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

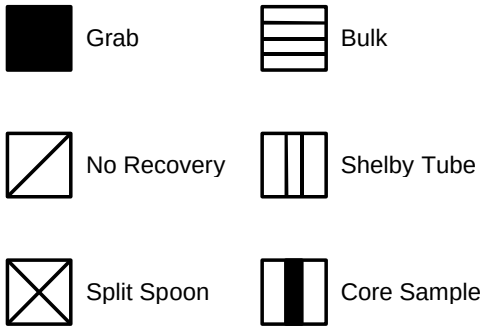
N	Consistency	C_u (kPa) approx.
0 - 1	Very Soft	<10
1 - 4	Soft	10 - 25
4 - 8	Firm	25 - 50
8 - 15	Stiff	50 - 100
15 - 30	Very Stiff	100 - 200
30 - 60	Hard	200 - 300
>60	Very Hard	>300

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

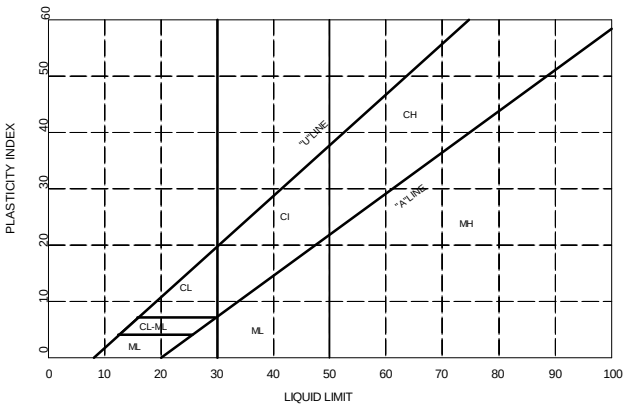
Soil Resistivity (ohm-cm)	Corrosivity Rating
>20,000	Essentially non-corrosive
10,000 – 20,000	Mildly corrosive
5,000 – 10,000	Moderately corrosive
3,000 – 5,000	Corrosive
1,000 – 3,000	Highly corrosive
<1,000	Extremely corrosive

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 (▼).

AECOM

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

EXPLANATION OF ROCK DESCRIPTION TERMS

1. CORE CONDITION

Total Core Recovery (TCR): Total length of core recovered expressed as percentage of core run length.

Solid Core Recovery (SCR): Total length of solid full diameter core expressed as percentage of core run length.

Rock Quality Designation (RQD): Sum of lengths of solid core pieces longer than 100 mm expressed as percentage of core run length.

Fracture Index (FI): Number of fractures per meter of core.

2. ROCK CLASSIFICATION WITH RESECT TO RQD

RQD (%)	RQD Classification
0 – 25	Very Poor Quality
25 – 50	Poor Quality
50 – 75	Fair Quality
75 – 90	Good Quality
90 – 100	Excellent Quality

3. ROCK CLASSIFICATION WITH RESPECT UNIAXIAL COMPRESSIVE STRENGTH (UCS)

Rock Grade	Term	UCS (MPa)
R6	Extremely Strong	> 250
R5	Very Strong	100 – 250
R4	Strong	50 – 100
R3	Medium Strong	25 – 50
R2	Weak	5 – 25
R1	Very Weak	1 – 5
R0	Extremely Weak	0.25 – 1

4. Discontinuity (Joint) Spacing

Spacing Classification	Spacing Width
Extremely Close	< 0.02 m
Very Close	0.02 m – 0.06 m
Close	0.06 m – 0.2 m
Moderately Close	0.2 m – 0.6 m
Wide	0.6 m – 2.0 m
Very Wide	2.0 m – 6.0 m
Extremely Wide	> 6 m

5. Bedding Inclination

Term	Inclination (degrees from the horizontal)
Sub-horizontal	0 – 5
Gently Inclined	6 – 15
Moderately Inclined	16 – 30
Steeply Inclined	31 – 60
Very Steeply Inclined	61 – 80
Sub-vertical	81 – 90

6. Grain Size

Term	Size
Very Coarse Grained	> 60 mm
Coarse Grained	2 mm – 60 mm
Medium Grained	60 microns – 2 mm
Fine Grained	2 microns – 60 microns
Very Fine Grained	< 2 microns

7. Classification of Discontinuities depending upon Water Flow

Class	Description
1	Water flow not possible
2	No evidence of water flow
3	Evidence of water floe (e.g. rust staining)
4	Dampness
5	Seepage
6	Glow (volume per unit of time)

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 SYMBOL	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
				G5		(G5): Gravel 0.0%, Sand 0.0%, Silt 18.0%, Clay 82.0%	
4							226
				S6	6	SPT Blows: [3/3/3], Spoon Recovery: 100%	
5							225
				G7			
6							224
		- grey below 9.1 m		T8		Tube Recovery: 0%	
7							223
				G9			
8							222
		- trace sand below 11.9 m		G10		(G10): Gravel 0.6%, Sand 8.9%, Silt 27.4%, Clay 63.1%	
9		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.					221
10							220
11							219
12							218
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/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

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
19			END OF TEST HOLE AT 18.29 m ON AUGER REFUSAL					212
20			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)					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

PROJECT: Jefferson East CSR Works (Contract 8A & 9)	CLIENT: City of Winnipeg	TESTHOLE NO: TH22-14
LOCATION: UTM 14 - 5533577 m N, 634284m E		PROJECT NO.: 60680190
CONTRACTOR: Maple Leaf Drilling	METHOD: B54X - 125 mm SSA	ELEVATION (m): 231.33

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

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

DEPTH (m)	USC	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	COMMENTS	ELEVATION
0	OR	TOPSOIL (100 mm) - black, moist					231
0	FILL	CLAY (Fill) - silty, some gravel					
1	FILL	- dark grey, stiff, moist		G1			230
1		SAND (Fill) - some silt, some gravel					
2		- light brown, moist		S2	6	SPT Blows: [2/3/3], Spoon Recovery: 28%	
2		Fat CLAY		G3			229
3		- dark greyish-brown, stiff, moist		G4			228
4							227
5				T5		Tube Recovery: 100%	
6				G6		(G6): Gravel 0%, Sand 0%, Silt 34%, Clay 66%	226
7							225
8	CH	- grey below 7.6 m		S7	6	SPT Blows: [4/3/3], Spoon Recovery: 100%	224
9				G8			223
10							222
11				T9		Tube Recovery: 100%	221
12				G10			220
13							219
14				S11	5	SPT Blows: [0/3/2], Spoon Recovery: 100%	218
15		Silty SAND (Till)					217
16	SM	- light brown, compact, moist					216
17				G13			215
18		END OF TESTHOLE at 16.8 m on AUGER REFUSAL					214
19		Notes:					213
20		1. Seepage not observed during augering.					212
21		2. Sloughing observed in sand fill layer.					211
22		3. Auger refusal met at 16.8 m.					210
		4. Test hole backfilled with sand from 16.7 m to 15.7 m, bentonite from 15.7 m to 0.3 m, and sand from 0.3 m to 0.2 m. Flush-mount cover installed.					
		5. Groundwater monitoring:					
		- October 26, 2022 at elev. 226.99 m (4.34 m bgs)					

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

LOG OF TEST HOLE 60680190 - TEST HOLE LOGS - CONTRACT 8A & 9_GL.GPJ UMA WINN.GDT 22-12-16

AECOM

LOGGED BY: Ryan Harras	COMPLETION DEPTH: 16.80 m
REVIEWED BY: German Leal	COMPLETION DATE: 22-9-13
PROJECT ENGINEER: Jordan Thompson	Page 1 of 1

PROJECT: Jefferson East CSR Works (Contract 8A & 9)	CLIENT: City of Winnipeg	TESTHOLE NO: TH22-15
LOCATION: UTM 14 - 5533670 m N, 634097m E		PROJECT NO.: 60680190
CONTRACTOR: Maple Leaf Drilling	METHOD: B54X - 125 mm SSA	ELEVATION (m): 231.29

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

DEPTH (m)	USC	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	COMMENTS	ELEVATION
0	OR	TOPSOIL (125 mm) - black, moist					231
	CH	Fat CLAY with sand - dark brownish-grey, stiff, moist		G1			
1							230
	ML	SILT - light brown, soft, moist		G2			
		Fat CLAY - brown mottled grey, firm, moist					
2				G3			229
3				T4		Tube Recovery: 100%, (T4): Gravel 0%, Sand 0%, Silt 7.9%, Clay 92.1%	228
4							
				G5			227
5							
							226
6		- grey below 6.1 m		S6	4	SPT Blows: [1/2/2], Spoon Recovery: 100%	225
7	CH						
				G7			224
8							
							223
9				T8		Tube Recovery: 75%, (T8): Gravel 0%, Sand 8.2%, Silt 25.8%, Clay 66%	222
10							
				G9			221
11							
							220
12							
				S10	3	SPT Blows: [0/1/2], Spoon Recovery: 100%	219
13		END OF TESTHOLE at 12.7 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
14							
							217
15							

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

AECOM

LOGGED BY: Ryan Harras	COMPLETION DEPTH: 12.70 m
REVIEWED BY: German Leal	COMPLETION DATE: 22-9-13
PROJECT ENGINEER: Jordan Thompson	Page 1 of 1

LOG OF TEST HOLE 60680190 - TEST HOLE LOGS - CONTRACT 8A & 9_GL.GPJ UMA WINN.GDT 22-12-16

PROJECT: Jefferson East CSR Works (Contract 8A & 9)	CLIENT: City of Winnipeg	TESTHOLE NO: TH22-16
LOCATION: UTM 14 - 5533749 m N, 634364m E		PROJECT NO.: 60680190
CONTRACTOR: Maple Leaf Drilling	METHOD: B54X - 125 mm SSA	ELEVATION (m): 231.43

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

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	COMMENTS	ELEVATION
0	OR FILL		TOPSOIL (100 mm) - black, moist					231
			CLAY (Fill) - silty, some sand - dark grey, stiff, dry to moist		G1			
1	ML		SILT - light brown, soft, moist					
					G2		(G2): Gravel 0%, Sand 7.2%, Silt 76%, Clay 16.7%	230
2			Fat CLAY - brown, firm, moist		G3			229
3			- soft from 3.1 m to 4.6 m		S4	1	SPT Blows: [0/0/1], Spoon Recovery: 22%	228
4					G5			227
			- firm below 4.6 m					
5								226
6					T6		Tube Recovery: 100%	225
7	CH		- grey below 6.7 m		G7		(G7): Gravel 0%, Sand 7.3%, Silt 26.8%, Clay 65.9%	224
8								223
9					S8	3	SPT Blows: [1/1/2], Spoon Recovery: 83%	222
10					G9			221
11								220
12					T10	15.9	Tube Recovery: 100%	219
13			END OF TESTHOLE at 12.8 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
14								217
15								

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

AECOM

LOGGED BY: Ryan Harras	COMPLETION DEPTH: 12.80 m
REVIEWED BY: German Leal	COMPLETION DATE: 22-9-13
PROJECT ENGINEER: Jordan Thompson	Page 1 of 1

LOG OF TEST HOLE 60680190 - TEST HOLE LOGS - CONTRACT 8A & 9_GL.GPJ UMA WINN.GDT 22-12-16

PROJECT: Jefferson East CSR Works (Contract 8A & 9)	CLIENT: City of Winnipeg	TESTHOLE NO: TH22-17
LOCATION: UTM 14 - 5533815 m N, 634202m E		PROJECT NO.: 60680190
CONTRACTOR: Maple Leaf Drilling	METHOD: B54X - 125 mm SSA	ELEVATION (m): 231.65

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

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

DEPTH (m)	USC	SOIL SYMBOL	SLOTTED PIEZOMETER	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	COMMENTS	ELEVATION
0	OR FILL			TOPSOIL (100 mm) - black, moist					231
1	ML			CLAY (Fill) - silty, some sand, trace gravel - dark grey mottled brown, stiff, moist		G1			
				SILT - light brown, soft, moist		S2	5	SPT Blows: [4/2/3], Spoon Recovery: 44%, (S2): Gravel 0%, Sand 1.8%, Silt 25%, Clay 73.2%	230
2				Fat CLAY - brown, firm, moist		G3			229
3						G4			
4									228
5						T5		Tube Recovery: 100%, (T5): Gravel 0%, Sand 0%, Silt 20.1%, Clay 79.9%	227
6				- grey below 6.1 m		G6			226
7	CH								225
8						S7	5	SPT Blows: [2/2/3], Spoon Recovery: 50%	224
9				- trace till inclusions below 9.1 m		G8			223
10									222
11						T9		Tube Recovery: 100%	221
12						G10			220
13									219
				Silty SAND (Till) - light brown, dense, moist		S11	48	SPT Blows: [5/24/24], Spoon Recovery: 33%	218
14	SM			- some clay, dry to moist below 14.3 m					
15									217
16						G12			216
17				END OF TESTHOLE at 15.9 m on AUGER REFUSAL Notes: 1. Seepage not observed during augering. 2. Sloughing observed in silt layer. 3. Auger refusal met at 15.9 m. 4. Test hole backfilled with sand from 15.9 m to 13.3 m, bentonite from 13.3 m to 0.3 m, and sand from 0.3 m to 0.2 m. Flush-mount cover installed. 5. Groundwater monitoring: - October 26, 2022 at elev. 225.84 m (5.81 m bgs)					215
18									214
19									213
20									212
21									211
22									210

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

LOG OF TEST HOLE 60680190 - TEST HOLE LOGS - CONTRACT 8A & 9_GL.GPJ UMA WINN.GDT 22-12-16

AECOM

LOGGED BY: Ryan Harras	COMPLETION DEPTH: 15.90 m
REVIEWED BY: German Leal	COMPLETION DATE: 22-9-14
PROJECT ENGINEER: Jordan Thompson	Page 1 of 1

PROJECT: Jefferson East CSR Works (Contract 8A & 9)	CLIENT: City of Winnipeg	TESTHOLE NO: TH22-18
LOCATION: UTM 14 - 5534071 m N, 634367m E		PROJECT NO.: 60680190
CONTRACTOR: Maple Leaf Drilling	METHOD: B54X - 125 mm SSA	ELEVATION (m): 231.03

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

DEPTH (m)	USC	SOIL DESCRIPTION	SAMPLE #	SPT (N)	COMMENTS	ELEVATION
0	OR	TOPSOIL (75 mm) - black, moist				
	CH	Fat CLAY with sand - dark grey, stiff, moist	G1			
1	ML	SILT - light brown, soft, moist				230
		Fat CLAY - brown mottled grey, firm, moist	S2	7	SPT Blows: [2/3/4], Spoon Recovery: 33%	
2			G3			229
3			G4		(G4): Gravel 0%, Sand 1.3%, Silt 22.4%, Clay 76.3%	228
4						227
5			T5		Tube Recovery: 100%	226
6		- grey below 6.1m	G6			225
7	CH					224
8			S7	5	SPT Blows: [2/2/3], Spoon Recovery: 67%	223
9		- trace till inclusions below 9.1 m	G8			222
10						221
11			T9		Tube Recovery: 100%	220
12			G10		(G10): Gravel 0.2%, Sand 12.6%, Silt 28.6%, Clay 58.6%	219
		END OF TESTHOLE at 12.3 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.				
13						218
14						217
15						

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

AECOM

LOGGED BY: Ryan Harras	COMPLETION DEPTH: 12.30 m
REVIEWED BY: German Leal	COMPLETION DATE: 22-9-14
PROJECT ENGINEER: Jordan Thompson	Page 1 of 1

LOG OF TEST HOLE 60680190 - TEST HOLE LOGS - CONTRACT 8A & 9_GL.GPJ UMA WINN.GDT 22-12-16

PROJECT: Jefferson East CSR Works (Contract 8A & 9)	CLIENT: City of Winnipeg	TESTHOLE NO: TH22-19
LOCATION: UTM 14 - 5534126 m N, 634477m E		PROJECT NO.: 60680190
CONTRACTOR: Maple Leaf Drilling	METHOD: B54X - 125 mm SSA	ELEVATION (m): 231.16

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

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	COMMENTS	ELEVATION
0	OR FILL		TOPSOIL (100 mm) - black, moist CLAY (Fill) - silty, some sand, trace gravel - dark grey mottled brown, stiff, moist		G1			231
1	CH		Fat CLAY with sand - dark grey, stiff, moist		G2			230
2	ML		SILT - light brown, soft, moist		G3			229
3			Fat CLAY - brown mottled grey, firm, moist		T4		Tube Recovery: 100%	228
4					G5			227
5								226
6			- grey below 6.1 m		S6	5	SPT Blows: [1/2/3], Spoon Recovery: 83%	225
7								224
8	CH				G7		(G7): Gravel 0%, Sand 0%, Silt 34%, Clay 66%	223
9			- trace till inclusions below 9.1 m		T8		Tube Recovery: 75%	222
10								221
11					G9			220
12					S10	3	SPT Blows: [1/1/2], Spoon Recovery: 83%	219
13			END OF TESTHOLE at 12.7 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
14								217
15								

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

AECOM

LOGGED BY: Ryan Harras	COMPLETION DEPTH: 12.70 m
REVIEWED BY: German Leal	COMPLETION DATE: 22-9-14
PROJECT ENGINEER: Jordan Thompson	Page 1 of 1

LOG OF TEST HOLE 60680190 - TEST HOLE LOGS - CONTRACT 8A & 9_GL.GPJ UMA WINN.GDT 22-12-16

PROJECT: Jefferson East CSR Works (Contract 8A & 9)	CLIENT: City of Winnipeg	TESTHOLE NO: TH22-20
LOCATION: UTM 14 - 5534198 m N, 634325m E		PROJECT NO.: 60680190
CONTRACTOR: Maple Leaf Drilling	METHOD: B54X - 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)	USC	SOIL SYMBOL	SLOTTED PIEZOMETER	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	COMMENTS	ELEVATION
0	OR			TOPSOIL (100 mm) - black, moist					231
0	CH			Fat CLAY with sand - dark grey, stiff, moist		G1			
1	ML			SILT - light brown, soft, moist		G2		(G2): Gravel 0%, Sand 3.4%, Silt 83.3%, Clay 13.3%	230
2				Fat CLAY - brown mottled grey, firm, moist		G3			229
3						S4	6	SPT Blows: [2/3/3], Spoon Recovery: 83%	228
4						G5			227
5									226
6						T6		Tube Recovery: 100%, (T6): Gravel 0%, Sand 2.5%, Silt 31.6%, Clay 65.9%	225
7	CH			- grey below 7.6 m		G7			224
8									223
9						S8	5	SPT Blows: [1/2/3], Spoon Recovery: 83%	222
10						G9			221
11									220
12						T10		Tube Recovery: 100%	219
13									218
14				Silty SAND (Till) - light brown, compact, moist to wet		G11			217
15	SM			- some clay, dry to moist below 14.6 m					216
15						S12	16	SPT Blows: [5/7/9], Spoon Recovery: 83%	
16				END OF TESTHOLE at 15.9 m on AUGER REFUSAL					215
17				Notes: 1. Seepage not observed during augering. 2. Sloughing not observed during augering. 3. Auger refusal met at 15.9 m. 4. Test hole backfilled with sand from 15.9 m to 15.1 m, bentonite from 15.1 m to 0.3 m, and sand from 0.3 m to 0.2 m. Flush-mount cover installed. 5. Groundwater monitoring: - October 26, 2022 at elev. 226.63 m (4.51 m bgs)					214
18									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/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

AECOM

LOGGED BY: Ryan Harras	COMPLETION DEPTH: 15.90 m
REVIEWED BY: German Leal	COMPLETION DATE: 22-9-15
PROJECT ENGINEER: Jordan Thompson	Page 1 of 1

LOG OF TEST HOLE 60680190 - TEST HOLE LOGS - CONTRACT 8A & 9_GL.GPJ UMA WINN.GDT 22-12-16

PROJECT: Jefferson East CSR Works (Contract 8B & 10)	CLIENT: City of Winnipeg	TESTHOLE NO: TH23-21
LOCATION: West of House 355 Burrin Ave.; UTM: 14U, 5533833.2 m N, 634639.6 m E		PROJECT NO.: 60680190
CONTRACTOR: Paddock Drilling	METHOD: Solid Stem Auger	ELEVATION (m): 230.92

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

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	COMMENTS	ELEVATION
0	OR FILL		TOPSOIL: black, moist					230
	CH		CLAY (Fill) - Dark grey, mottled brown, stiff, moist					
1	ML		Fat CLAY - Grey, firm, moist		G1			229
2			SILT - Light brown, soft to firm, moist - G1: Gravel (%) = 0.1, Sand (%) = 8.8, Silt (%) = 80.1, Clay (%) = 11					
3			Fat CLAY - Grey, firm, moist		S2	7	SPT blow: [3/3/4]	228
4					G3			227
5								226
6			- T4: Liquid Limit = 65.1, Plastic Limit= 15.3; Gravel (%) = 0, Sand (%) = 0, Silt (%) = 42.5, Clay (%) = 57.5; Bulk Unit Weight (kN/m3) = 17.3, Undrained Shear Strength (kPa) = 47		T4		Tube Recovery: 100%	225
7	CH				G5			224
8								223
9					S6	7	SPT blow: [2/3/4]	222
10			- Trace silt inclusion, trace sand, trace gravel below 10.1m		G7			221
11								220
12					T8		Tube Recovery: 100%	219
13			END OF TESTHOLE at 12.80 m in CLAY NOTES: - Frozen to 0.5m depth - No seepage observed during drilling - No Sloughing observed during drilling - Testhole backfilled with bentonite to the ground surface upon completion					218
14								217
15								216
16								215
17								214
18								213
19								212
20								

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

AECOM

LOGGED BY: Linh Trinh	COMPLETION DEPTH: 12.80 m
REVIEWED BY: German Leal	COMPLETION DATE: 23-1-11
PROJECT ENGINEER: Jordan Thompson	Page 1 of 1

LOG OF TEST HOLE 60680190_JEFFERSON CSR-8B AND 10_TESTHOLE LOGS.GPJ UMA WINN.GDT 23-6-1

PROJECT: Jefferson East CSR Works (Contract 8B & 10)	CLIENT: City of Winnipeg	TESTHOLE NO: TH23-22
LOCATION: East of House 414 Burrin Ave.; UTM: 14U, 5533895.9 m N, 634434.3 m E		PROJECT NO.: 60680190
CONTRACTOR: Paddock Drilling	METHOD: Solid Stem Auger	ELEVATION (m): 231.33

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

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

DEPTH (m)	USC	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	COMMENTS	ELEVATION
0	OR FILL	TOPSOIL: black, moist					231
1	ML	CLAY (Fill) - Dark grey, mottled brown, stiff, moist					230
2		SILT - Light brown, soft to firm, moist	SPT	S1	7	SPT blow: [2/3/4]	229
3		Fat CLAY - Grey, firm, moist	G	G2			228
4							227
5		- T3: Liquid Limit = 89.2, Plastic Limit= 18.5; Gravel (%) = 0, Sand (%) = 0, Silt (%) = 24.5, Clay (%) = 75.5; Bulk Unit Weight (kN/m3) = 16.3, Undrained Shear Strength (kPa) = 22.3	T	T3		Tube Recovery: 100%	226
6			G	G4			225
7							224
8	CH		SPT	S5	6	SPT blow: [2/3/3]	223
9			G	G6			222
10							221
11		- Trace silt inclusion, trace sand, trace gravel below 10.7m - T7: Bulk Unit Weight (kN/m3) = 16.5, Undrained Shear Strength (kPa) = 36.1	T	T7		Tube Recovery: 100%	220
12			G	G8			219
13							218
14			SPT	S9	5	SPT blow: [2/2/3]	217
15		SILT (Till) with sand and gravel - Light brown, very stiff, moist - G10: Gravel (%) = 4.2, Sand (%) = 31.2, Silt (%) = 43.5, Clay (%) = 21.1	G	G10			216
16	ML						215
17			SPT	S11	21	SPT blow: [10/6/15]	214
18			G	G12			213
19		END OF TESTHOLE at 18.29 m in SILT Till NOTES: - Frozen to 0.5m depth - No seepage observed during drilling - No Sloughing observed during drilling - One standpipe piezometer (1 inch diameter and 1 ft screening Casagrande tip) was installed in silt till at 18.0m - Testhole backfilled with sand from 18.3m to 17.4m, then with bentonite to 0.3m, and then with sand to 0.2m. Flush-mount cover installed - No groundwater observed upon completion - GWL moniroting: + Feb 24, 2023: 5.41 mBGS + May 31, 2023: 5.26 mBGS					212
20							211
21							210
22							209
23							208
24							207
25							

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

AECOM

LOGGED BY: Linh Trinh	COMPLETION DEPTH: 18.29 m
REVIEWED BY: German Leal	COMPLETION DATE: 23-1-11
PROJECT ENGINEER: Jordan Thompson	Page 1 of 1

LOG OF TEST HOLE 60680190_JEFFERSON CSR-8B AND 10_TESTHOLE LOGS.GPJ UMA WINN.GDT 23-6-1

PROJECT: Jefferson East CSR Works (Contract 8B & 10)	CLIENT: City of Winnipeg	TESTHOLE NO: TH23-23
LOCATION: East of House 417 Royal Ave.; UTM: 14U, 5534021.7 m N, 634492.8 m E		PROJECT NO.: 60680190
CONTRACTOR: Paddock Drilling	METHOD: Solid Stem Auger	ELEVATION (m): 231.13

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

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

DEPTH (m)	USC	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	COMMENTS	ELEVATION
0	OR FILL	TOPSOIL: black, moist CLAY (Fill) - Dark grey, mottled brown, stiff, moist					231
1	CH	Fat CLAY - Grey, firm, moist		G1			230
2		- G1: Liquid Limit = 76.3, Plastic Limit= 19.4; Gravel (%) = 0, Sand (%) = 0.6, Silt (%) = 33.9, Clay (%) = 65.5					229
3	ML	SILT - Light brown, soft to firm, moist					228
		Fat CLAY - Grey, firm, moist		T2		Tube Recovery: 100%	
4		- T2 (bottom): Liquid Limit = 81.5, Plastic Limit= 18.9; Gravel (%) = 0, Sand (%) = 0, Silt (%) = 20.1, Clay (%) = 79.9; Bulk Unit Weight (kN/m3) = 16.8, Undrained Shear Strength (kPa) = 33.3		G3			227
5							226
6				S4	7	SPT blow: [2/3/4]	225
7				G5			224
8	CH						223
9				T6		Tube Recovery: 100%	222
10				G7			221
11		- Trace silt inclusion, trace sand, trace gravel below 10.7m					220
12				S8	6	SPT blow: [2/3/3]	219
13		END OF TESTHOLE at 12.65 m in CLAY NOTES: - Frozen to 0.5m depth - No seepage observed during drilling - No Sloughing observed during drilling - Testhole backfilled with bentonite to the ground surface upon completion					218
14							217
15							216
16							215
17							214
18							213
19							212
20							

AECOM

LOGGED BY: Linh Trinh	COMPLETION DEPTH: 12.65 m
REVIEWED BY: German Leal	COMPLETION DATE: 23-1-11
PROJECT ENGINEER: Jordan Thompson	Page 1 of 1

LOG OF TEST HOLE 60680190_JEFFERSON CSR-8B AND 10_TESTHOLE LOGS.GPJ UMA WINN.GDT 23-6-1

PROJECT: Jefferson East CSR Works (Contract 8B & 10)	CLIENT: City of Winnipeg	TESTHOLE NO: TH23-24
LOCATION: West of House 514 Kilbride Ave.; UTM: 14U, 5533892.4 m N, 634002 m E		PROJECT NO.: 60680190
CONTRACTOR: Paddock Drilling	METHOD: Solid Stem Auger	ELEVATION (m): 231.40

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

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

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	COMMENTS	ELEVATION
0	OR FILL		TOPSOIL: black, moist					231
			CLAY (Fill)					
1	CH		- Dark grey, mottled brown, stiff, moist					
			Fat CLAY					
			- Grey, firm, moist		G1			230
2	ML		SILT					
			- Light brown, soft to firm, moist					229
			Fat CLAY					
3			- Grey, firm, moist					
					S2	6	SPT blow: [2/3/3]	228
4								
					G3			227
5								
								226
6			- T4: Liquid Limit = 69.2, Plastic Limit= 16.1; Gravel (%) = 0, Sand (%) = 0, Silt (%) = 30.5, Clay (%) = 69.5; Bulk Unit Weight (kN/m3) = 16.8, Undrained Shear Strength (kPa) = 47.4		T4		Tube Recovery: 100%	225
7	CH							
					G5			224
8								
								223
9								
					S6	6	SPT blow: [2/3/3]	222
10								
			- Trace silt inclusion, trace sand, trace gravel below 10.4m		G7			221
11								
								220
12								
			- T8: Bulk Unit Weight (kN/m3) = 19.8, Undrained Shear Strength (kPa) = 27.6		T8		Tube Recovery: 100%	219
13			END OF TESTHOLE at 12.80 m in CLAY					
			NOTES:					218
14			- Frozen to 0.5m depth					
			- No seepage observed during drilling					217
15			- No Sloughing observed during drilling					
			- Testhole backfilled with bentonite to the ground surface upon completion					216
16								
								215
17								
								214
18								
								213
19								
								212
20								

AECOM

LOGGED BY: Linh Trinh	COMPLETION DEPTH: 12.80 m
REVIEWED BY: German Leal	COMPLETION DATE: 23-1-12
PROJECT ENGINEER: Jordan Thompson	Page 1 of 1

LOG OF TEST HOLE 60680190_JEFFERSON CSR-8B AND 10_TESTHOLE LOGS.GPJ UMA WINN.GDT 23-6-1

PROJECT: Jefferson East CSR Works (Contract 8B & 10)	CLIENT: City of Winnipeg	TESTHOLE NO: TH23-25
LOCATION: In Front of House 499 Belmont Ave.; UTM: 14U, 5533806 m N, 634031.1 m E		PROJECT NO.: 60680190
CONTRACTOR: Paddock Drilling	METHOD: Solid Stem Auger	ELEVATION (m): 231.27

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

DEPTH (m)	USC	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	COMMENTS	ELEVATION
0	OR FILL	TOPSOIL: black, moist					231
		CLAY (Fill) - Dark grey, mottled brown, stiff, moist					
1	ML	SILT - Light brown, soft to firm, moist					230
				S1	7	SPT blow: [2/2/5]	
2		Fat CLAY - Grey, firm, moist					229
				G2			
3							228
4							227
		- T3: Liquid Limit = 80, Plastic Limit= 16.7; Gravel (%) = 0, Sand (%) = 0, Silt (%) = 20.1, Clay (%) = 79.9; Bulk Unit Weight (kN/m3) = 16.6 Undrained Shear Strength (kPa) = 20.6		T3		Tube Recovery: 100%	
5							226
6				G4			225
7	CH						224
		- T5: Bulk Unit Weight (kN/m3) = 17.2, Undrained Shear Strength (kPa) = 49.8		T5		Tube Recovery: 100%	
8							223
9				G6			222
10							221
		- Trace silt inclusion, trace sand, trace gravel below 10.7m		S7	6	SPT blow: [2/3/3]	
11							220
12				G8			219
		END OF TESTHOLE at 12.19 m in CLAY					
13		NOTES:					218
14		- Frozen to 0.5m depth					217
		- No seepage observed during drilling					
15		- No Sloughing observed during drilling					216
16		- Testhole backfilled with bentonite to the ground surface upon completion					215
17							214
18							213
19							212
20							

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

AECOM

LOGGED BY: Linh Trinh	COMPLETION DEPTH: 12.19 m
REVIEWED BY: German Leal	COMPLETION DATE: 23-1-12
PROJECT ENGINEER: Jordan Thompson	Page 1 of 1

LOG OF TEST HOLE 60680190_JEFFERSON CSR-8B AND 10_TESTHOLE LOGS.GPJ UMA WINN.GDT 23-6-1

PROJECT: Jefferson East CSR Works (Contract 8B & 10)	CLIENT: City of Winnipeg	TESTHOLE NO: TH23-26
LOCATION: In Front of House 503 Hartford Ave.; UTM: 14U, 5533742.5 m N, 633974.9 m E		PROJECT NO.: 60680190
CONTRACTOR: Paddock Drilling	METHOD: Solid Stem Auger	ELEVATION (m): 231.20

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

DEPTH (m)	USC	SOIL DESCRIPTION	SAMPLE #	SPT (N)	COMMENTS	ELEVATION
0	OR FILL	TOPSOIL: black, moist CLAY (Fill) - Dark grey, mottled brown, stiff, moist				231
1	ML	SILT - Light brown, soft to firm, moist				230
2		Fat CLAY - Grey, stiff, moist	S1	10	SPT blow: [3/4/6]	229
3			G2			228
		- Firm below 3.0m				
4						227
5		- T3: Liquid Limit = 89.3, Plastic Limit= 26.1; Gravel (%) = 0, Sand (%) = 0, Silt (%) = 21.3, Clay (%) = 78.7; Bulk Unit Weight (kN/m3) = 16.3, Undrained Shear Strength (kPa) = 43.1	T3		Tube Recovery: 100%	226
6			G4			225
7	CH					224
8			S5	5	SPT blow: [2/2/3]	223
9			G6			222
10						221
11		- T7: Bulk Unit Weight (kN/m3) = 17.3, Undrained Shear Strength (kPa) = 46	T7		Tube Recovery: 100%	220
		- Trace silt inclusion, trace sand, trace gravel below 11.6m				
12			G8			219
		END OF TESTHOLE at 12.19 m in CLAY NOTES: - Frozen to 0.5m depth - No seepage observed during drilling - No Sloughing observed during drilling - Testhole backfilled with bentonite to the ground surface upon completion				
13						218
14						217
15						216
16						215
17						214
18						213
19						212
20						

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

AECOM

LOGGED BY: Linh Trinh	COMPLETION DEPTH: 12.19 m
REVIEWED BY: German Leal	COMPLETION DATE: 23-1-12
PROJECT ENGINEER: Jordan Thompson	Page 1 of 1

LOG OF TEST HOLE 60680190_JEFFERSON CSR-8B AND 10_TESTHOLE LOGS.GPJ UMA WINN.GDT 23-6-1

PROJECT: Jefferson East CSR Works (Contract 8B & 10)	CLIENT: City of Winnipeg	TESTHOLE NO: TH23-27
LOCATION: West of House 550 Hartford Ave.; UTM: 14U, 5533797.7 m N, 633806.2 m E		PROJECT NO.: 60680190
CONTRACTOR: Paddock Drilling	METHOD: Solid Stem Auger	ELEVATION (m): 231.30

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

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	COMMENTS	ELEVATION
0	OR FILL		TOPSOIL: black, moist					231
			CLAY (Fill) - Dark grey, mottled brown, stiff, moist					
1	ML		SILT - Light brown, soft to firm, moist		G1			230
2			Fat CLAY - Grey, firm, moist					229
3			- T2: Liquid Limit = 87.2, Plastic Limit= 27.3; Gravel (%) = 0, Sand (%) = 0, Silt (%) = 23.6, Clay (%) = 76.4; Bulk Unit Weight (kN/m3) = 16.5 Undrained Shear Strength (kPa) = 26.6		T2		Tube Recovery: 100%	228
4	CH				G3			227
5								226
6					S4	5	SPT blow: [1/2/3]	225
7			END OF TESTHOLE at 6.55 m in CLAY NOTES: - Frozen to 0.5m depth - No Sloughing observed during drilling - Exesive seepage observed at 6.1m after SPT test (S4) at about 1:05 PM - Stopped drilling and monitored water level as below: + 1:30 PM: 5.79m + 3:30 PM: 5.28m + 4:00 PM: 5.23m + 5:41 PM: 5.19m - At this time, 5:41 PM, testhole backfilled with bentonite to the ground surface					224
8								223
9								222
10								221
11								220
12								219
13								218
14								217
15								216
16								215
17								214
18								213
19								212
20								

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

AECOM

LOGGED BY: Linh Trinh	COMPLETION DEPTH: 6.55 m
REVIEWED BY: German Leal	COMPLETION DATE: 23-1-12
PROJECT ENGINEER: Jordan Thompson	Page 1 of 1

LOG OF TEST HOLE 60680190_JEFFERSON CSR-8B AND 10_TESTHOLE LOGS.GPJ UMA WINN.GDT 23-6-1

PROJECT: Jefferson East CSR Works (Contract 8B & 10)	CLIENT: City of Winnipeg	TESTHOLE NO: TH23-28
LOCATION: East of House 529 St Anthony Ave.; UTM: 14U, 5533593.7 m N, 633849.1 m E		PROJECT NO.: 60680190
CONTRACTOR: Paddock Drilling	METHOD: Solid Stem Auger	ELEVATION (m): 231.23

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

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

DEPTH (m)	USC	SOIL SYMBOL	SLOTTED PIEZOMETER	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	COMMENTS	ELEVATION
0	OR FILL			TOPSOIL: black, moist					231
1	ML			CLAY (Fill) - Dark grey, mottled brown, stiff, moist		G1			230
2				SILT - Light brown, soft to firm, moist					229
3				Fat CLAY - Grey, firm, moist		S2	5	SPT blow: [2/2/3]	228
4						G3			227
5									226
6				- T4: Liquid Limit = 74.9, Plastic Limit= 45.6; Gravel (%) = 0, Sand (%) = 0, Silt (%) = 34, Clay (%) = 66; Bulk Unit Weight (kN/m3) = 16.6 Undrained Shear Strength (kPa) = 46.1		T4		Tube Recovery: 100%	225
7						G5			224
8									223
9	CH					S6	5	SPT blow: [1/2/3]	222
10									221
11						G7			220
12									219
13				- Trace silt inclusion, trace sand, trace gravel below 10.7m - T8: Bulk Unit Weight (kN/m3) = 16, Undrained Shear Strength (kPa) = 20.4		T8		Tube Recovery: 100%	218
14						G9			217
15	ML			SILT (Till) with sand and gravel - Light brown, very hard, moist		S10	55	SPT blow: [5/5/50]	216
16				END OF TESTHOLE at 15.70 m in SILT Till					215
17				NOTES: - Frozen to 0.5m depthUtility locates completed prior to drilling					214
18				- No seepage observed during drilling					213
19				- No Sloughing observed during drilling - One standpipe piezometer (1 inch diameter and 1 ft screening Casagrande tip) was installed in silt till at 14.9m					212
20				- Testhole backfilled with sand from 15.7m to 4.3m, then with bentonite to 0.3m, and then with sand to 0.2m. Flush-mount cover installed					211
21				- No groundwater observed upon completion					210
22				- GWL moniroting: + Feb 24, 2023: 5.15 mBGS					209
23				+ May 31, 2023: 3.72 mBGS					208
24									207
25									

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

AECOM

LOGGED BY: Linh Trinh	COMPLETION DEPTH: 15.70 m
REVIEWED BY: German Leal	COMPLETION DATE: 23-1-13
PROJECT ENGINEER: Jordan Thompson	Page 1 of 1

LOG OF TEST HOLE 60680190_JEFFERSON CSR-8B AND 10_TESTHOLE LOGS.GPJ UMA WINN.GDT 23-6-1

PROJECT: Jefferson East CSR Works (Contract 8B & 10)	CLIENT: City of Winnipeg	TESTHOLE NO: TH23-29
LOCATION: East of House 578 St Anthony Ave.; UTM: 14U, 5533649.2 m N, 633667.2 m E		PROJECT NO.: 60680190
CONTRACTOR: Paddock Drilling	METHOD: Solid Stem Auger	ELEVATION (m): 231.17

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

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

DEPTH (m)	USC	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	COMMENTS	ELEVATION
0	OR FILL		TOPSOIL: black, moist					231
			CLAY (Fill) - Dark grey, mottled brown, stiff, moist					
1	ML		SILT - Light brown, firm, moist					230
2			- S1: Gravel (%) = 0, Sand (%) = 8.2, Silt (%) = 74.4, Clay (%) = 17.4		S1	6	SPT blow: [2/3/3]	229
			Fat CLAY - Grey, firm, moist					
3					G2			228
4								227
5			- T3: Liquid Limit = 91.1, Plastic Limit= 18.5; Gravel (%) = 0, Sand (%) = 0, Silt (%) = 17, Clay (%) = 83; Bulk Unit Weight (kN/m3) = 16.7, Undrained Shear Strength (kPa) = 42.2		T3		Tube Recovery: 100%	226
6					G4			225
7	CH							224
8					S5	5	SPT blow: [1/2/3]	223
9					G6			222
10								221
11			- Trace silt inclusion, trace sand, trace gravel below 10.7m - T7: Bulk Unit Weight (kN/m3) = 18.4, Undrained Shear Strength (kPa) = 27.5		T7		Tube Recovery: 100%	220
12					G8			219
			END OF TESTHOLE at 12.19 m in CLAY					
13			NOTES: - Frozen to 0.5m depth					218
14			- No seepage observed during drilling					217
15			- No Sloughing observed during drilling					216
16			- Testhole backfilled with bentonite to the ground surface upon completion					215
17								214
18								213
19								212
20								

AECOM

LOGGED BY: Linh Trinh	COMPLETION DEPTH: 12.19 m
REVIEWED BY: German Leal	COMPLETION DATE: 23-1-12
PROJECT ENGINEER: Jordan Thompson	Page 1 of 1

LOG OF TEST HOLE 60680190_JEFFERSON CSR-8B AND 10_TESTHOLE LOGS.GPJ UMA WINN.GDT 23-6-1

AECOM
99 Commerce Drive
Winnipeg, MB, Canada R3P 0Y7
www.aecom.com

204 477 5381 tel
431 800 1210 fax

Memorandum

To	Ryan Harras	Page	1
CC			
Subject	Jefferson East Phase 3 (Contract 8A & 9) – City of Winnipeg –Test Results		
From	Elliott E. Drumright		
Date	November 18, 2022	Project Number	60680190.2.3 & 2.4

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

- Seventy-two (62) 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.
Winnipeg Geotechnical Laboratory
99 Commerce Drive
Winnipeg, Manitoba
R3P 0Y7
Phone: 204 477 5381 Fax: 431 800 1210

Project Name:	Jefferson CSR - Contracts 8A & 9	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:	October 3, 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 (%)
TH22-14	G1	0.76 - 0.91 m	**28.2%**
	S2	1.52 - 1.98 m	**27.4%**
	G3	2.29 - 2.44 m	**47.9%**
	G4	3.05 - 3.20 m	**47.7%**
	T5	4.57 - 5.18 m	**53.0%**
	G6	6.10 - 6.25 m	**45.7%**
	S7	7.62 - 8.08 m	**31.7%**
	G8	9.14 - 9.30 m	**47.1%**
	T9	10.67 - 11.28 m	**56.7%**
	G10	12.19 - 12.34 m	**53.1%**
	S11	13.72 - 14.17 m	**55.5%**
	G13	16.76 - 16.92 m	**23.7%**
TH22-15	G1	0.76 - 0.91 m	**24.5%**
	G2	1.52 - 1.68 m	**16.9%**
	G3	2.29 - 2.44 m	**34.9%**
	T4	3.05 - 3.66 m	**55.1%**
	G5	4.57 - 4.72 m	**49.2%**
	S6	6.10 - 6.55 m	**46.6%**
	G7	7.62 - 7.77 m	**45.1%**
	T8	9.14 - 9.75 m	**48.5%**
	G9	10.67 - 10.82 m	**47.1%**
	S10	12.19 - 12.65 m	**42.6%**
TH22-16	G1	0.76 - 0.91 m	**23.6%**
	G2	1.52 - 1.68 m	**20.2%**
	G3	2.29 - 2.44 m	**49.9%**
	S4	3.05 - 3.51 m	**44.3%**
	G5	4.57 - 4.72 m	**54.3%**
	T6	6.10 - 6.71 m	**49.6%**
	G7	7.62 - 7.77 m	**45.6%**
	S8	9.14 - 9.60 m	**48.7%**
	G9	10.67 - 10.82 m	**44.8%**
	T10	12.19 - 12.80 m	**68.1%**
TH22-17	G1	0.76 - 0.91 m	**20.7%**
	S2	1.52 - 1.98 m	**27.9%**
	G3	2.29 - 2.44 m	**52.6%**
	G4	3.05 - 3.20 m	**43.3%**
	T5	4.57 - 5.18 m	**53.1%**
	G6	6.10 - 6.25 m	**48.0%**

Location	Sample	Depth (m)	Moisture Content (%)
	S7	7.62 - 8.08 m	**45.0%**
	G8	9.14 - 9.30 m	**42.2%**
	T9	10.67 - 11.28 m	**60.1%**
	G10	12.19 - 12.34 m	**49.0%**
	S11	13.72 - 14.17 m	**12.5%**
	G12	15.85 - 16.00 m	**11.6%**
TH22-18	G1	0.76 - 0.91 m	**21.6%**
	S2	1.52 - 1.98 m	**31.4%**
	G3	2.29 - 2.44 m	**43.6%**
	G4	3.05 - 3.20 m	**47.8%**
	T5	4.57 - 5.18 m	**52.2%**
	G6	6.10 - 6.25 m	**42.2%**
	S7	7.62 - 8.08 m	**38.1%**
	G8	9.14 - 9.30 m	**46.1%**
	T9	10.67 - 11.28 m	**46.2%**
	G10	12.19 - 12.34 m	**41.0%**
TH22-19	G1	0.76 - 0.91 m	**29.7%**
	G2	1.52 - 1.68 m	**34.9%**
	G3	2.29 - 2.44 m	**23.6%**
	T4	3.05 - 3.66 m	**42.6%**
	G5	4.57 - 4.72 m	**52.9%**
	S6	6.10 - 6.55 m	**53.3%**
	G7	7.62 - 7.77 m	**43.9%**
	T8	9.14 - 9.75 m	**45.9%**
	G9	10.67 - 10.82 m	**42.9%**
	S10	12.19 - 12.65 m	**52.9%**
TH22-20	G1	0.76 - 0.91 m	**24.2%**
	G2	1.52 - 1.68 m	**21.2%**
	G3	2.29 - 2.44 m	**46.9%**
	S4	3.05 - 3.51 m	**53.4%**
	G5	4.57 - 4.72 m	**53.9%**
	T6	6.10 - 6.71 m	**42.9%**
	G7	7.62 - 7.77 m	**40.7%**
	S8	9.14 - 9.60 m	**49.7%**
	G9	10.67 - 10.82 m	**47.8%**
	T10	12.19 - 12.80 m	**31.6%**
	G11	13.72 - 13.87 m	**14.1%**
	S12	15.24 - 15.70 m	**13.2%**

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Winnipeg Geotechnical Laboratory
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Phone: 204 477 5381 Fax: 204 284 2040

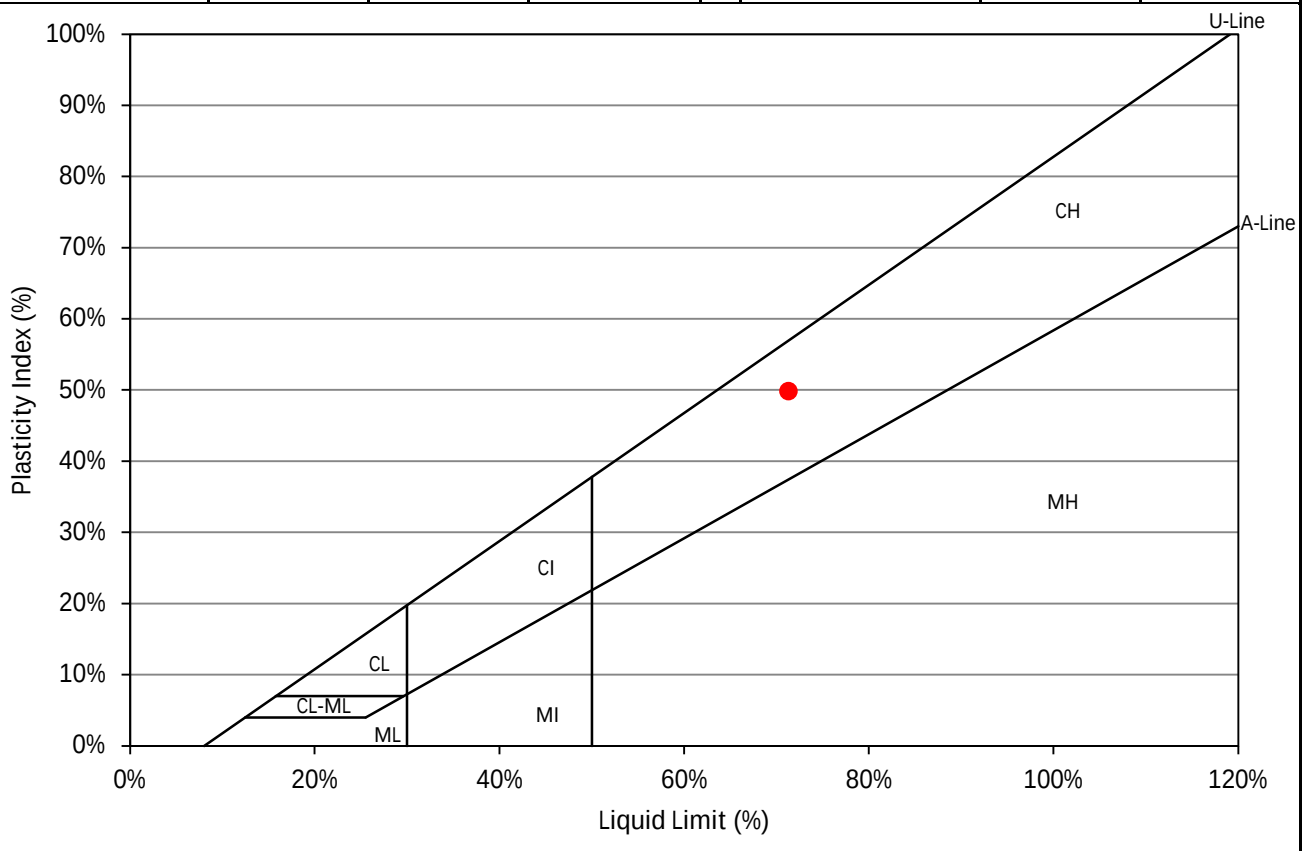
Project Name:	Jefferson CSR Contract 8A & 9	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-14	Sample Date:	Varies
Sample Depth:	6.10 - 6.25 m	Lab Technician:	EManimbao
Sample Number:	G6	Date Tested:	November 9, 2022

Atterberg Limits (ASTM D4318)

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

Liquid Limit			
Blows	33	26	17
Wet Sample (g)	8.9	10.0	8.8
Dry Sample (g)	5.3	5.8	5.0
Water Content (%)	68.9%	70.9%	74.5%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.2	6.2
Dry Sample (g)	5.1	5.1
Water Content (%)	21.1%	21.9%



Liquid Limit (%): 71.3%	Plastic Limit (%): 21.5%	Plasticity Index (%): 49.8%

AECOM Canada Ltd.
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99 Commerce Drive
Winnipeg, Manitoba
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Phone: 204 477 5381 Fax: 204 284 2040

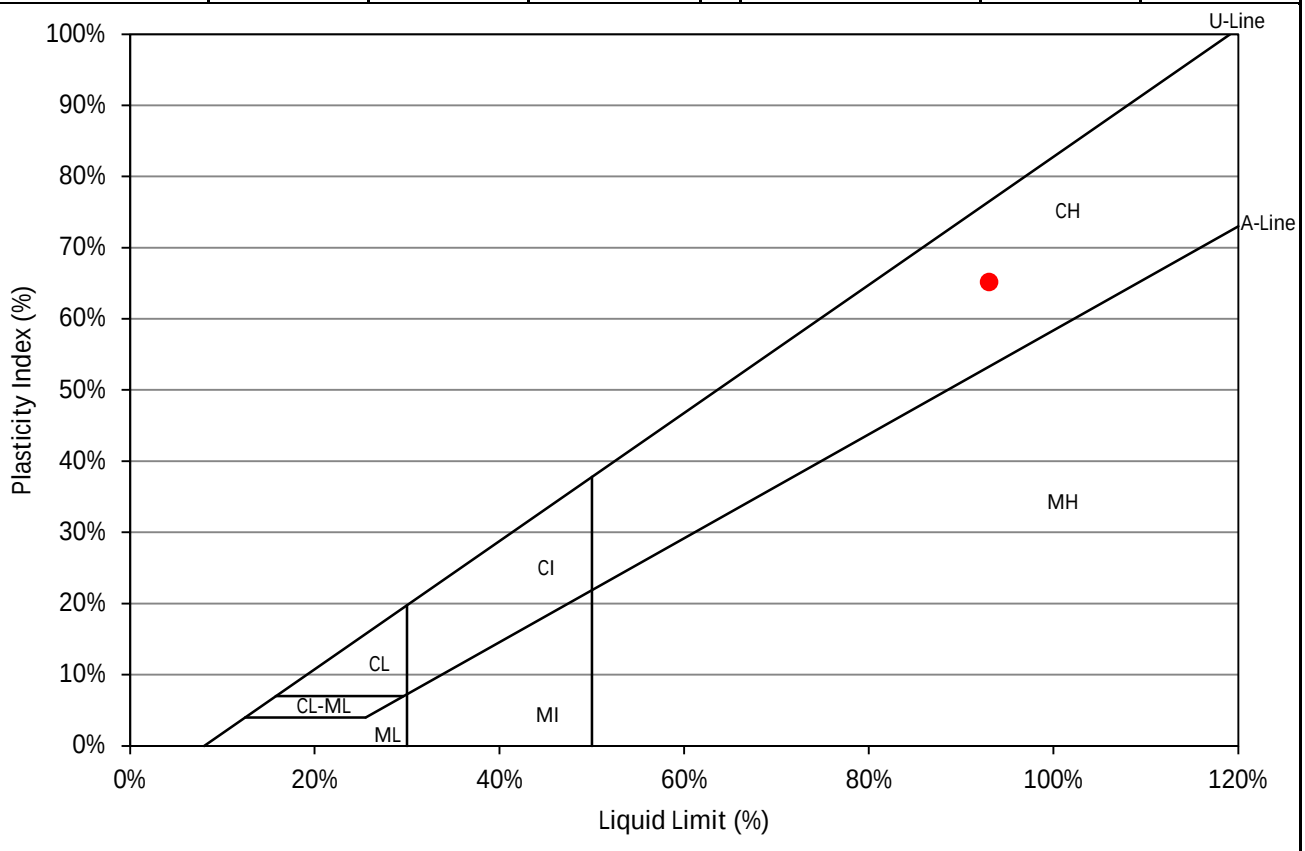
Project Name:	Jefferson CSR Contract 8A & 9	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-15	Sample Date:	Varies
Sample Depth:	3.05 - 3.66 m	Lab Technician:	EManimbao
Sample Number:	T4	Date Tested:	November 8, 2022

Atterberg Limits (ASTM D4318)

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

Liquid Limit			
Blows	29	24	20
Wet Sample (g)	9.8	8.9	9.3
Dry Sample (g)	5.1	4.6	4.8
Water Content (%)	91.5%	93.1%	95.3%

Plastic Limit		
Trial	1	2
Wet Sample (g)	5.6	5.2
Dry Sample (g)	4.4	4.1
Water Content (%)	27.7%	28.0%



Liquid Limit (%): 93.0%	Plastic Limit (%): 27.9%	Plasticity Index (%): 65.1%

AECOM Canada Ltd.
Winnipeg Geotechnical Laboratory
99 Commerce Drive
Winnipeg, Manitoba
R3P 0Y7
Phone: 204 477 5381 Fax: 204 284 2040

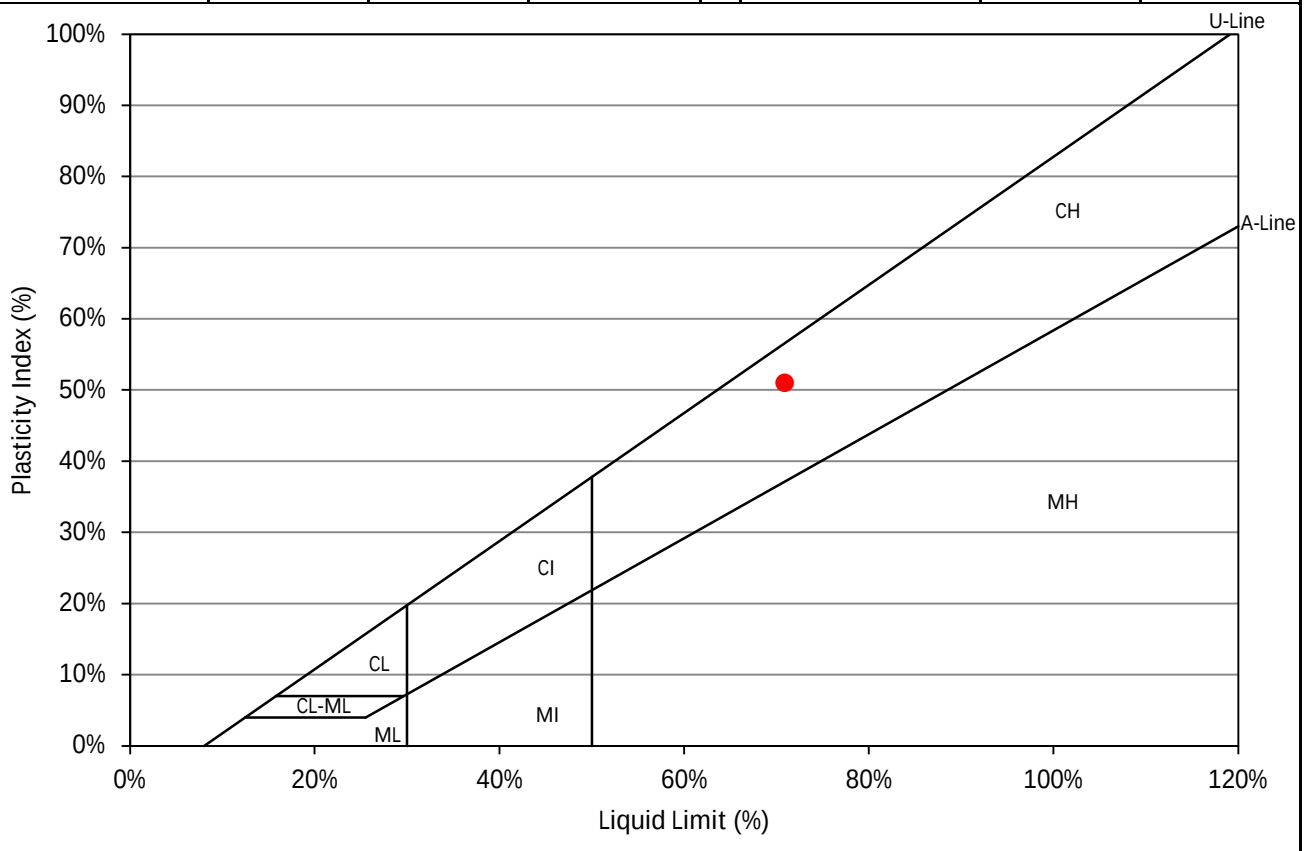
Project Name:	Jefferson CSR Contract 8A & 9	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-15	Sample Date:	Varies
Sample Depth:	9.14 - 9.75 m	Lab Technician:	EManimbao
Sample Number:	T8	Date Tested:	November 8, 2022

Atterberg Limits (ASTM D4318)

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

Liquid Limit			
Blows	28	24	19
Wet Sample (g)	9.1	9.1	7.8
Dry Sample (g)	5.3	5.3	4.5
Water Content (%)	70.0%	71.5%	73.3%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.2	6.5
Dry Sample (g)	5.2	5.4
Water Content (%)	19.8%	20.0%



Liquid Limit (%): 70.9%	Plastic Limit (%): 19.9%	Plasticity Index (%): 51.0%

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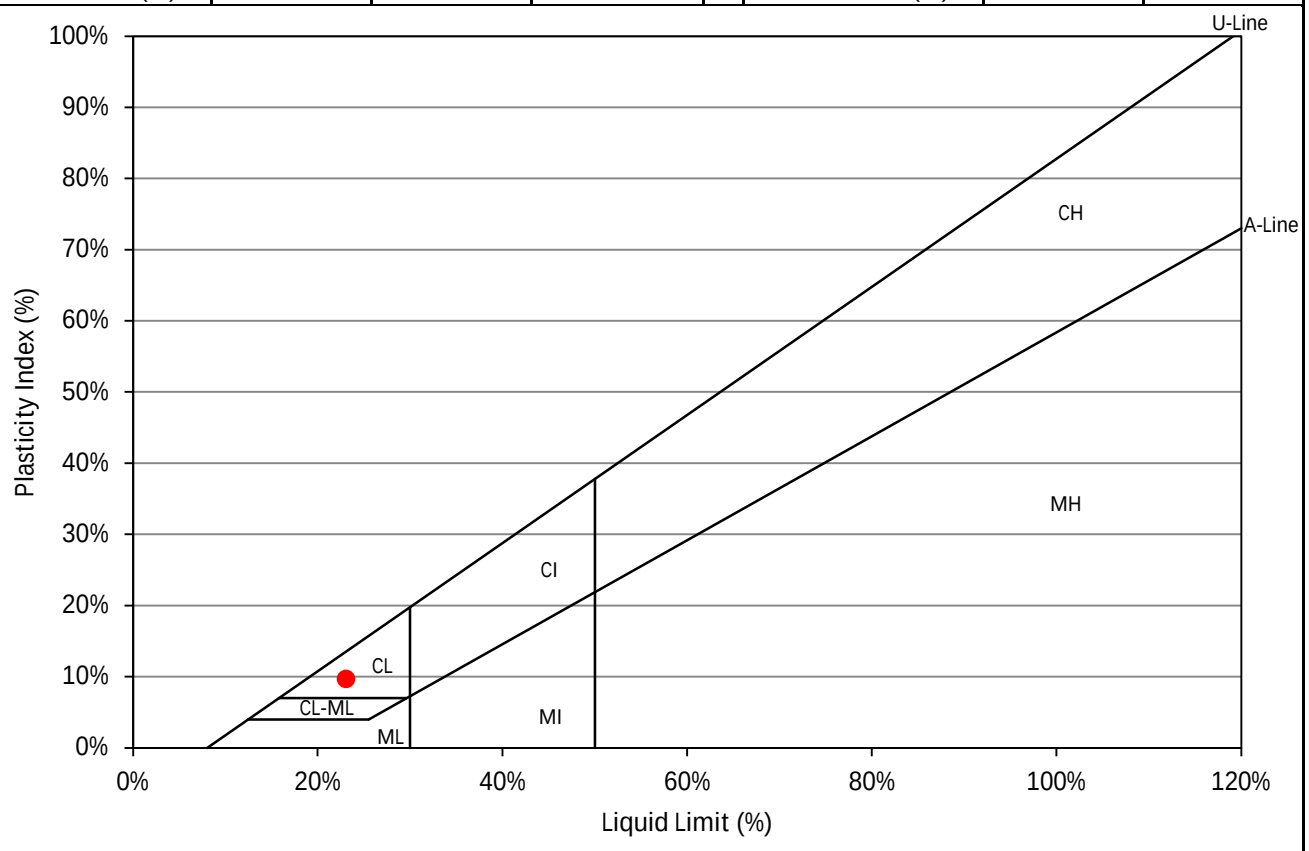
Project Name:	Jefferson CSR Contract 8A & 9	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-16	Sample Date:	Varies
Sample Depth:	1.52 - 1.68 m	Lab Technician:	EManimbao
Sample Number:	G2	Date Tested:	November 8, 2022

Atterberg Limits (ASTM D4318)

