMPLETION DATE: 6/23/22
PROJECT ENGINEER: J. Thompson	Page 1 of 1

LOG OF TEST HOLE 60680190 - TEST HOLE LOGS - CONTRACT 7.GPJ UMA WINN.GDT 7/27/22

PROJECT: Jefferson East CSR Works (Contract 7)	CLIENT: City of Winnipeg	TESTHOLE NO: **TH22-13**
LOCATION: UTM 14 - 5533854 m N, 634892 m E		PROJECT NO.: 60599385
CONTRACTOR: Maple Leaf Drilling	METHOD: Acker MP5 - 125 mm SSA	ELEVATION (m): 230.83

SAMPLE TYPE: GRAB | SHELBY TUBE | SPLIT SPOON | BULK | NO RECOVERY | CORE

BACKFILL TYPE: BENTONITE | GRAVEL | SLOUGH | GROUT | CUTTINGS | SAND

DEPTH (m)	SOIL SYMBOL	SLOTTED PIEZOMETER	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	COMMENTS	ELEVATION
0			TOPSOIL (150 mm) - black, moist					230
1			CLAY - silty, some sand, trace gravel - dark grey, stiff, moist - high plasticity		G1			
2			- brown mottled grey below 0.9 m		S2	8	SPT Blows: [3/3/5], Spoon Recovery: 33%	229
			SILT - some clay, trace sand - light brown, soft, moist - low plasticity		G3			
3			CLAY - silty - brown mottled grey, firm to stiff, moist - high plasticity - grey below 4.0 m		G4			228
4								227
5					T5		Tube Recovery: 100%	226
6					G6		(G6): Gravel 0.1%, Sand 0.1%, Silt 20.8%, Clay 79.0%	225
7								224
8					S7	9	SPT Blows: [4/5/4], Spoon Recovery: 100%	223
9			- firm, trace till inclusions from 9.1 m to 13.7 m		G8			222
10								221
11					T9		Tube Recovery: 100%	220
12					G10			219
13								218
14			- some till inclusions below 13.7 m		S11	5	SPT Blows: [3/3/2], Spoon Recovery: 67%	217
15					G12			216
16								215
17					S13	6	SPT Blows: [3/3/3], Spoon Recovery: 42%	214
			SILT (Till) - clayey, some sand, trace gravel - light brown, moist - low plasticity					
18			- some clay, dry to moist below 17.7 m		G14			213
			END OF TEST HOLE AT 18.29 m ON AUGER REFUSAL					
19			Notes: 1. Seepage not observed during augering. 2. Hole open to 17.7 m upon completion of augering. 3. Auger refusal met at 18.3 m. 4. Test hole backfilled with sand from 17.7 m to 16.5 m, bentonite from 16.5 m to 0.3 m, and sand from 0.3 m to 0.2 m. Flush-mount cover installed. 5. Groundwater monitoring: - July 13, 2022 at elev. 225.91 m (4.92 m bgs)					212
20								211
21								210
22								209

PENETRATION TESTS: ✳ Becker ✳ | ◇ Dynamic Cone ◇ | ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100 | ■ Total Unit Wt ■ (kN/m^3) 16 17 18 19 20 21 | Plastic MC Liquid 20 40 60 80 100

UNDRAINED SHEAR STRENGTH: + Torvane + | × QU/2 × | □ Lab Vane □ | △ Pocket Pen. △ | ⬘ Field Vane ⬘ (kPa) 50 100 150 200

LOG OF TEST HOLE 60680190 - TEST HOLE LOGS - CONTRACT 7.GPJ UMA WINN.GDT 7/27/22

AECOM

LOGGED BY: Ryan Harras	COMPLETION DEPTH: 18.29 m
REVIEWED BY: Faris Alobaidy	COMPLETION DATE: 6/23/22
PROJECT ENGINEER: J. Thompson	Page 1 of 1

AECOM
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204 477 5381 tel
431 800 1210 fax

Memorandum

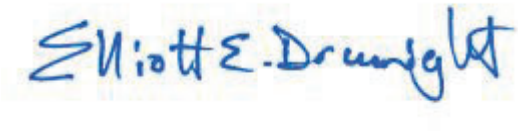
To	Ryan Harras	Page	1
CC			
Subject	Jefferson East Phase 3 (Contract 7) – City of Winnipeg –Test Results		
From	Elliott E. Drumright		
Date	July 20, 2022	Project Number	60680190.2.2

Please find attached the following material test result(s) on sample(s) submitted to the Winnipeg Geotechnical Laboratory:

- Seventy-five (75) Moisture Content Determination Test
- Twelve (12) Atterberg Limits (3 Points) Test
- Twelve (12) Grain Size Distribution (Hydrometer Method) Test
- Fourteen (14) Torvane, Pocket Penetrometer, Moisture Content, Bulk Density and Visual Description with Unconfined Compressive Strength on Shelby tube Samples.

If you have any questions, please contact the undersigned.

Sincerely,



Elliott E. Drumright, Ph.D.
Associate Geotechnical Engineer

Att.

AECOM Canada Ltd.
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99 Commerce Drive
Winnipeg, Manitoba
R3P 0Y7
Phone: 204 477 5381 Fax: 431 800 1210

CERTIFIED BY CCIL

Project Name:	Jefferson CSR - Contract 7	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	Jefferson	Sample Date:	Varies
Sample Depth:	Varies	Lab Technician:	EManimbao
Sample Number:	Varies	Date Tested:	July 4, 2022

Moisture Content (ASTM D2216-10)

Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

Location	Sample	Depth (m)	Moisture Content (%)
TH22-06	G1	0.76 - 0.91 m	**33.4%**
	S2	1.52 - 1.98 m	**22.8%**
	G3	2.29 - 2.44 m	**31.2%**
	T4	3.05 - 3.66 m	**47.6%**
	G5	4.57 - 4.72 m	**48.3%**
	S6	6.10 - 6.55 m	**49.9%**
	G7	7.62 - 7.77 m	**48.5%**
	T8	9.14 - 9.75 m	**39.9%**
	G9	10.67 - 10.82 m	**51.6%**
	S10	12.19 - 12.65 m	**52.7%**
	G11	13.72 - 13.87 m	**40.8%**
	S12	15.24 - 15.70 m	**18.1%**
	G14	18.29 - 18.44 m	**14.5%**
TH22-07	G1	0.76 - 0.91 m	**24.3%**
	S2	1.52 - 1.98 m	**23.4%**
	G3	2.29 - 2.44 m	**31.3%**
	G4	3.05 - 3.20 m	**49.2%**
	T5	4.57 - 5.18 m	**50.8%**
	G6	6.10 - 6.25 m	**52.7%**
	S7	7.62 - 8.08 m	**48.7%**
	G8	9.14 - 9.30 m	**44.2%**
	T9	10.67 - 11.28 m	**31.1%**
	G10	12.19 - 12.34 m	**50.5%**
TH22-08	G1	0.76 - 0.91 m	**28.4%**
	G2	1.52 - 1.68 m	**23.6%**
	G3	2.29 - 2.44 m	**53.1%**
	S4	3.05 - 3.51 m	**50.2%**
	G5	4.57 - 4.72 m	**51.8%**
	T6	6.10 - 6.71 m	**40.1%**
	G7	7.62 - 7.77 m	**44.0%**
	S8	9.14 - 9.60 m	**44.0%**
	G9	10.67 - 10.82 m	**44.5%**
	T10	12.19 - 12.80 m	**42.9%**
TH22-09	G1	0.76 - 0.91 m	**30.4%**
	G2	1.52 - 1.68 m	**31.1%**
	G3	2.29 - 2.44 m	**21.9%**
	S4	3.05 - 3.51 m	**27.8%**
	G5	4.57 - 4.72 m	**48.8%**

Location	Sample	Depth (m)	Moisture Content (%)
	T6	6.10 - 6.71 m	**47.1%**
	G7	7.62 - 7.77 m	**51.8%**
	S8	9.14 - 9.60 m	**47.1%**
	G9	10.67 - 10.82 m	**51.5%**
	G10	12.19 - 12.34 m	**37.4%**
TH22-10	G1	0.76 - 0.91 m	**35.0%**
	S2	1.52 - 1.98 m	**24.0%**
	G3	2.29 - 2.44 m	**31.8%**
	G4	3.05 - 3.20 m	**43.1%**
	T5	4.57 - 5.18 m	**50.3%**
	G6	6.10 - 6.25 m	**47.4%**
	S7	7.62 - 8.08 m	**43.6%**
	G8	9.14 - 9.30 m	**44.9%**
	S9	10.67 - 11.13 m	**48.2%**
	G10	12.19 - 12.34 m	**34.1%**
	T11	13.72 - 14.33 m	**42.9%**
	G12	15.24 - 15.39 m	**16.0%**
	S13	16.76 - 17.22 m	**11.5%**
TH22-11	G1	0.76 - 0.91 m	**28.9%**
	S2	1.52 - 1.98 m	**28.3%**
	G3	2.29 - 2.44 m	**32.5%**
	G4	3.05 - 3.20 m	**47.8%**
	T5	4.57 - 5.18 m	**40.4%**
	G6	6.10 - 6.25 m	**56.6%**
	S7	7.62 - 8.08 m	**48.5%**
	G8	9.14 - 9.30 m	**53.0%**
	T9	10.67 - 11.28 m	**55.3%**
	G10	12.19 - 12.34 m	**47.6%**
TH22-12	G1	0.76 - 0.91 m	**30.2%**
	G2	1.52 - 1.68 m	**27.7%**
	G3	2.29 - 2.44 m	**22.1%**
	T4	3.05 - 3.66 m	**36.8%**
	G5	4.57 - 4.72 m	**49.7%**
	S6	6.10 - 6.55 m	**54.7%**
	G7	7.62 - 7.77 m	**46.0%**
	G9	10.67 - 10.82 m	**58.1%**
	G10	12.19 - 12.34 m	**49.6%**
TH22-13	G1	0.76 - 0.91 m	**30.2%**

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CERTIFIED BY CCIL

Project Name:	Jefferson CSR - Contract 7	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	Jefferson	Sample Date:	Varies
Sample Depth:	Varies	Lab Technician:	EManimbao
Sample Number:	Varies	Date Tested:	July 4, 2022

Moisture Content (ASTM D2216-10)

Standard Test Method for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass

Location	Sample	Depth (m)	**Moisture Content (%)**
	S2	1.52 - 1.98 m	**26.5%**
	G3	2.29 - 2.44 m	**24.7%**
	G4	3.05 - 3.20 m	**39.3%**
	T5	4.57 - 5.18 m	**36.6%**
	G6	6.10 - 6.25 m	**48.2%**
	S7	7.62 - 8.08 m	**44.9%**
	G8	9.14 - 9.30 m	**45.1%**
	T9	10.67 - 11.28 m	**40.6%**
	G10	12.19 - 12.34 m	**49.5%**
	S11	13.72 - 14.17 m	**55.2%**
	G12	15.24 - 15.39 m	**50.7%**
	S13	16.76 - 17.22 m	**18.4%**
	G14	18.29 - 18.44 m	**14.7%**

Location	Sample	Depth (m)	**Moisture Content (%)**

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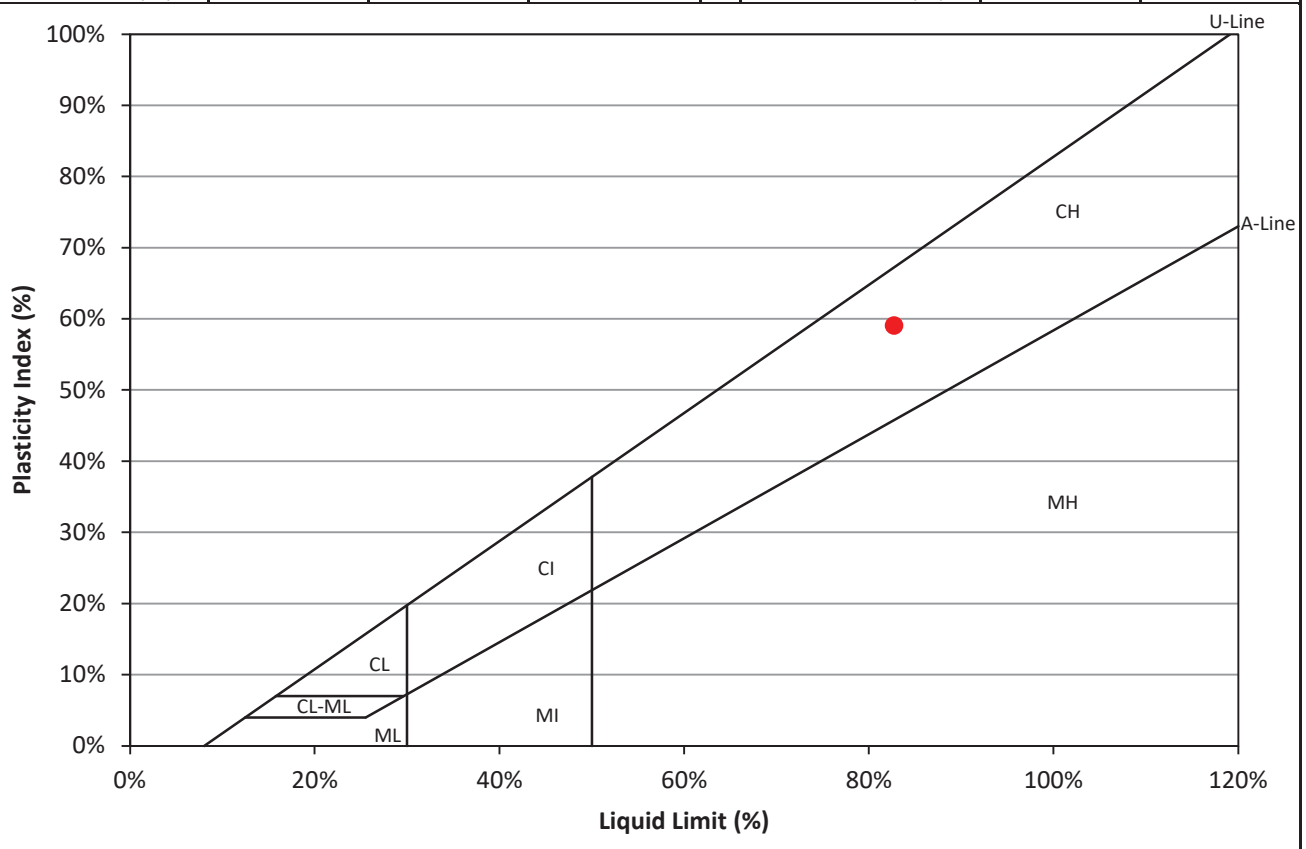
Project Name:	Jefferson CSR Contract 7	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-06	Sample Date:	6/21-23/2022
Sample Depth:	4.57 - 4.72 m	Lab Technician:	EManimbao
Sample Number:	G5	Date Tested:	July 13, 2022

Atterberg Limits (ASTM D4318)

Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

Liquid Limit			
Blows	29	23	17
Wet Sample (g)	7.2	8.3	9.6
Dry Sample (g)	4.0	4.5	5.2
Water Content (%)	81.6%	83.7%	85.8%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.3	6.2
Dry Sample (g)	5.1	5.0
Water Content (%)	23.6%	23.8%



Liquid Limit (%): 82.7%	Plastic Limit (%): 23.7%	Plasticity Index (%): 59.1%

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CERTIFIED BY CCIL

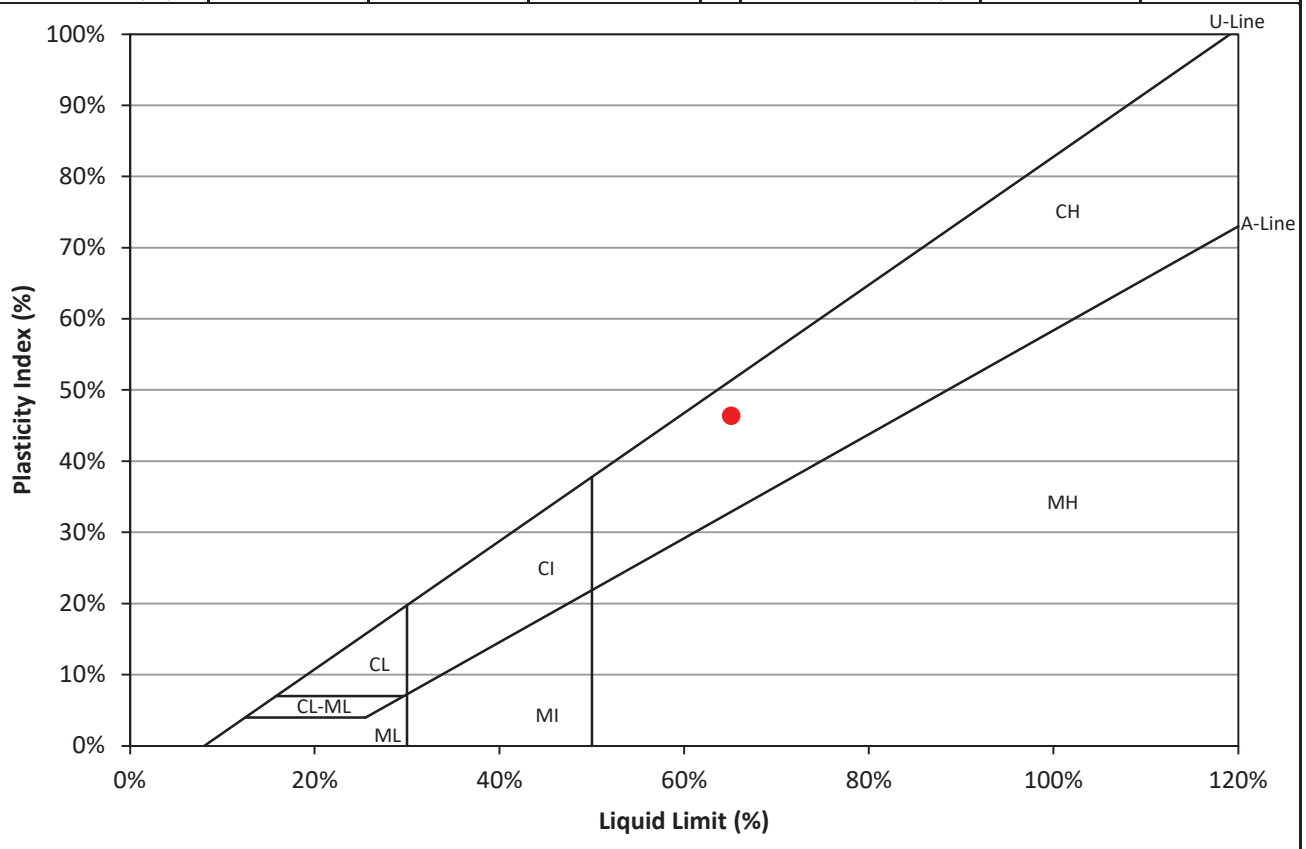
Project Name:	Jefferson CSR Contract 7	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-06	Sample Date:	6/21-23/2022
Sample Depth:	10.67 - 10.82 m	Lab Technician:	EManimbao
Sample Number:	G9	Date Tested:	July 13, 2022

Atterberg Limits (ASTM D4318)

Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

Liquid Limit			
Blows	35	27	19
Wet Sample (g)	9.3	8.6	9.9
Dry Sample (g)	5.7	5.3	5.9
Water Content (%)	63.2%	64.7%	66.3%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.2	6.1
Dry Sample (g)	5.2	5.1
Water Content (%)	18.8%	18.7%



Liquid Limit (%): 65.1%	Plastic Limit (%): 18.7%	Plasticity Index (%): 46.4%

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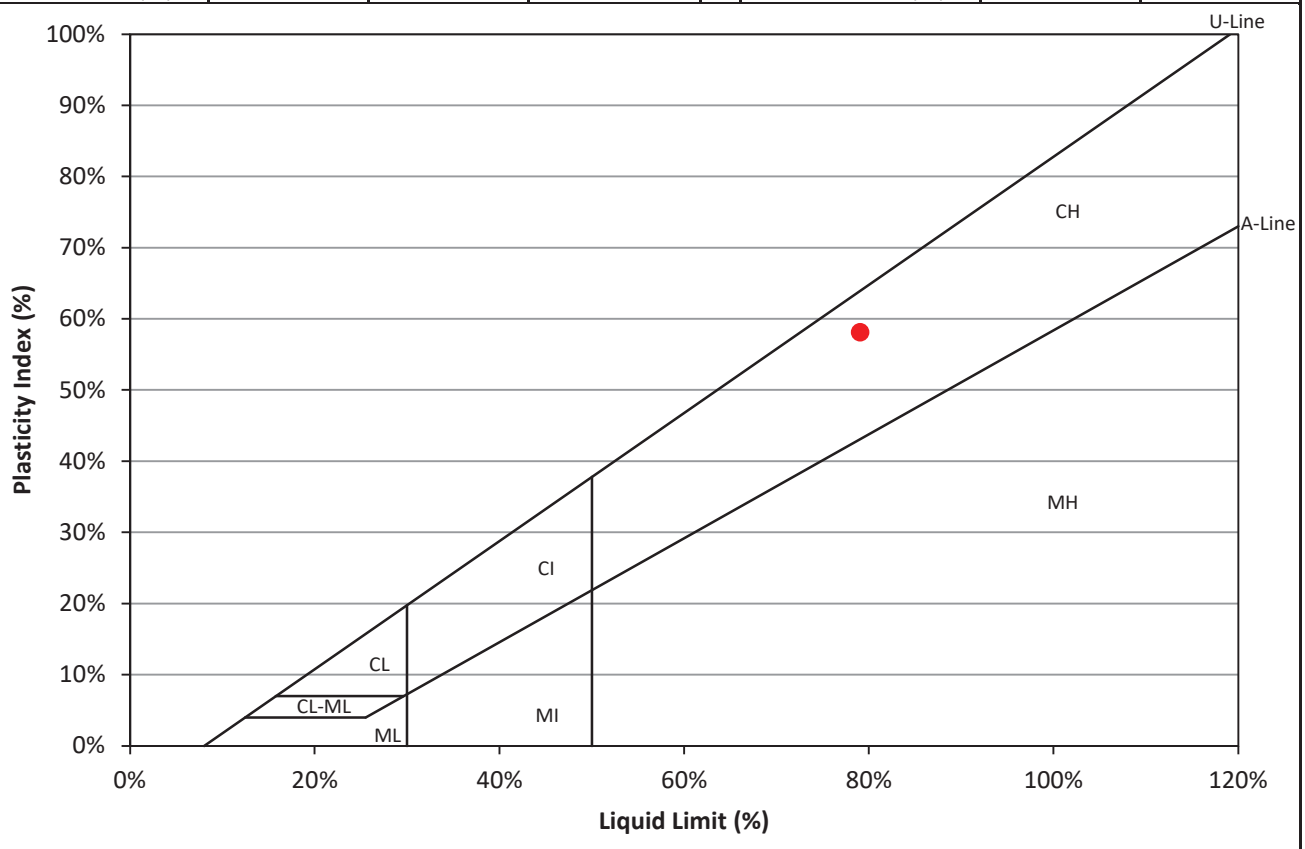
Project Name:	Jefferson CSR Contract 7	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-07	Sample Date:	6/21-23/2022
Sample Depth:	3.05 - 3.20 m	Lab Technician:	EManimbao
Sample Number:	G4	Date Tested:	July 13, 2022

Atterberg Limits (ASTM D4318)

Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

Liquid Limit			
Blows	29	21	16
Wet Sample (g)	9.0	9.3	8.9
Dry Sample (g)	5.0	5.2	4.9
Water Content (%)	77.8%	80.6%	83.0%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.5	6.2
Dry Sample (g)	5.4	5.1
Water Content (%)	20.8%	21.1%



Liquid Limit (%): 79.1%	Plastic Limit (%): 21.0%	Plasticity Index (%): 58.1%

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CERTIFIED BY CCIL

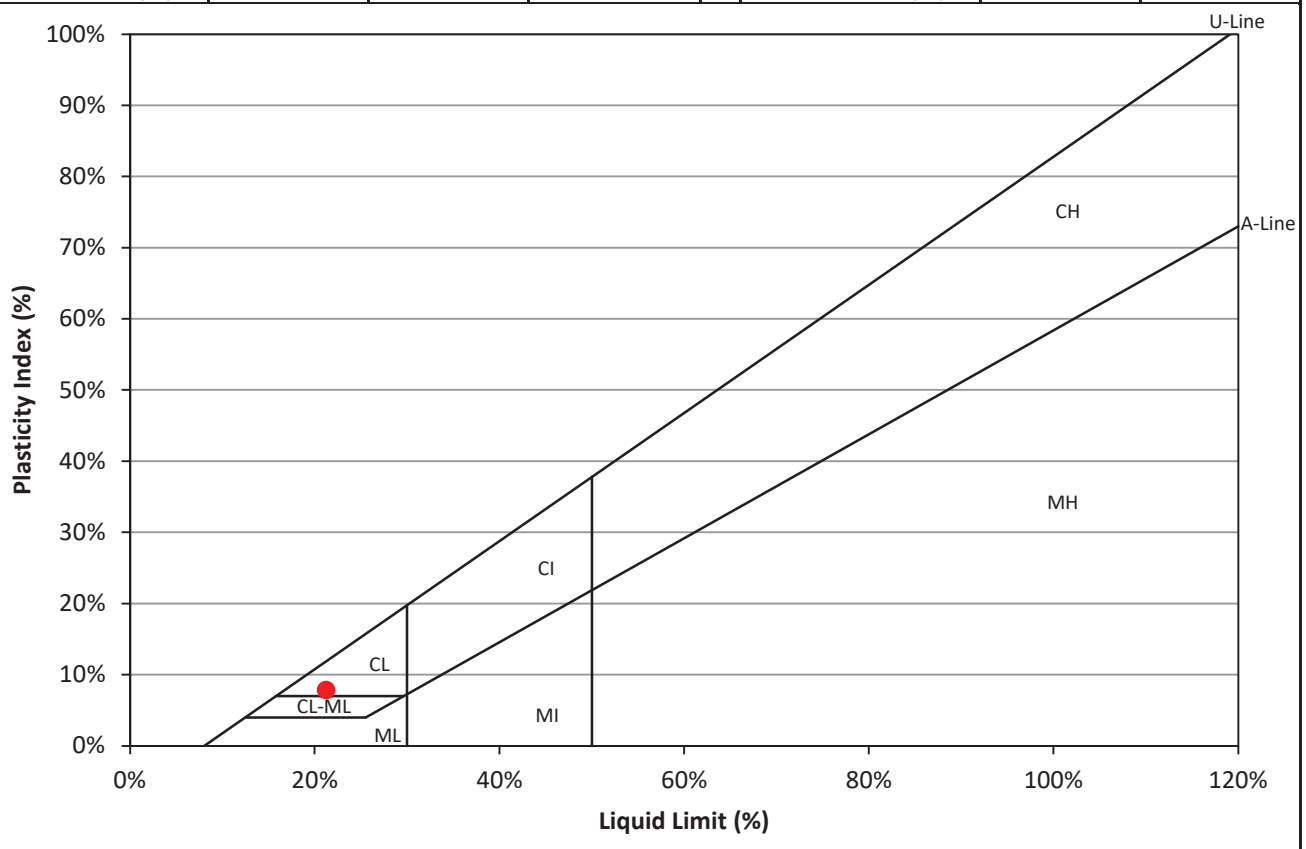
Project Name:	Jefferson CSR Contract 7	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-08	Sample Date:	6/21-23/2022
Sample Depth:	1.52 - 1.68 m	Lab Technician:	EManimbao
Sample Number:	G2	Date Tested:	July 13, 2022

Atterberg Limits (ASTM D4318)

Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

Liquid Limit			
Blows	30	22	15
Wet Sample (g)	11.0	13.7	12.5
Dry Sample (g)	9.1	11.3	10.2
Water Content (%)	20.6%	21.7%	22.9%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.5	6.7
Dry Sample (g)	5.7	5.9
Water Content (%)	13.6%	13.2%



Liquid Limit (%): 21.2%	Plastic Limit (%): 13.4%	Plasticity Index (%): 7.8%

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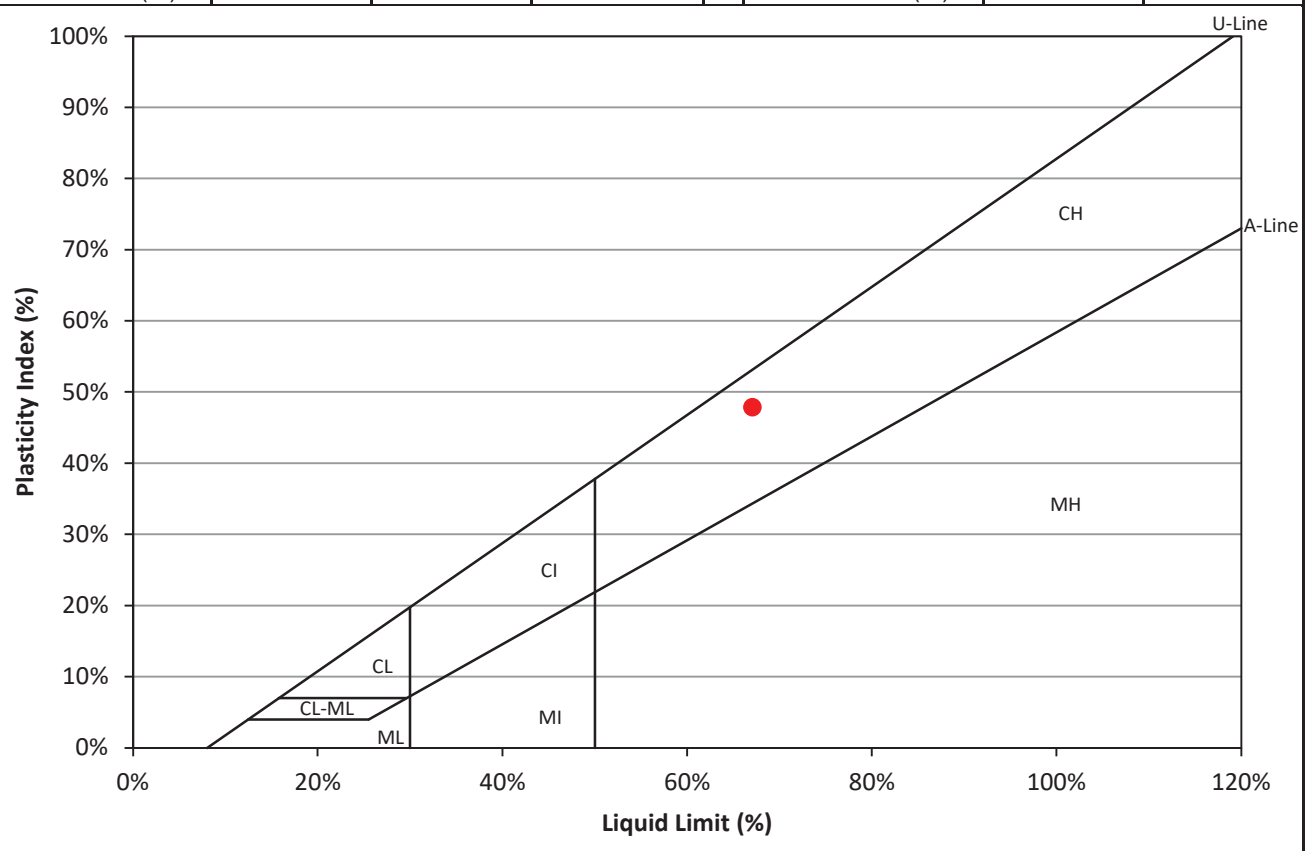
Project Name:	Jefferson CSR Contract 7	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-09	Sample Date:	6/21-23/2022
Sample Depth:	1.52 - 1.68 m	Lab Technician:	EManimbao
Sample Number:	G2	Date Tested:	July 13, 2022

