APPENDIX ‘G’

GEOTECHNICAL REPORT

APPENDIX 'G' – GEOTECHNICAL REPORT

The geotechnical report is provided to aid in the Contractor's evaluation of the existing pavement structure and/or soil conditions. The information presented is considered accurate at the locations shown on the Drawings and at the time of drilling. However, variations in pavement structure and/or soil conditions may exist between test holes and fluctuations in groundwater levels can be expected seasonally and may occur as a result of construction activities. The nature and extent of variations may not become evident until construction commences.

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2021 to 2022 University Crescent Pavement Renewal Project

AECOM 60648764, 05-0049/City of Wpg File No. 21-C-02

Prepared for

Ryan Cunningham, P.Eng.
Senior Transportation Engineer
99 Commerce Dr, Winnipeg, MB R3P 0Y7

Date

March 29, 2021

HMCL Project Number: **112-2101**

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Table of Content

Attachments

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Introduction

On February 11th, 2021, H. Manalo Consulting Ltd. (HMCL) received authorization from Mr. Ryan Cunningham, representing AECOM, to proceed with the scope of work as described in the email dated February 5th, 2021. The purpose of the work is to gather information about the existing subsurface soil conditions as well obtain pavement cores to help assess the existing pavement.

Field Work Program

The investigation program was performed following the guidelines listed in the City of Winnipeg document titled Site Investigation Requirements for Public Works Street Projects, dated January 2021. Prior to any subsurface work, the underground services were located. At some locations, the desired test hole location had to be moved based on the underground utilities. Pavement core samples were obtained between February 18 and March 2, 2021. The test holes were augered using a truck mounted geotechnical test hole drill rig on March 1 and 2, 2021, with the soil profile logged and samples collected at every 0.3 m. The test holes were back filled with bentonite clay, auger cuttings and then gravel. The pavement section was backfilled with asphalt cold mix. All pavement and soil samples were returned to HMCL's laboratory for further review.

Sample Review and Data Reporting

The asphalt pavement thickness ranges from 50 mm to 225 mm and the concrete pavement thickness was typically 200 mm. The general sub surface profile below the concrete generally consisted of minimal layer of granular fill, followed by a silty high plastic clay. There was typically a silt layer at a depth of approximately between 1 m to 2 m depth. The thickness of the silt layer ranged from 0.2 m to 0.5 m, the details can be found on the test hole logs. All samples were tested for moisture content, and selected samples were test for Atterberg limits, Grain size analysis (mechanical sieve and hydrometer methods) and CBR testing. A lab summary is attached as well as the lab testing reports.

The nine cores recovered at pavement transverse and longitudinal joints were used to help assess the condition of the concrete at the transverse and longitudinal joints. In general based

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on what was observed at each location, the concrete condition at one or both sides of the joints was deteriorated. Retrieving a complete core was difficult at some locations with several attempts made. In some cases only the upper part of the slab was recovered as an intact or partially intact core and the lower section had to be chipped out to measure the slab thickness.

Closure

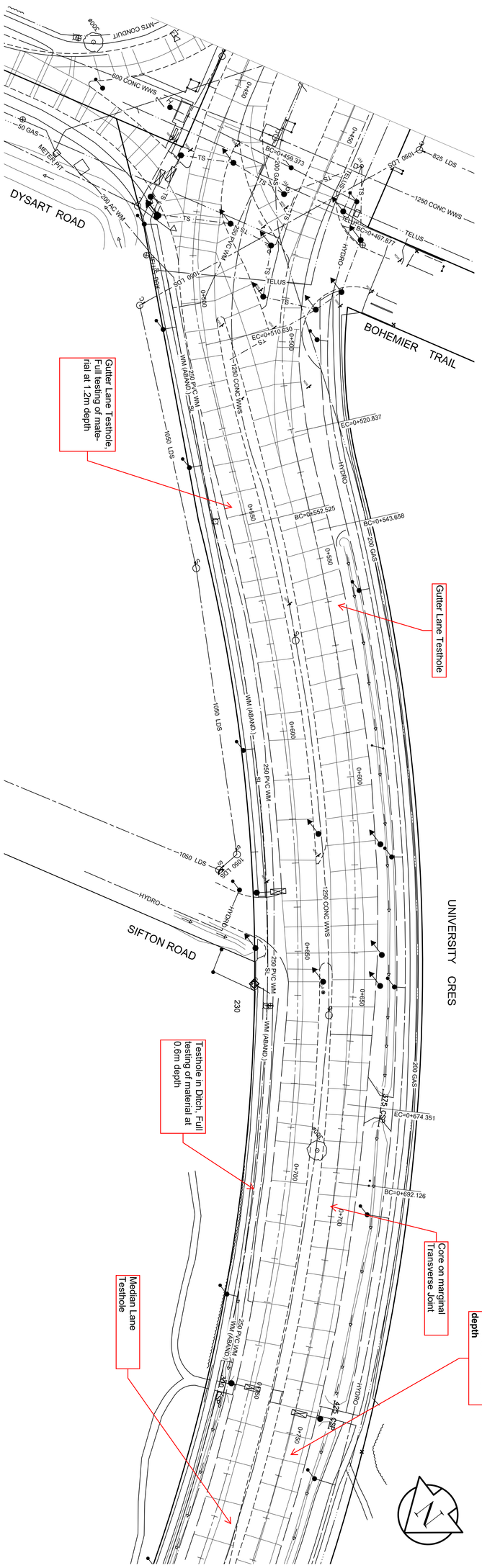
We appreciate the opportunity to assist you in this project. Please call the undersigned if you require further information.