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

Liquid Limit			
Blows	29	22	16
Wet Sample (g)	15.6	9.1	12.4
Dry Sample (g)	12.7	7.4	10.0
Water Content (%)	22.5%	23.7%	24.9%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.5	6.1
Dry Sample (g)	5.8	5.4
Water Content (%)	13.3%	13.4%



Liquid Limit (%): 23.1%	Plastic Limit (%): 13.4%	Plasticity Index (%): 9.7%

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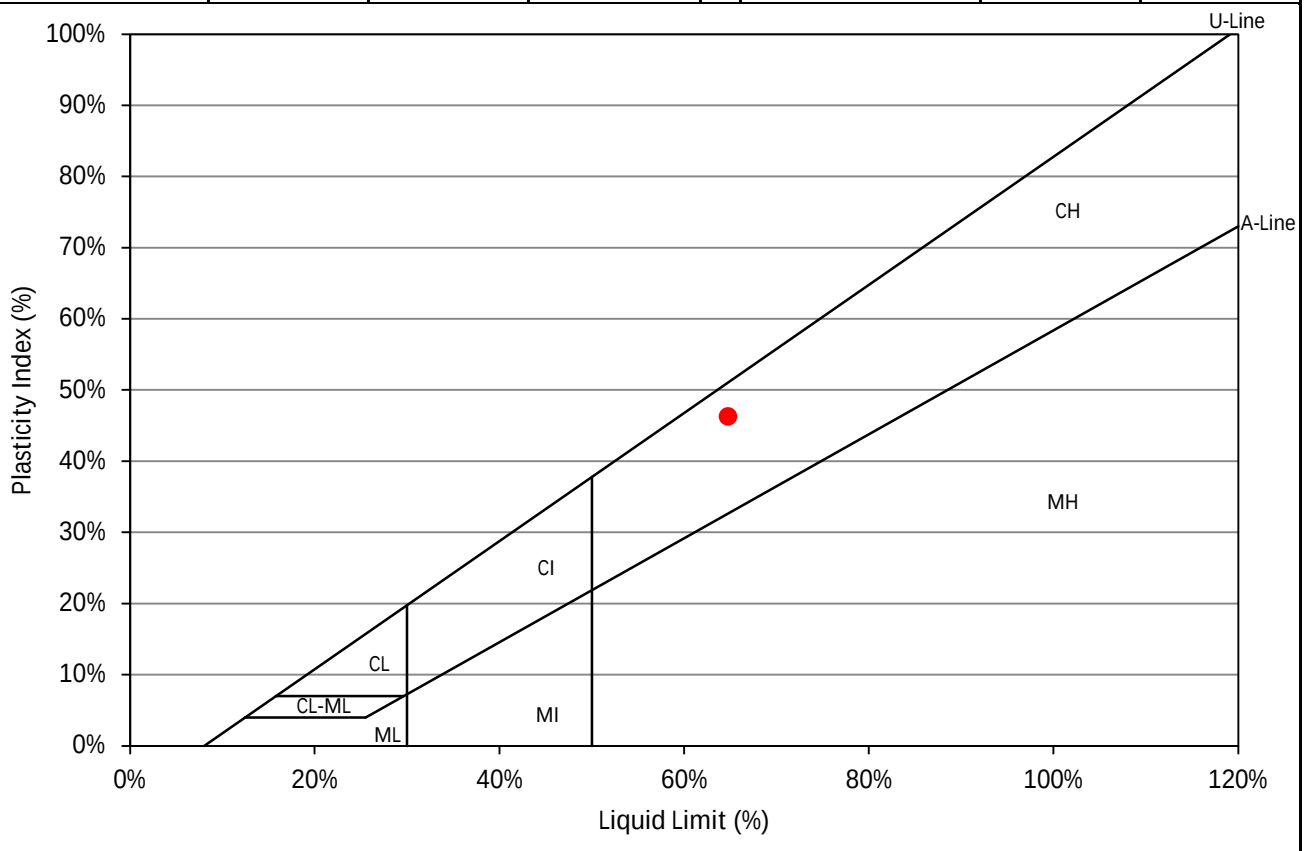
Project Name:	Jefferson CSR Contract 8A & 9	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-16	Sample Date:	Varies
Sample Depth:	7.62 - 7.77 m	Lab Technician:	EManimbao
Sample Number:	G7	Date Tested:	November 9, 2022

Atterberg Limits (ASTM D4318)

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

Liquid Limit			
Blows	29	23	18
Wet Sample (g)	8.9	9.4	10.5
Dry Sample (g)	5.5	5.7	6.2
Water Content (%)	63.4%	65.3%	67.8%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.2	6.0
Dry Sample (g)	5.2	5.1
Water Content (%)	18.6%	18.3%



Liquid Limit (%): 64.8%	Plastic Limit (%): 18.5%	Plasticity Index (%): 46.3%

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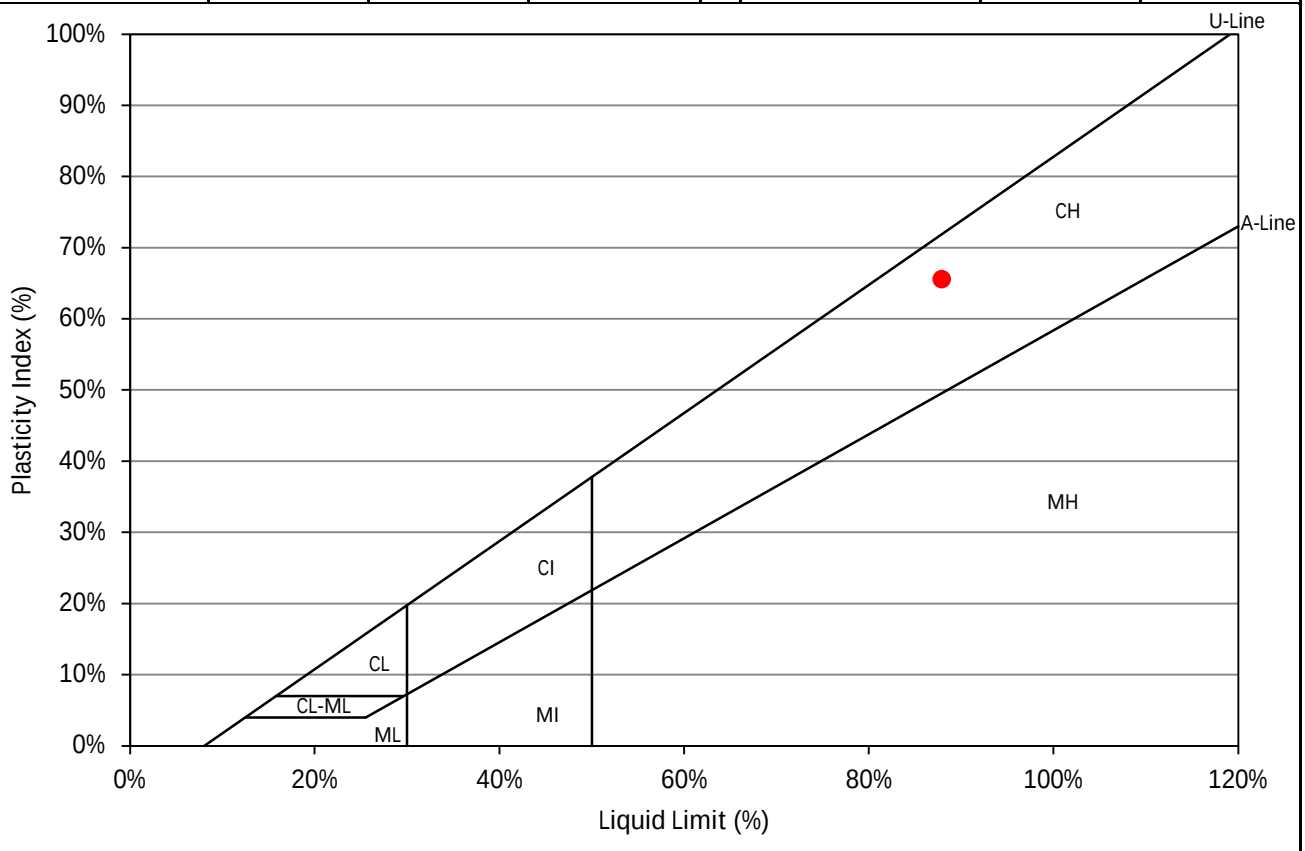
Project Name:	Jefferson CSR Contract 8A & 9	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-17	Sample Date:	Varies
Sample Depth:	4.57 - 5.18 m	Lab Technician:	EManimbao
Sample Number:	T5	Date Tested:	November 8, 2022

Atterberg Limits (ASTM D4318)

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

Liquid Limit			
Blows	26	23	19
Wet Sample (g)	9.4	8.0	9.1
Dry Sample (g)	5.0	4.2	4.8
Water Content (%)	87.7%	88.6%	89.8%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.2	6.3
Dry Sample (g)	5.1	5.1
Water Content (%)	22.3%	22.4%



Liquid Limit (%): 87.9%	Plastic Limit (%): 22.3%	Plasticity Index (%): 65.6%

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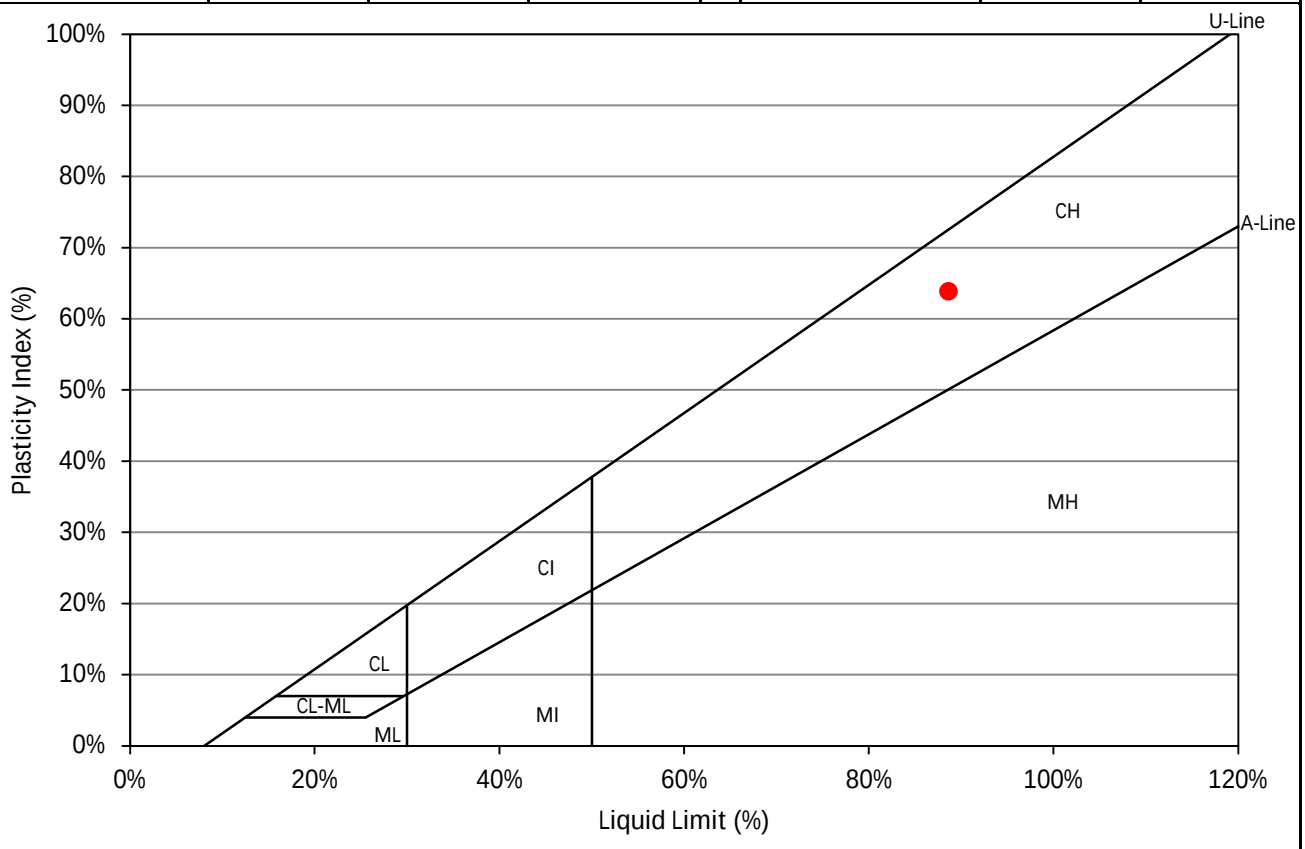
Project Name:	Jefferson CSR Contract 8A & 9	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-18	Sample Date:	Varies
Sample Depth:	3.05 - 3.20 m	Lab Technician:	EManimbao
Sample Number:	G4	Date Tested:	November 9, 2022

Atterberg Limits (ASTM D4318)

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

Liquid Limit			
Blows	27	21	17
Wet Sample (g)	10.0	9.5	8.6
Dry Sample (g)	5.3	5.0	4.5
Water Content (%)	88.1%	90.3%	92.0%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.4	6.7
Dry Sample (g)	5.1	5.3
Water Content (%)	25.0%	24.5%



Liquid Limit (%): 88.6%	Plastic Limit (%): 24.8%	Plasticity Index (%): 63.9%

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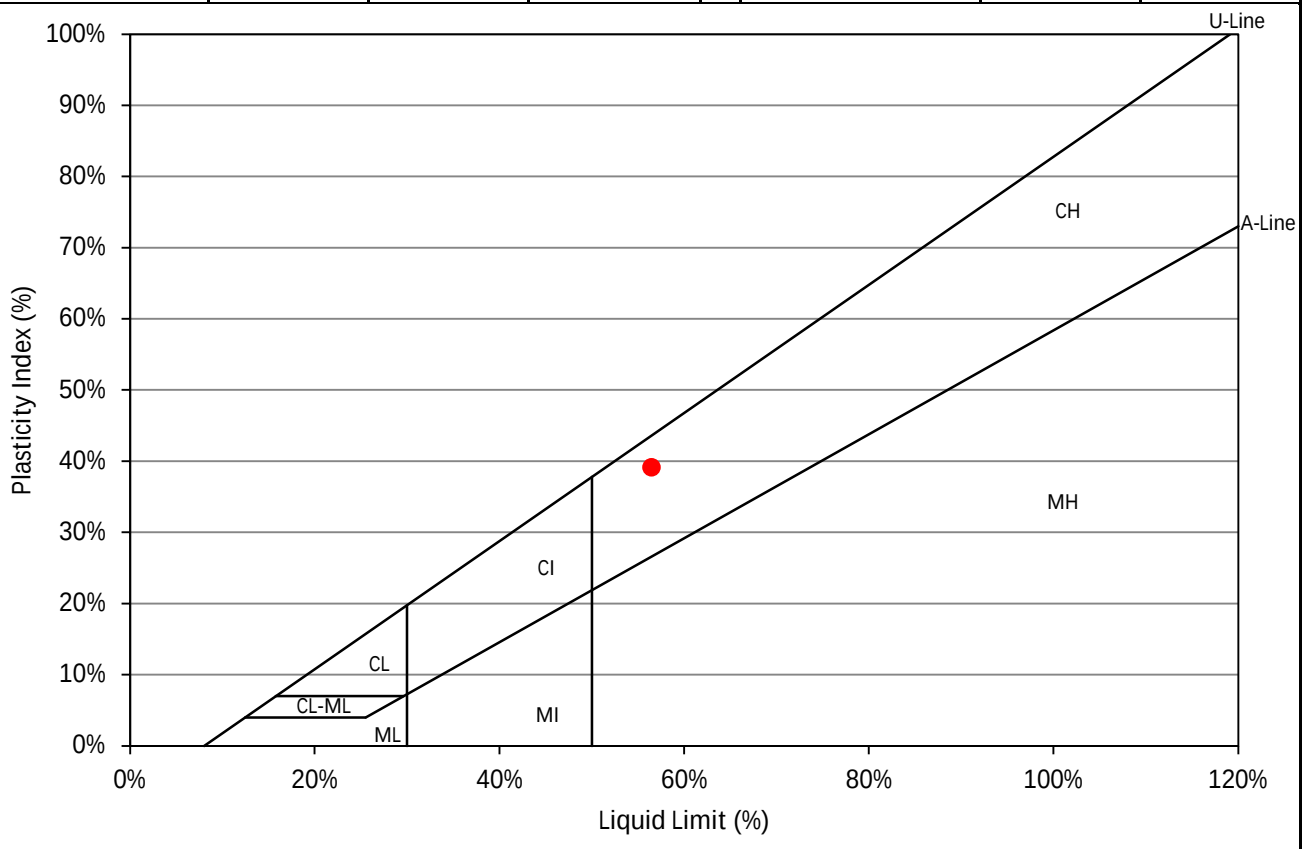
Project Name:	Jefferson CSR Contract 8A & 9	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-18	Sample Date:	Varies
Sample Depth:	12.19 - 12.34 m	Lab Technician:	EManimbao
Sample Number:	G10	Date Tested:	November 8, 2022

Atterberg Limits (ASTM D4318)

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

Liquid Limit			
Blows	34	25	18
Wet Sample (g)	10.5	11.2	11.3
Dry Sample (g)	6.8	7.2	7.1
Water Content (%)	54.8%	56.5%	58.2%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.2	6.3
Dry Sample (g)	5.3	5.4
Water Content (%)	17.1%	17.5%



Liquid Limit (%): 56.5%	Plastic Limit (%): 17.3%	Plasticity Index (%): 39.2%

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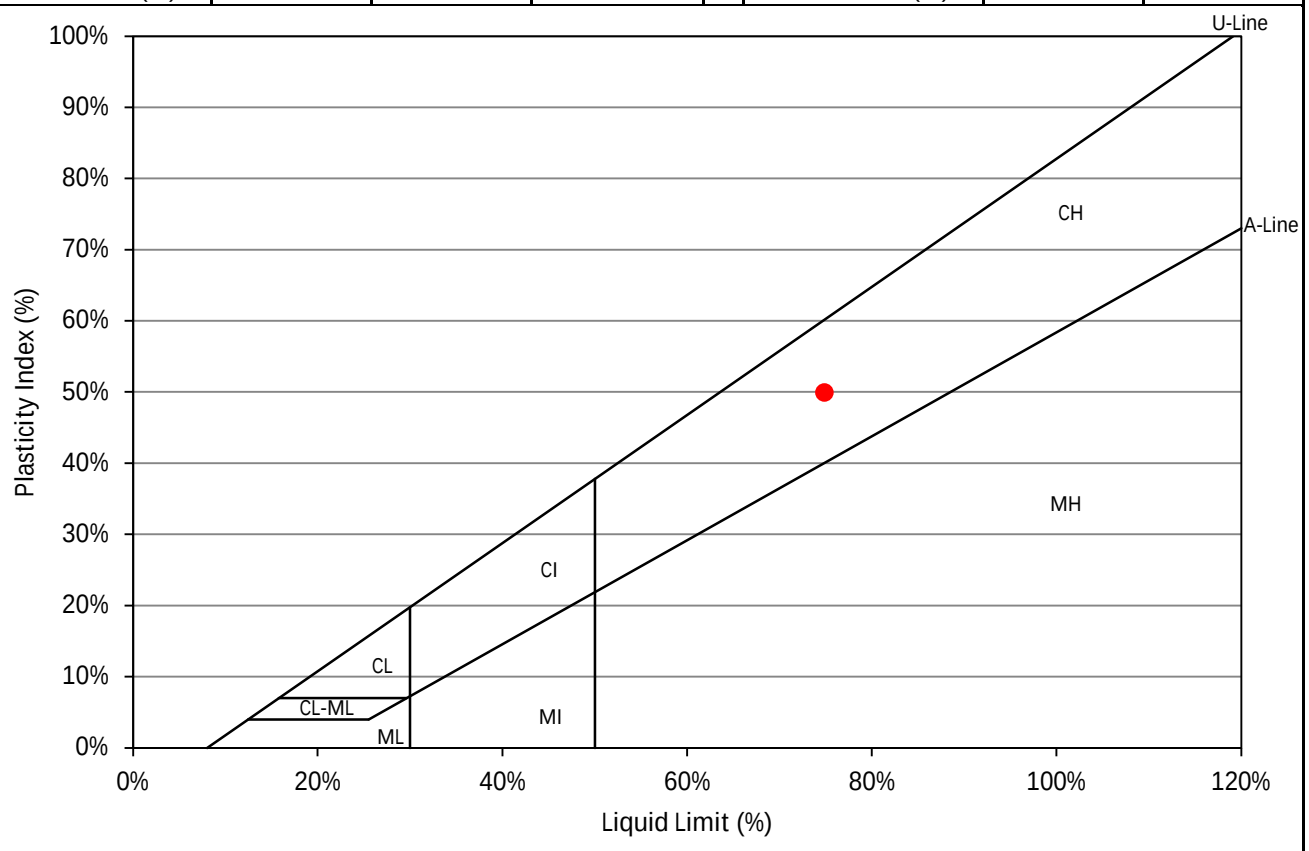
Project Name:	Jefferson CSR Contract 8A & 9	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-19	Sample Date:	Varies
Sample Depth:	1.52 - 1.68 m	Lab Technician:	EManimbao
Sample Number:	G2	Date Tested:	November 8, 2022

Atterberg Limits (ASTM D4318)

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

Liquid Limit			
Blows	28	22	16
Wet Sample (g)	9.8	9.1	6.3
Dry Sample (g)	5.6	5.2	3.6
Water Content (%)	74.2%	75.7%	77.2%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.2	6.1
Dry Sample (g)	4.9	4.9
Water Content (%)	25.0%	24.9%



Liquid Limit (%): 74.9%	Plastic Limit (%): 24.9%	Plasticity Index (%): 49.9%

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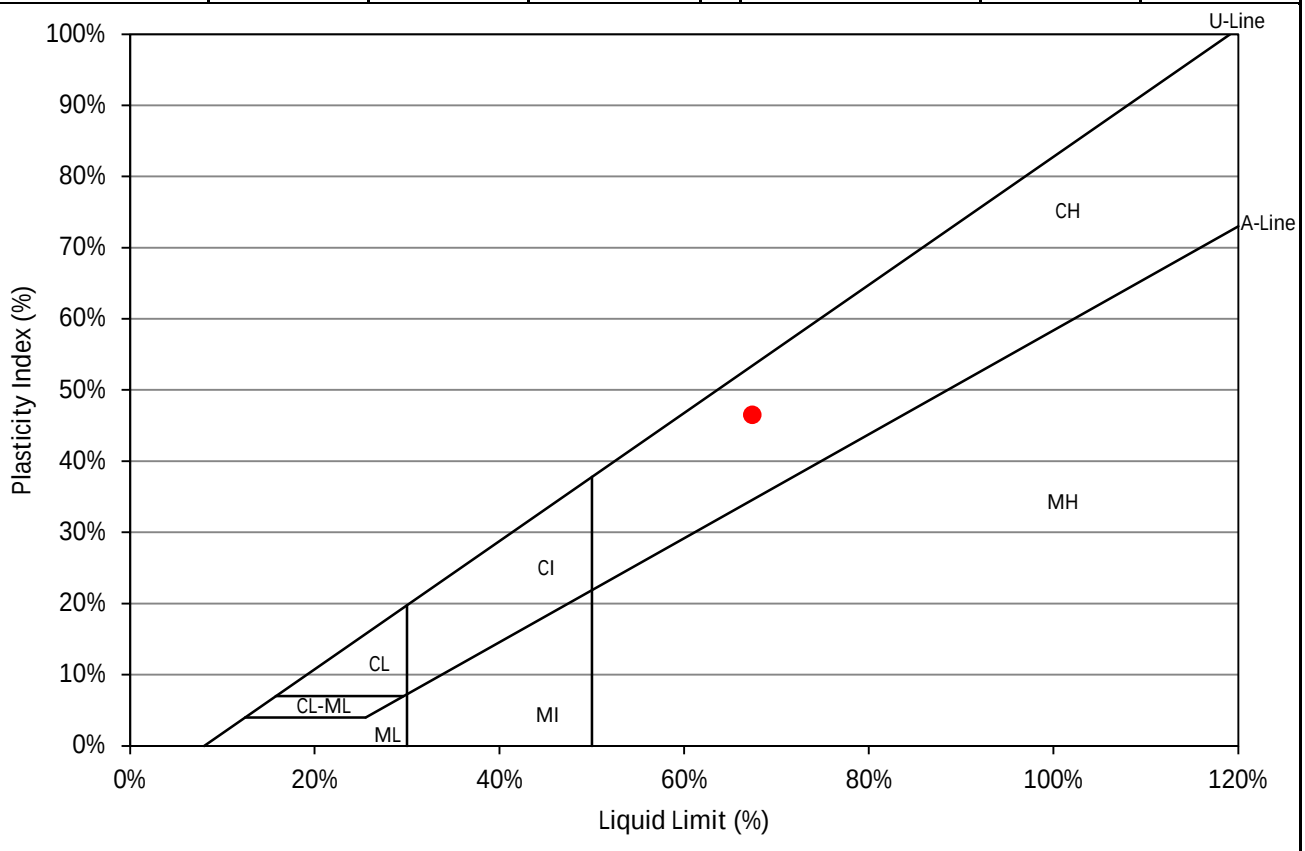
Project Name:	Jefferson CSR Contract 8A & 9	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-19	Sample Date:	Varies
Sample Depth:	7.62 - 7.77 m	Lab Technician:	EManimbao
Sample Number:	G7	Date Tested:	November 8, 2022

Atterberg Limits (ASTM D4318)

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

Liquid Limit			
Blows	28	23	18
Wet Sample (g)	8.1	9.7	9.5
Dry Sample (g)	4.9	5.8	5.6
Water Content (%)	66.3%	68.2%	70.1%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.7	6.3
Dry Sample (g)	5.5	5.2
Water Content (%)	20.6%	21.1%



Liquid Limit (%): 67.4%	Plastic Limit (%): 20.9%	Plasticity Index (%): 46.5%

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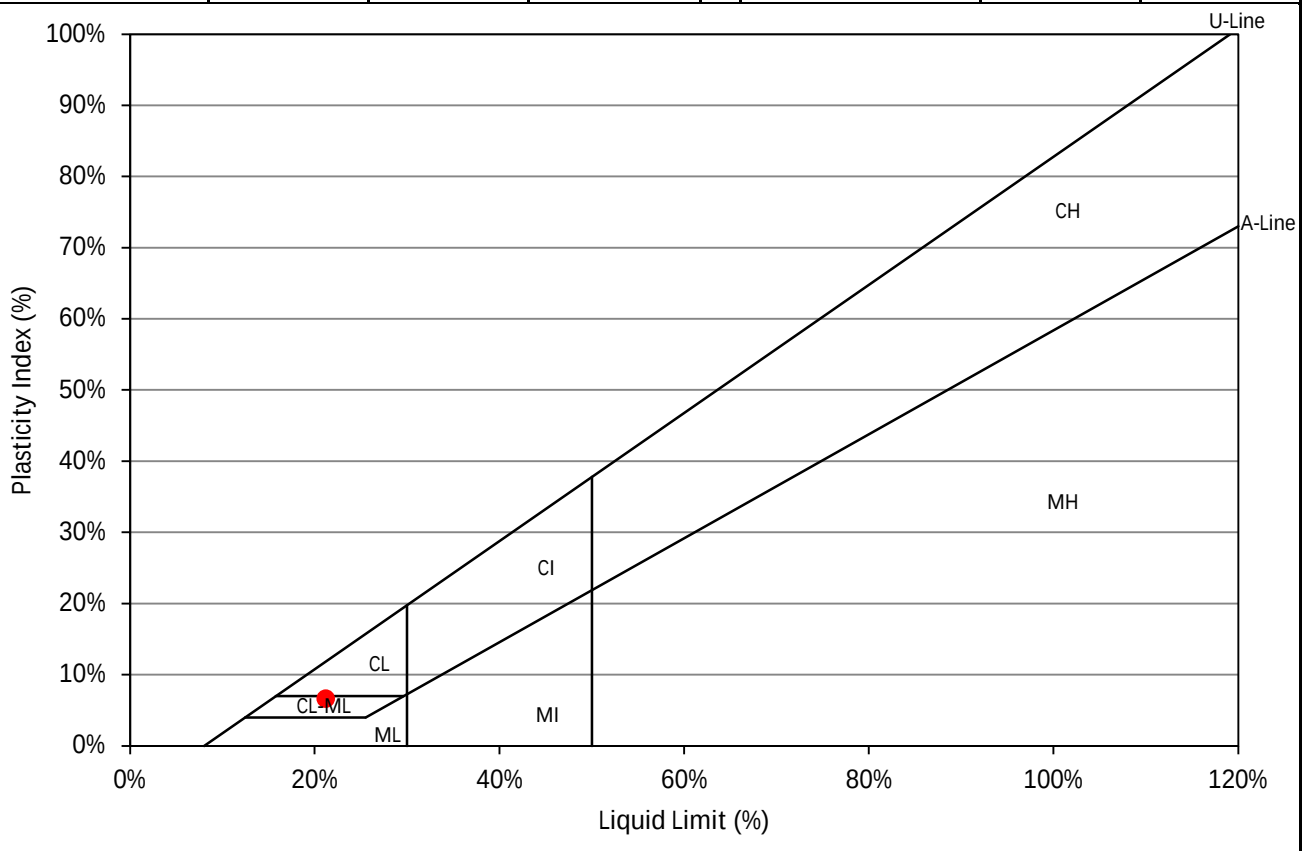
Project Name:	Jefferson CSR Contract 8A & 9	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-20	Sample Date:	Varies
Sample Depth:	1.52 - 1.68 m	Lab Technician:	EManimbao
Sample Number:	G2	Date Tested:	November 8, 2022

Atterberg Limits (ASTM D4318)

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

Liquid Limit			
Blows	26	22	17
Wet Sample (g)	17.5	13.8	10.8
Dry Sample (g)	14.4	11.4	8.8
Water Content (%)	21.1%	21.5%	21.9%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.9	6.4
Dry Sample (g)	6.0	5.6
Water Content (%)	14.7%	14.3%



Liquid Limit (%): 21.2%	Plastic Limit (%): 14.5%	Plasticity Index (%): 6.6%

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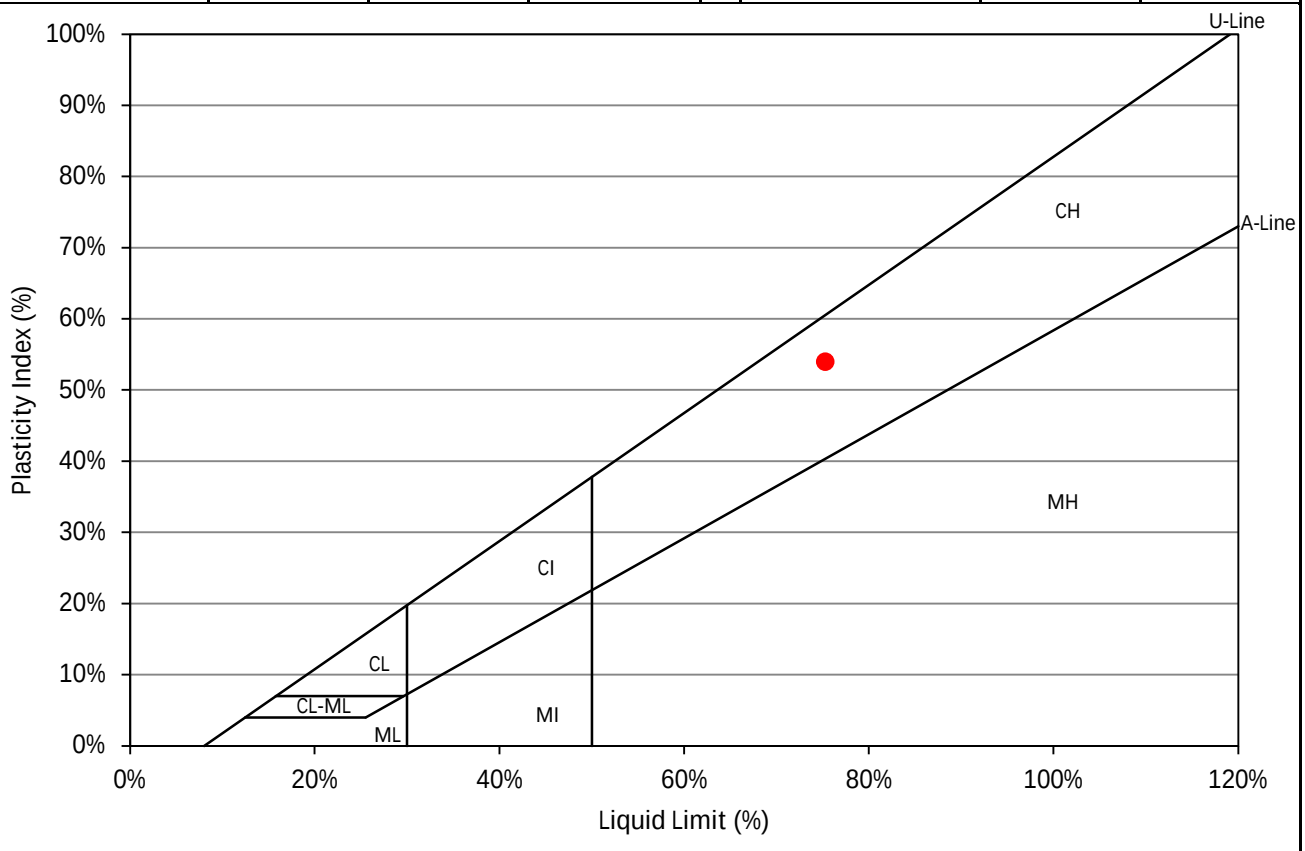
Project Name:	Jefferson CSR Contract 8A & 9	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	RHarras
Sample Location:	TH22-20	Sample Date:	Varies
Sample Depth:	6.10 - 6.71 m	Lab Technician:	EManimbao
Sample Number:	T6	Date Tested:	November 8, 2022

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)	8.1	8.8	8.3
Dry Sample (g)	4.7	5.0	4.7
Water Content (%)	73.3%	74.9%	76.8%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.3	6.3
Dry Sample (g)	5.2	5.2
Water Content (%)	21.7%	20.9%



Liquid Limit (%): 75.3%	Plastic Limit (%): 21.3%	Plasticity Index (%): 54.0%

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

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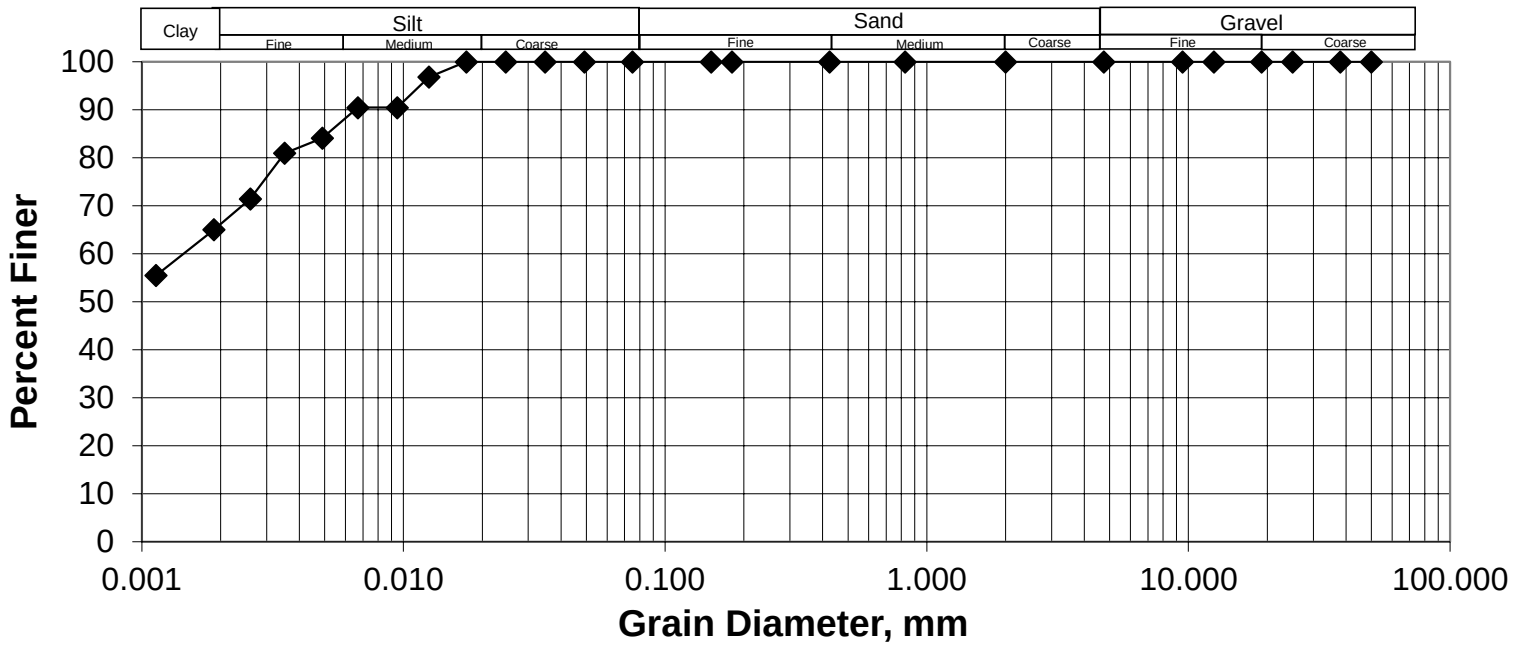
Job No.:	60680190	Hole No.:	TH22-14
Client:	City of Winnipeg	Sample No.:	G6
Project :	Jefferson CSR Contract 8A & 9	Depth:	6.10 - 6.25 m
Date Tested:	28-Oct-22	Date Sampled:	Varies
Tested By:	EManimbao	Sampled By:	AECOM

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	0.0125	96.8
4.75	100.0	0.075	100.0	0.0095	90.5
				0.0067	90.5
				0.0049	84.1
				0.0035	80.9
				0.0026	71.4
				0.0019	65.1
				0.0011	55.5

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**34.0%**
Sand	**0.0%**	**Clay**	**66.0%**

GRAIN SIZE DISTRIBUTION
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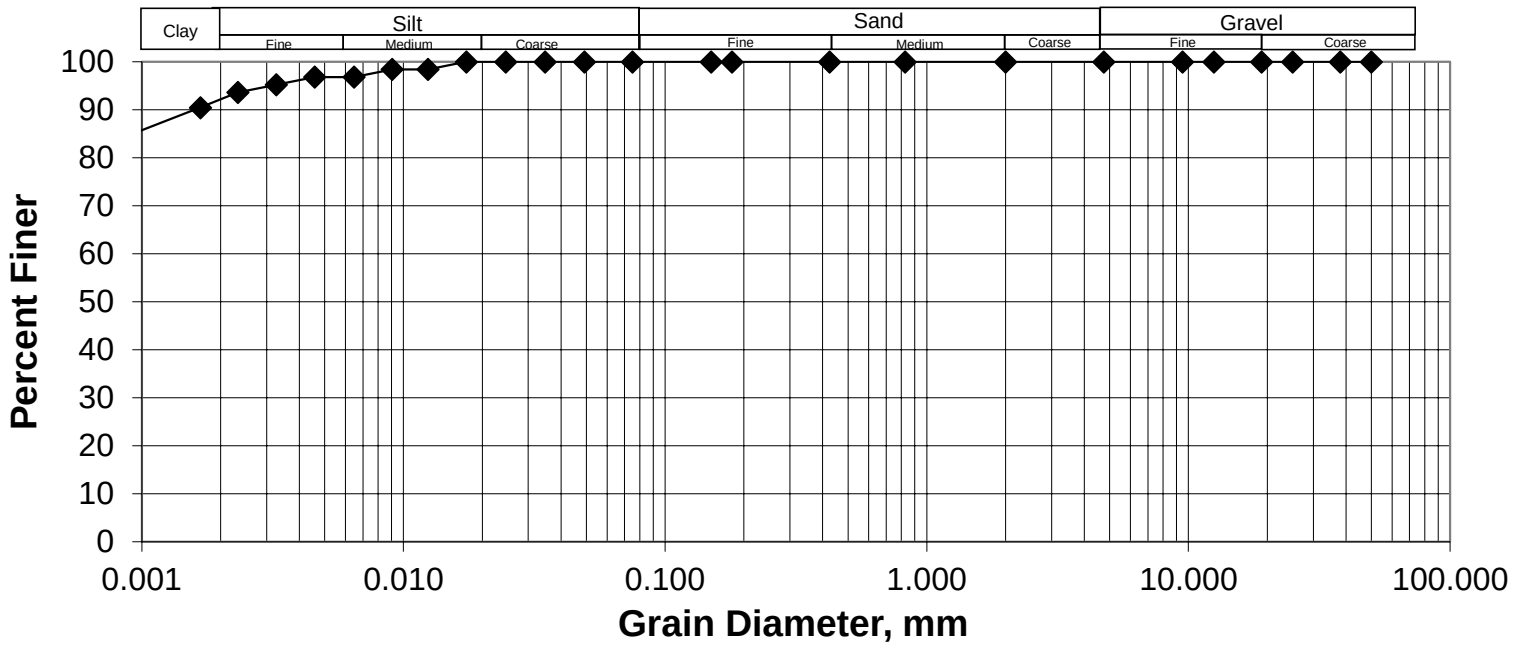
Job No.:	60680190	Hole No.:	TH22-15
Client:	City of Winnipeg	Sample No.:	T4
Project :	Jefferson CSR Contract 8A & 9	Depth:	3.05 - 3.66 m
Date Tested:	28-Oct-22	Date Sampled:	Varies
Tested By:	EManimbao	Sampled By:	AECOM

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
				0.0065	96.8
				0.0046	96.8
				0.0033	95.2
				0.0023	93.6
				0.0017	90.5
				0.0010	85.7

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**7.9%**
Sand	**0.0%**	**Clay**	**92.1%**

GRAIN SIZE DISTRIBUTION
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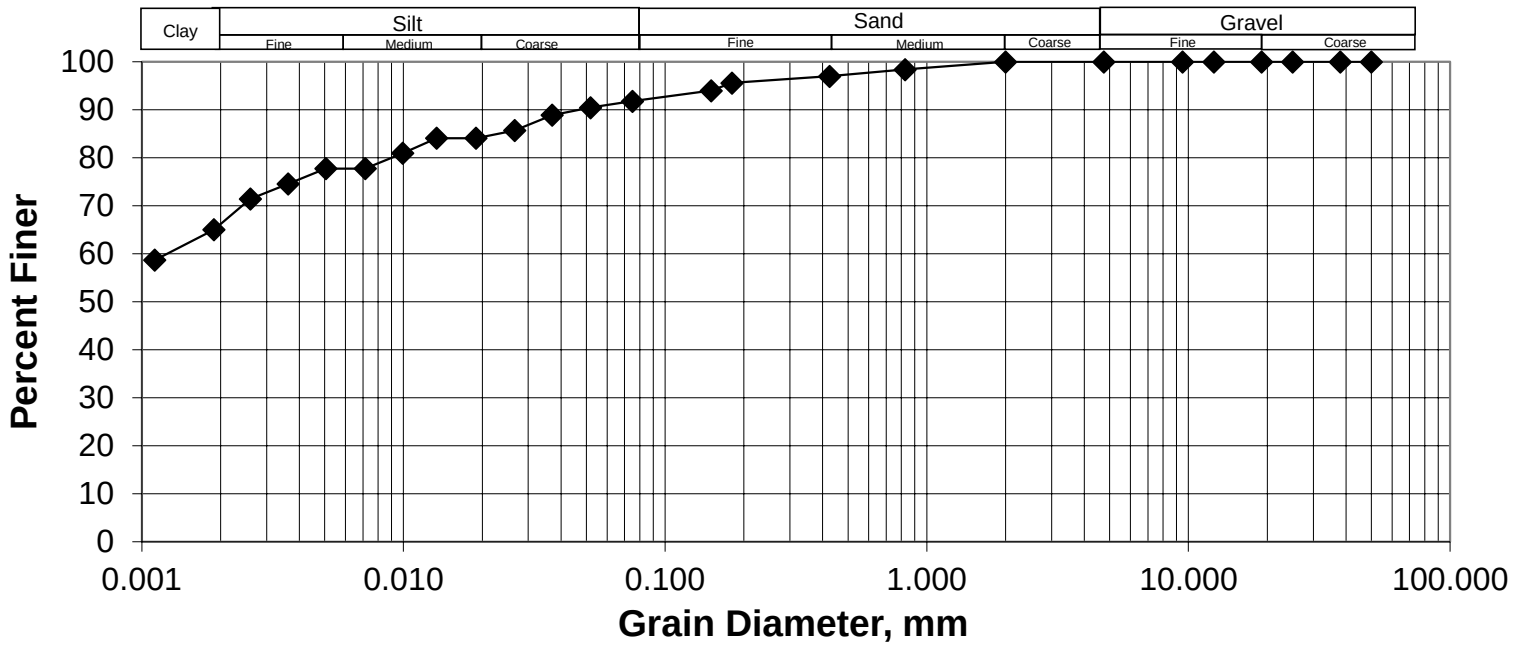
Job No.:	60680190	Hole No.:	TH22-15
Client:	City of Winnipeg	Sample No.:	T8
Project :	Jefferson CSR Contract 8A & 9	Depth:	9.14 - 9.75 m
Date Tested:	28-Oct-22	Date Sampled:	Varies
Tested By:	EManimbao	Sampled By:	AECOM

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	91.8
38.0	100.0	2.00	100.0	0.0518	90.5
25.0	100.0	0.825	98.4	0.0370	88.9
19.0	100.0	0.425	97.0	0.0266	85.7
12.5	100.0	0.18	95.6	0.0189	84.1
9.5	100.0	0.15	94.0	0.0134	84.1
4.75	100.0	0.075	91.8	0.0099	80.9
				0.0071	77.8
				0.0050	77.8
				0.0036	74.6
				0.0026	71.4
				0.0019	65.1
				0.0011	58.7

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**25.8%**
Sand	**8.2%**	**Clay**	**66.0%**

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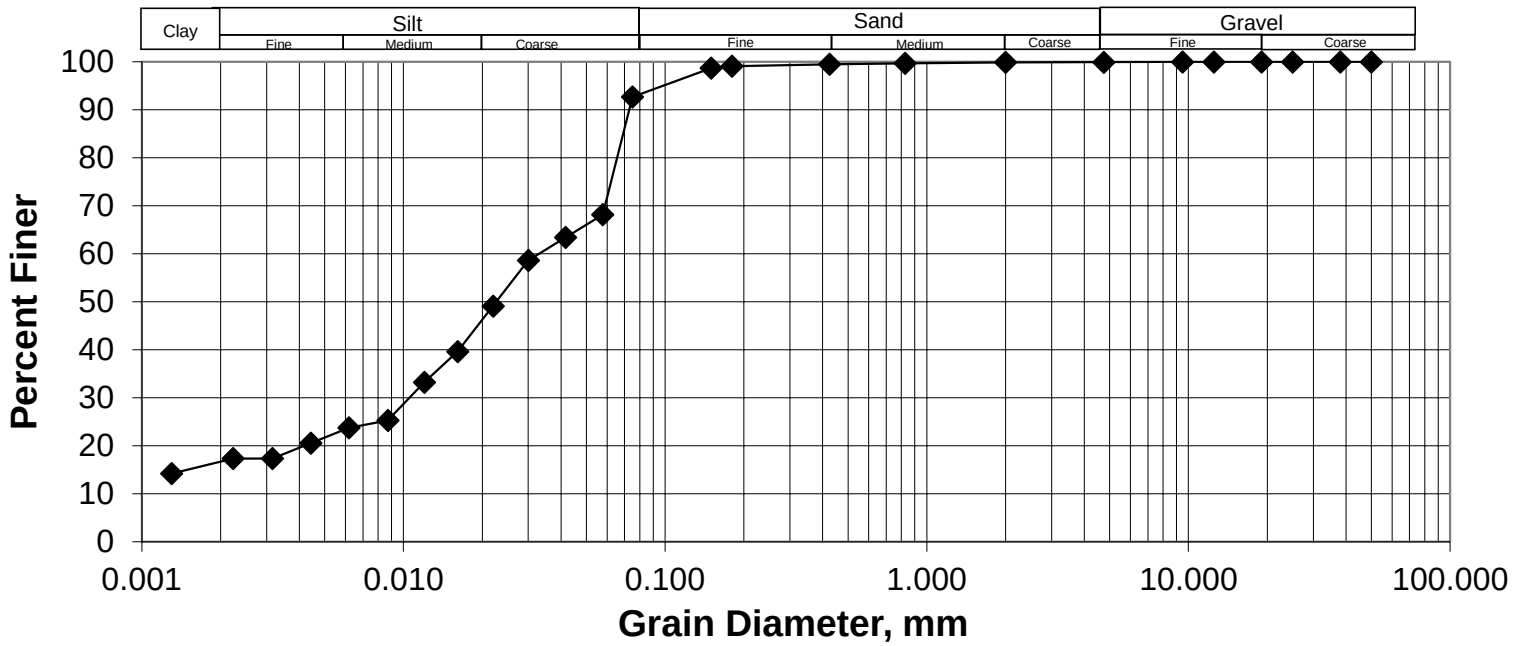
Job No.:	60680190	Hole No.:	TH22-16
Client:	City of Winnipeg	Sample No.:	G2
Project :	Jefferson CSR Contract 8A & 9	Depth:	1.52 - 1.68 m
Date Tested:	28-Oct-22	Date Sampled:	Varies
Tested By:	EManimbao	Sampled By:	AECOM

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	92.7
38.0	100.0	2.00	99.9	0.0577	68.2
25.0	100.0	0.825	99.7	0.0416	63.4
19.0	100.0	0.425	99.5	0.0300	58.6
12.5	100.0	0.18	99.1	0.0220	49.1
9.5	100.0	0.15	98.7	0.0161	39.6
4.75	99.9	0.075	92.7	0.0120	33.3
				0.0087	25.3
				0.0062	23.7
				0.0044	20.6
				0.0032	17.4
				0.0022	17.4
				0.0013	14.2

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.1%**	**Silt**	**76.0%**
Sand	**7.2%**	**Clay**	**16.7%**

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

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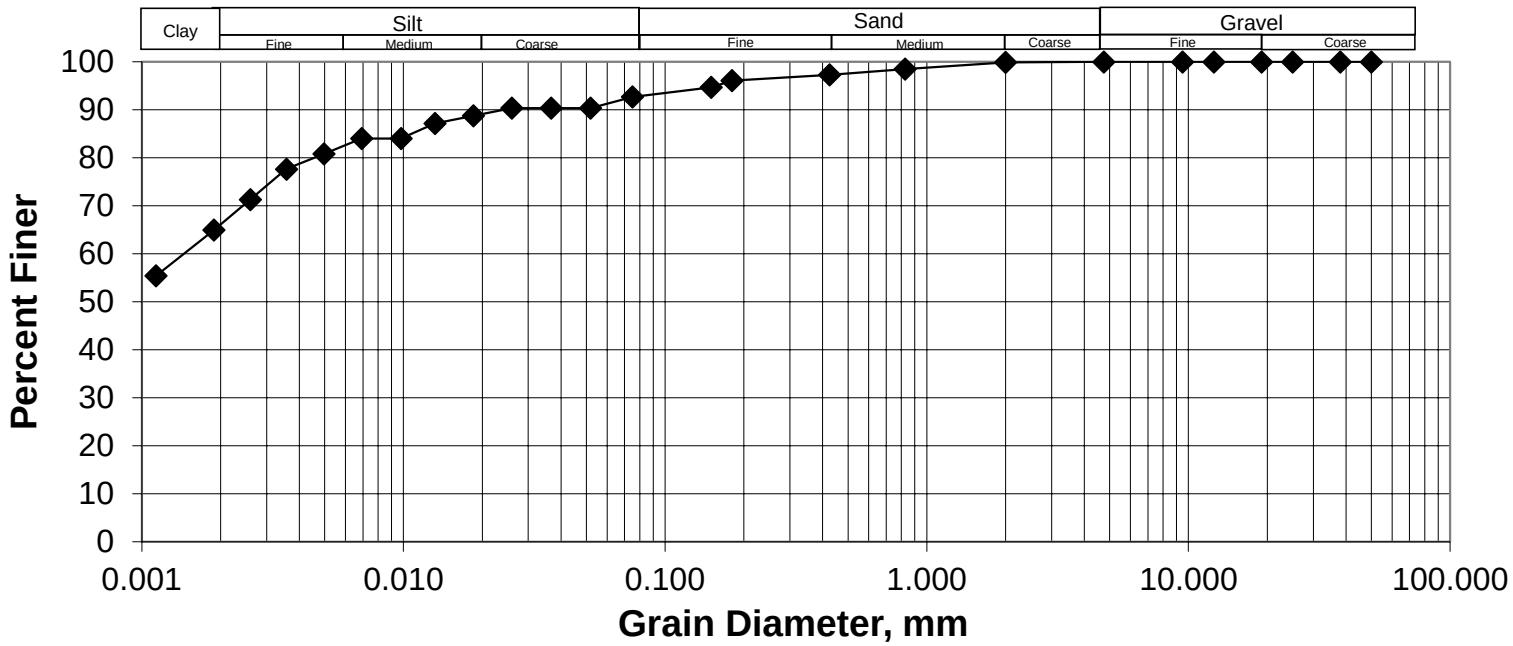
Job No.:	60680190	Hole No.:	TH22-16
Client:	City of Winnipeg	Sample No.:	G7
Project :	Jefferson CSR Contract 8A & 9	Depth:	7.62 - 7.77 m
Date Tested:	28-Oct-22	Date Sampled:	Varies
Tested By:	EManimbao	Sampled By:	AECOM

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	92.7
38.0	100.0	2.00	99.9	0.0518	90.4
25.0	100.0	0.825	98.5	0.0367	90.4
19.0	100.0	0.425	97.3	0.0259	90.4
12.5	100.0	0.18	96.1	0.0185	88.8
9.5	100.0	0.15	94.7	0.0132	87.2
4.75	100.0	0.075	92.7	0.0098	84.0
				0.0069	84.0
				0.0050	80.8
				0.0036	77.7
				0.0026	71.3
				0.0019	65.0
				0.0011	55.5

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**26.8%**
Sand	**7.3%**	**Clay**	**65.9%**

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

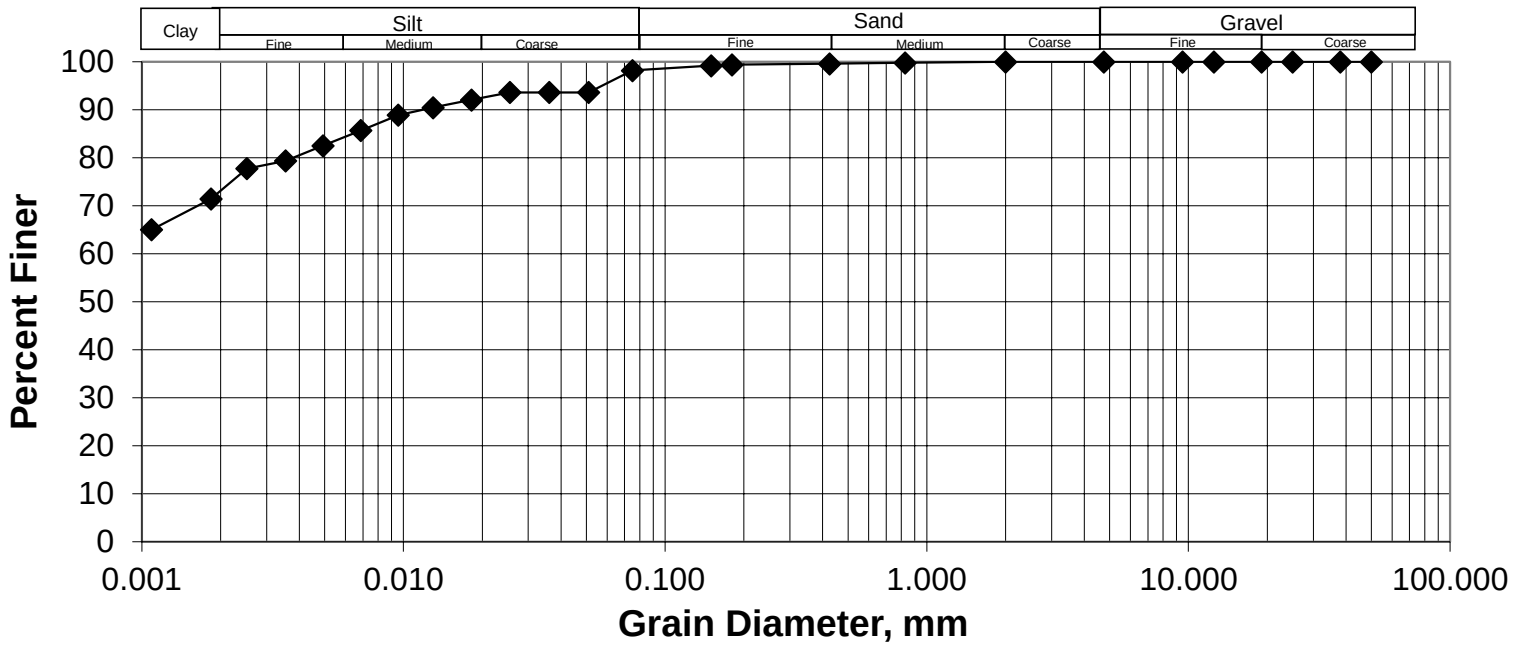
AECOM
WINNIPEG GEOTECHNICAL LABORATORY
99 Commerce Dr., Winnipeg, MB R3P 0Y7 Canada
tel (204) 477-5381 **fax** (431) 800-1210

CERTIFIED BY CCIL

Job No.:	60680190	Hole No.:	TH22-17
Client:	City of Winnipeg	Sample No.:	G2
Project :	Jefferson CSR Contract 8A & 9	Depth:	1.52 - 1.68 m
Date Tested:	28-Oct-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	98.2
38.0	100.0	2.00	100.0	0.0510	93.6
25.0	100.0	0.825	99.8	0.0360	93.6
19.0	100.0	0.425	99.6	0.0255	93.6
12.5	100.0	0.18	99.4	0.0182	92.1
9.5	100.0	0.15	99.2	0.0130	90.5
4.75	100.0	0.075	98.2	0.0095	88.9
				0.0069	85.7
				0.0049	82.5
				0.0035	79.3
				0.0025	77.8
				0.0018	71.4
				0.0011	65.1

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**25.0%**
Sand	**1.8%**	**Clay**	**73.2%**

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

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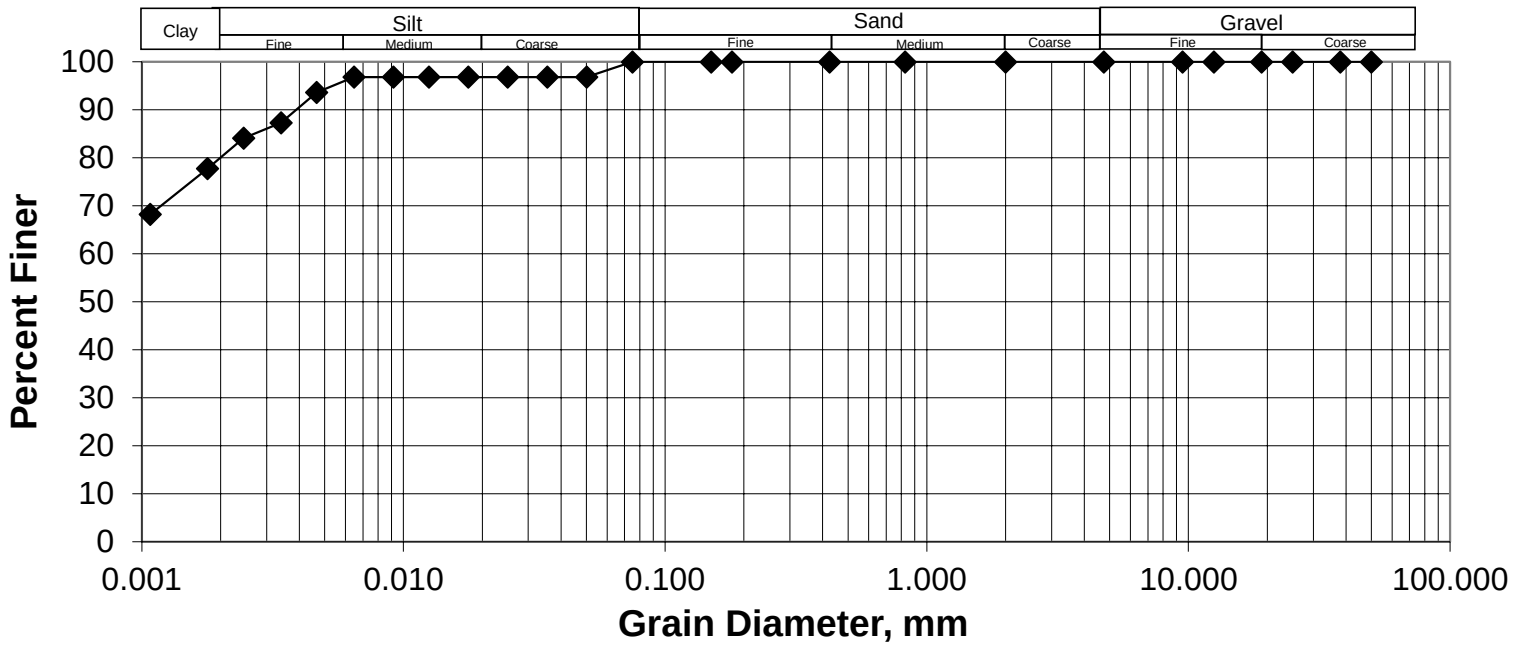
WINNIPEG GEOTECHNICAL LABORATORY
99 Commerce Dr., Winnipeg, MB R3P 0Y7 Canada
tel (204) 477-5381 **fax** (431) 800-1210

CERTIFIED BY CCIL

Job No.:	60680190	Hole No.:	TH22-17
Client:	City of Winnipeg	Sample No.:	T5
Project :	Jefferson CSR Contract 8A & 9	Depth:	4.57 - 5.18 m
Date Tested:	28-Oct-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	0.0500	96.8
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	0.0177	96.8
9.5	100.0	0.15	100.0	0.0125	96.8
4.75	100.0	0.075	100.0	0.0091	96.8
				0.0065	96.8
				0.0047	93.6
				0.0034	87.3
				0.0024	84.1
				0.0018	77.8
				0.0011	68.2

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**20.1%**
Sand	**0.0%**	**Clay**	**79.9%**