Atterberg Limits (ASTM D4318)

Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

Liquid Limit			
Blows	26	23	16
Wet Sample (g)	9.5	10.3	10.7
Dry Sample (g)	5.7	6.2	6.3
Water Content (%)	66.9%	67.4%	69.7%

Plastic Limit		
Trial	1	2
Wet Sample (g)	7.2	6.1
Dry Sample (g)	6.0	5.2
Water Content (%)	19.3%	19.1%



Liquid Limit (%): 67.1%	Plastic Limit (%): 19.2%	Plasticity Index (%): 47.9%

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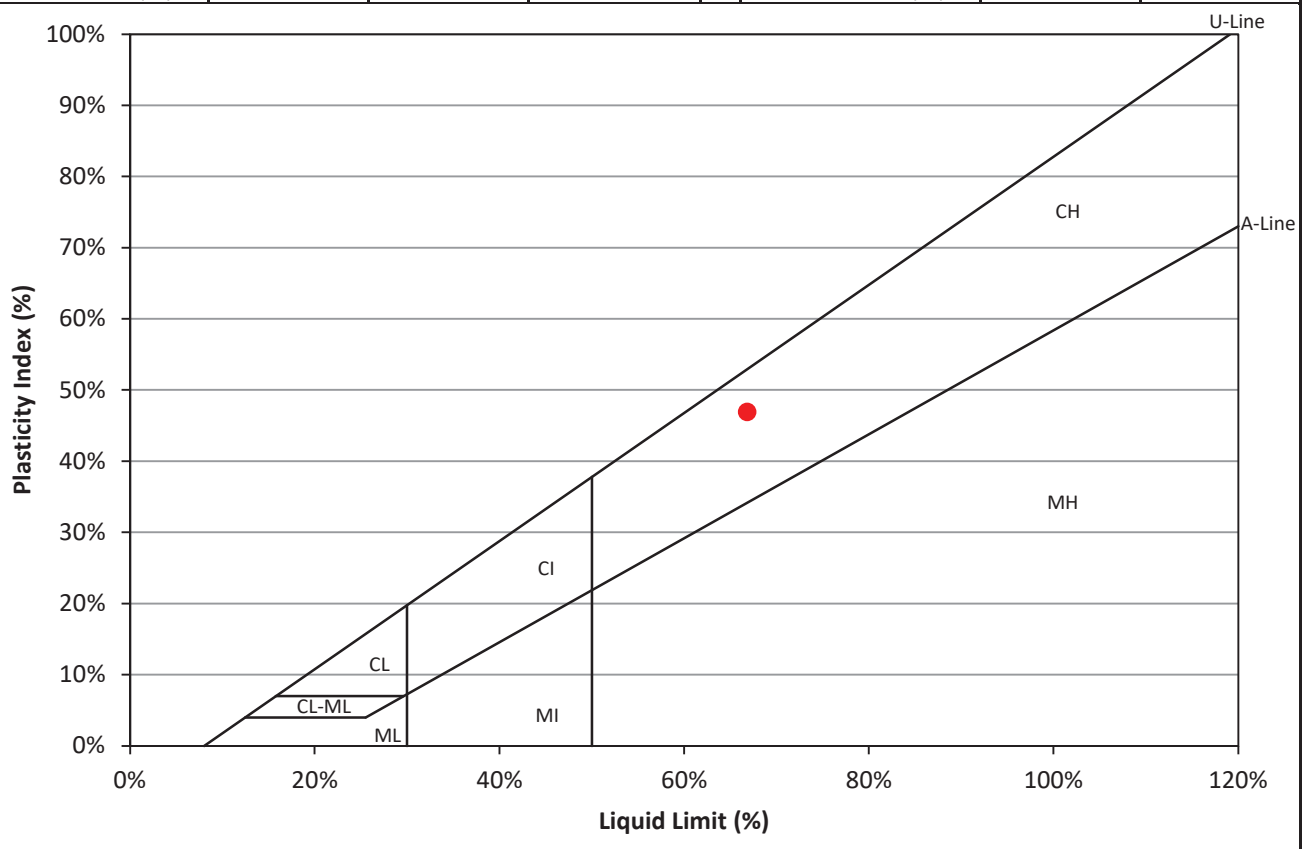
Project Name:	Jefferson CSR Contract 7	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-09	Sample Date:	6/21-23/2022
Sample Depth:	7.62 - 7.77 m	Lab Technician:	EManimbao
Sample Number:	G7	Date Tested:	July 13, 2022

Atterberg Limits (ASTM D4318)

Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

Liquid Limit			
Blows	28	21	18
Wet Sample (g)	8.4	8.8	7.9
Dry Sample (g)	5.1	5.2	4.7
Water Content (%)	66.0%	68.0%	69.5%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.3	6.7
Dry Sample (g)	5.3	5.6
Water Content (%)	20.1%	19.8%



Liquid Limit (%): 66.8%	Plastic Limit (%): 19.9%	Plasticity Index (%): 46.9%

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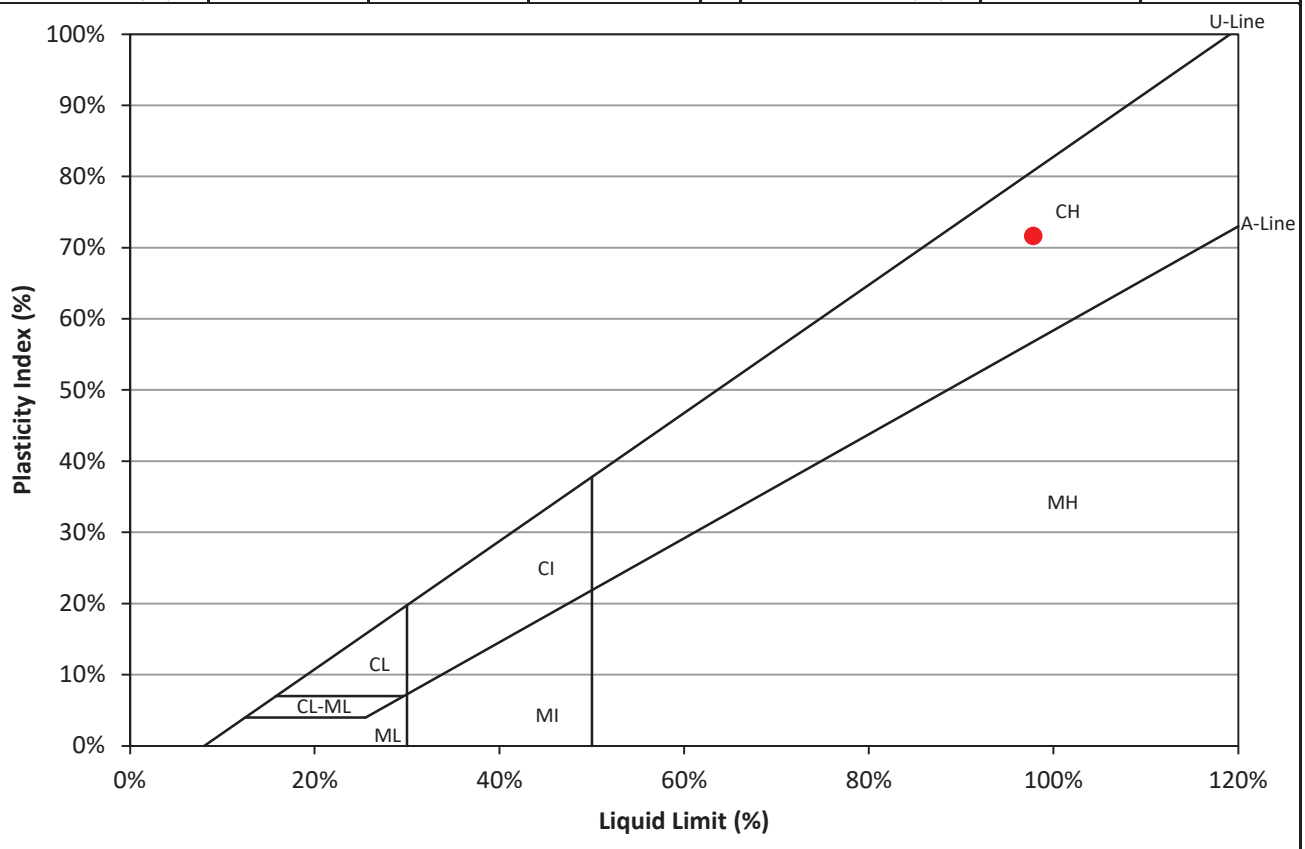
Project Name:	Jefferson CSR Contract 7	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-10	Sample Date:	6/21-23/2022
Sample Depth:	4.57 - 5.18 m	Lab Technician:	EManimbao
Sample Number:	T5	Date Tested:	July 13, 2022

Atterberg Limits (ASTM D4318)

Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

Liquid Limit			
Blows	34	27	19
Wet Sample (g)	8.6	9.9	9.2
Dry Sample (g)	4.4	5.0	4.6
Water Content (%)	94.4%	97.0%	101.2%

Plastic Limit		
Trial	1	2
Wet Sample (g)	7.1	6.2
Dry Sample (g)	5.7	4.9
Water Content (%)	26.1%	26.2%



Liquid Limit (%): 97.8%	Plastic Limit (%): 26.2%	Plasticity Index (%): 71.7%

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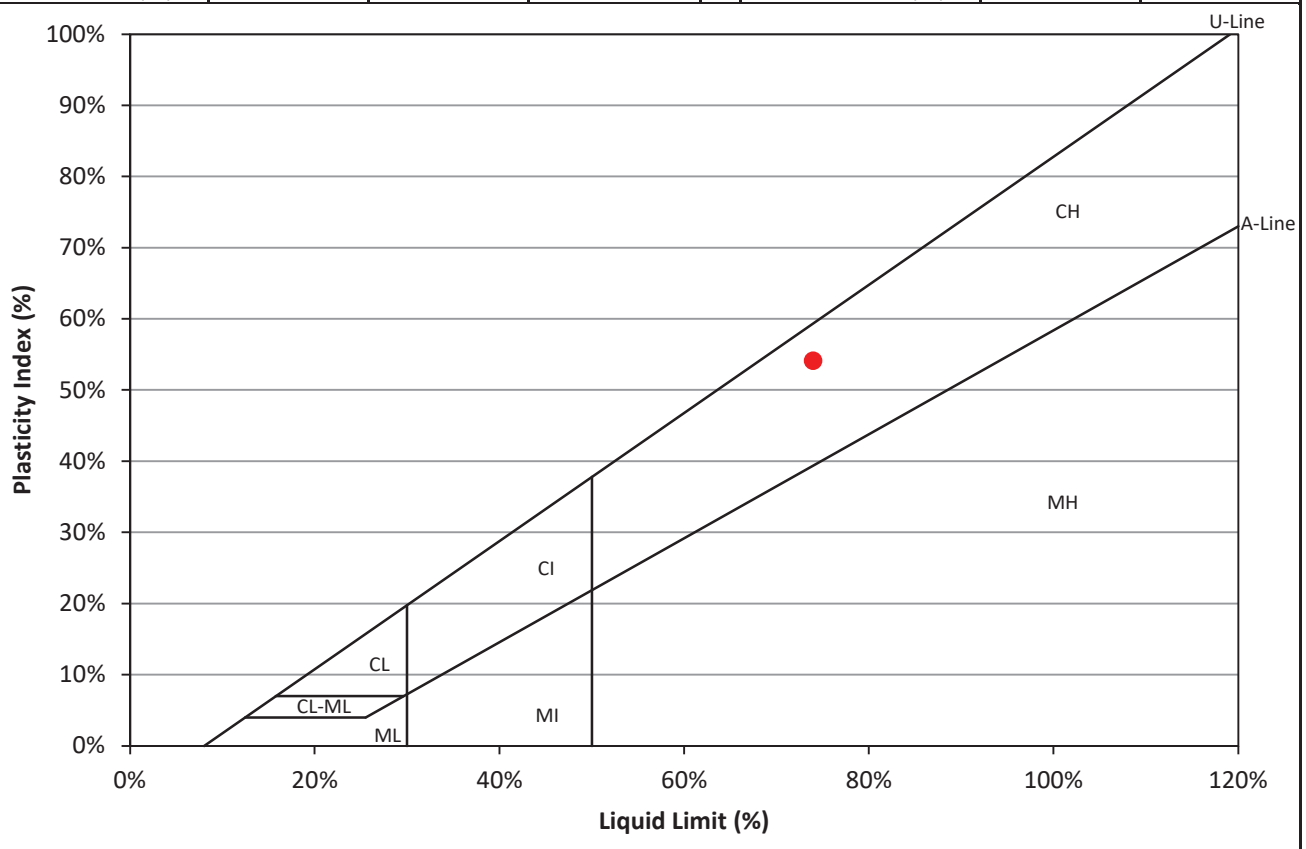
Project Name:	Jefferson CSR Contract 7	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-11	Sample Date:	6/21-23/2022
Sample Depth:	3.05 - 3.20 m	Lab Technician:	EManimbao
Sample Number:	G4	Date Tested:	July 13, 2022

Atterberg Limits (ASTM D4318)

Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

Liquid Limit			
Blows	35	28	20
Wet Sample (g)	8.4	8.0	9.3
Dry Sample (g)	4.9	4.6	5.3
Water Content (%)	71.2%	73.1%	76.1%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.1	6.2
Dry Sample (g)	5.1	5.2
Water Content (%)	19.9%	19.8%



Liquid Limit (%): 74.0%	Plastic Limit (%): 19.8%	Plasticity Index (%): 54.1%

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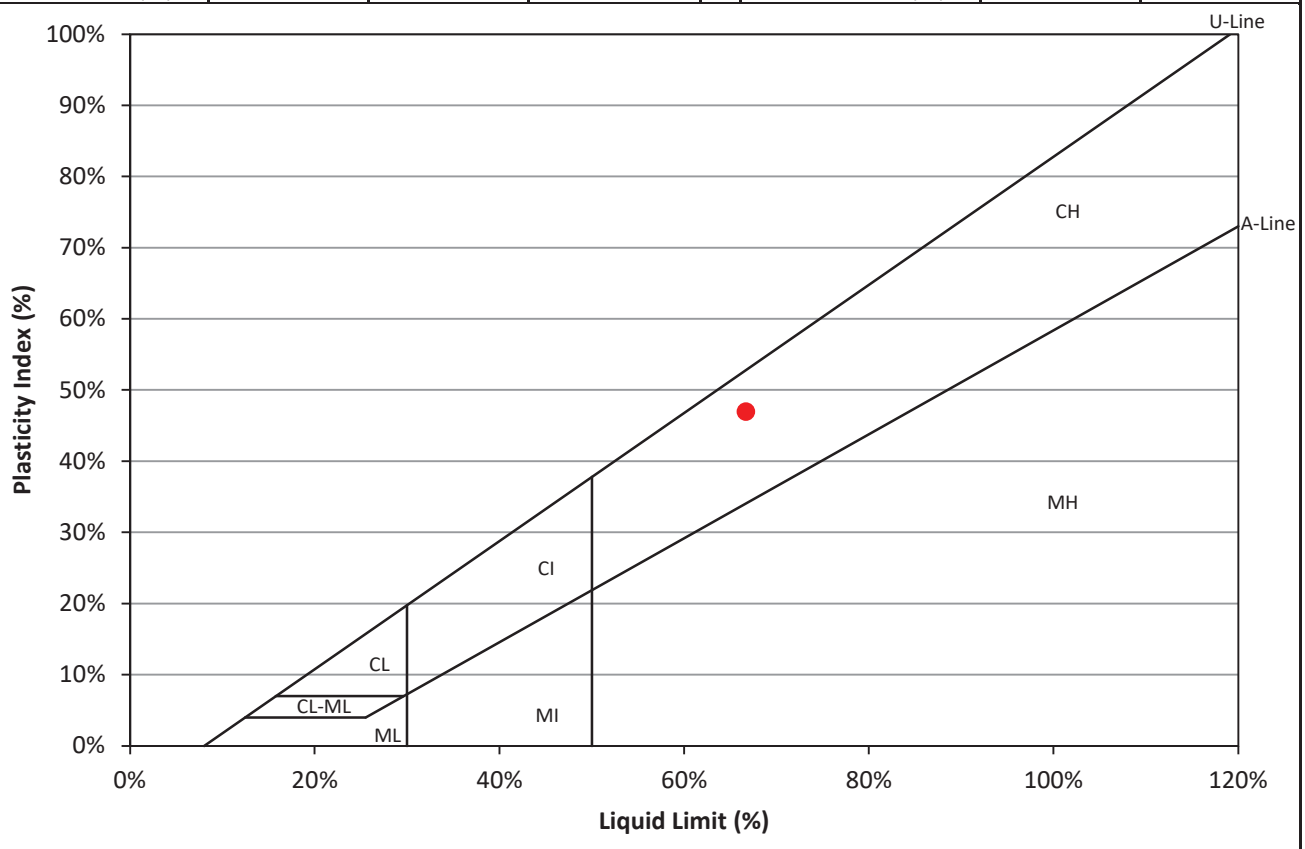
Project Name:	Jefferson CSR Contract 7	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-11	Sample Date:	6/21-23/2022
Sample Depth:	9.14 - 9.30 m	Lab Technician:	EManimbao
Sample Number:	G8	Date Tested:	July 13, 2022

Atterberg Limits (ASTM D4318)

Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

Liquid Limit			
Blows	29	21	17
Wet Sample (g)	9.4	10.4	9.5
Dry Sample (g)	5.7	6.2	5.6
Water Content (%)	65.7%	67.9%	68.9%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.2	6.4
Dry Sample (g)	5.2	5.4
Water Content (%)	19.7%	19.8%



Liquid Limit (%): 66.7%	Plastic Limit (%): 19.8%	Plasticity Index (%): 47.0%

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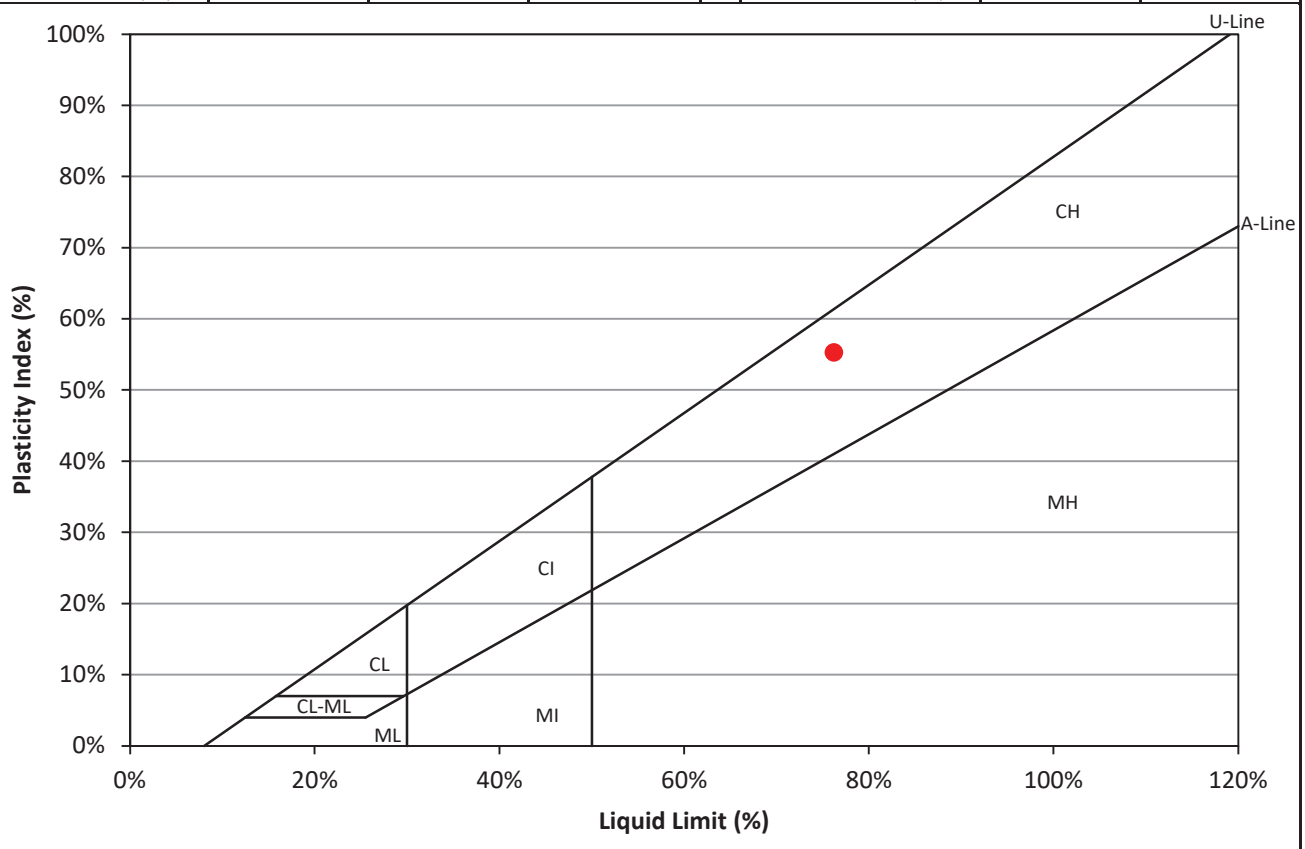
Project Name:	Jefferson CSR Contract 7	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-12	Sample Date:	6/21-23/2022
Sample Depth:	4.57 - 4.72 m	Lab Technician:	EManimbao
Sample Number:	G5	Date Tested:	July 13, 2022

Atterberg Limits (ASTM D4318)

Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

Liquid Limit			
Blows	30	24	19
Wet Sample (g)	9.0	10.1	8.8
Dry Sample (g)	5.2	5.7	4.9
Water Content (%)	74.0%	76.8%	79.0%

Plastic Limit		
Trial	1	2
Wet Sample (g)	7.0	6.3
Dry Sample (g)	5.8	5.2
Water Content (%)	21.0%	20.9%



Liquid Limit (%): 76.2%	Plastic Limit (%): 20.9%	Plasticity Index (%): 55.3%

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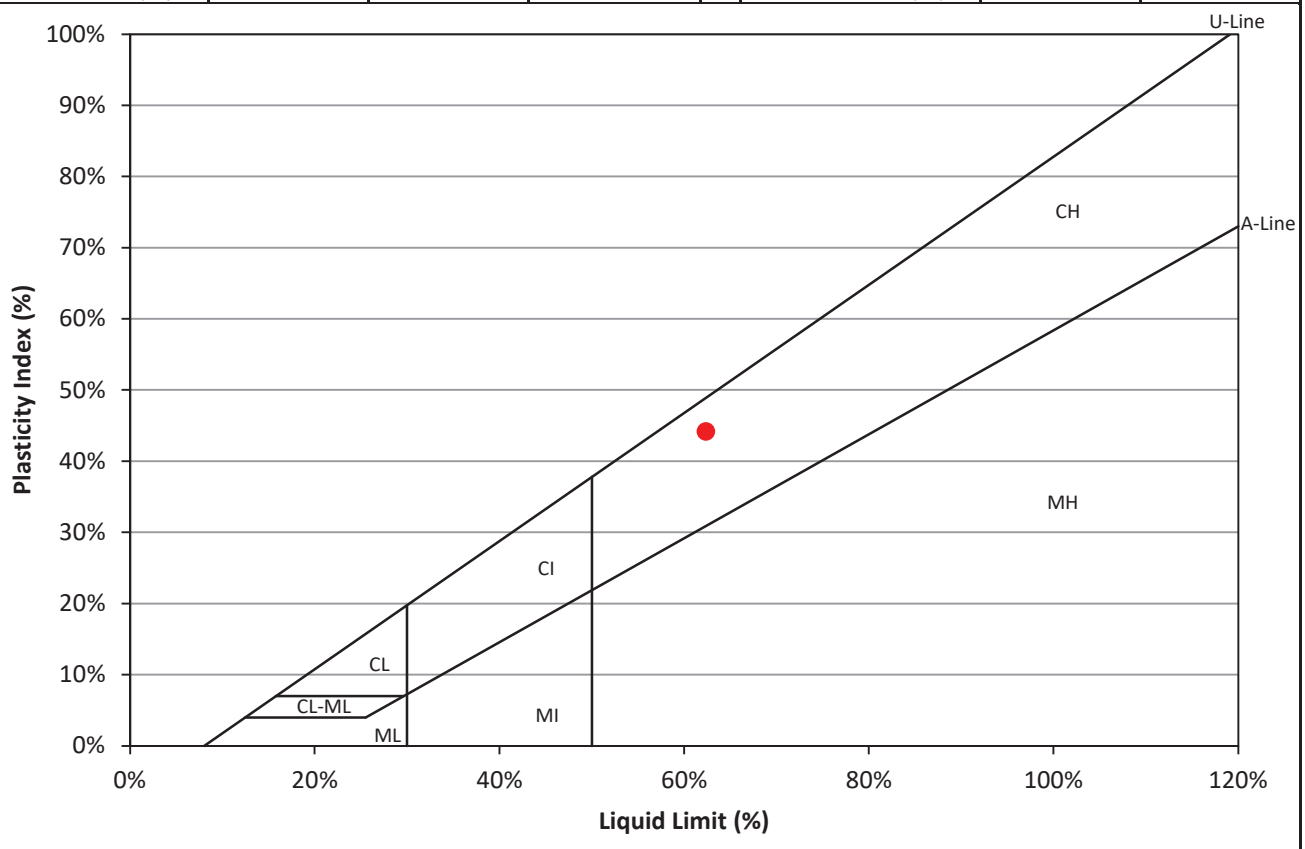
Project Name:	Jefferson CSR Contract 7	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-12	Sample Date:	6/21-23/2022
Sample Depth:	12.19 - 12.34 m	Lab Technician:	EManimbao
Sample Number:	G10	Date Tested:	July 13, 2022

Atterberg Limits (ASTM D4318)

Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

Liquid Limit			
Blows	29	21	16
Wet Sample (g)	9.5	9.8	10.1
Dry Sample (g)	5.9	6.0	6.1
Water Content (%)	61.7%	63.4%	65.0%

Plastic Limit		
Trial	1	2
Wet Sample (g)	7.1	6.6
Dry Sample (g)	6.0	5.6
Water Content (%)	18.2%	18.2%



Liquid Limit (%): 62.4%	Plastic Limit (%): 18.2%	Plasticity Index (%): 44.2%

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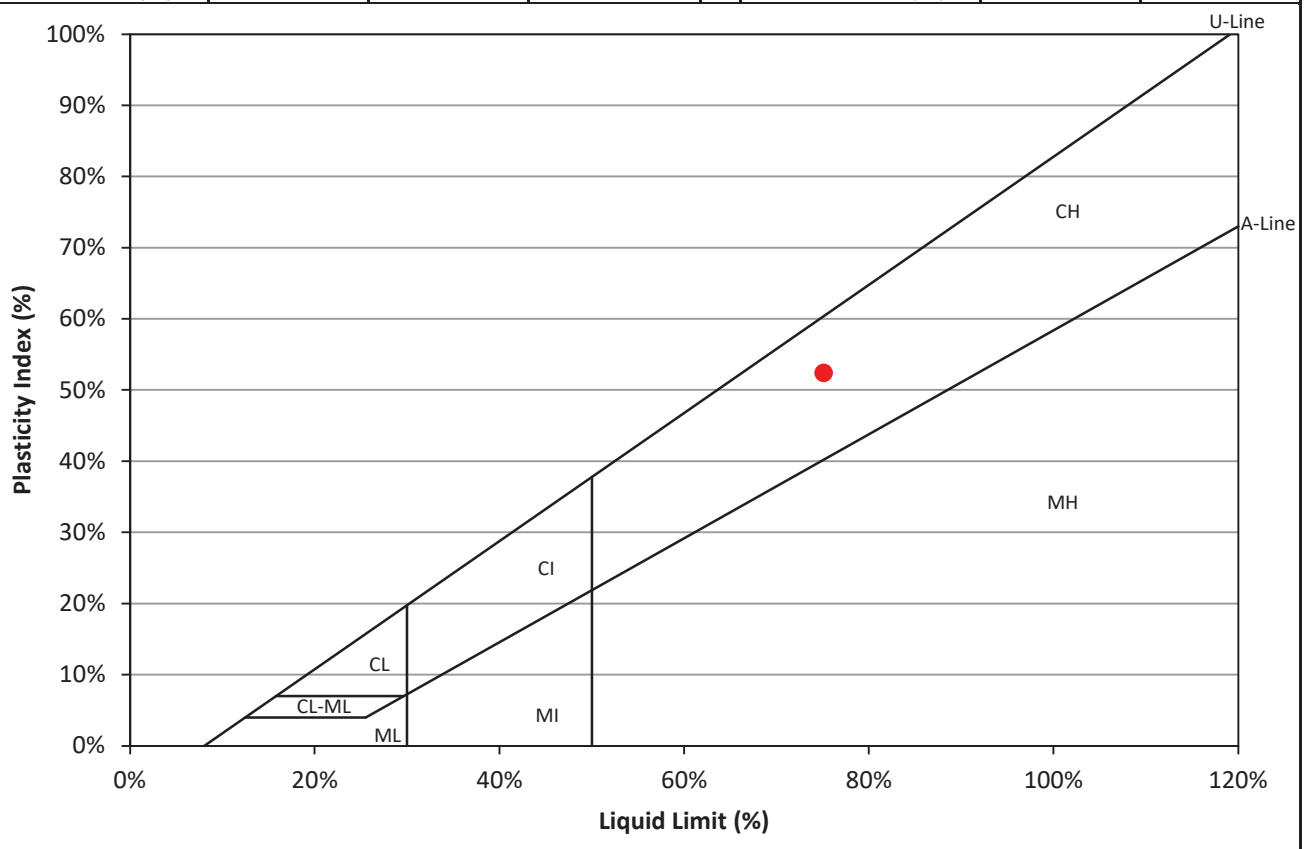
Project Name:	Jefferson CSR Contract 7	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-13	Sample Date:	6/21-23/2022
Sample Depth:	6.10 - 6.25 m	Lab Technician:	EManimbao
Sample Number:	G6	Date Tested:	July 13, 2022