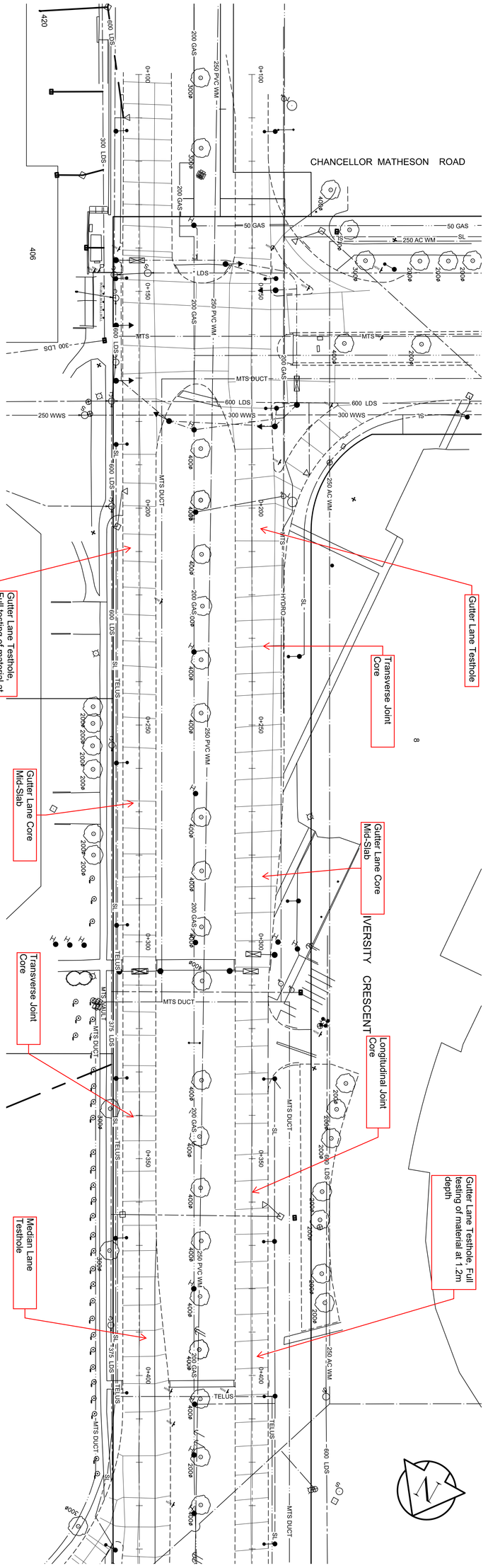
Fieldwork completed by:

Edwin Timtiman, EIT
Materials Technologist

Reviewed by:

Paul Bevel
Manager, Field and Laboratory Services





- TEST HOLE LOCATION

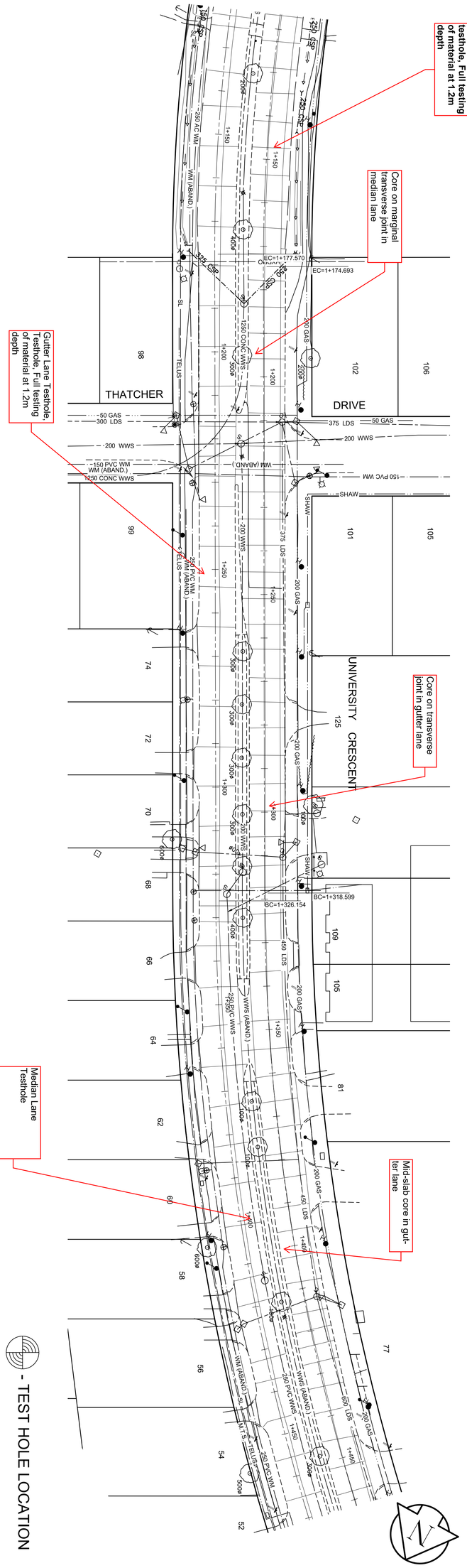
UNIVERSITY CRESCENT

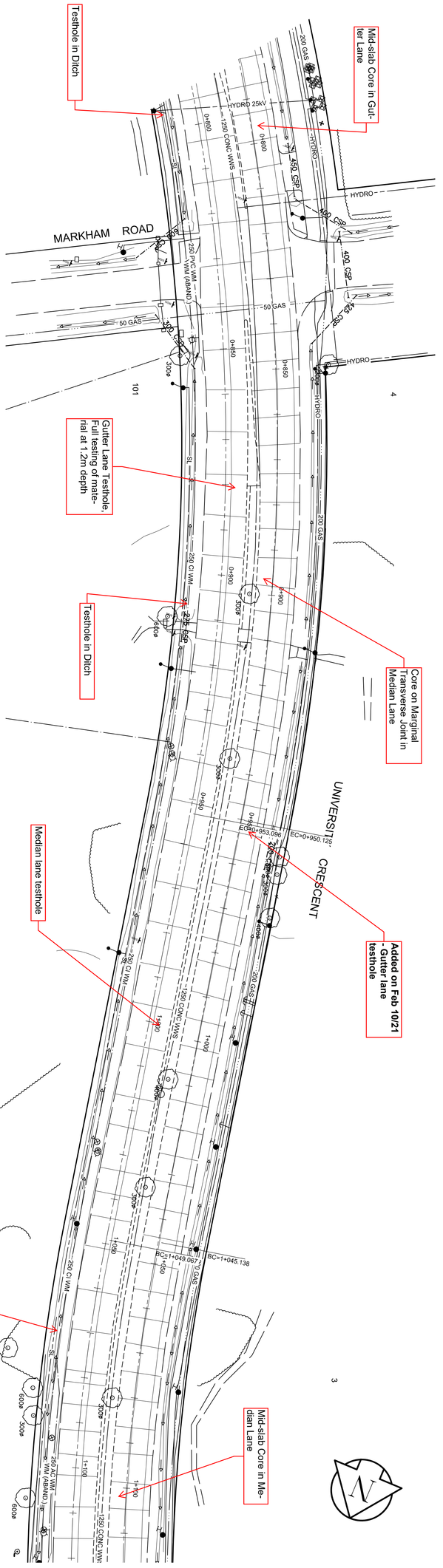
CITY OF WINNIPEG
Project No.: 60648764

PROPOSED GEOTECHNICAL INVESTIGATION

AECOM

SK-01





UNIVERSITY CRESCENT

CITY OF WINNIPEG
Project No.: 60648764

PROPOSED GEOTECHNICAL INVESTIGATION

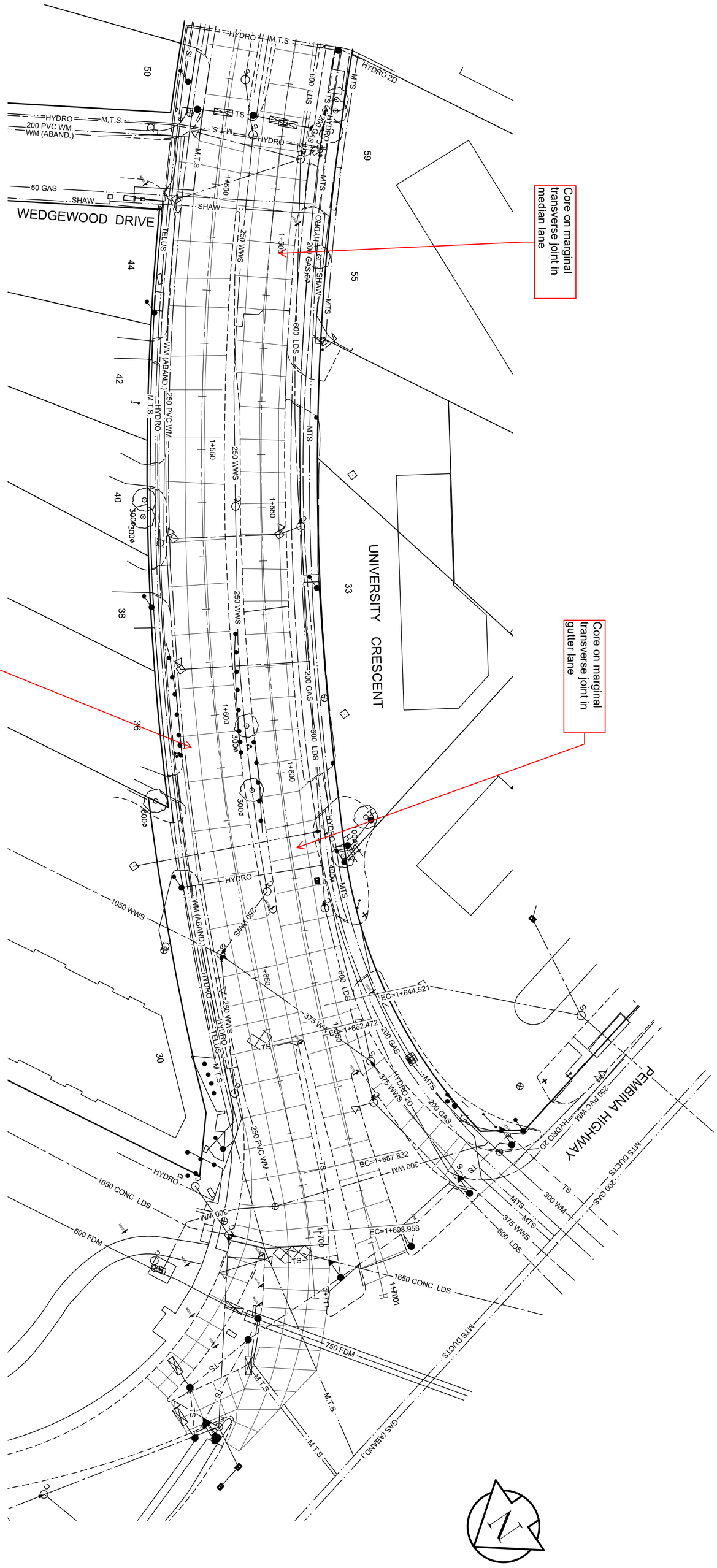
AECOM

SK-02

Last saved by: JASPER.ANDAN(2021-01-26) Last Plotted: 2021-01-26
Filename: L:\DCS\PROJECTS\TRN\60648764_UNIVERSITYCRES\900_CAD_GIS\910_CAD\25-SKETCHES\SK_TESTHOLE.DWG

Project Management Initials: Designer: BC Checked: RC Approved: RC

ISO A1 594mm x 841mm



- TEST HOLE LOCATION

UNIVERSITY CRESCENT

CITY OF WINNIPEG
Project No.: 60648764

PROPOSED GEOTECHNICAL INVESTIGATION

AECOM

SK-03

H. MANALO CONSULTING LTD.
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Phone: 204-697-3854 Cell: 204-997-1355 Email: hmanalo@mts.net

CONCRETE CORE COMPRESSIVE STRENGTH TEST REPORT (CSA A23.2-14C)

CLIENT: AECOM
99 Commerce Drive, Winnipeg
MB R3P 0Y7

ATTENTION: Ryan Cunningham

PROJECT: 2021-2022 University Crescent Pavement Renewals
University Crescent from Chancellor Matheson Road to Pembina Highway

STRUCTURE: N/P

DATE: February 21, 2021
FILE NO: 112-2101
REPORT NO: 21-001
TECHNOLOGIST: I.A.
DATE CORES TAKEN: February 18, 2021
DOCUMENT NO: HM-014
DATE RECEIVED IN LAB: February 18, 2021

Core Location	Length as Drilled (mm)	Core Diameter (mm)	Core Length (mm)	Length / Diameter (mm)	Correction Factor	Mass (grams)	Age at Break (days)	Date of Break	Type of Fracture	Comp. Strength as Calculated (MPa)	Comp. Strength as Corrected (MPa)
Core C1, STA 1+400 SB. GUTTER LANE	141.16	69.64	136.47	1.96	1.00	1191.7		21-Feb	1	23.2	23.2
Core C2, STA 1+100 SB. MEDIAN LANE	199.85	69.64	139.00	1.99	1.00	1218.8		21-Feb	1	38.0	38.0
Core C3, STA 0+795 SB. GUTTER LANE	213.31	97.92	194.29	1.98	1.00	3381.1		23-Feb	1	27.8	27.8
Core C4, STA 0+285 SB. GUTTER LANE	198.40	97.92	180.00	1.83	1.00	3240.0		23-Feb	1	20.6	20.6
Core C5, STA 0+268 NB. GUTTER LANE	185.34	97.92	166.80	1.70	1.00	2926.8		23-Feb	1	22.3	22.3

Remarks:
Tested in accordance with CSA A23.2-14C, Wet condition

Reviewed by:

Irvin Araquil
Senior Technologist

Approved by:

Hermie Manalo
Principal

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COMPRESSIVE STRENGTH CORES

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South bound transverse joint cores

South bound transverse joint, Sta. 1+560

South bound transverse joint, Sta. 1+515

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South bound transverse joint, Sta. 1+300

South bound transverse joint, Sta. 1+200

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South bound transverse joint, Sta. 0+896

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South bound transverse joint, Sta. 0+700

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South bound longitudinal joint, Sta. 0+357

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South bound transvers joint, Sta. 0+233. Could not extract concrete core due to crumbling