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

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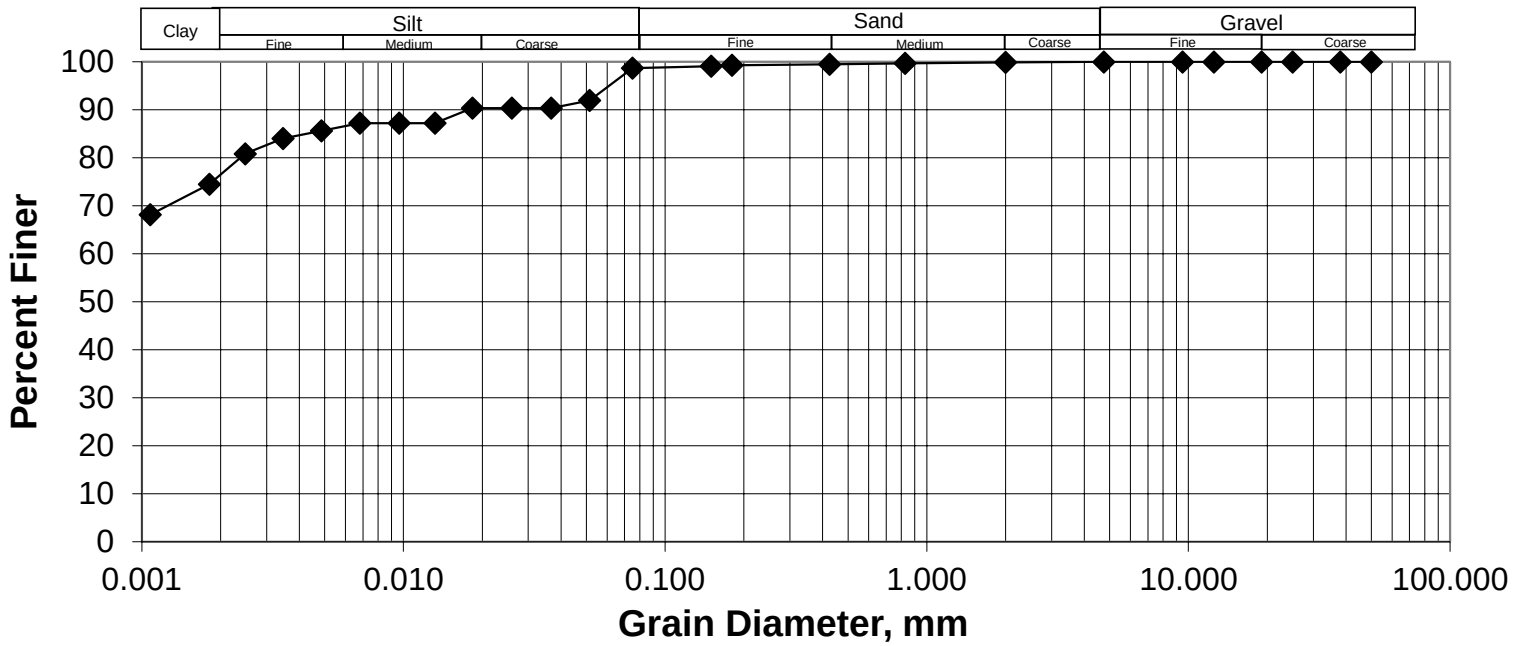
99 Commerce Dr., Winnipeg, MB R3P 0Y7 Canada
tel (204) 477-5381 **fax** (431) 800-1210

CERTIFIED BY CCIL

Job No.:	60680190	Hole No.:	TH22-18
Client:	City of Winnipeg	Sample No.:	G4
Project :	Jefferson CSR Contract 8A & 9	Depth:	3.05 - 3.20 m
Date Tested:	28-Oct-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	0.0514	92.0
25.0	100.0	0.825	99.7	0.0367	90.4
19.0	100.0	0.425	99.5	0.0259	90.4
12.5	100.0	0.18	99.3	0.0183	90.4
9.5	100.0	0.15	99.1	0.0132	87.2
4.75	100.0	0.075	98.7	0.0096	87.2
				0.0068	87.2
				0.0049	85.6
				0.0035	84.0
				0.0025	80.9
				0.0018	74.5
				0.0011	68.2

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**22.4%**
Sand	**1.3%**	**Clay**	**76.3%**

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

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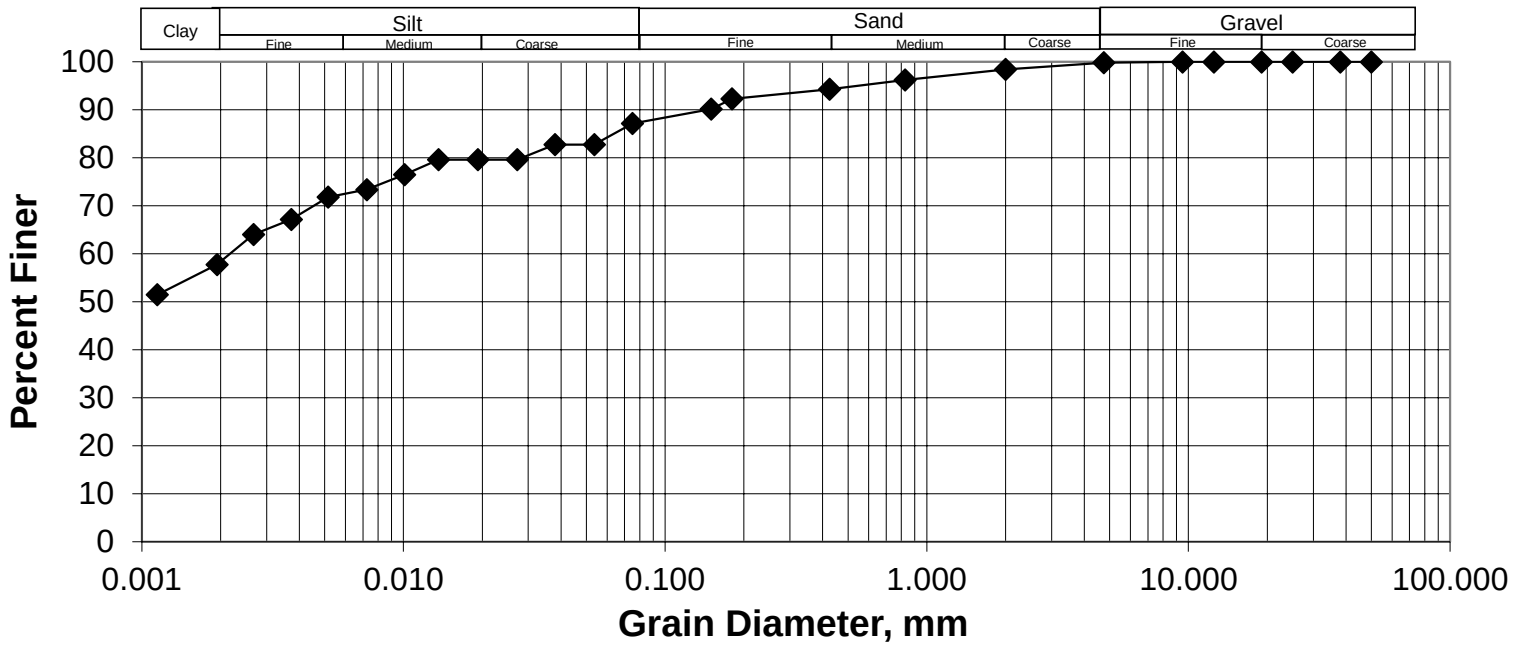
CERTIFIED BY CCIL

Job No.:	60680190	Hole No.:	TH22-18
Client:	City of Winnipeg	Sample No.:	G10
Project :	Jefferson CSR Contract 8A & 9	Depth:	12.19 - 12.34 m
Date Tested:	28-Oct-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	87.2
38.0	100.0	2.00	98.4	0.0536	82.8
25.0	100.0	0.825	96.2	0.0379	82.8
19.0	100.0	0.425	94.3	0.0272	79.6
12.5	100.0	0.18	92.3	0.0192	79.6
9.5	100.0	0.15	90.1	0.0136	79.6
4.75	99.8	0.075	87.2	0.0101	76.5
				0.0072	73.4
				0.0052	71.8
				0.0037	67.1
				0.0027	64.0
				0.0019	57.8
				0.0011	51.5

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.2%**	**Silt**	**28.6%**
Sand	**12.6%**	**Clay**	**58.6%**

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

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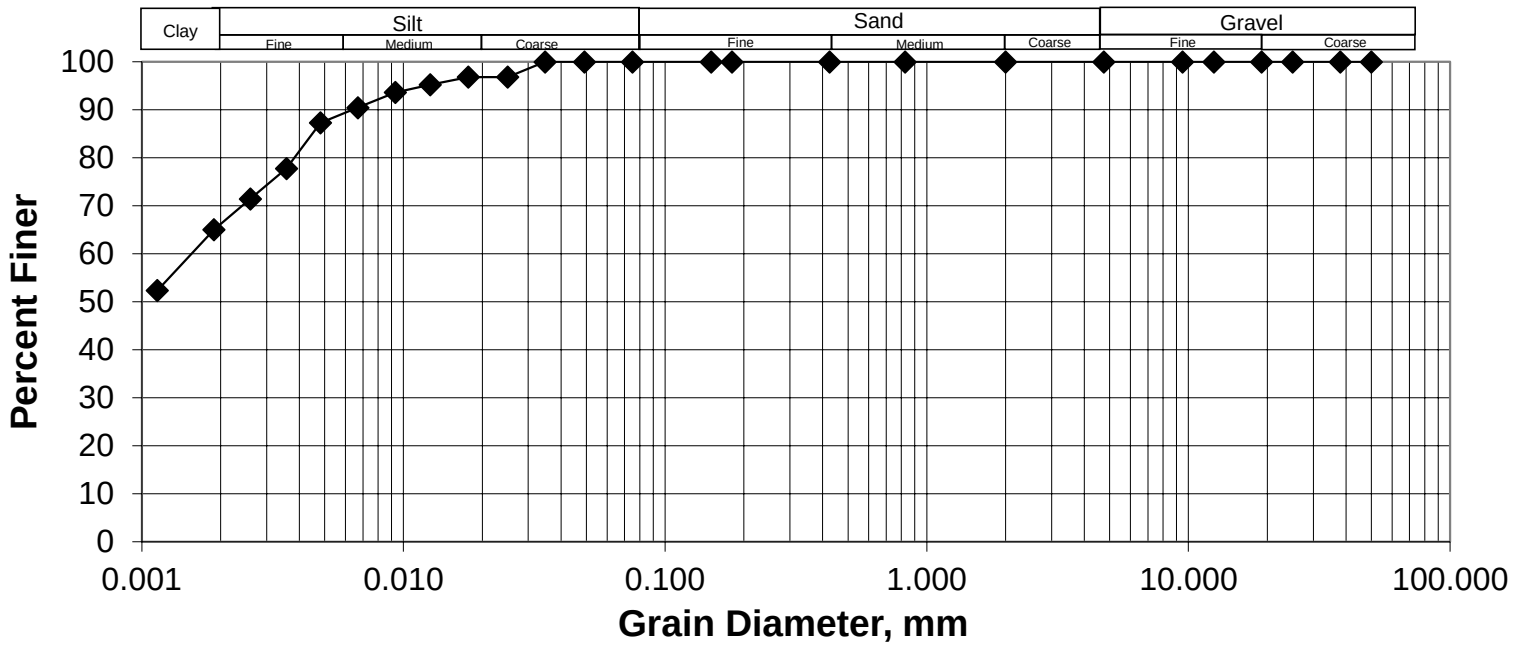
WINNIPEG GEOTECHNICAL LABORATORY
99 Commerce Dr., Winnipeg, MB R3P 0Y7 Canada
tel (204) 477-5381 **fax** (431) 800-1210

CERTIFIED BY CCIL

Job No.:	60680190	Hole No.:	TH22-19
Client:	City of Winnipeg	Sample No.:	G7
Project :	Jefferson CSR Contract 8A & 9	Depth:	7.62 - 7.77 m
Date Tested:	28-Oct-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	0.0177	96.8
9.5	100.0	0.15	100.0	0.0126	95.2
4.75	100.0	0.075	100.0	0.0093	93.6
				0.0067	90.5
				0.0048	87.3
				0.0036	77.8
				0.0026	71.4
				0.0019	65.1
				0.0011	52.3

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**34.0%**
Sand	**0.0%**	**Clay**	**66.0%**

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

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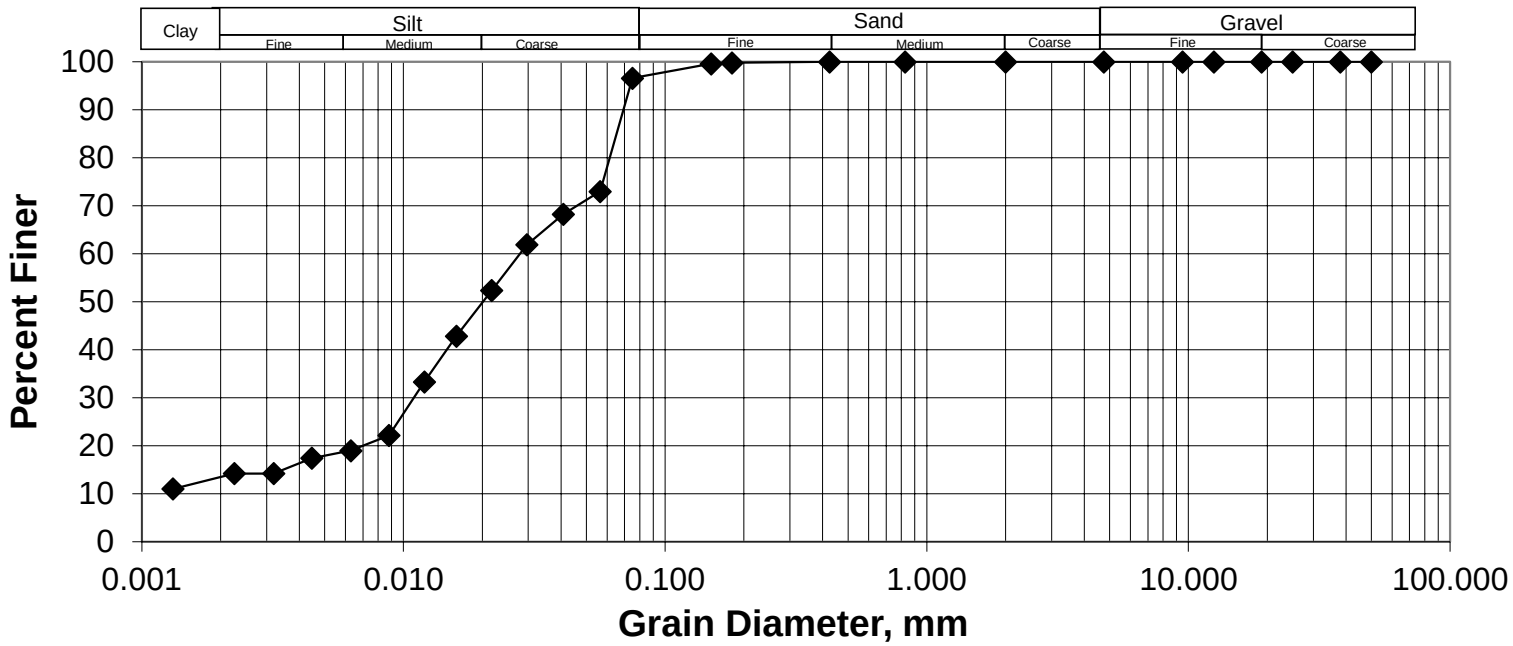
CERTIFIED BY CCIL

Job No.:	60680190	Hole No.:	TH22-20
Client:	City of Winnipeg	Sample No.:	G2
Project :	Jefferson CSR Contract 8A & 9	Depth:	1.52 - 1.68 m
Date Tested:	28-Oct-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	96.6
38.0	100.0	2.00	100.0	0.0565	73.0
25.0	100.0	0.825	100.0	0.0408	68.2
19.0	100.0	0.425	100.0	0.0296	61.9
12.5	100.0	0.18	99.8	0.0217	52.3
9.5	100.0	0.15	99.6	0.0159	42.8
4.75	100.0	0.075	96.6	0.0120	33.3
				0.0088	22.2
				0.0063	19.0
				0.0045	17.4
				0.0032	14.2
				0.0023	14.2
				0.0013	11.1

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**83.3%**
Sand	**3.4%**	**Clay**	**13.3%**

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

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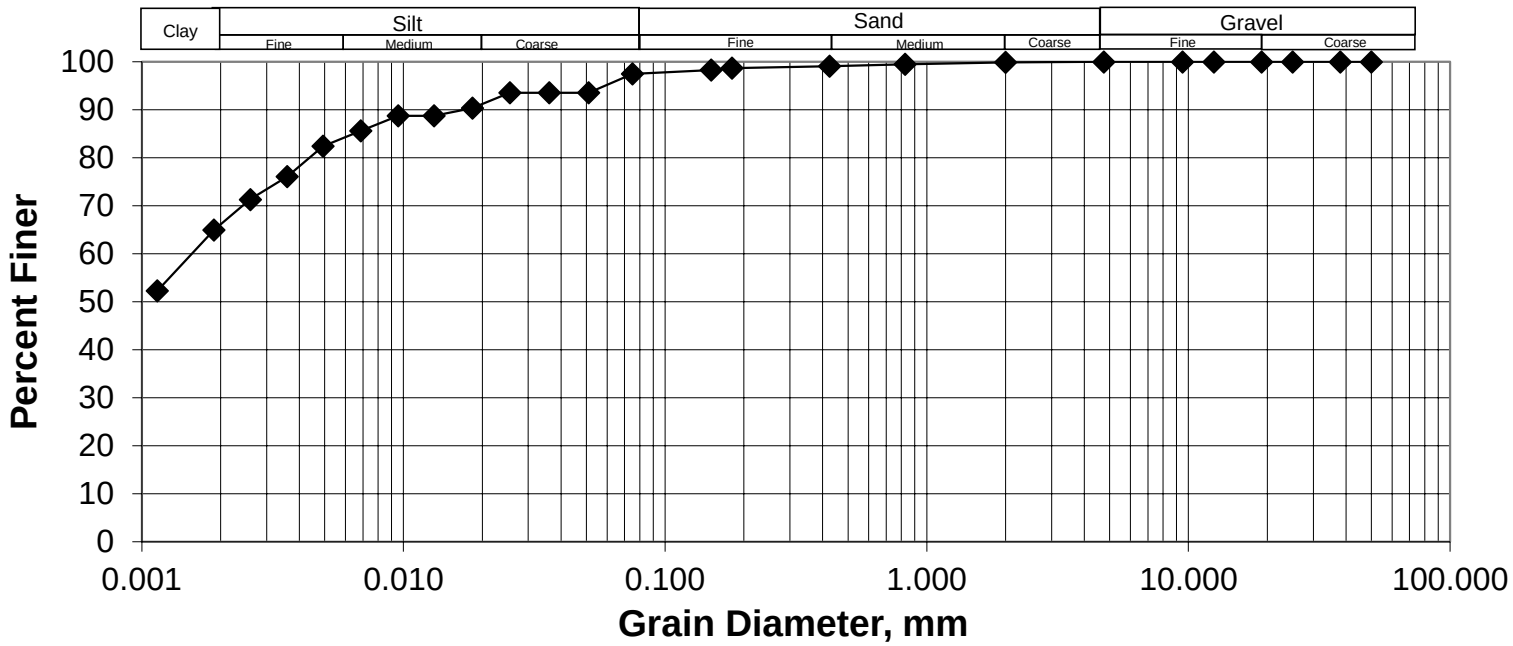
99 Commerce Dr., Winnipeg, MB R3P 0Y7 Canada
tel (204) 477-5381 **fax** (431) 800-1210

CERTIFIED BY CCIL

Job No.:	60680190	Hole No.:	TH22-20
Client:	City of Winnipeg	Sample No.:	T6
Project :	Jefferson CSR Contract 8A & 9	Depth:	6.10 - 6.71 m
Date Tested:	28-Oct-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	97.5
38.0	100.0	2.00	99.9	0.0510	93.5
25.0	100.0	0.825	99.5	0.0360	93.5
19.0	100.0	0.425	99.1	0.0255	93.5
12.5	100.0	0.18	98.7	0.0183	90.4
9.5	100.0	0.15	98.3	0.0131	88.8
4.75	100.0	0.075	97.5	0.0095	88.8
				0.0069	85.6
				0.0049	82.4
				0.0036	76.1
				0.0026	71.3
				0.0019	65.0
				0.0011	52.3

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**31.6%**
Sand	**2.5%**	**Clay**	**65.9%**

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

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 8A & 9
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-14**
SAMPLE NO.:	**T5**
SAMPLE DEPTH:	4.57 - 5.18 m
DATE TESTED:	25-Oct-22
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.70
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**68.7**
Undrained Shear Strength (ksf)	1.43
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)	1.25
Undrained Shear Strength (kPa)	**59.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**80.0**
Unconfined compressive strength (ksf)	**1.7**
Undrained Shear Strength (kPa)	**40.0**
Undrained Shear Strength (ksf)	**0.835**
MOISTURE CONTENT	
Tare Number	E30
Wt. Sample wet + tare (g)	520.1
Wt. Sample dry + tare (g)	343.1
Wt. Tare (g)	9.4
Moisture Content %	**53.0**
BULK DENSITY	
Sample Wt. (g)	1053.3
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.20
Diameter 3 (cm)	7.10
Avg. Diameter (cm)	**7.17**
Length 1 (cm)	15.40
Length 2 (cm)	15.50
Length 3 (cm)	15.40
Avg. Length (cm)	**15.43**
Volume (cm^3)	622.6
Moisture content (%)	53.0
Bulk Density (g/cm^3)	1.692
Bulk Unit Weight (kN/m^3)	**16.6**
Bulk Unit Weight (pcf)	**105.6**
Dry Unit Weight (kN/m^3)	**10.84**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8A & 9
JOB NO.:	60680190

TEST HOLE NO.:	TH22-14
SAMPLE NO.:	T5
SAMPLE DEPTH:	4.57 - 5.18 m
SAMPLE DATE:	
TEST DATE:	25-Oct-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel,moist, firm,	
grey,high plasticity	
MOISTURE CONTENT:	53.0

SAMPLE DIAM.(Do):	71.67	**(mm)**	**INITIAL AREA, Ao:**	4033.9	**(mm^2)**
SAMPLE LENGTH, (Lo):	154.33	**(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)**

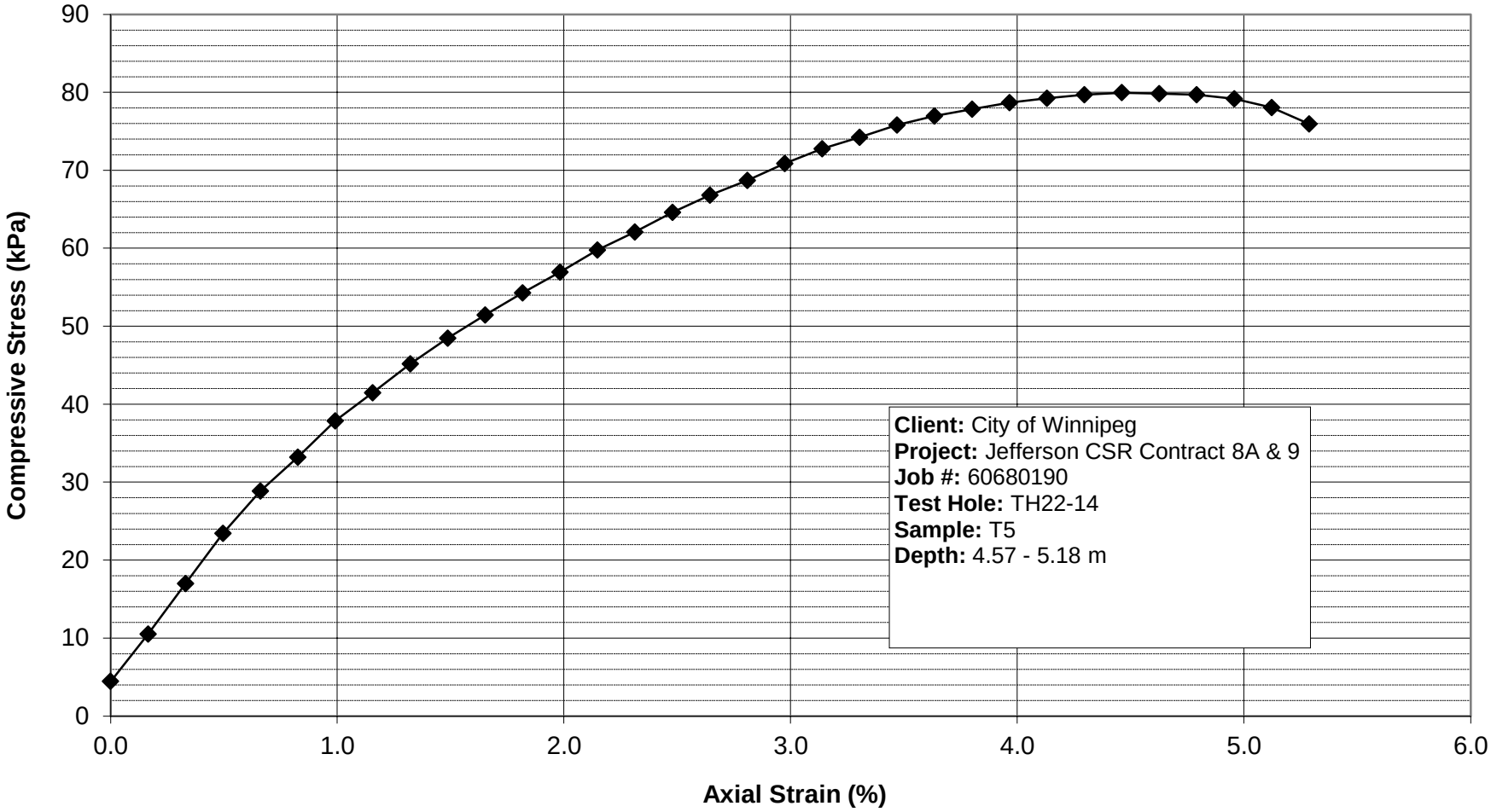
FAILURE SKETCH

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	0.0004	0.00	6.25	4.03	0.64	0.093	4.4
0.02	0.0010	0.17	6.26	9.56	1.53	0.220	10.5
0.03	0.0017	0.33	6.27	15.46	2.46	0.355	17.0
0.04	0.0023	0.50	6.28	21.36	3.40	0.490	23.4
0.05	0.0028	0.66	6.29	26.33	4.18	0.602	28.8
0.06	0.0032	0.83	6.30	30.36	4.82	0.693	33.2
0.07	0.0037	0.99	6.32	34.67	5.49	0.791	37.9
0.08	0.0041	1.16	6.33	38.04	6.01	0.866	41.5
0.09	0.0044	1.32	6.34	41.51	6.55	0.943	45.2
0.10	0.0048	1.49	6.35	44.60	7.03	1.012	48.5
0.11	0.0051	1.65	6.36	47.41	7.46	1.074	51.4
0.12	0.0054	1.82	6.37	50.13	7.87	1.134	54.3
0.13	0.0056	1.98	6.38	52.66	8.26	1.189	56.9
0.14	0.0059	2.15	6.39	55.38	8.67	1.248	59.8
0.15	0.0062	2.31	6.40	57.63	9.00	1.296	62.1
0.16	0.0064	2.48	6.41	60.06	9.37	1.349	64.6
0.17	0.0066	2.64	6.42	62.22	9.69	1.395	66.8
0.18	0.0068	2.81	6.43	64.09	9.96	1.435	68.7
0.19	0.0071	2.97	6.44	66.25	10.28	1.480	70.9
0.20	0.0073	3.14	6.46	68.12	10.55	1.520	72.8
0.21	0.0074	3.30	6.47	69.62	10.77	1.550	74.2
0.22	0.0076	3.47	6.48	71.21	10.99	1.583	75.8
0.23	0.0077	3.63	6.49	72.43	11.16	1.607	77.0
0.24	0.0078	3.80	6.50	73.37	11.29	1.625	77.8
0.25	0.0079	3.97	6.51	74.30	11.41	1.643	78.7
0.26	0.0080	4.13	6.52	74.96	11.49	1.655	79.2
0.27	0.0081	4.30	6.53	75.52	11.56	1.665	79.7
0.28	0.0081	4.46	6.54	75.90	11.60	1.670	80.0
0.29	0.0081	4.63	6.56	75.90	11.58	1.667	79.8
0.30	0.0081	4.79	6.57	75.90	11.56	1.664	79.7
0.31	0.0081	4.96	6.58	75.52	11.48	1.653	79.2
0.32	0.0080	5.12	6.59	74.59	11.32	1.630	78.0
0.33	0.0078	5.29	6.60	72.71	11.01	1.586	75.9

UNCONFINED COMPRESSIVE STRENGTH, q_u:	79.96	kPa
(based on maximum q_u value)	1.670	ksf
UNDRAINED SHEAR STRENGTH, S_u:	39.98	kPa
(based on maximum q_u value)	0.835	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 8A & 9
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-14**
SAMPLE NO.:	**T9**
SAMPLE DEPTH:	10.67 - 11.28 m
DATE TESTED:	25-Oct-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)	0.75
Undrained Shear Strength (kPa)	**35.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**77.5**
Unconfined compressive strength (ksf)	**1.6**
Undrained Shear Strength (kPa)	**38.8**
Undrained Shear Strength (ksf)	**0.810**
MOISTURE CONTENT	
Tare Number	M27
Wt. Sample wet + tare (g)	443.9
Wt. Sample dry + tare (g)	286.5
Wt. Tare (g)	8.9
Moisture Content %	**56.7**
BULK DENSITY	
Sample Wt. (g)	1050.8
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.20
Diameter 3 (cm)	7.10
Avg. Diameter (cm)	**7.17**
Length 1 (cm)	15.50
Length 2 (cm)	15.50
Length 3 (cm)	15.40
Avg. Length (cm)	**15.47**
Volume (cm^3)	623.9
Moisture content (%)	56.7
Bulk Density (g/cm^3)	1.684
Bulk Unit Weight (kN/m^3)	**16.5**
Bulk Unit Weight (pcf)	**105.1**
Dry Unit Weight (kN/m^3)	**10.54**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8A & 9
JOB NO.:	60680190

TEST HOLE NO.:	TH22-14
SAMPLE NO.:	T9
SAMPLE DEPTH:	10.67 - 11.28 m
SAMPLE DATE:	
TEST DATE:	25-Oct-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel,moist, firm,	
grey,high plasticity	
MOISTURE CONTENT:	56.7

FAILURE SKETCH

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)**

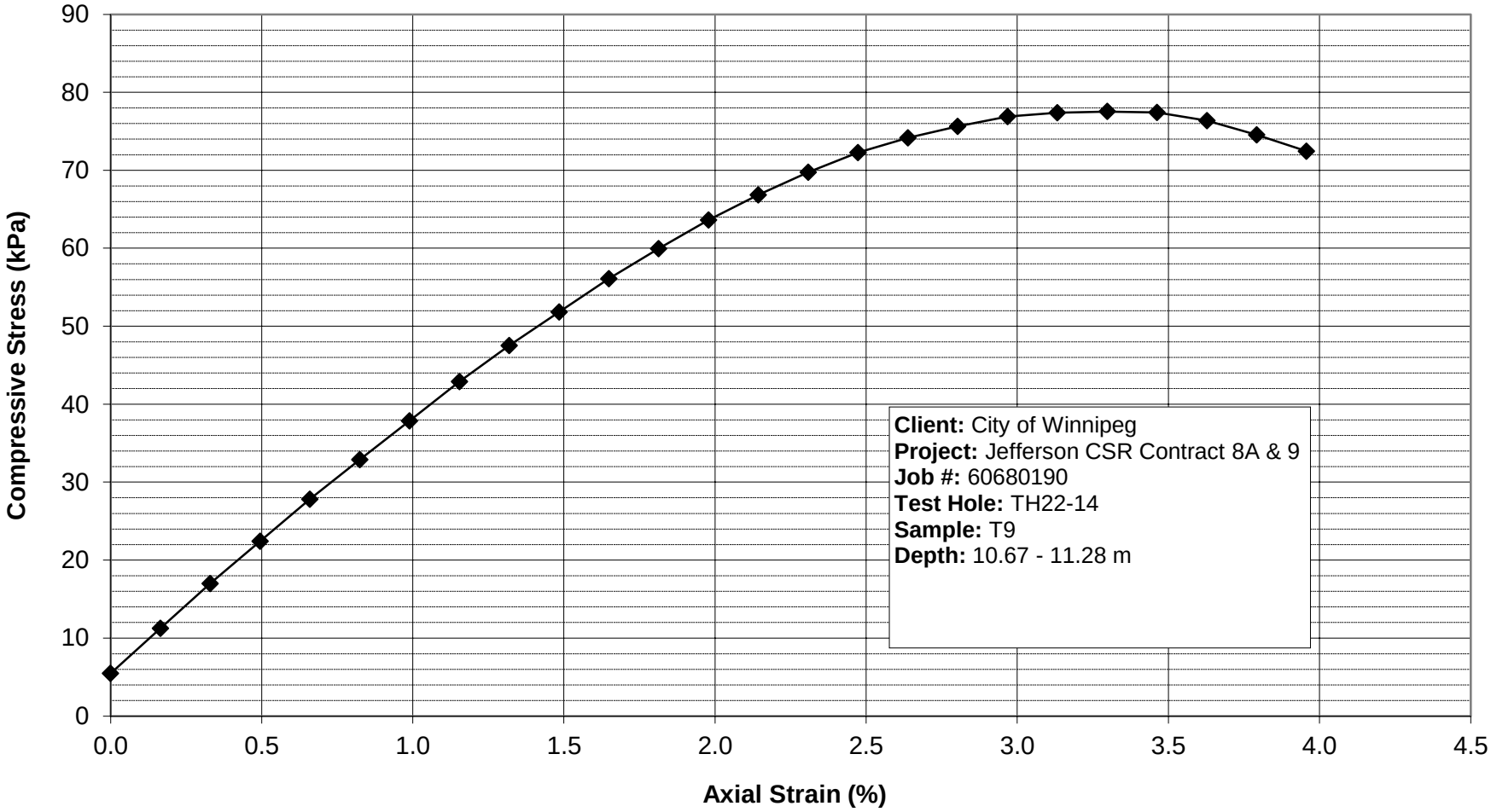
TEST DATA - DIAL READINGS

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	6.25	4.97	0.79	0.114	5.5
0.02	0.0011	0.16	6.26	10.21	1.63	0.235	11.2
0.03	0.0017	0.33	6.27	15.46	2.46	0.355	17.0
0.04	0.0022	0.49	6.28	20.43	3.25	0.468	22.4
0.05	0.0027	0.66	6.29	25.39	4.03	0.581	27.8
0.06	0.0032	0.82	6.30	30.08	4.77	0.687	32.9
0.07	0.0037	0.99	6.32	34.67	5.49	0.791	37.9
0.08	0.0042	1.15	6.33	39.35	6.22	0.896	42.9
0.09	0.0047	1.32	6.34	43.66	6.89	0.992	47.5
0.10	0.0051	1.48	6.35	47.69	7.51	1.082	51.8
0.11	0.0055	1.65	6.36	51.72	8.14	1.172	56.1
0.12	0.0059	1.81	6.37	55.38	8.70	1.252	60.0
0.13	0.0063	1.98	6.38	58.84	9.22	1.328	63.6
0.14	0.0066	2.14	6.39	61.94	9.69	1.396	66.8
0.15	0.0069	2.31	6.40	64.75	10.12	1.457	69.7
0.16	0.0072	2.47	6.41	67.18	10.48	1.509	72.3
0.17	0.0074	2.64	6.42	69.06	10.75	1.548	74.1
0.18	0.0075	2.80	6.43	70.56	10.97	1.579	75.6
0.19	0.0077	2.97	6.44	71.87	11.15	1.606	76.9
0.20	0.0077	3.13	6.45	72.43	11.22	1.616	77.4
0.21	0.0078	3.30	6.47	72.71	11.25	1.619	77.5
0.22	0.0078	3.46	6.48	72.71	11.23	1.617	77.4
0.23	0.0077	3.63	6.49	71.87	11.08	1.595	76.4
0.24	0.0075	3.79	6.50	70.28	10.81	1.557	74.6
0.25	0.0073	3.96	6.51	68.40	10.51	1.513	72.4

UNCONFINED COMPRESSIVE STRENGTH, q_u:	77.54	kPa
(based on maximum q_u value)	1.619	ksf
UNDRAINED SHEAR STRENGTH, S_u:	38.77	kPa
(based on maximum q_u value)	0.810	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 8A & 9
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-15**
SAMPLE NO.:	**T4**
SAMPLE DEPTH:	3.05 - 3.66 m
DATE TESTED:	25-Oct-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)	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)	**42.1**
Unconfined compressive strength (ksf)	**0.9**
Undrained Shear Strength (kPa)	**21.0**
Undrained Shear Strength (ksf)	**0.439**
MOISTURE CONTENT	
Tare Number	J10
Wt. Sample wet + tare (g)	587.5
Wt. Sample dry + tare (g)	381.9
Wt. Tare (g)	8.5
Moisture Content %	**55.1**
BULK DENSITY	
Sample Wt. (g)	1048.3
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.10
Diameter 3 (cm)	7.20
Avg. Diameter (cm)	**7.17**
Length 1 (cm)	15.40
Length 2 (cm)	15.50
Length 3 (cm)	15.50
Avg. Length (cm)	**15.47**
Volume (cm^3)	623.9
Moisture content (%)	55.1
Bulk Density (g/cm^3)	1.680
Bulk Unit Weight (kN/m^3)	**16.5**
Bulk Unit Weight (pcf)	**104.9**
Dry Unit Weight (kN/m^3)	**10.63**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8A & 9
JOB NO.:	60680190

TEST HOLE NO.:	TH22-15
SAMPLE NO.:	T4
SAMPLE DEPTH:	3.05 - 3.66 m
SAMPLE DATE:	
TEST DATE:	25-Oct-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel,moist, firm,	
grey,high plasticity	
MOISTURE CONTENT:	55.1

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)**

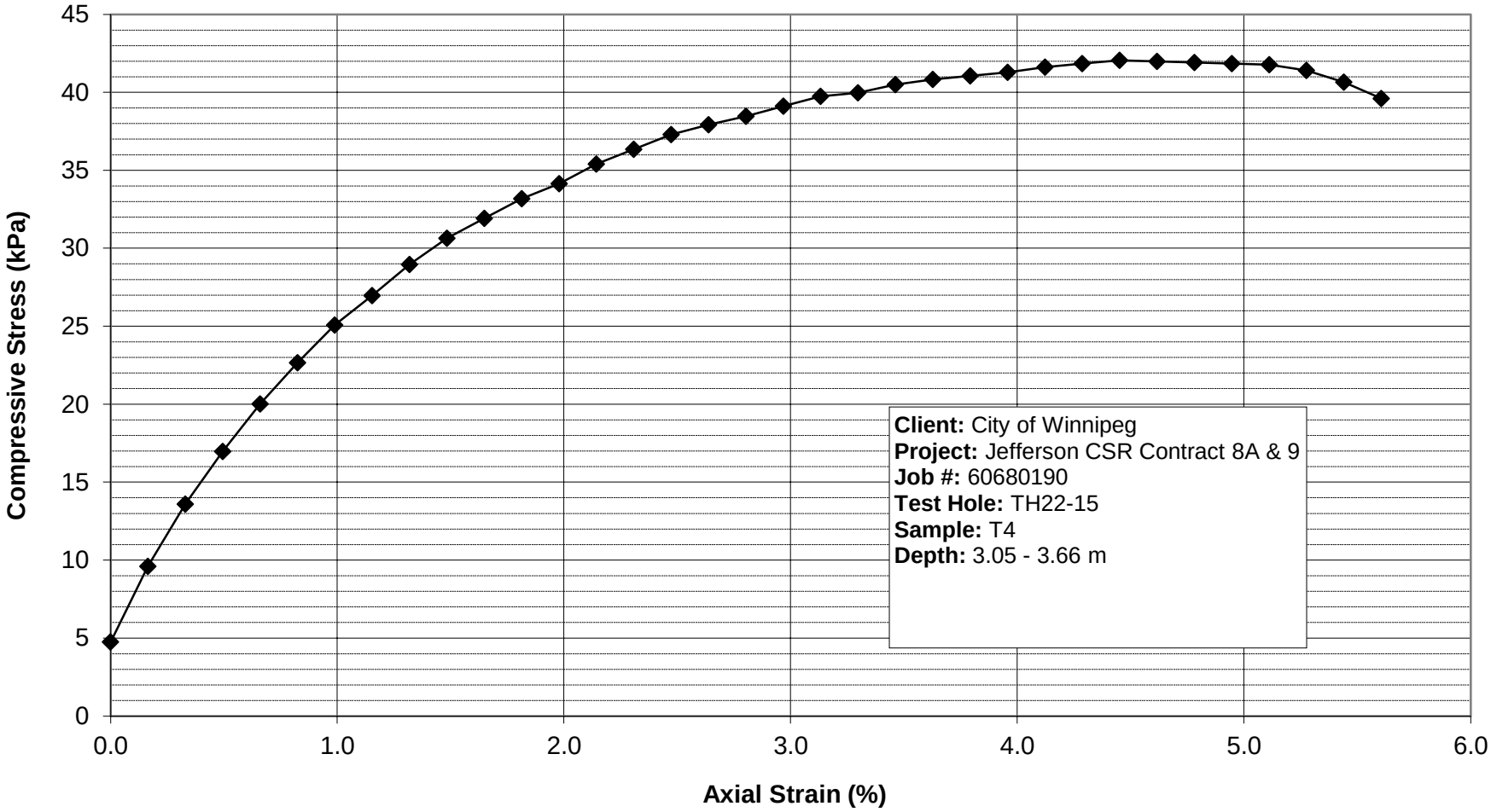
FAILURE SKETCH

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	0.0005	0.00	6.25	4.31	0.69	0.099	4.8
0.02	0.0009	0.16	6.26	8.71	1.39	0.200	9.6
0.03	0.0013	0.33	6.27	12.37	1.97	0.284	13.6
0.04	0.0017	0.49	6.28	15.46	2.46	0.354	17.0
0.05	0.0020	0.66	6.29	18.27	2.90	0.418	20.0
0.06	0.0022	0.82	6.30	20.71	3.28	0.473	22.6
0.07	0.0025	0.99	6.32	22.96	3.64	0.523	25.1
0.08	0.0026	1.15	6.33	24.74	3.91	0.563	27.0
0.09	0.0028	1.32	6.34	26.61	4.20	0.605	29.0
0.10	0.0030	1.48	6.35	28.20	4.44	0.640	30.6
0.11	0.0031	1.65	6.36	29.42	4.63	0.666	31.9
0.12	0.0033	1.81	6.37	30.64	4.81	0.693	33.2
0.13	0.0034	1.98	6.38	31.58	4.95	0.713	34.1
0.14	0.0035	2.14	6.39	32.80	5.13	0.739	35.4
0.15	0.0036	2.31	6.40	33.73	5.27	0.759	36.3
0.16	0.0037	2.47	6.41	34.67	5.41	0.779	37.3
0.17	0.0038	2.64	6.42	35.32	5.50	0.792	37.9
0.18	0.0038	2.80	6.43	35.89	5.58	0.803	38.5
0.19	0.0039	2.97	6.44	36.54	5.67	0.817	39.1
0.20	0.0040	3.13	6.45	37.20	5.76	0.830	39.7
0.21	0.0040	3.30	6.47	37.48	5.80	0.835	40.0
0.22	0.0041	3.46	6.48	38.04	5.87	0.846	40.5
0.23	0.0041	3.63	6.49	38.42	5.92	0.853	40.8
0.24	0.0041	3.79	6.50	38.70	5.95	0.857	41.1
0.25	0.0042	3.96	6.51	38.98	5.99	0.862	41.3
0.26	0.0042	4.12	6.52	39.35	6.03	0.869	41.6
0.27	0.0042	4.29	6.53	39.64	6.07	0.874	41.8
0.28	0.0043	4.45	6.54	39.92	6.10	0.878	42.1
0.29	0.0043	4.62	6.56	39.92	6.09	0.877	42.0
0.30	0.0043	4.78	6.57	39.92	6.08	0.875	41.9
0.31	0.0043	4.95	6.58	39.92	6.07	0.874	41.8
0.32	0.0043	5.11	6.59	39.92	6.06	0.872	41.8
0.33	0.0042	5.28	6.60	39.64	6.00	0.865	41.4
0.34	0.0042	5.44	6.61	38.98	5.89	0.849	40.6
0.35	0.0041	5.61	6.62	38.04	5.74	0.827	39.6

UNCONFINED COMPRESSIVE STRENGTH, q_u:	42.06	kPa
(based on maximum q_u value)	0.878	ksf
UNDRAINED SHEAR STRENGTH, S_u:	21.03	kPa
(based on maximum q_u value)	0.439	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 8A & 9
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-15**
SAMPLE NO.:	**T8**
SAMPLE DEPTH:	9.14 - 9.75 m
DATE TESTED:	25-Oct-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)	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)	**43.9**
Unconfined compressive strength (ksf)	**0.9**
Undrained Shear Strength (kPa)	**22.0**
Undrained Shear Strength (ksf)	**0.459**
MOISTURE CONTENT	
Tare Number	M12
Wt. Sample wet + tare (g)	573.1
Wt. Sample dry + tare (g)	388.8
Wt. Tare (g)	8.6
Moisture Content %	**48.5**
BULK DENSITY	
Sample Wt. (g)	1051.7
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)	15.50
Avg. Length (cm)	**15.47**
Volume (cm^3)	629.7
Moisture content (%)	48.5
Bulk Density (g/cm^3)	1.670
Bulk Unit Weight (kN/m^3)	**16.4**
Bulk Unit Weight (pcf)	**104.3**
Dry Unit Weight (kN/m^3)	**11.03**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8A & 9
JOB NO.:	60680190

TEST HOLE NO.:	TH22-15
SAMPLE NO.:	T8
SAMPLE DEPTH:	9.14 - 9.75 m
SAMPLE DATE:	
TEST DATE:	25-Oct-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel,moist, firm,	
grey,high plasticity	
MOISTURE CONTENT:	48.5

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

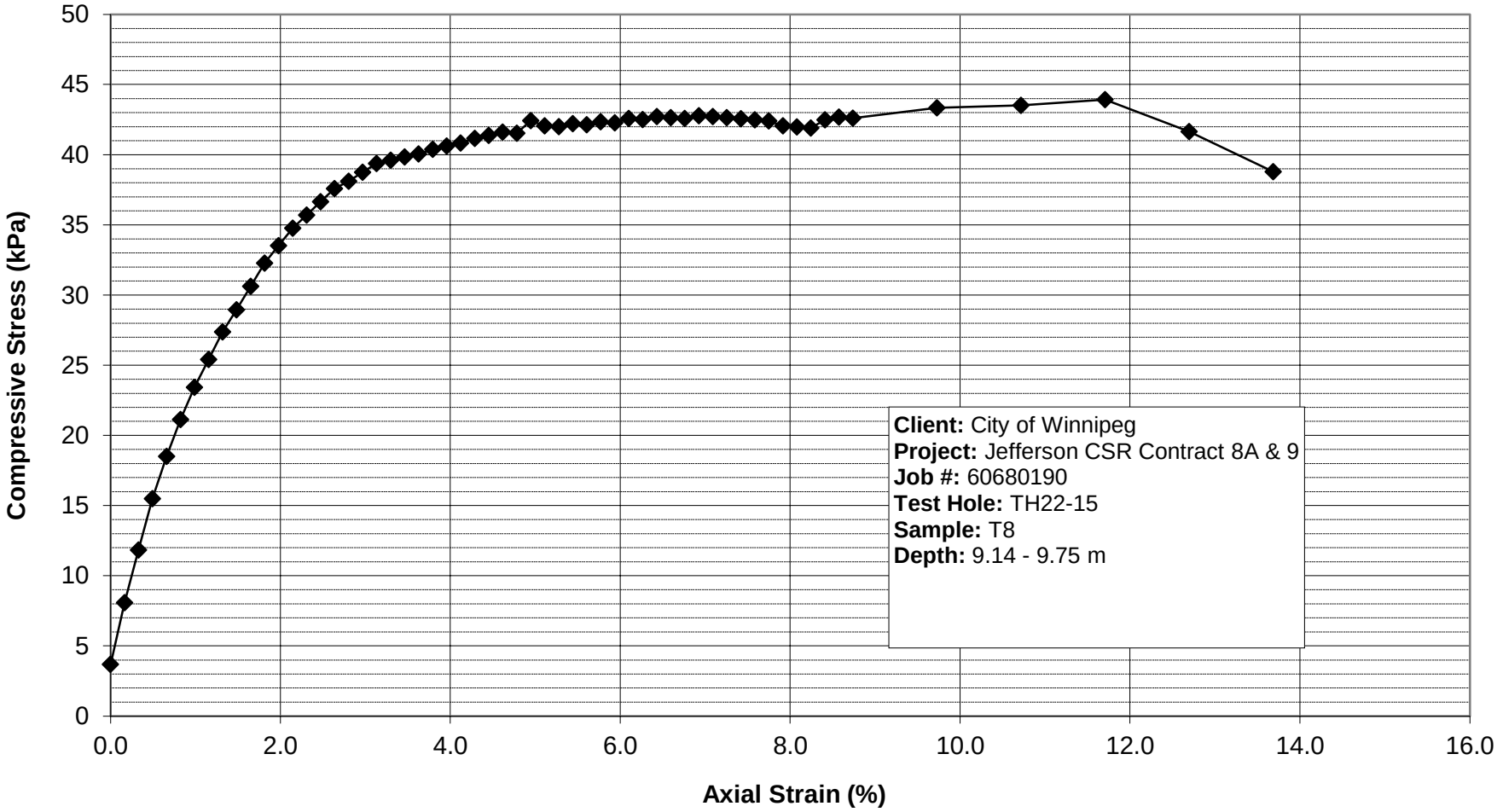
TEST DATA - DIAL READINGS							
AXIAL COMPRESSION	**PROVING RING**	**TOTAL AXIAL STRAIN, ε_1**	**AVERAGE CROSS-SECTIONAL AREA, A**	**APPLIED AXIAL LOAD, P**	**COMPRESSIVE STRESS, σ_c**		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0004	0.00	6.31	3.37	0.53	0.077	3.7
0.02	0.0008	0.16	6.32	7.40	1.17	0.169	8.1
0.03	0.0012	0.33	6.33	10.87	1.72	0.247	11.8
0.04	0.0015	0.49	6.34	14.24	2.25	0.323	15.5
0.05	0.0018	0.66	6.35	17.05	2.68	0.387	18.5
0.06	0.0021	0.82	6.36	19.49	3.06	0.441	21.1
0.07	0.0023	0.99	6.37	21.64	3.40	0.489	23.4
0.08	0.0025	1.15	6.38	23.52	3.68	0.530	25.4
0.09	0.0027	1.32	6.40	25.39	3.97	0.572	27.4
0.10	0.0029	1.48	6.41	26.89	4.20	0.605	28.9
0.11	0.0030	1.65	6.42	28.48	4.44	0.639	30.6
0.12	0.0032	1.81	6.43	30.08	4.68	0.674	32.3
0.13	0.0033	1.98	6.44	31.30	4.86	0.700	33.5
0.14	0.0035	2.14	6.45	32.51	5.04	0.726	34.8
0.15	0.0036	2.31	6.46	33.45	5.18	0.746	35.7
0.16	0.0037	2.47	6.47	34.39	5.31	0.765	36.6
0.17	0.0038	2.64	6.48	35.32	5.45	0.785	37.6
0.18	0.0038	2.80	6.49	35.89	5.53	0.796	38.1
0.19	0.0039	2.97	6.50	36.54	5.62	0.809	38.7
0.20	0.0040	3.13	6.51	37.20	5.71	0.822	39.4
0.21	0.0040	3.30	6.53	37.48	5.74	0.827	39.6
0.22	0.0040	3.46	6.54	37.76	5.78	0.832	39.8
0.23	0.0041	3.63	6.55	38.04	5.81	0.837	40.1
0.24	0.0041	3.79	6.56	38.42	5.86	0.843	40.4
0.25	0.0041	3.96	6.57	38.70	5.89	0.848	40.6
0.26	0.0042	4.12	6.58	38.98	5.92	0.853	40.8
0.27	0.0042	4.29	6.59	39.35	5.97	0.859	41.2
0.28	0.0042	4.45	6.60	39.64	6.00	0.864	41.4
0.29	0.0043	4.62	6.62	39.92	6.03	0.869	41.6
0.30	0.0043	4.78	6.63	39.92	6.02	0.867	41.5
0.31	0.0044	4.95	6.64	40.85	6.15	0.886	42.4
0.32	0.0043	5.11	6.65	40.57	6.10	0.878	42.1
0.33	0.0043	5.28	6.66	40.57	6.09	0.877	42.0
0.34	0.0044	5.44	6.67	40.85	6.12	0.881	42.2
0.35	0.0044	5.61	6.69	40.85	6.11	0.880	42.1
0.36	0.0044	5.77	6.70	41.13	6.14	0.884	42.3
0.37	0.0044	5.94	6.71	41.13	6.13	0.883	42.3
0.38	0.0044	6.10	6.72	41.51	6.18	0.889	42.6
0.39	0.0044	6.27	6.73	41.51	6.17	0.888	42.5
0.40	0.0045	6.43	6.74	41.79	6.20	0.892	42.7
0.41	0.0045	6.59	6.76	41.79	6.19	0.891	42.6
0.42	0.0045	6.76	6.77	41.79	6.17	0.889	42.6
0.43	0.0045	6.92	6.78	42.07	6.20	0.894	42.8
0.44	0.0045	7.09	6.79	42.07	6.19	0.892	42.7
0.45	0.0045	7.25	6.80	42.07	6.18	0.890	42.6
0.46	0.0045	7.42	6.82	42.07	6.17	0.889	42.6
0.47	0.0045	7.58	6.83	42.07	6.16	0.887	42.5
0.48	0.0045	7.75	6.84	42.07	6.15	0.886	42.4
0.49	0.0045	7.91	6.85	41.79	6.10	0.878	42.0
0.50	0.0045	8.08	6.87	41.79	6.09	0.877	42.0
0.51	0.0045	8.24	6.88	41.79	6.08	0.875	41.9
0.52	0.0045	8.41	6.89	42.45	6.16	0.887	42.5
0.53	0.0046	8.57	6.90	42.73	6.19	0.891	42.7
0.54	0.0046	8.74	6.92	42.73	6.18	0.890	42.6
0.60	0.0047	9.73	6.99	43.95	6.29	0.905	43.3
0.66	0.0048	10.72	7.07	44.60	6.31	0.909	43.5
0.72	0.0049	11.71	7.15	45.54	6.37	0.917	43.9
0.78	0.0047	12.70	7.23	43.66	6.04	0.870	41.6
0.84	0.0044	13.68	7.31	41.13	5.63	0.810	38.8

UNCONFINED COMPRESSIVE STRENGTH, q_u:	43.93	kPa
(based on maximum q_u value)	0.917	ksf
UNDRAINED SHEAR STRENGTH, S_u:	21.96	kPa
(based on maximum q_u value)	0.459	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 8A & 9
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-16**
SAMPLE NO.:	**T6**
SAMPLE DEPTH:	6.10 - 6.71 m
DATE TESTED:	25-Oct-22
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.70
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**68.7**
Undrained Shear Strength (ksf)	1.43
POCKET PENETROMETER	
Reading - Qu (tsf)	1.00
Undrained Shear Strength (kPa)	**47.9**
Reading - Qu (tsf)	1.50
Undrained Shear Strength (kPa)	**71.8**
Reading - Qu (tsf)	1.00
Undrained Shear Strength (kPa)	**47.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**94.4**
Unconfined compressive strength (ksf)	**2.0**
Undrained Shear Strength (kPa)	**47.2**
Undrained Shear Strength (ksf)	**0.986**
MOISTURE CONTENT	
Tare Number	X6
Wt. Sample wet + tare (g)	515.0
Wt. Sample dry + tare (g)	347.1
Wt. Tare (g)	8.5
Moisture Content %	**49.6**
BULK DENSITY	
Sample Wt. (g)	1098.5
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 (%)	49.6
Bulk Density (g/cm^3)	1.744
Bulk Unit Weight (kN/m^3)	**17.1**
Bulk Unit Weight (pcf)	**108.9**
Dry Unit Weight (kN/m^3)	**11.44**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8A & 9
JOB NO.:	60680190

TEST HOLE NO.:	TH22-16
SAMPLE NO.:	T6
SAMPLE DEPTH:	6.10 - 6.71 m
SAMPLE DATE:	
TEST DATE:	25-Oct-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel,moist, firm,	
grey,high plasticity	
MOISTURE CONTENT:	49.6

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)**

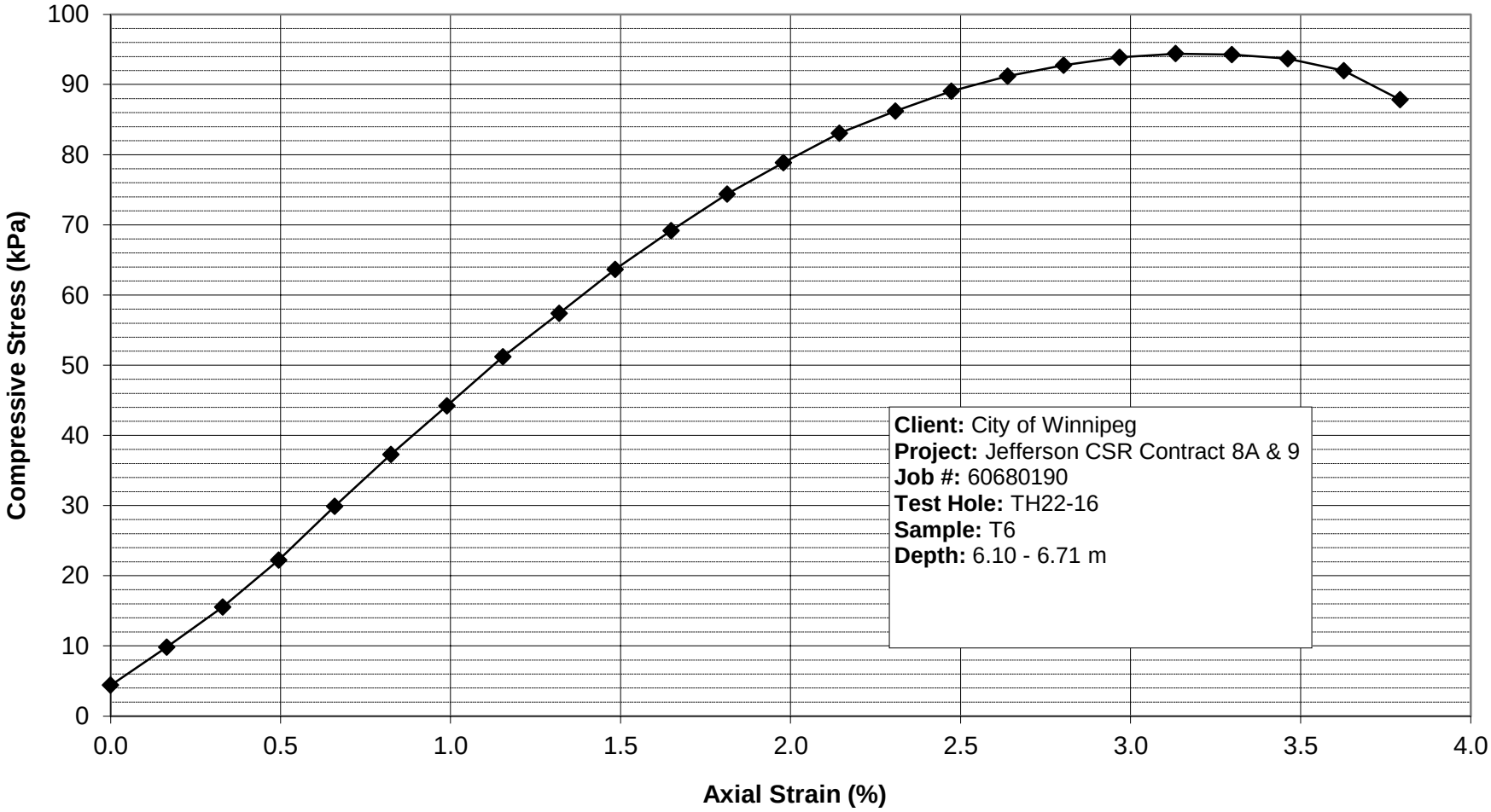
FAILURE SKETCH

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	0.0004	0.00	6.31	4.03	0.64	0.092	4.4
0.02	0.0010	0.16	6.32	9.00	1.42	0.205	9.8
0.03	0.0015	0.33	6.33	14.24	2.25	0.324	15.5
0.04	0.0022	0.49	6.34	20.43	3.22	0.464	22.2
0.05	0.0029	0.66	6.35	27.55	4.34	0.624	29.9
0.06	0.0037	0.82	6.36	34.39	5.40	0.778	37.3
0.07	0.0044	0.99	6.37	40.85	6.41	0.923	44.2
0.08	0.0051	1.15	6.38	47.41	7.43	1.069	51.2
0.09	0.0057	1.32	6.40	53.22	8.32	1.198	57.4
0.10	0.0063	1.48	6.41	59.12	9.23	1.329	63.6
0.11	0.0069	1.65	6.42	64.37	10.03	1.445	69.2
0.12	0.0074	1.81	6.43	69.34	10.79	1.553	74.4
0.13	0.0079	1.98	6.44	73.65	11.44	1.647	78.9
0.14	0.0083	2.14	6.45	77.68	12.04	1.734	83.0
0.15	0.0086	2.31	6.46	80.77	12.50	1.800	86.2
0.16	0.0089	2.47	6.47	83.58	12.92	1.860	89.1
0.17	0.0092	2.64	6.48	85.74	13.23	1.905	91.2
0.18	0.0093	2.80	6.49	87.33	13.45	1.937	92.7
0.19	0.0095	2.97	6.50	88.55	13.61	1.960	93.9
0.20	0.0095	3.13	6.51	89.20	13.69	1.972	94.4
0.21	0.0095	3.30	6.53	89.20	13.67	1.968	94.2
0.22	0.0095	3.46	6.54	88.83	13.59	1.957	93.7
0.23	0.0093	3.63	6.55	87.33	13.34	1.920	91.9
0.24	0.0089	3.79	6.56	83.58	12.74	1.835	87.9

UNCONFINED COMPRESSIVE STRENGTH, q_u:	94.40	kPa
(based on maximum q_u value)	1.972	ksf
UNDRAINED SHEAR STRENGTH, S_u:	47.20	kPa
(based on maximum q_u value)	0.986	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 8A & 9
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-16**
SAMPLE NO.:	**T10**
SAMPLE DEPTH:	12.19 - 12.80 m
DATE TESTED:	25-Oct-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)	0.25
Undrained Shear Strength (kPa)	**12.0**
Reading - Qu (tsf)	0.25
Undrained Shear Strength (kPa)	**12.0**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**50.5**
Unconfined compressive strength (ksf)	**1.1**
Undrained Shear Strength (kPa)	**25.3**
Undrained Shear Strength (ksf)	**0.528**
MOISTURE CONTENT	
Tare Number	A8
Wt. Sample wet + tare (g)	417.2
Wt. Sample dry + tare (g)	251.6
Wt. Tare (g)	8.4
Moisture Content %	**68.1**
BULK DENSITY	
Sample Wt. (g)	1023.1
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 (%)	68.1
Bulk Density (g/cm^3)	1.625
Bulk Unit Weight (kN/m^3)	**15.9**
Bulk Unit Weight (pcf)	**101.4**
Dry Unit Weight (kN/m^3)	**9.48**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8A & 9
JOB NO.:	60680190

TEST HOLE NO.:	TH22-16
SAMPLE NO.:	T10
SAMPLE DEPTH:	12.19 - 12.80 m
SAMPLE DATE:	
TEST DATE:	25-Oct-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel,moist, firm,	
grey,high plasticity	
MOISTURE CONTENT:	68.1