Atterberg Limits (ASTM D4318)

Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils

Liquid Limit			
Blows	28	22	17
Wet Sample (g)	9.4	7.9	9.7
Dry Sample (g)	5.4	4.5	5.4
Water Content (%)	74.3%	75.9%	77.5%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.9	6.3
Dry Sample (g)	5.6	5.2
Water Content (%)	22.6%	22.8%



Liquid Limit (%): 75.1%	Plastic Limit (%): 22.7%	Plasticity Index (%): 52.4%

GRAIN SIZE DISTRIBUTION
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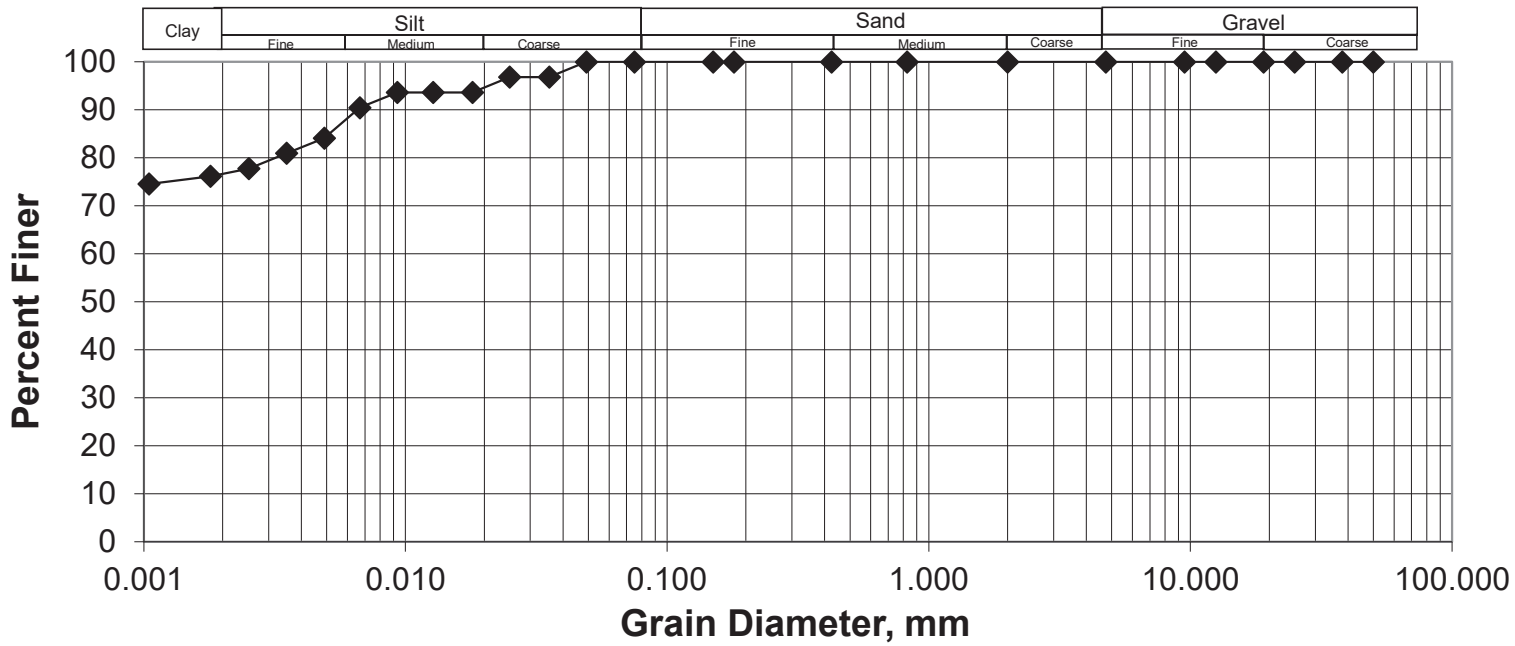
Job No.:	60680190	Hole No.:	TH22-06
Client:	City of Winnipeg	Sample No.:	G5
Project :	Jefferson CSR Contract 7	Depth:	4.57 - 4.72 m
Date Tested:	7-Jul-22	Date Sampled:	Varies
Tested By:	EManimbao	Sampled By:	AECOM

GRAVEL SIZES		SAND SIZES		FINES	
Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing
50.0	100.0	4.75	100.0	0.0750	100.0
38.0	100.0	2.00	100.0	0.0491	100.0
25.0	100.0	0.825	100.0	0.0354	96.8
19.0	100.0	0.425	100.0	0.0250	96.8
12.5	100.0	0.18	100.0	0.0180	93.6
9.5	100.0	0.15	100.0	0.0127	93.6
4.75	100.0	0.075	100.0	0.0093	93.6
				0.0067	90.5
				0.0049	84.1
				0.0035	80.9
				0.0025	77.8
				0.0018	76.2
				0.0010	74.6

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**23.3%**
Sand	**0.0%**	**Clay**	**76.7%**

GRAIN SIZE DISTRIBUTION
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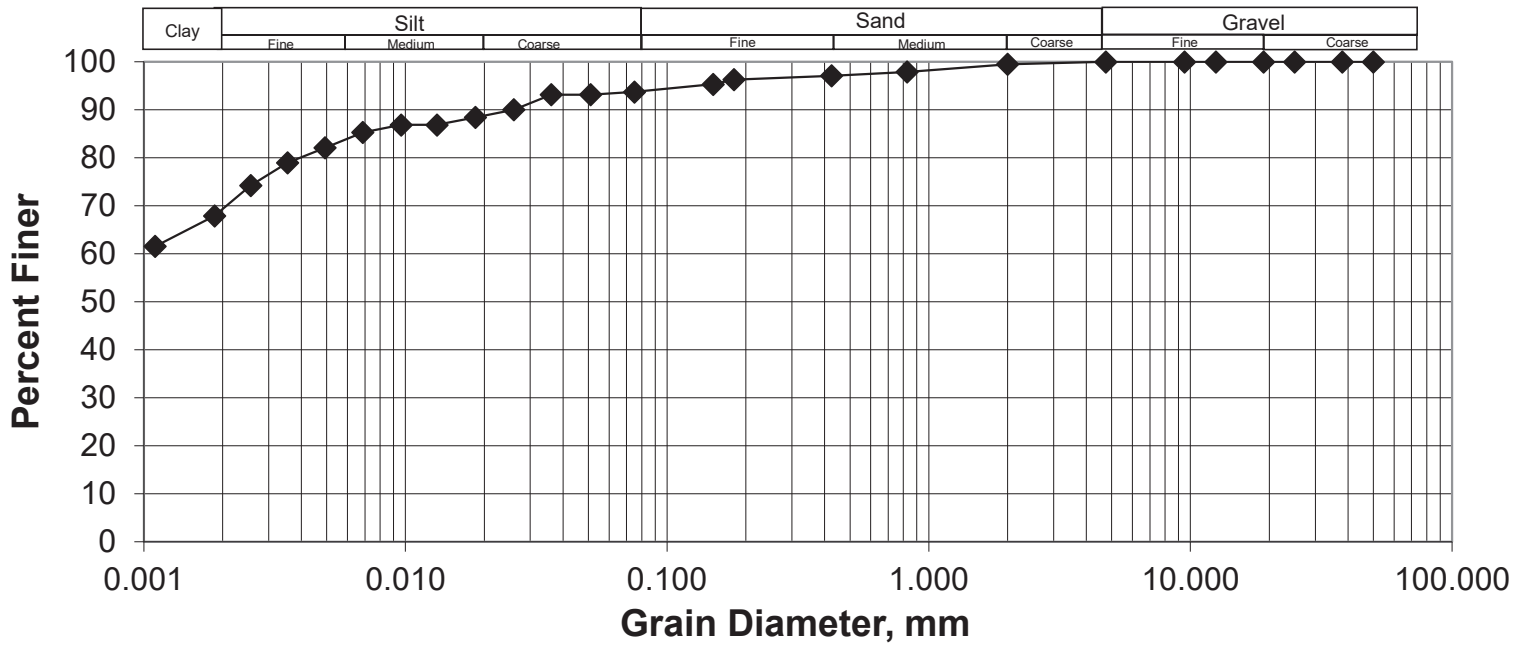
Job No.:	60680190	Hole No.:	TH22-06
Client:	City of Winnipeg	Sample No.:	G9
Project :	Jefferson CSR Contract 7	Depth:	10.67 - 10.82 m
Date Tested:	7-Jul-22	Date Sampled:	Varies
Tested By:	EManimbao	Sampled By:	AECOM

GRAVEL SIZES		SAND SIZES		FINES	
Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing
50.0	100.0	4.75	100.0	0.0750	93.7
38.0	100.0	2.00	99.5	0.0510	93.2
25.0	100.0	0.825	97.9	0.0360	93.2
19.0	100.0	0.425	97.1	0.0259	90.0
12.5	100.0	0.18	96.3	0.0185	88.4
9.5	100.0	0.15	95.3	0.0132	86.9
4.75	100.0	0.075	93.7	0.0096	86.9
				0.0069	85.3
				0.0049	82.1
				0.0035	79.0
				0.0026	74.2
				0.0019	67.9
				0.0011	61.6

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**24.9%**
Sand	**6.3%**	**Clay**	**68.8%**

GRAIN SIZE DISTRIBUTION
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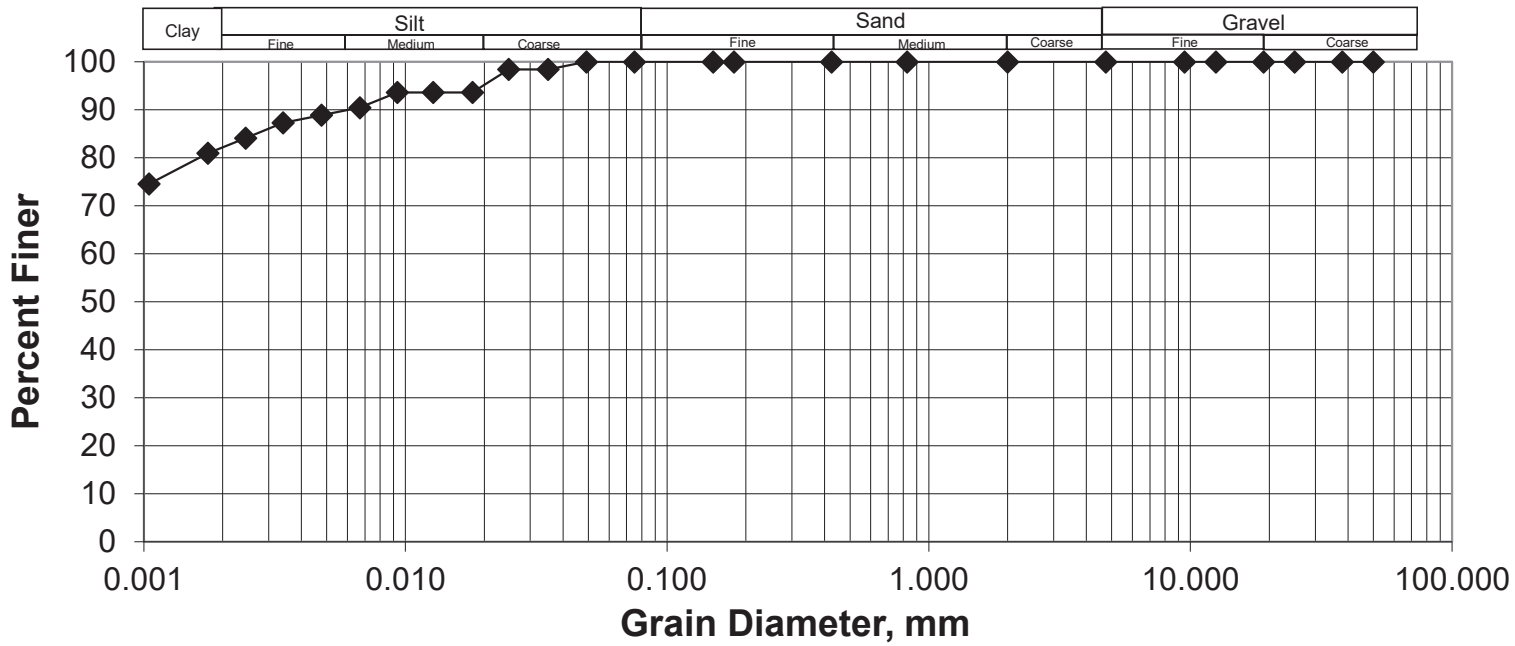
Job No.:	60680190	Hole No.:	TH22-07
Client:	City of Winnipeg	Sample No.:	G4
Project :	Jefferson CSR Contract 7	Depth:	3.05 - 3.20 m
Date Tested:	7-Jul-22	Date Sampled:	Varies
Tested By:	EManimbao	Sampled By:	AECOM

GRAVEL SIZES		SAND SIZES		FINES	
Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing
50.0	100.0	4.75	100.0	0.0750	100.0
38.0	100.0	2.00	100.0	0.0491	100.0
25.0	100.0	0.825	100.0	0.0351	98.4
19.0	100.0	0.425	100.0	0.0248	98.4
12.5	100.0	0.18	100.0	0.0180	93.6
9.5	100.0	0.15	100.0	0.0127	93.6
4.75	100.0	0.075	100.0	0.0093	93.6
				0.0067	90.5
				0.0048	88.9
				0.0034	87.3
				0.0024	84.1
				0.0018	80.9
				0.0010	74.6

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**18.0%**
Sand	**0.0%**	**Clay**	**82.0%**

GRAIN SIZE DISTRIBUTION
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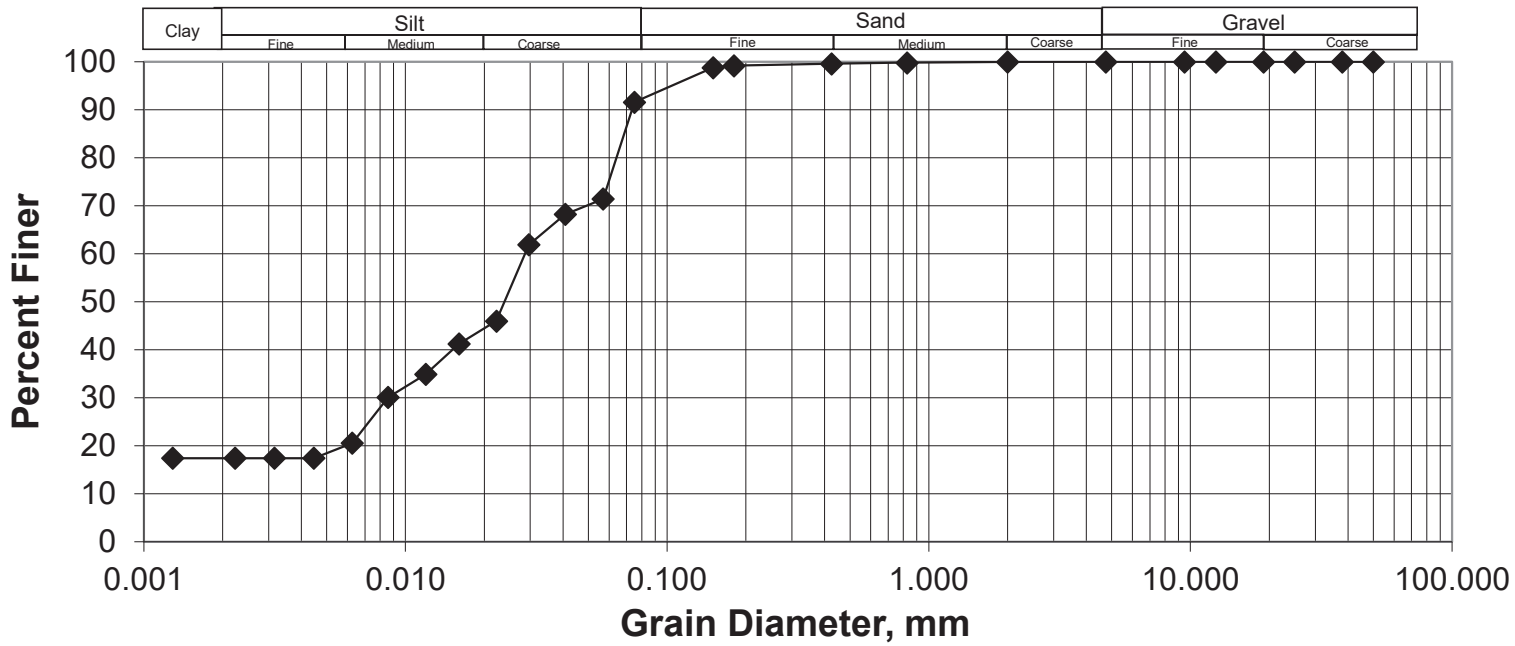
Job No.:	60680190	Hole No.:	TH22-08
Client:	City of Winnipeg	Sample No.:	G2
Project :	Jefferson CSR Contract 7	Depth:	1.52 - 1.98 m
Date Tested:	7-Jul-22	Date Sampled:	Varies
Tested By:	EManimbao	Sampled By:	AECOM

GRAVEL SIZES		SAND SIZES		FINES	
Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing
50.0	100.0	4.75	100.0	0.0750	91.6
38.0	100.0	2.00	100.0	0.0569	71.4
25.0	100.0	0.825	99.8	0.0408	68.2
19.0	100.0	0.425	99.6	0.0296	61.9
12.5	100.0	0.18	99.2	0.0223	46.0
9.5	100.0	0.15	98.8	0.0160	41.2
4.75	100.0	0.075	91.6	0.0119	34.9
				0.0086	30.1
				0.0063	20.6
				0.0045	17.4
				0.0032	17.4
				0.0022	17.4
				0.0013	17.4

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**74.2%**
Sand	**8.4%**	**Clay**	**17.4%**

GRAIN SIZE DISTRIBUTION
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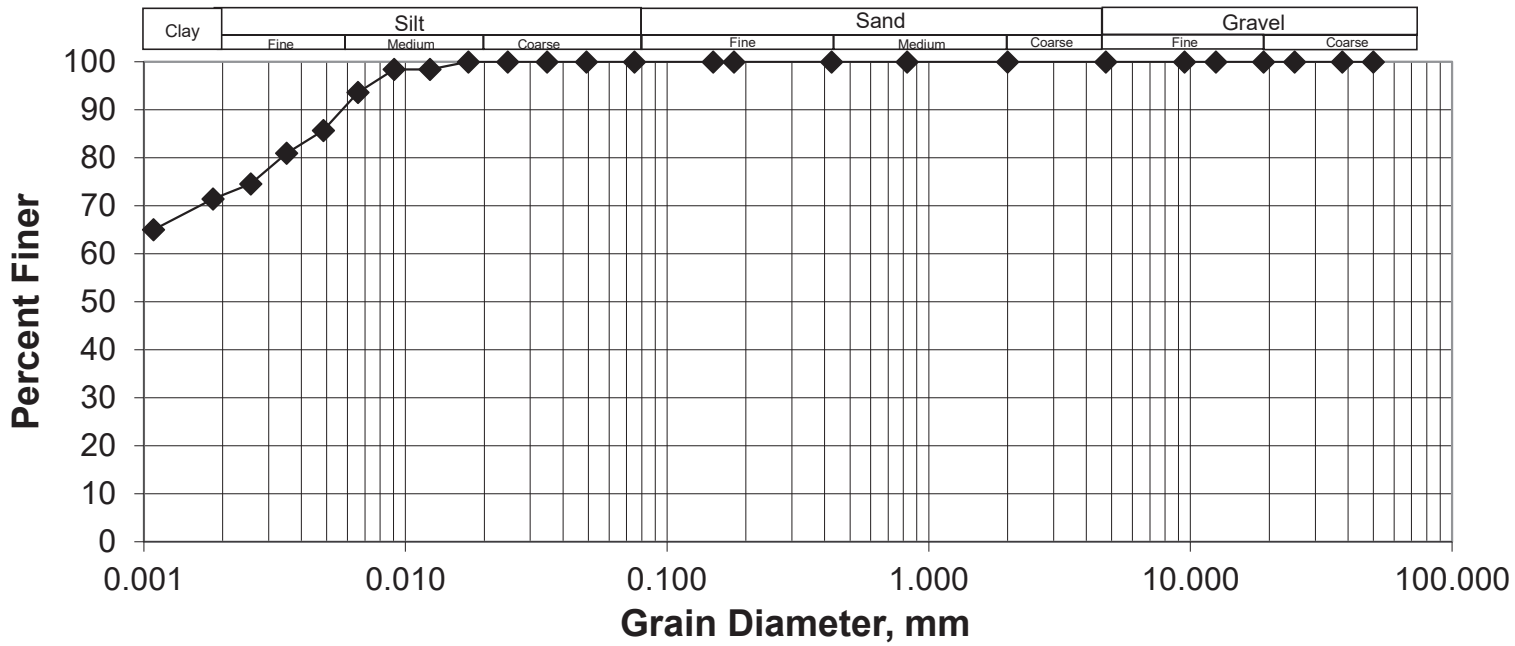
Job No.:	60680190	Hole No.:	TH22-09
Client:	City of Winnipeg	Sample No.:	G2
Project :	Jefferson CSR Contract 7	Depth:	1.52 - 1.68 m
Date Tested:	7-Jul-22	Date Sampled:	Varies
Tested By:	EManimbao	Sampled By:	AECOM

GRAVEL SIZES		SAND SIZES		FINES	
Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing
50.0	100.0	4.75	100.0	0.0750	100.0
38.0	100.0	2.00	100.0	0.0491	100.0
25.0	100.0	0.825	100.0	0.0347	100.0
19.0	100.0	0.425	100.0	0.0246	100.0
12.5	100.0	0.18	100.0	0.0174	100.0
9.5	100.0	0.15	100.0	0.0124	98.4
4.75	100.0	0.075	100.0	0.0091	98.4
				0.0066	93.6
				0.0049	85.7
				0.0035	80.9
				0.0026	74.6
				0.0018	71.4
				0.0011	65.1

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**27.8%**
Sand	**0.0%**	**Clay**	**72.2%**

GRAIN SIZE DISTRIBUTION
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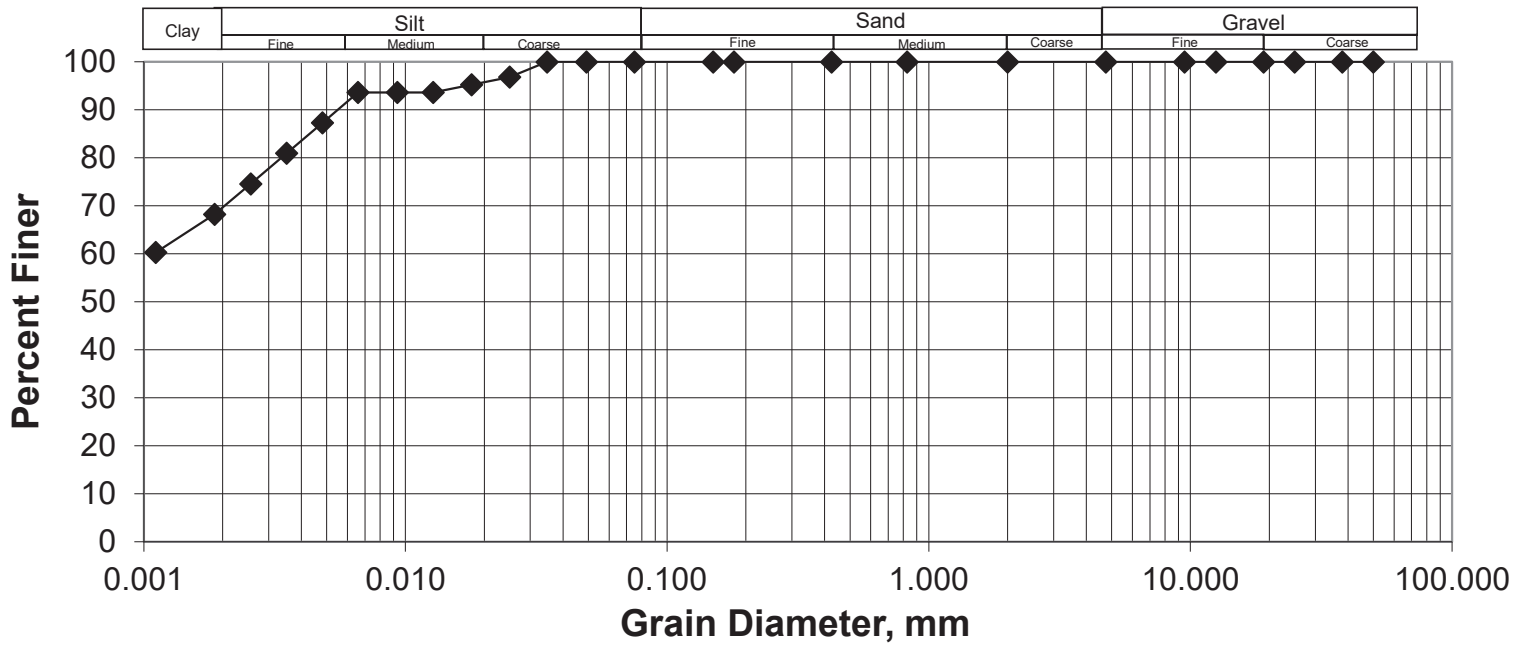
Job No.:	60680190	Hole No.:	TH22-09
Client:	City of Winnipeg	Sample No.:	G7
Project :	Jefferson CSR Contract 7	Depth:	7.62 - 7.77 m
Date Tested:	7-Jul-22	Date Sampled:	Varies
Tested By:	EManimbao	Sampled By:	AECOM

GRAVEL SIZES		SAND SIZES		FINES	
Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing
50.0	100.0	4.75	100.0	0.0750	100.0
38.0	100.0	2.00	100.0	0.0491	100.0
25.0	100.0	0.825	100.0	0.0347	100.0
19.0	100.0	0.425	100.0	0.0250	96.8
12.5	100.0	0.18	100.0	0.0179	95.2
9.5	100.0	0.15	100.0	0.0127	93.6
4.75	100.0	0.075	100.0	0.0093	93.6
				0.0066	93.6
				0.0048	87.3
				0.0035	80.9
				0.0026	74.6
				0.0019	68.2
				0.0011	60.3

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**30.9%**
Sand	**0.0%**	**Clay**	**69.1%**

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

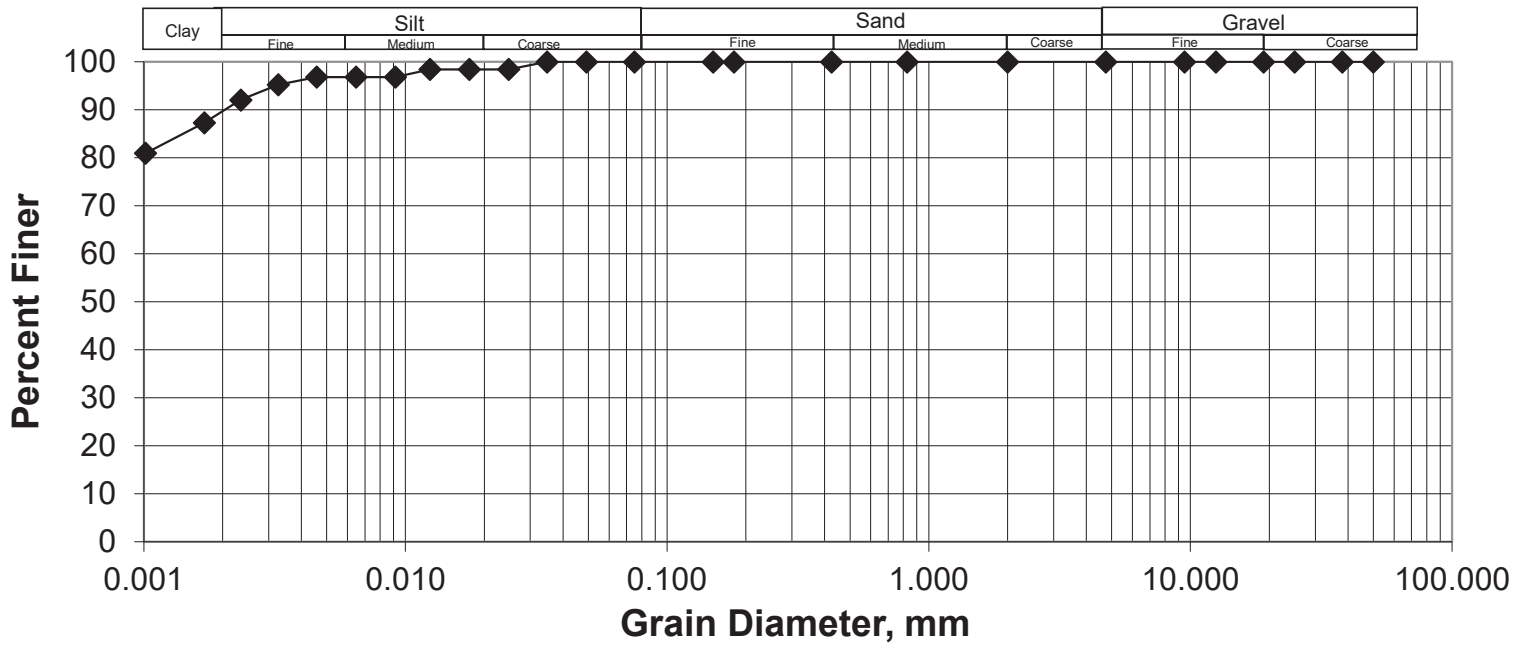
AECOM
WINNIPEG GEOTECHNICAL LABORATORY
99 Commerce Dr., Winnipeg, MB R3P 0Y7 Canada
tel (204) 477-5381 **fax** (431) 800-1210

CERTIFIED BY CCIL

Job No.:	60680190	Hole No.:	TH22-10
Client:	City of Winnipeg	Sample No.:	T5
Project :	Jefferson CSR Contract 7	Depth:	4.57 - 5.18 m
Date Tested:	7-Jul-22	Date Sampled:	Varies
Tested By:	EManimbao	Sampled By:	AECOM