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North bound transverse joint, Sta. 1+200

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TEST HOLE PAVEMENT CORES

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TH 1, south bound Sta. 1+150

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TH 2, south bound Sta. 0+950

TH 3, south bound Sta. 0+756

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TH 4, south bound Sta. 0+561

TH 5, south bound Sta. 0+395

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TH 6, south bound Sta. 0+205

TH 7, north bound Sta. 0+210

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TH 8, north bound Sta. 0+383

TH 9, north bound Sta. 0+547

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TH 10, north bound Sta. 0+780

TH 11, north bound Sta. 0+870

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TH 12, north bound Sta. 1+000, lower part of concrete core could not be recovered

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TH 13, north bound Sta. 1+250, concrete could not be recovered

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TH 14, north bound Sta. 1+400

TH 15, north bound Sta. 1+605

H. MANALO CONSULTING LTD.

Project No: 112-2101

Project: University Crescent

Client: AECOM

Location: 14U 633328 m E, 5519642 m N

TH 1

Logged By: ET

Engineer: GP

SUBSURFACE PROFILE

Depth (ft / m)	Symbol	Description	Number	Type
0 / 0		Ground Surface		
		CONCRETE - 205 mm		
1			1-1	GS
2		***CLAY (CH)*** -silty, black, moist, firm to stiff	1-2	GS
3 / 1		-dark brown below 0.9 m	1-3	GS
4				
5		***SILT (CL)*** -some clay, light brown, soft, moist,	1-4	GS
			1-5	GS
6				
			1-6	GS
7 / 2				
8		***CLAY (CH)*** -silty, brown, firm, moist	1-7	GS
9		-End of test hole -No seepage -Sloughing at silt layer		
10 / 3				

Shear Strength (kPa): 20 40 60 80 100 120 140 160 180

Water Content %: 20 40 60

Drill Method: Auger

Drill Date: March 1, 2021

Hole Size: 5 inch

Datum:

Checked by: PB

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

Project No: 112-2101

Project: University Crescent

Client: AECOM

Location: 14U 633372 m E, 5519467 m N

TH 2

Logged By: ET

Engineer: GP

SUBSURFACE PROFILE

Depth (ft)	Depth (m)	Symbol	Description	Number	Type
0	0		Ground Surface		
			CONCRETE - 203 mm		
1			***SAND and GRAVEL***		
				2-1	GS
2					
				2-2	GS
3	1		***CLAY and SILT (CL)*** -mottled black and brown, moist, firm to soft		
				2-3	GS
4					
				2-4	GS
5					
				2-5	GS
6					
	2		***SILT (CL)*** -clayey, light brown, soft, moist,	2-6	GS
7					
				2-7	GS
8			***CLAY (CH)*** -silty, brown, firm, moist		
9				2-8	GS
			-End of test hole -No seepage		
10	3				

Shear Strength (kPa): 20 40 60 80 100 120 140 160 180

Water Content %: 20 40 60

Drill Method: Auger

Drill Date: March 1, 2021

Hole Size: 5 inch

Datum:

Checked by: PB

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

Project No: 112-2101

Project: University Crescent

Client: AECOM

Location: 14U 633451 m E, 5519298 m N

TH 3

Logged By: ET

Engineer: GP

SUBSURFACE PROFILE

Depth (ft / m)	Symbol	Description	Number	Type
0 / 0		Ground Surface		
		CONCRETE - 208 mm		
1			3-1	GS
2			3-2	GS
		CLAY (CH) -silty, black, moist, firm to stiff		
3 / 1		-brown below 0.7m	3-3	GS
4			3-4	GS
5			3-5	GS
		SILT (CL) -clayey, light brown, soft, moist,		
6			3-6	GS
7 / 2				
8		***CLAY (CH)*** -some silt, grey, firm, moist	3-7	GS
9		-End of test hole -No seepage -Sloughing from silt layer		
10 / 3				

Shear Strength (kPa): 20 40 60 80 100 120 140 160 180

Water Content %: 20 40 60

Drill Method: Auger

Drill Date: Mar 1, 021

Hole Size: 5 inch

Datum:

Checked by: PB

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

Project No: 112-2101

Project: University Crescent

Client: AECOM

Location: 14U 633613 m E, 5519162 m N

TH 4

Logged By: ET

Engineer: GP

SUBSURFACE PROFILE

Depth (ft)	Depth (m)	Symbol	Description	Number	Type
0	0		Ground Surface		
0			***ASPHALT and CONCRETE*** 50 mm Asph. 200 mm Conc.		
1			***SAND and GRAVEL***		
				4-1	GS
2			***CLAY (CH)*** -with silt, black, moist, stiff	4-2	GS
3	1		-dark brown below 1.1 m	4-3	GS
4					
			SILT (CL) -clayey, light brown, moist, soft	4-4	GS
5					
				4-5	GS
6					
	2			4-6	GS
7			***CLAY (CH)*** -silty, brown, moist, firm		
8					
				4-7	GS
9			-End of test hole -No seepage		
10	3				

Shear Strength (kPa): 20 40 60 80 100 120 140 160 180

Water Content %: 20 40 60

Drill Method: Auger

Drill Date: Mar 1, 2021

Hole Size: 5 inch

Datum:

Checked by: PB

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

Project No: 112-2101

Project: University Crescent

Client: AECOM

Location: 14U 633710 m E, 5519052 m N

TH 5

Logged By: ET

Engineer: GP

SUBSURFACE PROFILE

Depth (ft)	Depth (m)	Symbol	Description	Number	Type
0	0		Ground Surface		
			ASPHALT and CONCRETE 52 mm Asph. 215 mm Conc.		
1			***SAND and GRAVEL***		
				5-1	GS
2					
				5-2	GS
3	1				
				5-3	GS
4					
			CLAY (CH) -silty, black, firm, trace organics, moist,	5-4	GS
5			-mottled black and brown below 1.0m		
			-brown below 1.7m	5-5	GS
6					
	2			5-6	GS
7					
8					
				5-7	GS
9			-End of test hole -No seepage		
	3				
10					

Shear Strength (kPa): 20 40 60 80 100 120 140 160 180

Water Content %: 20 40 60

Drill Method: Auger

Drill Date: Mar 1, 2021

Hole Size: 5 inch

Datum:

Checked by: PB

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

Project No: 112-2021

Project: University Crescent

Client: AECOM

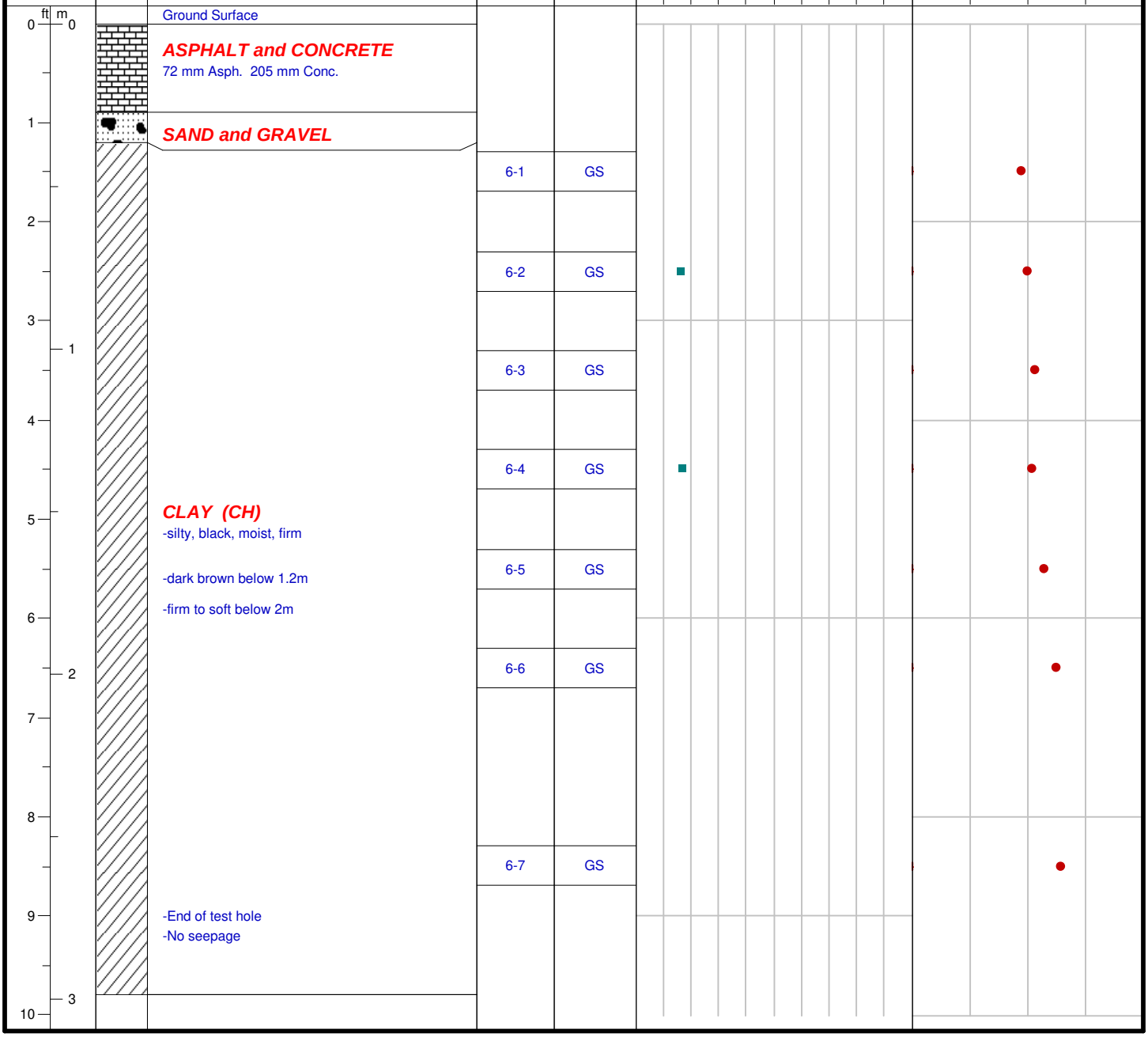
Location: 14U 633800 m E, 5518888 m N

TH 6

Logged By: ET

Engineer: GP

SUBSURFACE PROFILE



Drill Method: Auger

Drill Date: Mar 1, 2021

Hole Size: 5 inch

Datum:

Checked by: PB

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

Project No: 112-1913

Project: University Crescent

Client: AECOM

Location: 14U 633827 m E, 5518911 m N

TH 7

Logged By: ET

Engineer: GP

SUBSURFACE PROFILE

Depth (ft / m)	Symbol	Description	Number	Type
0 / 0		Ground Surface		
		ASPHALT and CONCRETE 68 mm Asph. 192 mm Conc.		
1			7-1	GS
2			7-2	GS
3 / 1		***CLAY (CH)*** -silty, black, moist, firm to stiff -mottled dark brown and black below 0.6m	7-3	GS
4			7-4	GS
5			7-5	GS
6 / 2		***SILT (CH)*** -clayey, light brown, moist, soft, -wet below 1.9m	7-6	GS
7				
8		***CLAY (CH)*** - with silt, grey, stiff, moist,	7-7	GS
9		-End of test hole -No seepage -Sloughing from silty layer		
10 / 3				

Shear Strength (kPa): 20 40 60 80 100 120 140 160 180

Water Content %: 20 40 60

Drill Method: Auger

Drill Date: Mar 1, 2021

Hole Size: 5 inch

Datum:

Checked by: PB

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

Project No: 112-2101

Project: University Crescent

Client: AECOM

Location: 14U 633732 m E, 5519063 m N

TH 8

Logged By: ET

Engineer: GP

SUBSURFACE PROFILE

Depth (ft / m)	Symbol	Description	Number	Type
0 / 0		Ground Surface		
		ASPHALT and CONCRETE 58 mm Asph. 195 mm Conc.		
1			8-1	GS
2			8-2	GS
3 / 1		***CLAY (CH)*** -silty, mottled blackand grey, moist, firm to soft	8-3	GS
4		-dark brown below 1m	8-4	GS
5			8-5	GS
6 / 2				
7		***SILT (CL)*** -some clay, soft, light brown, moist,	8-6	GS
8		***CLAY (CH)*** -silty, greyish brown, moist, soft	8-7	GS
9		-End of test hole -No seepage -Sloughing from silt		
10 / 3				

Shear Strength (kPa): 20 40 60 80 100 120 140 160 180

Water Content %: 20 40 60

Drill Method: Auger

Drill Date: Mar. 1, 2021

Hole Size: 5 inch

Datum:

Checked by: PB

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

Project No: 112-2101

Project: University Crescent

Client: AECOM

Location: 14U 633642 m E, 5519171 m N

TH 9

Logged By: ET

Engineer: GP

SUBSURFACE PROFILE

Depth (ft / m)	Symbol	Description	Number	Type
0 / 0		Ground Surface		
		ASPHALT and CONCRETE - 52 mm Asph. 204 mm Conc.		
1		***CLAY (CH)*** -silty, some sand, trace wood fibers, black, moist, firm,	9-1	GS
2			9-2	GS
3 / 1		***CLAY and SILT (CL)*** - mottled dark and light brown, moist, firm to soft	9-3	GS
4			9-4	GS
5			9-5	GS
		SILT (CL)		
6			9-6	GS
7 / 2		***CLAY (CH)*** - some silt, grey, stiff, moist,		
8			9-7	GS
9		-End of test hole -No seepage -Sloughing from silt		
10 / 3				