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)**

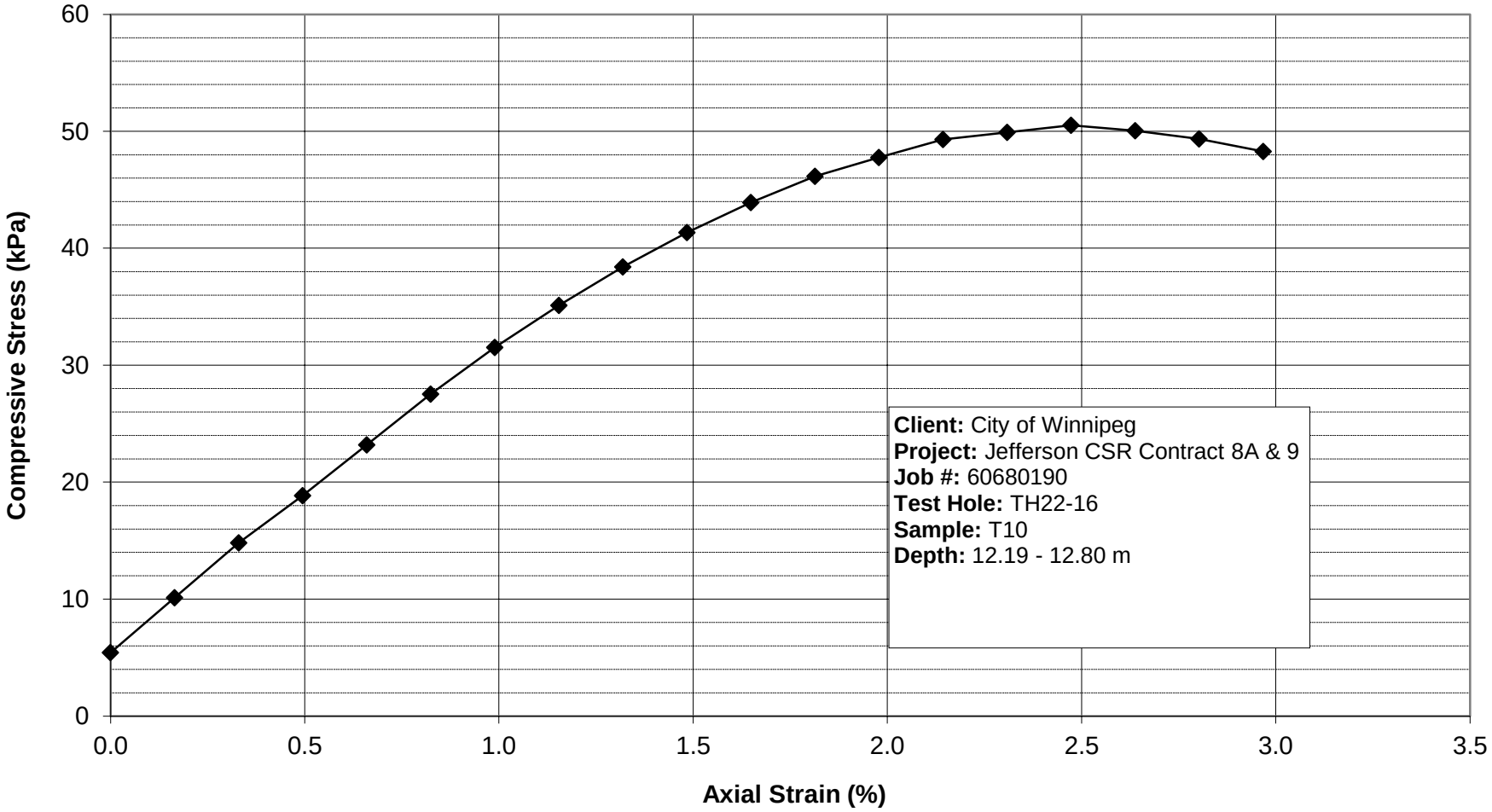
FAILURE SKETCH

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	0.0005	0.00	6.31	4.97	0.79	0.113	5.4
0.02	0.0010	0.16	6.32	9.28	1.47	0.211	10.1
0.03	0.0015	0.33	6.33	13.59	2.15	0.309	14.8
0.04	0.0019	0.49	6.34	17.33	2.73	0.394	18.8
0.05	0.0023	0.66	6.35	21.36	3.36	0.484	23.2
0.06	0.0027	0.82	6.36	25.39	3.99	0.575	27.5
0.07	0.0031	0.99	6.37	29.14	4.57	0.658	31.5
0.08	0.0035	1.15	6.38	32.51	5.09	0.733	35.1
0.09	0.0038	1.32	6.40	35.61	5.57	0.802	38.4
0.10	0.0041	1.48	6.41	38.42	6.00	0.864	41.3
0.11	0.0044	1.65	6.42	40.85	6.37	0.917	43.9
0.12	0.0046	1.81	6.43	43.01	6.69	0.964	46.1
0.13	0.0048	1.98	6.44	44.60	6.93	0.998	47.8
0.14	0.0049	2.14	6.45	46.10	7.15	1.029	49.3
0.15	0.0050	2.31	6.46	46.76	7.24	1.042	49.9
0.16	0.0051	2.47	6.47	47.41	7.33	1.055	50.5
0.17	0.0050	2.64	6.48	47.04	7.26	1.045	50.0
0.18	0.0050	2.80	6.49	46.48	7.16	1.031	49.4
0.19	0.0049	2.97	6.50	45.54	7.00	1.008	48.3

UNCONFINED COMPRESSIVE STRENGTH, q_u:	50.52	kPa
(based on maximum q_u value)	1.055	ksf
UNDRAINED SHEAR STRENGTH, S_u:	25.26	kPa
(based on maximum q_u value)	0.528	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 8A & 9
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-17**
SAMPLE NO.:	**T5**
SAMPLE DEPTH:	4.57 - 5.18 m
DATE TESTED:	25-Oct-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)	0.75
Undrained Shear Strength (kPa)	**35.9**
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)	**70.6**
Unconfined compressive strength (ksf)	**1.5**
Undrained Shear Strength (kPa)	**35.3**
Undrained Shear Strength (ksf)	**0.737**
MOISTURE CONTENT	
Tare Number	F2S
Wt. Sample wet + tare (g)	497.9
Wt. Sample dry + tare (g)	328.1
Wt. Tare (g)	8.4
Moisture Content %	**53.1**
BULK DENSITY	
Sample Wt. (g)	1043.7
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.20
Diameter 3 (cm)	7.10
Avg. Diameter (cm)	**7.17**
Length 1 (cm)	15.50
Length 2 (cm)	15.50
Length 3 (cm)	15.40
Avg. Length (cm)	**15.47**
Volume (cm^3)	623.9
Moisture content (%)	53.1
Bulk Density (g/cm^3)	1.673
Bulk Unit Weight (kN/m^3)	**16.4**
Bulk Unit Weight (pcf)	**104.4**
Dry Unit Weight (kN/m^3)	**10.71**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8A & 9
JOB NO.:	60680190

TEST HOLE NO.:	TH22-17
SAMPLE NO.:	T5
SAMPLE DEPTH:	4.57 - 5.18 m
SAMPLE DATE:	
TEST DATE:	25-Oct-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel,moist, firm,	
grey,high plasticity	
MOISTURE CONTENT:	53.1

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

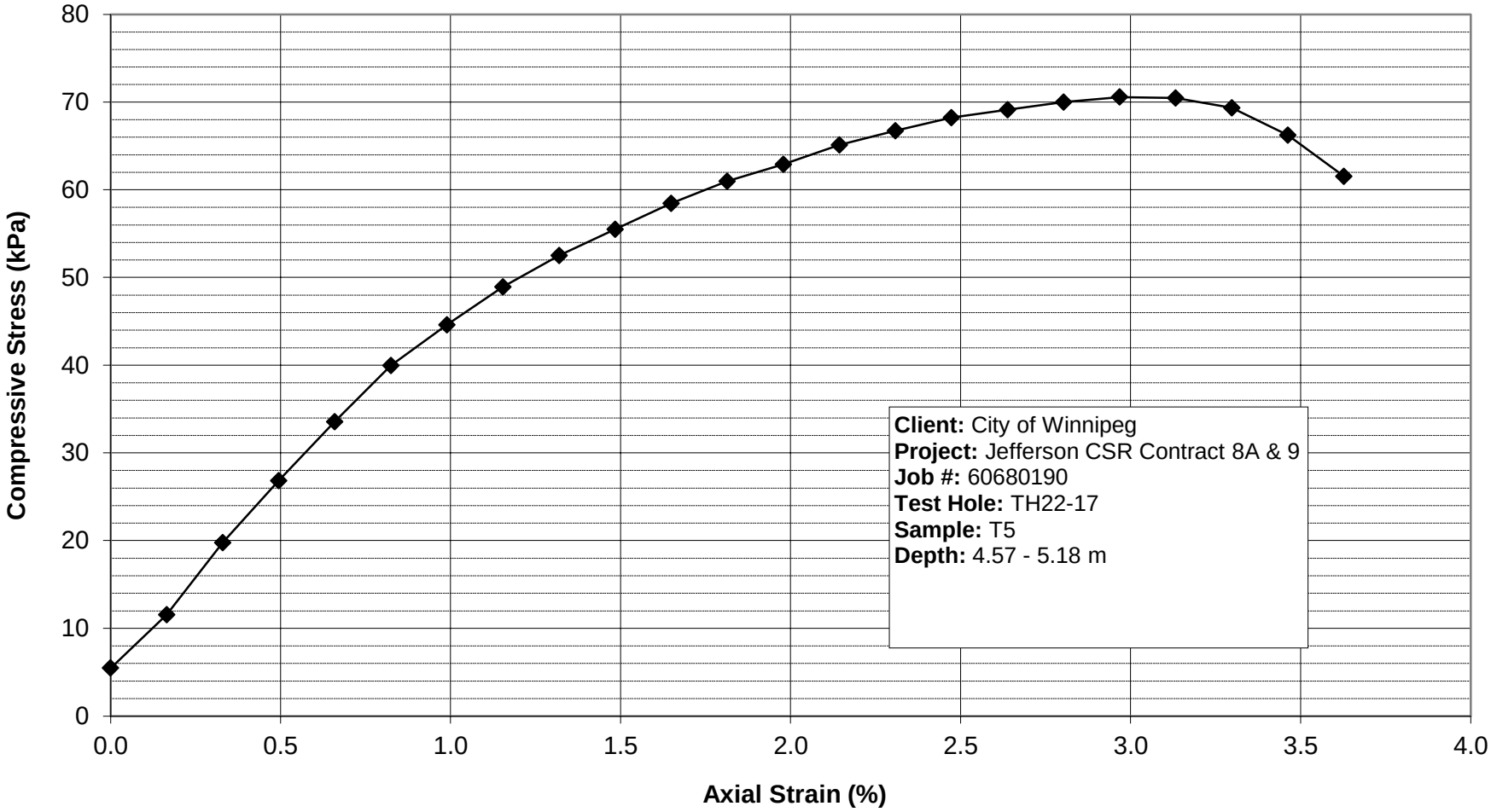
TEST DATA - DIAL READINGS							
AXIAL COMPRESSION	**PROVING RING**	**TOTAL AXIAL STRAIN, ε_1**	**AVERAGE CROSS-SECTIONAL AREA, A**	**APPLIED AXIAL LOAD, P**	**COMPRESSIVE STRESS, σ_c**		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0005	0.00	6.25	4.97	0.79	0.114	5.5
0.02	0.0011	0.16	6.26	10.49	1.68	0.241	11.6
0.03	0.0019	0.33	6.27	17.99	2.87	0.413	19.8
0.04	0.0026	0.49	6.28	24.46	3.89	0.560	26.8
0.05	0.0033	0.66	6.29	30.64	4.87	0.701	33.6
0.06	0.0039	0.82	6.30	36.54	5.80	0.835	40.0
0.07	0.0044	0.99	6.32	40.85	6.47	0.932	44.6
0.08	0.0048	1.15	6.33	44.88	7.10	1.022	48.9
0.09	0.0052	1.32	6.34	48.26	7.62	1.097	52.5
0.10	0.0055	1.48	6.35	51.07	8.05	1.159	55.5
0.11	0.0058	1.65	6.36	53.88	8.47	1.220	58.4
0.12	0.0060	1.81	6.37	56.31	8.84	1.273	61.0
0.13	0.0062	1.98	6.38	58.19	9.12	1.314	62.9
0.14	0.0064	2.14	6.39	60.34	9.44	1.360	65.1
0.15	0.0066	2.31	6.40	61.94	9.68	1.393	66.7
0.16	0.0068	2.47	6.41	63.43	9.89	1.425	68.2
0.17	0.0069	2.64	6.42	64.37	10.02	1.443	69.1
0.18	0.0070	2.80	6.43	65.31	10.15	1.462	70.0
0.19	0.0070	2.97	6.44	65.96	10.24	1.474	70.6
0.20	0.0070	3.13	6.45	65.96	10.22	1.472	70.5
0.21	0.0069	3.30	6.47	65.03	10.06	1.448	69.3
0.22	0.0066	3.46	6.48	62.22	9.61	1.383	66.2
0.23	0.0062	3.63	6.49	57.91	8.93	1.285	61.5

UNCONFINED COMPRESSIVE STRENGTH, q_u:	70.58	kPa
(based on maximum q_u value)	1.474	ksf
UNDRAINED SHEAR STRENGTH, S_u:	35.29	kPa
(based on maximum q_u value)	0.737	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 8A & 9
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-17**
SAMPLE NO.:	**T9**
SAMPLE DEPTH:	10.67 - 11.28 m
DATE TESTED:	20-Oct-22
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.30
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**29.4**
Undrained Shear Strength (ksf)	0.61
POCKET PENETROMETER	
Reading - Qu (tsf)	0.25
Undrained Shear Strength (kPa)	**12.0**
Reading - Qu (tsf)	0.25
Undrained Shear Strength (kPa)	**12.0**
Reading - Qu (tsf)	0.25
Undrained Shear Strength (kPa)	**12.0**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**49.9**
Unconfined compressive strength (ksf)	**1.0**
Undrained Shear Strength (kPa)	**25.0**
Undrained Shear Strength (ksf)	**0.521**
MOISTURE CONTENT	
Tare Number	SG13
Wt. Sample wet + tare (g)	421.4
Wt. Sample dry + tare (g)	266.4
Wt. Tare (g)	8.6
Moisture Content %	**60.1**
BULK DENSITY	
Sample Wt. (g)	1039
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.20
Diameter 3 (cm)	7.30
Avg. Diameter (cm)	**7.23**
Length 1 (cm)	15.50
Length 2 (cm)	15.50
Length 3 (cm)	15.40
Avg. Length (cm)	**15.47**
Volume (cm^3)	635.6
Moisture content (%)	60.1
Bulk Density (g/cm^3)	1.635
Bulk Unit Weight (kN/m^3)	**16.0**
Bulk Unit Weight (pcf)	**102.1**
Dry Unit Weight (kN/m^3)	**10.01**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8A & 9
JOB NO.:	60680190

TEST HOLE NO.:	TH22-17
SAMPLE NO.:	T9
SAMPLE DEPTH:	10.67 - 11.28 m
SAMPLE DATE:	
TEST DATE:	20-Oct-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel,moist, firm,	
grey,high plasticity	
MOISTURE CONTENT:	60.1

SAMPLE DIAM.(Do):	72.33	**(mm)**	**INITIAL AREA, Ao:**	4109.3	**(mm^2)**
SAMPLE LENGTH, (Lo):	154.67	**(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

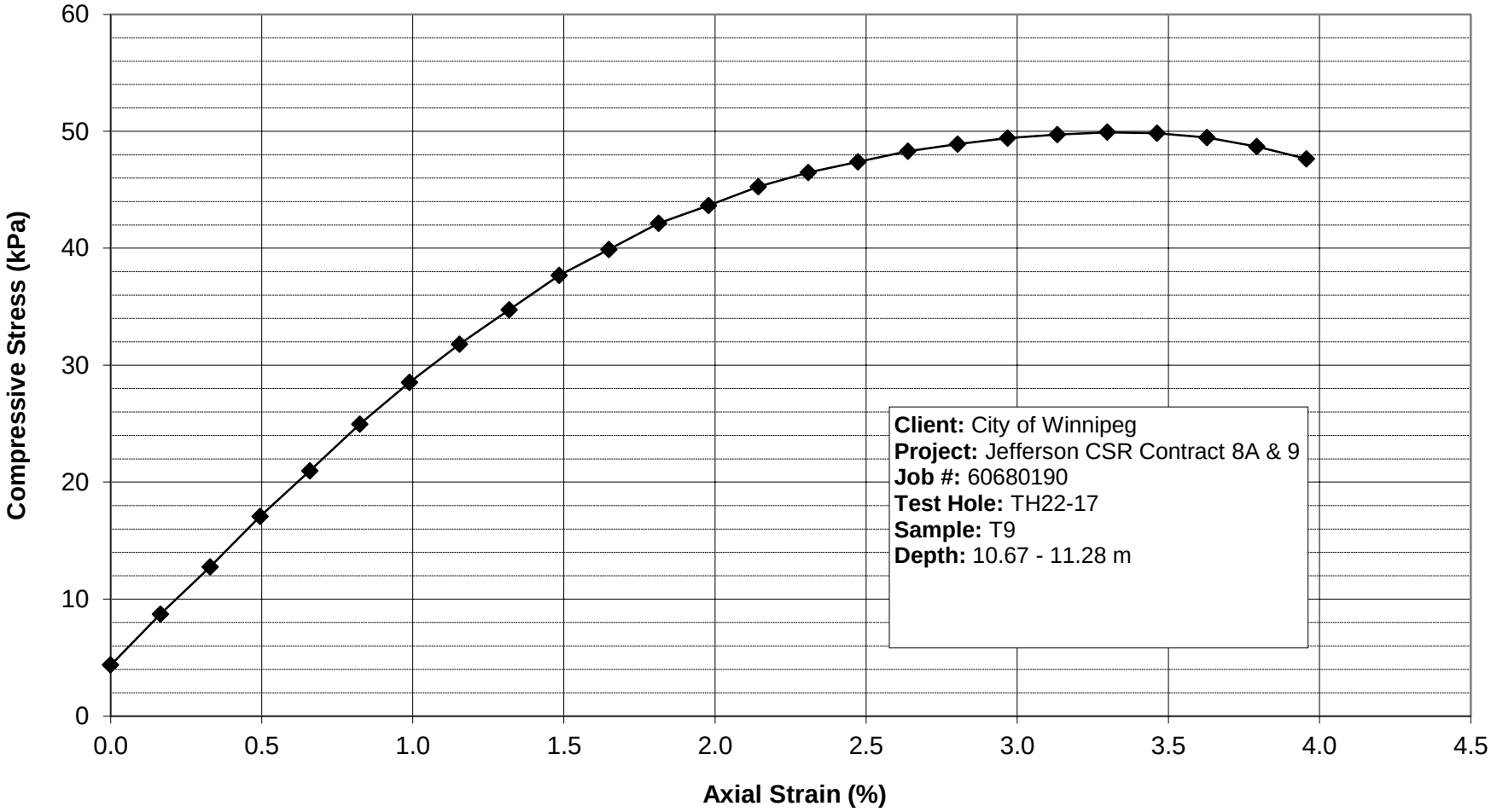
TEST DATA - DIAL READINGS

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	0.0004	0.00	6.37	4.03	0.63	0.091	4.4
0.02	0.0009	0.16	6.38	8.06	1.26	0.182	8.7
0.03	0.0013	0.33	6.39	11.81	1.85	0.266	12.7
0.04	0.0017	0.49	6.40	15.84	2.47	0.356	17.1
0.05	0.0021	0.66	6.41	19.49	3.04	0.438	21.0
0.06	0.0025	0.82	6.42	23.24	3.62	0.521	24.9
0.07	0.0028	0.99	6.43	26.61	4.14	0.596	28.5
0.08	0.0032	1.15	6.44	29.70	4.61	0.664	31.8
0.09	0.0035	1.32	6.45	32.51	5.04	0.725	34.7
0.10	0.0038	1.48	6.47	35.32	5.46	0.787	37.7
0.11	0.0040	1.65	6.48	37.48	5.79	0.833	39.9
0.12	0.0042	1.81	6.49	39.64	6.11	0.880	42.1
0.13	0.0044	1.98	6.50	41.13	6.33	0.912	43.6
0.14	0.0046	2.14	6.51	42.73	6.56	0.945	45.3
0.15	0.0047	2.31	6.52	43.95	6.74	0.971	46.5
0.16	0.0048	2.47	6.53	44.88	6.87	0.990	47.4
0.17	0.0049	2.64	6.54	45.82	7.00	1.009	48.3
0.18	0.0050	2.80	6.55	46.48	7.09	1.021	48.9
0.19	0.0050	2.97	6.56	47.04	7.17	1.032	49.4
0.20	0.0051	3.13	6.58	47.41	7.21	1.038	49.7
0.21	0.0051	3.30	6.59	47.69	7.24	1.043	49.9
0.22	0.0051	3.46	6.60	47.69	7.23	1.041	49.8
0.23	0.0051	3.63	6.61	47.41	7.17	1.033	49.5
0.24	0.0050	3.79	6.62	46.76	7.06	1.017	48.7
0.25	0.0049	3.96	6.63	45.82	6.91	0.995	47.6

UNCONFINED COMPRESSIVE STRENGTH, q_u:	49.92	kPa
(based on maximum q_u value)	1.043	ksf
UNDRAINED SHEAR STRENGTH, S_u:	24.96	kPa
(based on maximum q_u value)	0.521	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 8A & 9
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-18**
SAMPLE NO.:	**T5**
SAMPLE DEPTH:	4.57 - 5.18 m
DATE TESTED:	25-Oct-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)	1.25
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)	**90.6**
Unconfined compressive strength (ksf)	**1.9**
Undrained Shear Strength (kPa)	**45.3**
Undrained Shear Strength (ksf)	**0.946**
MOISTURE CONTENT	
Tare Number	T22
Wt. Sample wet + tare (g)	514.0
Wt. Sample dry + tare (g)	340.5
Wt. Tare (g)	8.3
Moisture Content %	**52.2**
BULK DENSITY	
Sample Wt. (g)	1076.8
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.20
Diameter 3 (cm)	7.30
Avg. Diameter (cm)	**7.23**
Length 1 (cm)	15.50
Length 2 (cm)	15.50
Length 3 (cm)	15.40
Avg. Length (cm)	**15.47**
Volume (cm^3)	635.6
Moisture content (%)	52.2
Bulk Density (g/cm^3)	1.694
Bulk Unit Weight (kN/m^3)	**16.6**
Bulk Unit Weight (pcf)	**105.8**
Dry Unit Weight (kN/m^3)	**10.91**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8A & 9
JOB NO.:	60680190

TEST HOLE NO.:	TH22-18
SAMPLE NO.:	T5
SAMPLE DEPTH:	4.57 - 5.18 m
SAMPLE DATE:	
TEST DATE:	25-Oct-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel,moist, firm,	
grey,high plasticity	
MOISTURE CONTENT:	52.2

SAMPLE DIAM.(Do):	72.33	**(mm)**	**INITIAL AREA, Ao:**	4109.3	**(mm^2)**
SAMPLE LENGTH, (Lo):	154.67	**(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)**

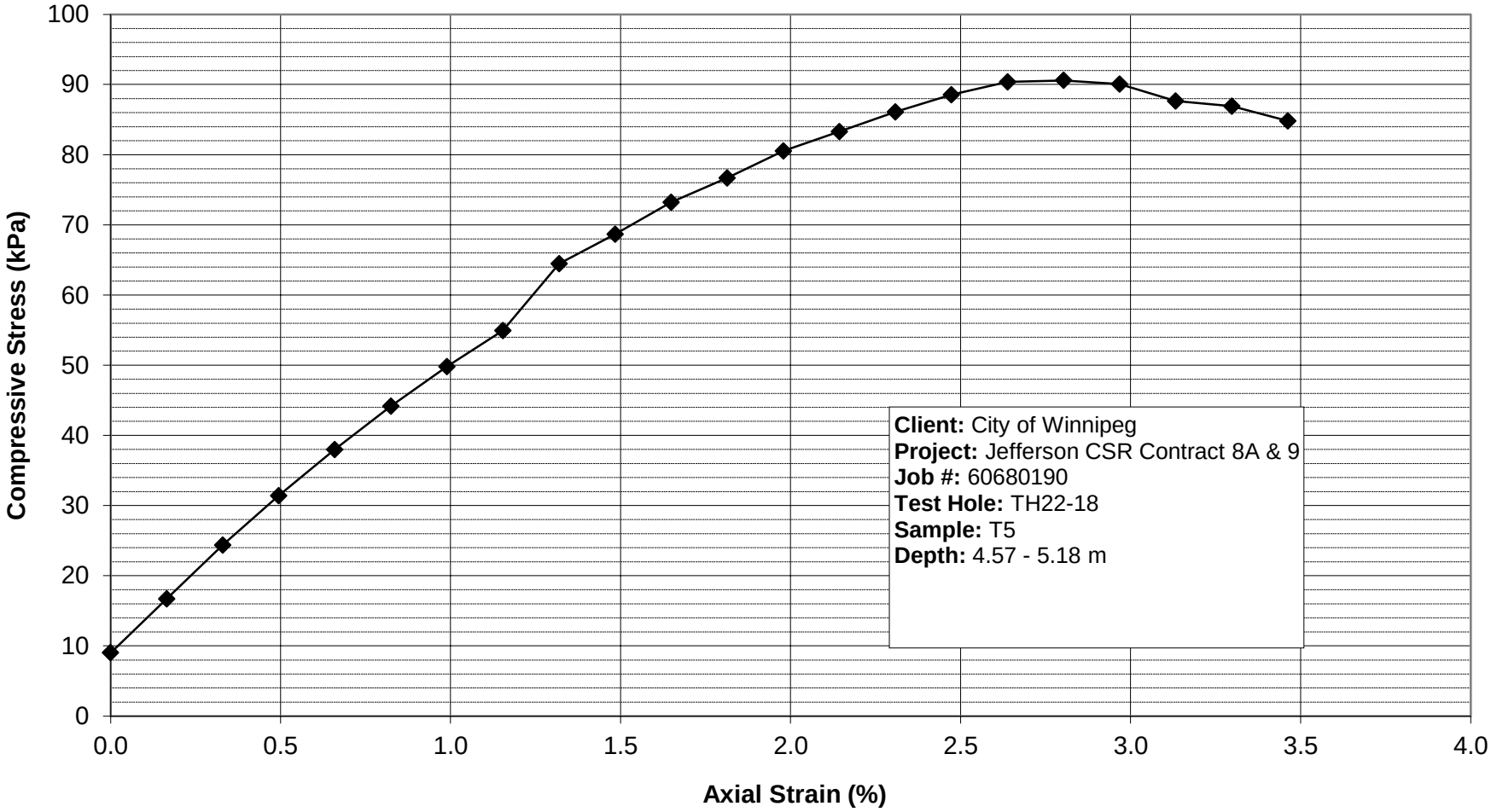
FAILURE SKETCH

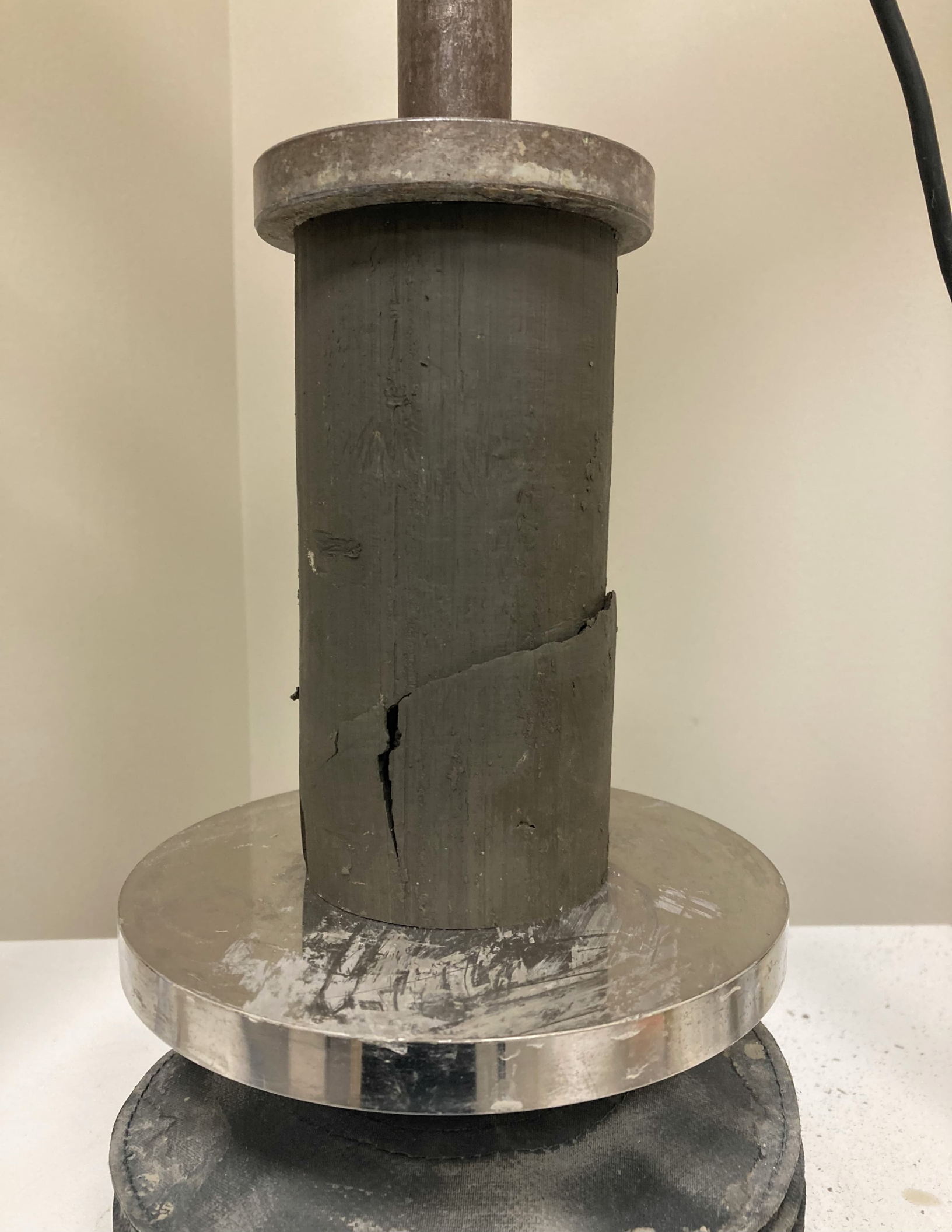
TEST DATA - DIAL READINGS							
AXIAL COMPRESSION	**PROVING RING**	**TOTAL AXIAL STRAIN, ε_1**	**AVERAGE CROSS-SECTIONAL AREA, A**	**APPLIED AXIAL LOAD, P**	**COMPRESSIVE STRESS, σ_c**		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0009	0.00	6.37	8.34	1.31	0.189	9.0
0.02	0.0017	0.16	6.38	15.46	2.42	0.349	16.7
0.03	0.0024	0.33	6.39	22.58	3.53	0.509	24.4
0.04	0.0031	0.49	6.40	29.14	4.55	0.656	31.4
0.05	0.0038	0.66	6.41	35.32	5.51	0.793	38.0
0.06	0.0044	0.82	6.42	41.13	6.40	0.922	44.2
0.07	0.0050	0.99	6.43	46.48	7.22	1.040	49.8
0.08	0.0055	1.15	6.44	51.35	7.97	1.147	54.9
0.09	0.0064	1.32	6.45	60.34	9.35	1.346	64.5
0.10	0.0069	1.48	6.47	64.37	9.96	1.434	68.6
0.11	0.0073	1.65	6.48	68.78	10.62	1.529	73.2
0.12	0.0077	1.81	6.49	72.15	11.12	1.602	76.7
0.13	0.0081	1.98	6.50	75.90	11.68	1.682	80.5
0.14	0.0084	2.14	6.51	78.61	12.08	1.739	83.3
0.15	0.0087	2.31	6.52	81.43	12.49	1.798	86.1
0.16	0.0090	2.47	6.53	83.86	12.84	1.849	88.5
0.17	0.0092	2.64	6.54	85.74	13.11	1.887	90.4
0.18	0.0092	2.80	6.55	86.11	13.14	1.892	90.6
0.19	0.0092	2.97	6.56	85.74	13.06	1.881	90.1
0.20	0.0089	3.13	6.58	83.58	12.71	1.830	87.6
0.21	0.0089	3.30	6.59	83.02	12.60	1.815	86.9
0.22	0.0087	3.46	6.60	81.14	12.30	1.771	84.8

UNCONFINED COMPRESSIVE STRENGTH, q_u:	90.60	kPa
(based on maximum q_u value)	1.892	ksf
UNDRAINED SHEAR STRENGTH, S_u:	45.30	kPa
(based on maximum q_u value)	0.946	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 8A & 9
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-18**
SAMPLE NO.:	**T9**
SAMPLE DEPTH:	10.67 - 11.28 m
DATE TESTED:	20-Oct-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)	0.75
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)	**68.2**
Unconfined compressive strength (ksf)	**1.4**
Undrained Shear Strength (kPa)	**34.1**
Undrained Shear Strength (ksf)	**0.712**
MOISTURE CONTENT	
Tare Number	J19
Wt. Sample wet + tare (g)	497.2
Wt. Sample dry + tare (g)	342.7
Wt. Tare (g)	8.5
Moisture Content %	**46.2**
BULK DENSITY	
Sample Wt. (g)	1127.3
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.10
Diameter 3 (cm)	7.20
Avg. Diameter (cm)	**7.17**
Length 1 (cm)	15.40
Length 2 (cm)	15.40
Length 3 (cm)	15.50
Avg. Length (cm)	**15.43**
Volume (cm^3)	622.6
Moisture content (%)	46.2
Bulk Density (g/cm^3)	1.811
Bulk Unit Weight (kN/m^3)	**17.8**
Bulk Unit Weight (pcf)	**113.0**
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 8A & 9
JOB NO.:	60680190

TEST HOLE NO.:	TH22-18
SAMPLE NO.:	T9
SAMPLE DEPTH:	10.67 - 11.28 m
SAMPLE DATE:	
TEST DATE:	20-Oct-22

SOIL DESCRIPTION:
CLAY - silt pockets (5mm), trace sand, trace gravel,moist, firm,
grey,high plasticity
MOISTURE CONTENT: 46.2

FAILURE SKETCH

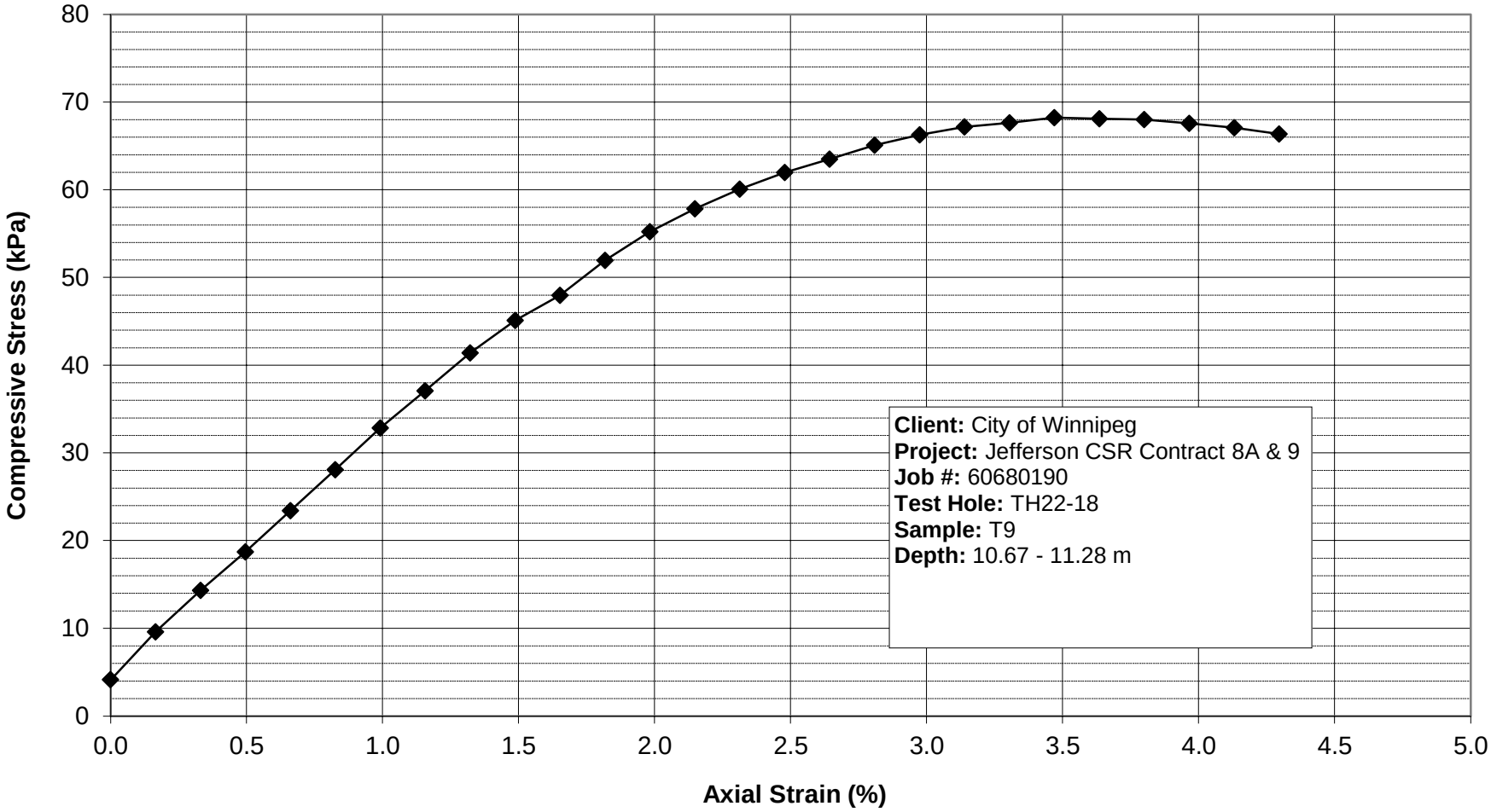
SAMPLE DIAM.(Do):	71.67	**(mm)**	**INITIAL AREA, Ao:**	4033.9	**(mm^2)**
SAMPLE LENGTH, (Lo):	154.33	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.15	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	0.99	**(0.5<R<2 % / minute)**

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	6.25	3.75	0.60	0.086	4.1
0.02	0.0009	0.17	6.26	8.71	1.39	0.200	9.6
0.03	0.0014	0.33	6.27	13.02	2.08	0.299	14.3
0.04	0.0018	0.50	6.28	17.05	2.71	0.391	18.7
0.05	0.0023	0.66	6.29	21.36	3.39	0.489	23.4
0.06	0.0027	0.83	6.30	25.67	4.07	0.586	28.1
0.07	0.0032	0.99	6.32	30.08	4.76	0.686	32.8
0.08	0.0036	1.16	6.33	34.01	5.38	0.774	37.1
0.09	0.0041	1.32	6.34	38.04	6.00	0.865	41.4
0.10	0.0044	1.49	6.35	41.51	6.54	0.942	45.1
0.11	0.0047	1.65	6.36	44.23	6.96	1.002	48.0
0.12	0.0051	1.82	6.37	47.97	7.53	1.085	51.9
0.13	0.0055	1.98	6.38	51.07	8.01	1.153	55.2
0.14	0.0057	2.15	6.39	53.60	8.39	1.208	57.8
0.15	0.0060	2.31	6.40	55.75	8.71	1.254	60.1
0.16	0.0062	2.48	6.41	57.63	8.99	1.294	62.0
0.17	0.0063	2.64	6.42	59.12	9.21	1.326	63.5
0.18	0.0065	2.81	6.43	60.72	9.44	1.359	65.1
0.19	0.0066	2.97	6.44	61.94	9.61	1.384	66.3
0.20	0.0067	3.14	6.46	62.87	9.74	1.403	67.2
0.21	0.0068	3.30	6.47	63.43	9.81	1.413	67.6
0.22	0.0068	3.47	6.48	64.09	9.89	1.425	68.2
0.23	0.0068	3.63	6.49	64.09	9.88	1.422	68.1
0.24	0.0068	3.80	6.50	64.09	9.86	1.420	68.0
0.25	0.0068	3.97	6.51	63.81	9.80	1.411	67.6
0.26	0.0068	4.13	6.52	63.43	9.73	1.401	67.1
0.27	0.0067	4.30	6.53	62.87	9.62	1.386	66.4

UNCONFINED COMPRESSIVE STRENGTH, q_u:	68.22	kPa
(based on maximum q_u value)	1.425	ksf
UNDRAINED SHEAR STRENGTH, S_u:	34.11	kPa
(based on maximum q_u value)	0.712	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 8A & 9
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-19**
SAMPLE NO.:	**T4**
SAMPLE DEPTH:	3.05 - 3.66 m
DATE TESTED:	25-Oct-22
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.85
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**83.4**
Undrained Shear Strength (ksf)	1.74
POCKET PENETROMETER	
Reading - Qu (tsf)	2.75
Undrained Shear Strength (kPa)	**131.7**
Reading - Qu (tsf)	2.75
Undrained Shear Strength (kPa)	**131.7**
Reading - Qu (tsf)	2.75
Undrained Shear Strength (kPa)	**131.7**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**84.0**
Unconfined compressive strength (ksf)	**1.8**
Undrained Shear Strength (kPa)	**42.0**
Undrained Shear Strength (ksf)	**0.877**
MOISTURE CONTENT	
Tare Number	B10
Wt. Sample wet + tare (g)	498.5
Wt. Sample dry + tare (g)	352.1
Wt. Tare (g)	8.8
Moisture Content %	**42.6**
BULK DENSITY	
Sample Wt. (g)	1124
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 (%)	42.6
Bulk Density (g/cm^3)	1.802
Bulk Unit Weight (kN/m^3)	**17.7**
Bulk Unit Weight (pcf)	**112.5**
Dry Unit Weight (kN/m^3)	**12.39**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8A & 9
JOB NO.:	60680190

TEST HOLE NO.:	TH22-19
SAMPLE NO.:	T4
SAMPLE DEPTH:	3.05 - 3.66 m
SAMPLE DATE:	
TEST DATE:	25-Oct-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel,moist, firm,	
greyish brown, intemediate to high plasticity	
MOISTURE CONTENT:	42.6

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)**

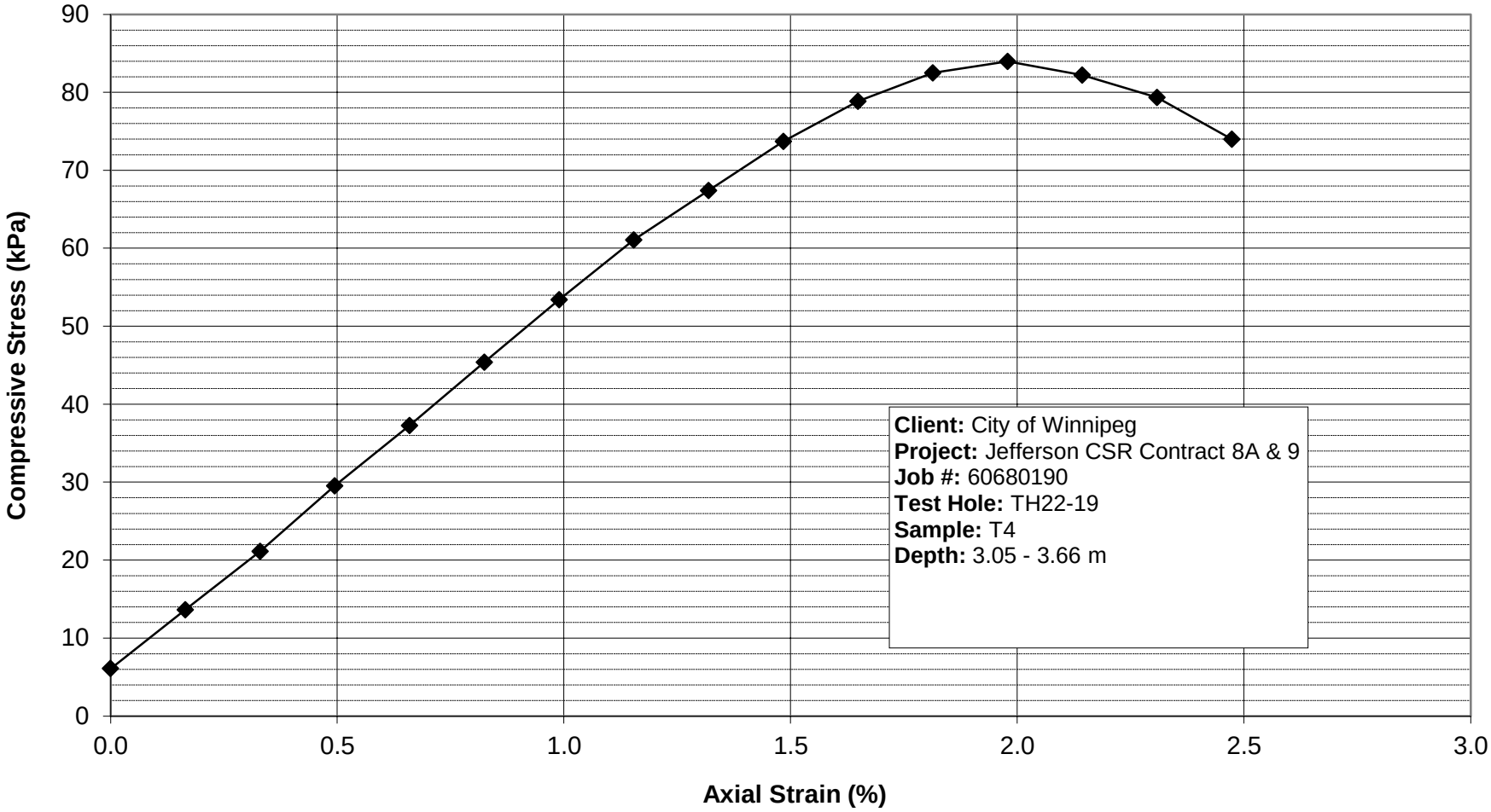
FAILURE SKETCH

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	0.0006	0.00	6.25	5.53	0.88	0.127	6.1
0.02	0.0013	0.16	6.26	12.37	1.97	0.284	13.6
0.03	0.0021	0.33	6.27	19.21	3.06	0.441	21.1
0.04	0.0029	0.49	6.28	26.89	4.28	0.616	29.5
0.05	0.0036	0.66	6.29	34.01	5.40	0.778	37.3
0.06	0.0044	0.82	6.30	41.51	6.58	0.948	45.4
0.07	0.0052	0.99	6.32	48.91	7.75	1.115	53.4
0.08	0.0060	1.15	6.33	56.03	8.86	1.276	61.1
0.09	0.0066	1.32	6.34	61.94	9.78	1.408	67.4
0.10	0.0072	1.48	6.35	67.84	10.69	1.539	73.7
0.11	0.0078	1.65	6.36	72.71	11.44	1.647	78.9
0.12	0.0081	1.81	6.37	76.18	11.96	1.723	82.5
0.13	0.0083	1.98	6.38	77.68	12.18	1.754	84.0
0.14	0.0081	2.14	6.39	76.18	11.92	1.717	82.2
0.15	0.0079	2.31	6.40	73.65	11.51	1.657	79.3
0.16	0.0073	2.47	6.41	68.78	10.73	1.545	74.0

UNCONFINED COMPRESSIVE STRENGTH, q_u:	83.96	kPa
(based on maximum q_u value)	1.754	ksf
UNDRAINED SHEAR STRENGTH, S_u:	41.98	kPa
(based on maximum q_u value)	0.877	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 8A & 9
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-19**
SAMPLE NO.:	**T8**
SAMPLE DEPTH:	9.14 - 9.75 m
DATE TESTED:	25-Oct-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)	0.75
Undrained Shear Strength (kPa)	**35.9**
Reading - Qu (tsf)	0.50
Undrained Shear Strength (kPa)	**23.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**67.2**
Unconfined compressive strength (ksf)	**1.4**
Undrained Shear Strength (kPa)	**33.6**
Undrained Shear Strength (ksf)	**0.701**
MOISTURE CONTENT	
Tare Number	J45
Wt. Sample wet + tare (g)	542.2
Wt. Sample dry + tare (g)	374.4
Wt. Tare (g)	8.5
Moisture Content %	**45.9**
BULK DENSITY	
Sample Wt. (g)	1118.9
Diameter 1 (cm)	7.10
Diameter 2 (cm)	7.20
Diameter 3 (cm)	7.20
Avg. Diameter (cm)	**7.17**
Length 1 (cm)	15.40
Length 2 (cm)	15.40
Length 3 (cm)	15.50
Avg. Length (cm)	**15.43**
Volume (cm^3)	622.6
Moisture content (%)	45.9
Bulk Density (g/cm^3)	1.797
Bulk Unit Weight (kN/m^3)	**17.6**
Bulk Unit Weight (pcf)	**112.2**
Dry Unit Weight (kN/m^3)	**12.08**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8A & 9
JOB NO.:	60680190

TEST HOLE NO.:	TH22-19
SAMPLE NO.:	T8
SAMPLE DEPTH:	9.14 - 9.75 m
SAMPLE DATE:	
TEST DATE:	25-Oct-22

SOIL DESCRIPTION:	
CLAY - trace silt, trace sand, trace gravel,moist, firm,	
grey, high plasticity	
MOISTURE CONTENT:	45.9

SAMPLE DIAM.(Do):	71.67	**(mm)**	**INITIAL AREA, Ao:**	4033.9	**(mm^2)**
SAMPLE LENGTH, (Lo):	154.33	**(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

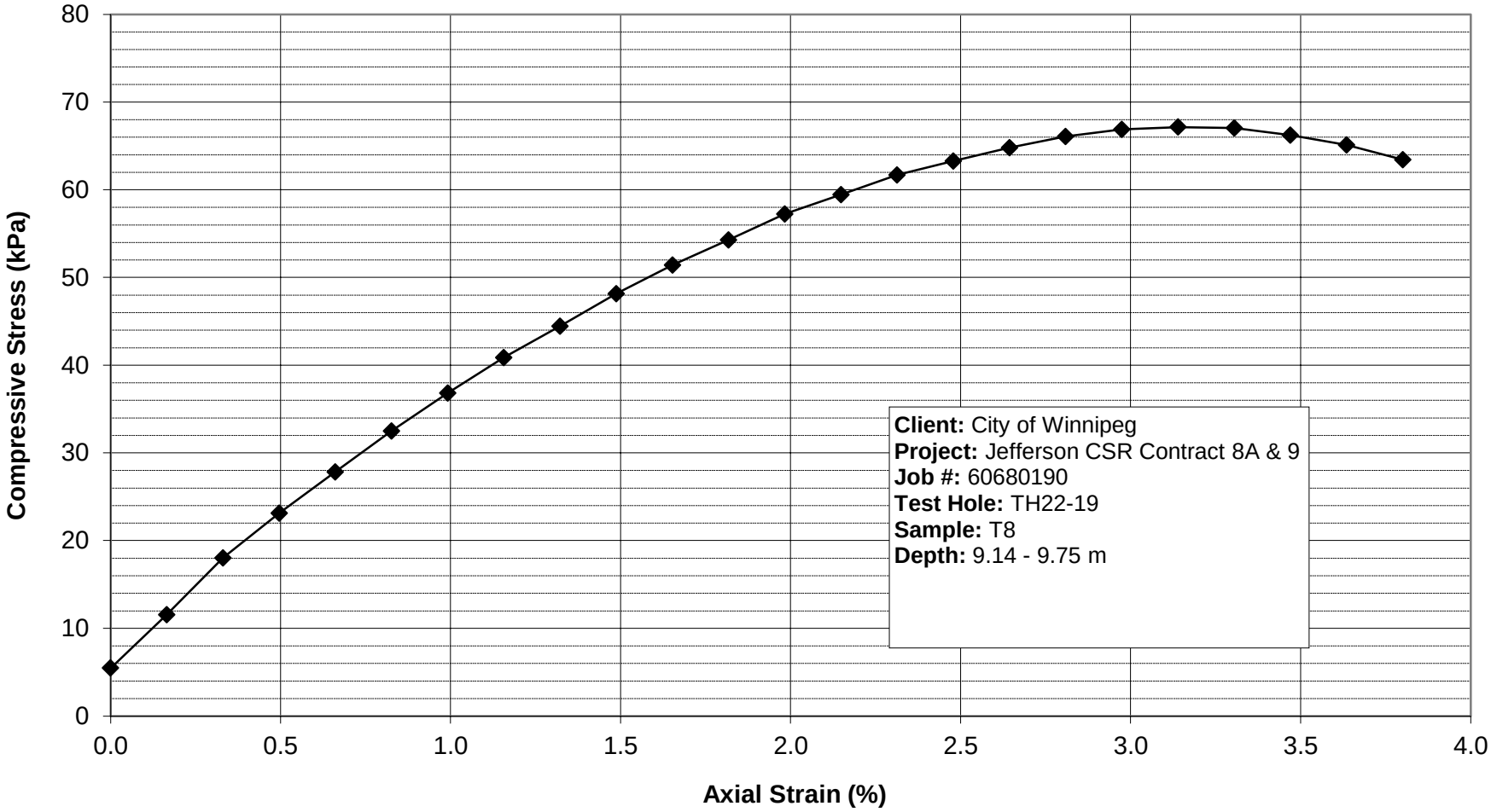
TEST DATA - DIAL READINGS							
AXIAL COMPRESSION	**PROVING RING**	**TOTAL AXIAL STRAIN, ε_1**	**AVERAGE CROSS-SECTIONAL AREA, A**	**APPLIED AXIAL LOAD, P**	**COMPRESSIVE STRESS, σ_c**		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0005	0.00	6.25	4.97	0.79	0.114	5.5
0.02	0.0011	0.17	6.26	10.49	1.68	0.241	11.6
0.03	0.0018	0.33	6.27	16.40	2.61	0.376	18.0
0.04	0.0023	0.50	6.28	21.08	3.36	0.483	23.1
0.05	0.0027	0.66	6.29	25.39	4.03	0.581	27.8
0.06	0.0032	0.83	6.30	29.70	4.71	0.678	32.5
0.07	0.0036	0.99	6.32	33.73	5.34	0.769	36.8
0.08	0.0040	1.16	6.33	37.48	5.93	0.853	40.9
0.09	0.0044	1.32	6.34	40.85	6.45	0.928	44.5
0.10	0.0047	1.49	6.35	44.32	6.98	1.006	48.1
0.11	0.0051	1.65	6.36	47.41	7.46	1.074	51.4
0.12	0.0054	1.82	6.37	50.13	7.87	1.134	54.3
0.13	0.0057	1.98	6.38	52.94	8.30	1.195	57.2
0.14	0.0059	2.15	6.39	55.10	8.62	1.242	59.4
0.15	0.0061	2.31	6.40	57.25	8.94	1.288	61.7
0.16	0.0063	2.48	6.41	58.84	9.18	1.322	63.3
0.17	0.0064	2.64	6.42	60.34	9.40	1.353	64.8
0.18	0.0066	2.81	6.43	61.65	9.58	1.380	66.1
0.19	0.0067	2.97	6.44	62.50	9.70	1.397	66.9
0.20	0.0067	3.14	6.46	62.87	9.74	1.403	67.2
0.21	0.0067	3.30	6.47	62.87	9.72	1.400	67.0
0.22	0.0066	3.47	6.48	62.22	9.61	1.383	66.2
0.23	0.0065	3.63	6.49	61.28	9.44	1.360	65.1
0.24	0.0064	3.80	6.50	59.78	9.20	1.324	63.4

UNCONFINED COMPRESSIVE STRENGTH, q_u:	67.15	kPa
(based on maximum q_u value)	1.403	ksf
UNDRAINED SHEAR STRENGTH, S_u:	33.58	kPa
(based on maximum q_u value)	0.701	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 8A & 9
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-20**
SAMPLE NO.:	**T6**
SAMPLE DEPTH:	6.10 - 6.71 m
DATE TESTED:	20-Oct-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)	1.00
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)	**130.9**
Unconfined compressive strength (ksf)	**2.7**
Undrained Shear Strength (kPa)	**65.4**
Undrained Shear Strength (ksf)	**1.367**
MOISTURE CONTENT	
Tare Number	B23
Wt. Sample wet + tare (g)	551.5
Wt. Sample dry + tare (g)	388.5
Wt. Tare (g)	8.6
Moisture Content %	**42.9**
BULK DENSITY	
Sample Wt. (g)	1058.7
Diameter 1 (cm)	7.00
Diameter 2 (cm)	7.00
Diameter 3 (cm)	7.00
Avg. Diameter (cm)	**7.00**
Length 1 (cm)	15.40
Length 2 (cm)	15.40
Length 3 (cm)	15.30
Avg. Length (cm)	**15.37**
Volume (cm^3)	591.4
Moisture content (%)	42.9
Bulk Density (g/cm^3)	1.790
Bulk Unit Weight (kN/m^3)	**17.6**
Bulk Unit Weight (pcf)	**111.8**
Dry Unit Weight (kN/m^3)	**12.29**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8A & 9
JOB NO.:	60680190

TEST HOLE NO.:	TH22-20
SAMPLE NO.:	T6
SAMPLE DEPTH:	6.10 - 6.71 m
SAMPLE DATE:	
TEST DATE:	20-Oct-22

SOIL DESCRIPTION:	
CLAY - silt pockets (5mm), trace sand, trace gravel,moist, firm,	
grey, high plasticity	
MOISTURE CONTENT:	42.9

SAMPLE DIAM.(Do):	70.00	**(mm)**	**INITIAL AREA, Ao:**	3848.5	**(mm^2)**
SAMPLE LENGTH, (Lo):	153.67	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.20	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	1.00	**(0.5<R<2 % / minute)**

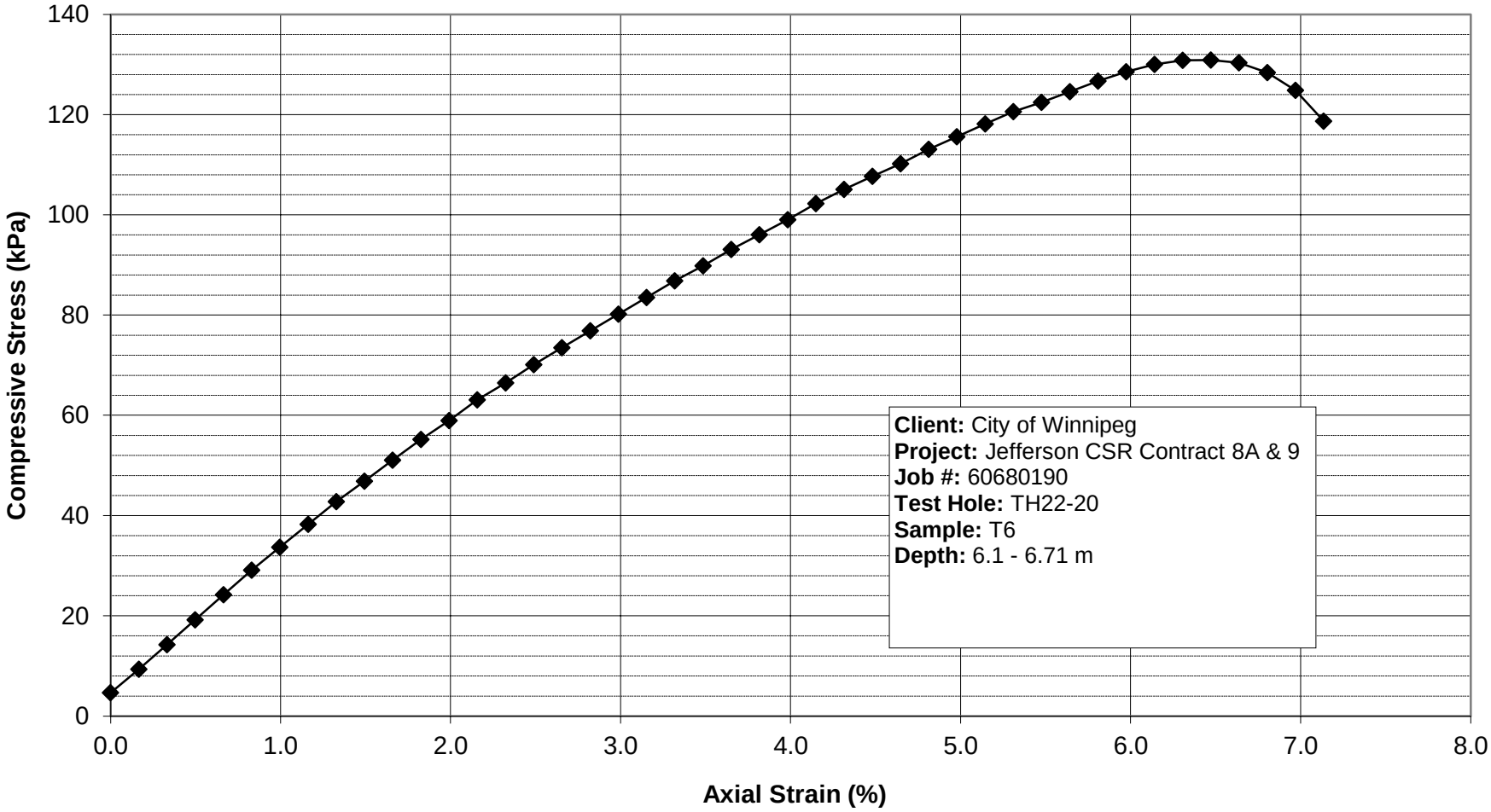
FAILURE SKETCH

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	5.97	4.03	0.68	0.097	4.7
0.02	0.0009	0.17	5.98	8.06	1.35	0.194	9.3
0.03	0.0013	0.33	5.98	12.37	2.07	0.298	14.2
0.04	0.0018	0.50	5.99	16.68	2.78	0.401	19.2
0.05	0.0023	0.66	6.00	21.08	3.51	0.506	24.2
0.06	0.0027	0.83	6.02	25.39	4.22	0.608	29.1
0.07	0.0031	1.00	6.03	29.42	4.88	0.703	33.7
0.08	0.0036	1.16	6.04	33.45	5.54	0.798	38.2
0.09	0.0040	1.33	6.05	37.48	6.20	0.893	42.7
0.10	0.0044	1.49	6.06	41.13	6.79	0.978	46.8
0.11	0.0048	1.66	6.07	44.88	7.40	1.065	51.0
0.12	0.0052	1.83	6.08	48.63	8.00	1.153	55.2
0.13	0.0056	1.99	6.09	52.00	8.54	1.230	58.9
0.14	0.0060	2.16	6.10	55.75	9.14	1.317	63.1
0.15	0.0063	2.32	6.11	58.84	9.64	1.388	66.4
0.16	0.0066	2.49	6.12	62.22	10.17	1.465	70.1
0.17	0.0070	2.66	6.13	65.31	10.66	1.535	73.5
0.18	0.0073	2.82	6.14	68.40	11.14	1.605	76.8
0.19	0.0076	2.99	6.15	71.49	11.63	1.674	80.2
0.20	0.0080	3.15	6.16	74.59	12.11	1.744	83.5
0.21	0.0083	3.32	6.17	77.68	12.59	1.813	86.8
0.22	0.0086	3.48	6.18	80.49	13.02	1.875	89.8
0.23	0.0089	3.65	6.19	83.58	13.50	1.944	93.1
0.24	0.0092	3.82	6.20	86.39	13.93	2.006	96.0
0.25	0.0095	3.98	6.21	89.20	14.36	2.068	99.0
0.26	0.0099	4.15	6.22	92.29	14.83	2.136	102.3
0.27	0.0101	4.31	6.23	95.01	15.24	2.195	105.1
0.28	0.0104	4.48	6.24	97.54	15.62	2.249	107.7
0.29	0.0107	4.65	6.26	99.98	15.98	2.301	110.2
0.30	0.0110	4.81	6.27	102.79	16.40	2.362	113.1
0.31	0.0112	4.98	6.28	105.23	16.76	2.414	115.6
0.32	0.0115	5.14	6.29	107.76	17.13	2.467	118.1
0.33	0.0118	5.31	6.30	110.19	17.49	2.519	120.6
0.34	0.0120	5.48	6.31	112.07	17.76	2.557	122.4
0.35	0.0122	5.64	6.32	114.22	18.07	2.602	124.6
0.36	0.0124	5.81	6.33	116.38	18.38	2.646	126.7
0.37	0.0126	5.97	6.34	118.25	18.64	2.684	128.5
0.38	0.0128	6.14	6.36	119.84	18.86	2.715	130.0
0.39	0.0129	6.31	6.37	120.78	18.97	2.732	130.8
0.40	0.0129	6.47	6.38	121.06	18.98	2.733	130.9
0.41	0.0129	6.64	6.39	120.78	18.90	2.722	130.3
0.42	0.0127	6.80	6.40	119.19	18.62	2.681	128.4
0.43	0.0124	6.97	6.41	116.09	18.11	2.607	124.8
0.44	0.0118	7.14	6.42	110.57	17.21	2.479	118.7