GRAVEL SIZES		SAND SIZES		FINES	
Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing
50.0	100.0	4.75	100.0	0.0750	100.0
38.0	100.0	2.00	100.0	0.0491	100.0
25.0	100.0	0.825	100.0	0.0347	100.0
19.0	100.0	0.425	100.0	0.0248	98.4
12.5	100.0	0.18	100.0	0.0175	98.4
9.5	100.0	0.15	100.0	0.0124	98.4
4.75	100.0	0.075	100.0	0.0091	96.8
				0.0065	96.8
				0.0046	96.8
				0.0033	95.2
				0.0023	92.1
				0.0017	87.3
				0.0010	80.9

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**10.3%**
Sand	**0.0%**	**Clay**	**89.7%**

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

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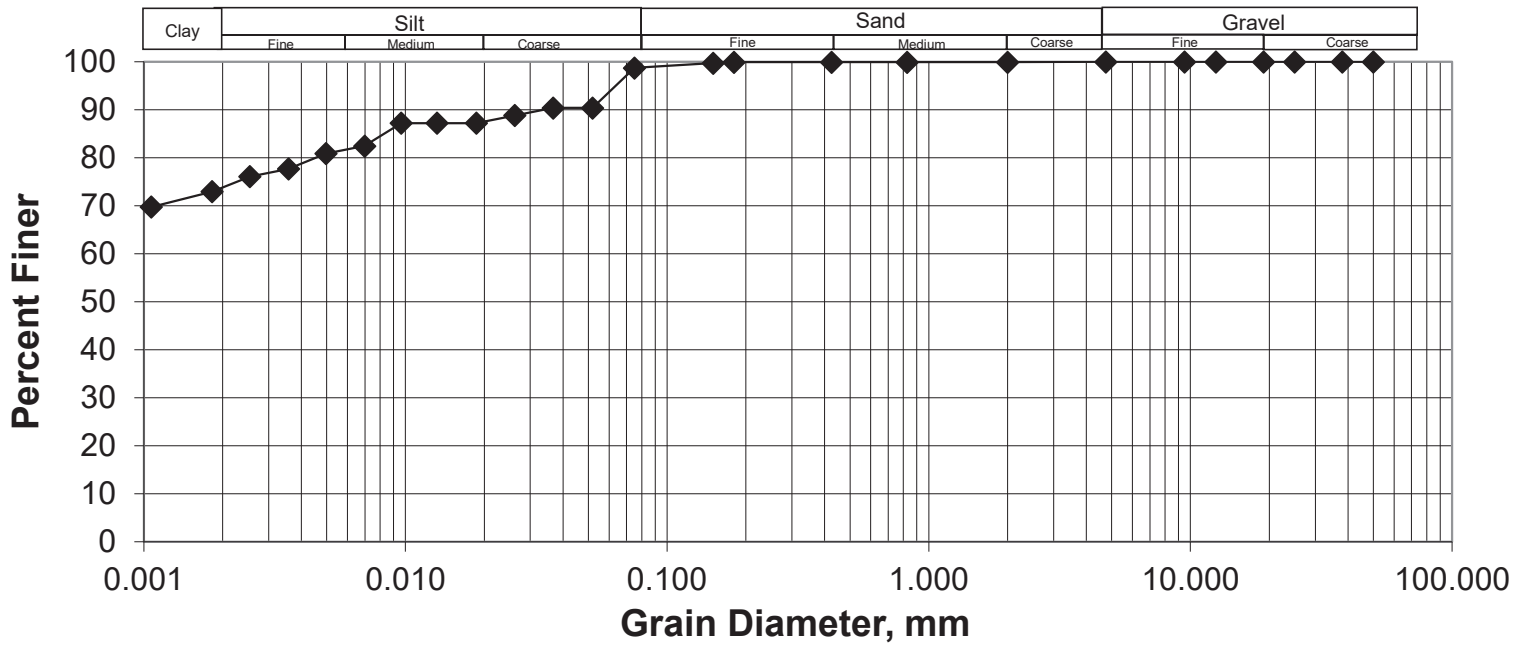
99 Commerce Dr., Winnipeg, MB R3P 0Y7 Canada
tel (204) 477-5381 **fax** (431) 800-1210

CERTIFIED BY CCIL

Job No.:	60680190	Hole No.:	TH22-11
Client:	City of Winnipeg	Sample No.:	G4
Project :	Jefferson CSR Contract 7	Depth:	3.05 - 3.20 m
Date Tested:	7-Jul-22	Date Sampled:	Varies
Tested By:	EManimbao	Sampled By:	AECOM

GRAVEL SIZES		SAND SIZES		FINES	
Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing
50.0	100.0	4.75	100.0	0.0750	98.7
38.0	100.0	2.00	99.9	0.0518	90.4
25.0	100.0	0.825	99.9	0.0367	90.4
19.0	100.0	0.425	99.9	0.0261	88.8
12.5	100.0	0.18	99.9	0.0186	87.2
9.5	100.0	0.15	99.7	0.0132	87.2
4.75	100.0	0.075	98.7	0.0096	87.2
				0.0070	82.5
				0.0050	80.9
				0.0036	77.7
				0.0025	76.1
				0.0018	72.9
				0.0011	69.8

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**24.9%**
Sand	**1.3%**	**Clay**	**73.8%**

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

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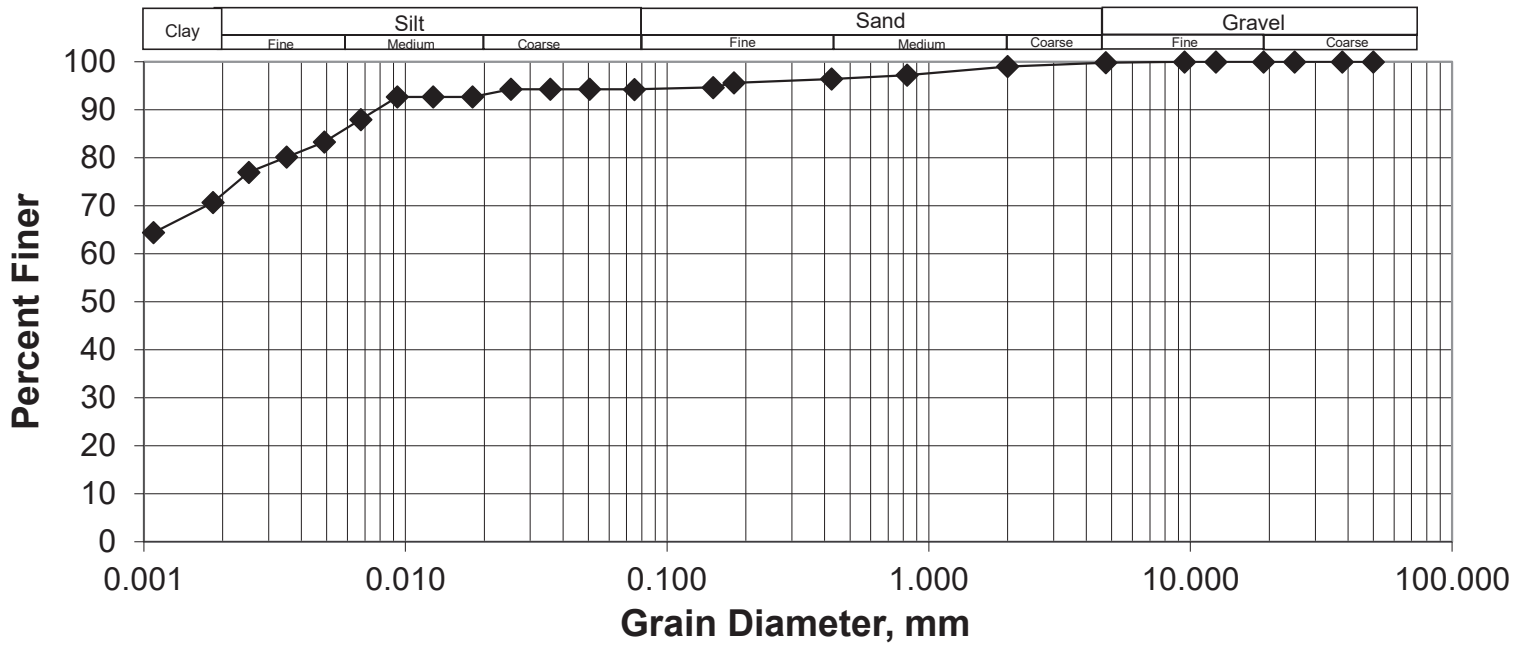
CERTIFIED BY CCIL

Job No.:	60680190	Hole No.:	TH22-11
Client:	City of Winnipeg	Sample No.:	G8
Project :	Jefferson CSR Contract 7	Depth:	9.14 - 9.30 m
Date Tested:	7-Jul-22	Date Sampled:	Varies
Tested By:	EManimbao	Sampled By:	AECOM

GRAVEL SIZES		SAND SIZES		FINES	
Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing
50.0	100.0	4.75	99.8	0.0750	94.3
38.0	100.0	2.00	99.0	0.0505	94.3
25.0	100.0	0.825	97.2	0.0357	94.3
19.0	100.0	0.425	96.4	0.0253	94.3
12.5	100.0	0.18	95.6	0.0180	92.7
9.5	100.0	0.15	94.7	0.0127	92.7
4.75	99.8	0.075	94.3	0.0093	92.7
				0.0067	88.0
				0.0049	83.3
				0.0035	80.1
				0.0025	77.0
				0.0018	70.7
				0.0011	64.4

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.2%**	**Silt**	**21.8%**
Sand	**5.5%**	**Clay**	**72.5%**

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

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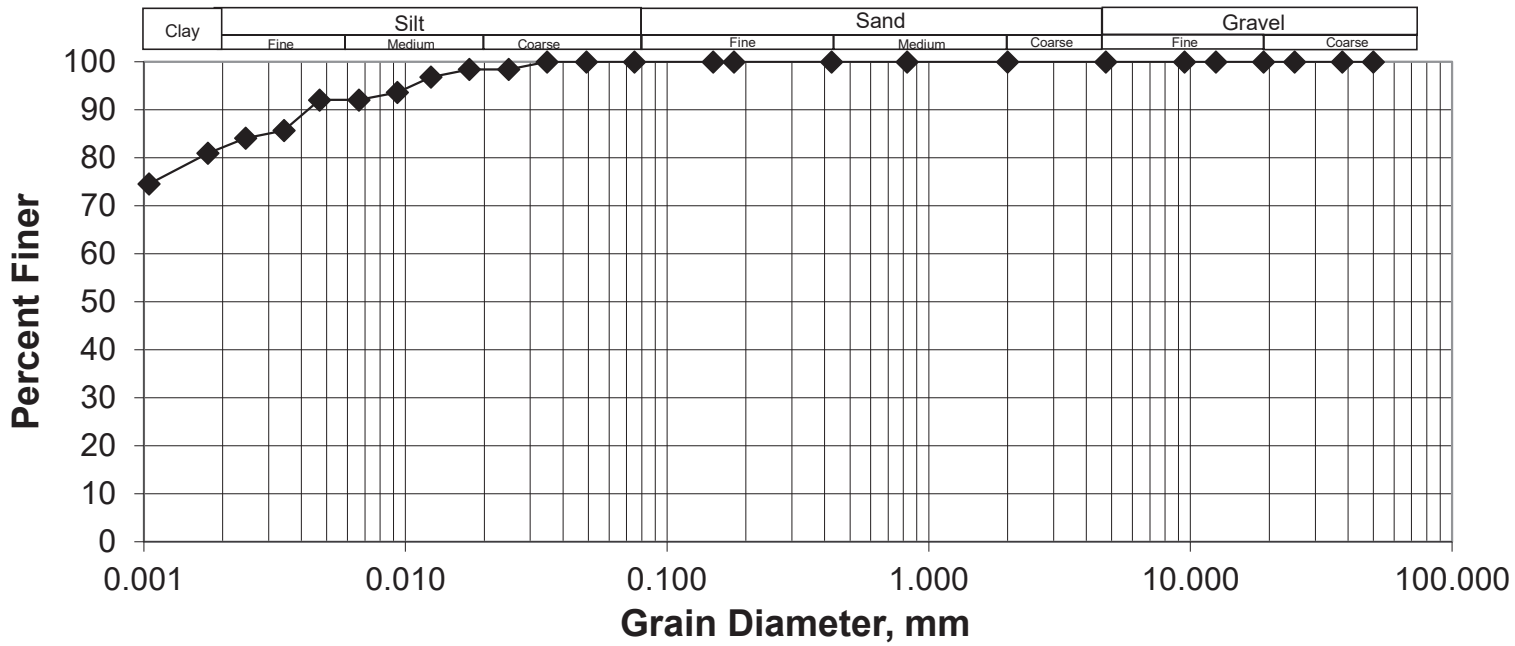
tel (204) 477-5381 **fax** (431) 800-1210

CERTIFIED BY CCIL

Job No.:	60680190	Hole No.:	TH22-12
Client:	City of Winnipeg	Sample No.:	G5
Project :	Jefferson CSR Contract 7	Depth:	4.57 - 4.72 m
Date Tested:	7-Jul-22	Date Sampled:	Varies
Tested By:	EManimbao	Sampled By:	AECOM

GRAVEL SIZES		SAND SIZES		FINES	
Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing
50.0	100.0	4.75	100.0	0.0750	100.0
38.0	100.0	2.00	100.0	0.0491	100.0
25.0	100.0	0.825	100.0	0.0347	100.0
19.0	100.0	0.425	100.0	0.0248	98.4
12.5	100.0	0.18	100.0	0.0175	98.4
9.5	100.0	0.15	100.0	0.0125	96.8
4.75	100.0	0.075	100.0	0.0093	93.6
				0.0066	92.1
				0.0047	92.1
				0.0034	85.7
				0.0024	84.1
				0.0018	80.9
				0.0010	74.6

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**18.0%**
Sand	**0.0%**	**Clay**	**82.0%**

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

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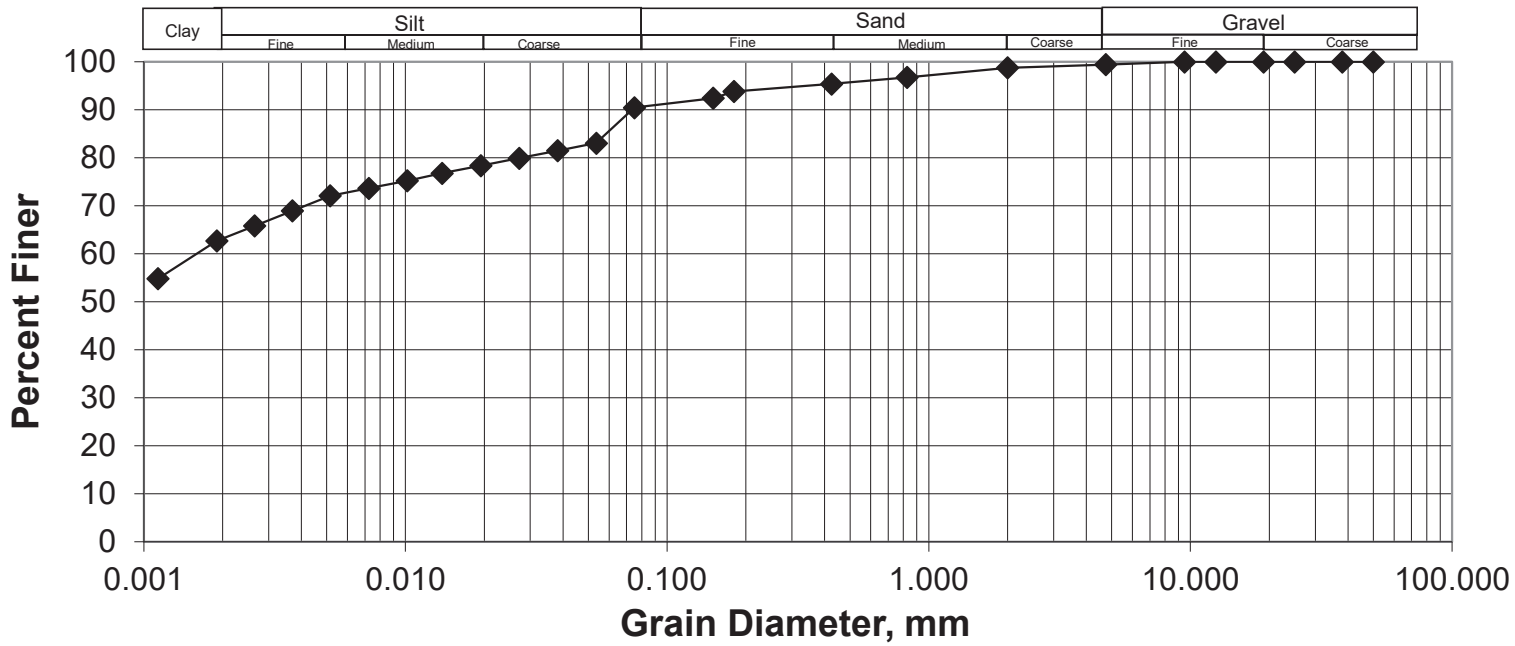
CERTIFIED BY CCIL

Job No.:	60680190	Hole No.:	TH22-12
Client:	City of Winnipeg	Sample No.:	G10
Project :	Jefferson CSR Contract 7	Depth:	12.19 - 12.34 m
Date Tested:	7-Jul-22	Date Sampled:	Varies
Tested By:	EManimbao	Sampled By:	AECOM

GRAVEL SIZES		SAND SIZES		FINES	
Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing
50.0	100.0	4.75	99.4	0.0750	90.5
38.0	100.0	2.00	98.8	0.0536	83.1
25.0	100.0	0.825	96.8	0.0382	81.5
19.0	100.0	0.425	95.4	0.0272	79.9
12.5	100.0	0.18	93.8	0.0194	78.4
9.5	100.0	0.15	92.4	0.0138	76.8
4.75	99.4	0.075	90.5	0.0102	75.2
				0.0072	73.7
				0.0052	72.1
				0.0037	69.0
				0.0026	65.8
				0.0019	62.7
				0.0011	54.8

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.6%**	**Silt**	**27.4%**
Sand	**8.9%**	**Clay**	**63.1%**

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

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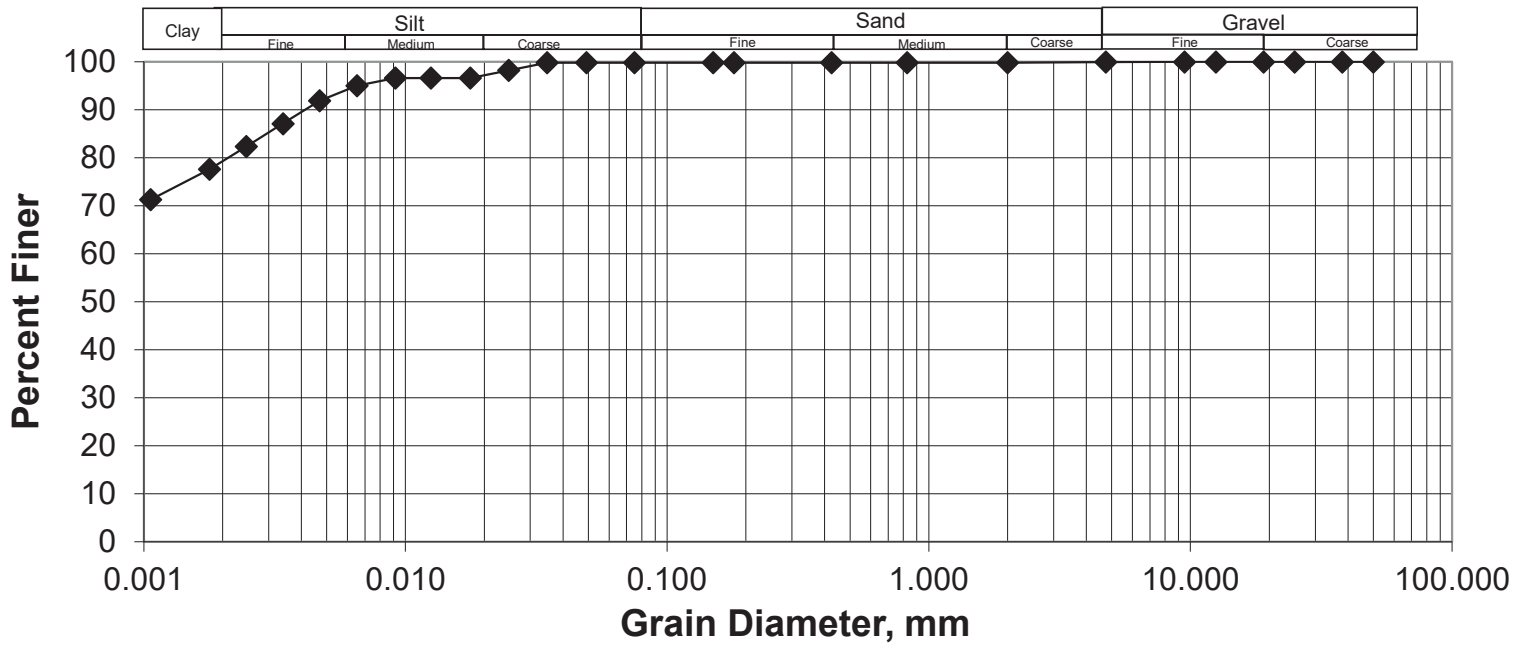
CERTIFIED BY CCIL

Job No.:	60680190	Hole No.:	TH22-13
Client:	City of Winnipeg	Sample No.:	G6
Project :	Jefferson CSR Contract 7	Depth:	6.10 - 6.25 m
Date Tested:	7-Jul-22	Date Sampled:	Varies
Tested By:	EManimbao	Sampled By:	AECOM

GRAVEL SIZES		SAND SIZES		FINES	
Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing	Grain Size (mm.)	Total Percent Passing
50.0	100.0	4.75	99.9	0.0750	99.8
38.0	100.0	2.00	99.8	0.0491	99.8
25.0	100.0	0.825	99.8	0.0347	99.8
19.0	100.0	0.425	99.8	0.0248	98.2
12.5	100.0	0.18	99.8	0.0177	96.6
9.5	100.0	0.15	99.8	0.0125	96.6
4.75	99.9	0.075	99.8	0.0091	96.6
				0.0065	95.0
				0.0047	91.9
				0.0034	87.1
				0.0025	82.4
				0.0018	77.6
				0.0011	71.3

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.1%**	**Silt**	**20.8%**
Sand	**0.1%**	**Clay**	**79.0%**

AECOM - SOILS LABORATORY
SHEAR STRENGTH, MOISTURE CONTENT & DENSITY CALCULATIONS

AECOM

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 7
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-06**
SAMPLE NO.:	**T4**
SAMPLE DEPTH:	3.05 - 3.66 m
DATE TESTED:	5-Jul-22
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.50
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**49.0**
Undrained Shear Strength (ksf)	1.02
POCKET PENETROMETER	
Reading - Qu (tsf)	1.00
Undrained Shear Strength (kPa)	**47.9**
Reading - Qu (tsf)	0.75
Undrained Shear Strength (kPa)	**35.9**
Reading - Qu (tsf)	1.00
Undrained Shear Strength (kPa)	**47.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**32.0**
Unconfined compressive strength (ksf)	**0.7**
Undrained Shear Strength (kPa)	**16.0**
Undrained Shear Strength (ksf)	**0.334**
MOISTURE CONTENT	
Tare Number	99
Wt. Sample wet + tare (g)	310.2
Wt. Sample dry + tare (g)	212.9
Wt. Tare (g)	8.4
Moisture Content %	**47.6**
BULK DENSITY	
Sample Wt. (g)	1077
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.20
Diameter 3 (cm)	7.20
Avg. Diameter (cm)	**7.20**
Length 1 (cm)	15.40
Length 2 (cm)	15.40
Length 3 (cm)	15.50
Avg. Length (cm)	**15.43**
Volume (cm^3)	628.4
Moisture content (%)	47.6
Bulk Density (g/cm^3)	1.714
Bulk Unit Weight (kN/m^3)	**16.8**
Bulk Unit Weight (pcf)	**107.0**
Dry Unit Weight (kN/m^3)	**11.39**

AECOM - SOILS LABORATORY
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS (ASTM D2166)

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 7
JOB NO.:	60680190

TEST HOLE NO.:	TH22-06
SAMPLE NO.:	T4
SAMPLE DEPTH:	3.05 - 3.66 m
SAMPLE DATE:	
TEST DATE:	5-Jul-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel, trace oxidation,moist, firm,	
grey, high plasticity	
MOISTURE CONTENT:	47.6

SAMPLE DIAM.(Do):	72.00	**(mm)**	**INITIAL AREA, Ao:**	4071.5	**(mm^2)**
SAMPLE LENGTH, (Lo):	154.33	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.14	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	0.99	**(0.5<R<2 % / minute)**

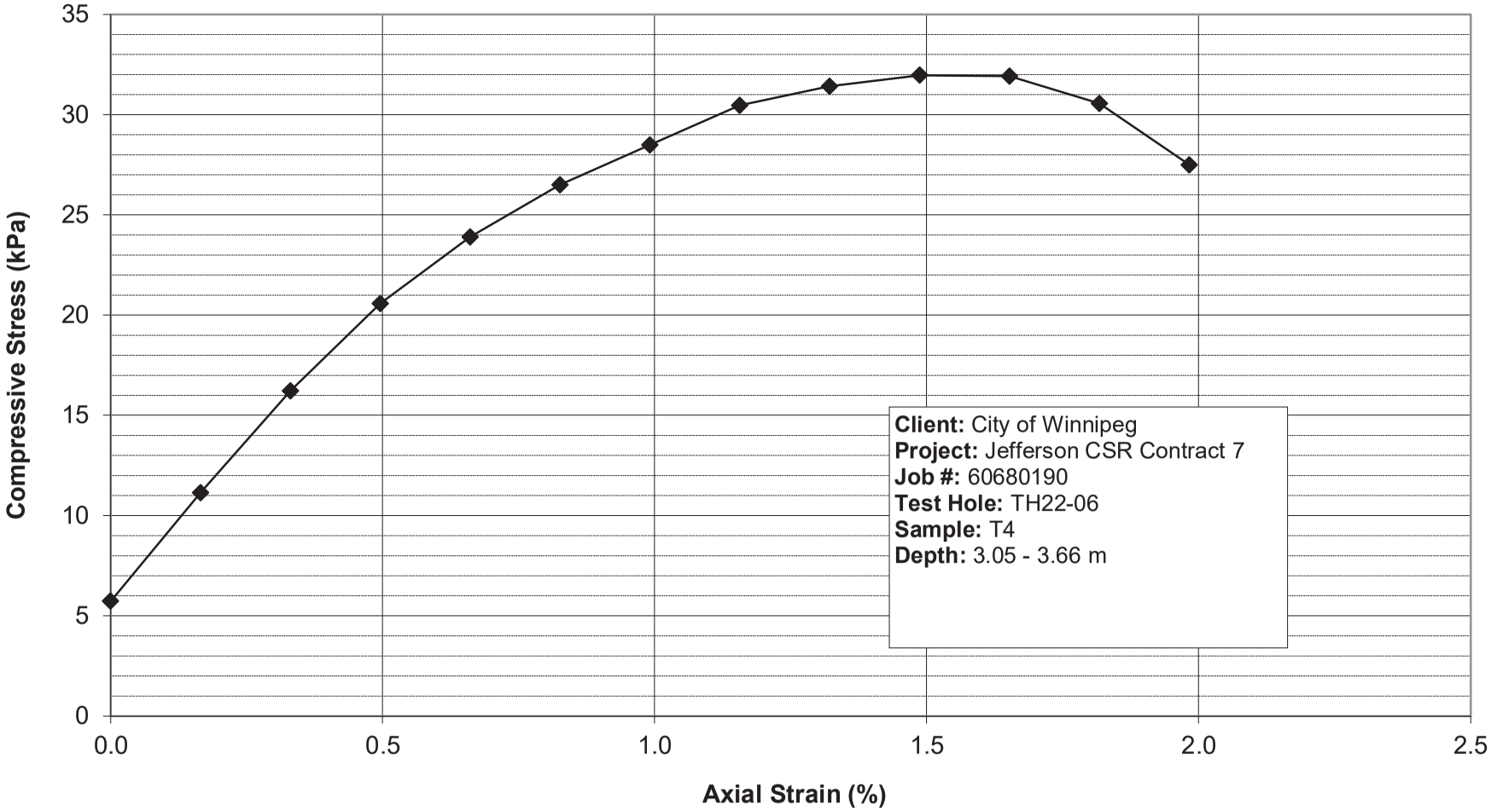
FAILURE SKETCH

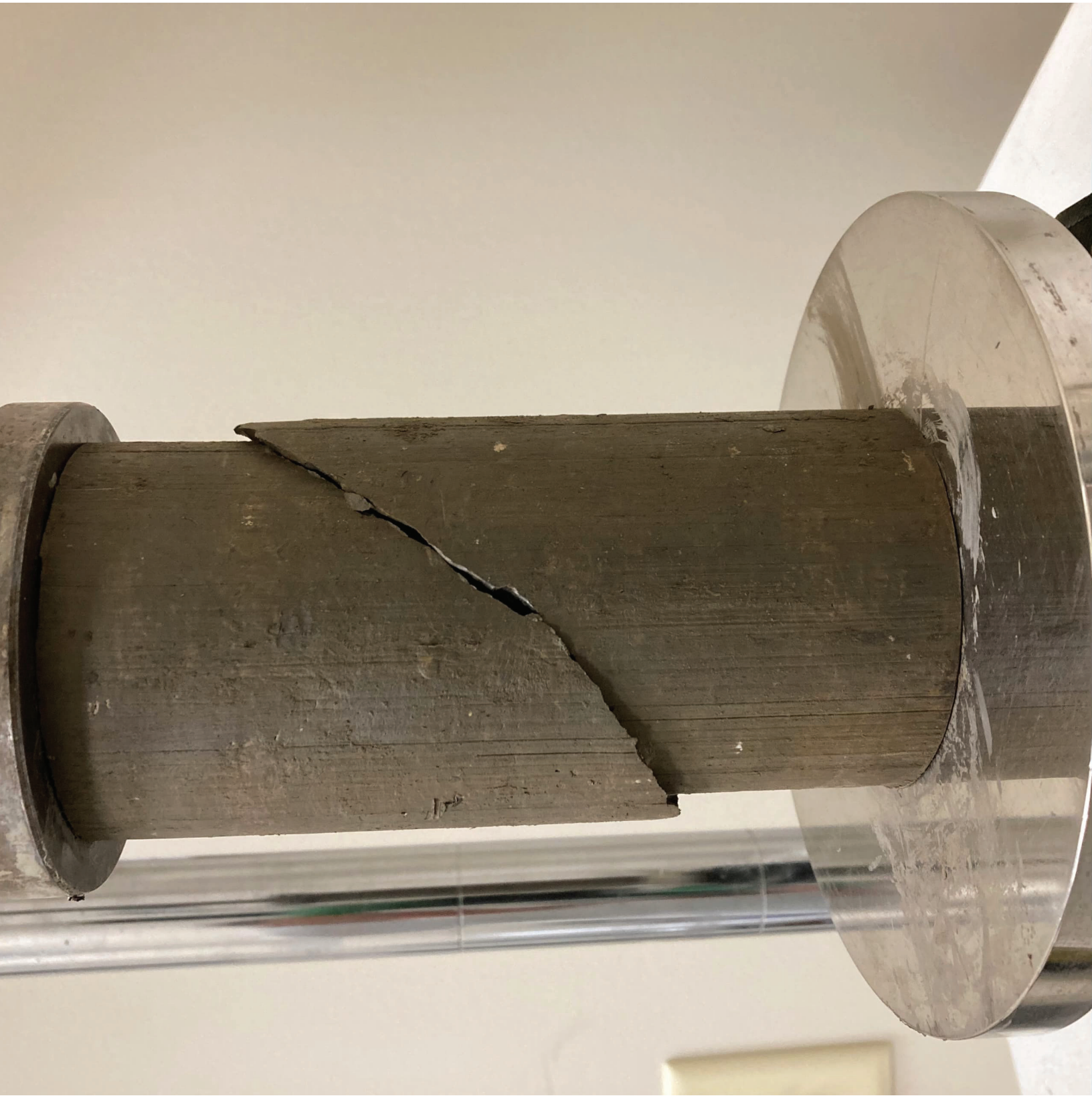
TEST DATA - DIAL READINGS							
AXIAL COMPRESSION	**PROVING RING**	**TOTAL AXIAL STRAIN, ε_1**	**AVERAGE CROSS-SECTIONAL AREA, A**	**APPLIED AXIAL LOAD, P**	**COMPRESSIVE STRESS, σ_c**		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0006	0.00	6.31	5.25	0.83	0.120	5.7
0.02	0.0011	0.17	6.32	10.21	1.62	0.233	11.1
0.03	0.0016	0.33	6.33	14.90	2.35	0.339	16.2
0.04	0.0020	0.50	6.34	18.93	2.98	0.430	20.6
0.05	0.0024	0.66	6.35	22.02	3.47	0.499	23.9
0.06	0.0026	0.83	6.36	24.46	3.84	0.553	26.5
0.07	0.0028	0.99	6.37	26.33	4.13	0.595	28.5
0.08	0.0030	1.16	6.38	28.20	4.42	0.636	30.5
0.09	0.0031	1.32	6.40	29.14	4.56	0.656	31.4
0.10	0.0032	1.49	6.41	29.70	4.64	0.668	32.0
0.11	0.0032	1.65	6.42	29.70	4.63	0.667	31.9
0.12	0.0030	1.82	6.43	28.48	4.43	0.638	30.6
0.13	0.0027	1.98	6.44	25.67	3.99	0.574	27.5