Shear Strength (kPa): 20 40 60 80 100 120 140 160 180

Water Content %: 20 40 60

Drill Method: Auger

Drill Date: Mar 1, 2021

Hole Size: 5 inch

Datum:

Checked by: PB

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

Project No: 112-2101

Project: University Crescent

Client: AECOM

Location: 14U 633454 m E, 5519311 m N

TH 10

Logged By: ET

Engineer: GP

SUBSURFACE PROFILE

Depth (ft / m)	Symbol	Description	Number	Type
0 / 0		Ground Surface		
0		***ASPHALT and CONCRETE*** 100 mm Asph. 201 mm Conc.		
1			10-1	GS
2			10-2	GS
3 / 1		***CLAY (CH)*** -silty, black, moist, firm	10-3	GS
4			10-4	GS
5		***SILT (CL)*** -some clay, soft, light brown, moist	10-5	GS
6		***CLAY (CH)*** -silty, dark brown, moist, firm	10-6	GS
7 / 2		***SILT (CL)*** -clayey, soft, light brown, moist,	10-7	GS
8		***CLAY (CH)*** -silty, greyish brown, firm, moist	10-8	SS
9		-End of test hole -No seepage -Sloughing from silt		
10 / 3				

Shear Strength (kPa): 20 40 60 80 100 120 140 160 180

Water Content %: 20 40 60

Drill Method: Auger

Drill Date: Mar 2, 2021

Hole Size: 5 inch

Datum:

Checked by: PB

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

Project No: 112-2101

Project: University Crescent

Client: AECOM

Location: 14U 633411 m E, 5519393 m N

TH 11

Logged By: ET

Engineer: GP

SUBSURFACE PROFILE

Depth (ft)	Depth (m)	Symbol	Description	Number	Type
0	0		Ground Surface		
			ASPHALT and CONCRETE - 85 mm Asph. 185 mm Conc.		
1				11-1	GS
2				11-2	GS
3	1		***CLAY (CH)*** -silty, mottled black and brown, moist, firm	11-3	GS
			trace root fibers at 0.5m		
4			-brown below 1.4m	11-4	GS
5				11-5	GS
6				11-6	GS
	2				
7			-End of test hole -No seepage		
8					
9					
10	3				

Shear Strength (kPa): 20 40 60 80 100 120 140 160 180

Water Content %: 20 40 60

Drill Method: Auger

Drill Date: Mar 2, 2021

Hole Size: 5 inch

Datum:

Checked by: PB

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

Project No: 112-2101

Project: University Crescent

Client: AECOM

Location: 14U 633372 m E, 5519528 m N

TH 12

Logged By: ET

Engineer: GP

SUBSURFACE PROFILE

Depth (ft / m)	Symbol	Description	Number	Type
0 / 0		Ground Surface		
0		***ASPHALT and CONCRETE*** 102 mm Asph. 193 mm Conc.		
1		***SAND and GRAVEL***		
2		***CLAY (CH)*** -silty, black, firm, moist	12-1	GS
		-brown below 0.7m.		
3 / 1			12-2	GS
4		***SILT (CL)*** -some clay, light brown, moist, soft	12-3	GS
		-wet below 1.4m		
5			12-4	GS
6			12-5	GS
7 / 2		***CLAY (CH)*** -silty, brown, firm, moist	12-6	GS
8			12-7	GS
9		-End of test hole -No seepage -Seepage and sloughing from silt layer		
10 / 3				

Shear Strength (kPa): 20 40 60 80 100 120 140 160 180

Water Content %: 20 40 60

Drill Method: Auger

Drill Date: Mar 2, 2021

Hole Size: 5 inch

Datum:

Checked by: PB

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

Project No: 112-2101

Project: University Crescent

Client: AECOM

Location: 14U 633289 m E, 5519752 m N

TH 13

Logged By: ET

Engineer: GP

SUBSURFACE PROFILE

Depth (ft / m)	Symbol	Description	Number	Type
0 / 0		Ground Surface		
		ASPHALT and CONCRETE 225 mm Asph. 200 mm Conc.		
			13-1	GS
		CLAY (CH) -silty, black, firm,		
		-mottled brown and black below 3ft.	13-2	GS
1 /				
			13-3	GS
		SILT (CL) -clayey, light brown, moist, soft	13-4	GS
			13-5	GS
2 /				
			13-6	GS
		CLAY (CH) -silty, brown, moist, firm to soft		
			13-7	GS
		-End of test hole -No seepage		
3 /				

Shear Strength (kPa): 20 40 60 80 100 120 140 160 180

Water Content %: 20 40 60

Drill Method: Auger

Drill Date: Mar 2, 2021

Hole Size: 5 inch

Datum:

Checked by: PB

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

Project No: 112-2101

Project: University Crescent

Client: AECOM

Location: 14U 633226 m E, 5519871 m N

TH 14

Logged By: ET

Engineer: GP

SUBSURFACE PROFILE

Depth (ft)	Depth (m)	Description	Number	Type
0	0	Ground Surface		
0	0	***ASPHALT and CONCRETE*** 88 mm Asph. 200 mm Conc.		
1		***SAND and GRAVEL***		
1.5		***CLAY (CH)*** -silty, mottled black and dark brown, firm, moist	14-1	GS
2				
2.5			14-2	GS
3	1	***SILT (CL)***	14-3	GS
4				
4.5			14-4	GS
5		***CLAY (CH)*** -silty, dark brown, firm, moist		
5.5			14-5	GS
6				
6.5	2		14-6	GS
7		***SILT (CL)***	14-7	GS
8		***CLAY (CH)*** -silty, dark brown, firm to soft, moist	14-8	GS
9		-End of test hole -No seepage		
10	3			

Shear Strength (kPa): 20 40 60 80 100 120 140 160 180

Water Content %: 20 40 60

Drill Method: Auger

Drill Date: Mar 2, 2021

Hole Size: 5 inch

Datum:

Checked by: PB

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

Project No: 112-2101

Project: University Crescent

Client: AECOM

Location: 14U 633052 m E, 5520019 m N

TH 15

Logged By: ET

Engineer: GP

SUBSURFACE PROFILE

Depth (ft)	Depth (m)	Symbol	Description	Number	Type
0	0		Ground Surface		
0 – 1	0		***ASPHALT and CONCRETE*** - 125 mm Asph. 248 Conc.		
1 – 2	0		***LIMESTONE*** -gravels size 10mm, crushed, light brown,	13-1	GS
2 – 3	1		***SILT (CL)*** -clayey, brown, moist, soft	13-2	GS
3 – 4	1			13-3	GS
4 – 5	1			13-4	GS
5 – 6	1			13-5	GS
6 – 7	2		***CLAY (CH)*** -some silt, brown, firm, -trace silt layers below 6ft.	13-6	GS
7 – 8	2			13-7	GS
8 – 9	2		-End of test hole -No seepage		
9 – 10	3				