UNCONFINED COMPRESSIVE STRENGTH, q_u:	130.87	kPa
(based on maximum q_u value)	2.733	ksf
UNDRAINED SHEAR STRENGTH, S_u:	65.44	kPa
(based on maximum q_u value)	1.367	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 8A & 9
JOB NO.: 60680190

TEST HOLE NO.:	**TH22-20**
SAMPLE NO.:	**T10**
SAMPLE DEPTH:	12.19 - 12.80 m
DATE TESTED:	20-Oct-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)	**52.5**
Unconfined compressive strength (ksf)	**1.1**
Undrained Shear Strength (kPa)	**26.3**
Undrained Shear Strength (ksf)	**0.548**
MOISTURE CONTENT	
Tare Number	X35
Wt. Sample wet + tare (g)	407.1
Wt. Sample dry + tare (g)	311.4
Wt. Tare (g)	8.5
Moisture Content %	**31.6**
BULK DENSITY	
Sample Wt. (g)	1279.3
Diameter 1 (cm)	7.30
Diameter 2 (cm)	7.20
Diameter 3 (cm)	7.30
Avg. Diameter (cm)	**7.27**
Length 1 (cm)	15.40
Length 2 (cm)	15.30
Length 3 (cm)	15.40
Avg. Length (cm)	**15.37**
Volume (cm^3)	637.3
Moisture content (%)	31.6
Bulk Density (g/cm^3)	2.007
Bulk Unit Weight (kN/m^3)	**19.7**
Bulk Unit Weight (pcf)	**125.3**
Dry Unit Weight (kN/m^3)	**14.96**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8A & 9
JOB NO.:	60680190

TEST HOLE NO.:	TH22-20
SAMPLE NO.:	T10
SAMPLE DEPTH:	12.19 - 12.80 m
SAMPLE DATE:	
TEST DATE:	20-Oct-22

SOIL DESCRIPTION:	
CLAY - silt pockets (10mm), trace sand, trace gravel,moist, firm,	
grey, high plasticity	
MOISTURE CONTENT:	31.6

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)**

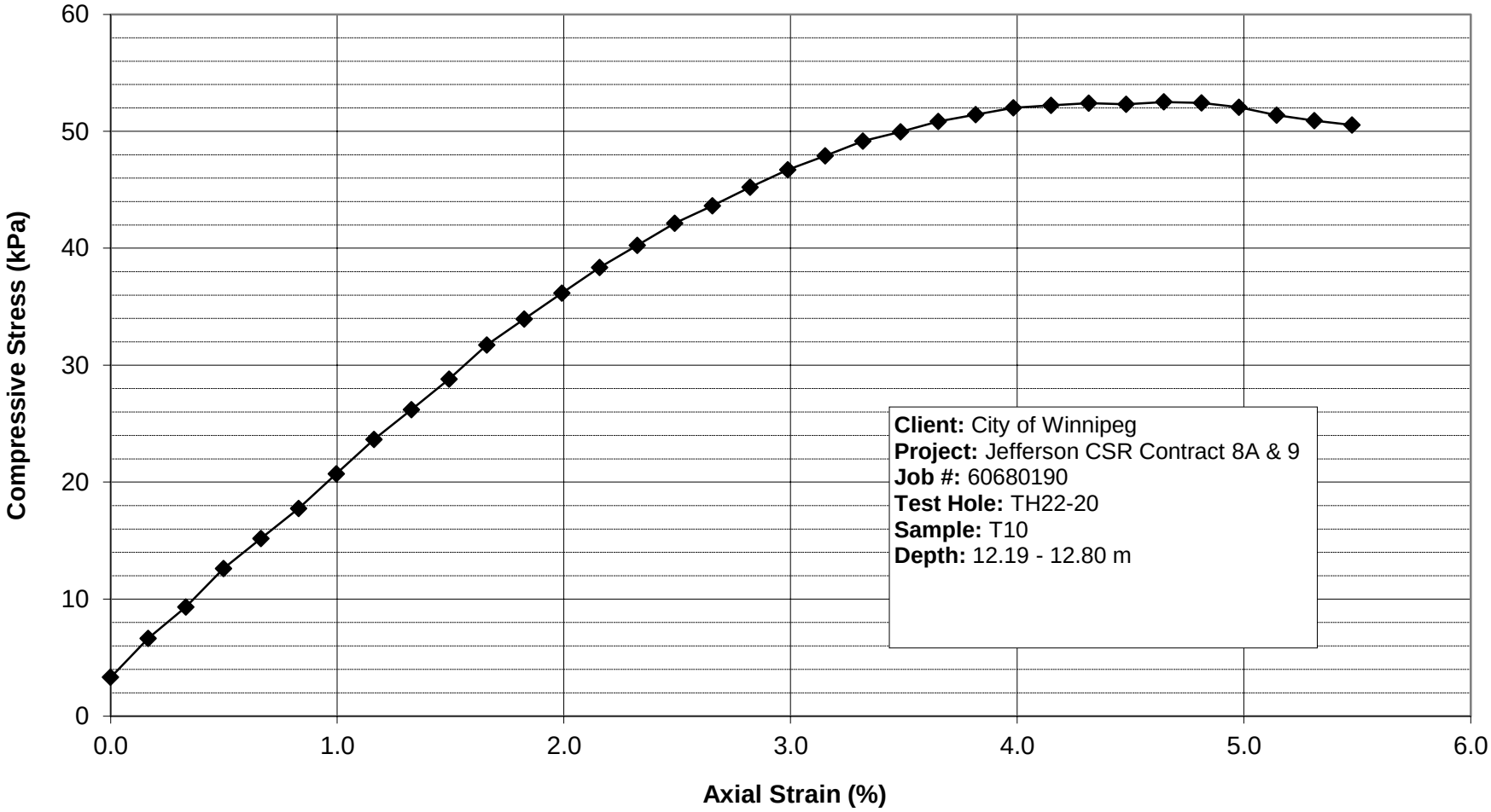
FAILURE SKETCH

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	0.0003	0.00	6.43	3.09	0.48	0.069	3.3
0.02	0.0007	0.17	6.44	6.18	0.96	0.138	6.6
0.03	0.0009	0.33	6.45	8.71	1.35	0.195	9.3
0.04	0.0013	0.50	6.46	11.81	1.83	0.263	12.6
0.05	0.0015	0.66	6.47	14.24	2.20	0.317	15.2
0.06	0.0018	0.83	6.48	16.68	2.57	0.371	17.7
0.07	0.0021	1.00	6.49	19.49	3.00	0.432	20.7
0.08	0.0024	1.16	6.50	22.30	3.43	0.494	23.6
0.09	0.0026	1.33	6.51	24.74	3.80	0.547	26.2
0.10	0.0029	1.49	6.53	27.27	4.18	0.602	28.8
0.11	0.0032	1.66	6.54	30.08	4.60	0.663	31.7
0.12	0.0034	1.83	6.55	32.23	4.92	0.709	33.9
0.13	0.0037	1.99	6.56	34.39	5.24	0.755	36.1
0.14	0.0039	2.16	6.57	36.54	5.56	0.801	38.3
0.15	0.0041	2.32	6.58	38.42	5.84	0.841	40.2
0.16	0.0043	2.49	6.59	40.29	6.11	0.880	42.1
0.17	0.0045	2.66	6.60	41.79	6.33	0.911	43.6
0.18	0.0046	2.82	6.61	43.38	6.56	0.944	45.2
0.19	0.0048	2.99	6.63	44.88	6.77	0.975	46.7
0.20	0.0049	3.15	6.64	46.10	6.95	1.000	47.9
0.21	0.0051	3.32	6.65	47.41	7.13	1.027	49.2
0.22	0.0052	3.48	6.66	48.26	7.25	1.043	50.0
0.23	0.0053	3.65	6.67	49.19	7.37	1.062	50.8
0.24	0.0053	3.82	6.68	49.85	7.46	1.074	51.4
0.25	0.0054	3.98	6.69	50.50	7.54	1.086	52.0
0.26	0.0054	4.15	6.71	50.79	7.57	1.090	52.2
0.27	0.0055	4.31	6.72	51.07	7.60	1.095	52.4
0.28	0.0055	4.48	6.73	51.07	7.59	1.093	52.3
0.29	0.0055	4.65	6.74	51.35	7.62	1.097	52.5
0.30	0.0055	4.81	6.75	51.35	7.60	1.095	52.4
0.31	0.0055	4.98	6.77	51.07	7.55	1.087	52.0
0.32	0.0054	5.14	6.78	50.50	7.45	1.073	51.4
0.33	0.0054	5.31	6.79	50.13	7.38	1.063	50.9
0.34	0.0053	5.48	6.80	49.85	7.33	1.056	50.5

UNCONFINED COMPRESSIVE STRENGTH, q_u:	52.52	kPa
(based on maximum q_u value)	1.097	ksf
UNDRAINED SHEAR STRENGTH, S_u:	26.26	kPa
(based on maximum q_u value)	0.548	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)



AECOM
99 Commerce Drive
Winnipeg, MB, Canada R3P 0Y7
www.aecom.com

204 477 5381 tel
204 284 2040 fax

Memorandum

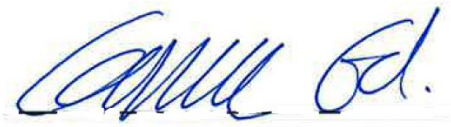
To	Linh Trinh	Page	1
CC			
Subject	Jefferson CSR Contract 8B – CoW - Test Results		
From	German Leal		
Date	March 24, 2023	Project Number	60680190.2.3 & 2.5

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

- Fifty-eight (58) Moisture Content Determination Test.
- Ten (10) Atterberg Limits (3 Points) Test.
- Thirteen (13) Grain Size Distribution (Hydrometer method) Test.
- Sixteen (16) 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,



German Leal, M.Eng., P.Eng.
Discipline Lead, Geotechnical

Att.

AECOM Canada Ltd.
Winnipeg Geotechnical Laboratory
99 Commerce Drive
Winnipeg, Manitoba
R3P 0Y7
Phone: 204 477 5381 Fax: 204 284 2040

Project Name:	Jefferson CSR Contract 8B & 10	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	LTrinh
Sample Location:	Winnipeg	Sample Date:	1/24-25/2023
Sample Depth:	Varies	Lab Technician:	LBoughton
Sample Number:	Varies	Date Tested:	February 13, 2023

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 (%)**
TH23-21	G1	1.37 - 1.52 m	**19.2%**
	S2	3.05 - 3.51 m	**34.0%**
	G3	4.42 - 4.57 m	**33.4%**
	T4	6.10 - 6.71 m	**45.0%**
	G5	7.47 - 7.62 m	**29.5%**
	S6	9.14 - 9.60 m	**31.0%**
	G7	10.52 - 10.67 m	**29.0%**
	T8	12.19 - 12.80 m	**-**
TH23-22	S1	0.61 - 1.07 m	**28.4%**
	G2	2.90 - 3.05 m	**32.1%**
	T3	4.57 - 5.18 m	**60.4%**
	G4	5.94 - 6.10 m	**37.4%**
	S5	7.62 - 8.08 m	**29.1%**
	G6	8.99 - 9.14 m	**31.0%**
	T7	10.67 - 11.28 m	**52.7%**
	G8	12.04 - 12.19 m	**32.1%**
	S9	13.72 - 14.17 m	**31.2%**
	G10	15.09 - 15.24 m	**11.2%**
	S11	16.76 - 17.22 m	**8.4%**
	G12	18.14 - 18.29 m	**8.6%**
TH23-23	G1	1.37 - 1.52 m	**20.2%**
	T2 (Clay)	3.05 - 3.66 m	**49.6%**
	G3	4.42 - 4.57 m	**34.2%**
	S4	6.10 - 6.55 m	**34.0%**
	G5	7.47 - 7.62 m	**31.8%**
	T6	9.14 - 9.75 m	**25.0%**
	G7	10.52 - 10.67 m	**37.7%**
	S8	12.19 - 12.65 m	**34.2%**
TH23-24	G1	1.37 - 1.52 m	**20.5%**
	S2	3.05 - 3.51 m	**31.8%**
	G3	4.42 - 4.57 m	**35.3%**
	T4	6.10 - 6.71 m	**50.6%**
	G5	7.47 - 7.62 m	**29.6%**
	S6	9.14 - 9.60 m	**33.3%**
	G7	10.52 - 10.67 m	**32.6%**
	T8	12.19 - 12.80 m	**25.4%**
TH23-25	S1	1.52 - 1.98 m	**19.5%**
	G2	2.90 - 3.05 m	**27.2%**
	T3	4.57 - 5.18 m	**55.0%**
	G4	5.94 - 6.10 m	**30.9%**
	T5	7.62 - 8.23 m	**43.7%**
	G6	8.99 - 9.14 m	**31.8%**
	S7	10.67 - 11.13 m	**28.9%**
	G8	12.04 - 1.52 m	**21.6%**
TH23-26	S1	1.52 - 1.98 m	**25.4%**
	G2	2.90 - 3.05 m	**30.8%**
	T3	4.57 - 5.18 m	**56.1%**
	G4	5.94 - 6.10 m	**22.2%**
	S5	7.62 - 8.08 m	**22.7%**
	G6	8.99 - 9.14 m	**24.8%**
	T7	10.67 - 11.28 m	**51.1%**
	G8	12.04 - 12.19 m	**20.7%**
TH23-27	G1	1.37 - 1.52 m	**15.4%**
	T2	3.05 - 3.66 m	**49.6%**
	G3	4.42 - 4.57 m	**33.7%**
	S4	6.10 - 6.55 m	**31.8%**
TH23-28	G1	1.37 - 1.52 m	**18.8%**
	S2	3.05 - 3.51 m	**30.8%**
	G3	4.42 - 4.57 m	**29.0%**
	T4	6.10 - 6.71 m	**51.5%**
	G5	7.47 - 7.62 m	**33.6%**
	S6	9.14 - 9.60 m	**26.1%**
	G7	10.52 - 10.67 m	**21.4%**
	T8	12.19 - 12.80 m	**49.7%**
	G9	13.56 - 13.72 m	**30.7%**
	S10	15.24 - 15.70 m	**9.9%**
TH23-29	S1	1.52 - 1.98 m	**17.3%**
	G2	2.90 - 3.05 m	**23.9%**
	T3	4.57 - 5.18 m	**56.9%**
	G4	5.94 - 6.10 m	**28.1%**
	S5	7.62 - 8.08 m	**26.2%**
	G6	8.99 - 9.14 m	**25.5%**
	T7	10.67 - 11.28 m	**17.4%**
	G8	12.04 - 12.19 m	**28.5%**

AECOM Canada Ltd.
Winnipeg Geotechnical Laboratory
99 Commerce Drive
Winnipeg, Manitoba
R3P 0Y7
Phone: 204 477 5381 Fax: 204 284 2040

CERTIFIED BY CCIL

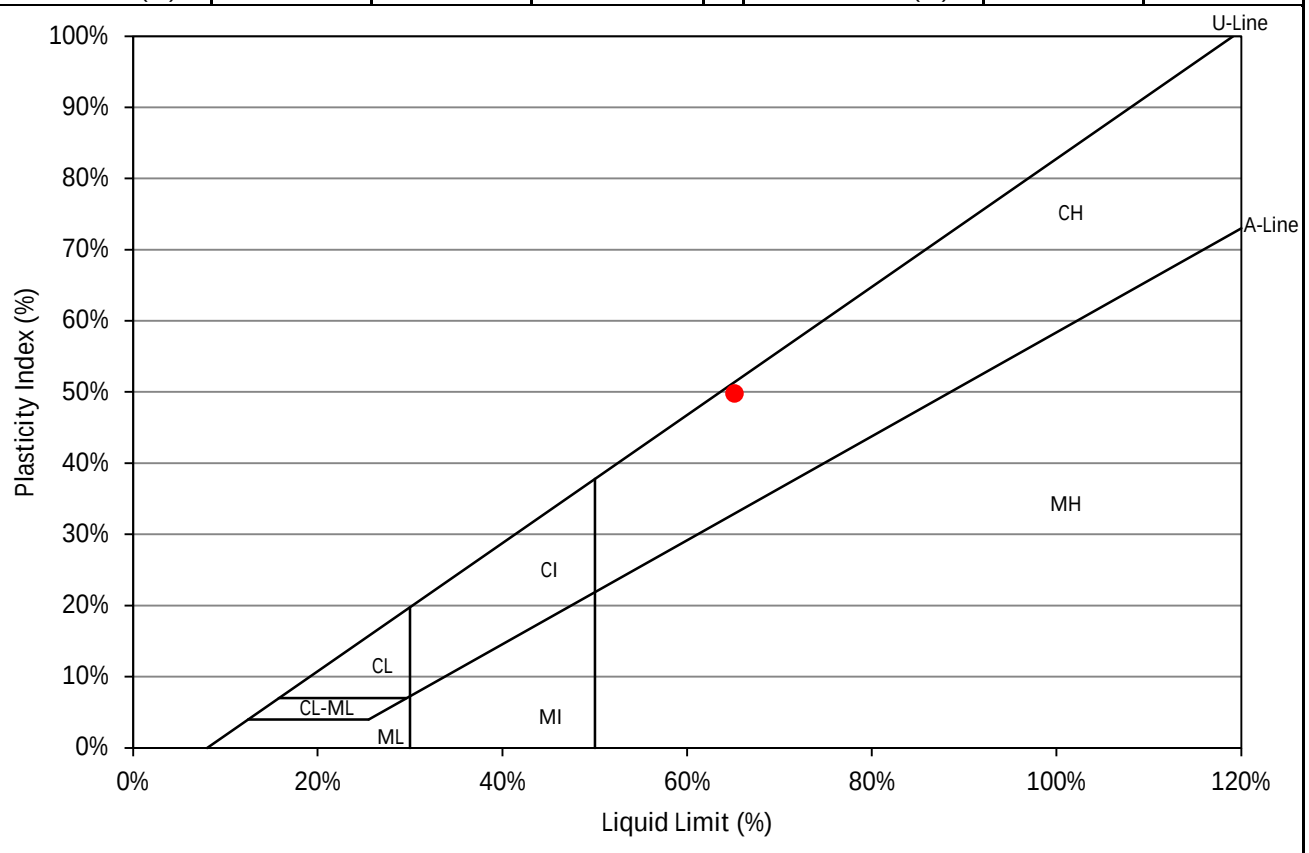
Project Name:	Jefferson CSR Contract 8B & 10	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	LTrinh
Sample Location:	TH23-21	Sample Date:	Varies
Sample Depth:	6.10 - 6.71 m	Lab Technician:	LBoughton
Sample Number:	T4	Date Tested:	March 17, 2023

Atterberg Limits (ASTM D4318)

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

Liquid Limit			
Blows	35	22	16
Wet Sample (g)	11.7	10.9	9.7
Dry Sample (g)	7.2	6.5	5.8
Water Content (%)	63.1%	66.0%	67.8%

Plastic Limit		
Trial	1	2
Wet Sample (g)	5.6	5.5
Dry Sample (g)	4.9	4.8
Water Content (%)	15.2%	15.5%



Liquid Limit (%): 65.1%	Plastic Limit (%): 15.3%	Plasticity Index (%): 49.8%

AECOM Canada Ltd.
Winnipeg Geotechnical Laboratory
99 Commerce Drive
Winnipeg, Manitoba
R3P 0Y7
Phone: 204 477 5381 Fax: 204 284 2040

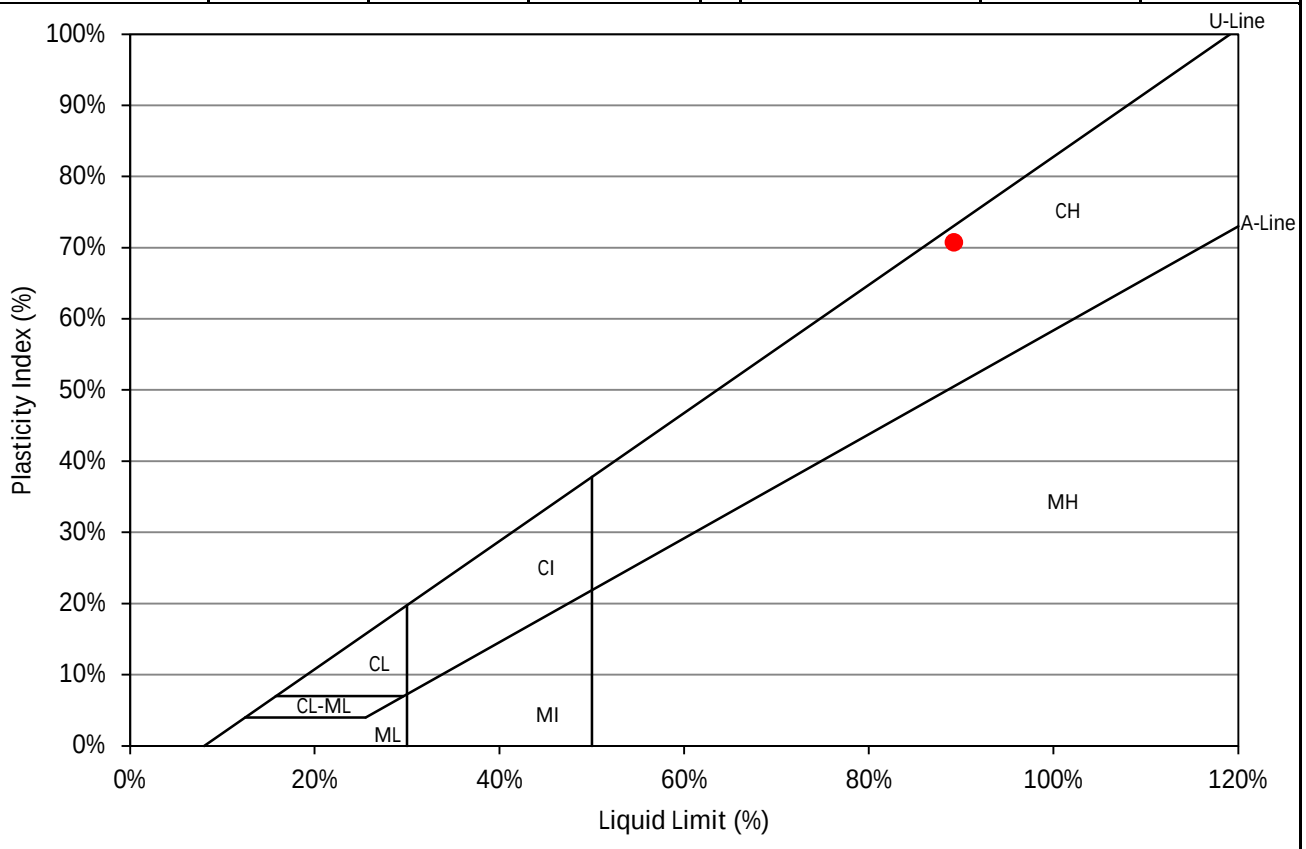
Project Name:	Jefferson CSR Contract 8B & 10	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	LTrinh
Sample Location:	TH23-22	Sample Date:	Varies
Sample Depth:	4.57 - 5.18 m	Lab Technician:	LBoughton
Sample Number:	T3	Date Tested:	March 17, 2023

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)	10.0	10.0	9.5
Dry Sample (g)	5.3	5.3	4.9
Water Content (%)	88.0%	89.7%	93.2%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.0	6.0
Dry Sample (g)	5.1	5.1
Water Content (%)	17.9%	19.1%



Liquid Limit (%): 89.2%	Plastic Limit (%): 18.5%	Plasticity Index (%): 70.7%

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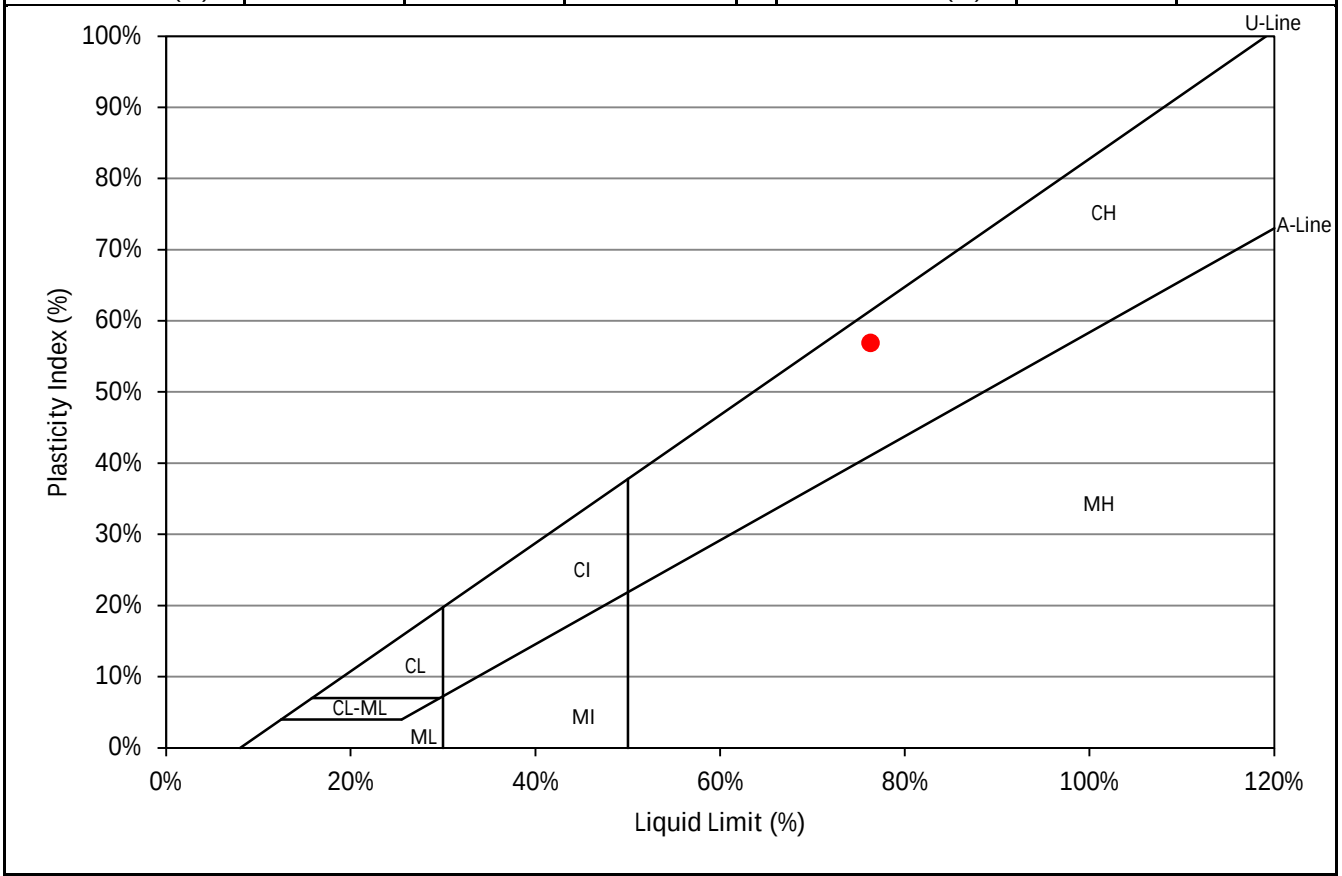
Project Name:	Jefferson CSR Contract 8B & 10	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	LTrinh
Sample Location:	TH23-23	Sample Date:	Varies
Sample Depth:	1.52 - 2.13 m	Lab Technician:	LBoughton
Sample Number:	G1	Date Tested:	March 2, 2023

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)	11.0	12.0	13.6
Dry Sample (g)	6.3	6.8	7.7
Water Content (%)	74.4%	76.1%	77.3%

Plastic Limit		
Trial	1	2
Wet Sample (g)	5.8	7.1
Dry Sample (g)	4.9	6.0
Water Content (%)	19.3%	19.5%



Liquid Limit (%): 76.3%	Plastic Limit (%): 19.4%	Plasticity Index (%): 56.9%

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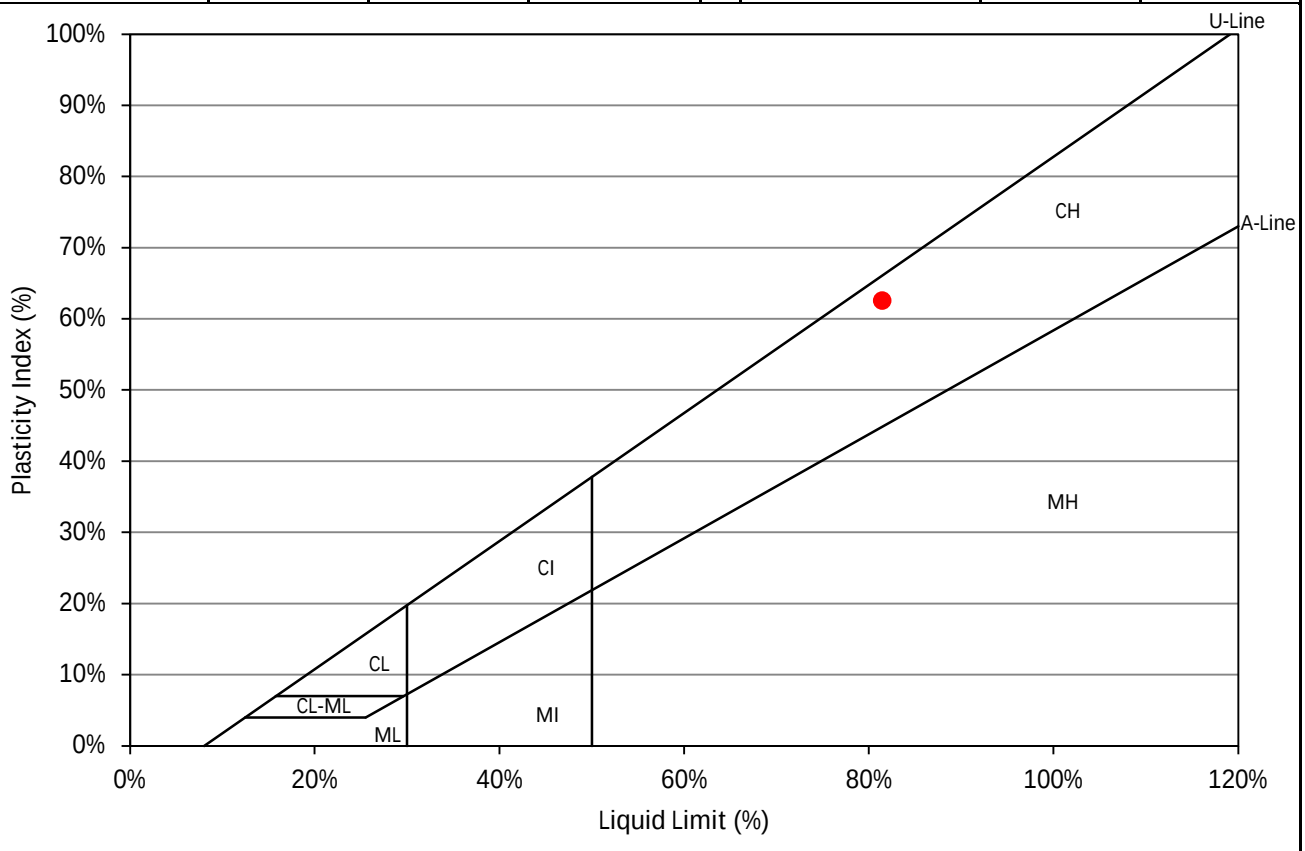
Project Name:	Jefferson CSR Contract 8B & 10	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	LTrinh
Sample Location:	TH23-23	Sample Date:	Varies
Sample Depth:	3.05 - 3.66 m	Lab Technician:	LBoughton
Sample Number:	T2	Date Tested:	March 17, 2023

Atterberg Limits (ASTM D4318)

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

Liquid Limit			
Blows	30	26	16
Wet Sample (g)	12.8	9.5	10.1
Dry Sample (g)	7.2	5.2	5.5
Water Content (%)	79.1%	82.0%	85.1%

Plastic Limit		
Trial	1	2
Wet Sample (g)	5.4	4.9
Dry Sample (g)	4.6	4.1
Water Content (%)	18.7%	19.1%



Liquid Limit (%): 81.5%	Plastic Limit (%): 18.9%	Plasticity Index (%): 62.6%

Note: Sample tested was clay.

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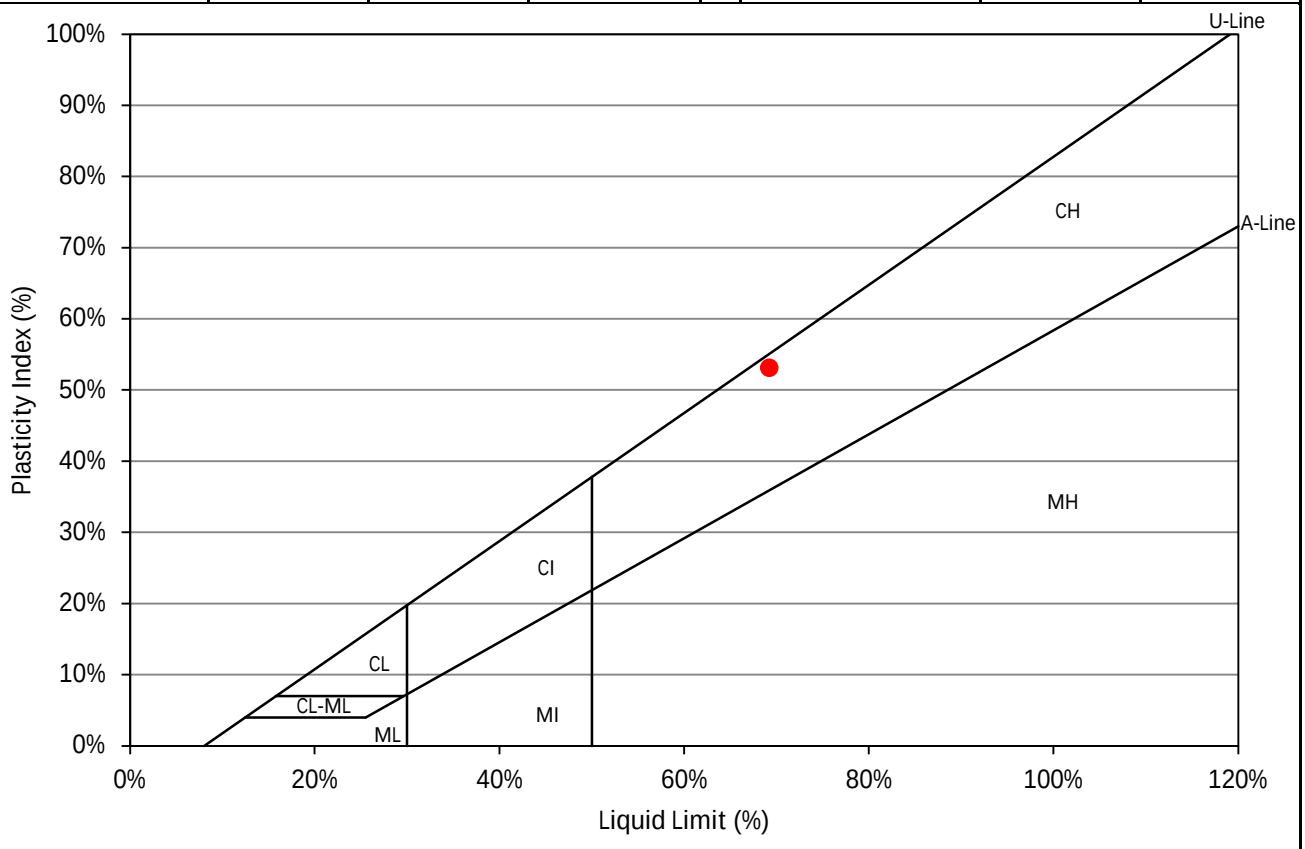
Project Name:	Jefferson CSR Contract 8B & 10	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	LTrinh
Sample Location:	TH23-24	Sample Date:	Varies
Sample Depth:	6.10 - 6.71 m	Lab Technician:	LBoughton
Sample Number:	T4	Date Tested:	March 17, 2023

Atterberg Limits (ASTM D4318)

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

Liquid Limit			
Blows	31	20	17
Wet Sample (g)	11.2	9.4	10.6
Dry Sample (g)	6.7	5.5	6.1
Water Content (%)	67.9%	70.3%	72.2%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.0	5.7
Dry Sample (g)	5.2	5.0
Water Content (%)	16.6%	15.6%



Liquid Limit (%): 69.2%	Plastic Limit (%): 16.1%	Plasticity Index (%): 53.1%

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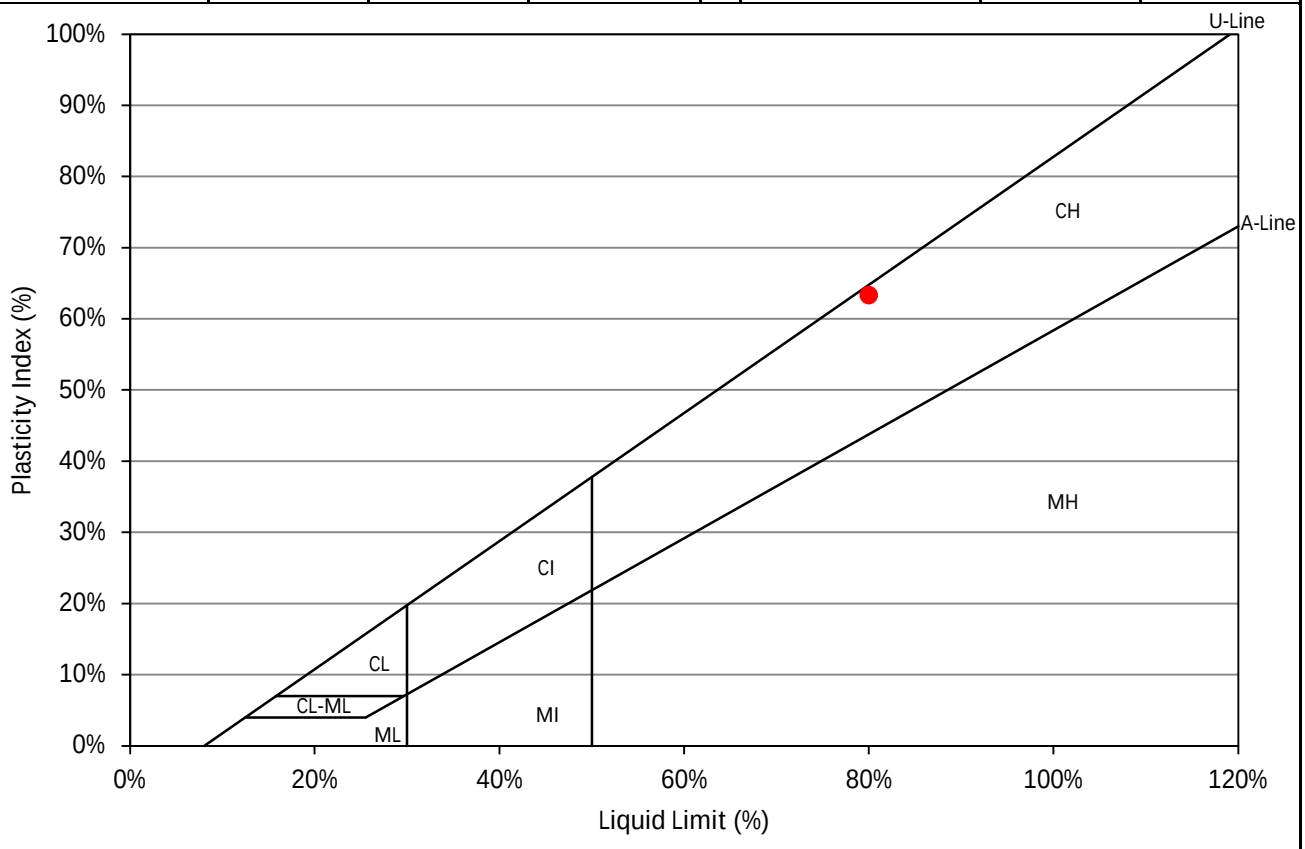
Project Name:	Jefferson CSR Contract 8B & 10	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	LTrinh
Sample Location:	TH23-25	Sample Date:	Varies
Sample Depth:	4.57 - 5.18 m	Lab Technician:	LBoughton
Sample Number:	T3	Date Tested:	March 17, 2023

Atterberg Limits (ASTM D4318)

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

Liquid Limit			
Blows	30	21	17
Wet Sample (g)	12.3	8.7	9.4
Dry Sample (g)	6.9	4.8	5.1
Water Content (%)	78.7%	80.6%	83.1%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.6	5.6
Dry Sample (g)	5.7	4.8
Water Content (%)	16.3%	17.1%



Liquid Limit (%): 80.0%	Plastic Limit (%): 16.7%	Plasticity Index (%): 63.3%

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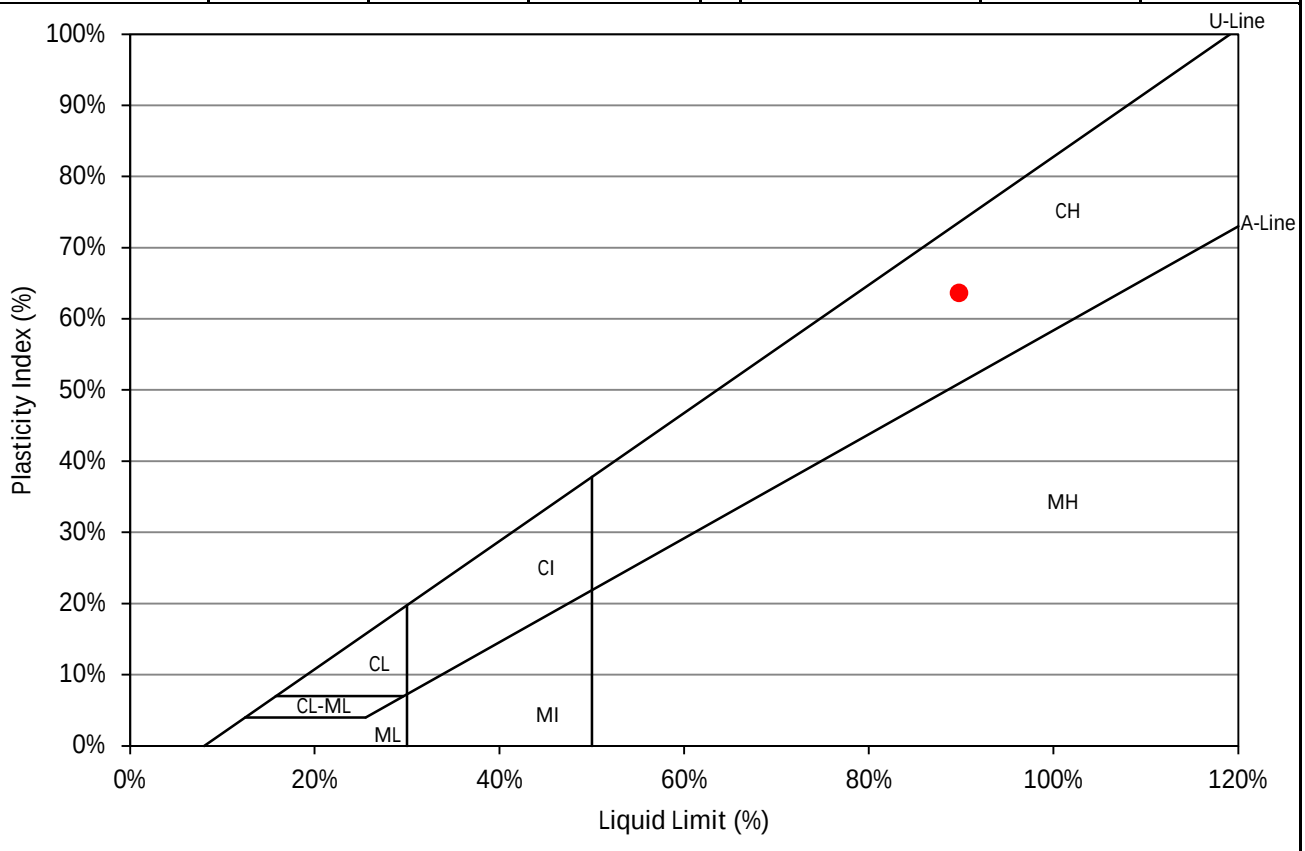
Project Name:	Jefferson CSR Contract 8B & 10	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	LTrinh
Sample Location:	TH23-26	Sample Date:	Varies
Sample Depth:	4.57 - 5.18 m	Lab Technician:	LBoughton
Sample Number:	T3	Date Tested:	March 21, 2023

Atterberg Limits (ASTM D4318)

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

Liquid Limit			
Blows	34	28	23
Wet Sample (g)	8.8	10.1	8.2
Dry Sample (g)	4.7	5.3	4.3
Water Content (%)	86.6%	88.4%	90.6%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.4	6.9
Dry Sample (g)	5.1	5.5
Water Content (%)	26.1%	26.2%



Liquid Limit (%): 89.8%	Plastic Limit (%): 26.1%	Plasticity Index (%): 63.6%

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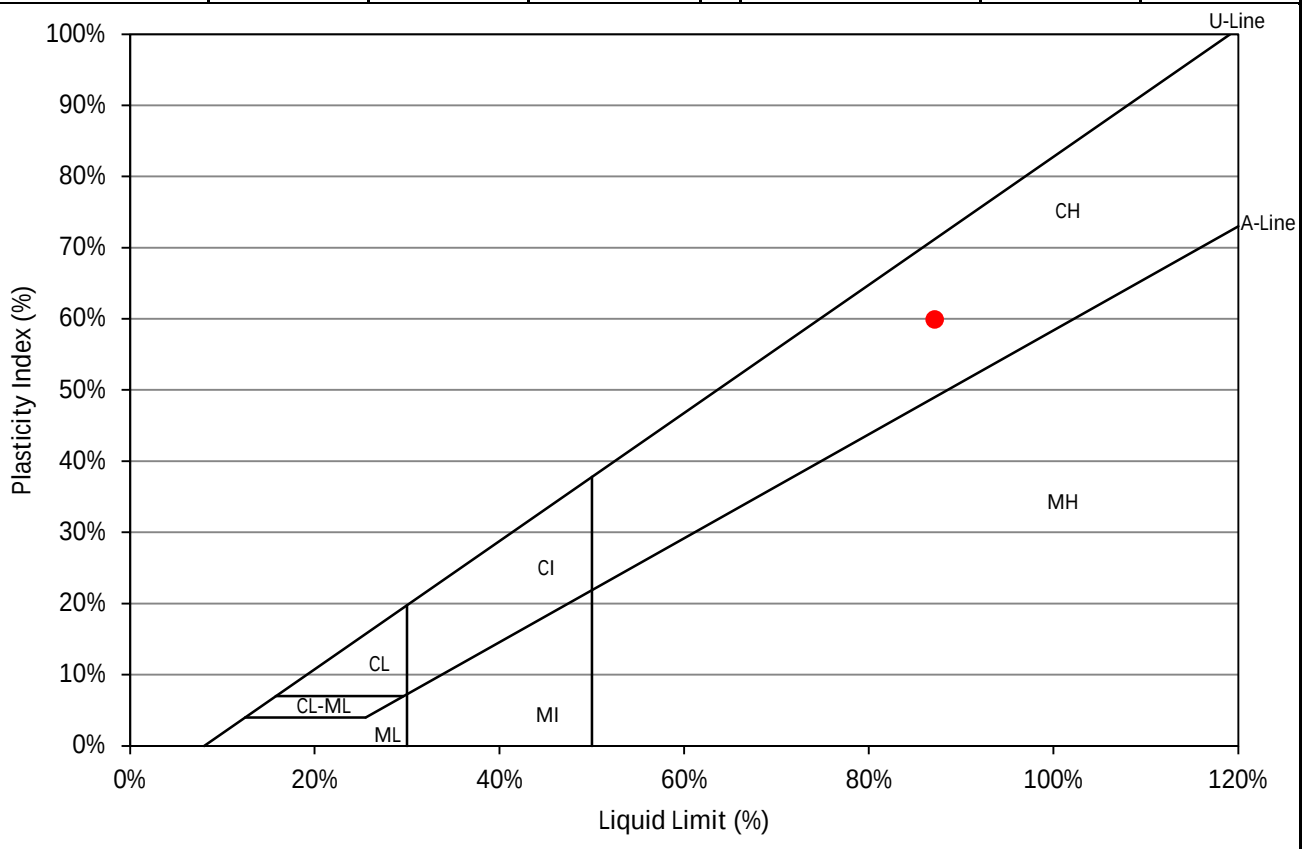
Project Name:	Jefferson CSR Contract 8B & 10	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	LTrinh
Sample Location:	TH23-27	Sample Date:	Varies
Sample Depth:	3.05 - 3.66 m	Lab Technician:	LBoughton
Sample Number:	T2	Date Tested:	March 17, 2023

Atterberg Limits (ASTM D4318)

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

Liquid Limit			
Blows	31	23	19
Wet Sample (g)	10.3	11.2	9.0
Dry Sample (g)	5.6	6.0	4.7
Water Content (%)	85.6%	87.2%	89.7%

Plastic Limit		
Trial	1	2
Wet Sample (g)	6.5	6.5
Dry Sample (g)	5.1	5.1
Water Content (%)	27.4%	27.2%



Liquid Limit (%): 87.2%	Plastic Limit (%): 27.3%	Plasticity Index (%): 59.9%

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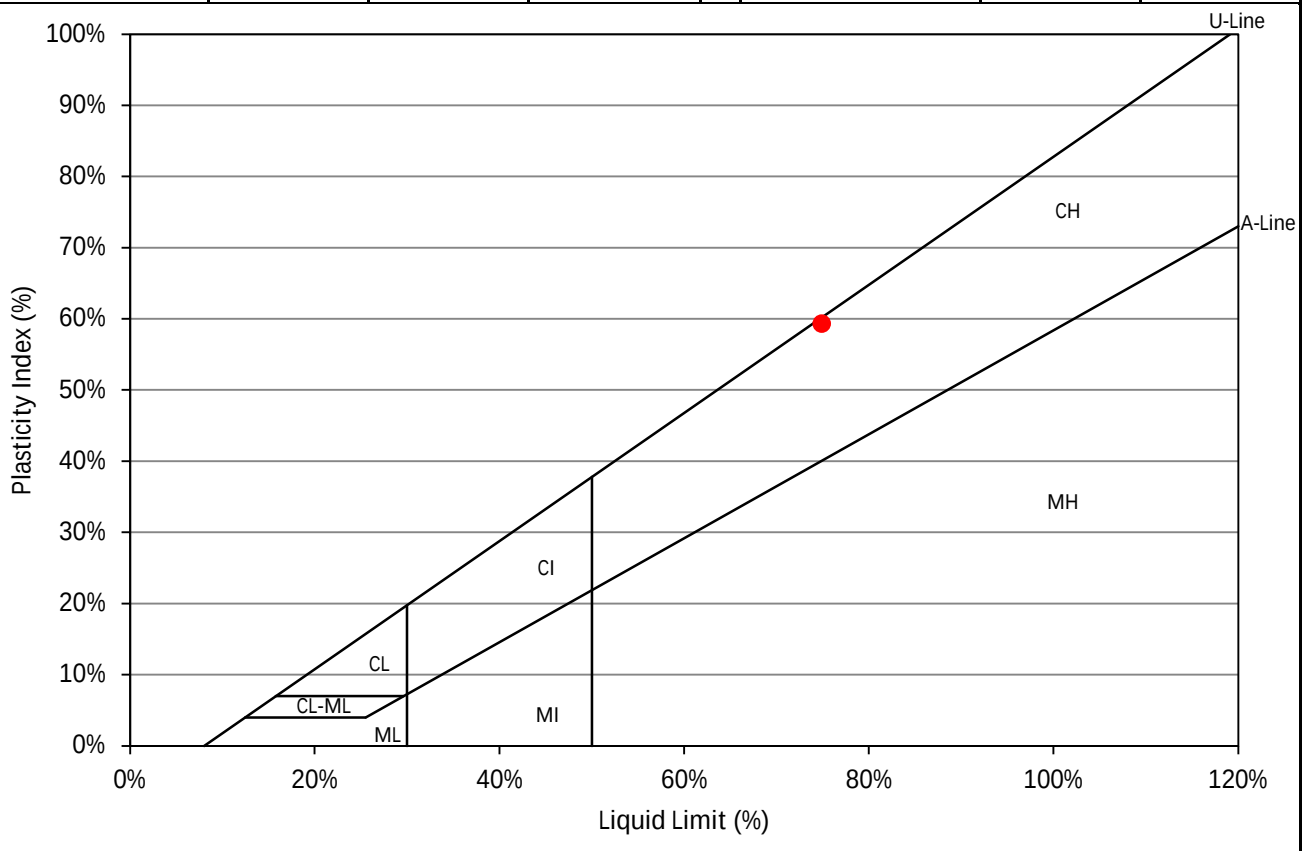
Project Name:	Jefferson CSR Contract 8B & 10	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	LTrinh
Sample Location:	TH23-28	Sample Date:	Varies
Sample Depth:	6.10 - 6.71 m	Lab Technician:	LBoughton
Sample Number:	T4	Date Tested:	March 17, 2023

Atterberg Limits (ASTM D4318)

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

Liquid Limit			
Blows	35	29	20
Wet Sample (g)	8.4	9.7	8.7
Dry Sample (g)	4.9	5.6	4.9
Water Content (%)	72.3%	73.9%	76.9%

Plastic Limit		
Trial	1	2
Wet Sample (g)	5.4	5.7
Dry Sample (g)	4.7	4.9
Water Content (%)	15.4%	15.8%



Liquid Limit (%): 74.9%	Plastic Limit (%): 15.6%	Plasticity Index (%): 59.3%

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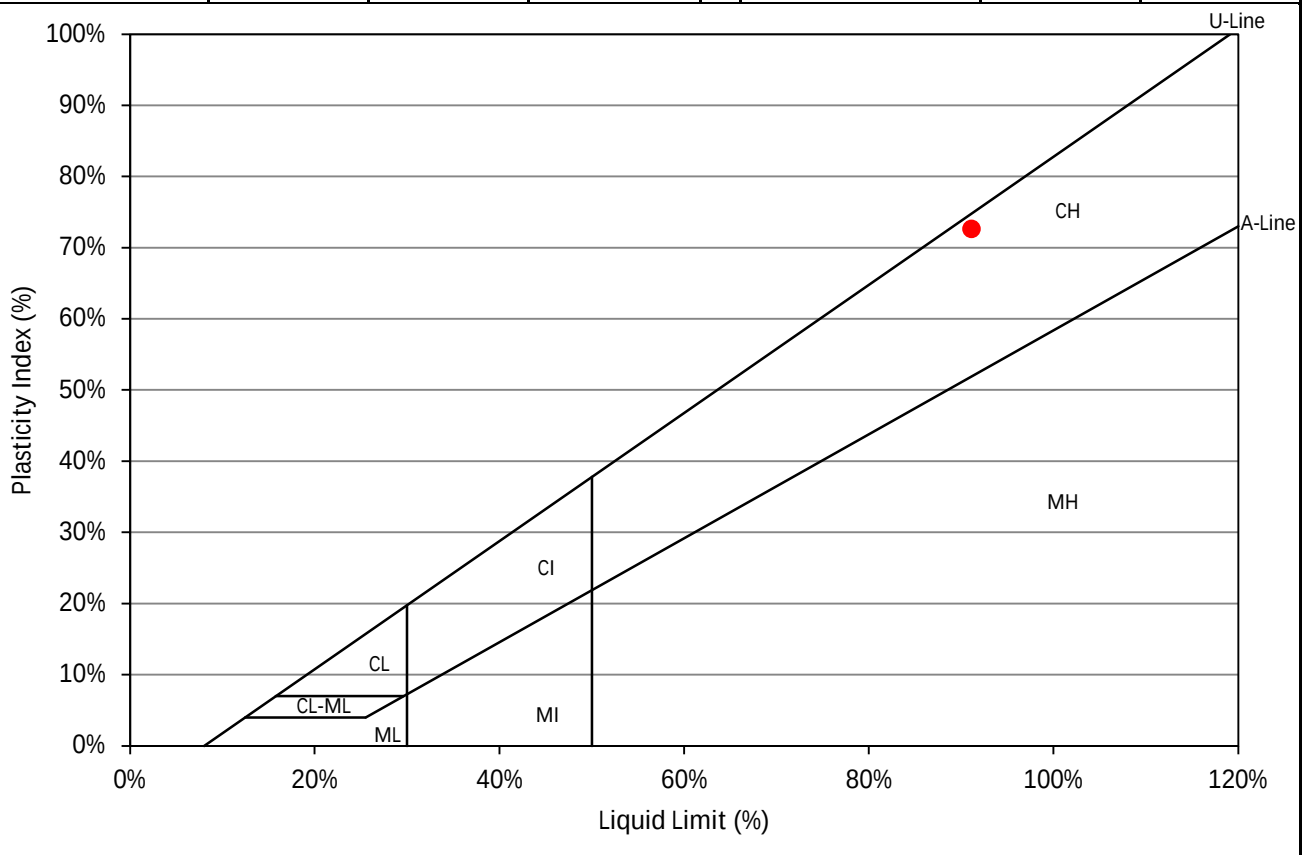
Project Name:	Jefferson CSR Contract 8B & 10	Supplier:	AECOM
Project Number:	60680190	Specification:	N/A
Client:	CoW	Field Technician:	LTrinh
Sample Location:	TH23-29	Sample Date:	Varies
Sample Depth:	4.57 - 5.18 m	Lab Technician:	LBoughton
Sample Number:	T3	Date Tested:	March 2, 2023

Atterberg Limits (ASTM D4318)

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

Liquid Limit			
Blows	35	22	19
Wet Sample (g)	8.3	8.9	9.0
Dry Sample (g)	4.4	4.7	4.7
Water Content (%)	88.3%	91.5%	94.0%

Plastic Limit		
Trial	1	2
Wet Sample (g)	5.9	5.4
Dry Sample (g)	5.0	4.5
Water Content (%)	18.5%	18.5%



Liquid Limit (%): 91.1%	Plastic Limit (%): 18.5%	Plasticity Index (%): 72.6%

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

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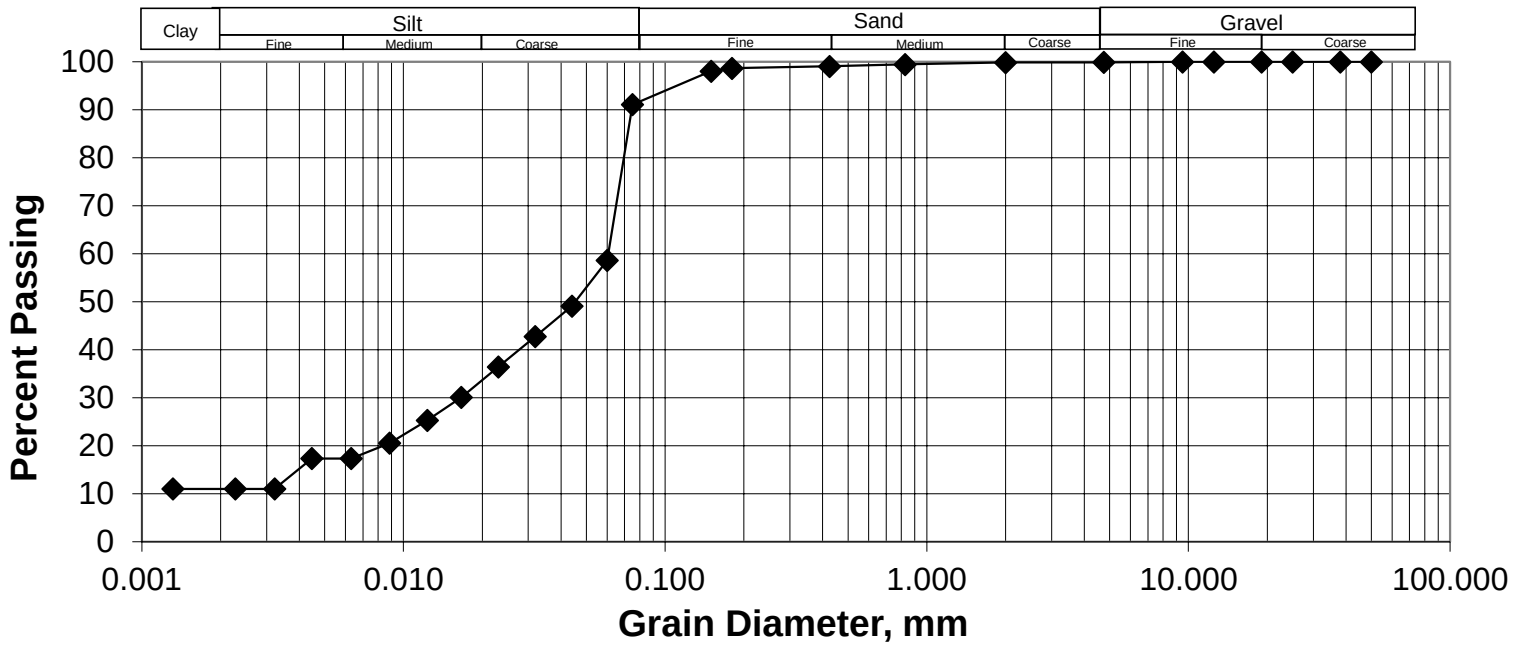
Job No.:	60680190	Hole No.:	TH23-21
Client:	COW	Sample No.:	G1
Project :	Jefferson CSR Contract 8B & 10	Depth:	1.52 - 1.68 m
Date Tested:	24-Feb-23	Date Sampled:	Varies
Tested By:	Lee Boughton	Sampled By:	AECOM