UNCONFINED COMPRESSIVE STRENGTH, q_u:	31.97	kPa
(based on maximum q_u value)	0.668	ksf
UNDRAINED SHEAR STRENGTH, S_u:	15.98	kPa
(based on maximum q_u value)	0.334	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)





AECOM - SOILS LABORATORY
SHEAR STRENGTH, MOISTURE CONTENT & DENSITY CALCULATIONS

AECOM

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 7
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-06**
SAMPLE NO.:	**T8**
SAMPLE DEPTH:	9.14 - 9.75 m
DATE TESTED:	6-Jul-22
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.55
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**53.9**
Undrained Shear Strength (ksf)	1.13
POCKET PENETROMETER	
Reading - Qu (tsf)	0.75
Undrained Shear Strength (kPa)	**35.9**
Reading - Qu (tsf)	0.75
Undrained Shear Strength (kPa)	**35.9**
Reading - Qu (tsf)	0.75
Undrained Shear Strength (kPa)	**35.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**94.8**
Unconfined compressive strength (ksf)	**2.0**
Undrained Shear Strength (kPa)	**47.4**
Undrained Shear Strength (ksf)	**0.990**
MOISTURE CONTENT	
Tare Number	B40
Wt. Sample wet + tare (g)	456.5
Wt. Sample dry + tare (g)	328.6
Wt. Tare (g)	8.3
Moisture Content %	**39.9**
BULK DENSITY	
Sample Wt. (g)	1152.4
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.20
Diameter 3 (cm)	7.20
Avg. Diameter (cm)	**7.20**
Length 1 (cm)	15.40
Length 2 (cm)	15.50
Length 3 (cm)	15.40
Avg. Length (cm)	**15.43**
Volume (cm^3)	628.4
Moisture content (%)	39.9
Bulk Density (g/cm^3)	1.834
Bulk Unit Weight (kN/m^3)	**18.0**
Bulk Unit Weight (pcf)	**114.5**
Dry Unit Weight (kN/m^3)	**12.85**

AECOM - SOILS LABORATORY
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS (ASTM D2166)

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 7
JOB NO.:	60680190

TEST HOLE NO.:	TH22-06
SAMPLE NO.:	T8
SAMPLE DEPTH:	9.14 - 9.75 m
SAMPLE DATE:	
TEST DATE:	6-Jul-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel, trace oxidation,moist, firm,	
grey, high plasticity	
MOISTURE CONTENT:	39.9

SAMPLE DIAM.(Do):	72.00	**(mm)**	**INITIAL AREA, Ao:**	4071.5	**(mm^2)**
SAMPLE LENGTH, (Lo):	154.33	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.14	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	0.99	**(0.5<R<2 % / minute)**

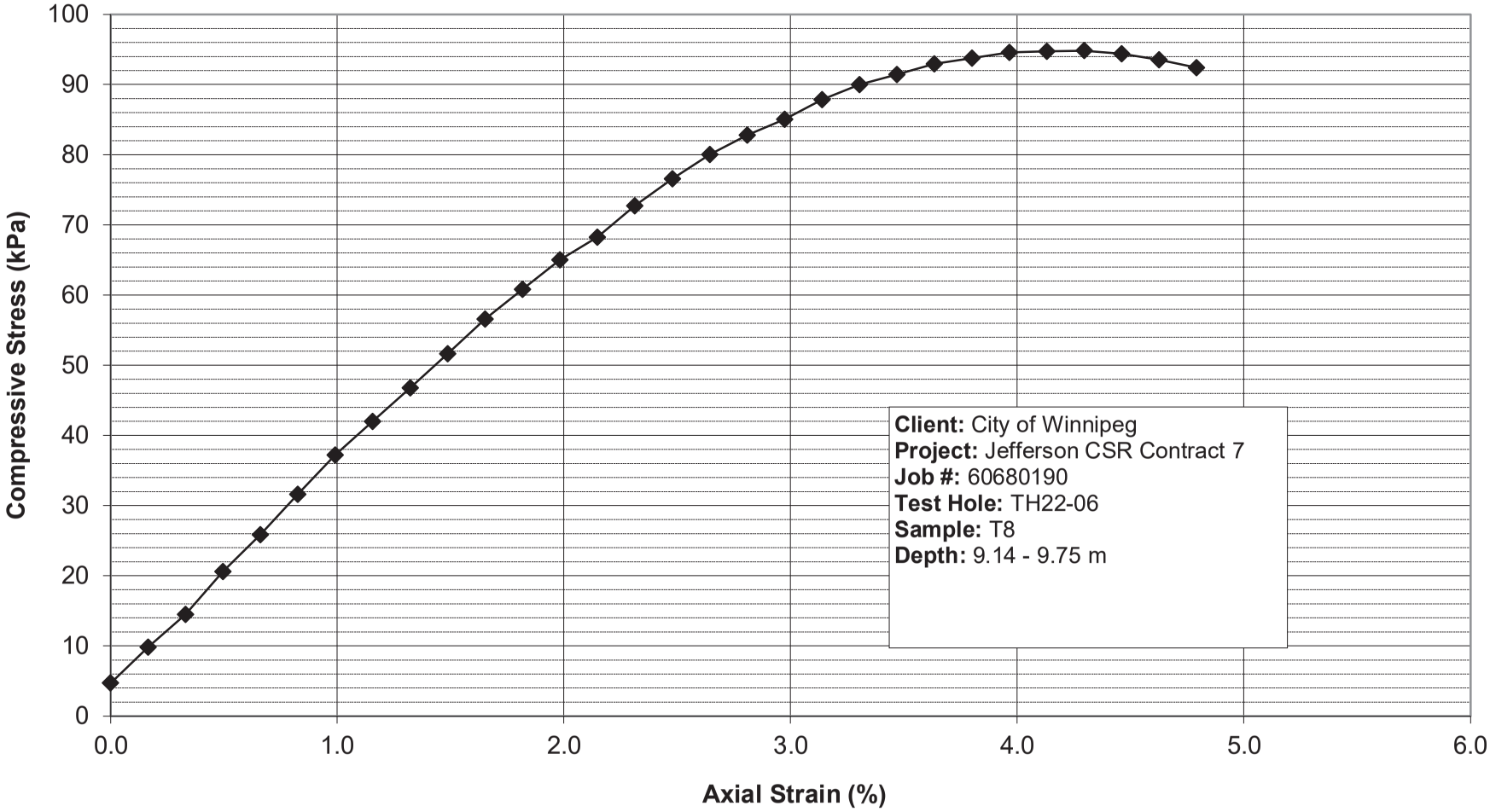
FAILURE SKETCH

TEST DATA - DIAL READINGS							
AXIAL COMPRESSION	**PROVING RING**	**TOTAL AXIAL STRAIN, ε_1**	**AVERAGE CROSS-SECTIONAL AREA, A**	**APPLIED AXIAL LOAD, P**	**COMPRESSIVE STRESS, σ_c**		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0005	0.00	6.31	4.31	0.68	0.098	4.7
0.02	0.0010	0.17	6.32	9.00	1.42	0.205	9.8
0.03	0.0014	0.33	6.33	13.31	2.10	0.303	14.5
0.04	0.0020	0.50	6.34	18.93	2.98	0.430	20.6
0.05	0.0025	0.66	6.35	23.80	3.75	0.539	25.8
0.06	0.0031	0.83	6.36	29.14	4.58	0.659	31.6
0.07	0.0037	0.99	6.37	34.39	5.39	0.777	37.2
0.08	0.0042	1.16	6.38	38.89	6.09	0.877	42.0
0.09	0.0046	1.32	6.40	43.38	6.78	0.977	46.8
0.10	0.0051	1.49	6.41	47.97	7.49	1.078	51.6
0.11	0.0056	1.65	6.42	52.66	8.21	1.182	56.6
0.12	0.0061	1.82	6.43	56.69	8.82	1.270	60.8
0.13	0.0065	1.98	6.44	60.72	9.43	1.358	65.0
0.14	0.0068	2.15	6.45	63.81	9.89	1.425	68.2
0.15	0.0073	2.31	6.46	68.12	10.54	1.518	72.7
0.16	0.0077	2.48	6.47	71.87	11.11	1.599	76.6
0.17	0.0080	2.64	6.48	75.24	11.61	1.671	80.0
0.18	0.0083	2.81	6.49	77.96	12.01	1.729	82.8
0.19	0.0086	2.97	6.50	80.21	12.33	1.776	85.0
0.20	0.0089	3.14	6.52	83.02	12.74	1.835	87.9
0.21	0.0091	3.30	6.53	85.17	13.05	1.879	90.0
0.22	0.0093	3.47	6.54	86.67	13.26	1.909	91.4
0.23	0.0094	3.63	6.55	88.27	13.48	1.941	92.9
0.24	0.0095	3.80	6.56	89.20	13.60	1.958	93.8
0.25	0.0096	3.97	6.57	90.14	13.72	1.975	94.6
0.26	0.0097	4.13	6.58	90.42	13.74	1.978	94.7
0.27	0.0097	4.30	6.59	90.70	13.75	1.981	94.8
0.28	0.0097	4.46	6.61	90.42	13.69	1.971	94.4
0.29	0.0096	4.63	6.62	89.76	13.57	1.953	93.5
0.30	0.0095	4.79	6.63	88.83	13.40	1.930	92.4

UNCONFINED COMPRESSIVE STRENGTH, q_u:	94.84	kPa
(based on maximum q_u value)	1.981	ksf
UNDRAINED SHEAR STRENGTH, S_u:	47.42	kPa
(based on maximum q_u value)	0.990	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)



AECOM - SOILS LABORATORY
SHEAR STRENGTH, MOISTURE CONTENT & DENSITY CALCULATIONS

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 7
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-07**
SAMPLE NO.:	**T5**
SAMPLE DEPTH:	4.57 - 5.18 m
DATE TESTED:	7-Jul-22
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.65
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**63.8**
Undrained Shear Strength (ksf)	1.33
POCKET PENETROMETER	
Reading - Qu (tsf)	1.25
Undrained Shear Strength (kPa)	**59.9**
Reading - Qu (tsf)	1.25
Undrained Shear Strength (kPa)	**59.9**
Reading - Qu (tsf)	1.25
Undrained Shear Strength (kPa)	**59.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**90.4**
Unconfined compressive strength (ksf)	**1.9**
Undrained Shear Strength (kPa)	**45.2**
Undrained Shear Strength (ksf)	**0.944**
MOISTURE CONTENT	
Tare Number	F 29
Wt. Sample wet + tare (g)	406.9
Wt. Sample dry + tare (g)	272.6
Wt. Tare (g)	8.1
Moisture Content %	**50.8**
BULK DENSITY	
Sample Wt. (g)	1062.4
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.20
Diameter 3 (cm)	7.20
Avg. Diameter (cm)	**7.20**
Length 1 (cm)	15.40
Length 2 (cm)	15.40
Length 3 (cm)	15.50
Avg. Length (cm)	**15.43**
Volume (cm^3)	628.4
Moisture content (%)	50.8
Bulk Density (g/cm^3)	1.691
Bulk Unit Weight (kN/m^3)	**16.6**
Bulk Unit Weight (pcf)	**105.6**
Dry Unit Weight (kN/m^3)	**11.00**

AECOM - SOILS LABORATORY
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS (ASTM D2166)

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 7
JOB NO.:	60680190

TEST HOLE NO.:	TH22-07
SAMPLE NO.:	T5
SAMPLE DEPTH:	4.57 - 5.18 m
SAMPLE DATE:	
TEST DATE:	7-Jul-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sulfate,moist, firm,	
grey, high plasticity	
MOISTURE CONTENT:	50.8

SAMPLE DIAM.(Do):	72.00	**(mm)**	**INITIAL AREA, Ao:**	4071.5	**(mm^2)**
SAMPLE LENGTH, (Lo):	154.33	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.14	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	0.99	**(0.5<R<2 % / minute)**

FAILURE SKETCH

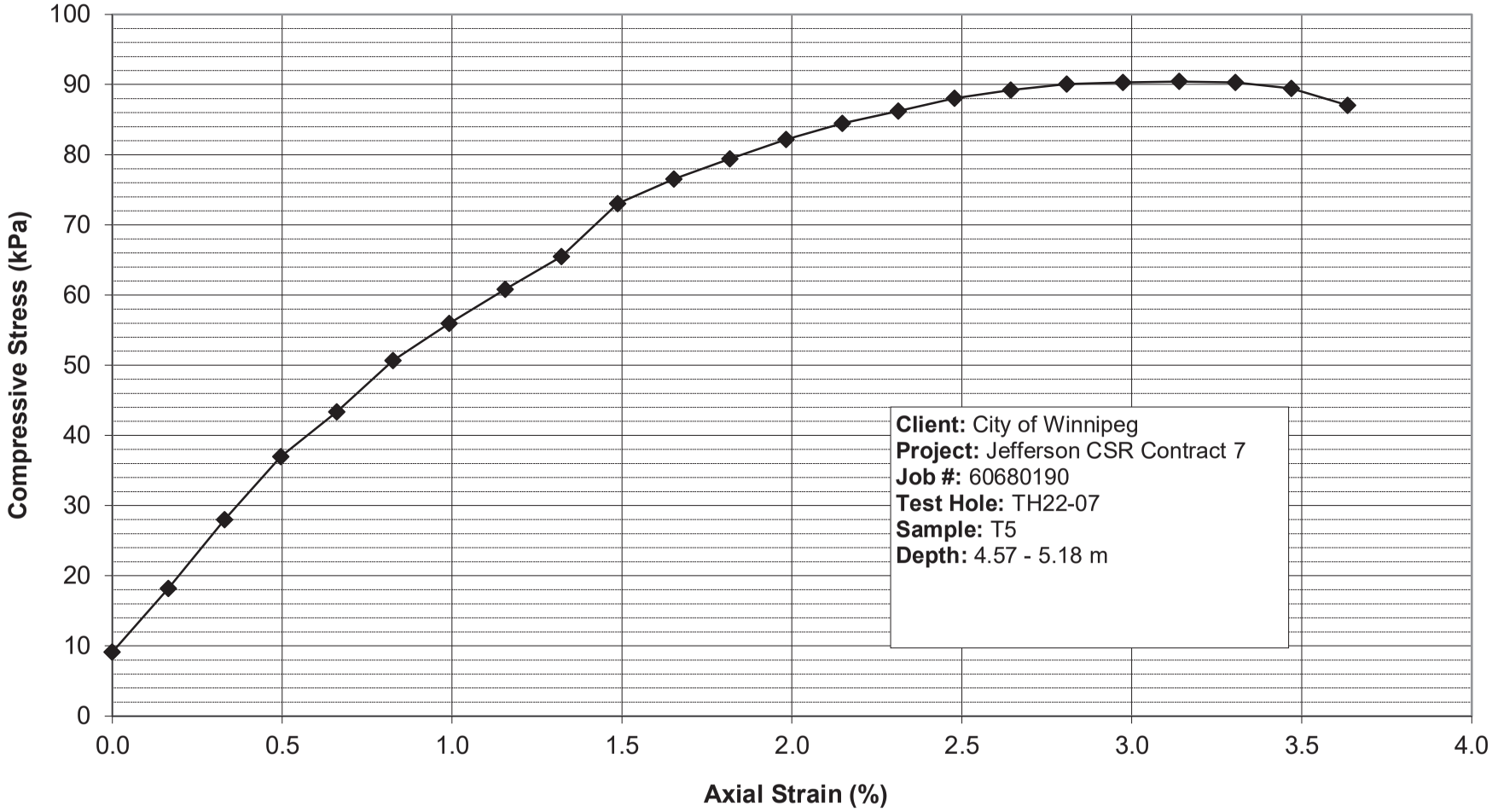
TEST DATA - DIAL READINGS

AXIAL COMPRESSION	PROVING RING	TOTAL AXIAL STRAIN, ε_1	AVERAGE CROSS-SECTIONAL AREA, A	APPLIED AXIAL LOAD, P	COMPRESSIVE STRESS, σ_c		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0009	0.00	6.31	8.34	1.32	0.190	9.1
0.02	0.0018	0.17	6.32	16.68	2.64	0.380	18.2
0.03	0.0027	0.33	6.33	25.67	4.05	0.584	28.0
0.04	0.0036	0.50	6.34	34.01	5.36	0.772	37.0
0.05	0.0043	0.66	6.35	39.92	6.28	0.905	43.3
0.06	0.0050	0.83	6.36	46.76	7.35	1.058	50.7
0.07	0.0055	0.99	6.37	51.72	8.11	1.168	55.9
0.08	0.0060	1.16	6.38	56.31	8.82	1.270	60.8
0.09	0.0065	1.32	6.40	60.72	9.49	1.367	65.5
0.10	0.0072	1.49	6.41	67.84	10.59	1.525	73.0
0.11	0.0076	1.65	6.42	71.21	11.10	1.598	76.5
0.12	0.0079	1.82	6.43	74.02	11.52	1.658	79.4
0.13	0.0082	1.98	6.44	76.74	11.92	1.716	82.2
0.14	0.0084	2.15	6.45	78.99	12.25	1.764	84.4
0.15	0.0086	2.31	6.46	80.77	12.50	1.800	86.2
0.16	0.0088	2.48	6.47	82.64	12.77	1.839	88.1
0.17	0.0090	2.64	6.48	83.86	12.94	1.863	89.2
0.18	0.0091	2.81	6.49	84.80	13.06	1.881	90.0
0.19	0.0091	2.97	6.50	85.17	13.09	1.886	90.3
0.20	0.0091	3.14	6.52	85.45	13.12	1.889	90.4
0.21	0.0091	3.30	6.53	85.45	13.09	1.885	90.3
0.22	0.0091	3.47	6.54	84.80	12.97	1.868	89.4
0.23	0.0088	3.63	6.55	82.64	12.62	1.817	87.0

UNCONFINED COMPRESSIVE STRENGTH, q_u:	90.43	kPa
(based on maximum q_u value)	1.889	ksf
UNDRAINED SHEAR STRENGTH, S_u:	45.22	kPa
(based on maximum q_u value)	0.944	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)



AECOM - SOILS LABORATORY
SHEAR STRENGTH, MOISTURE CONTENT & DENSITY CALCULATIONS

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 7
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-07**
SAMPLE NO.:	**T9**
SAMPLE DEPTH:	10.67 - 11.28 m
DATE TESTED:	7-Jul-22
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.40
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**39.2**
Undrained Shear Strength (ksf)	0.82
POCKET PENETROMETER	
Reading - Qu (tsf)	0.75
Undrained Shear Strength (kPa)	**35.9**
Reading - Qu (tsf)	0.75
Undrained Shear Strength (kPa)	**35.9**
Reading - Qu (tsf)	0.75
Undrained Shear Strength (kPa)	**35.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**81.1**
Unconfined compressive strength (ksf)	**1.7**
Undrained Shear Strength (kPa)	**40.5**
Undrained Shear Strength (ksf)	**0.846**
MOISTURE CONTENT	
Tare Number	MAC 10
Wt. Sample wet + tare (g)	394.4
Wt. Sample dry + tare (g)	302.9
Wt. Tare (g)	8.6
Moisture Content %	**31.1**
BULK DENSITY	
Sample Wt. (g)	1205
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.20
Diameter 3 (cm)	7.20
Avg. Diameter (cm)	**7.20**
Length 1 (cm)	15.50
Length 2 (cm)	15.50
Length 3 (cm)	15.40
Avg. Length (cm)	**15.47**
Volume (cm^3)	629.7
Moisture content (%)	31.1
Bulk Density (g/cm^3)	1.914
Bulk Unit Weight (kN/m^3)	**18.8**
Bulk Unit Weight (pcf)	**119.5**
Dry Unit Weight (kN/m^3)	**14.32**

AECOM - SOILS LABORATORY
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS (ASTM D2166)

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 7
JOB NO.:	60680190

TEST HOLE NO.:	TH22-07
SAMPLE NO.:	T9
SAMPLE DEPTH:	10.67 - 11.28 m
SAMPLE DATE:	
TEST DATE:	7-Jul-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel, moist, firm,	
grey, high plasticity	
MOISTURE CONTENT:	31.1

SAMPLE DIAM.(Do):	72.00	**(mm)**	**INITIAL AREA, Ao:**	4071.5	**(mm^2)**
SAMPLE LENGTH, (Lo):	154.67	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.15	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	0.99	**(0.5<R<2 % / minute)**

FAILURE SKETCH

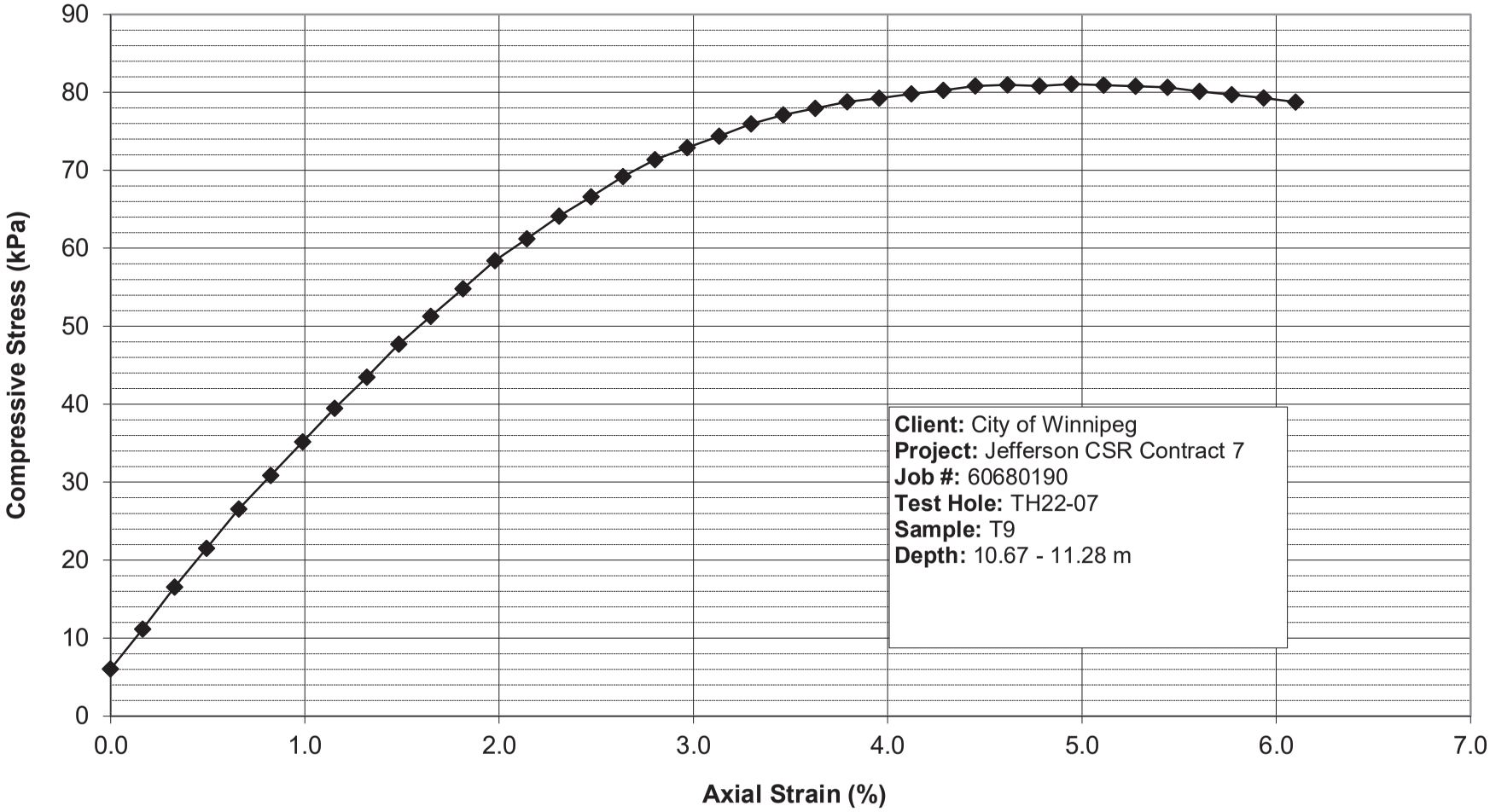
TEST DATA - DIAL READINGS

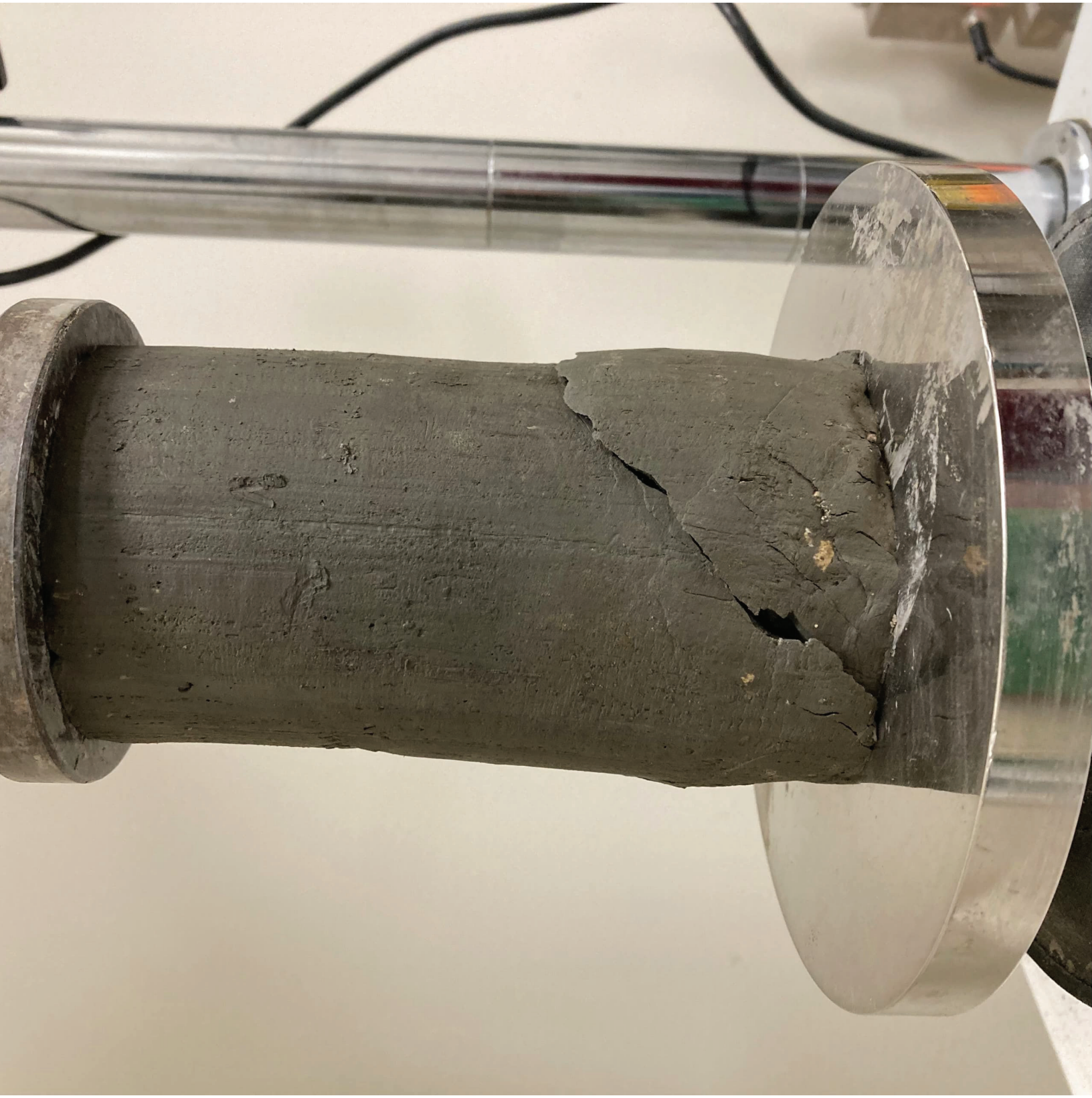
AXIAL COMPRESSION	PROVING RING	TOTAL AXIAL STRAIN, ε_1	AVERAGE CROSS-SECTIONAL AREA, A	APPLIED AXIAL LOAD, P	COMPRESSIVE STRESS, σ_c		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0006	0.00	6.31	5.53	0.88	0.126	6.0
0.02	0.0011	0.16	6.32	10.21	1.62	0.233	11.1
0.03	0.0016	0.33	6.33	15.18	2.40	0.345	16.5
0.04	0.0021	0.49	6.34	19.77	3.12	0.449	21.5
0.05	0.0026	0.66	6.35	24.46	3.85	0.554	26.5
0.06	0.0030	0.82	6.36	28.48	4.48	0.645	30.9
0.07	0.0035	0.99	6.37	32.51	5.10	0.735	35.2
0.08	0.0039	1.15	6.38	36.54	5.72	0.824	39.5
0.09	0.0043	1.32	6.40	40.29	6.30	0.907	43.4
0.10	0.0047	1.48	6.41	44.32	6.92	0.996	47.7
0.11	0.0051	1.65	6.42	47.69	7.43	1.070	51.2
0.12	0.0055	1.81	6.43	51.07	7.95	1.144	54.8
0.13	0.0058	1.98	6.44	54.53	8.47	1.220	58.4
0.14	0.0061	2.14	6.45	57.25	8.88	1.278	61.2
0.15	0.0064	2.31	6.46	60.06	9.30	1.339	64.1
0.16	0.0067	2.47	6.47	62.50	9.66	1.391	66.6
0.17	0.0069	2.64	6.48	65.03	10.03	1.445	69.2
0.18	0.0072	2.80	6.49	67.18	10.35	1.490	71.3
0.19	0.0073	2.97	6.50	68.78	10.57	1.523	72.9
0.20	0.0075	3.13	6.51	70.28	10.79	1.553	74.4
0.21	0.0077	3.30	6.53	71.87	11.01	1.586	75.9
0.22	0.0078	3.46	6.54	73.09	11.18	1.610	77.1
0.23	0.0079	3.63	6.55	74.02	11.30	1.628	77.9
0.24	0.0080	3.79	6.56	74.96	11.43	1.646	78.8
0.25	0.0081	3.96	6.57	75.52	11.49	1.655	79.2
0.26	0.0081	4.12	6.58	76.18	11.57	1.667	79.8
0.27	0.0082	4.29	6.59	76.74	11.64	1.676	80.2
0.28	0.0083	4.45	6.60	77.40	11.72	1.687	80.8
0.29	0.0083	4.62	6.62	77.68	11.74	1.691	80.9
0.30	0.0083	4.78	6.63	77.68	11.72	1.688	80.8
0.31	0.0083	4.95	6.64	78.05	11.76	1.693	81.1
0.32	0.0083	5.11	6.65	78.05	11.74	1.690	80.9
0.33	0.0083	5.28	6.66	78.05	11.72	1.687	80.8
0.34	0.0083	5.44	6.67	78.05	11.70	1.684	80.6
0.35	0.0083	5.61	6.69	77.68	11.62	1.673	80.1
0.36	0.0083	5.77	6.70	77.40	11.56	1.664	79.7
0.37	0.0082	5.94	6.71	77.12	11.49	1.655	79.2
0.38	0.0082	6.10	6.72	76.74	11.42	1.644	78.7

UNCONFINED COMPRESSIVE STRENGTH, q_u:	81.06	kPa
(based on maximum q_u value)	1.693	ksf
UNDRAINED SHEAR STRENGTH, S_u:	40.53	kPa
(based on maximum q_u value)	0.846	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)





AECOM - SOILS LABORATORY
SHEAR STRENGTH, MOISTURE CONTENT & DENSITY CALCULATIONS

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 7
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-08**
SAMPLE NO.:	**T6**
SAMPLE DEPTH:	6.10 - 6.71 m
DATE TESTED:	18-Jul-22
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.55
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**53.9**
Undrained Shear Strength (ksf)	1.13
POCKET PENETROMETER	
Reading - Qu (tsf)	1.00
Undrained Shear Strength (kPa)	**47.9**
Reading - Qu (tsf)	1.25
Undrained Shear Strength (kPa)	**59.9**
Reading - Qu (tsf)	1.50
Undrained Shear Strength (kPa)	**71.8**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**118.1**
Unconfined compressive strength (ksf)	**2.5**
Undrained Shear Strength (kPa)	**59.1**
Undrained Shear Strength (ksf)	**1.234**
MOISTURE CONTENT	
Tare Number	E 41
Wt. Sample wet + tare (g)	568.4
Wt. Sample dry + tare (g)	408.4
Wt. Tare (g)	9.4
Moisture Content %	**40.1**
BULK DENSITY	
Sample Wt. (g)	1134.1
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.20
Diameter 3 (cm)	7.30
Avg. Diameter (cm)	**7.23**
Length 1 (cm)	15.40
Length 2 (cm)	15.30
Length 3 (cm)	15.40
Avg. Length (cm)	**15.37**
Volume (cm^3)	631.5
Moisture content (%)	40.1
Bulk Density (g/cm^3)	1.796
Bulk Unit Weight (kN/m^3)	**17.6**
Bulk Unit Weight (pcf)	**112.1**
Dry Unit Weight (kN/m^3)	**12.57**

AECOM - SOILS LABORATORY
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS (ASTM D2166)

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 7
JOB NO.:	60680190

TEST HOLE NO.:	TH22-08
SAMPLE NO.:	T6
SAMPLE DEPTH:	6.10 - 6.71 m
SAMPLE DATE:	
TEST DATE:	18-Jul-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel,moist, firm,	
grey, high plasticity	
MOISTURE CONTENT:	40.1

SAMPLE DIAM.(Do):	72.33	**(mm)**	**INITIAL AREA, Ao:**	4109.3	**(mm^2)**
SAMPLE LENGTH, (Lo):	153.67	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.12	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	1.00	**(0.5<R<2 % / minute)**

FAILURE SKETCH

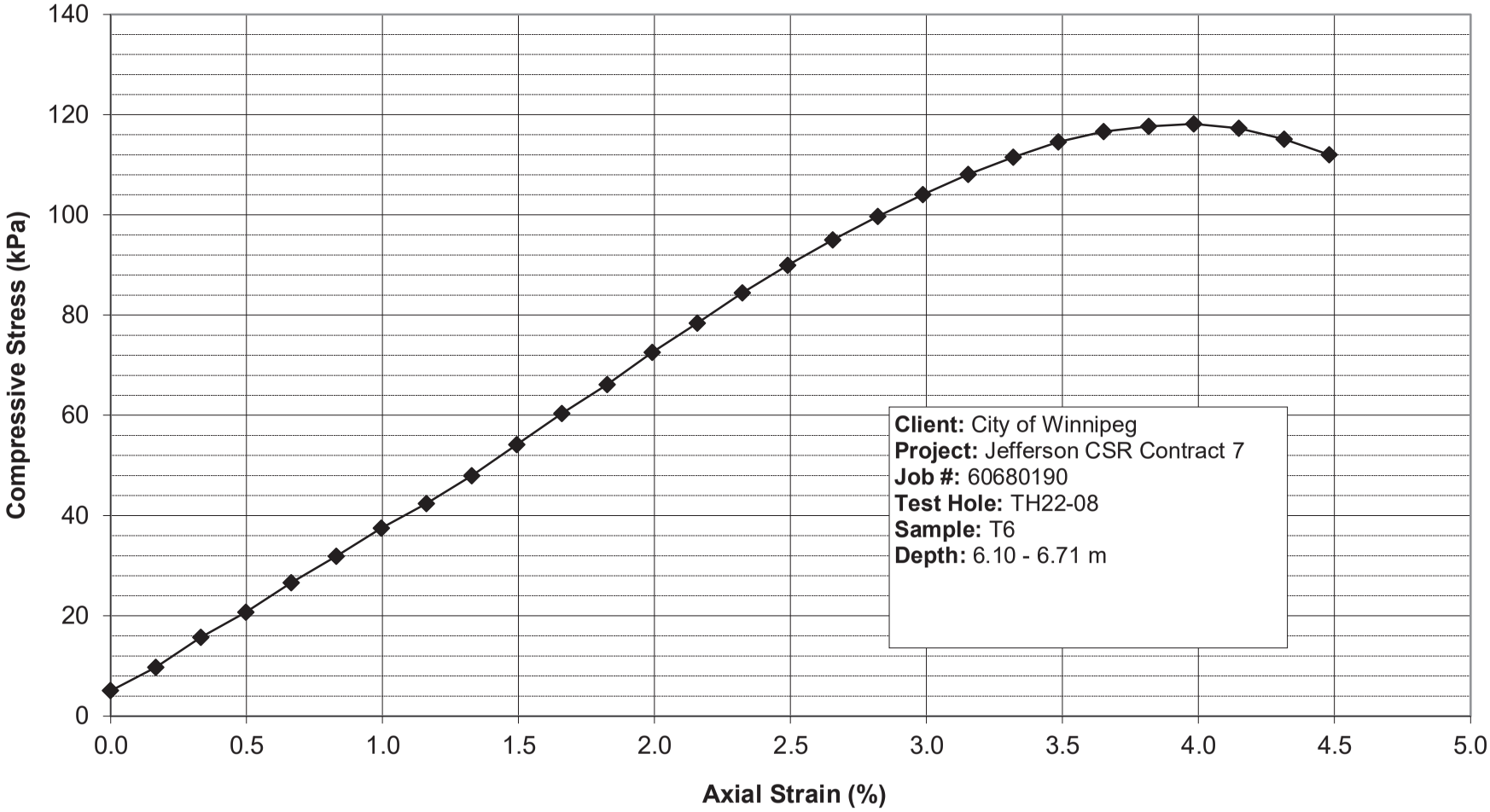
TEST DATA - DIAL READINGS

AXIAL COMPRESSION	PROVING RING	TOTAL AXIAL STRAIN, ε_1	AVERAGE CROSS-SECTIONAL AREA, A	APPLIED AXIAL LOAD, P	COMPRESSIVE STRESS, σ_c		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0005	0.00	6.37	4.69	0.74	0.106	5.1
0.02	0.0010	0.17	6.38	9.00	1.41	0.203	9.7
0.03	0.0016	0.33	6.39	14.52	2.27	0.327	15.7
0.04	0.0021	0.50	6.40	19.21	3.00	0.432	20.7
0.05	0.0026	0.66	6.41	24.74	3.86	0.556	26.6
0.06	0.0032	0.83	6.42	29.70	4.62	0.666	31.9
0.07	0.0037	1.00	6.43	34.95	5.43	0.782	37.5
0.08	0.0042	1.16	6.44	39.64	6.15	0.886	42.4
0.09	0.0048	1.33	6.46	44.88	6.95	1.001	47.9
0.10	0.0054	1.49	6.47	50.79	7.85	1.131	54.2
0.11	0.0061	1.66	6.48	56.69	8.75	1.260	60.3
0.12	0.0066	1.83	6.49	62.22	9.59	1.381	66.1
0.13	0.0073	1.99	6.50	68.40	10.53	1.516	72.6
0.14	0.0079	2.16	6.51	74.02	11.37	1.637	78.4
0.15	0.0085	2.32	6.52	79.83	12.24	1.763	84.4
0.16	0.0091	2.49	6.53	85.17	13.04	1.878	89.9
0.17	0.0096	2.66	6.54	90.14	13.78	1.984	95.0
0.18	0.0101	2.82	6.55	94.73	14.45	2.081	99.7
0.19	0.0106	2.99	6.57	99.04	15.08	2.172	104.0
0.20	0.0110	3.15	6.58	103.07	15.67	2.257	108.1
0.21	0.0114	3.32	6.59	106.54	16.17	2.329	111.5
0.22	0.0117	3.48	6.60	109.63	16.61	2.392	114.5
0.23	0.0119	3.65	6.61	111.78	16.91	2.435	116.6
0.24	0.0121	3.82	6.62	113.00	17.06	2.457	117.7
0.25	0.0121	3.98	6.63	113.66	17.13	2.467	118.1
0.26	0.0121	4.15	6.65	113.00	17.01	2.449	117.2
0.27	0.0119	4.31	6.66	111.13	16.69	2.404	115.1
0.28	0.0116	4.48	6.67	108.32	16.24	2.339	112.0

UNCONFINED COMPRESSIVE STRENGTH, q_u:	118.13	kPa
(based on maximum q_u value)	2.467	ksf
UNDRAINED SHEAR STRENGTH, S_u:	59.07	kPa
(based on maximum q_u value)	1.234	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)



AECOM - SOILS LABORATORY
SHEAR STRENGTH, MOISTURE CONTENT & DENSITY CALCULATIONS

AECOM

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 7
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-08**
SAMPLE NO.:	**T10**
SAMPLE DEPTH:	12.19 - 12.80 m
DATE TESTED:	18-Jul-22
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.40
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**39.2**
Undrained Shear Strength (ksf)	0.82
POCKET PENETROMETER	
Reading - Qu (tsf)	0.25
Undrained Shear Strength (kPa)	**12.0**
Reading - Qu (tsf)	0.50
Undrained Shear Strength (kPa)	**23.9**
Reading - Qu (tsf)	0.75
Undrained Shear Strength (kPa)	**35.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**40.9**
Unconfined compressive strength (ksf)	**0.9**
Undrained Shear Strength (kPa)	**20.4**
Undrained Shear Strength (ksf)	**0.427**
MOISTURE CONTENT	
Tare Number	C 80
Wt. Sample wet + tare (g)	579.2
Wt. Sample dry + tare (g)	407.9
Wt. Tare (g)	8.4
Moisture Content %	**42.9**
BULK DENSITY	
Sample Wt. (g)	1132.9
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.20
Diameter 3 (cm)	7.30
Avg. Diameter (cm)	**7.23**
Length 1 (cm)	15.30
Length 2 (cm)	15.40
Length 3 (cm)	15.40
Avg. Length (cm)	**15.37**
Volume (cm^3)	631.5
Moisture content (%)	42.9
Bulk Density (g/cm^3)	1.794
Bulk Unit Weight (kN/m^3)	**17.6**
Bulk Unit Weight (pcf)	**112.0**
Dry Unit Weight (kN/m^3)	**12.31**

AECOM - SOILS LABORATORY
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS (ASTM D2166)

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 7
JOB NO.:	60680190

TEST HOLE NO.:	TH22-08
SAMPLE NO.:	T10
SAMPLE DEPTH:	12.19 - 12.80 m
SAMPLE DATE:	
TEST DATE:	18-Jul-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel,moist, firm,	
grey, high plasticity	
MOISTURE CONTENT:	42.9

SAMPLE DIAM.(Do):	72.33	**(mm)**	**INITIAL AREA, Ao:**	4109.3	**(mm^2)**
SAMPLE LENGTH, (Lo):	153.67	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.12	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	1.00	**(0.5<R<2 % / minute)**

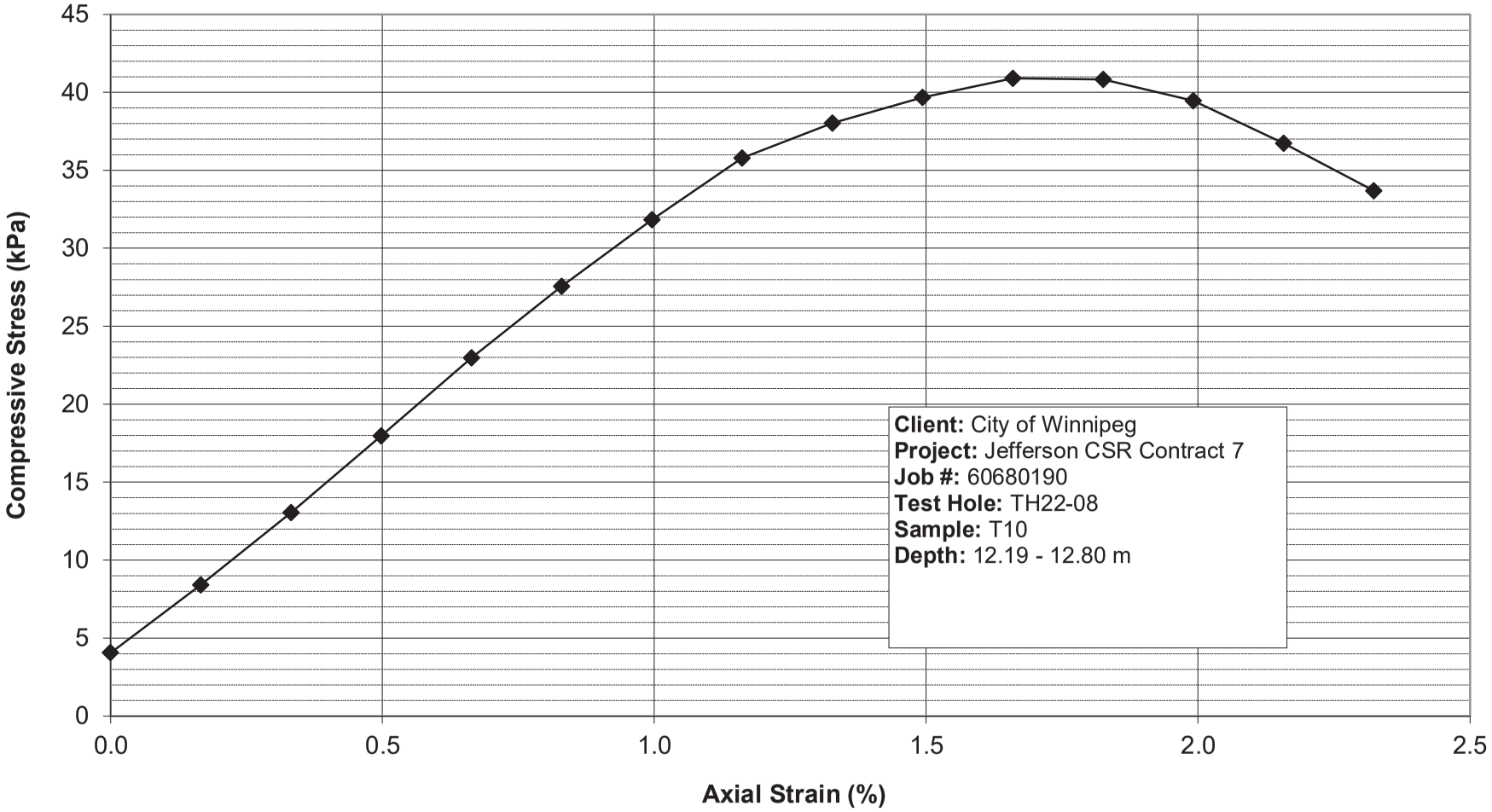
FAILURE SKETCH

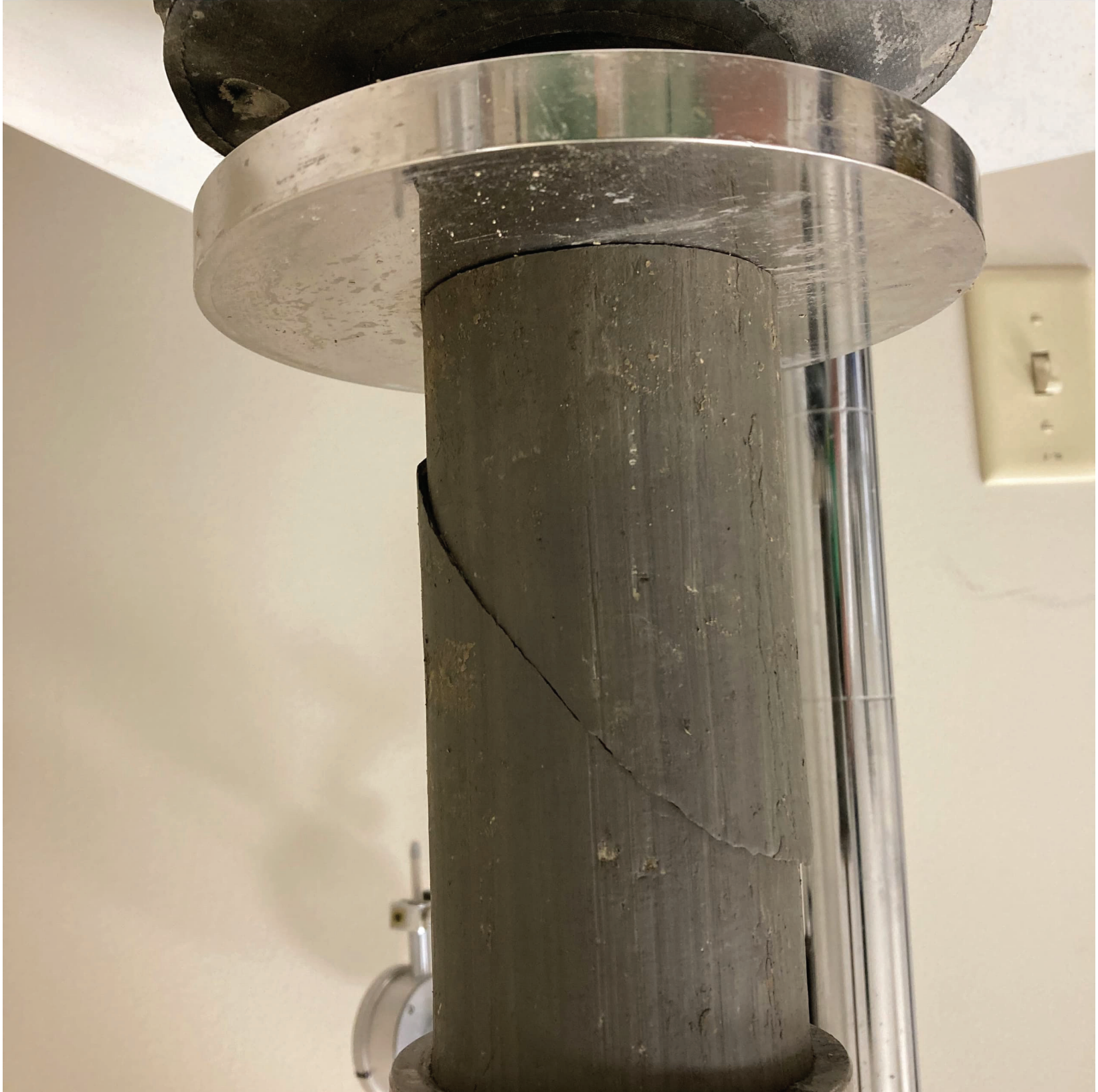
TEST DATA - DIAL READINGS							
AXIAL COMPRESSION	**PROVING RING**	**TOTAL AXIAL STRAIN, ε_1**	**AVERAGE CROSS-SECTIONAL AREA, A**	**APPLIED AXIAL LOAD, P**	**COMPRESSIVE STRESS, σ_c**		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0004	0.00	6.37	3.75	0.59	0.085	4.1
0.02	0.0008	0.17	6.38	7.78	1.22	0.176	8.4
0.03	0.0013	0.33	6.39	12.09	1.89	0.272	13.0
0.04	0.0018	0.50	6.40	16.68	2.61	0.375	18.0
0.05	0.0023	0.66	6.41	21.36	3.33	0.480	23.0
0.06	0.0027	0.83	6.42	25.67	4.00	0.576	27.6
0.07	0.0032	1.00	6.43	29.70	4.62	0.665	31.8
0.08	0.0036	1.16	6.44	33.45	5.19	0.747	35.8
0.09	0.0038	1.33	6.46	35.61	5.52	0.794	38.0
0.10	0.0040	1.49	6.47	37.20	5.75	0.828	39.7
0.11	0.0041	1.66	6.48	38.42	5.93	0.854	40.9
0.12	0.0041	1.83	6.49	38.42	5.92	0.853	40.8
0.13	0.0040	1.99	6.50	37.20	5.72	0.824	39.5
0.14	0.0037	2.16	6.51	34.67	5.33	0.767	36.7
0.15	0.0034	2.32	6.52	31.86	4.89	0.704	33.7

UNCONFINED COMPRESSIVE STRENGTH, q_u:	40.90	kPa
(based on maximum q_u value)	0.854	ksf
UNDRAINED SHEAR STRENGTH, S_u:	20.45	kPa
(based on maximum q_u value)	0.427	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)





AECOM - SOILS LABORATORY
SHEAR STRENGTH, MOISTURE CONTENT & DENSITY CALCULATIONS

AECOM

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 7
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-09**
SAMPLE NO.:	**T6**
SAMPLE DEPTH:	6.10 - 6.71 m
DATE TESTED:	18-Jul-22
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.60
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**58.8**
Undrained Shear Strength (ksf)	1.23
POCKET PENETROMETER	
Reading - Qu (tsf)	1.00
Undrained Shear Strength (kPa)	**47.9**
Reading - Qu (tsf)	0.75
Undrained Shear Strength (kPa)	**35.9**
Reading - Qu (tsf)	1.00
Undrained Shear Strength (kPa)	**47.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**98.1**
Unconfined compressive strength (ksf)	**2.0**
Undrained Shear Strength (kPa)	**49.1**
Undrained Shear Strength (ksf)	**1.025**
MOISTURE CONTENT	
Tare Number	J 9
Wt. Sample wet + tare (g)	559.6
Wt. Sample dry + tare (g)	383.1
Wt. Tare (g)	8.3
Moisture Content %	**47.1**
BULK DENSITY	
Sample Wt. (g)	1104.3
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.30
Diameter 3 (cm)	7.30
Avg. Diameter (cm)	**7.27**
Length 1 (cm)	15.40
Length 2 (cm)	15.40
Length 3 (cm)	15.30
Avg. Length (cm)	**15.37**
Volume (cm^3)	637.3
Moisture content (%)	47.1
Bulk Density (g/cm^3)	1.733
Bulk Unit Weight (kN/m^3)	**17.0**
Bulk Unit Weight (pcf)	**108.2**
Dry Unit Weight (kN/m^3)	**11.55**

AECOM - SOILS LABORATORY
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS (ASTM D2166)

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 7
JOB NO.:	60680190

TEST HOLE NO.:	TH22-09
SAMPLE NO.:	T6
SAMPLE DEPTH:	6.10 - 6.71 m
SAMPLE DATE:	
TEST DATE:	18-Jul-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel,moist, firm,	
grey, high plasticity	
MOISTURE CONTENT:	47.1

SAMPLE DIAM.(Do):	72.67	**(mm)**	**INITIAL AREA, Ao:**	4147.3	**(mm^2)**
SAMPLE LENGTH, (Lo):	153.67	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.11	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	1.00	**(0.5<R<2 % / minute)**

FAILURE SKETCH

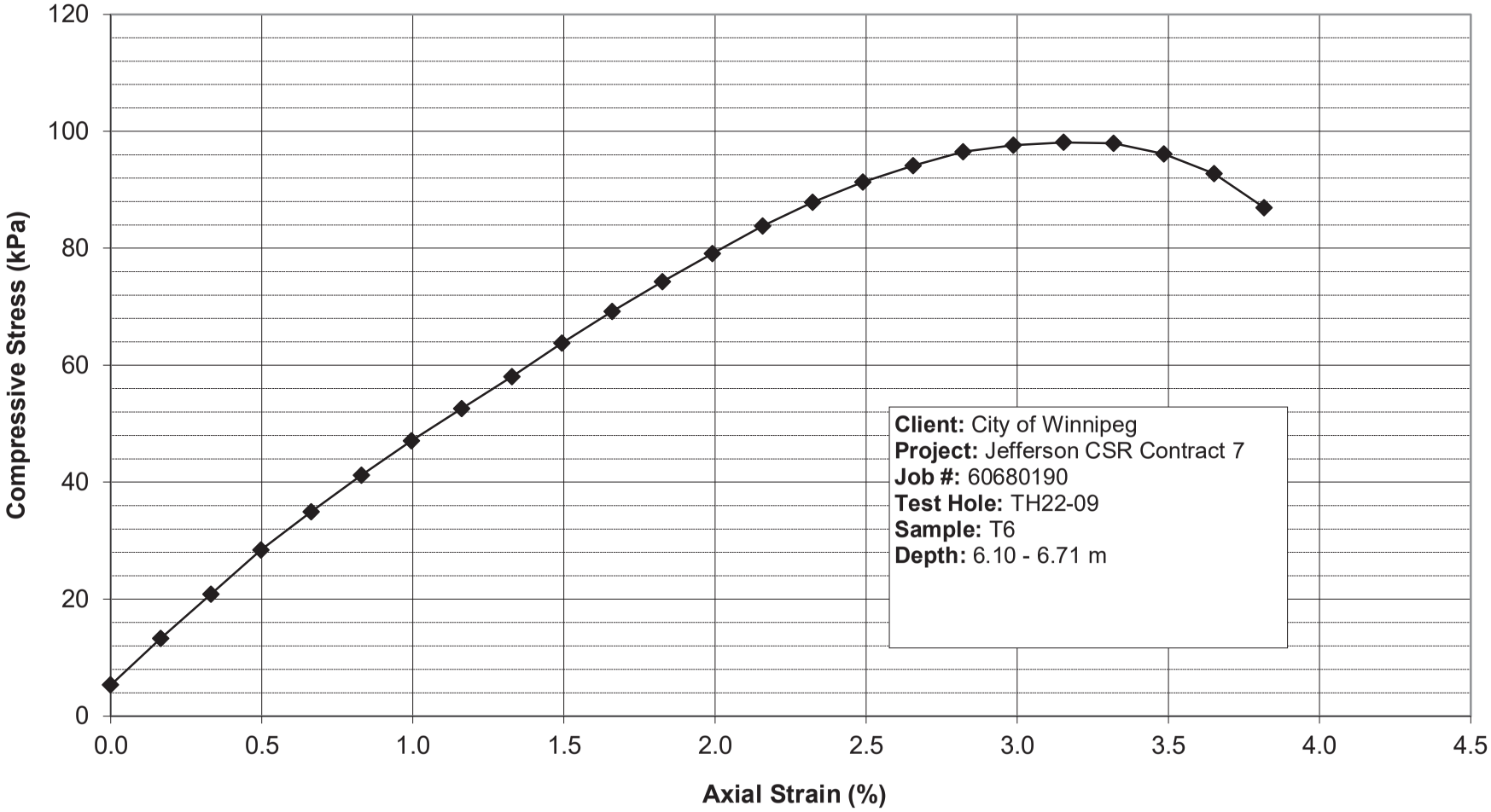
TEST DATA - DIAL READINGS

AXIAL COMPRESSION	PROVING RING	TOTAL AXIAL STRAIN, ε_1	AVERAGE CROSS-SECTIONAL AREA, A	APPLIED AXIAL LOAD, P	COMPRESSIVE STRESS, σ_c		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0005	0.00	6.43	4.97	0.77	0.111	5.3
0.02	0.0013	0.17	6.44	12.37	1.92	0.277	13.2
0.03	0.0021	0.33	6.45	19.49	3.02	0.435	20.8
0.04	0.0028	0.50	6.46	26.61	4.12	0.593	28.4
0.05	0.0035	0.66	6.47	32.80	5.07	0.730	34.9
0.06	0.0041	0.83	6.48	38.70	5.97	0.860	41.2
0.07	0.0047	1.00	6.49	44.32	6.83	0.983	47.1
0.08	0.0053	1.16	6.50	49.57	7.62	1.097	52.5
0.09	0.0059	1.33	6.51	54.81	8.41	1.212	58.0
0.10	0.0064	1.49	6.53	60.34	9.25	1.332	63.8
0.11	0.0070	1.66	6.54	65.59	10.03	1.445	69.2
0.12	0.0075	1.83	6.55	70.56	10.78	1.552	74.3
0.13	0.0080	1.99	6.56	75.24	11.47	1.652	79.1
0.14	0.0085	2.16	6.57	79.83	12.15	1.750	83.8
0.15	0.0090	2.32	6.58	83.86	12.74	1.835	87.9
0.16	0.0093	2.49	6.59	87.33	13.25	1.908	91.3
0.17	0.0096	2.66	6.60	90.14	13.65	1.966	94.1
0.18	0.0099	2.82	6.61	92.58	14.00	2.015	96.5
0.19	0.0100	2.99	6.63	93.79	14.16	2.038	97.6
0.20	0.0101	3.15	6.64	94.45	14.23	2.049	98.1
0.21	0.0101	3.32	6.65	94.45	14.21	2.046	97.9
0.22	0.0099	3.48	6.66	92.86	13.94	2.008	96.1
0.23	0.0096	3.65	6.67	89.76	13.45	1.937	92.8
0.24	0.0090	3.82	6.68	84.24	12.60	1.815	86.9