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	91.1
38.0	100.0	2.00	99.9	0.0600	58.6
25.0	100.0	0.825	99.5	0.0440	49.1
19.0	100.0	0.425	99.1	0.0318	42.8
12.5	100.0	0.18	98.7	0.0230	36.4
9.5	100.0	0.15	98.1	0.0166	30.1
4.75	99.9	0.075	91.1	0.0123	25.3
				0.0088	20.6
				0.0063	17.4
				0.0045	17.4
				0.0032	11.0
				0.0023	11.0
				0.0013	11.0

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.1%**	**Silt**	**80.1%**
Sand	**8.8%**	**Clay**	**11.0%**

GRAIN SIZE DISTRIBUTION
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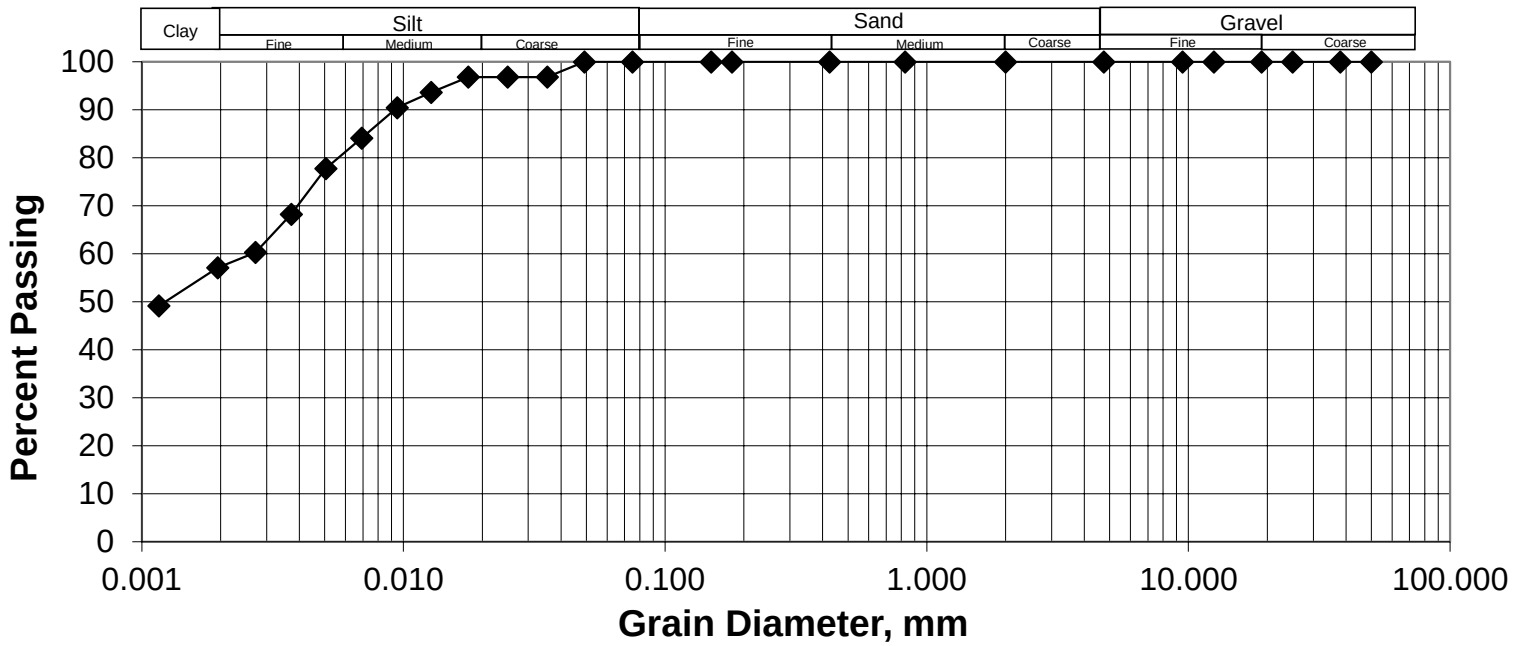
Job No.:	60680190	Hole No.:	TH23-21
Client:	City of Winnipeg	Sample No.:	T4
Project :	Jefferson CSR Contract 8B & 10	Depth:	6.10 - 6.71 m
Date Tested:	14-Mar-23	Date Sampled:	Varies
Tested By:	Lee Boughton	Sampled By:	AECOM

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	0.0177	96.8
9.5	100.0	0.15	100.0	0.0127	93.6
4.75	100.0	0.075	100.0	0.0095	90.5
				0.0069	84.1
				0.0050	77.8
				0.0037	68.2
				0.0027	60.3
				0.0019	57.1
				0.0012	49.2

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**42.5%**
Sand	**0.0%**	**Clay**	**57.5%**

GRAIN SIZE DISTRIBUTION
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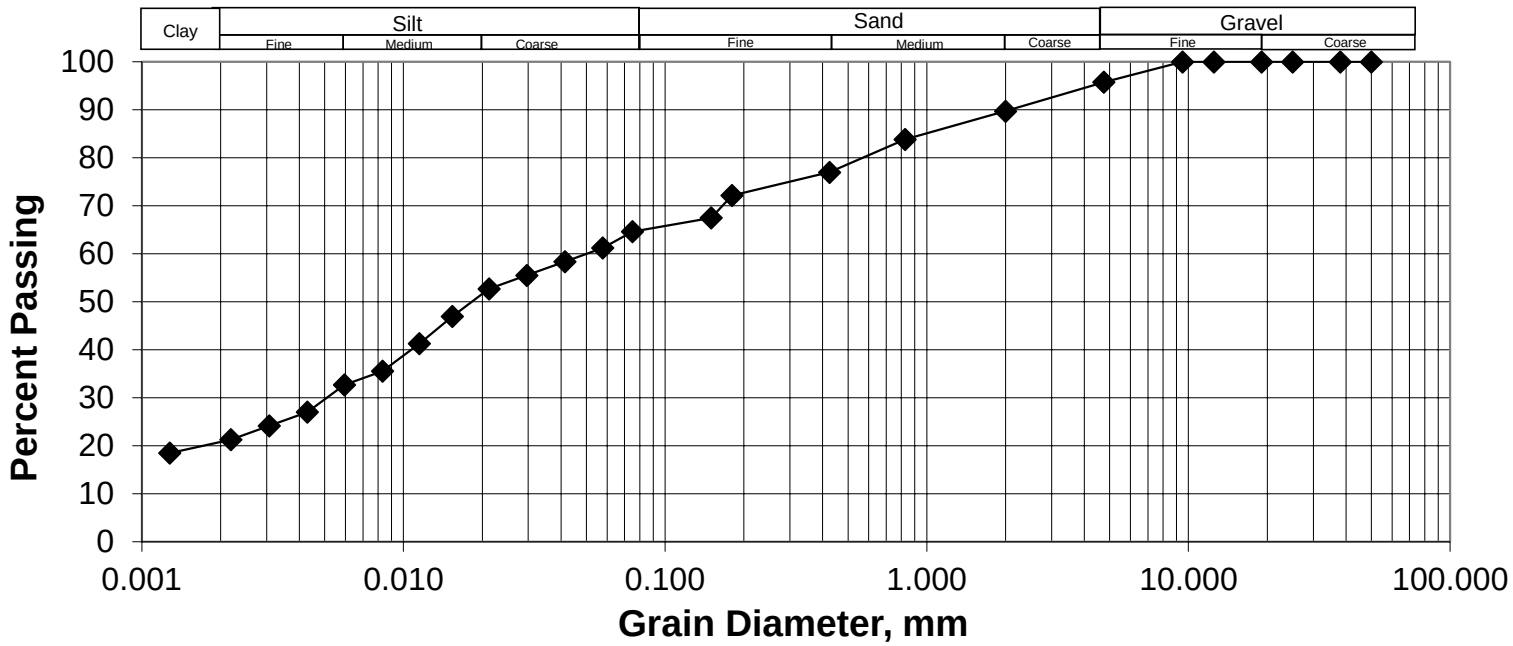
Job No.:	60680190	Hole No.:	TH23-22
Client:	City of Winnipeg	Sample No.:	G10
Project :	Jefferson CSR Contract 8B & 10	Depth:	15.24 - 15.39 m
Date Tested:	14-Mar-23	Date Sampled:	Varies
Tested By:	Lee Boughton	Sampled By:	AECOM

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	95.8	0.0750	64.6
38.0	100.0	2.00	89.7	0.0577	61.2
25.0	100.0	0.825	83.8	0.0413	58.4
19.0	100.0	0.425	77.0	0.0296	55.5
12.5	100.0	0.18	72.1	0.0212	52.7
9.5	100.0	0.15	67.5	0.0154	47.0
4.75	95.8	0.075	64.6	0.0115	41.3
				0.0083	35.6
				0.0059	32.7
				0.0043	27.0
				0.0031	24.2
				0.0022	21.3
				0.0013	18.5

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**4.2%**	**Silt**	**43.5%**
Sand	**31.2%**	**Clay**	**21.1%**

GRAIN SIZE DISTRIBUTION
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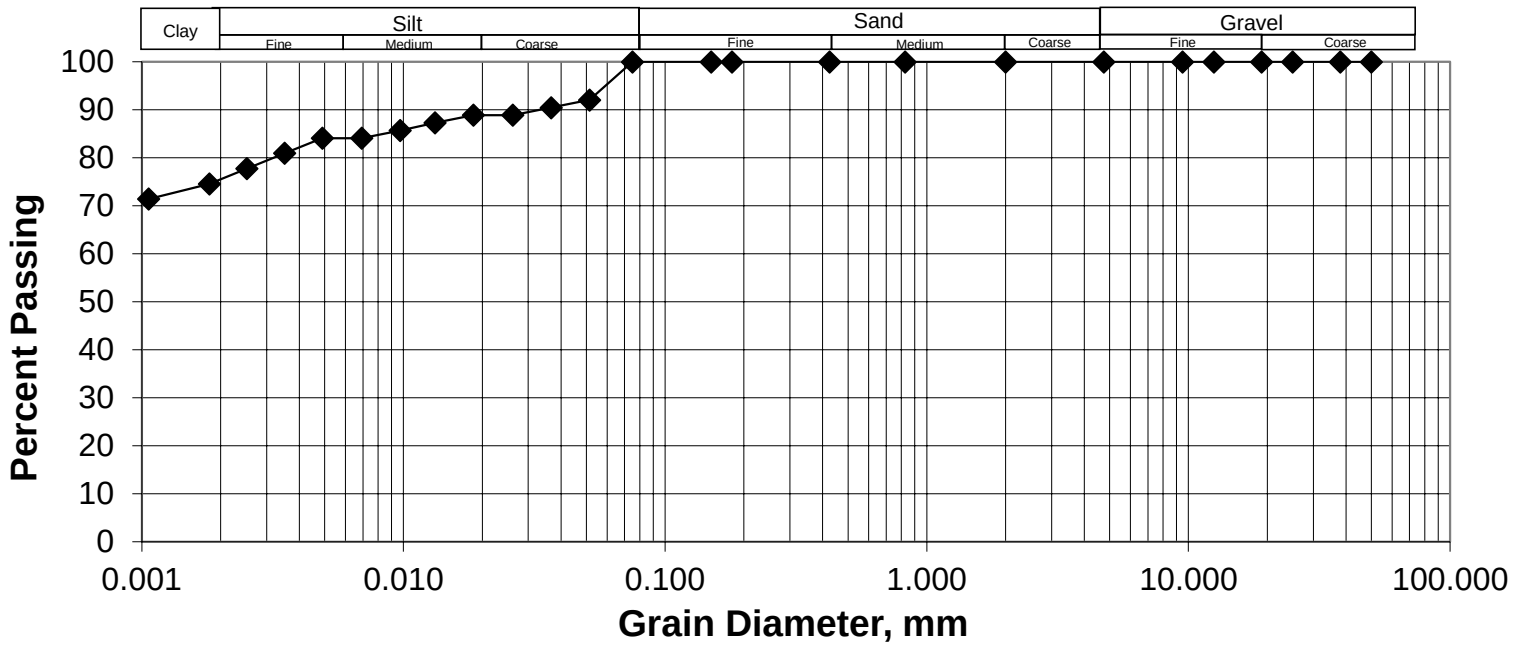
Job No.:	60680190	Hole No.:	TH23-22
Client:	City of Winnipeg	Sample No.:	T3
Project :	Jefferson CSR Contract 8B & 10	Depth:	4.57 - 5.18 m
Date Tested:	14-Mar-23	Date Sampled:	Varies
Tested By:	Lee Boughton	Sampled By:	AECOM

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	0.0514	92.1
25.0	100.0	0.825	100.0	0.0367	90.5
19.0	100.0	0.425	100.0	0.0261	88.9
12.5	100.0	0.18	100.0	0.0185	88.9
9.5	100.0	0.15	100.0	0.0132	87.3
4.75	100.0	0.075	100.0	0.0097	85.7
				0.0069	84.1
				0.0049	84.1
				0.0035	80.9
				0.0025	77.8
				0.0018	74.6
				0.0011	71.4

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**24.5%**
Sand	**0.0%**	**Clay**	**75.5%**

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

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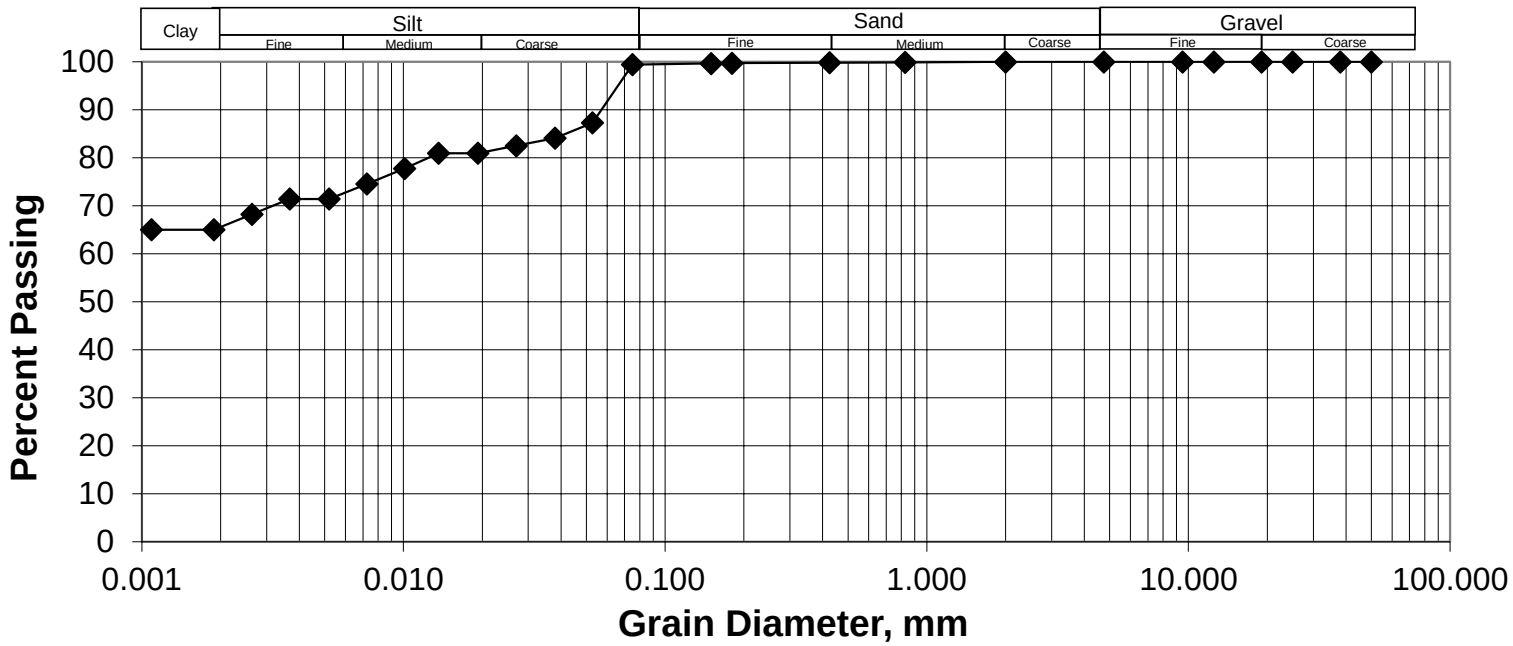
Job No.:	60680190	Hole No.:	TH23-23
Client:	COW	Sample No.:	G1
Project :	Jefferson CSR Contract 8B & 10	Depth:	1.52 - 1.68 m
Date Tested:	24-Feb-23	Date Sampled:	Varies
Tested By:	Lee Boughton	Sampled By:	AECOM

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	99.4
38.0	100.0	2.00	100.0	0.0527	87.3
25.0	100.0	0.825	99.9	0.0379	84.1
19.0	100.0	0.425	99.8	0.0270	82.5
12.5	100.0	0.18	99.7	0.0192	80.9
9.5	100.0	0.15	99.7	0.0136	80.9
4.75	100.0	0.075	99.4	0.0101	77.8
				0.0072	74.6
				0.0052	71.4
				0.0037	71.4
				0.0026	68.2
				0.0019	65.1
				0.0011	65.1

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**33.9%**
Sand	**0.6%**	**Clay**	**65.5%**

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

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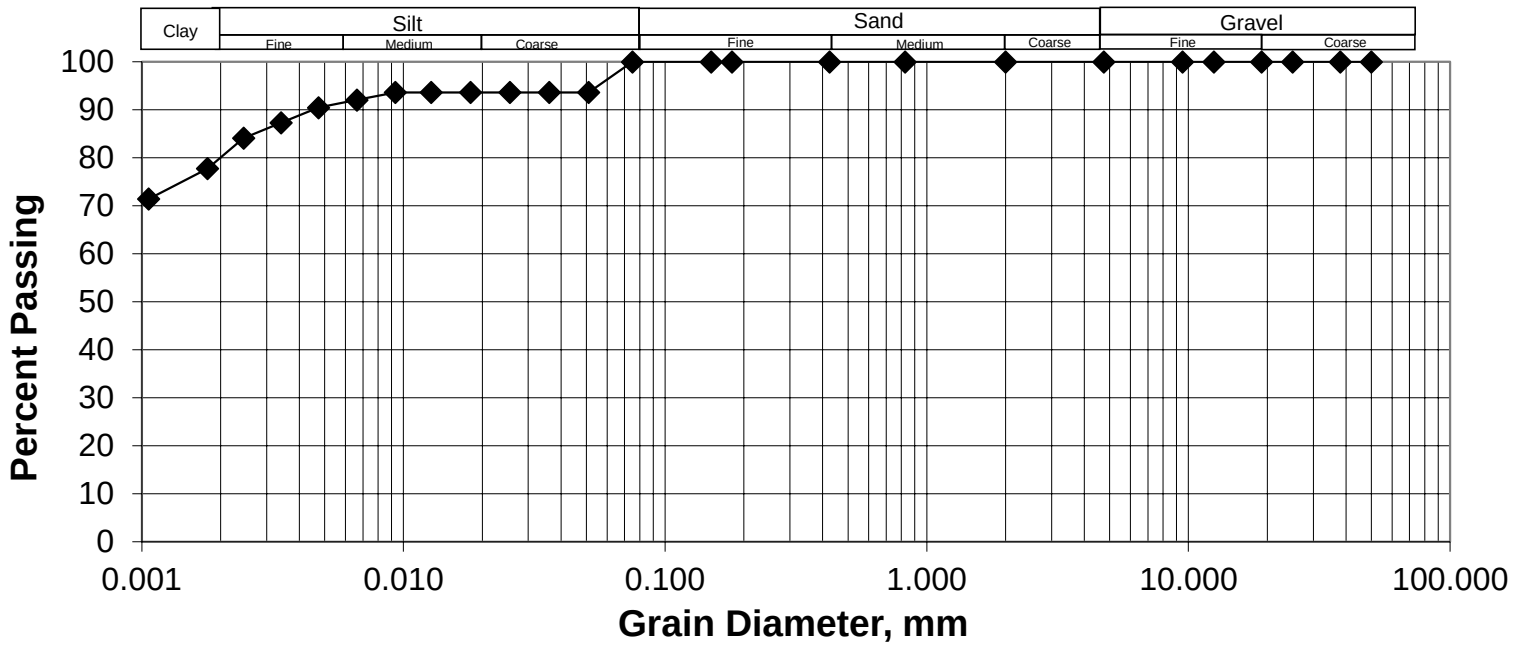
Job No.:	60680190	Hole No.:	TH23-23
Client:	City of Winnipeg	Sample No.:	T2
Project :	Jefferson CSR Contract 8B & 10	Depth:	3.05 - 3.66 m
Date Tested:	14-Mar-23	Date Sampled:	Varies
Tested By:	Lee Boughton	Sampled By:	AECOM

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	0.0510	93.6
25.0	100.0	0.825	100.0	0.0360	93.6
19.0	100.0	0.425	100.0	0.0255	93.6
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
				0.0066	92.1
				0.0047	90.5
				0.0034	87.3
				0.0024	84.1
				0.0018	77.8
				0.0011	71.4

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**20.1%**
Sand	**0.0%**	**Clay**	**79.9%**

Note: Sample tested was clay.

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

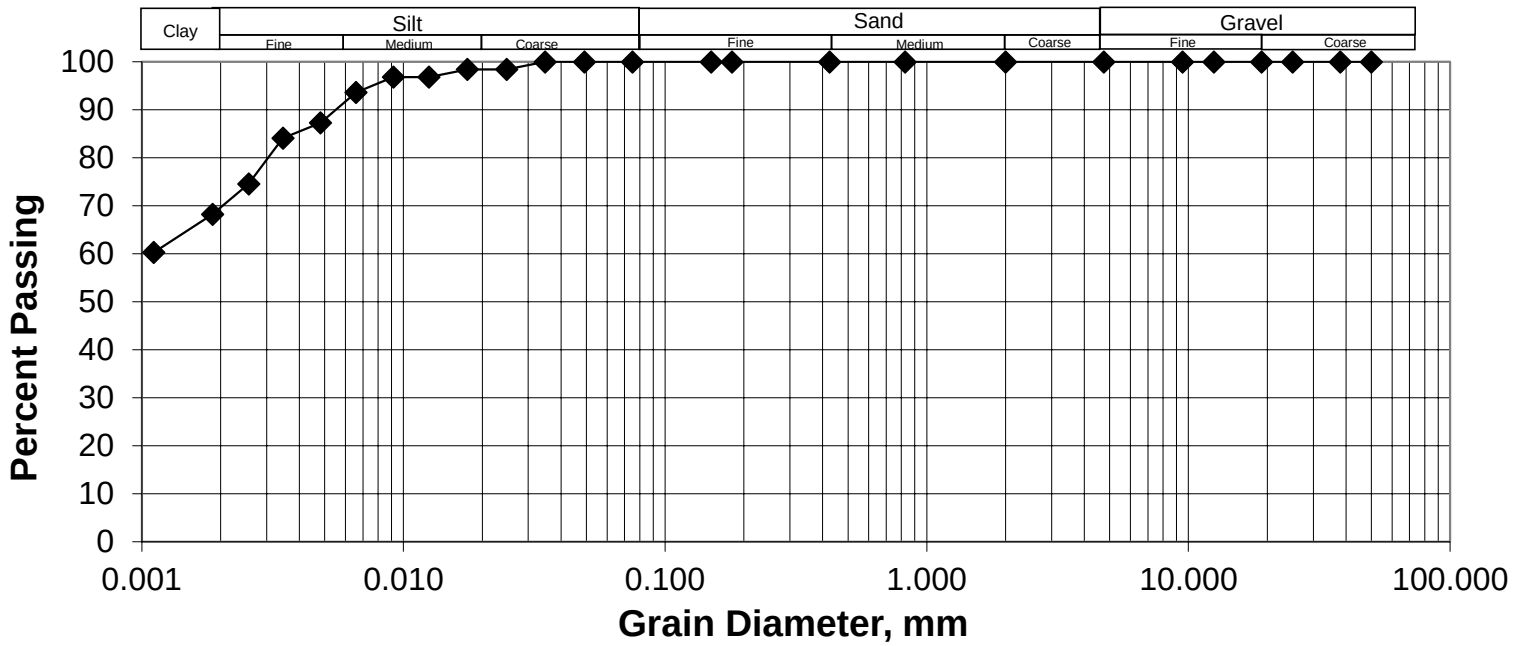
AECOM
WINNIPEG GEOTECHNICAL LABORATORY
99 Commerce Dr., Winnipeg, MB R3P 0Y7 Canada
tel (204) 477-5381 **fax** (431) 800-1210

CERTIFIED BY CCIL

Job No.:	60680190	Hole No.:	TH23-24
Client:	City of Winnipeg	Sample No.:	T4
Project :	Jefferson CSR Contract 8B & 10	Depth:	6.10 - 6.71 m
Date Tested:	14-Mar-23	Date Sampled:	Varies
Tested By:	Lee Boughton	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	0.0091	96.8
				0.0066	93.6
				0.0048	87.3
				0.0035	84.1
				0.0026	74.6
				0.0019	68.2
				0.0011	60.3

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**30.5%**
Sand	**0.0%**	**Clay**	**69.5%**

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

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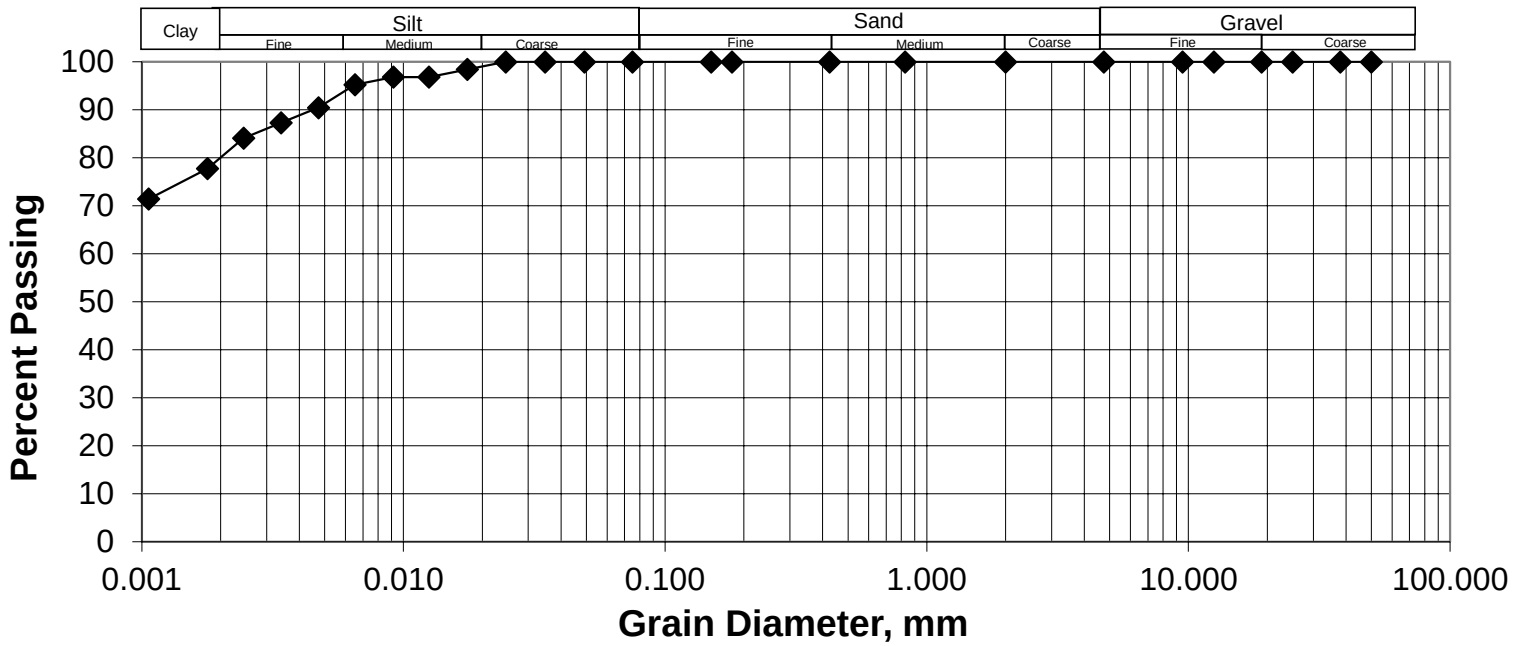
CERTIFIED BY CCIL

Job No.:	60680190	Hole No.:	TH23-25
Client:	City of Winnipeg	Sample No.:	T3
Project :	Jefferson CSR Contract 8B & 10	Depth:	4.57 - 5.18 m
Date Tested:	14-Mar-23	Date Sampled:	Varies
Tested By:	Lee Boughton	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	0.0175	98.4
9.5	100.0	0.15	100.0	0.0125	96.8
4.75	100.0	0.075	100.0	0.0091	96.8
				0.0065	95.2
				0.0047	90.5
				0.0034	87.3
				0.0024	84.1
				0.0018	77.8
				0.0011	71.4

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**20.1%**
Sand	**0.0%**	**Clay**	**79.9%**

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

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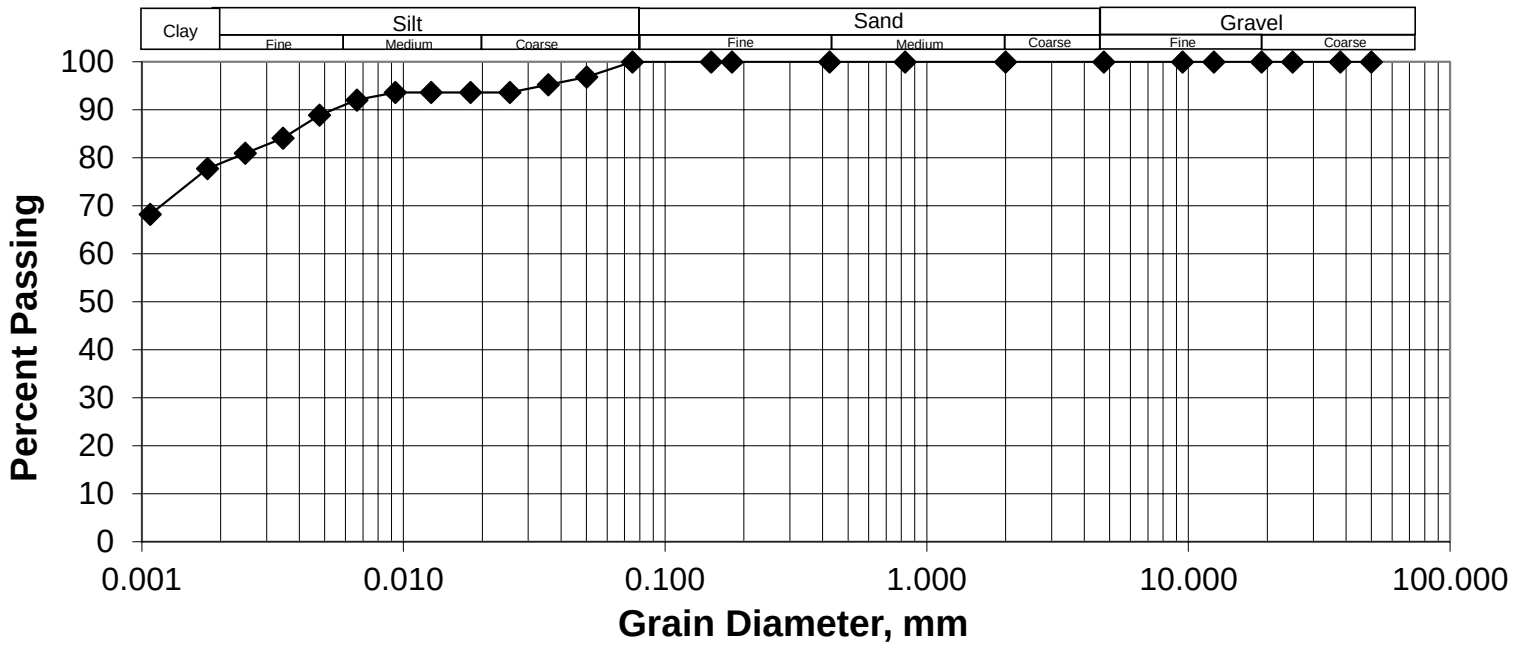
tel (204) 477-5381 **fax** (431) 800-1210

CERTIFIED BY CCIL

Job No.:	60680190	Hole No.:	TH23-26
Client:	City of Winnipeg	Sample No.:	T3
Project :	Jefferson CSR Contract 8B & 10	Depth:	4.57 - 5.18 m
Date Tested:	14-Mar-23	Date Sampled:	Varies
Tested By:	Lee Boughton	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	0.0500	96.8
25.0	100.0	0.825	100.0	0.0357	95.2
19.0	100.0	0.425	100.0	0.0255	93.6
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
				0.0066	92.1
				0.0048	88.9
				0.0035	84.1
				0.0025	80.9
				0.0018	77.8
				0.0011	68.2

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**21.3%**
Sand	**0.0%**	**Clay**	**78.7%**

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

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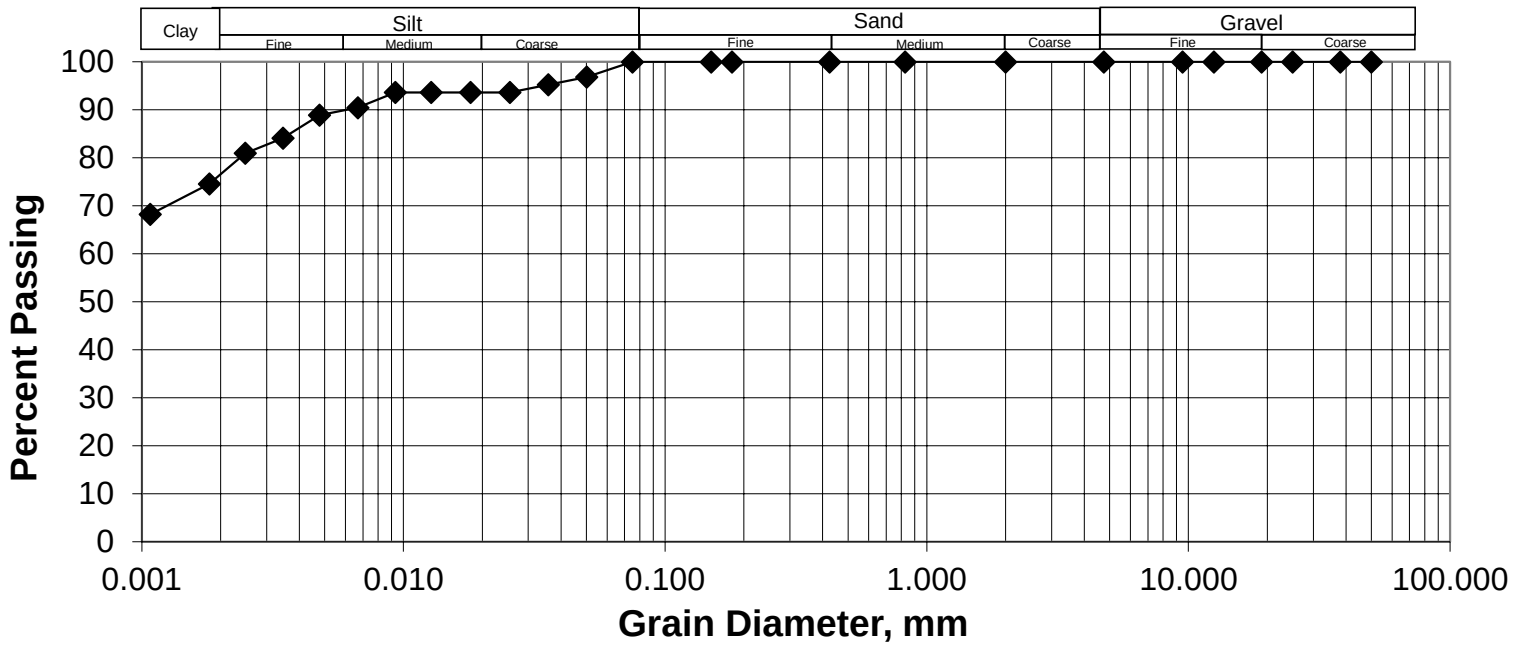
CERTIFIED BY CCIL

Job No.:	60680190	Hole No.:	TH23-27
Client:	City of Winnipeg	Sample No.:	T2
Project :	Jefferson CSR Contract 8B & 10	Depth:	3.05 - 3.66 m
Date Tested:	14-Mar-23	Date Sampled:	Varies
Tested By:	Lee Boughton	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	0.0500	96.8
25.0	100.0	0.825	100.0	0.0357	95.2
19.0	100.0	0.425	100.0	0.0255	93.6
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
				0.0035	84.1
				0.0025	80.9
				0.0018	74.6
				0.0011	68.2

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**23.6%**
Sand	**0.0%**	**Clay**	**76.4%**

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

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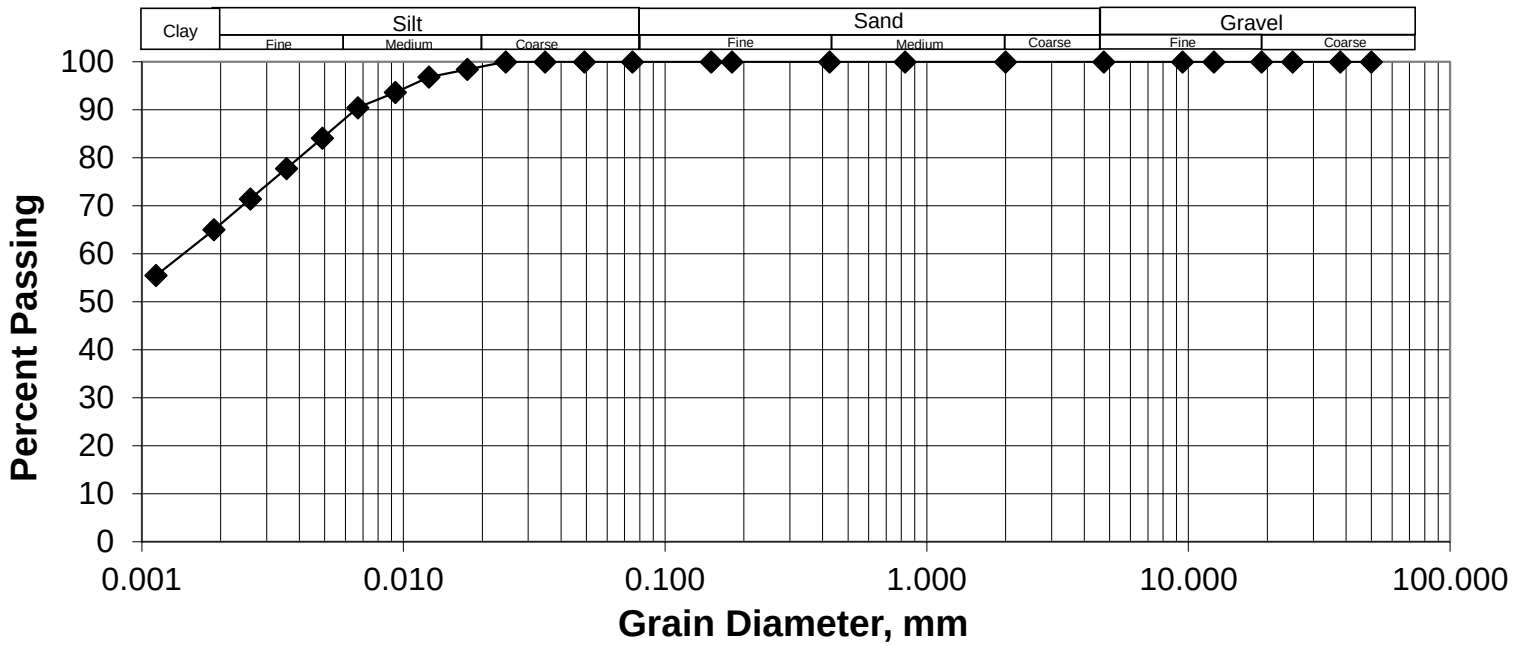
tel (204) 477-5381 **fax** (431) 800-1210

CERTIFIED BY CCIL

Job No.:	60680190	Hole No.:	TH23-28
Client:	City of Winnipeg	Sample No.:	T4
Project :	Jefferson CSR Contract 8B & 10	Depth:	6.10 - 6.71 m
Date Tested:	14-Mar-23	Date Sampled:	Varies
Tested By:	Lee Boughton	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	0.0175	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
				0.0067	90.5
				0.0049	84.1
				0.0036	77.8
				0.0026	71.4
				0.0019	65.1
				0.0011	55.5

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**34.0%**
Sand	**0.0%**	**Clay**	**66.0%**

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

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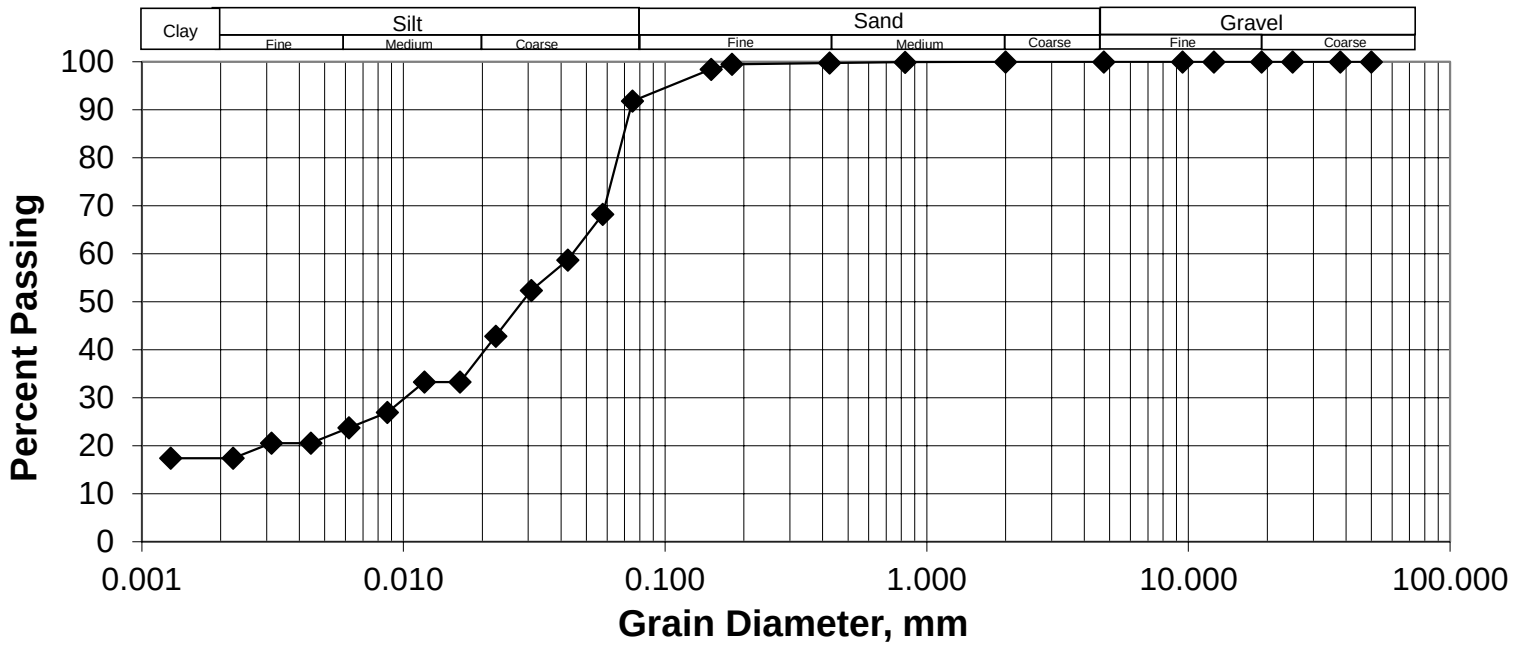
CERTIFIED BY CCIL

Job No.:	60680190	Hole No.:	TH23-29
Client:	COW	Sample No.:	S1
Project :	Jefferson CSR Contract 8B & 10	Depth:	1.52 - 1.98 m
Date Tested:	24-Feb-23	Date Sampled:	Varies
Tested By:	Lee Boughton	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	91.8
38.0	100.0	2.00	100.0	0.0577	68.2
25.0	100.0	0.825	99.9	0.0424	58.7
19.0	100.0	0.425	99.8	0.0307	52.3
12.5	100.0	0.18	99.5	0.0225	42.8
9.5	100.0	0.15	98.5	0.0164	33.3
4.75	100.0	0.075	91.8	0.0120	33.3
				0.0087	26.9
				0.0062	23.8
				0.0044	20.6
				0.0031	20.6
				0.0022	17.4
				0.0013	17.4

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**74.4%**
Sand	**8.2%**	**Clay**	**17.4%**

GRAIN SIZE DISTRIBUTION
(ASTM D422-63)

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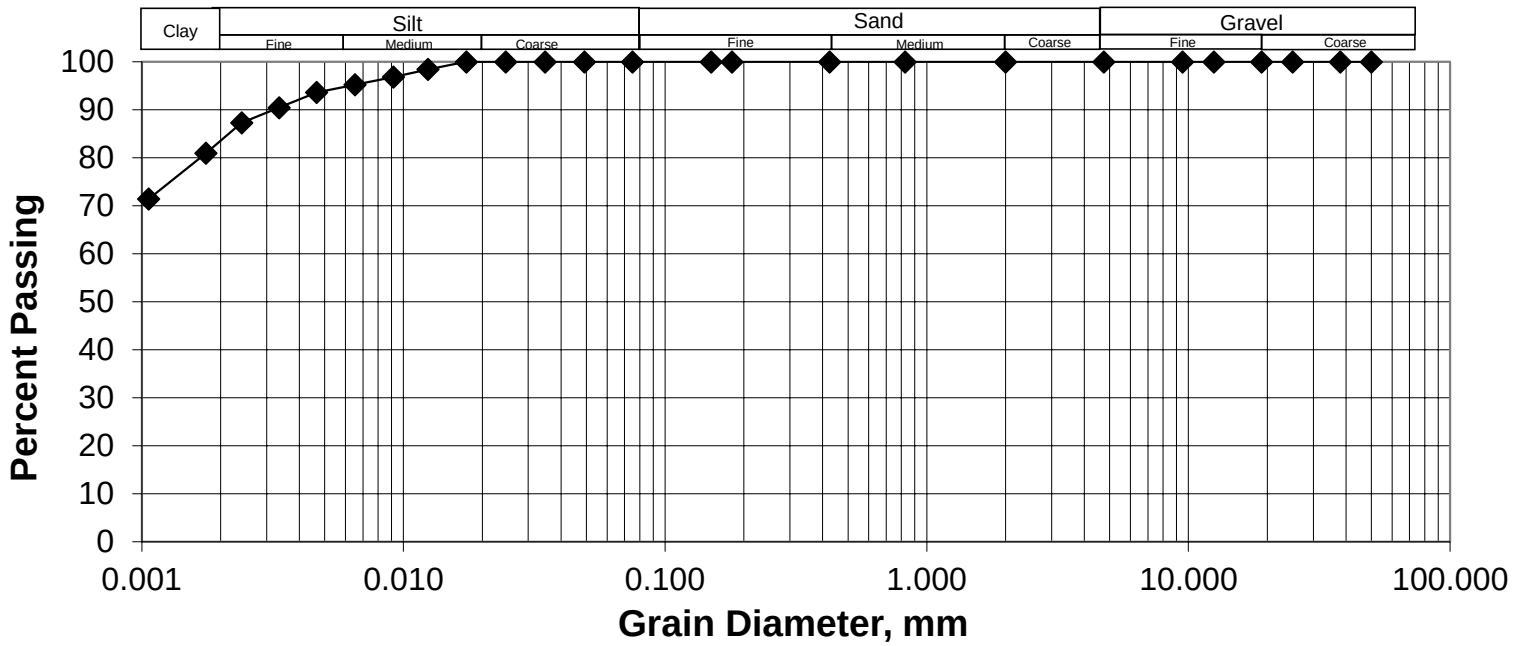
CERTIFIED BY CCIL

Job No.:	60680190	Hole No.:	TH23-29
Client:	City of Winnipeg	Sample No.:	T3
Project :	Jefferson CSR Contract 8B & 10	Depth:	4.57 - 5.18 m
Date Tested:	14-Mar-23	Date Sampled:	Varies
Tested By:	Lee Boughton	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	96.8
				0.0065	95.2
				0.0047	93.6
				0.0033	90.5
				0.0024	87.3
				0.0018	80.9
				0.0011	71.4

GRAIN SIZE DISTRIBUTION CURVE



Gravel	**0.0%**	**Silt**	**17.0%**
Sand	**0.0%**	**Clay**	**83.0%**

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

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 8B & 10
JOB NO.: 60680190

TEST HOLE NO.:	**TH23-21**
SAMPLE NO.:	**T4**
SAMPLE DEPTH:	6.10 - 6.71 m
DATE TESTED:	10-Mar-23
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)	1.50
Undrained Shear Strength (kPa)	**71.8**
Reading - Qu (tsf)	1.50
Undrained Shear Strength (kPa)	**71.8**
Reading - Qu (tsf)	1.25
Undrained Shear Strength (kPa)	**59.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**93.9**
Unconfined compressive strength (ksf)	**2.0**
Undrained Shear Strength (kPa)	**47.0**
Undrained Shear Strength (ksf)	**0.981**
MOISTURE CONTENT	
Tare Number	F31
Wt. Sample wet + tare (g)	474.7
Wt. Sample dry + tare (g)	330.1
Wt. Tare (g)	8.6
Moisture Content %	**45.0**
BULK DENSITY	
Sample Wt. (g)	1113.9
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)	15.40
Length 3 (cm)	15.40
Avg. Length (cm)	**15.40**
Volume (cm^3)	632.8
Moisture content (%)	45.0
Bulk Density (g/cm^3)	1.760
Bulk Unit Weight (kN/m^3)	**17.3**
Bulk Unit Weight (pcf)	**109.9**
Dry Unit Weight (kN/m^3)	**11.91**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8B & 10
JOB NO.:	60680190

TEST HOLE NO.:	TH23-21
SAMPLE NO.:	T4
SAMPLE DEPTH:	6.10 - 6.71 m
SAMPLE DATE:	
TEST DATE:	10-Mar-23

SOIL DESCRIPTION:	
CLAY - grey, moist, firm, silty	
high plasticity	
MOISTURE CONTENT:	45.0

See attached photo

FAILURE SKETCH

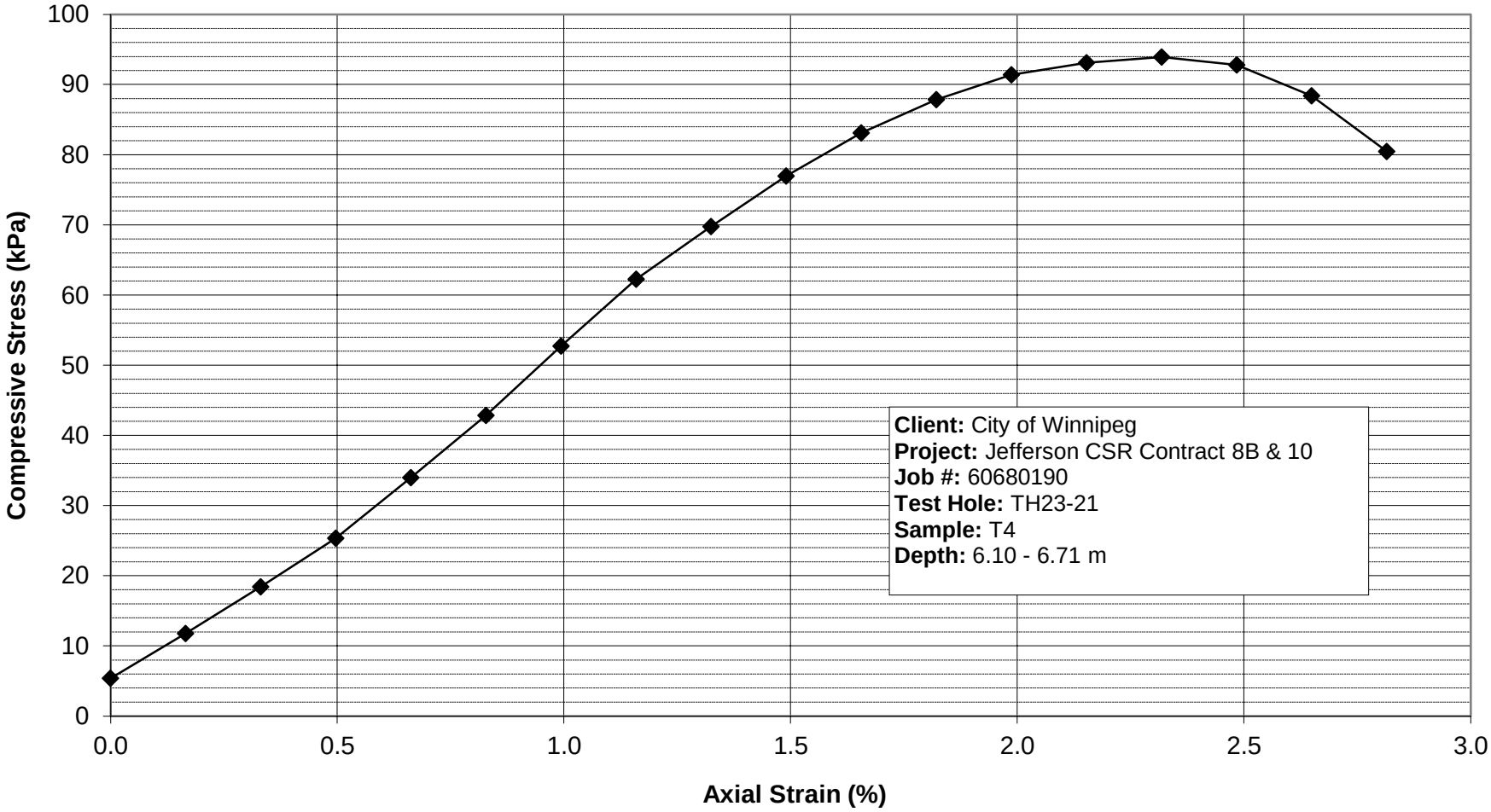
SAMPLE DIAM.(Do):	72.33	**(mm)**	**INITIAL AREA, Ao:**	4109.3	**(mm^2)**
SAMPLE LENGTH, (Lo):	154.00	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.13	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	0.99	**(0.5<R<2 % / minute)**

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	0.0012	0.17	6.38	10.87	1.70	0.245	11.7
0.03	0.0018	0.33	6.39	17.05	2.67	0.384	18.4
0.04	0.0025	0.50	6.40	23.52	3.67	0.529	25.3
0.05	0.0034	0.66	6.41	31.58	4.92	0.709	34.0
0.06	0.0043	0.83	6.42	39.92	6.21	0.895	42.9
0.07	0.0053	0.99	6.43	49.19	7.65	1.101	52.7
0.08	0.0062	1.16	6.44	58.19	9.03	1.300	62.3
0.09	0.0070	1.32	6.45	65.31	10.12	1.457	69.8
0.10	0.0077	1.49	6.47	72.15	11.16	1.607	76.9
0.11	0.0083	1.66	6.48	78.05	12.05	1.735	83.1
0.12	0.0088	1.82	6.49	82.64	12.74	1.834	87.8
0.13	0.0092	1.99	6.50	86.11	13.25	1.908	91.4
0.14	0.0094	2.15	6.51	87.89	13.50	1.944	93.1
0.15	0.0095	2.32	6.52	88.83	13.62	1.962	93.9
0.16	0.0094	2.48	6.53	87.89	13.46	1.938	92.8
0.17	0.0090	2.65	6.54	83.86	12.82	1.846	88.4
0.18	0.0082	2.81	6.55	76.46	11.67	1.680	80.4

UNCONFINED COMPRESSIVE STRENGTH, q_u:	93.93	kPa
(based on maximum q_u value)	1.962	ksf
UNDRAINED SHEAR STRENGTH, S_u:	46.96	kPa
(based on maximum q_u value)	0.981	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)



TH23-21, T4

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

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 8B & 10
JOB NO.: 60680190

TEST HOLE NO.:	**TH23-22**
SAMPLE NO.:	**T3**
SAMPLE DEPTH:	4.57 - 5.18 m
DATE TESTED:	10-Mar-23
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)	1.00
Undrained Shear Strength (kPa)	**47.9**
Reading - Qu (tsf)	0.75
Undrained Shear Strength (kPa)	**35.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**44.6**
Unconfined compressive strength (ksf)	**0.9**
Undrained Shear Strength (kPa)	**22.3**
Undrained Shear Strength (ksf)	**0.466**
MOISTURE CONTENT	
Tare Number	C27
Wt. Sample wet + tare (g)	532.3
Wt. Sample dry + tare (g)	335.1
Wt. Tare (g)	8.6
Moisture Content %	**60.4**
BULK DENSITY	
Sample Wt. (g)	1038.2
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)	15.50
Length 3 (cm)	15.40
Avg. Length (cm)	**15.47**
Volume (cm^3)	623.9
Moisture content (%)	60.4
Bulk Density (g/cm^3)	1.664
Bulk Unit Weight (kN/m^3)	**16.3**
Bulk Unit Weight (pcf)	**103.9**
Dry Unit Weight (kN/m^3)	**10.17**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8B & 10
JOB NO.:	60680190

TEST HOLE NO.:	TH23-22
SAMPLE NO.:	T3
SAMPLE DEPTH:	4.57 - 5.18 m
SAMPLE DATE:	
TEST DATE:	10-Mar-23

SOIL DESCRIPTION:	
CLAY - brown, moist, firm, silty	
high plasticity	
MOISTURE CONTENT:	60.4

See attached photo

FAILURE SKETCH

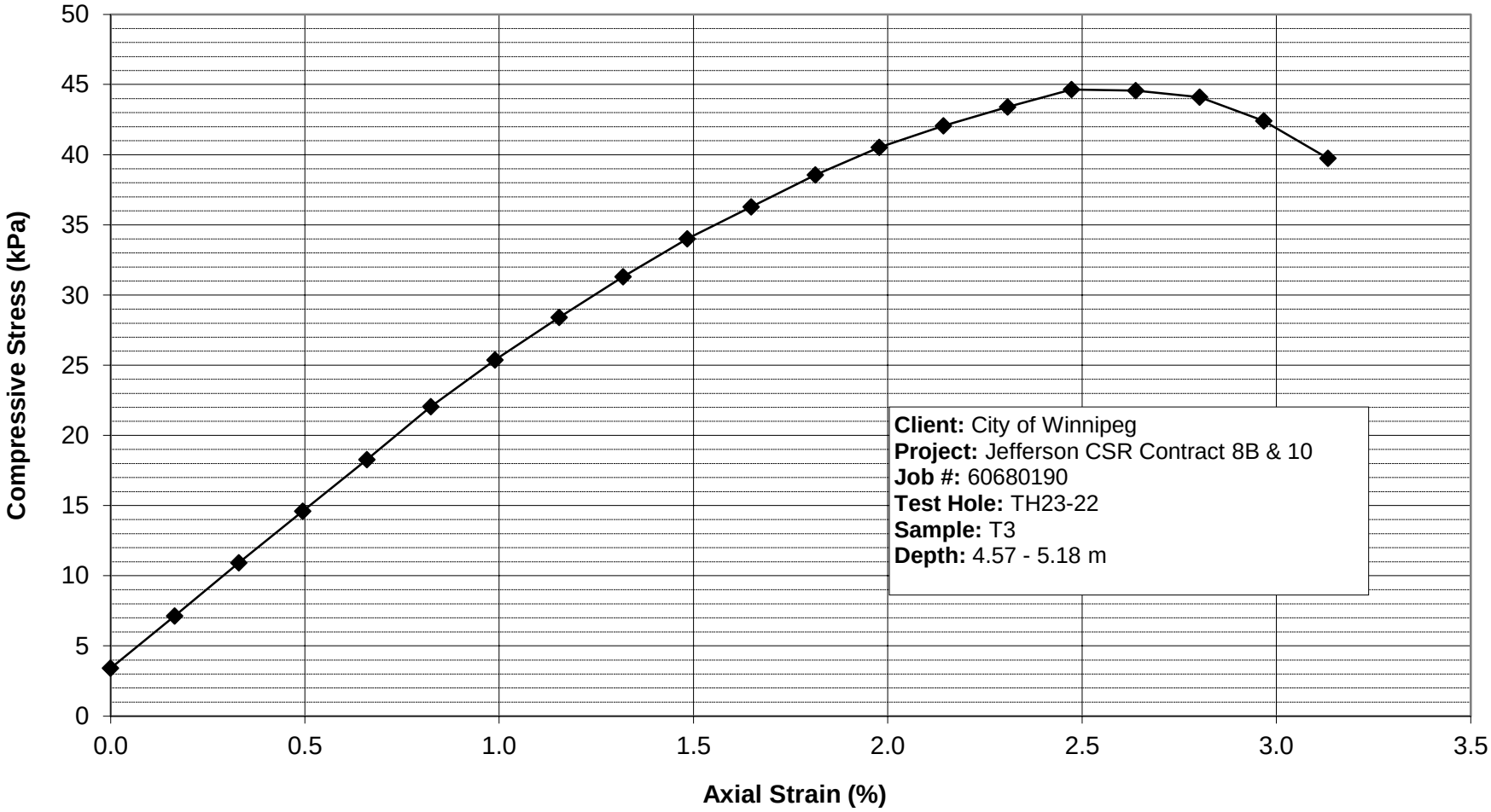
SAMPLE DIAM.(Do):	71.67	**(mm)**	**INITIAL AREA, Ao:**	4033.9	**(mm^2)**
SAMPLE LENGTH, (Lo):	154.67	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.16	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	0.99	**(0.5<R<2 % / minute)**