UNCONFINED COMPRESSIVE STRENGTH, q_u:	98.11	kPa
(based on maximum q_u value)	2.049	ksf
UNDRAINED SHEAR STRENGTH, S_u:	49.05	kPa
(based on maximum q_u value)	1.025	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)



AECOM - SOILS LABORATORY
SHEAR STRENGTH, MOISTURE CONTENT & DENSITY CALCULATIONS

AECOM

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 7
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-10**
SAMPLE NO.:	**T5**
SAMPLE DEPTH:	4.57 - 5.18 m
DATE TESTED:	6-Jul-22
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.65
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**63.8**
Undrained Shear Strength (ksf)	1.33
POCKET PENETROMETER	
Reading - Qu (tsf)	1.50
Undrained Shear Strength (kPa)	**71.8**
Reading - Qu (tsf)	0.75
Undrained Shear Strength (kPa)	**35.9**
Reading - Qu (tsf)	0.75
Undrained Shear Strength (kPa)	**35.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**89.0**
Unconfined compressive strength (ksf)	**1.9**
Undrained Shear Strength (kPa)	**44.5**
Undrained Shear Strength (ksf)	**0.929**
MOISTURE CONTENT	
Tare Number	AK 30
Wt. Sample wet + tare (g)	565.1
Wt. Sample dry + tare (g)	378.8
Wt. Tare (g)	8.4
Moisture Content %	**50.3**
BULK DENSITY	
Sample Wt. (g)	1066.6
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.10
Diameter 3 (cm)	7.20
Avg. Diameter (cm)	**7.17**
Length 1 (cm)	15.50
Length 2 (cm)	15.40
Length 3 (cm)	15.50
Avg. Length (cm)	**15.47**
Volume (cm^3)	623.9
Moisture content (%)	50.3
Bulk Density (g/cm^3)	1.710
Bulk Unit Weight (kN/m^3)	**16.8**
Bulk Unit Weight (pcf)	**106.7**
Dry Unit Weight (kN/m^3)	**11.15**

AECOM - SOILS LABORATORY
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS (ASTM D2166)

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 7
JOB NO.:	60680190

TEST HOLE NO.:	TH22-10
SAMPLE NO.:	T5
SAMPLE DEPTH:	4.57 - 5.18 m
SAMPLE DATE:	
TEST DATE:	6-Jul-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel, trace oxidation,moist, firm,	
grey, high plasticity	
MOISTURE CONTENT:	50.3

SAMPLE DIAM.(Do):	71.67	**(mm)**	**INITIAL AREA, Ao:**	4033.9	**(mm^2)**
SAMPLE LENGTH, (Lo):	154.67	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.16	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	0.99	**(0.5<R<2 % / minute)**

FAILURE SKETCH

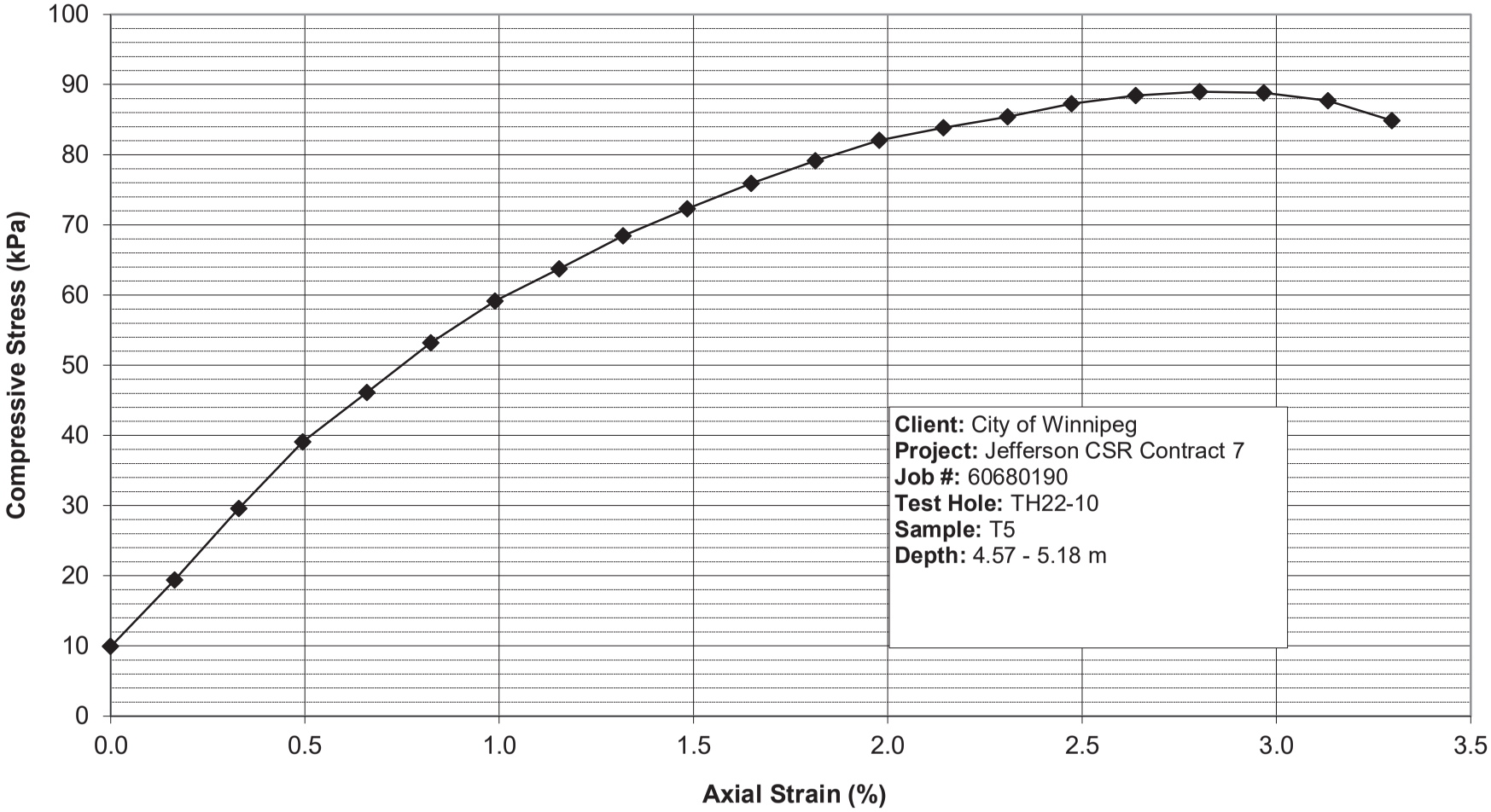
TEST DATA - DIAL READINGS

AXIAL COMPRESSION	PROVING RING	TOTAL AXIAL STRAIN, ε_1	AVERAGE CROSS-SECTIONAL AREA, A	APPLIED AXIAL LOAD, P	COMPRESSIVE STRESS, σ_c		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0010	0.00	6.25	9.00	1.44	0.207	9.9
0.02	0.0019	0.16	6.26	17.62	2.81	0.405	19.4
0.03	0.0029	0.33	6.27	26.89	4.29	0.617	29.6
0.04	0.0038	0.49	6.28	35.61	5.67	0.816	39.1
0.05	0.0045	0.66	6.29	42.07	6.68	0.963	46.1
0.06	0.0052	0.82	6.30	48.63	7.71	1.111	53.2
0.07	0.0058	0.99	6.32	54.16	8.58	1.235	59.1
0.08	0.0062	1.15	6.33	58.47	9.24	1.331	63.7
0.09	0.0067	1.32	6.34	62.87	9.92	1.429	68.4
0.10	0.0071	1.48	6.35	66.53	10.48	1.509	72.3
0.11	0.0075	1.65	6.36	69.99	11.01	1.585	75.9
0.12	0.0078	1.81	6.37	73.09	11.48	1.653	79.1
0.13	0.0081	1.98	6.38	75.90	11.90	1.713	82.0
0.14	0.0083	2.14	6.39	77.68	12.16	1.751	83.8
0.15	0.0085	2.31	6.40	79.27	12.39	1.784	85.4
0.16	0.0087	2.47	6.41	81.14	12.66	1.823	87.3
0.17	0.0088	2.64	6.42	82.36	12.83	1.847	88.4
0.18	0.0089	2.80	6.43	83.02	12.91	1.858	89.0
0.19	0.0089	2.97	6.44	83.02	12.88	1.855	88.8
0.20	0.0088	3.13	6.45	82.08	12.72	1.831	87.7
0.21	0.0085	3.30	6.47	79.55	12.30	1.772	84.8

UNCONFINED COMPRESSIVE STRENGTH, q_u:	88.98	kPa
(based on maximum q_u value)	1.858	ksf
UNDRAINED SHEAR STRENGTH, S_u:	44.49	kPa
(based on maximum q_u value)	0.929	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)



AECOM - SOILS LABORATORY
SHEAR STRENGTH, MOISTURE CONTENT & DENSITY CALCULATIONS

AECOM

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 7
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-10**
SAMPLE NO.:	**T11**
SAMPLE DEPTH:	13.72 - 14.33 m
DATE TESTED:	18-Jul-22
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.45
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**44.1**
Undrained Shear Strength (ksf)	0.92
POCKET PENETROMETER	
Reading - Qu (tsf)	0.50
Undrained Shear Strength (kPa)	**23.9**
Reading - Qu (tsf)	0.50
Undrained Shear Strength (kPa)	**23.9**
Reading - Qu (tsf)	0.50
Undrained Shear Strength (kPa)	**23.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**65.6**
Unconfined compressive strength (ksf)	**1.4**
Undrained Shear Strength (kPa)	**32.8**
Undrained Shear Strength (ksf)	**0.685**
MOISTURE CONTENT	
Tare Number	B 40
Wt. Sample wet + tare (g)	504.0
Wt. Sample dry + tare (g)	355.3
Wt. Tare (g)	8.5
Moisture Content %	**42.9**
BULK DENSITY	
Sample Wt. (g)	1058.2
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.40
Diameter 3 (cm)	7.30
Avg. Diameter (cm)	**7.30**
Length 1 (cm)	15.40
Length 2 (cm)	15.30
Length 3 (cm)	15.20
Avg. Length (cm)	**15.30**
Volume (cm^3)	640.4
Moisture content (%)	42.9
Bulk Density (g/cm^3)	1.652
Bulk Unit Weight (kN/m^3)	**16.2**
Bulk Unit Weight (pcf)	**103.2**
Dry Unit Weight (kN/m^3)	**11.34**

AECOM - SOILS LABORATORY
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS (ASTM D2166)

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 7
JOB NO.:	60680190

TEST HOLE NO.:	TH22-10
SAMPLE NO.:	T11
SAMPLE DEPTH:	13.72 - 14.33 m
SAMPLE DATE:	
TEST DATE:	18-Jul-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel,moist, firm,	
grey, high plasticity	
MOISTURE CONTENT:	42.9

SAMPLE DIAM.(Do):	73.00	**(mm)**	**INITIAL AREA, Ao:**	4185.4	**(mm^2)**
SAMPLE LENGTH, (Lo):	153.00	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.10	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	1.00	**(0.5<R<2 % / minute)**

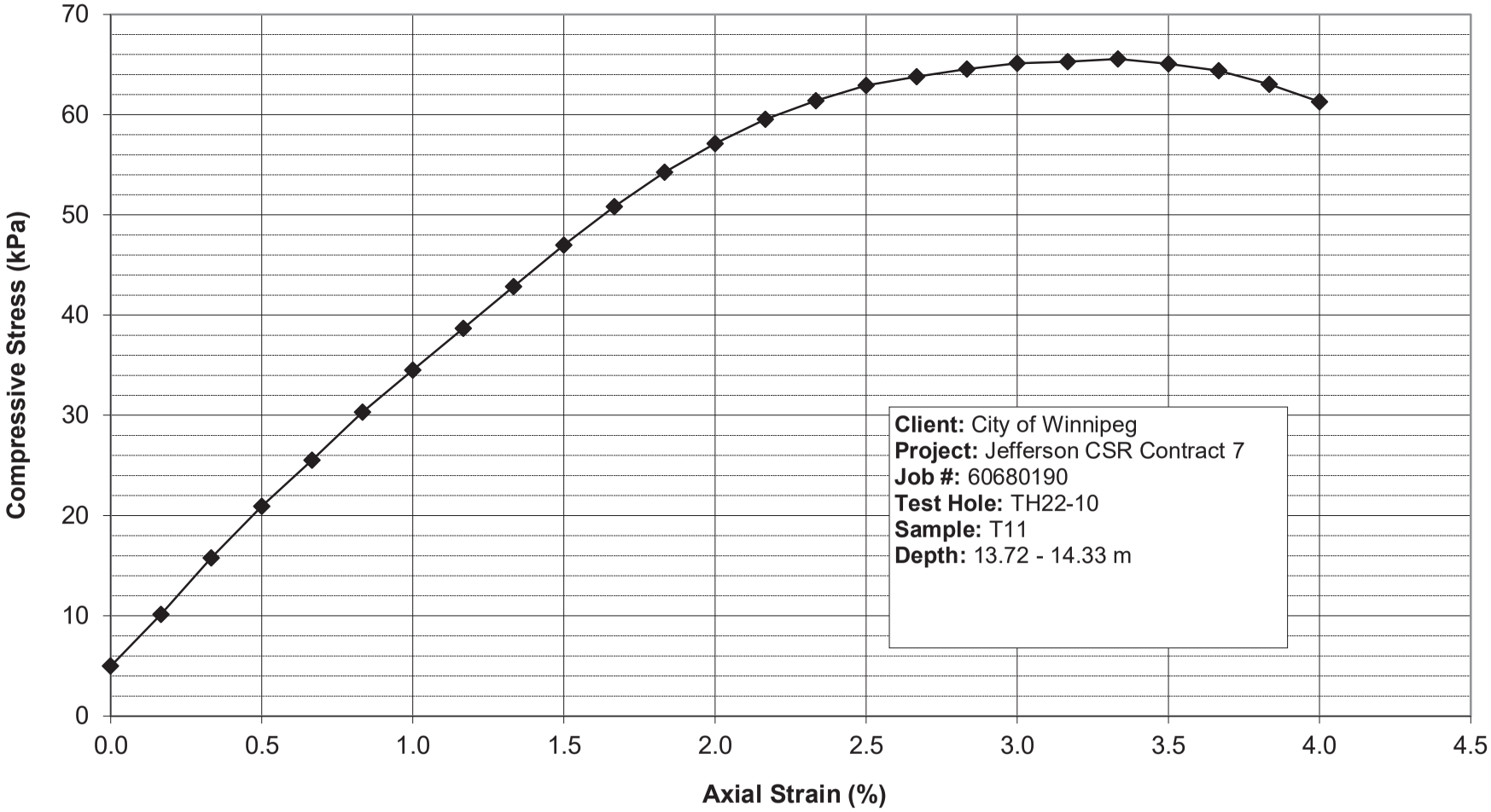
FAILURE SKETCH

TEST DATA - DIAL READINGS							
AXIAL COMPRESSION	**PROVING RING**	**TOTAL AXIAL STRAIN, ε_1**	**AVERAGE CROSS-SECTIONAL AREA, A**	**APPLIED AXIAL LOAD, P**	**COMPRESSIVE STRESS, σ_c**		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0005	0.00	6.49	4.69	0.72	0.104	5.0
0.02	0.0010	0.17	6.50	9.56	1.47	0.212	10.1
0.03	0.0016	0.33	6.51	14.90	2.29	0.330	15.8
0.04	0.0021	0.50	6.52	19.77	3.03	0.437	20.9
0.05	0.0026	0.67	6.53	24.17	3.70	0.533	25.5
0.06	0.0031	0.83	6.54	28.77	4.40	0.633	30.3
0.07	0.0035	1.00	6.55	32.80	5.00	0.721	34.5
0.08	0.0039	1.17	6.56	36.82	5.61	0.808	38.7
0.09	0.0044	1.33	6.58	40.85	6.21	0.895	42.8
0.10	0.0048	1.50	6.59	44.88	6.81	0.981	47.0
0.11	0.0052	1.67	6.60	48.63	7.37	1.061	50.8
0.12	0.0056	1.83	6.61	52.00	7.87	1.133	54.3
0.13	0.0059	2.00	6.62	54.81	8.28	1.192	57.1
0.14	0.0061	2.17	6.63	57.25	8.63	1.243	59.5
0.15	0.0063	2.33	6.64	59.12	8.90	1.282	61.4
0.16	0.0065	2.50	6.65	60.72	9.13	1.314	62.9
0.17	0.0066	2.67	6.67	61.65	9.25	1.332	63.8
0.18	0.0067	2.83	6.68	62.50	9.36	1.348	64.5
0.19	0.0067	3.00	6.69	63.15	9.44	1.360	65.1
0.20	0.0068	3.17	6.70	63.43	9.47	1.363	65.3
0.21	0.0068	3.33	6.71	63.81	9.51	1.369	65.6
0.22	0.0068	3.50	6.72	63.43	9.44	1.359	65.1
0.23	0.0067	3.67	6.73	62.87	9.34	1.344	64.4
0.24	0.0066	3.83	6.75	61.65	9.14	1.316	63.0
0.25	0.0064	4.00	6.76	60.06	8.89	1.280	61.3

UNCONFINED COMPRESSIVE STRENGTH, q_u:	65.56	kPa
(based on maximum q_u value)	1.369	ksf
UNDRAINED SHEAR STRENGTH, S_u:	32.78	kPa
(based on maximum q_u value)	0.685	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)



AECOM - SOILS LABORATORY
SHEAR STRENGTH, MOISTURE CONTENT & DENSITY CALCULATIONS

AECOM

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 7
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-11**
SAMPLE NO.:	**T5**
SAMPLE DEPTH:	4.57 - 5.18 m
DATE TESTED:	18-Jul-22
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.55
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**53.9**
Undrained Shear Strength (ksf)	1.13
POCKET PENETROMETER	
Reading - Qu (tsf)	1.25
Undrained Shear Strength (kPa)	**59.9**
Reading - Qu (tsf)	1.25
Undrained Shear Strength (kPa)	**59.9**
Reading - Qu (tsf)	1.25
Undrained Shear Strength (kPa)	**59.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**78.6**
Unconfined compressive strength (ksf)	**1.6**
Undrained Shear Strength (kPa)	**39.3**
Undrained Shear Strength (ksf)	**0.821**
MOISTURE CONTENT	
Tare Number	SG 52
Wt. Sample wet + tare (g)	554.2
Wt. Sample dry + tare (g)	397.2
Wt. Tare (g)	8.6
Moisture Content %	**40.4**
BULK DENSITY	
Sample Wt. (g)	1069.3
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.20
Diameter 3 (cm)	7.20
Avg. Diameter (cm)	**7.20**
Length 1 (cm)	15.30
Length 2 (cm)	15.20
Length 3 (cm)	15.40
Avg. Length (cm)	**15.30**
Volume (cm^3)	622.9
Moisture content (%)	40.4
Bulk Density (g/cm^3)	1.717
Bulk Unit Weight (kN/m^3)	**16.8**
Bulk Unit Weight (pcf)	**107.2**
Dry Unit Weight (kN/m^3)	**11.99**

AECOM - SOILS LABORATORY
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS (ASTM D2166)

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 7
JOB NO.:	60680190

TEST HOLE NO.:	TH22-11
SAMPLE NO.:	T5
SAMPLE DEPTH:	4.57 - 5.18 m
SAMPLE DATE:	
TEST DATE:	18-Jul-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel,moist, firm,	
grey, high plasticity	
MOISTURE CONTENT:	40.4

SAMPLE DIAM.(Do):	72.00	**(mm)**	**INITIAL AREA, Ao:**	4071.5	**(mm^2)**
SAMPLE LENGTH, (Lo):	153.00	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.13	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	1.00	**(0.5<R<2 % / minute)**

FAILURE SKETCH

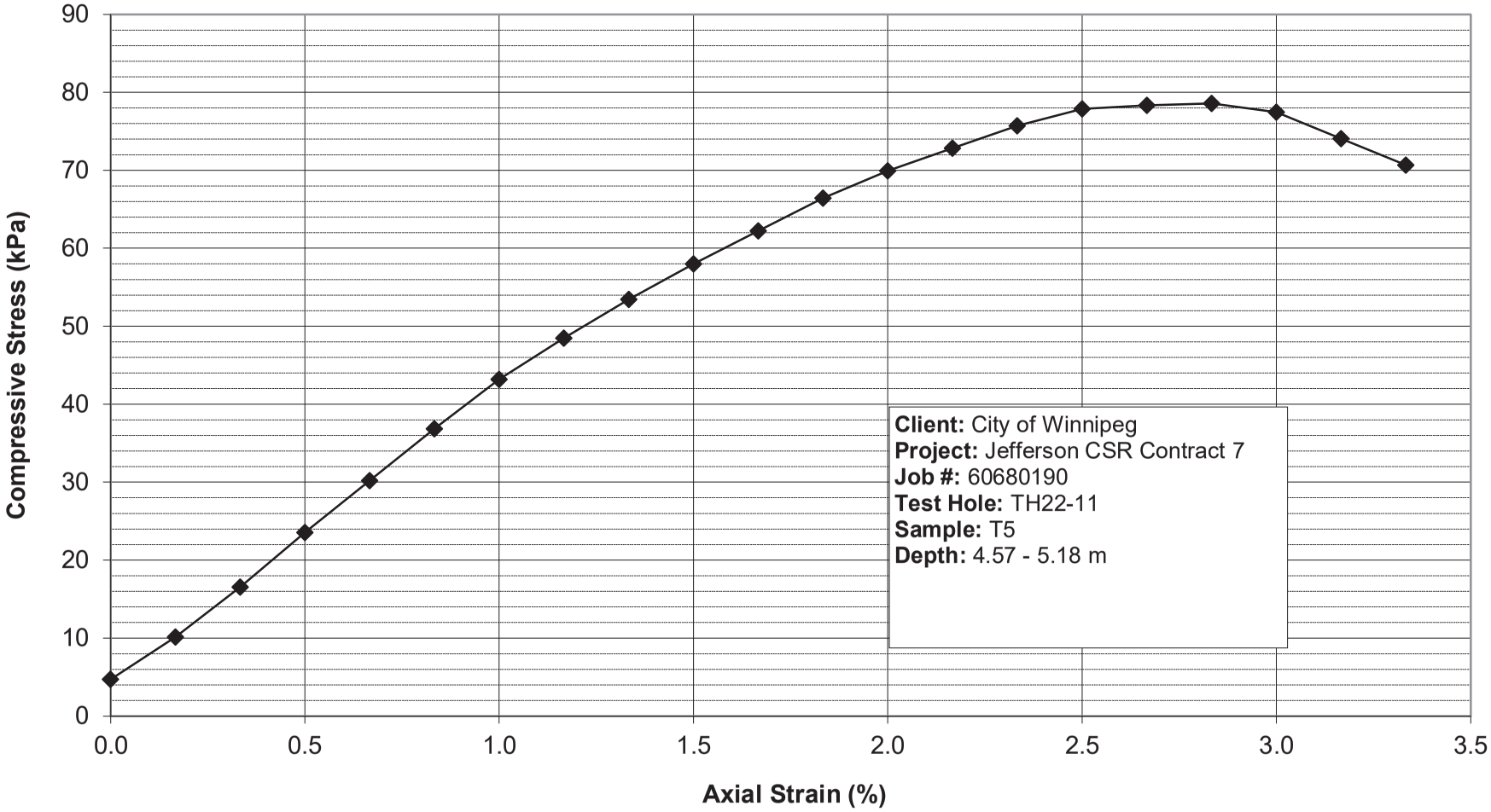
TEST DATA - DIAL READINGS

AXIAL COMPRESSION	PROVING RING	TOTAL AXIAL STRAIN, ε_1	AVERAGE CROSS-SECTIONAL AREA, A	APPLIED AXIAL LOAD, P	COMPRESSIVE STRESS, σ_c		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0005	0.00	6.31	4.31	0.68	0.098	4.7
0.02	0.0010	0.17	6.32	9.28	1.47	0.211	10.1
0.03	0.0016	0.33	6.33	15.18	2.40	0.345	16.5
0.04	0.0023	0.50	6.34	21.64	3.41	0.491	23.5
0.05	0.0030	0.67	6.35	27.83	4.38	0.631	30.2
0.06	0.0036	0.83	6.36	34.01	5.34	0.770	36.9
0.07	0.0043	1.00	6.37	39.92	6.26	0.902	43.2
0.08	0.0048	1.17	6.39	44.88	7.03	1.012	48.5
0.09	0.0053	1.33	6.40	49.57	7.75	1.116	53.4
0.10	0.0058	1.50	6.41	53.88	8.41	1.211	58.0
0.11	0.0062	1.67	6.42	57.91	9.02	1.299	62.2
0.12	0.0066	1.83	6.43	61.94	9.63	1.387	66.4
0.13	0.0070	2.00	6.44	65.31	10.14	1.460	69.9
0.14	0.0073	2.17	6.45	68.12	10.56	1.521	72.8
0.15	0.0076	2.33	6.46	70.93	10.98	1.581	75.7
0.16	0.0078	2.50	6.47	73.09	11.29	1.626	77.9
0.17	0.0079	2.67	6.48	73.65	11.36	1.636	78.3
0.18	0.0079	2.83	6.49	74.02	11.40	1.641	78.6
0.19	0.0078	3.00	6.51	73.09	11.23	1.618	77.5
0.20	0.0075	3.17	6.52	69.99	10.74	1.547	74.0
0.21	0.0071	3.33	6.53	66.90	10.25	1.476	70.7

UNCONFINED COMPRESSIVE STRENGTH, q_u:	78.58	kPa
(based on maximum q_u value)	1.641	ksf
UNDRAINED SHEAR STRENGTH, S_u:	39.29	kPa
(based on maximum q_u value)	0.821	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)



AECOM - SOILS LABORATORY
SHEAR STRENGTH, MOISTURE CONTENT & DENSITY CALCULATIONS

AECOM

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 7
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-11**
SAMPLE NO.:	**T9**
SAMPLE DEPTH:	10.67 - 11.28 m
DATE TESTED:	18-Jul-22
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.40
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**39.2**
Undrained Shear Strength (ksf)	0.82
POCKET PENETROMETER	
Reading - Qu (tsf)	0.50
Undrained Shear Strength (kPa)	**23.9**
Reading - Qu (tsf)	0.50
Undrained Shear Strength (kPa)	**23.9**
Reading - Qu (tsf)	0.75
Undrained Shear Strength (kPa)	**35.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**89.3**
Unconfined compressive strength (ksf)	**1.9**
Undrained Shear Strength (kPa)	**44.7**
Undrained Shear Strength (ksf)	**0.933**
MOISTURE CONTENT	
Tare Number	AK 44
Wt. Sample wet + tare (g)	460.5
Wt. Sample dry + tare (g)	299.5
Wt. Tare (g)	8.2
Moisture Content %	**55.3**
BULK DENSITY	
Sample Wt. (g)	1067.3
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.20
Diameter 3 (cm)	7.20
Avg. Diameter (cm)	**7.20**
Length 1 (cm)	15.50
Length 2 (cm)	15.40
Length 3 (cm)	15.30
Avg. Length (cm)	**15.40**
Volume (cm^3)	627.0
Moisture content (%)	55.3
Bulk Density (g/cm^3)	1.702
Bulk Unit Weight (kN/m^3)	**16.7**
Bulk Unit Weight (pcf)	**106.3**
Dry Unit Weight (kN/m^3)	**10.75**

AECOM - SOILS LABORATORY
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS (ASTM D2166)

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 7
JOB NO.:	60680190

TEST HOLE NO.:	TH22-11
SAMPLE NO.:	T9
SAMPLE DEPTH:	10.67 - 11.28 m
SAMPLE DATE:	
TEST DATE:	18-Jul-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel,moist, firm,	
grey, high plasticity	
MOISTURE CONTENT:	55.3

SAMPLE DIAM.(Do):	72.00	**(mm)**	**INITIAL AREA, Ao:**	4071.5	**(mm^2)**
SAMPLE LENGTH, (Lo):	154.00	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.14	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	0.99	**(0.5<R<2 % / minute)**

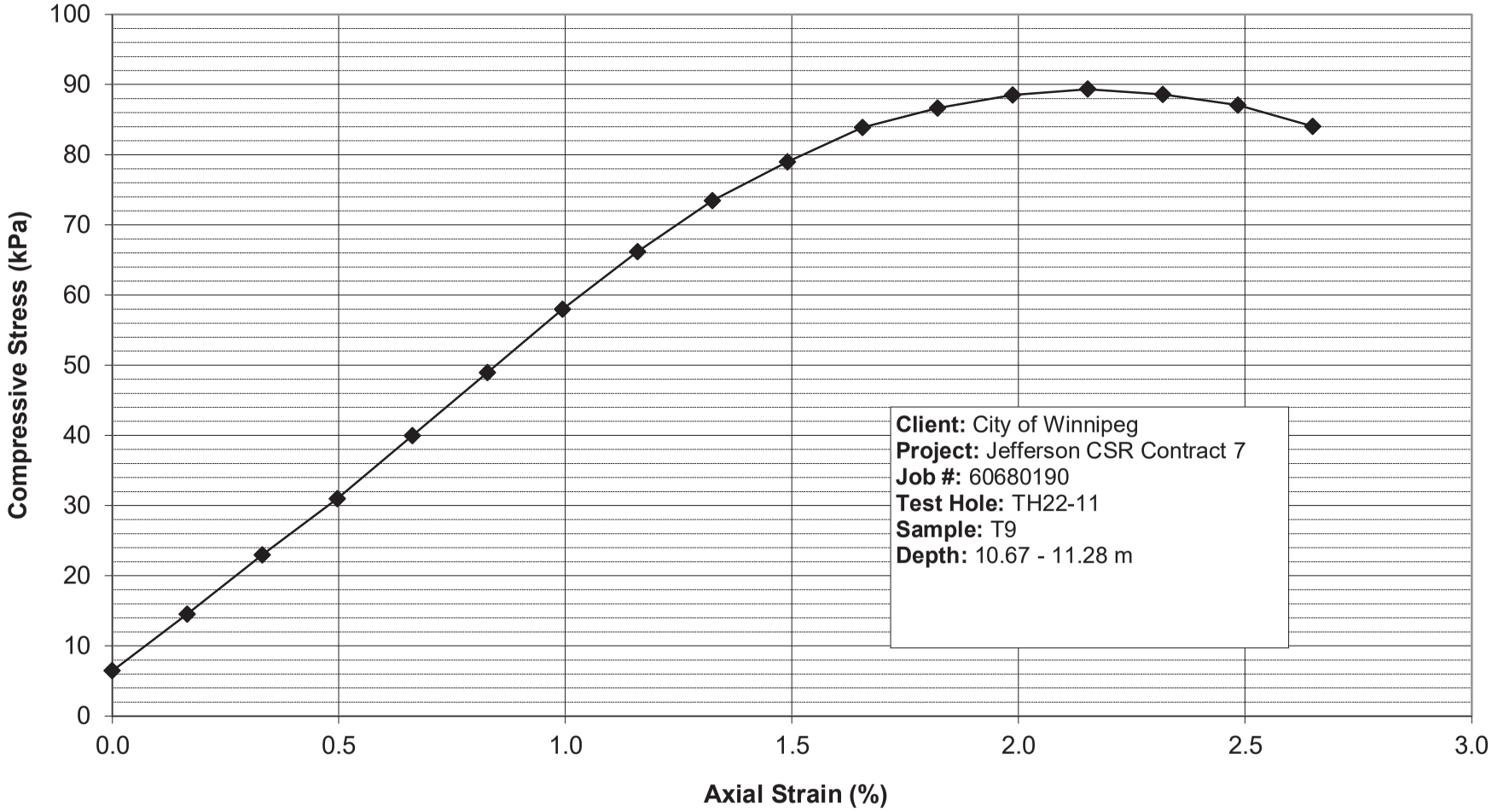
FAILURE SKETCH

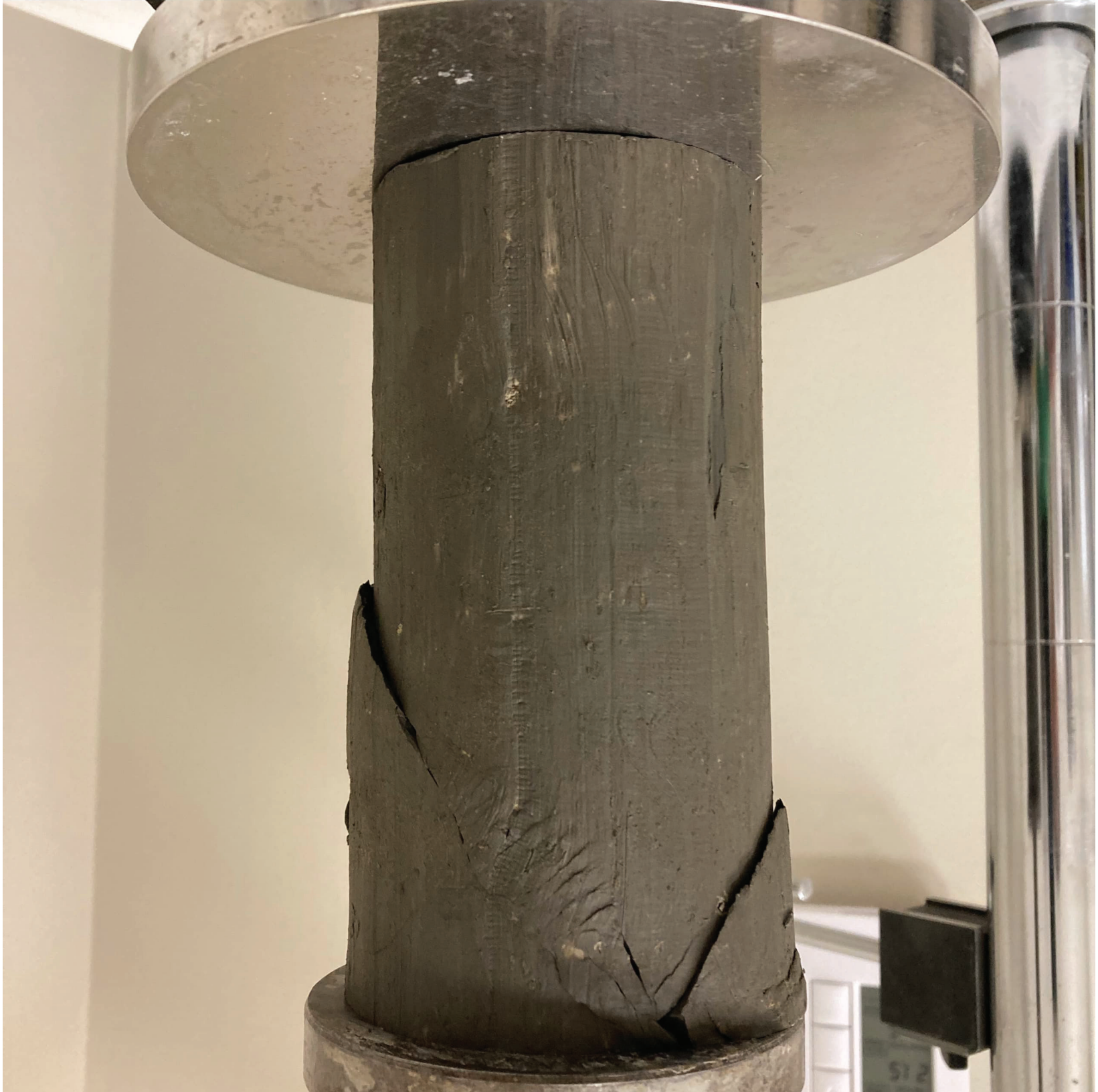
TEST DATA - DIAL READINGS							
AXIAL COMPRESSION	**PROVING RING**	**TOTAL AXIAL STRAIN, ε_1**	**AVERAGE CROSS-SECTIONAL AREA, A**	**APPLIED AXIAL LOAD, P**	**COMPRESSIVE STRESS, σ_c**		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0006	0.00	6.31	5.90	0.94	0.135	6.4
0.02	0.0014	0.17	6.32	13.31	2.10	0.303	14.5
0.03	0.0023	0.33	6.33	21.08	3.33	0.479	23.0
0.04	0.0030	0.50	6.34	28.48	4.49	0.647	31.0
0.05	0.0039	0.66	6.35	36.82	5.80	0.835	40.0
0.06	0.0048	0.83	6.36	45.16	7.10	1.022	48.9
0.07	0.0057	0.99	6.37	53.60	8.41	1.211	58.0
0.08	0.0065	1.16	6.38	61.28	9.60	1.382	66.2
0.09	0.0073	1.32	6.40	68.12	10.65	1.534	73.4
0.10	0.0078	1.49	6.41	73.37	11.45	1.649	79.0
0.11	0.0083	1.66	6.42	78.05	12.16	1.751	83.9
0.12	0.0086	1.82	6.43	80.77	12.57	1.809	86.6
0.13	0.0088	1.99	6.44	82.64	12.84	1.848	88.5
0.14	0.0089	2.15	6.45	83.58	12.96	1.866	89.3
0.15	0.0089	2.32	6.46	83.02	12.85	1.850	88.6
0.16	0.0087	2.48	6.47	81.71	12.63	1.818	87.0
0.17	0.0084	2.65	6.48	78.99	12.18	1.755	84.0

UNCONFINED COMPRESSIVE STRENGTH, q_u:	89.35	kPa
(based on maximum q_u value)	1.866	ksf
UNDRAINED SHEAR STRENGTH, S_u:	44.67	kPa
(based on maximum q_u value)	0.933	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)





AECOM - SOILS LABORATORY
SHEAR STRENGTH, MOISTURE CONTENT & DENSITY CALCULATIONS

AECOM

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 7
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-12**
SAMPLE NO.:	**T4**
SAMPLE DEPTH:	3.05 - 3.66 m
DATE TESTED:	18-Jul-22
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.75
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**73.6**
Undrained Shear Strength (ksf)	1.54
POCKET PENETROMETER	
Reading - Qu (tsf)	1.00
Undrained Shear Strength (kPa)	**47.9**
Reading - Qu (tsf)	1.00
Undrained Shear Strength (kPa)	**47.9**
Reading - Qu (tsf)	1.00
Undrained Shear Strength (kPa)	**47.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**44.1**
Unconfined compressive strength (ksf)	**0.9**
Undrained Shear Strength (kPa)	**22.1**
Undrained Shear Strength (ksf)	**0.461**
MOISTURE CONTENT	
Tare Number	T 17
Wt. Sample wet + tare (g)	506.3
Wt. Sample dry + tare (g)	372.4
Wt. Tare (g)	8.6
Moisture Content %	**36.8**
BULK DENSITY	
Sample Wt. (g)	1072.5
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.20
Diameter 3 (cm)	7.30
Avg. Diameter (cm)	**7.23**
Length 1 (cm)	15.30
Length 2 (cm)	15.40
Length 3 (cm)	15.20
Avg. Length (cm)	**15.30**
Volume (cm^3)	628.7
Moisture content (%)	36.8
Bulk Density (g/cm^3)	1.706
Bulk Unit Weight (kN/m^3)	**16.7**
Bulk Unit Weight (pcf)	**106.5**
Dry Unit Weight (kN/m^3)	**12.23**

AECOM - SOILS LABORATORY
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS (ASTM D2166)

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 7
JOB NO.:	60680190

TEST HOLE NO.:	TH22-12
SAMPLE NO.:	T4
SAMPLE DEPTH:	3.05 - 3.66 m
SAMPLE DATE:	
TEST DATE:	18-Jul-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel,moist, firm,	
grey, high plasticity	
MOISTURE CONTENT:	36.8

SAMPLE DIAM.(Do):	72.33	**(mm)**	**INITIAL AREA, Ao:**	4109.3	**(mm^2)**
SAMPLE LENGTH, (Lo):	153.00	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.12	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	1.00	**(0.5<R<2 % / minute)**

FAILURE SKETCH

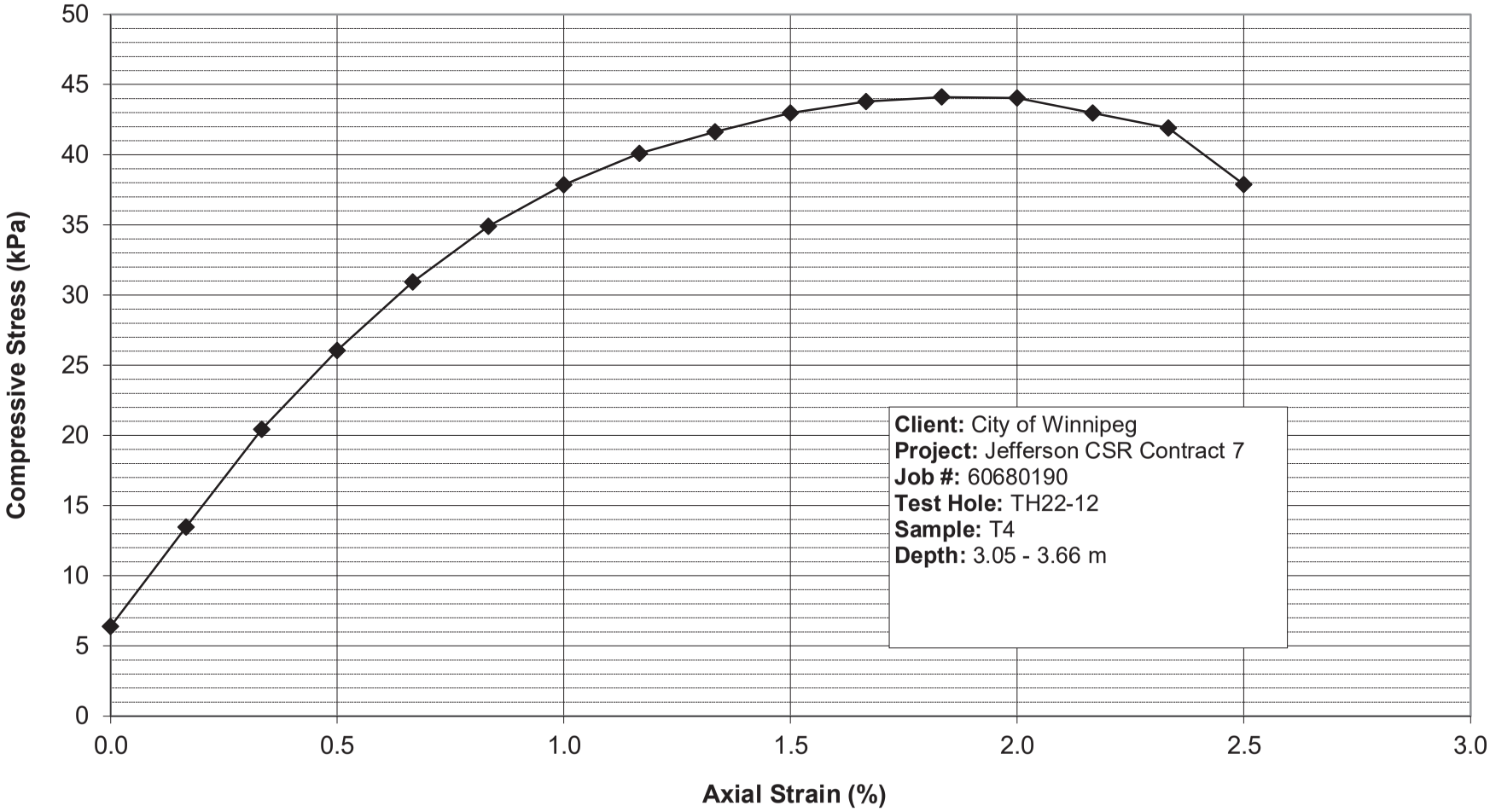
TEST DATA - DIAL READINGS

AXIAL COMPRESSION	PROVING RING	TOTAL AXIAL STRAIN, ε_1	AVERAGE CROSS-SECTIONAL AREA, A	APPLIED AXIAL LOAD, P	COMPRESSIVE STRESS, σ_c		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0006	0.00	6.37	5.90	0.93	0.133	6.4
0.02	0.0013	0.17	6.38	12.46	1.95	0.281	13.5
0.03	0.0020	0.33	6.39	18.93	2.96	0.426	20.4
0.04	0.0026	0.50	6.40	24.17	3.78	0.544	26.0
0.05	0.0031	0.67	6.41	28.77	4.49	0.646	30.9
0.06	0.0035	0.83	6.42	32.51	5.06	0.729	34.9
0.07	0.0038	1.00	6.43	35.32	5.49	0.791	37.9
0.08	0.0040	1.17	6.44	37.48	5.82	0.837	40.1
0.09	0.0042	1.33	6.46	38.98	6.04	0.869	41.6
0.10	0.0043	1.50	6.47	40.29	6.23	0.897	43.0
0.11	0.0044	1.67	6.48	41.13	6.35	0.914	43.8
0.12	0.0044	1.83	6.49	41.51	6.40	0.921	44.1
0.13	0.0044	2.00	6.50	41.51	6.39	0.920	44.0
0.14	0.0043	2.17	6.51	40.57	6.23	0.897	43.0
0.15	0.0042	2.33	6.52	39.64	6.08	0.875	41.9
0.16	0.0038	2.50	6.53	35.89	5.49	0.791	37.9

UNCONFINED COMPRESSIVE STRENGTH, q_u:	44.11	kPa
(based on maximum q_u value)	0.921	ksf
UNDRAINED SHEAR STRENGTH, S_u:	22.05	kPa
(based on maximum q_u value)	0.461	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)



AECOM - SOILS LABORATORY
SHEAR STRENGTH, MOISTURE CONTENT & DENSITY CALCULATIONS

AECOM

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 7
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-13**
SAMPLE NO.:	**T5**
SAMPLE DEPTH:	4.57 - 5.18 m
DATE TESTED:	18-Jul-22
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.80
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**78.5**
Undrained Shear Strength (ksf)	1.64
POCKET PENETROMETER	
Reading - Qu (tsf)	1.00
Undrained Shear Strength (kPa)	**47.9**
Reading - Qu (tsf)	1.25
Undrained Shear Strength (kPa)	**59.9**
Reading - Qu (tsf)	1.00
Undrained Shear Strength (kPa)	**47.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**72.1**
Unconfined compressive strength (ksf)	**1.5**
Undrained Shear Strength (kPa)	**36.0**
Undrained Shear Strength (ksf)	**0.753**
MOISTURE CONTENT	
Tare Number	SG 44
Wt. Sample wet + tare (g)	538.3
Wt. Sample dry + tare (g)	396.4
Wt. Tare (g)	8.3
Moisture Content %	**36.6**
BULK DENSITY	
Sample Wt. (g)	1062.8
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.30
Diameter 3 (cm)	7.20
Avg. Diameter (cm)	**7.23**
Length 1 (cm)	15.40
Length 2 (cm)	15.30
Length 3 (cm)	15.20
Avg. Length (cm)	**15.30**
Volume (cm^3)	628.7
Moisture content (%)	36.6
Bulk Density (g/cm^3)	1.690
Bulk Unit Weight (kN/m^3)	**16.6**
Bulk Unit Weight (pcf)	**105.5**
Dry Unit Weight (kN/m^3)	**12.14**

AECOM - SOILS LABORATORY
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS (ASTM D2166)

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 7
JOB NO.:	60680190

TEST HOLE NO.:	TH22-13
SAMPLE NO.:	T5
SAMPLE DEPTH:	4.57 - 5.18 m
SAMPLE DATE:	
TEST DATE:	18-Jul-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel,moist, firm,	
grey, high plasticity	
MOISTURE CONTENT:	36.6

SAMPLE DIAM.(Do):	72.33	**(mm)**	**INITIAL AREA, Ao:**	4109.3	**(mm^2)**
SAMPLE LENGTH, (Lo):	153.00	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.12	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	1.00	**(0.5<R<2 % / minute)**

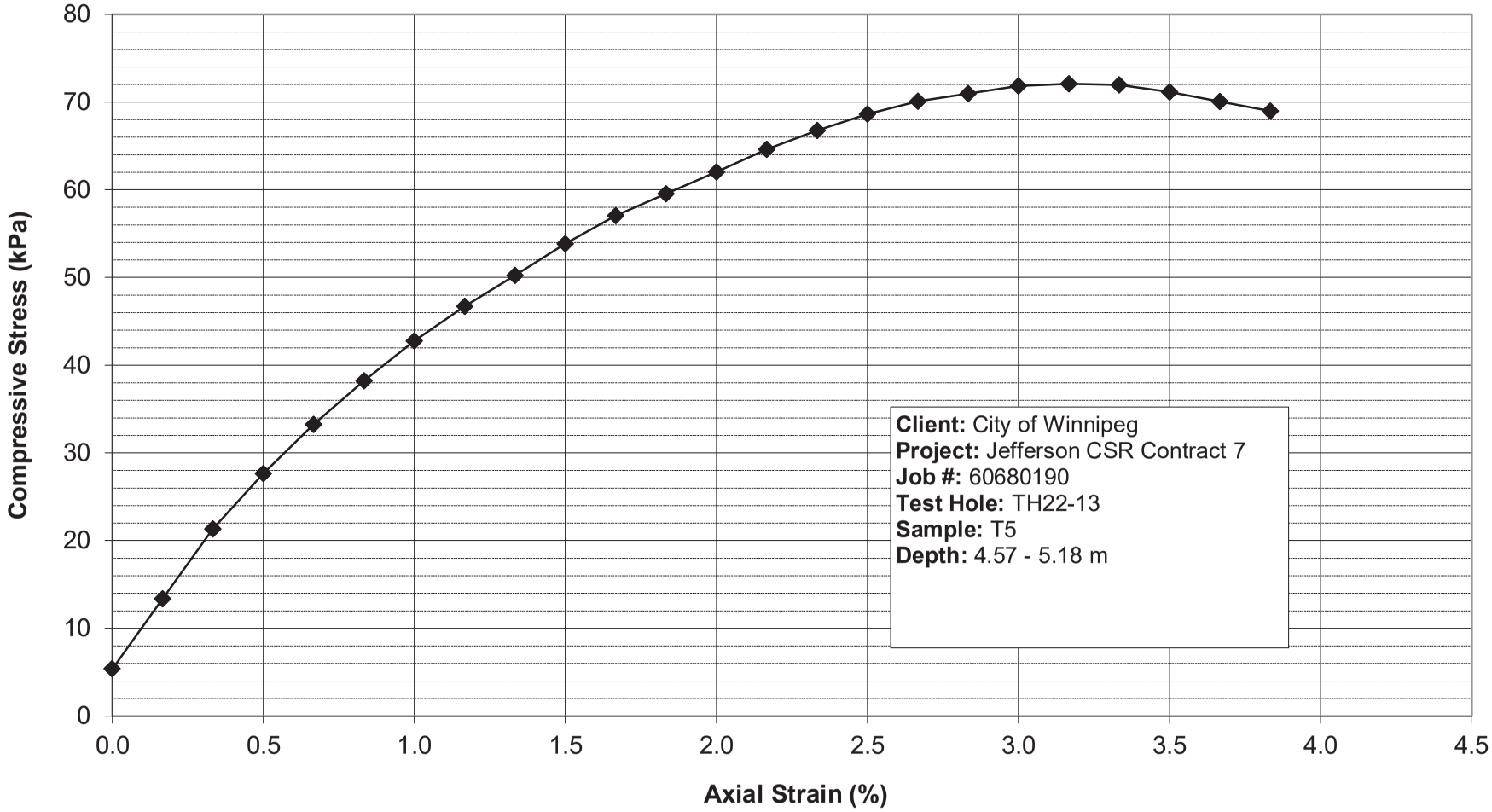
FAILURE SKETCH

TEST DATA - DIAL READINGS							
AXIAL COMPRESSION	**PROVING RING**	**TOTAL AXIAL STRAIN, ε_1**	**AVERAGE CROSS-SECTIONAL AREA, A**	**APPLIED AXIAL LOAD, P**	**COMPRESSIVE STRESS, σ_c**		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0005	0.00	6.37	4.97	0.78	0.112	5.4
0.02	0.0013	0.17	6.38	12.37	1.94	0.279	13.4
0.03	0.0021	0.33	6.39	19.77	3.09	0.445	21.3
0.04	0.0027	0.50	6.40	25.67	4.01	0.578	27.7
0.05	0.0033	0.67	6.41	30.92	4.82	0.694	33.2
0.06	0.0038	0.83	6.42	35.61	5.54	0.798	38.2
0.07	0.0043	1.00	6.43	39.92	6.20	0.893	42.8
0.08	0.0047	1.17	6.44	43.66	6.78	0.976	46.7
0.09	0.0050	1.33	6.46	47.04	7.29	1.049	50.2
0.10	0.0054	1.50	6.47	50.50	7.81	1.125	53.8
0.11	0.0057	1.67	6.48	53.60	8.27	1.192	57.1
0.12	0.0060	1.83	6.49	56.03	8.64	1.244	59.5
0.13	0.0062	2.00	6.50	58.47	9.00	1.295	62.0
0.14	0.0065	2.17	6.51	61.00	9.37	1.349	64.6
0.15	0.0067	2.33	6.52	63.15	9.68	1.394	66.8
0.16	0.0069	2.50	6.53	65.03	9.95	1.433	68.6
0.17	0.0071	2.67	6.54	66.53	10.17	1.464	70.1
0.18	0.0072	2.83	6.56	67.46	10.29	1.482	71.0
0.19	0.0073	3.00	6.57	68.40	10.42	1.500	71.8
0.20	0.0073	3.17	6.58	68.78	10.46	1.506	72.1
0.21	0.0073	3.33	6.59	68.78	10.44	1.503	72.0
0.22	0.0073	3.50	6.60	68.12	10.32	1.486	71.2
0.23	0.0072	3.67	6.61	67.18	10.16	1.463	70.1
0.24	0.0071	3.83	6.62	66.25	10.00	1.440	69.0

UNCONFINED COMPRESSIVE STRENGTH, q_u:	72.09	kPa
(based on maximum q_u value)	1.506	ksf
UNDRAINED SHEAR STRENGTH, S_u:	36.05	kPa
(based on maximum q_u value)	0.753	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)



AECOM - SOILS LABORATORY
SHEAR STRENGTH, MOISTURE CONTENT & DENSITY CALCULATIONS

AECOM

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 7
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-13**
SAMPLE NO.:	**T9**
SAMPLE DEPTH:	10.67 - 11.28 m
DATE TESTED:	18-Jul-22
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.35
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**34.3**
Undrained Shear Strength (ksf)	0.72
POCKET PENETROMETER	
Reading - Qu (tsf)	0.50
Undrained Shear Strength (kPa)	**23.9**
Reading - Qu (tsf)	0.50
Undrained Shear Strength (kPa)	**23.9**
Reading - Qu (tsf)	0.50
Undrained Shear Strength (kPa)	**23.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**57.6**
Unconfined compressive strength (ksf)	**1.2**
Undrained Shear Strength (kPa)	**28.8**
Undrained Shear Strength (ksf)	**0.601**
MOISTURE CONTENT	
Tare Number	AT 21
Wt. Sample wet + tare (g)	514.0
Wt. Sample dry + tare (g)	368.0
Wt. Tare (g)	8.4
Moisture Content %	**40.6**
BULK DENSITY	
Sample Wt. (g)	1080
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.30
Diameter 3 (cm)	7.20
Avg. Diameter (cm)	**7.23**
Length 1 (cm)	15.30
Length 2 (cm)	15.40
Length 3 (cm)	15.30
Avg. Length (cm)	**15.33**
Volume (cm^3)	630.1
Moisture content (%)	40.6
Bulk Density (g/cm^3)	1.714
Bulk Unit Weight (kN/m^3)	**16.8**
Bulk Unit Weight (pcf)	**107.0**
Dry Unit Weight (kN/m^3)	**11.96**

AECOM - SOILS LABORATORY
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS (ASTM D2166)

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 7
JOB NO.:	60680190

TEST HOLE NO.:	TH22-13
SAMPLE NO.:	T9
SAMPLE DEPTH:	10.67 - 11.28 m
SAMPLE DATE:	
TEST DATE:	18-Jul-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel,moist, firm,	
grey, high plasticity	
MOISTURE CONTENT:	40.6

SAMPLE DIAM.(Do):	72.33	**(mm)**	**INITIAL AREA, Ao:**	4109.3	**(mm^2)**
SAMPLE LENGTH, (Lo):	153.33	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.12	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	1.00	**(0.5<R<2 % / minute)**

FAILURE SKETCH

TEST DATA - DIAL READINGS

AXIAL COMPRESSION	PROVING RING	TOTAL AXIAL STRAIN, ε_1	AVERAGE CROSS-SECTIONAL AREA, A	APPLIED AXIAL LOAD, P	COMPRESSIVE STRESS, σ_c		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0005	0.00	6.37	4.31	0.68	0.097	4.7
0.02	0.0011	0.17	6.38	9.93	1.56	0.224	10.7
0.03	0.0017	0.33	6.39	15.46	2.42	0.348	16.7
0.04	0.0021	0.50	6.40	19.49	3.04	0.438	21.0
0.05	0.0025	0.67	6.41	22.96	3.58	0.516	24.7
0.06	0.0029	0.83	6.42	26.89	4.19	0.603	28.9
0.07	0.0032	1.00	6.43	30.36	4.72	0.680	32.5
0.08	0.0035	1.16	6.44	33.17	5.15	0.741	35.5
0.09	0.0038	1.33	6.46	35.89	5.56	0.801	38.3
0.10	0.0041	1.50	6.47	38.04	5.88	0.847	40.6
0.11	0.0043	1.66	6.48	40.29	6.22	0.896	42.9
0.12	0.0045	1.83	6.49	42.45	6.54	0.942	45.1
0.13	0.0047	2.00	6.50	44.32	6.82	0.982	47.0
0.14	0.0049	2.16	6.51	45.82	7.04	1.013	48.5
0.15	0.0051	2.33	6.52	47.41	7.27	1.047	50.1
0.16	0.0052	2.49	6.53	48.63	7.44	1.072	51.3
0.17	0.0054	2.66	6.54	50.13	7.66	1.103	52.8
0.18	0.0055	2.83	6.55	51.07	7.79	1.122	53.7
0.19	0.0056	2.99	6.57	52.00	7.92	1.141	54.6
0.20	0.0057	3.16	6.58	52.94	8.05	1.159	55.5
0.21	0.0057	3.33	6.59	53.60	8.13	1.171	56.1
0.22	0.0058	3.49	6.60	54.16	8.21	1.182	56.6
0.23	0.0059	3.66	6.61	54.81	8.29	1.194	57.2
0.24	0.0059	3.82	6.62	55.10	8.32	1.198	57.4
0.25	0.0059	3.99	6.63	55.38	8.35	1.202	57.6
0.26	0.0059	4.16	6.65	55.10	8.29	1.194	57.2
0.27	0.0058	4.32	6.66	54.53	8.19	1.180	56.5
0.28	0.0057	4.49	6.67	53.60	8.04	1.157	55.4

UNCONFINED COMPRESSIVE STRENGTH, q_u:	57.55	kPa
(based on maximum q_u value)	1.202	ksf
UNDRAINED SHEAR STRENGTH, S_u:	28.78	kPa
(based on maximum q_u value)	0.601	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)