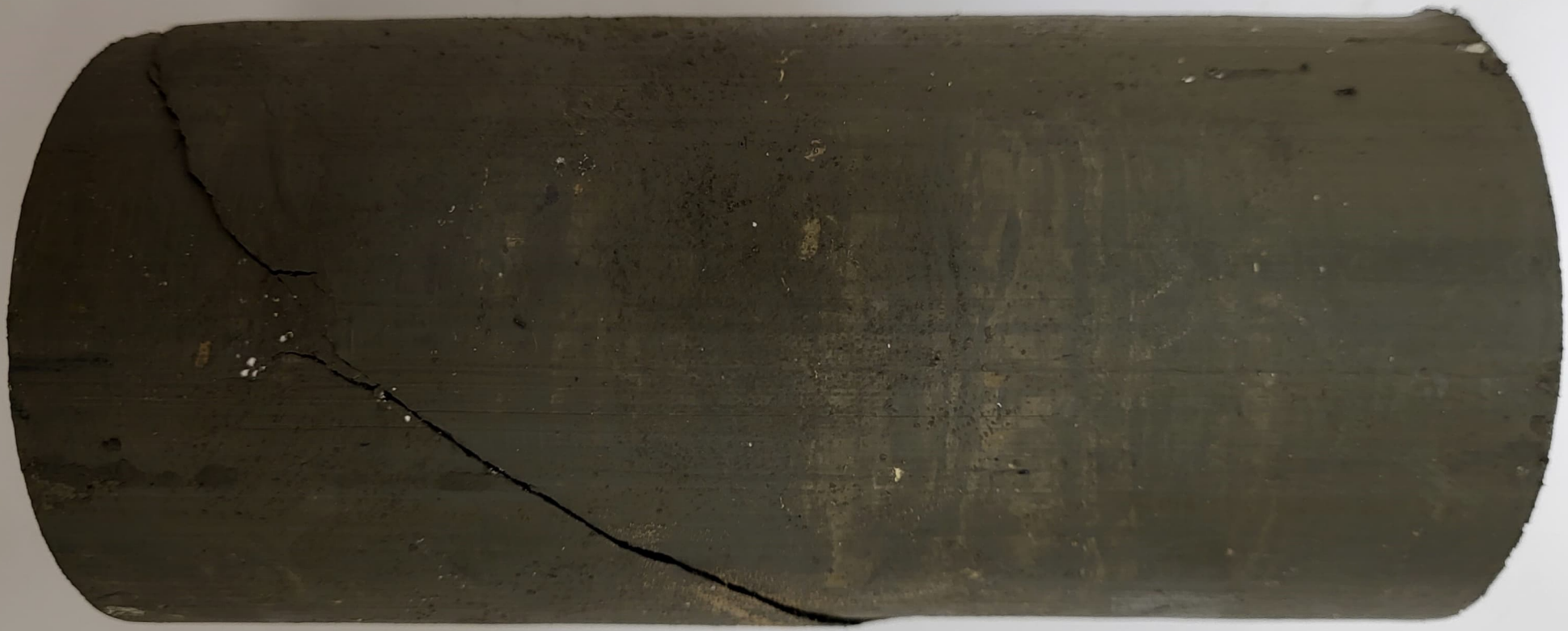
TEST DATA - DIAL READINGS							
AXIAL COMPRESSION	**PROVING RING**	**TOTAL AXIAL STRAIN, ε_1**	**AVERAGE CROSS-SECTIONAL AREA, A**	**APPLIED AXIAL LOAD, P**	**COMPRESSIVE STRESS, σ_c**		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0003	0.00	6.25	3.09	0.49	0.071	3.4
0.02	0.0007	0.16	6.26	6.47	1.03	0.149	7.1
0.03	0.0011	0.33	6.27	9.93	1.58	0.228	10.9
0.04	0.0014	0.49	6.28	13.31	2.12	0.305	14.6
0.05	0.0018	0.66	6.29	16.68	2.65	0.382	18.3
0.06	0.0022	0.82	6.30	20.15	3.20	0.460	22.0
0.07	0.0025	0.99	6.32	23.24	3.68	0.530	25.4
0.08	0.0028	1.15	6.33	26.05	4.12	0.593	28.4
0.09	0.0031	1.32	6.34	28.77	4.54	0.654	31.3
0.10	0.0033	1.48	6.35	31.30	4.93	0.710	34.0
0.11	0.0036	1.65	6.36	33.45	5.26	0.758	36.3
0.12	0.0038	1.81	6.37	35.61	5.59	0.805	38.6
0.13	0.0040	1.98	6.38	37.48	5.88	0.846	40.5
0.14	0.0042	2.14	6.39	38.98	6.10	0.878	42.1
0.15	0.0043	2.31	6.40	40.29	6.30	0.907	43.4
0.16	0.0044	2.47	6.41	41.51	6.47	0.932	44.6
0.17	0.0044	2.64	6.42	41.51	6.46	0.931	44.6
0.18	0.0044	2.80	6.43	41.13	6.39	0.921	44.1
0.19	0.0042	2.97	6.44	39.64	6.15	0.886	42.4
0.20	0.0040	3.13	6.45	37.20	5.76	0.830	39.7

UNCONFINED COMPRESSIVE STRENGTH, q_u:	44.64	kPa
(based on maximum q_u value)	0.932	ksf
UNDRAINED SHEAR STRENGTH, S_u:	22.32	kPa
(based on maximum q_u value)	0.466	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)





TH23-22, T3

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

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 8B & 10
JOB NO.: 60680190

TEST HOLE NO.:	**TH23-22**
SAMPLE NO.:	**T7**
SAMPLE DEPTH:	10.67 - 11.28 m
DATE TESTED:	16-Mar-23
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)	0.60
Undrained Shear Strength (kPa)	**28.7**
Reading - Qu (tsf)	0.75
Undrained Shear Strength (kPa)	**35.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**72.2**
Unconfined compressive strength (ksf)	**1.5**
Undrained Shear Strength (kPa)	**36.1**
Undrained Shear Strength (ksf)	**0.754**
MOISTURE CONTENT	
Tare Number	AT15
Wt. Sample wet + tare (g)	336.2
Wt. Sample dry + tare (g)	223.1
Wt. Tare (g)	8.3
Moisture Content %	**52.7**
BULK DENSITY	
Sample Wt. (g)	1043.7
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.20
Diameter 3 (cm)	7.20
Avg. Diameter (cm)	**7.20**
Length 1 (cm)	15.20
Length 2 (cm)	15.20
Length 3 (cm)	15.20
Avg. Length (cm)	**15.20**
Volume (cm^3)	618.9
Moisture content (%)	52.7
Bulk Density (g/cm^3)	1.686
Bulk Unit Weight (kN/m^3)	**16.5**
Bulk Unit Weight (pcf)	**105.3**
Dry Unit Weight (kN/m^3)	**10.83**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8B & 10
JOB NO.:	60680190

TEST HOLE NO.:	TH23-22
SAMPLE NO.:	T7
SAMPLE DEPTH:	10.67 - 11.28 m
SAMPLE DATE:	
TEST DATE:	16-Mar-23

SOIL DESCRIPTION:	
CLAY - grey, moist, firm, silty, silt inclusions	
high plasticity	
MOISTURE CONTENT:	52.7

See attached photo

FAILURE SKETCH

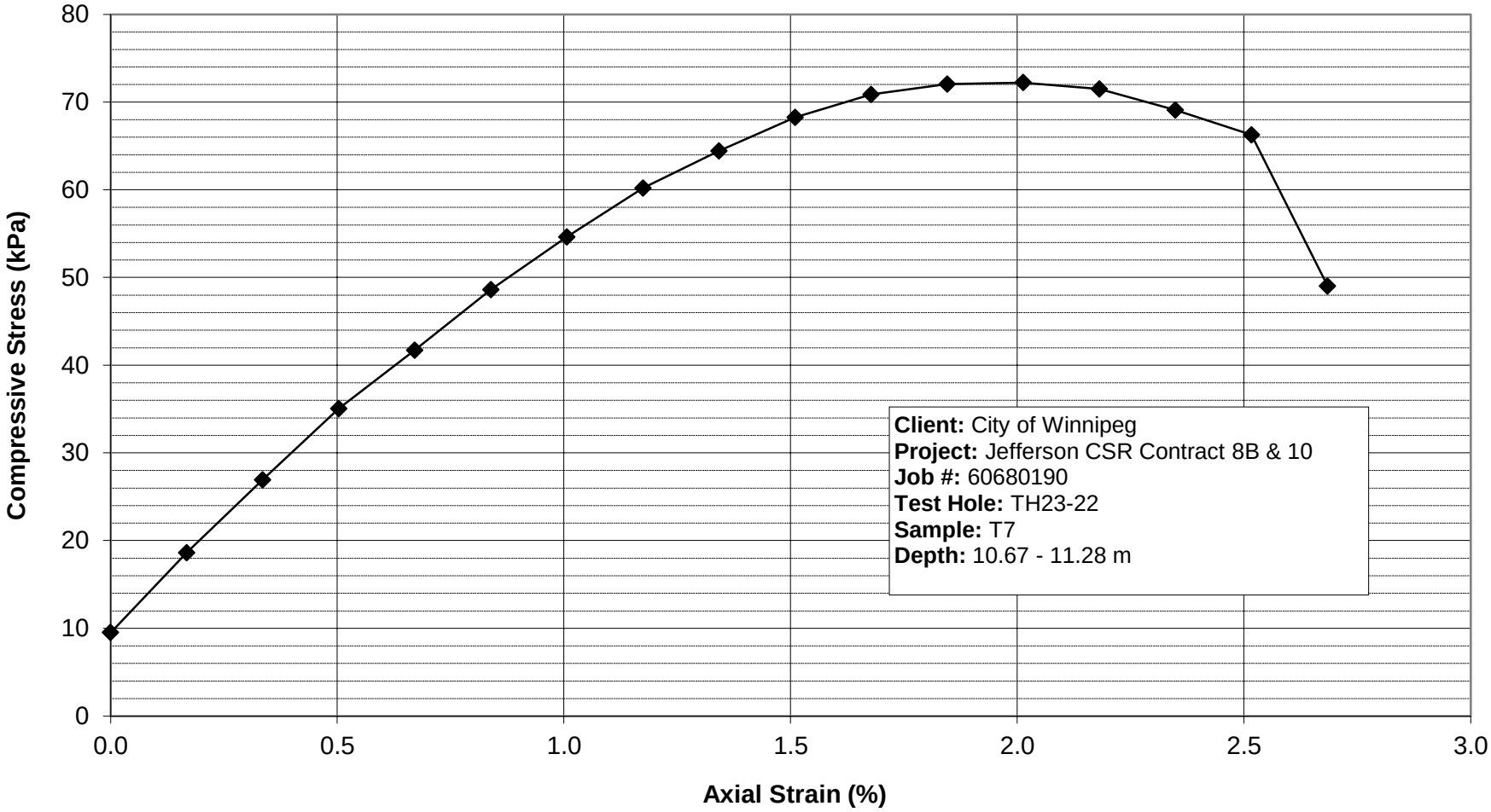
SAMPLE DIAM.(Do):	72.00	**(mm)**	**INITIAL AREA, Ao:**	4071.5	**(mm^2)**
SAMPLE LENGTH, (Lo):	152.00	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.11	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	1.01	**(0.5<R<2 % / minute)**

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	8.71	1.38	0.199	9.5
0.02	0.0018	0.17	6.32	17.05	2.70	0.388	18.6
0.03	0.0026	0.34	6.33	24.74	3.91	0.563	26.9
0.04	0.0034	0.50	6.34	32.23	5.08	0.732	35.0
0.05	0.0041	0.67	6.35	38.42	6.05	0.871	41.7
0.06	0.0048	0.84	6.36	44.88	7.05	1.016	48.6
0.07	0.0054	1.01	6.38	50.50	7.92	1.141	54.6
0.08	0.0060	1.17	6.39	55.75	8.73	1.257	60.2
0.09	0.0064	1.34	6.40	59.78	9.35	1.346	64.4
0.10	0.0068	1.51	6.41	63.43	9.90	1.426	68.3
0.11	0.0070	1.68	6.42	65.96	10.28	1.480	70.9
0.12	0.0072	1.85	6.43	67.18	10.45	1.505	72.0
0.13	0.0072	2.01	6.44	67.46	10.47	1.509	72.2
0.14	0.0071	2.18	6.45	66.90	10.37	1.493	71.5
0.15	0.0069	2.35	6.46	64.75	10.02	1.443	69.1
0.16	0.0066	2.52	6.47	62.22	9.61	1.384	66.3
0.17	0.0049	2.68	6.48	46.10	7.11	1.024	49.0

UNCONFINED COMPRESSIVE STRENGTH, q_u:	72.22	kPa
(based on maximum q_u value)	1.508	ksf
UNDRAINED SHEAR STRENGTH, S_u:	36.11	kPa
(based on maximum q_u value)	0.754	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)



TH23-22, T7

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

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 8B & 10
JOB NO.: 60680190

TEST HOLE NO.:	**TH23-23**
SAMPLE NO.:	**T2**
SAMPLE DEPTH:	3.05 - 3.66 m
DATE TESTED:	10-Mar-23
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)	**66.6**
Unconfined compressive strength (ksf)	**1.4**
Undrained Shear Strength (kPa)	**33.3**
Undrained Shear Strength (ksf)	**0.696**
MOISTURE CONTENT	
Tare Number	4
Wt. Sample wet + tare (g)	724.4
Wt. Sample dry + tare (g)	487.7
Wt. Tare (g)	8.4
Moisture Content %	**49.4**
BULK DENSITY	
Sample Wt. (g)	1089.2
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.20
Diameter 3 (cm)	7.20
Avg. Diameter (cm)	**7.20**
Length 1 (cm)	15.60
Length 2 (cm)	15.60
Length 3 (cm)	15.60
Avg. Length (cm)	**15.60**
Volume (cm^3)	635.2
Moisture content (%)	49.4
Bulk Density (g/cm^3)	1.715
Bulk Unit Weight (kN/m^3)	**16.8**
Bulk Unit Weight (pcf)	**107.1**
Dry Unit Weight (kN/m^3)	**11.26**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8B & 10
JOB NO.:	60680190

TEST HOLE NO.:	TH23-23
SAMPLE NO.:	T2
SAMPLE DEPTH:	3.05 - 3.66 m
SAMPLE DATE:	
TEST DATE:	10-Mar-23

SOIL DESCRIPTION:	
CLAY - brown, moist, stiff, silty	
high plasticity	
MOISTURE CONTENT:	49.4

See attached photo

FAILURE SKETCH

SAMPLE DIAM.(Do):	72.00	**(mm)**	**INITIAL AREA, Ao:**	4071.5	**(mm^2)**
SAMPLE LENGTH, (Lo):	156.00	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.17	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	0.98	**(0.5<R<2 % / minute)**

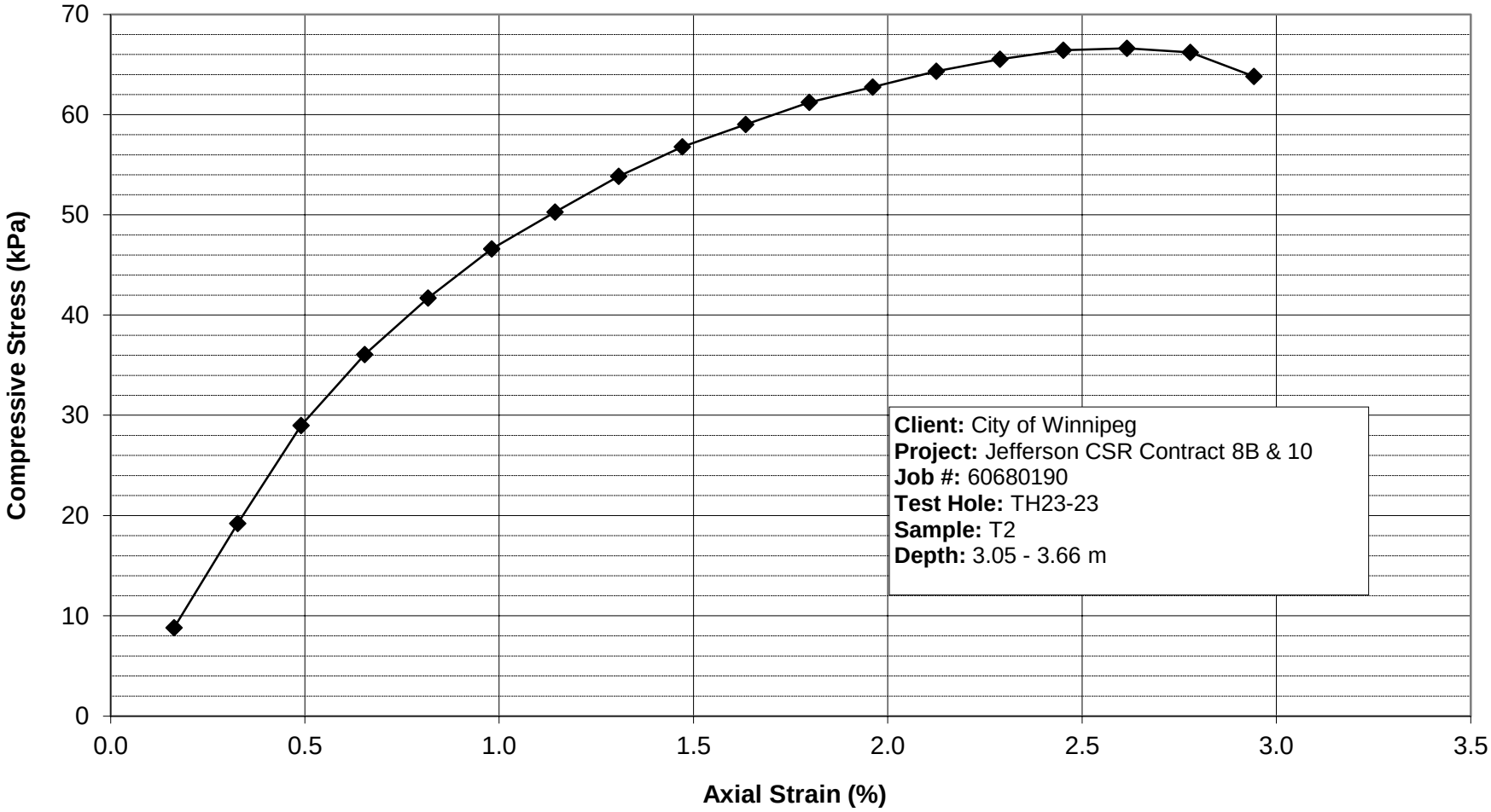
TEST DATA - DIAL READINGS							
AXIAL COMPRESSION	**PROVING RING**	**TOTAL AXIAL STRAIN, ε_1**	**AVERAGE CROSS-SECTIONAL AREA, A**	**APPLIED AXIAL LOAD, P**	**COMPRESSIVE STRESS, σ_c**		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0009	0.00	6.31	8.06	1.28	0.184	8.8
0.02	0.0019	0.16	6.32	17.62	2.79	0.401	19.2
0.03	0.0028	0.33	6.33	26.61	4.20	0.605	29.0
0.04	0.0035	0.49	6.34	33.17	5.23	0.753	36.1
0.05	0.0041	0.65	6.35	38.42	6.05	0.871	41.7
0.06	0.0046	0.82	6.36	43.01	6.76	0.973	46.6
0.07	0.0050	0.98	6.37	46.48	7.29	1.050	50.3
0.08	0.0053	1.14	6.38	49.85	7.81	1.124	53.8
0.09	0.0056	1.31	6.39	52.66	8.24	1.186	56.8
0.10	0.0059	1.47	6.41	54.81	8.56	1.232	59.0
0.11	0.0061	1.63	6.42	56.97	8.88	1.279	61.2
0.12	0.0062	1.80	6.43	58.47	9.10	1.310	62.7
0.13	0.0064	1.96	6.44	60.06	9.33	1.344	64.3
0.14	0.0065	2.12	6.45	61.28	9.50	1.369	65.5
0.15	0.0066	2.29	6.46	62.22	9.63	1.387	66.4
0.16	0.0067	2.45	6.47	62.50	9.66	1.391	66.6
0.17	0.0066	2.62	6.48	62.22	9.60	1.383	66.2
0.18	0.0064	2.78	6.49	60.06	9.25	1.332	63.8
0.19	0.0062	2.94	6.50	57.91	8.91	1.282	61.4

UNCONFINED COMPRESSIVE STRENGTH, q_u:	66.61	kPa
(based on maximum q_u value)	1.391	ksf
UNDRAINED SHEAR STRENGTH, S_u:	33.30	kPa
(based on maximum q_u value)	0.696	ksf

NOTES:
Sample tested was clay portion.

AECOM

UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS (ASTM D2166)



TH23-23, T2

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

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 8B & 10
JOB NO.: 60680190

TEST HOLE NO.:	**TH23-23**
SAMPLE NO.:	**T6**
SAMPLE DEPTH:	9.14 - 9.75 m
DATE TESTED:	16-Mar-23
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.00
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**0.0**
Undrained Shear Strength (ksf)	0.00
POCKET PENETROMETER	
Reading - Qu (tsf)	0.00
Undrained Shear Strength (kPa)	**0.0**
Reading - Qu (tsf)	0.00
Undrained Shear Strength (kPa)	**0.0**
Reading - Qu (tsf)	0.00
Undrained Shear Strength (kPa)	**0.0**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**#VALUE!**
Unconfined compressive strength (ksf)	**#VALUE!**
Undrained Shear Strength (kPa)	**#VALUE!**
Undrained Shear Strength (ksf)	**#VALUE!**
MOISTURE CONTENT	
Tare Number	MAK5
Wt. Sample wet + tare (g)	584.2
Wt. Sample dry + tare (g)	469.2
Wt. Tare (g)	8.8
Moisture Content %	**25.0**
BULK DENSITY	
Sample Wt. (g)	0
Diameter 1 (cm)	0.00
Diameter 2 (cm)	0.00
Diameter 3 (cm)	0.00
Avg. Diameter (cm)	**0.00**
Length 1 (cm)	0.00
Length 2 (cm)	0.00
Length 3 (cm)	0.00
Avg. Length (cm)	**0.00**
Volume (cm^3)	0.0
Moisture content (%)	25.0
Bulk Density (g/cm^3)	#DIV/0!
Bulk Unit Weight (kN/m^3)	**#DIV/0!**
Bulk Unit Weight (pcf)	**#DIV/0!**
Dry Unit Weight (kN/m^3)	**#DIV/0!**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8B & 10
JOB NO.:	60680190

TEST HOLE NO.:	TH23-23
SAMPLE NO.:	T6
SAMPLE DEPTH:	9.14 - 9.75 m
SAMPLE DATE:	
TEST DATE:	16-Mar-23

SOIL DESCRIPTION:	
SILT -trace sand, trace gravel, tan, moist, soft	
low plasticity	
MOISTURE CONTENT:	25.0

See attached photo

FAILURE SKETCH

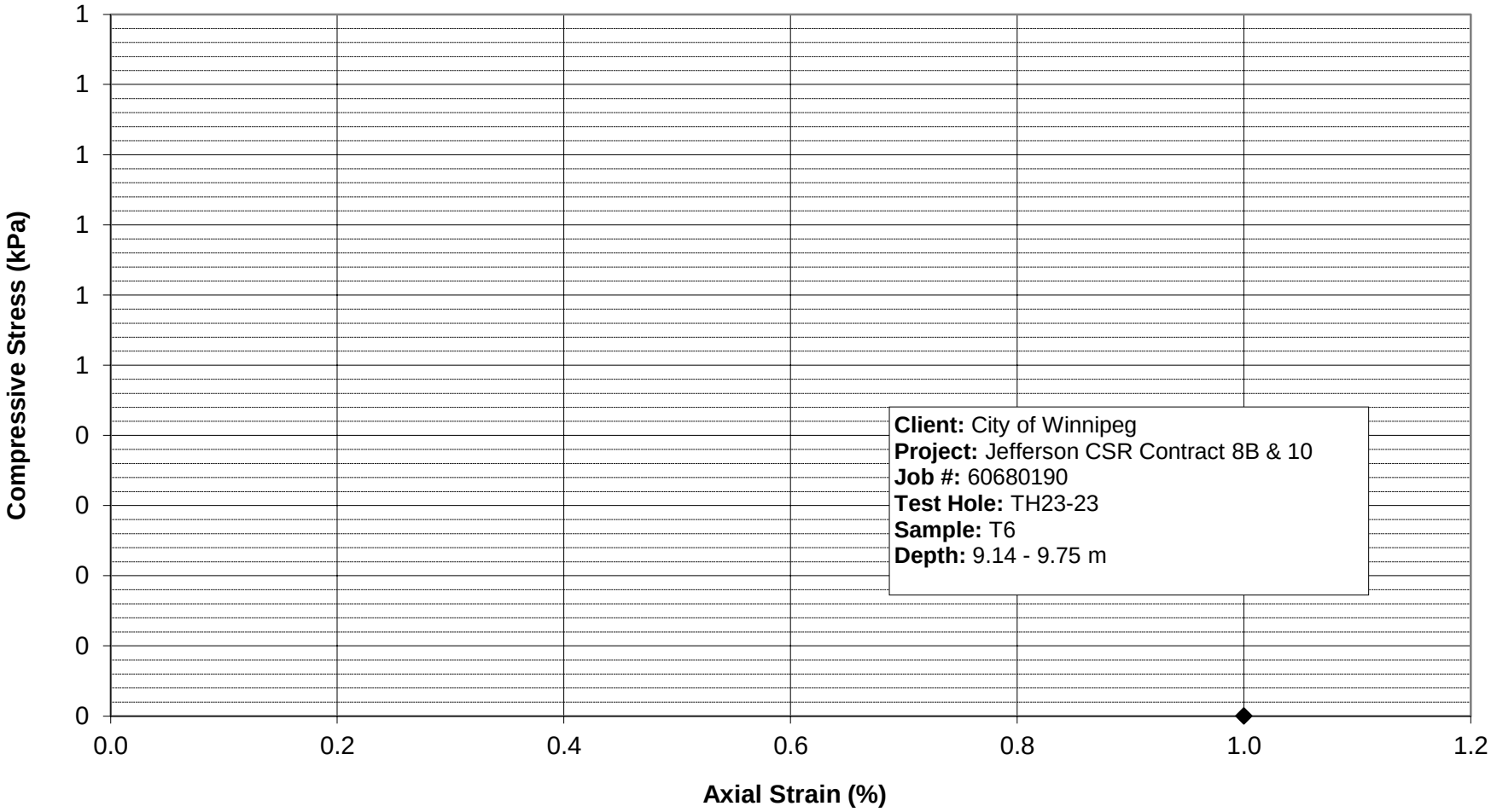
SAMPLE DIAM.(Do):	0.00	**(mm)**	**INITIAL AREA, Ao:**	0.0	**(mm^2)**
SAMPLE LENGTH, (Lo):	0.00	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	#DIV/0!	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	#DIV/0!	**(0.5<R<2 % / minute)**

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)
0.0000		#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!	#VALUE!

UNCONFINED COMPRESSIVE STRENGTH, q_u:	#VALUE!	kPa
(based on maximum q_u value)	#VALUE!	ksf
UNDRAINED SHEAR STRENGTH, S_u:	#VALUE!	kPa
(based on maximum q_u value)	#VALUE!	ksf

NOTES:
Not suitable for testing

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)



TH23-23, T6

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

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 8B & 10
JOB NO.: 60680190

TEST HOLE NO.:	**TH23-24**
SAMPLE NO.:	**T4**
SAMPLE DEPTH:	6.10 - 6.71 m
DATE TESTED:	10-Mar-23
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)	1.25
Undrained Shear Strength (kPa)	**59.9**
Reading - Qu (tsf)	1.50
Undrained Shear Strength (kPa)	**71.8**
Reading - Qu (tsf)	1.50
Undrained Shear Strength (kPa)	**71.8**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**94.7**
Unconfined compressive strength (ksf)	**2.0**
Undrained Shear Strength (kPa)	**47.4**
Undrained Shear Strength (ksf)	**0.989**
MOISTURE CONTENT	
Tare Number	SG30
Wt. Sample wet + tare (g)	842.7
Wt. Sample dry + tare (g)	562.5
Wt. Tare (g)	8.7
Moisture Content %	**50.6**
BULK DENSITY	
Sample Wt. (g)	1043.9
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.30
Diameter 3 (cm)	7.20
Avg. Diameter (cm)	**7.23**
Length 1 (cm)	14.80
Length 2 (cm)	14.80
Length 3 (cm)	14.80
Avg. Length (cm)	**14.80**
Volume (cm^3)	608.2
Moisture content (%)	50.6
Bulk Density (g/cm^3)	1.716
Bulk Unit Weight (kN/m^3)	**16.8**
Bulk Unit Weight (pcf)	**107.2**
Dry Unit Weight (kN/m^3)	**11.18**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8B & 10
JOB NO.:	60680190

TEST HOLE NO.:	TH23-24
SAMPLE NO.:	T4
SAMPLE DEPTH:	6.10 - 6.71 m
SAMPLE DATE:	
TEST DATE:	10-Mar-23

SOIL DESCRIPTION:	
CLAY - grey, moist, firm, silty, silt inclusions	
high plasticity	
MOISTURE CONTENT:	50.6

See attached photo

FAILURE SKETCH

SAMPLE DIAM.(Do):	72.33	**(mm)**	**INITIAL AREA, Ao:**	4109.3	**(mm^2)**
SAMPLE LENGTH, (Lo):	148.00	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.05	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	1.03	**(0.5<R<2 % / minute)**

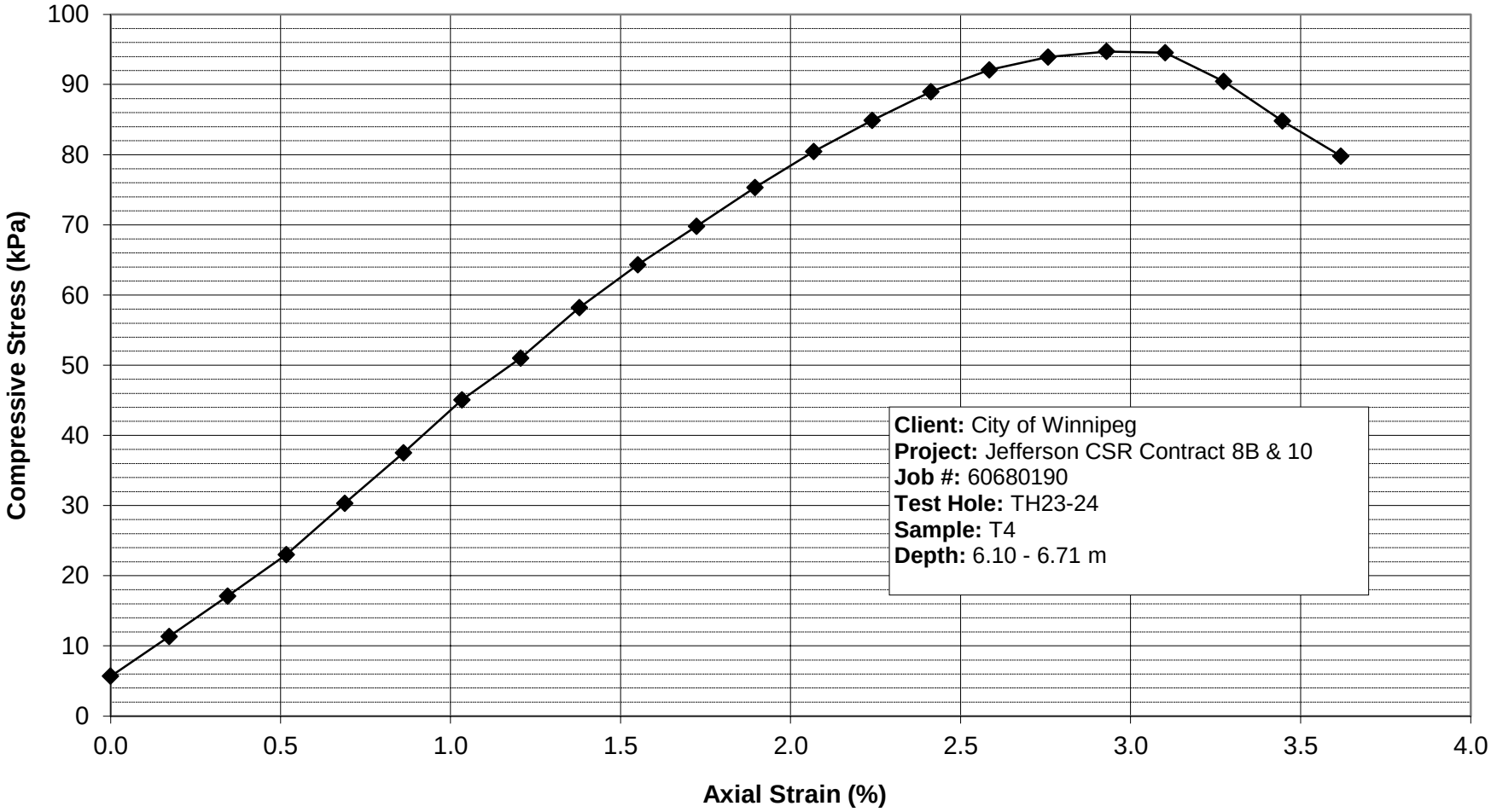
TEST DATA - DIAL READINGS

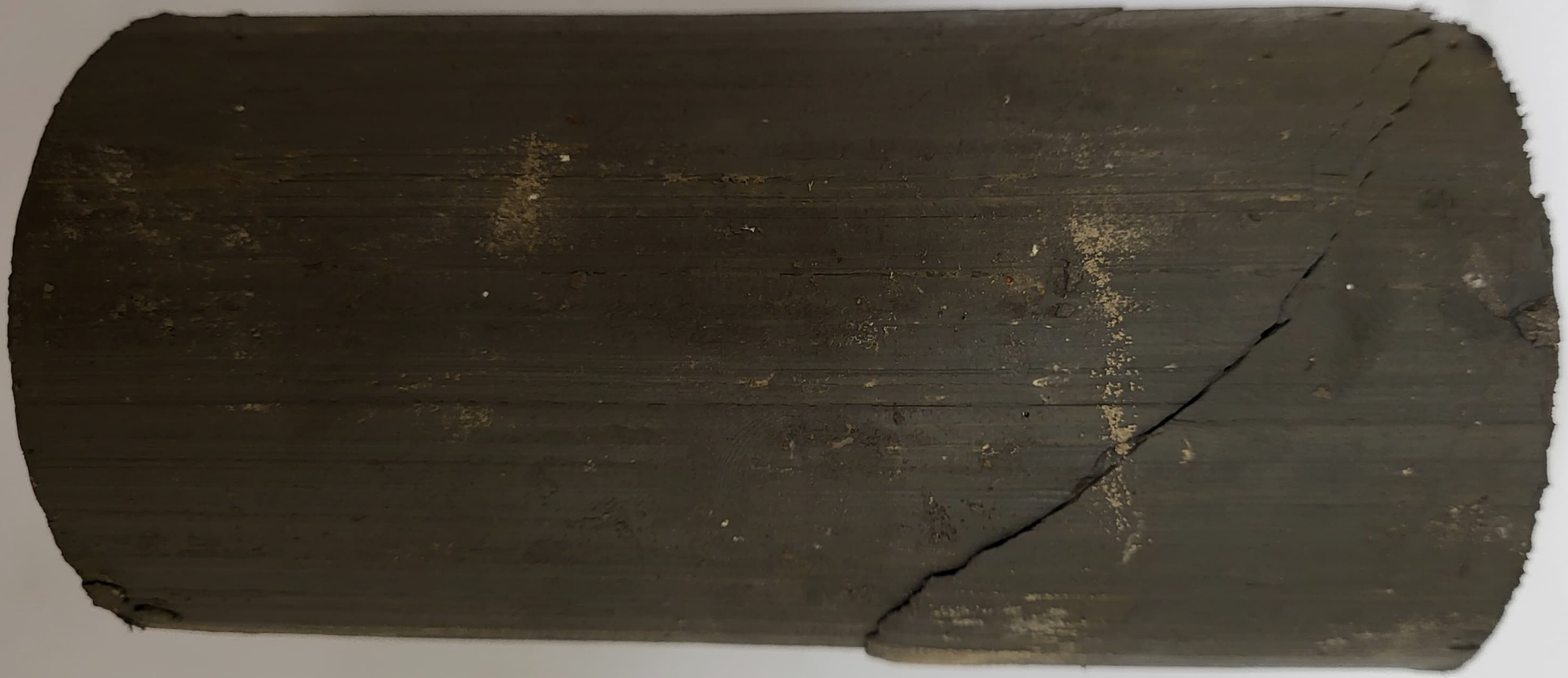
AXIAL COMPRESSION	PROVING RING	TOTAL AXIAL STRAIN, ε_1	AVERAGE CROSS-SECTIONAL AREA, A	APPLIED AXIAL LOAD, P	COMPRESSIVE STRESS, σ_c		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0006	0.00	6.37	5.25	0.82	0.119	5.7
0.02	0.0011	0.17	6.38	10.49	1.64	0.237	11.3
0.03	0.0017	0.34	6.39	15.84	2.48	0.357	17.1
0.04	0.0023	0.52	6.40	21.36	3.34	0.480	23.0
0.05	0.0030	0.69	6.41	28.20	4.40	0.633	30.3
0.06	0.0037	0.86	6.42	34.95	5.44	0.783	37.5
0.07	0.0045	1.03	6.44	42.07	6.54	0.941	45.1
0.08	0.0051	1.21	6.45	47.69	7.40	1.065	51.0
0.09	0.0059	1.38	6.46	54.53	8.44	1.216	58.2
0.10	0.0064	1.55	6.47	60.34	9.33	1.343	64.3
0.11	0.0070	1.72	6.48	65.59	10.12	1.457	69.8
0.12	0.0076	1.90	6.49	70.93	10.93	1.573	75.3
0.13	0.0081	2.07	6.50	75.90	11.67	1.680	80.5
0.14	0.0086	2.24	6.52	80.21	12.31	1.773	84.9
0.15	0.0090	2.41	6.53	84.24	12.91	1.858	89.0
0.16	0.0093	2.58	6.54	87.33	13.36	1.923	92.1
0.17	0.0095	2.76	6.55	89.20	13.62	1.961	93.9
0.18	0.0096	2.93	6.56	90.14	13.74	1.978	94.7
0.19	0.0096	3.10	6.57	90.14	13.71	1.975	94.5
0.20	0.0092	3.27	6.58	86.39	13.12	1.889	90.5
0.21	0.0087	3.45	6.60	81.14	12.30	1.771	84.8
0.22	0.0082	3.62	6.61	76.46	11.57	1.666	79.8

UNCONFINED COMPRESSIVE STRENGTH, q_u:	94.72	kPa
(based on maximum q_u value)	1.978	ksf
UNDRAINED SHEAR STRENGTH, S_u:	47.36	kPa
(based on maximum q_u value)	0.989	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)





TH23-24, T4

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

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 8B & 10
JOB NO.: 60680190

TEST HOLE NO.:	**TH23-24**
SAMPLE NO.:	**T8**
SAMPLE DEPTH:	12.19 - 12.80 m
DATE TESTED:	15-Mar-23
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.25
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**24.5**
Undrained Shear Strength (ksf)	0.51
POCKET PENETROMETER	
Reading - Qu (tsf)	0.20
Undrained Shear Strength (kPa)	**9.6**
Reading - Qu (tsf)	0.20
Undrained Shear Strength (kPa)	**9.6**
Reading - Qu (tsf)	0.25
Undrained Shear Strength (kPa)	**12.0**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**55.2**
Unconfined compressive strength (ksf)	**1.2**
Undrained Shear Strength (kPa)	**27.6**
Undrained Shear Strength (ksf)	**0.577**
MOISTURE CONTENT	
Tare Number	E2
Wt. Sample wet + tare (g)	311.3
Wt. Sample dry + tare (g)	250.1
Wt. Tare (g)	9.4
Moisture Content %	**25.4**
BULK DENSITY	
Sample Wt. (g)	1196.9
Diameter 1 (cm)	6.50
Diameter 2 (cm)	7.20
Diameter 3 (cm)	7.20
Avg. Diameter (cm)	**6.97**
Length 1 (cm)	15.50
Length 2 (cm)	15.60
Length 3 (cm)	15.60
Avg. Length (cm)	**15.57**
Volume (cm^3)	593.4
Moisture content (%)	25.4
Bulk Density (g/cm^3)	2.017
Bulk Unit Weight (kN/m^3)	**19.8**
Bulk Unit Weight (pcf)	**125.9**
Dry Unit Weight (kN/m^3)	**15.77**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8B & 10
JOB NO.:	60680190

TEST HOLE NO.:	TH23-24
SAMPLE NO.:	T8
SAMPLE DEPTH:	12.19 - 12.80 m
SAMPLE DATE:	
TEST DATE:	15-Mar-23

SOIL DESCRIPTION:	
CLAY - grey, moist, soft, silty, trace sand, trace gravel, silt inclusions	
high plasticity	
MOISTURE CONTENT:	25.4

See attached photo

FAILURE SKETCH

SAMPLE DIAM.(Do):	69.67	**(mm)**	**INITIAL AREA, Ao:**	3811.9	**(mm^2)**
SAMPLE LENGTH, (Lo):	155.67	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.23	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	0.98	**(0.5<R<2 % / minute)**

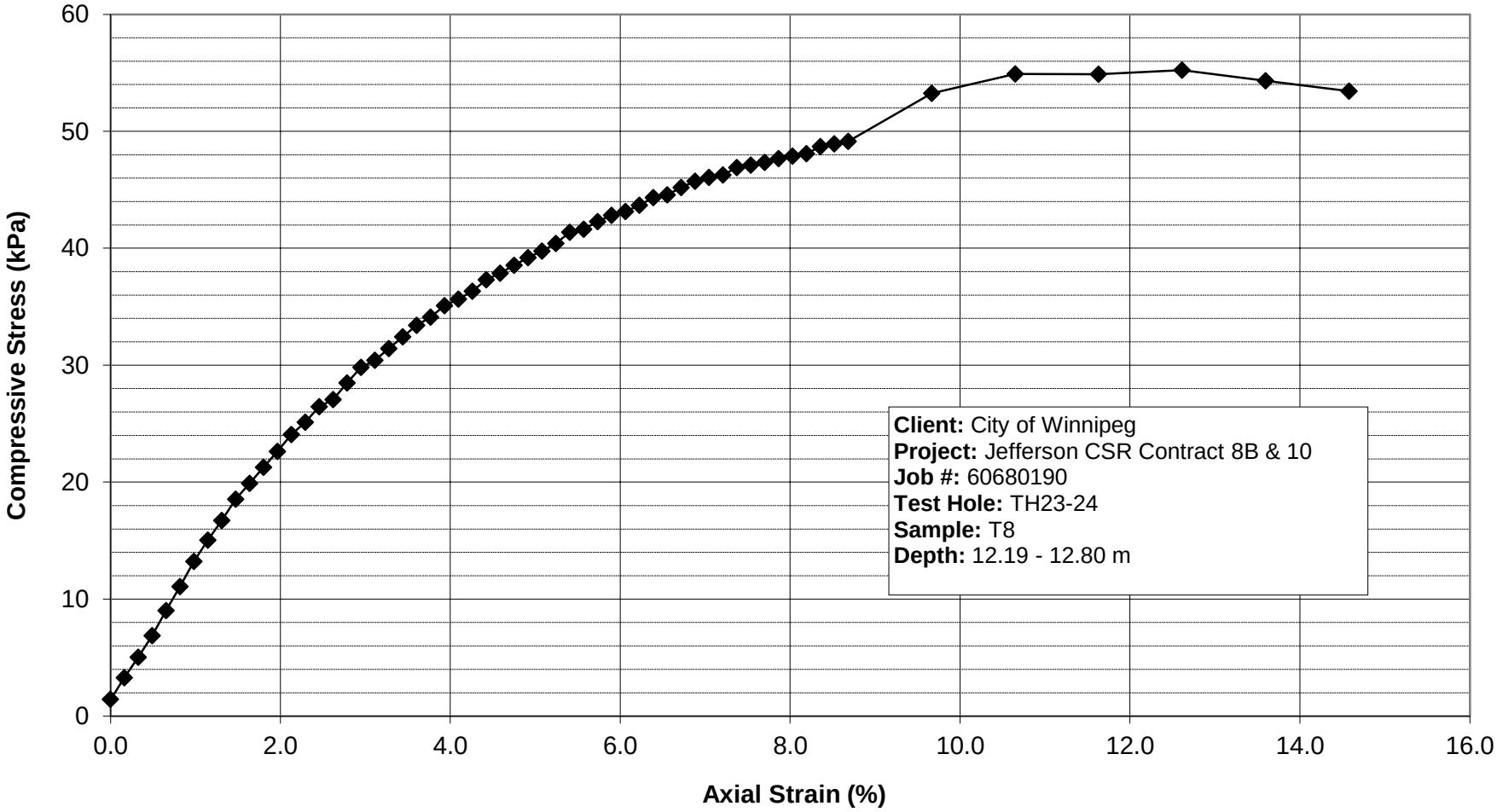
TEST DATA - DIAL READINGS

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	0.0001	0.00	5.91	1.22	0.21	0.030	1.4
0.02	0.0003	0.16	5.92	2.81	0.47	0.068	3.3
0.03	0.0005	0.33	5.93	4.31	0.73	0.105	5.0
0.04	0.0006	0.49	5.94	5.90	0.99	0.143	6.9
0.05	0.0008	0.66	5.95	7.78	1.31	0.188	9.0
0.06	0.0010	0.82	5.96	9.56	1.60	0.231	11.1
0.07	0.0012	0.98	5.97	11.43	1.92	0.276	13.2
0.08	0.0014	1.15	5.98	13.02	2.18	0.314	15.0
0.09	0.0016	1.31	5.99	14.52	2.43	0.349	16.7
0.10	0.0017	1.47	6.00	16.12	2.69	0.387	18.5
0.11	0.0019	1.64	6.01	17.33	2.89	0.416	19.9
0.12	0.0020	1.80	6.02	18.55	3.08	0.444	21.3
0.13	0.0021	1.97	6.03	19.77	3.28	0.472	22.6
0.14	0.0023	2.13	6.04	21.08	3.49	0.503	24.1
0.15	0.0024	2.29	6.05	22.02	3.64	0.524	25.1
0.16	0.0025	2.46	6.06	23.24	3.84	0.552	26.5
0.17	0.0025	2.62	6.07	23.80	3.92	0.565	27.0
0.18	0.0027	2.78	6.08	25.11	4.13	0.595	28.5
0.19	0.0028	2.95	6.09	26.33	4.32	0.623	29.8
0.20	0.0029	3.11	6.10	26.89	4.41	0.635	30.4
0.21	0.0030	3.28	6.11	27.83	4.56	0.656	31.4
0.22	0.0031	3.44	6.12	28.77	4.70	0.677	32.4
0.23	0.0032	3.60	6.13	29.70	4.85	0.698	33.4
0.24	0.0032	3.77	6.14	30.36	4.94	0.712	34.1
0.25	0.0033	3.93	6.15	31.30	5.09	0.733	35.1
0.26	0.0034	4.10	6.16	31.86	5.17	0.745	35.7
0.27	0.0035	4.26	6.17	32.51	5.27	0.759	36.3
0.28	0.0036	4.42	6.18	33.45	5.41	0.779	37.3
0.29	0.0036	4.59	6.19	34.01	5.49	0.791	37.9
0.30	0.0037	4.75	6.20	34.67	5.59	0.805	38.5
0.31	0.0038	4.91	6.21	35.32	5.68	0.819	39.2
0.32	0.0038	5.08	6.22	35.89	5.77	0.830	39.8
0.33	0.0039	5.24	6.24	36.54	5.86	0.844	40.4
0.34	0.0040	5.41	6.25	37.48	6.00	0.864	41.4
0.35	0.0040	5.57	6.26	37.76	6.04	0.869	41.6
0.36	0.0041	5.73	6.27	38.42	6.13	0.883	42.3
0.37	0.0042	5.90	6.28	38.98	6.21	0.894	42.8
0.38	0.0042	6.06	6.29	39.35	6.26	0.901	43.1
0.39	0.0043	6.22	6.30	39.92	6.34	0.912	43.7
0.40	0.0043	6.39	6.31	40.57	6.43	0.926	44.3
0.41	0.0044	6.55	6.32	40.85	6.46	0.930	44.5
0.42	0.0044	6.72	6.33	41.51	6.55	0.944	45.2
0.43	0.0045	6.88	6.34	42.07	6.63	0.955	45.7
0.44	0.0045	7.04	6.36	42.45	6.68	0.962	46.0
0.45	0.0046	7.21	6.37	42.73	6.71	0.966	46.3
0.46	0.0046	7.37	6.38	43.38	6.80	0.979	46.9
0.47	0.0047	7.54	6.39	43.66	6.83	0.984	47.1
0.48	0.0047	7.70	6.40	43.95	6.87	0.989	47.3
0.49	0.0047	7.86	6.41	44.32	6.91	0.995	47.7
0.50	0.0048	8.03	6.42	44.60	6.94	1.000	47.9
0.51	0.0048	8.19	6.44	44.88	6.97	1.004	48.1
0.52	0.0049	8.35	6.45	45.54	7.06	1.017	48.7
0.53	0.0049	8.52	6.46	45.82	7.09	1.022	48.9
0.54	0.0049	8.68	6.47	46.10	7.13	1.026	49.1
0.60	0.0054	9.66	6.54	50.50	7.72	1.112	53.2
0.66	0.0056	10.65	6.61	52.66	7.96	1.147	54.9
0.72	0.0057	11.63	6.69	53.22	7.96	1.146	54.9
0.78	0.0058	12.61	6.76	54.16	8.01	1.153	55.2
0.84	0.0058	13.60	6.84	53.88	7.88	1.135	54.3
0.90	0.0057	14.58	6.92	53.60	7.75	1.116	53.4

UNCONFINED COMPRESSIVE STRENGTH, q_u:	55.23	kPa
(based on maximum q_u value)	1.153	ksf
UNDRAINED SHEAR STRENGTH, S_u:	27.61	kPa
(based on maximum q_u value)	0.577	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)



TH23-24, T8

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

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 8B & 10
JOB NO.: 60680190

TEST HOLE NO.:	**TH23-25**
SAMPLE NO.:	**T3**
SAMPLE DEPTH:	4.57 - 5.18 m
DATE TESTED:	10-Mar-23
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.46
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**45.1**
Undrained Shear Strength (ksf)	0.94
POCKET PENETROMETER	
Reading - Qu (tsf)	1.25
Undrained Shear Strength (kPa)	**59.9**
Reading - Qu (tsf)	1.30
Undrained Shear Strength (kPa)	**62.2**
Reading - Qu (tsf)	1.40
Undrained Shear Strength (kPa)	**67.0**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**41.2**
Unconfined compressive strength (ksf)	**0.9**
Undrained Shear Strength (kPa)	**20.6**
Undrained Shear Strength (ksf)	**0.430**
MOISTURE CONTENT	
Tare Number	SG63
Wt. Sample wet + tare (g)	717.0
Wt. Sample dry + tare (g)	465.6
Wt. Tare (g)	8.3
Moisture Content %	**55.0**
BULK DENSITY	
Sample Wt. (g)	1083.6
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.30
Diameter 3 (cm)	7.20
Avg. Diameter (cm)	**7.23**
Length 1 (cm)	15.60
Length 2 (cm)	15.60
Length 3 (cm)	15.50
Avg. Length (cm)	**15.57**
Volume (cm^3)	639.7
Moisture content (%)	55.0
Bulk Density (g/cm^3)	1.694
Bulk Unit Weight (kN/m^3)	**16.6**
Bulk Unit Weight (pcf)	**105.8**
Dry Unit Weight (kN/m^3)	**10.72**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8B & 10
JOB NO.:	60680190

TEST HOLE NO.:	TH23-25
SAMPLE NO.:	T3
SAMPLE DEPTH:	4.57 - 5.18 m
SAMPLE DATE:	
TEST DATE:	10-Mar-23

SOIL DESCRIPTION:	
CLAY - brown, moist, firm, silty, trace precipitates	
high plasticity	
MOISTURE CONTENT:	55.0

See attached photo

FAILURE SKETCH

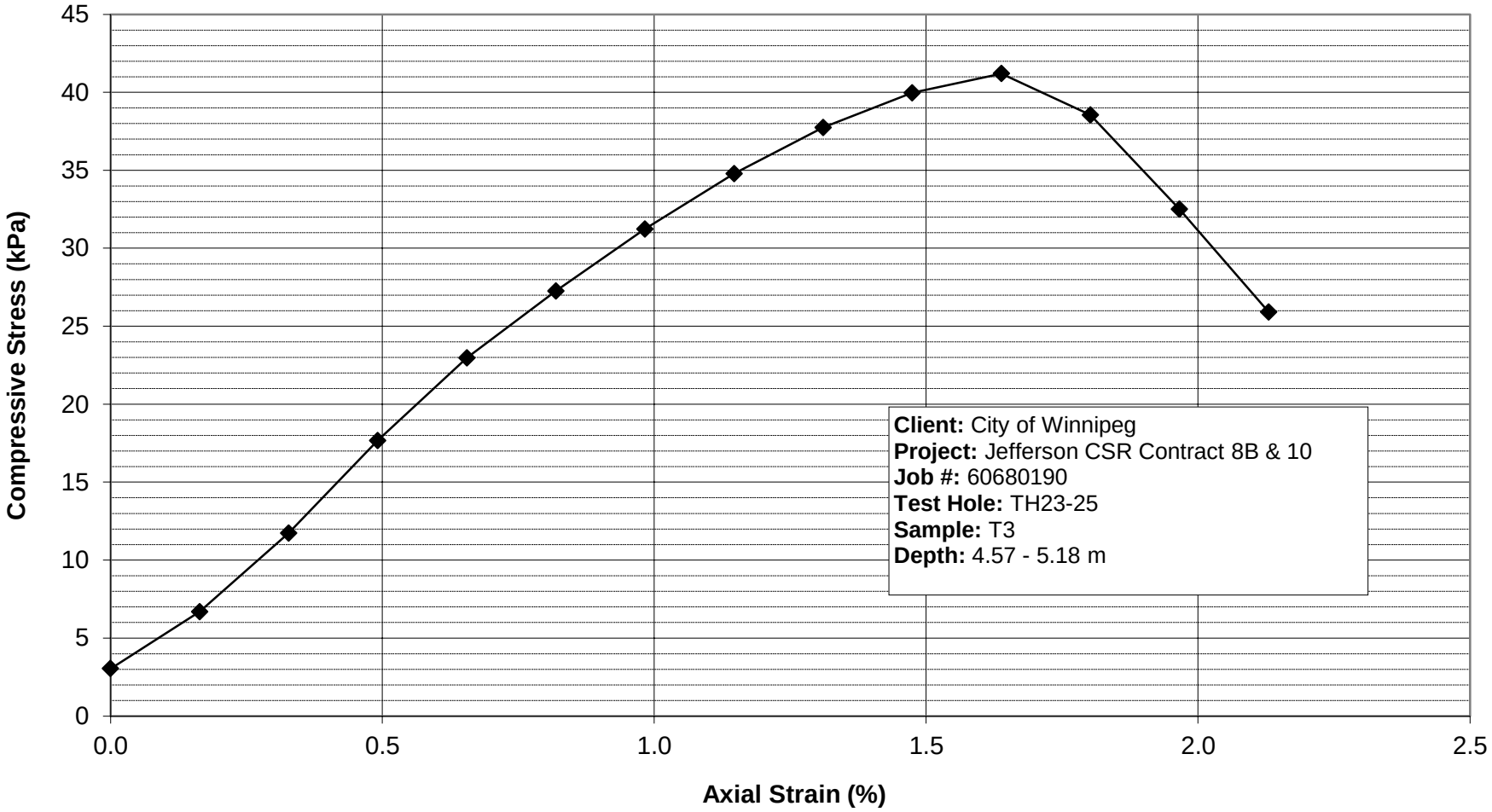
SAMPLE DIAM.(Do):	72.33	**(mm)**	**INITIAL AREA, Ao:**	4109.3	**(mm^2)**
SAMPLE LENGTH, (Lo):	155.67	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.15	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	0.98	**(0.5<R<2 % / minute)**

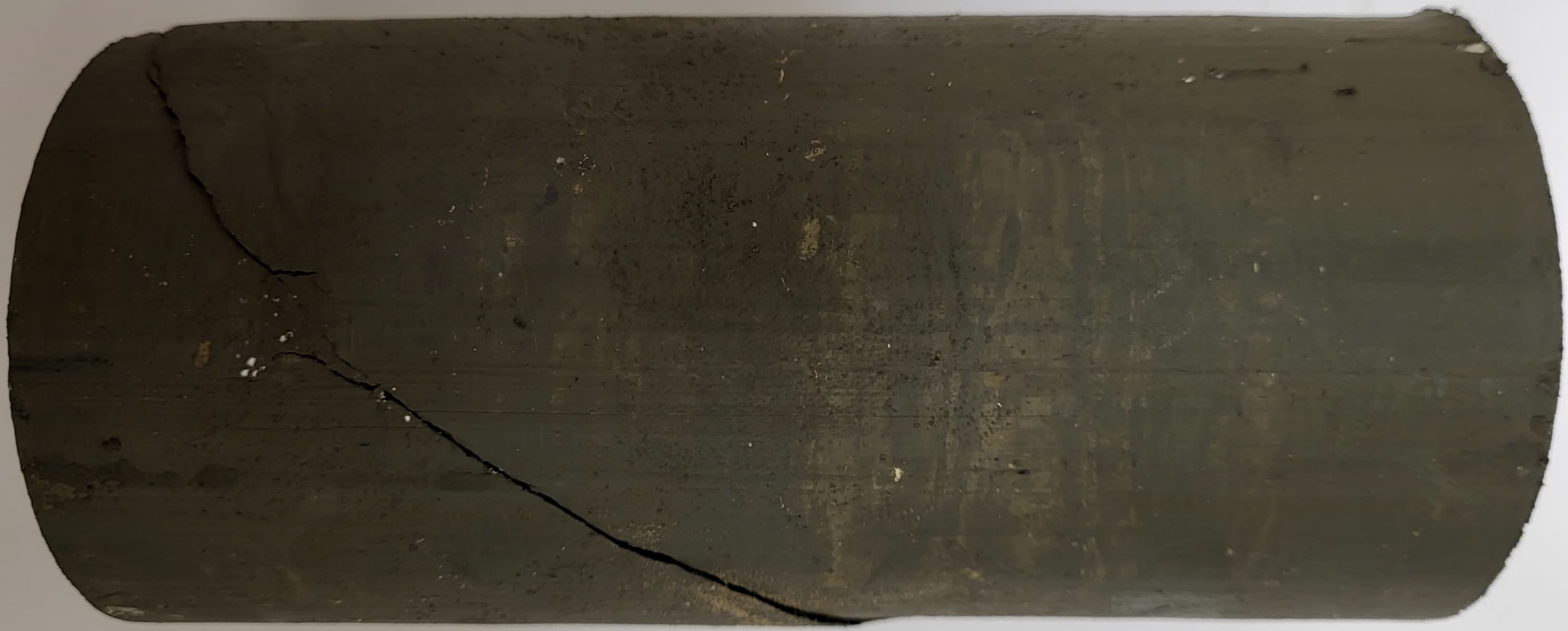
TEST DATA - DIAL READINGS							
AXIAL COMPRESSION	**PROVING RING**	**TOTAL AXIAL STRAIN, ε_1**	**AVERAGE CROSS-SECTIONAL AREA, A**	**APPLIED AXIAL LOAD, P**	**COMPRESSIVE STRESS, σ_c**		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0003	0.00	6.37	2.81	0.44	0.064	3.0
0.02	0.0007	0.16	6.38	6.18	0.97	0.140	6.7
0.03	0.0012	0.33	6.39	10.87	1.70	0.245	11.7
0.04	0.0018	0.49	6.40	16.40	2.56	0.369	17.7
0.05	0.0023	0.66	6.41	21.36	3.33	0.480	23.0
0.06	0.0027	0.82	6.42	25.39	3.95	0.569	27.3
0.07	0.0031	0.98	6.43	29.14	4.53	0.652	31.2
0.08	0.0035	1.15	6.44	32.51	5.05	0.727	34.8
0.09	0.0038	1.31	6.45	35.32	5.47	0.788	37.7
0.10	0.0040	1.47	6.46	37.48	5.80	0.835	40.0
0.11	0.0041	1.64	6.48	38.70	5.98	0.861	41.2
0.12	0.0039	1.80	6.49	36.26	5.59	0.805	38.5
0.13	0.0033	1.97	6.50	30.64	4.72	0.679	32.5
0.14	0.0026	2.13	6.51	24.46	3.76	0.541	25.9

UNCONFINED COMPRESSIVE STRENGTH, q_u:	41.20	kPa
(based on maximum q_u value)	0.861	ksf
UNDRAINED SHEAR STRENGTH, S_u:	20.60	kPa
(based on maximum q_u value)	0.430	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)





TH23-25, T3

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

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 8B & 10
JOB NO.: 60680190

TEST HOLE NO.:	**TH23-25**
SAMPLE NO.:	**T5**
SAMPLE DEPTH:	7.62 - 8.23 m
DATE TESTED:	16-Mar-23
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)	1.10
Undrained Shear Strength (kPa)	**52.7**
Reading - Qu (tsf)	1.20
Undrained Shear Strength (kPa)	**57.5**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**99.6**
Unconfined compressive strength (ksf)	**2.1**
Undrained Shear Strength (kPa)	**49.8**
Undrained Shear Strength (ksf)	**1.041**
MOISTURE CONTENT	
Tare Number	F12
Wt. Sample wet + tare (g)	348.9
Wt. Sample dry + tare (g)	245.6
Wt. Tare (g)	9.4
Moisture Content %	**43.7**
BULK DENSITY	
Sample Wt. (g)	1113.6
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.20
Diameter 3 (cm)	7.20
Avg. Diameter (cm)	**7.20**
Length 1 (cm)	15.60
Length 2 (cm)	15.60
Length 3 (cm)	15.60
Avg. Length (cm)	**15.60**
Volume (cm^3)	635.2
Moisture content (%)	43.7
Bulk Density (g/cm^3)	1.753
Bulk Unit Weight (kN/m^3)	**17.2**
Bulk Unit Weight (pcf)	**109.5**
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 8B & 10
JOB NO.:	60680190

TEST HOLE NO.:	TH23-25
SAMPLE NO.:	T5
SAMPLE DEPTH:	7.62 - 8.23 m
SAMPLE DATE:	
TEST DATE:	16-Mar-23

SOIL DESCRIPTION:	
CLAY - grey, moist, firm, silty, trace gravel, silt inclusions	
high plasticity	
MOISTURE CONTENT:	43.7

See attached photo

FAILURE SKETCH

SAMPLE DIAM.(Do):	72.00	**(mm)**	**INITIAL AREA, Ao:**	4071.5	**(mm^2)**
SAMPLE LENGTH, (Lo):	156.00	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.17	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	0.98	**(0.5<R<2 % / minute)**

TEST DATA - DIAL READINGS

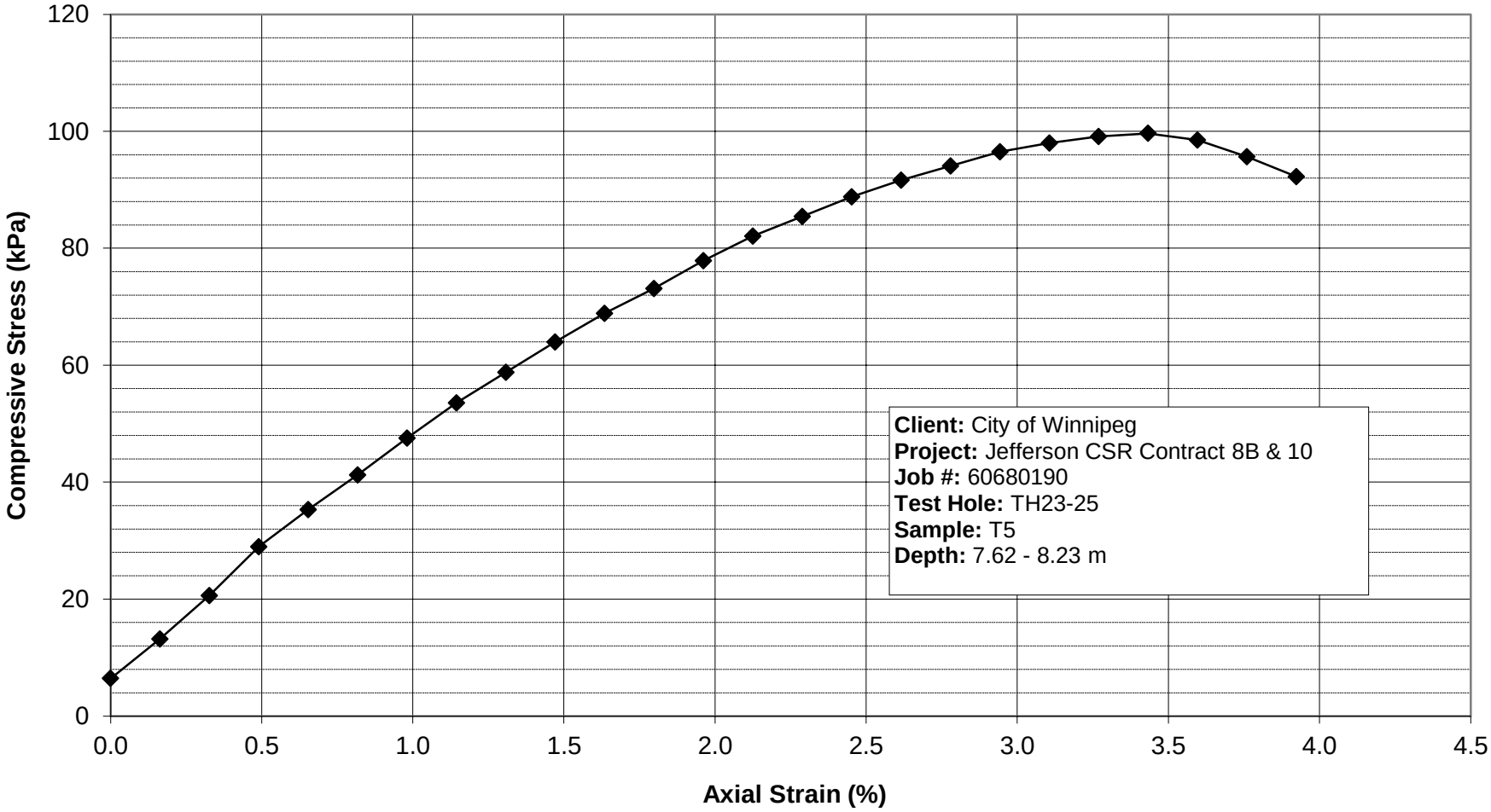
AXIAL COMPRESSION	PROVING RING	TOTAL AXIAL STRAIN, ε_1	AVERAGE CROSS-SECTIONAL AREA, A	APPLIED AXIAL LOAD, P	COMPRESSIVE STRESS, σ_c		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0006	0.00	6.31	5.90	0.94	0.135	6.4
0.02	0.0013	0.16	6.32	12.09	1.91	0.275	13.2
0.03	0.0020	0.33	6.33	18.93	2.99	0.430	20.6
0.04	0.0028	0.49	6.34	26.61	4.20	0.604	28.9
0.05	0.0035	0.65	6.35	32.51	5.12	0.737	35.3
0.06	0.0041	0.82	6.36	38.04	5.98	0.861	41.2
0.07	0.0047	0.98	6.37	43.95	6.90	0.993	47.5
0.08	0.0053	1.14	6.38	49.57	7.76	1.118	53.5
0.09	0.0058	1.31	6.39	54.53	8.53	1.228	58.8
0.10	0.0063	1.47	6.41	59.41	9.27	1.336	63.9
0.11	0.0068	1.63	6.42	64.09	9.99	1.439	68.9
0.12	0.0073	1.80	6.43	68.12	10.60	1.526	73.1
0.13	0.0078	1.96	6.44	72.71	11.30	1.627	77.9
0.14	0.0082	2.12	6.45	76.74	11.90	1.714	82.1
0.15	0.0085	2.29	6.46	80.02	12.39	1.784	85.4
0.16	0.0089	2.45	6.47	83.30	12.88	1.854	88.8
0.17	0.0092	2.62	6.48	86.11	13.29	1.913	91.6
0.18	0.0095	2.78	6.49	88.55	13.64	1.964	94.1
0.19	0.0097	2.94	6.50	90.98	13.99	2.015	96.5
0.20	0.0099	3.11	6.51	92.58	14.21	2.047	98.0
0.21	0.0100	3.27	6.52	93.79	14.38	2.070	99.1
0.22	0.0101	3.43	6.54	94.45	14.45	2.081	99.6
0.23	0.0100	3.60	6.55	93.51	14.28	2.057	98.5
0.24	0.0097	3.76	6.56	90.98	13.87	1.998	95.7
0.25	0.0094	3.92	6.57	87.89	13.38	1.927	92.3

UNCONFINED COMPRESSIVE STRENGTH, q_u:	99.65	kPa
(based on maximum q_u value)	2.081	ksf
UNDRAINED SHEAR STRENGTH, S_u:	49.82	kPa
(based on maximum q_u value)	1.041	ksf

NOTES:

AECOM

UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS (ASTM D2166)



TH23-25, T5

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

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 8B & 10
JOB NO.: 60680190

TEST HOLE NO.:	**TH23-26**
SAMPLE NO.:	**T3**
SAMPLE DEPTH:	4.57 - 5.18 m
DATE TESTED:	10-Mar-23
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)	1.10
Undrained Shear Strength (kPa)	**52.7**
Reading - Qu (tsf)	1.10
Undrained Shear Strength (kPa)	**52.7**
Reading - Qu (tsf)	1.25
Undrained Shear Strength (kPa)	**59.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**86.2**
Unconfined compressive strength (ksf)	**1.8**
Undrained Shear Strength (kPa)	**43.1**
Undrained Shear Strength (ksf)	**0.900**
MOISTURE CONTENT	
Tare Number	MAC10
Wt. Sample wet + tare (g)	742.6
Wt. Sample dry + tare (g)	478.8
Wt. Tare (g)	8.7
Moisture Content %	**56.1**
BULK DENSITY	
Sample Wt. (g)	1078.9
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.30
Diameter 3 (cm)	7.30
Avg. Diameter (cm)	**7.27**
Length 1 (cm)	15.70
Length 2 (cm)	15.70
Length 3 (cm)	15.70
Avg. Length (cm)	**15.70**
Volume (cm^3)	651.1
Moisture content (%)	56.1
Bulk Density (g/cm^3)	1.657
Bulk Unit Weight (kN/m^3)	**16.3**
Bulk Unit Weight (pcf)	**103.4**
Dry Unit Weight (kN/m^3)	**10.41**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8B & 10
JOB NO.:	60680190

TEST HOLE NO.:	TH23-26
SAMPLE NO.:	T3
SAMPLE DEPTH:	4.57 - 5.18 m
SAMPLE DATE:	
TEST DATE:	10-Mar-23

SOIL DESCRIPTION:	
CLAY - brown, moist, firm, silty, silt inclusions	
high plasticity	
MOISTURE CONTENT:	56.1

See attached photo

FAILURE SKETCH

SAMPLE DIAM.(Do):	72.67	**(mm)**	**INITIAL AREA, Ao:**	4147.3	**(mm^2)**
SAMPLE LENGTH, (Lo):	157.00	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.16	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	0.97	**(0.5<R<2 % / minute)**

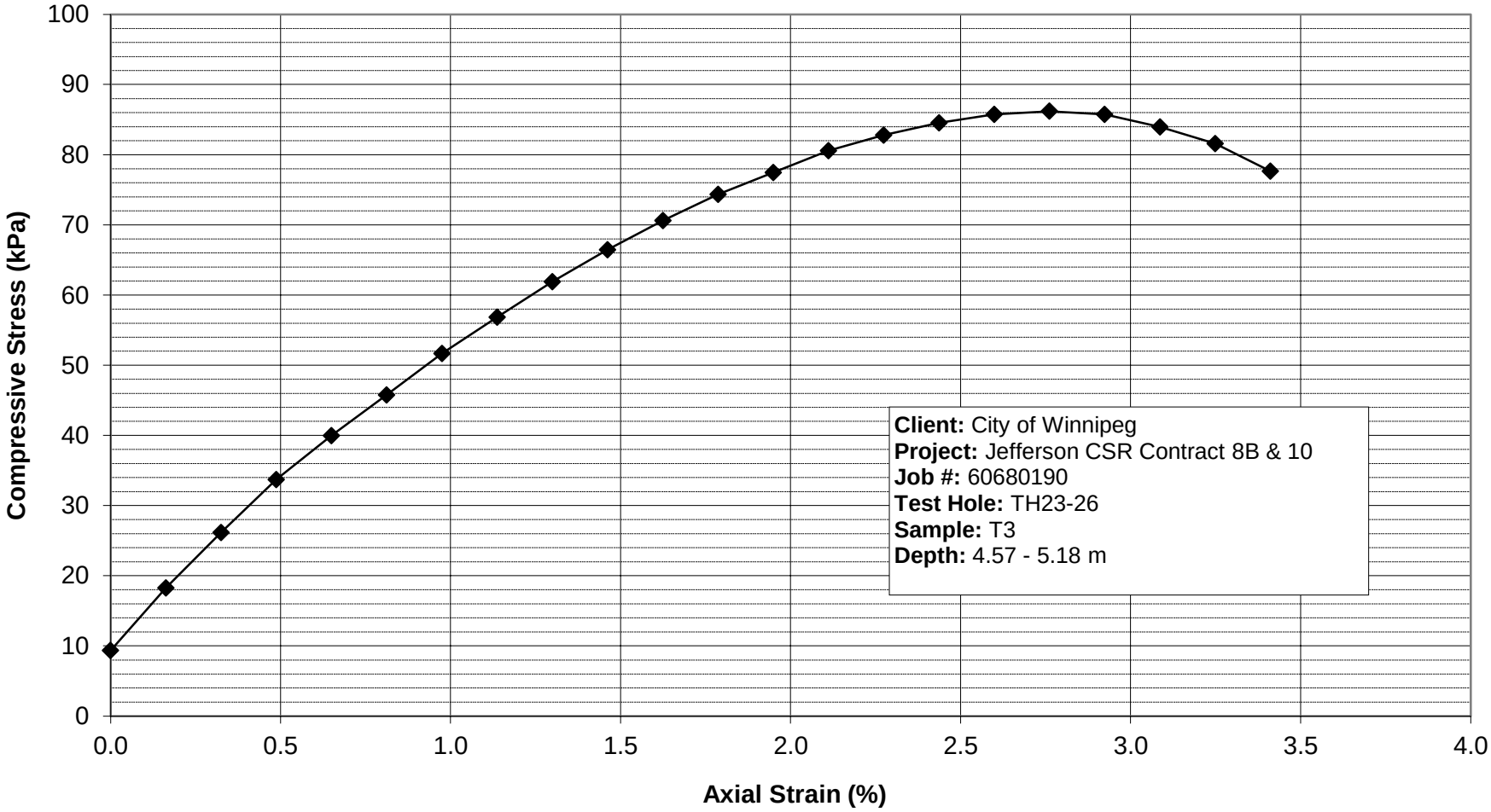
TEST DATA - DIAL READINGS

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	6.43	8.71	1.36	0.195	9.3
0.02	0.0018	0.16	6.44	17.05	2.65	0.381	18.3
0.03	0.0026	0.32	6.45	24.46	3.79	0.546	26.1
0.04	0.0034	0.49	6.46	31.58	4.89	0.704	33.7
0.05	0.0040	0.65	6.47	37.48	5.79	0.834	39.9
0.06	0.0046	0.81	6.48	43.01	6.64	0.956	45.8
0.07	0.0052	0.97	6.49	48.63	7.49	1.079	51.7
0.08	0.0057	1.14	6.50	53.60	8.24	1.187	56.8
0.09	0.0062	1.30	6.51	58.47	8.98	1.293	61.9
0.10	0.0067	1.46	6.52	62.87	9.64	1.388	66.4
0.11	0.0071	1.62	6.53	66.90	10.24	1.474	70.6
0.12	0.0075	1.79	6.55	70.56	10.78	1.552	74.3
0.13	0.0079	1.95	6.56	73.65	11.23	1.618	77.5
0.14	0.0082	2.11	6.57	76.74	11.69	1.683	80.6
0.15	0.0084	2.27	6.58	78.99	12.01	1.729	82.8
0.16	0.0086	2.44	6.59	80.77	12.26	1.765	84.5
0.17	0.0088	2.60	6.60	82.08	12.44	1.791	85.8
0.18	0.0088	2.76	6.61	82.64	12.50	1.800	86.2
0.19	0.0088	2.92	6.62	82.36	12.44	1.791	85.8
0.20	0.0086	3.09	6.63	80.77	12.18	1.753	84.0
0.21	0.0084	3.25	6.64	78.61	11.83	1.704	81.6
0.22	0.0080	3.41	6.66	74.96	11.26	1.622	77.7

UNCONFINED COMPRESSIVE STRENGTH, q_u:	86.19	kPa
(based on maximum q_u value)	1.800	ksf
UNDRAINED SHEAR STRENGTH, S_u:	43.10	kPa
(based on maximum q_u value)	0.900	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)



TH23-26, T3

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

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 8B & 10
JOB NO.: 60680190

TEST HOLE NO.:	**TH23-26**
SAMPLE NO.:	**T7**
SAMPLE DEPTH:	10.67 - 11.28 m
DATE TESTED:	16-Mar-23
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)	0.90
Undrained Shear Strength (kPa)	**43.1**
Reading - Qu (tsf)	0.90
Undrained Shear Strength (kPa)	**43.1**
Reading - Qu (tsf)	0.90
Undrained Shear Strength (kPa)	**43.1**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**91.9**
Unconfined compressive strength (ksf)	**1.9**
Undrained Shear Strength (kPa)	**46.0**
Undrained Shear Strength (ksf)	**0.960**
MOISTURE CONTENT	
Tare Number	F22
Wt. Sample wet + tare (g)	303.4
Wt. Sample dry + tare (g)	203.8
Wt. Tare (g)	8.9
Moisture Content %	**51.1**
BULK DENSITY	
Sample Wt. (g)	1114.1
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)	15.50
Avg. Length (cm)	**15.50**
Volume (cm^3)	631.1
Moisture content (%)	51.1
Bulk Density (g/cm^3)	1.765
Bulk Unit Weight (kN/m^3)	**17.3**
Bulk Unit Weight (pcf)	**110.2**
Dry Unit Weight (kN/m^3)	**11.46**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8B & 10
JOB NO.:	60680190

TEST HOLE NO.:	TH23-26
SAMPLE NO.:	T7
SAMPLE DEPTH:	10.67 - 11.28 m
SAMPLE DATE:	
TEST DATE:	16-Mar-23

SOIL DESCRIPTION:	
CLAY - grey, moist, firm, silty, silt inclusions	
high plasticity	
MOISTURE CONTENT:	51.1

See attached photo

FAILURE SKETCH

SAMPLE DIAM.(Do):	72.00	**(mm)**	**INITIAL AREA, Ao:**	4071.5	**(mm^2)**
SAMPLE LENGTH, (Lo):	155.00	**(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)**

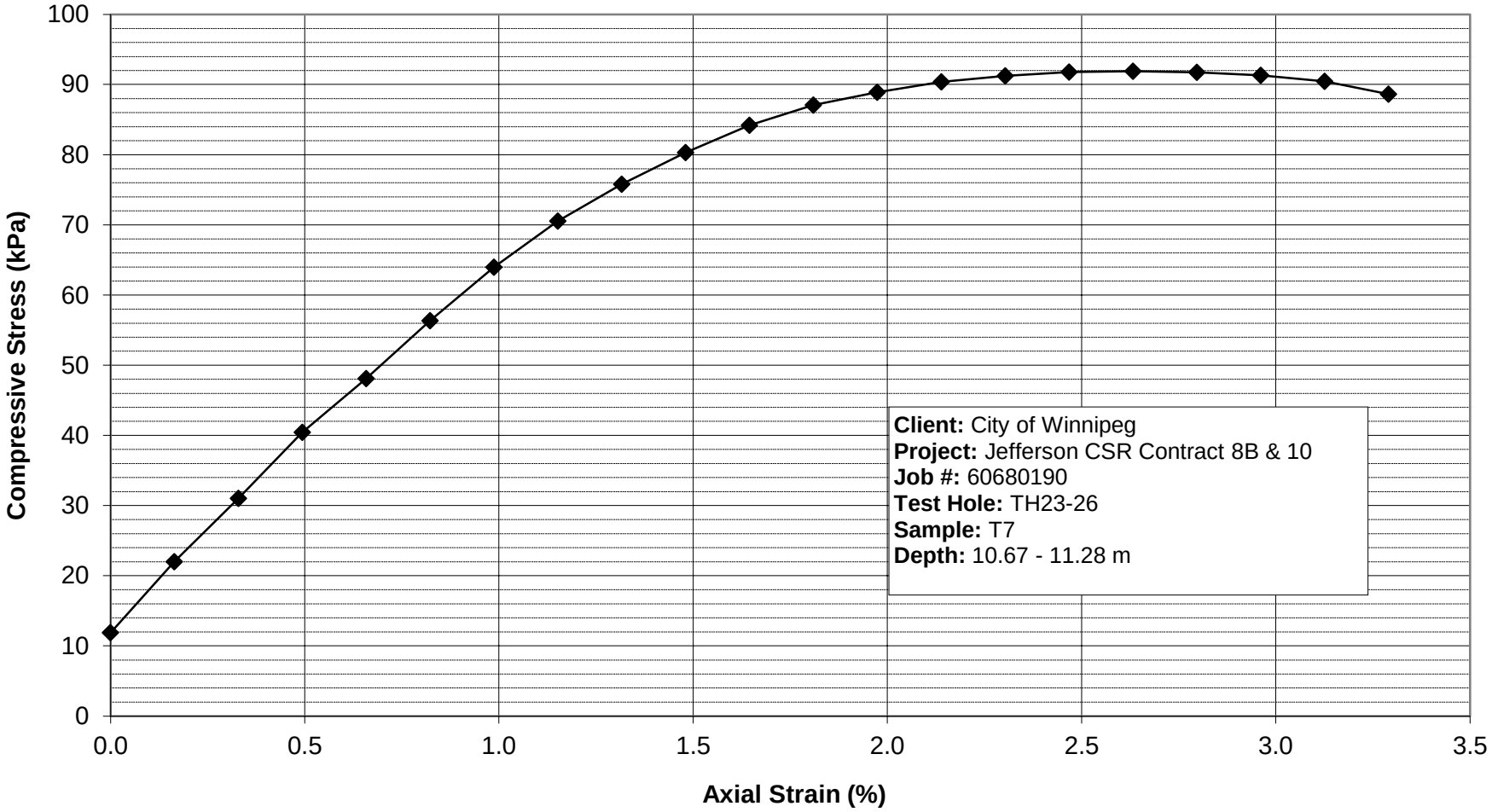
TEST DATA - DIAL READINGS

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	0.0012	0.00	6.31	10.87	1.72	0.248	11.9
0.02	0.0022	0.16	6.32	20.15	3.19	0.459	22.0
0.03	0.0030	0.33	6.33	28.48	4.50	0.648	31.0
0.04	0.0040	0.49	6.34	37.20	5.87	0.845	40.4
0.05	0.0047	0.66	6.35	44.32	6.98	1.005	48.1
0.06	0.0056	0.82	6.36	52.00	8.17	1.177	56.3
0.07	0.0063	0.99	6.37	59.12	9.28	1.336	64.0
0.08	0.0070	1.15	6.38	65.31	10.23	1.473	70.5
0.09	0.0075	1.32	6.40	70.28	10.99	1.582	75.8
0.10	0.0080	1.48	6.41	74.59	11.64	1.677	80.3
0.11	0.0084	1.65	6.42	78.33	12.21	1.758	84.2
0.12	0.0087	1.81	6.43	81.14	12.63	1.818	87.0
0.13	0.0089	1.97	6.44	83.02	12.90	1.857	88.9
0.14	0.0090	2.14	6.45	84.52	13.11	1.887	90.4
0.15	0.0091	2.30	6.46	85.45	13.23	1.905	91.2
0.16	0.0092	2.47	6.47	86.11	13.31	1.916	91.8
0.17	0.0092	2.63	6.48	86.39	13.33	1.919	91.9
0.18	0.0092	2.80	6.49	86.39	13.31	1.916	91.7
0.19	0.0092	2.96	6.50	86.11	13.24	1.907	91.3
0.20	0.0091	3.13	6.51	85.45	13.12	1.889	90.4
0.21	0.0090	3.29	6.53	83.86	12.85	1.851	88.6

UNCONFINED COMPRESSIVE STRENGTH, q_u:	91.90	kPa
(based on maximum q_u value)	1.919	ksf
UNDRAINED SHEAR STRENGTH, S_u:	45.95	kPa
(based on maximum q_u value)	0.960	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)



TH23-26, T7

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

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 8B & 10
JOB NO.: 60680190

TEST HOLE NO.:	**TH23-27**
SAMPLE NO.:	**T2**
SAMPLE DEPTH:	3.05 - 3.66 m
DATE TESTED:	10-Mar-23
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.63
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**61.8**
Undrained Shear Strength (ksf)	1.29
POCKET PENETROMETER	
Reading - Qu (tsf)	1.10
Undrained Shear Strength (kPa)	**52.7**
Reading - Qu (tsf)	1.20
Undrained Shear Strength (kPa)	**57.5**
Reading - Qu (tsf)	1.25
Undrained Shear Strength (kPa)	**59.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**53.2**
Unconfined compressive strength (ksf)	**1.1**
Undrained Shear Strength (kPa)	**26.6**
Undrained Shear Strength (ksf)	**0.556**
MOISTURE CONTENT	
Tare Number	J51
Wt. Sample wet + tare (g)	687.6
Wt. Sample dry + tare (g)	452.7
Wt. Tare (g)	8.5
Moisture Content %	**52.9**
BULK DENSITY	
Sample Wt. (g)	1067.8
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)	15.60
Length 3 (cm)	15.60
Avg. Length (cm)	**15.57**
Volume (cm^3)	633.8
Moisture content (%)	52.9
Bulk Density (g/cm^3)	1.685
Bulk Unit Weight (kN/m^3)	**16.5**
Bulk Unit Weight (pcf)	**105.2**
Dry Unit Weight (kN/m^3)	**10.81**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8B & 10
JOB NO.:	60680190

TEST HOLE NO.:	TH23-27
SAMPLE NO.:	T2
SAMPLE DEPTH:	3.05 - 3.66 m
SAMPLE DATE:	
TEST DATE:	10-Mar-23

SOIL DESCRIPTION:	
CLAY - brown, moist, stiff, silty, silt inclusions, trace precipitates	
high plasticity	
MOISTURE CONTENT:	52.9

See attached photo

FAILURE SKETCH

SAMPLE DIAM.(Do):	72.00	**(mm)**	**INITIAL AREA, Ao:**	4071.5	**(mm^2)**
SAMPLE LENGTH, (Lo):	155.67	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.16	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	0.98	**(0.5<R<2 % / minute)**

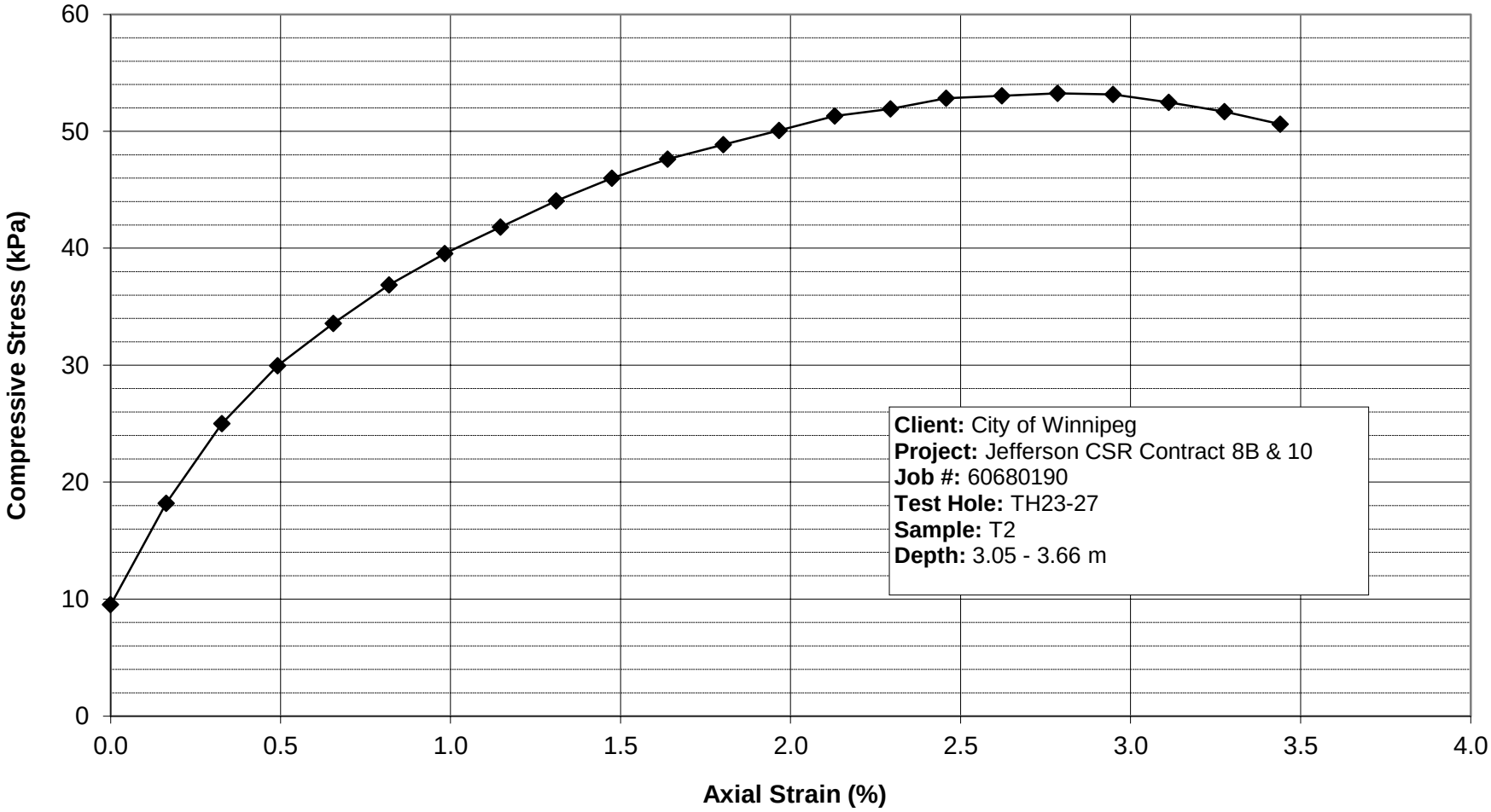
TEST DATA - DIAL READINGS

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	8.71	1.38	0.199	9.5
0.02	0.0018	0.16	6.32	16.68	2.64	0.380	18.2
0.03	0.0025	0.33	6.33	22.96	3.63	0.522	25.0
0.04	0.0029	0.49	6.34	27.55	4.34	0.625	29.9
0.05	0.0033	0.66	6.35	30.92	4.87	0.701	33.6
0.06	0.0036	0.82	6.36	34.01	5.35	0.770	36.9
0.07	0.0039	0.98	6.37	36.54	5.73	0.826	39.5
0.08	0.0041	1.15	6.38	38.70	6.06	0.873	41.8
0.09	0.0044	1.31	6.39	40.85	6.39	0.920	44.0
0.10	0.0046	1.47	6.41	42.73	6.67	0.961	46.0
0.11	0.0047	1.64	6.42	44.32	6.91	0.995	47.6
0.12	0.0049	1.80	6.43	45.54	7.09	1.020	48.9
0.13	0.0050	1.97	6.44	46.76	7.26	1.046	50.1
0.14	0.0051	2.13	6.45	47.97	7.44	1.071	51.3
0.15	0.0052	2.29	6.46	48.63	7.53	1.084	51.9
0.16	0.0053	2.46	6.47	49.57	7.66	1.103	52.8
0.17	0.0053	2.62	6.48	49.85	7.69	1.108	53.0
0.18	0.0054	2.78	6.49	50.13	7.72	1.112	53.2
0.19	0.0054	2.95	6.50	50.13	7.71	1.110	53.2
0.20	0.0053	3.11	6.51	49.57	7.61	1.096	52.5
0.21	0.0052	3.28	6.52	48.91	7.50	1.079	51.7
0.22	0.0051	3.44	6.54	47.97	7.34	1.057	50.6

UNCONFINED COMPRESSIVE STRENGTH, q_u:	53.24	kPa
(based on maximum q_u value)	1.112	ksf
UNDRAINED SHEAR STRENGTH, S_u:	26.62	kPa
(based on maximum q_u value)	0.556	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)



TH23-27, T2

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

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 8B & 10
JOB NO.: 60680190

TEST HOLE NO.:	**TH23-28**
SAMPLE NO.:	**T4**
SAMPLE DEPTH:	6.10 - 6.71 m
DATE TESTED:	10-Mar-23
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)	1.00
Undrained Shear Strength (kPa)	**47.9**
Reading - Qu (tsf)	1.10
Undrained Shear Strength (kPa)	**52.7**
Reading - Qu (tsf)	1.20
Undrained Shear Strength (kPa)	**57.5**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**92.2**
Unconfined compressive strength (ksf)	**1.9**
Undrained Shear Strength (kPa)	**46.1**
Undrained Shear Strength (ksf)	**0.963**
MOISTURE CONTENT	
Tare Number	32
Wt. Sample wet + tare (g)	749.6
Wt. Sample dry + tare (g)	497.8
Wt. Tare (g)	8.7
Moisture Content %	**51.5**
BULK DENSITY	
Sample Wt. (g)	1072
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)	15.40
Length 3 (cm)	15.40
Avg. Length (cm)	**15.40**
Volume (cm^3)	632.8
Moisture content (%)	51.5
Bulk Density (g/cm^3)	1.694
Bulk Unit Weight (kN/m^3)	**16.6**
Bulk Unit Weight (pcf)	**105.8**
Dry Unit Weight (kN/m^3)	**10.97**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8B & 10
JOB NO.:	60680190

TEST HOLE NO.:	TH23-28
SAMPLE NO.:	T4
SAMPLE DEPTH:	6.10 - 6.71 m
SAMPLE DATE:	
TEST DATE:	10-Mar-23

SOIL DESCRIPTION:	
CLAY - brown, moist, stiff, silty, silt inclusions	
high plasticity	
MOISTURE CONTENT:	51.5

Seeattached photo

FAILURE SKETCH

SAMPLE DIAM.(Do):	72.33	**(mm)**	**INITIAL AREA, Ao:**	4109.3	**(mm^2)**
SAMPLE LENGTH, (Lo):	154.00	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.13	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	0.99	**(0.5<R<2 % / minute)**

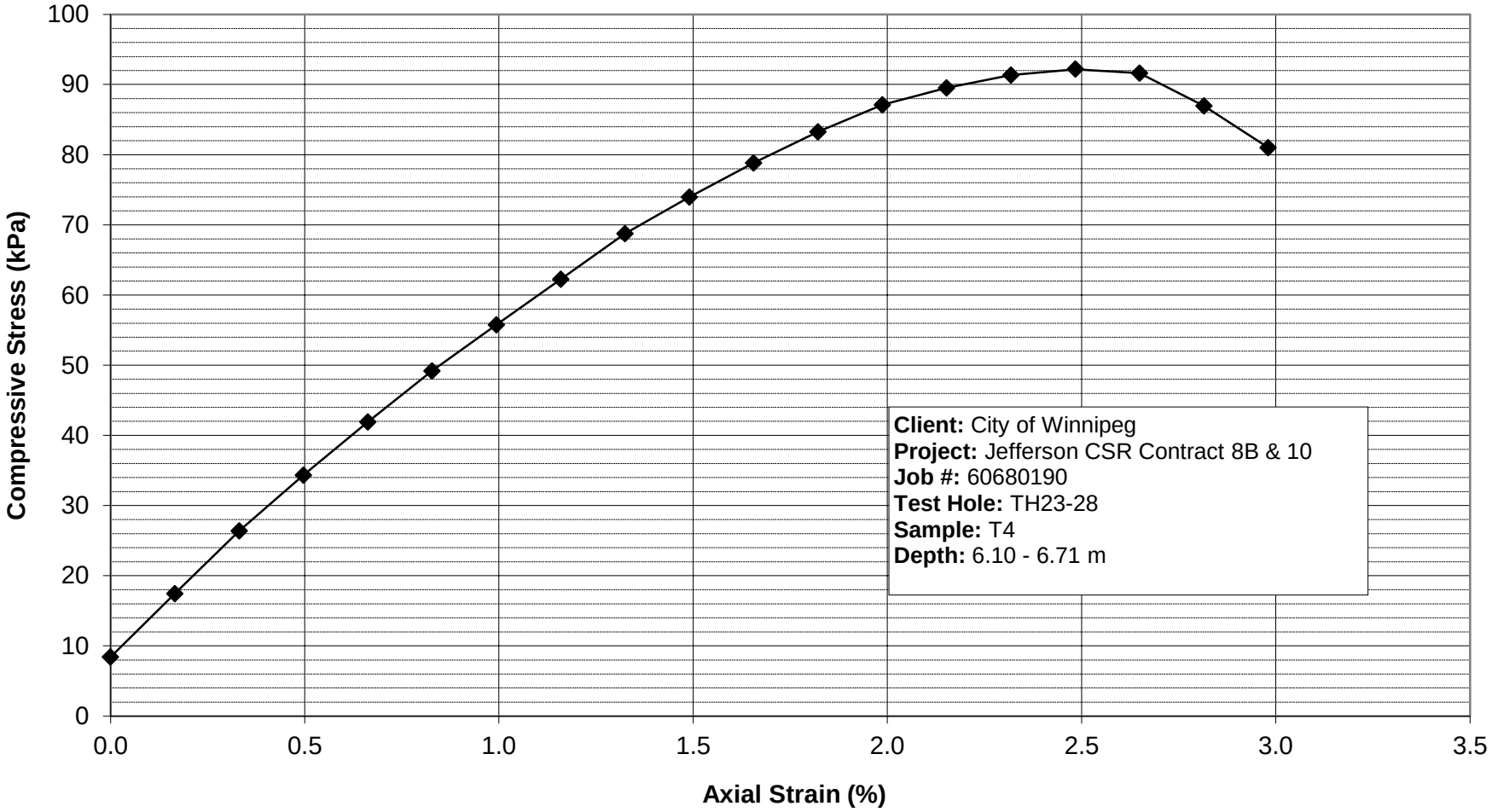
TEST DATA - DIAL READINGS

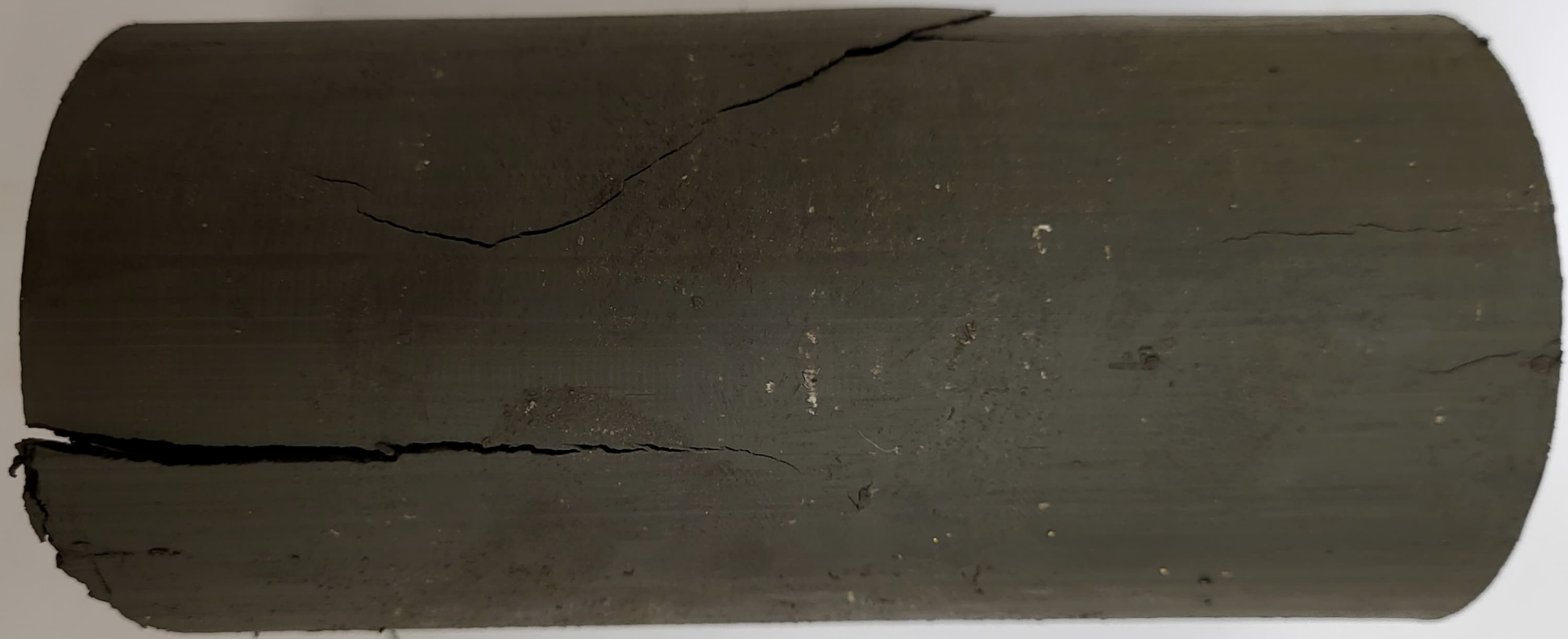
AXIAL COMPRESSION	PROVING RING	TOTAL AXIAL STRAIN, ε_1	AVERAGE CROSS-SECTIONAL AREA, A	APPLIED AXIAL LOAD, P	COMPRESSIVE STRESS, σ_c		
(inches)	(inches)	(%)	(inches2)	(lbs)	(psi)	(ksf)	(kPa)
0.01	0.0008	0.00	6.37	7.78	1.22	0.176	8.4
0.02	0.0017	0.17	6.38	16.12	2.53	0.364	17.4
0.03	0.0026	0.33	6.39	24.46	3.83	0.551	26.4
0.04	0.0034	0.50	6.40	31.86	4.98	0.717	34.3
0.05	0.0042	0.66	6.41	38.98	6.08	0.875	41.9
0.06	0.0049	0.83	6.42	45.82	7.13	1.027	49.2
0.07	0.0056	0.99	6.43	52.00	8.08	1.164	55.7
0.08	0.0062	1.16	6.44	58.19	9.03	1.300	62.3
0.09	0.0069	1.32	6.45	64.37	9.97	1.436	68.8
0.10	0.0074	1.49	6.47	69.34	10.72	1.544	73.9
0.11	0.0079	1.66	6.48	74.02	11.43	1.646	78.8
0.12	0.0084	1.82	6.49	78.33	12.07	1.739	83.2
0.13	0.0088	1.99	6.50	82.08	12.63	1.819	87.1
0.14	0.0090	2.15	6.51	84.52	12.98	1.870	89.5
0.15	0.0092	2.32	6.52	86.39	13.25	1.908	91.3
0.16	0.0093	2.48	6.53	87.33	13.37	1.925	92.2
0.17	0.0093	2.65	6.54	86.95	13.29	1.914	91.6
0.18	0.0088	2.81	6.55	82.64	12.61	1.816	86.9
0.19	0.0082	2.98	6.57	77.12	11.75	1.691	81.0

UNCONFINED COMPRESSIVE STRENGTH, q_u:	92.18	kPa
(based on maximum q_u value)	1.925	ksf
UNDRAINED SHEAR STRENGTH, S_u:	46.09	kPa
(based on maximum q_u value)	0.963	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)





TH23-28, T4

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

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 8B & 10
JOB NO.: 60680190

TEST HOLE NO.:	**TH23-28**
SAMPLE NO.:	**T8**
SAMPLE DEPTH:	12.19 - 12.80 m
DATE TESTED:	16-Mar-23
SHEAR STRENGTH TESTS	
TORVANE	
Reading	0.46
Vane Size (S, M, L)	M
Undrained Shear Strength (kPa)	**45.1**
Undrained Shear Strength (ksf)	0.94
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)	0.75
Undrained Shear Strength (kPa)	**35.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**40.8**
Unconfined compressive strength (ksf)	**0.9**
Undrained Shear Strength (kPa)	**20.4**
Undrained Shear Strength (ksf)	**0.426**
MOISTURE CONTENT	
Tare Number	57
Wt. Sample wet + tare (g)	253.6
Wt. Sample dry + tare (g)	172.2
Wt. Tare (g)	8.5
Moisture Content %	**49.7**
BULK DENSITY	
Sample Wt. (g)	1040.1
Diameter 1 (cm)	7.20
Diameter 2 (cm)	7.30
Diameter 3 (cm)	7.20
Avg. Diameter (cm)	**7.23**
Length 1 (cm)	15.50
Length 2 (cm)	15.50
Length 3 (cm)	15.50
Avg. Length (cm)	**15.50**
Volume (cm^3)	636.9
Moisture content (%)	49.7
Bulk Density (g/cm^3)	1.633
Bulk Unit Weight (kN/m^3)	**16.0**
Bulk Unit Weight (pcf)	**101.9**
Dry Unit Weight (kN/m^3)	**10.70**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8B & 10
JOB NO.:	60680190

TEST HOLE NO.:	TH23-28
SAMPLE NO.:	T8
SAMPLE DEPTH:	12.19 - 12.80 m
SAMPLE DATE:	
TEST DATE:	16-Mar-23

SOIL DESCRIPTION:	
CLAY - grey, moist, firm, silty, silt inclusions	
high plasticity	
MOISTURE CONTENT:	49.7

See attached photo

FAILURE SKETCH

SAMPLE DIAM.(Do):	72.33	**(mm)**	**INITIAL AREA, Ao:**	4109.3	**(mm^2)**
SAMPLE LENGTH, (Lo):	155.00	**(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)**

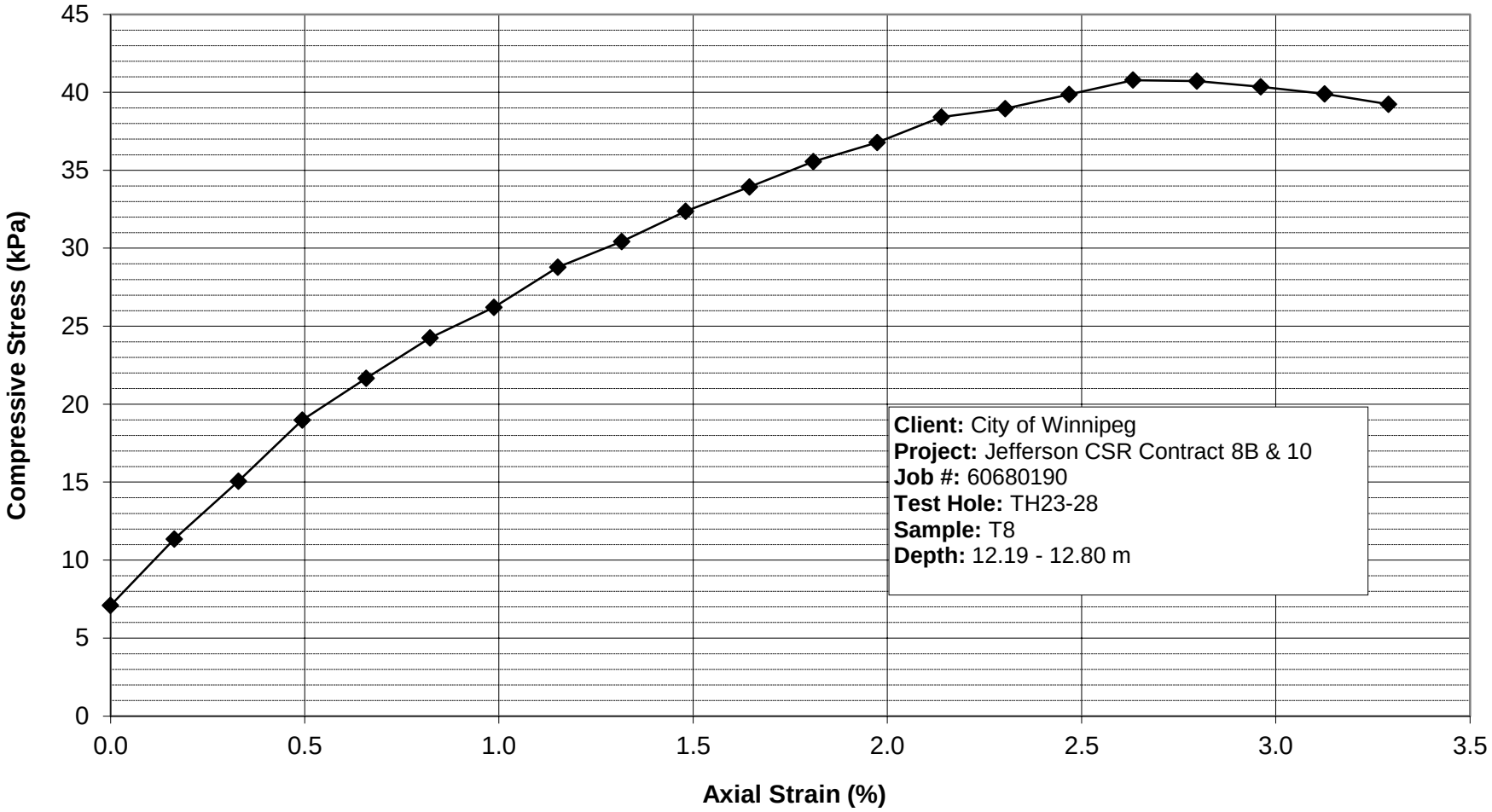
TEST DATA - DIAL READINGS

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	0.0007	0.00	6.37	6.56	1.03	0.148	7.1
0.02	0.0011	0.16	6.38	10.49	1.64	0.237	11.3
0.03	0.0015	0.33	6.39	13.96	2.18	0.315	15.1
0.04	0.0019	0.49	6.40	17.62	2.75	0.396	19.0
0.05	0.0022	0.66	6.41	20.15	3.14	0.452	21.7
0.06	0.0024	0.82	6.42	22.58	3.52	0.506	24.2
0.07	0.0026	0.99	6.43	24.46	3.80	0.547	26.2
0.08	0.0029	1.15	6.44	26.89	4.17	0.601	28.8
0.09	0.0030	1.32	6.45	28.48	4.41	0.636	30.4
0.10	0.0032	1.48	6.47	30.36	4.70	0.676	32.4
0.11	0.0034	1.65	6.48	31.86	4.92	0.708	33.9
0.12	0.0036	1.81	6.49	33.45	5.16	0.743	35.6
0.13	0.0037	1.97	6.50	34.67	5.34	0.769	36.8
0.14	0.0039	2.14	6.51	36.26	5.57	0.802	38.4
0.15	0.0039	2.30	6.52	36.82	5.65	0.813	38.9
0.16	0.0040	2.47	6.53	37.76	5.78	0.833	39.9
0.17	0.0041	2.63	6.54	38.70	5.92	0.852	40.8
0.18	0.0041	2.80	6.55	38.70	5.91	0.850	40.7
0.19	0.0041	2.96	6.56	38.42	5.85	0.843	40.4
0.20	0.0041	3.13	6.57	38.04	5.79	0.833	39.9
0.21	0.0040	3.29	6.59	37.48	5.69	0.819	39.2

UNCONFINED COMPRESSIVE STRENGTH, q_u:	40.79	kPa
(based on maximum q_u value)	0.852	ksf
UNDRAINED SHEAR STRENGTH, S_u:	20.39	kPa
(based on maximum q_u value)	0.426	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)



TH23-28, T8

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

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 8B & 10
JOB NO.: 60680190

TEST HOLE NO.:	**TH23-29**
SAMPLE NO.:	**T3**
SAMPLE DEPTH:	4.57 - 5.18 m
DATE TESTED:	10-Mar-23
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)	1.00
Undrained Shear Strength (kPa)	**47.9**
Reading - Qu (tsf)	1.50
Undrained Shear Strength (kPa)	**71.8**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**84.5**
Unconfined compressive strength (ksf)	**1.8**
Undrained Shear Strength (kPa)	**42.2**
Undrained Shear Strength (ksf)	**0.882**
MOISTURE CONTENT	
Tare Number	AK11
Wt. Sample wet + tare (g)	736.2
Wt. Sample dry + tare (g)	472.2
Wt. Tare (g)	8.5
Moisture Content %	**56.9**
BULK DENSITY	
Sample Wt. (g)	1074.3
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)	15.50
Length 3 (cm)	15.40
Avg. Length (cm)	**15.47**
Volume (cm^3)	629.7
Moisture content (%)	56.9
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)	**10.66**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8B & 10
JOB NO.:	60680190

TEST HOLE NO.:	TH23-29
SAMPLE NO.:	T3
SAMPLE DEPTH:	4.57 - 5.18 m
SAMPLE DATE:	
TEST DATE:	10-Mar-23

SOIL DESCRIPTION:	
CLAY - brown, moist, stiff, silty, silt inclusions	
high plasticity	
MOISTURE CONTENT:	56.9

See attached photo

FAILURE SKETCH

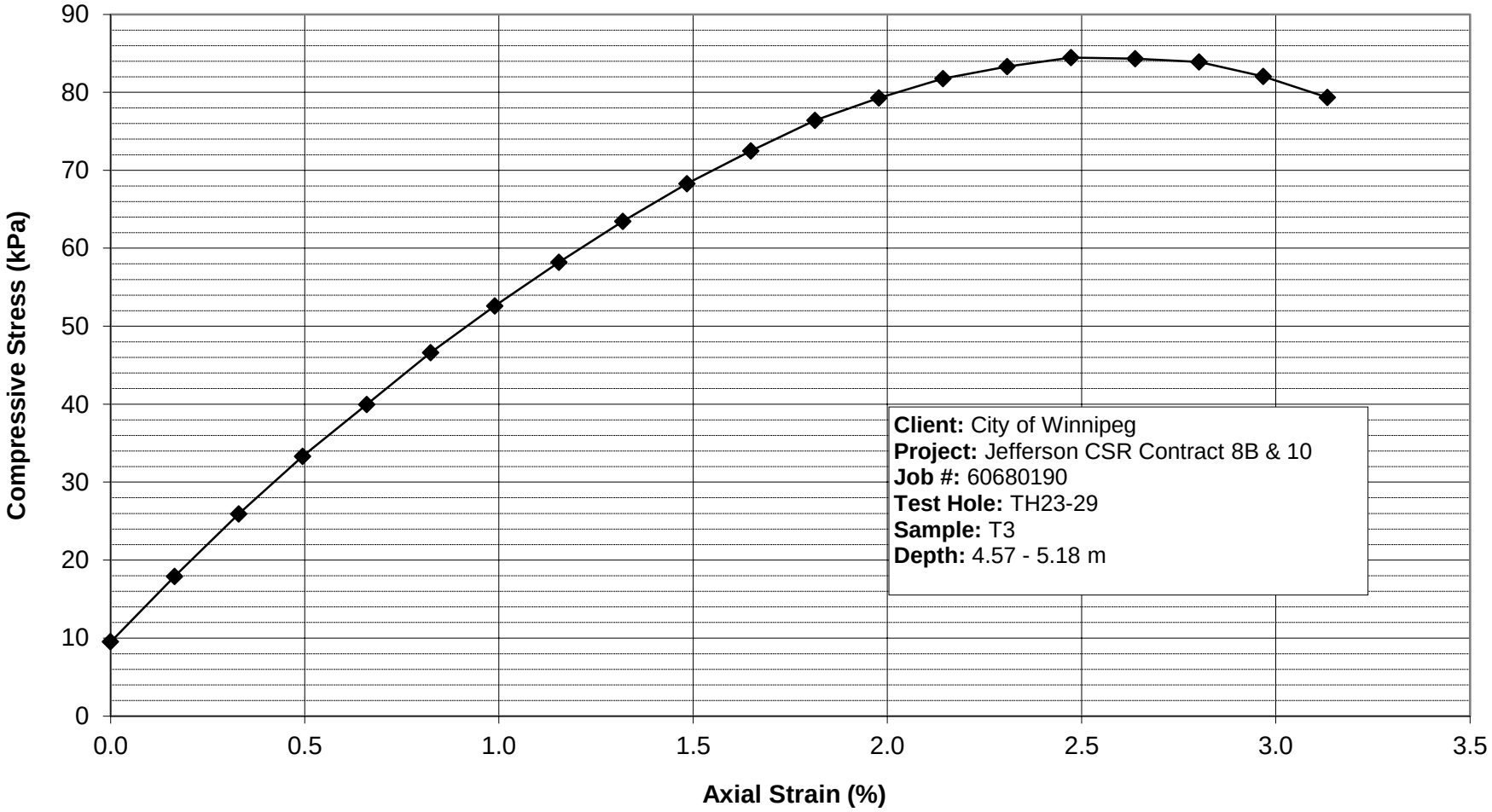
SAMPLE DIAM.(Do):	72.00	**(mm)**	**INITIAL AREA, Ao:**	4071.5	**(mm^2)**
SAMPLE LENGTH, (Lo):	154.67	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.15	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	0.99	**(0.5<R<2 % / minute)**

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	8.71	1.38	0.199	9.5
0.02	0.0018	0.16	6.32	16.40	2.59	0.374	17.9
0.03	0.0025	0.33	6.33	23.80	3.76	0.541	25.9
0.04	0.0033	0.49	6.34	30.64	4.83	0.696	33.3
0.05	0.0039	0.66	6.35	36.82	5.80	0.835	40.0
0.06	0.0046	0.82	6.36	43.01	6.76	0.973	46.6
0.07	0.0052	0.99	6.37	48.63	7.63	1.099	52.6
0.08	0.0058	1.15	6.38	53.88	8.44	1.215	58.2
0.09	0.0063	1.32	6.40	58.84	9.20	1.325	63.4
0.10	0.0068	1.48	6.41	63.43	9.90	1.426	68.3
0.11	0.0072	1.65	6.42	67.46	10.51	1.514	72.5
0.12	0.0076	1.81	6.43	71.21	11.08	1.595	76.4
0.13	0.0079	1.98	6.44	74.02	11.50	1.656	79.3
0.14	0.0082	2.14	6.45	76.46	11.86	1.707	81.7
0.15	0.0083	2.31	6.46	78.05	12.08	1.740	83.3
0.16	0.0085	2.47	6.47	79.27	12.25	1.764	84.5
0.17	0.0085	2.64	6.48	79.27	12.23	1.761	84.3
0.18	0.0084	2.80	6.49	78.99	12.17	1.752	83.9
0.19	0.0083	2.97	6.50	77.40	11.90	1.714	82.0
0.20	0.0080	3.13	6.51	74.96	11.51	1.657	79.3

UNCONFINED COMPRESSIVE STRENGTH, q_u:	84.46	kPa
(based on maximum q_u value)	1.764	ksf
UNDRAINED SHEAR STRENGTH, S_u:	42.23	kPa
(based on maximum q_u value)	0.882	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)



TH23-29, T3

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

CLIENT: City of Winnipeg
PROJECT: Jefferson CSR Contract 8B & 10
JOB NO.: 60680190

TEST HOLE NO.:	**TH23-29**
SAMPLE NO.:	**T7**
SAMPLE DEPTH:	10.67 - 11.28 m
DATE TESTED:	16-Mar-23
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)	0.75
Undrained Shear Strength (kPa)	**35.9**
Reading - Qu (tsf)	0.50
Undrained Shear Strength (kPa)	**23.9**
UNCONFINED COMPRESSIVE STRENGTH TEST	
Unconfined compressive strength (kPa)	**55.1**
Unconfined compressive strength (ksf)	**1.2**
Undrained Shear Strength (kPa)	**27.5**
Undrained Shear Strength (ksf)	**0.575**
MOISTURE CONTENT	
Tare Number	A8
Wt. Sample wet + tare (g)	346.3
Wt. Sample dry + tare (g)	338.9
Wt. Tare (g)	8.3
Moisture Content %	**2.2**
BULK DENSITY	
Sample Wt. (g)	1185.9
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)	15.50
Avg. Length (cm)	**15.50**
Volume (cm^3)	631.1
Moisture content (%)	2.2
Bulk Density (g/cm^3)	1.879
Bulk Unit Weight (kN/m^3)	**18.4**
Bulk Unit Weight (pcf)	**117.3**
Dry Unit Weight (kN/m^3)	**18.03**

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

AECOM

CLIENT:	City of Winnipeg
PROJECT:	Jefferson CSR Contract 8B & 10
JOB NO.:	60680190

TEST HOLE NO.:	TH23-29
SAMPLE NO.:	T7
SAMPLE DEPTH:	10.67 - 11.28 m
SAMPLE DATE:	
TEST DATE:	16-Mar-23

SOIL DESCRIPTION:	
CLAY - grey, moist, firm, silty, trace gravel, silt inclusions	
high plasticity	
MOISTURE CONTENT:	2.2

See attached photo

FAILURE SKETCH

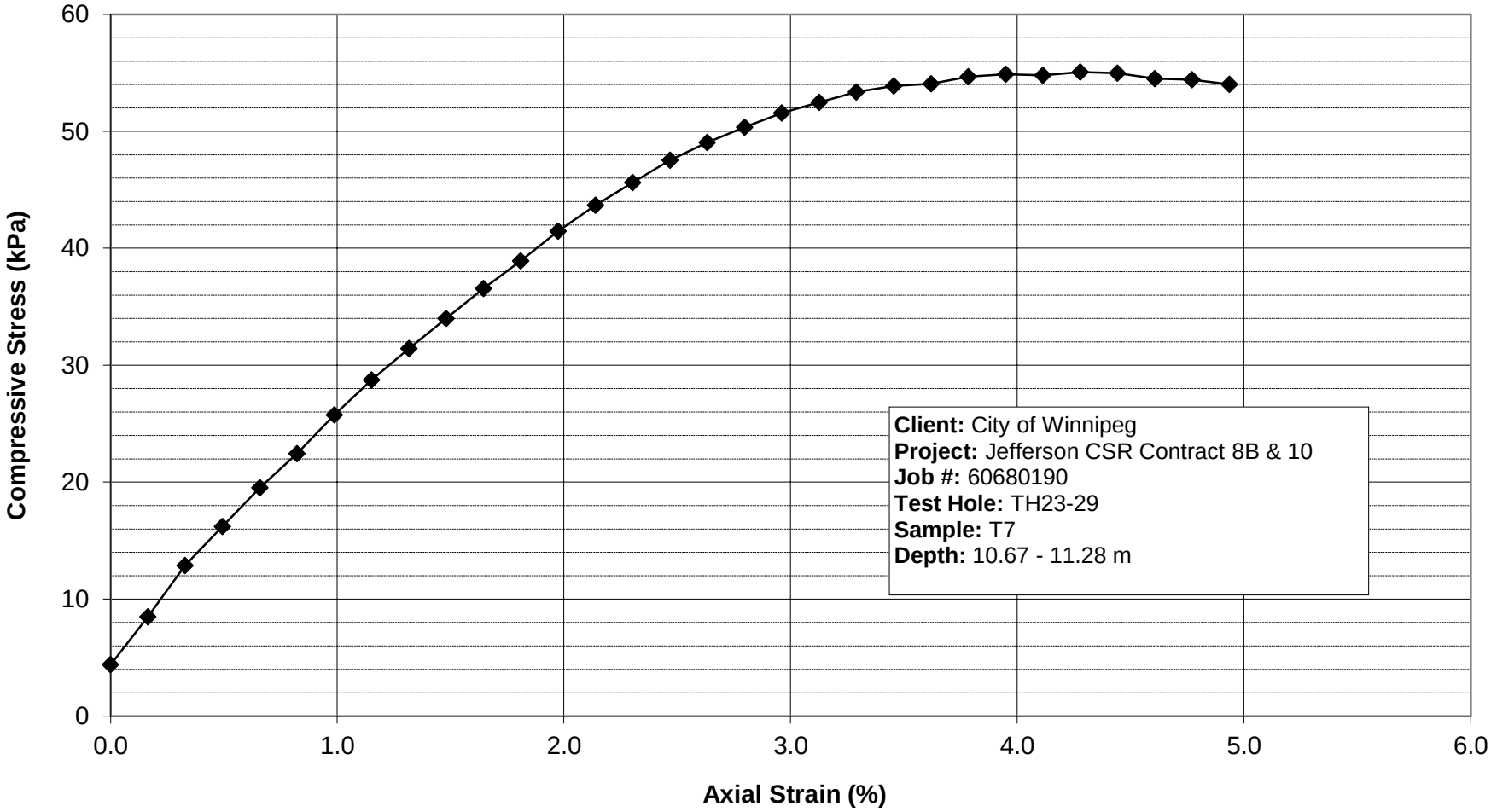
SAMPLE DIAM.(Do):	72.00	**(mm)**	**INITIAL AREA, Ao:**	4071.5	**(mm^2)**
SAMPLE LENGTH, (Lo):	155.00	**(mm)**	**PISTON RATE:**	0.0602	**(inches / minute)**
L / D RATIO:	2.15	**(2 < L/D < 2.5)**	**AXIAL STRAIN RATE, R:**	0.99	**(0.5<R<2 % / minute)**

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	6.31	4.03	0.64	0.092	4.4
0.02	0.0008	0.16	6.32	7.78	1.23	0.177	8.5
0.03	0.0013	0.33	6.33	11.81	1.86	0.269	12.9
0.04	0.0016	0.49	6.34	14.90	2.35	0.338	16.2
0.05	0.0019	0.66	6.35	17.99	2.83	0.406	19.5
0.06	0.0022	0.82	6.36	20.71	3.25	0.469	22.4
0.07	0.0025	0.99	6.37	23.80	3.73	0.538	25.7
0.08	0.0028	1.15	6.38	26.61	4.17	0.600	28.7
0.09	0.0031	1.32	6.40	29.14	4.56	0.656	31.4
0.10	0.0034	1.48	6.41	31.58	4.93	0.710	34.0
0.11	0.0036	1.65	6.42	34.01	5.30	0.763	36.5
0.12	0.0039	1.81	6.43	36.26	5.64	0.812	38.9
0.13	0.0041	1.97	6.44	38.70	6.01	0.866	41.4
0.14	0.0044	2.14	6.45	40.85	6.34	0.912	43.7
0.15	0.0046	2.30	6.46	42.73	6.61	0.952	45.6
0.16	0.0048	2.47	6.47	44.60	6.89	0.993	47.5
0.17	0.0049	2.63	6.48	46.10	7.11	1.024	49.0
0.18	0.0051	2.80	6.49	47.41	7.30	1.052	50.4
0.19	0.0052	2.96	6.50	48.63	7.48	1.077	51.6
0.20	0.0053	3.13	6.51	49.57	7.61	1.096	52.5
0.21	0.0054	3.29	6.53	50.50	7.74	1.114	53.4
0.22	0.0055	3.45	6.54	51.07	7.81	1.125	53.9
0.23	0.0055	3.62	6.55	51.35	7.84	1.129	54.1
0.24	0.0056	3.78	6.56	52.00	7.93	1.142	54.7
0.25	0.0056	3.95	6.57	52.28	7.96	1.146	54.9
0.26	0.0056	4.11	6.58	52.28	7.94	1.144	54.8
0.27	0.0056	4.28	6.59	52.66	7.99	1.150	55.1
0.28	0.0056	4.44	6.60	52.66	7.97	1.148	55.0
0.29	0.0056	4.61	6.62	52.28	7.90	1.138	54.5
0.30	0.0056	4.77	6.63	52.28	7.89	1.136	54.4
0.31	0.0056	4.94	6.64	52.00	7.83	1.128	54.0

UNCONFINED COMPRESSIVE STRENGTH, q_u:	55.07	kPa
(based on maximum q_u value)	1.150	ksf
UNDRAINED SHEAR STRENGTH, S_u:	27.54	kPa
(based on maximum q_u value)	0.575	ksf

NOTES:

AECOM
UNCONFINED COMPRESSIVE STRENGTH OF COHESIVE SOILS
(ASTM D2166)



TH23-27, T7