Shear Strength (kPa): 20 40 60 80 100 120 140 160 180

Water Content %: 20 40 60

Drill Method: Auger

Drill Date: Mar 2, 2021

Hole Size: 5 inch

Datum:

Checked by: PB

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

Project No: 112-2101

Project: University Crescent

Client: AECOM

Location: 14U 633513 m E, 5519268 m N

TH 16

Logged By: ET

Engineer: GP

SUBSURFACE PROFILE

Depth (ft / m)	Symbol	Description	Number	Type
0 / 0		Ground Surface		
		CLAY (CH) -silty, black, moist, firm to stiff -mottled dark brown and black below 0.5m	16-1	GS
			16-2	GS
1			16-3	GS
		SILT and CLAY (CL) -light brown, moist, soft,	16-4	GS
5			16-5	GS
6 / 2		***CLAY (CH)*** - silty, dark grey, stiff, moist,		
7		-End of test hole -No seepage -Sloughing from silt layer		
10 / 3				

Shear Strength (kPa): 20 40 60 80 100 120 140 160 180

Water Content %: 20 40 60

Drill Method: Auger

Drill Date: Mar 2, 2021

Hole Size: 5 inch

Datum:

Checked by: PB

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

Project No: 112-2101

Project: University Crescent

Client: AECOM

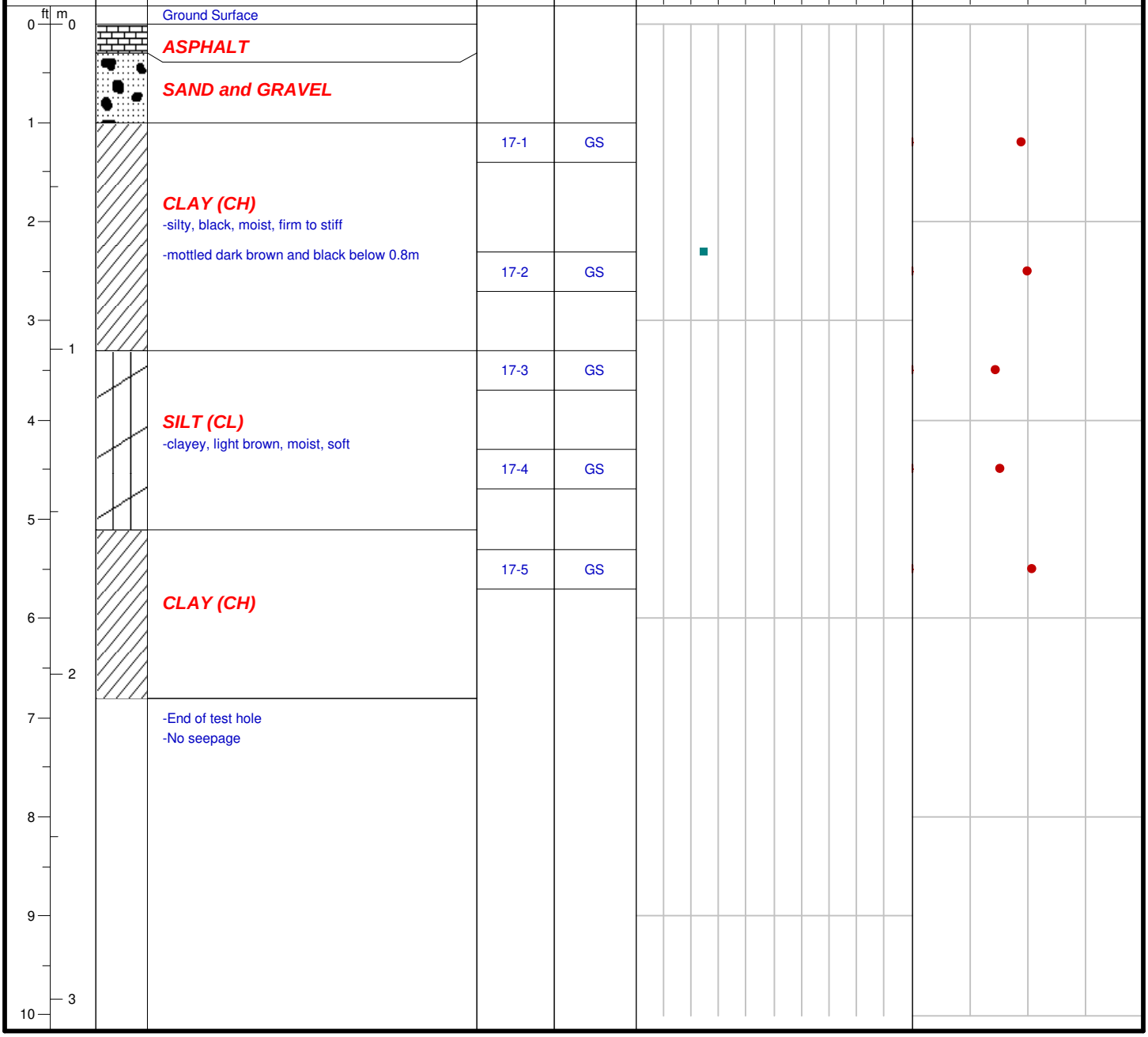
Location: 14U 633455 m E, 5519336 m N

TH 17

Logged By: ET

Engineer: GP

SUBSURFACE PROFILE



Drill Method: Auger

Drill Date: Mar 2, 2021

Hole Size: 5 inch

Datum:

Checked by: PB

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

Project No: 112-2101

Project: University Crescent

Client: AECOM

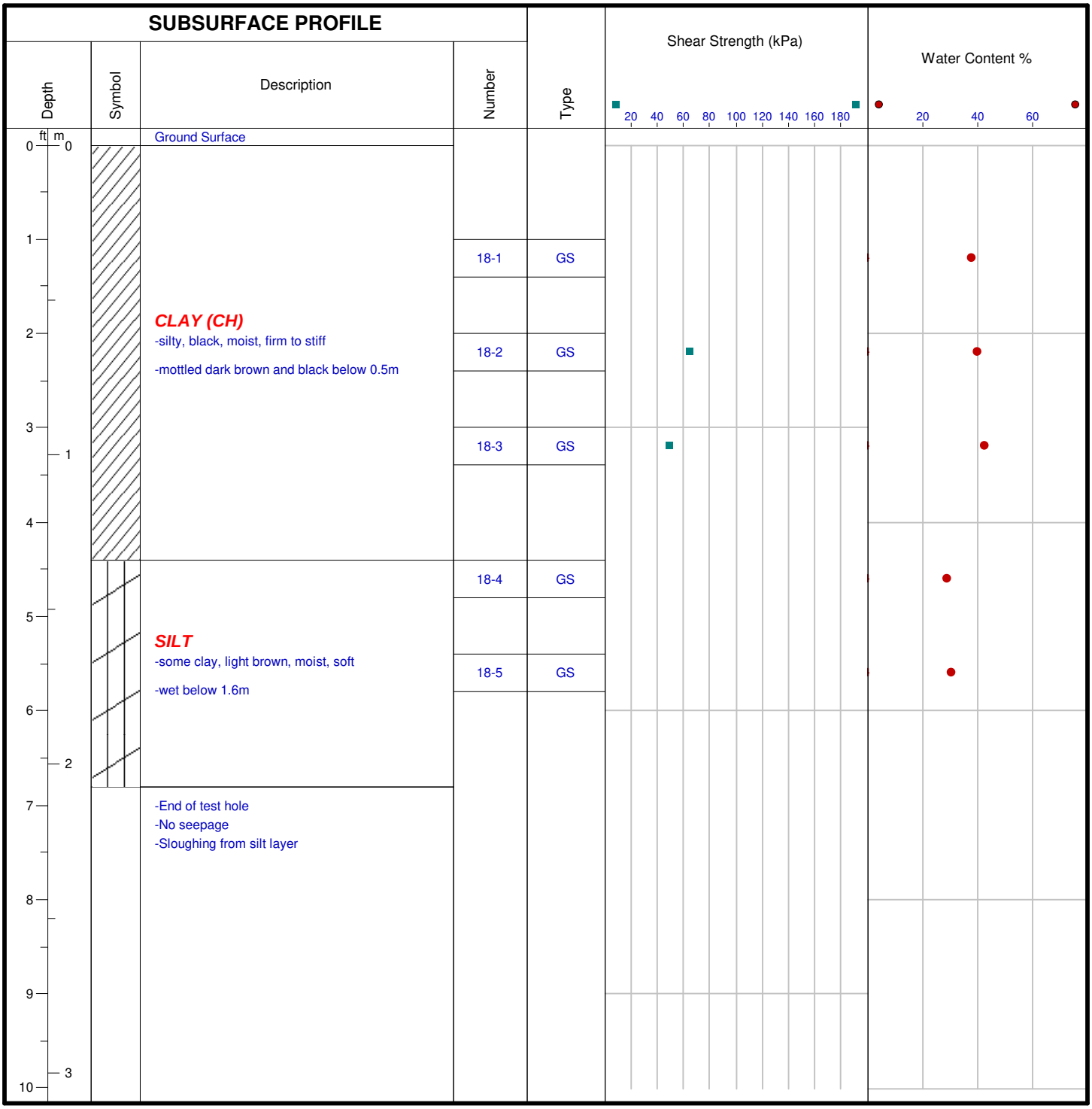
Location: 14U 633407 m E, 5519430 m N

TH 18

Logged By: ET

Engineer: GP

SUBSURFACE PROFILE



Drill Method: Auger

Drill Date: Mar 2, 2021

Hole Size: 5 inch

Datum:

Checked by: PB

Sheet: 1 of 1

H. MANALO CONSULTING LTD.

Project No: 112-2101

Project: University Crescent

Client: AECOM

Location: 14U 633354 m E, 5519645 m N

TH 19

Logged By: ET

Engineer: GP

SUBSURFACE PROFILE

Depth (ft)	Depth (m)	Symbol	Description	Number	Type
0	0		Ground Surface		
			CLAY (CH) -silty, black, moist, firm to stiff -mottled dark brown and black below 1m	19-1	GS
				19-2	GS
	1			19-3	GS
				19-4	GS
			SILT and CLAY (CL) -light brown, moist, soft, -wet below 1.8m	19-5	GS
	2				
7			-End of test hole -No seepage		
10	3				

Shear Strength (kPa): 20 40 60 80 100 120 140 160 180

Water Content %: 20 40 60

Drill Method: Auger

Drill Date: Mar 2, 2021

Hole Size: 5 inch

Datum:

Checked by: PB

Sheet: 1 of 1

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hermie@hmanalo.ca

SUMMARY OF LAB TEST DATA

Test Hole Number	Material Zone		CBR At 95%	Grain Size				Atterberg Limits		
	Start Depth (m)	End Depth (m)		Gravel (%)	Sand (%)	Silt (%)	Clay (%)	LL	PL	PI
TH 1	0.5	1.4	3.9	0	3	32	65	65	26	39
TH 3	0.5	1.6	4.1	0	2	30	68	69	29	41
TH 5	0.5	1.6	2.8	0	1	33	66	66	28	38
TH 7	0.5	1.6	3.8	0	2	27	71	78	31	47
TH 9	0.6	1.5	1.8	0	5	38	57	55	23	32
TH 11	0.5	1.6	3.1	0	2	35	63	67	26	41
TH 13	0.6	1.5	2.0	0	3	43	54	57	20	37
TH 15	0.3	1.5	1.6	0	8	59	33	38	13	26
TH 16	0.3	1.4	4.4	0	5	35	60	74	29	45
TH 19	0.3	1.2	3.3	0	6	37	57	71	28	43

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MOISTURE CONTENT OF SOIL (ASTM D2216)

CLIENT: Aecom	TEST NO: 1	PROJECT NO: 112-2101
PROJECT: University Crescent	DATE SAMPLED: Mar 1 & 2	SAMPLED BY: ET
PROJECT CONTACT: Ryan Cunningham	DATE TESTED: Mar 03, 2021	TESTED BY: GM/EI

Test Hole No.	1	1	1	1	1
ID	1-1	1-2	1-3	1-4	1-5
Tare No.					
Wt Wet Sample + Tare	181.1	217.8	200.9	265.9	190
Wt Dry Sample + Tare	132.3	160	145.7	211.2	139.7
Wt Water	48.8	57.8	55.2	54.7	50.3
Wt Tare	4.9	4.3	4.6	4.2	4.5
Wt Dry Sample	127.4	155.7	141.1	207.0	135.2
Moisture Content (%)	**38.3**	**37.1**	**39.1**	**26.4**	**37.2**
Test Hole No.	1	1	2	2	2
ID	1-6	1-7	2-1	2-2	2-3
Tare No.					
Wt Wet Sample + Tare	179.1	253.6	157	188	211.7
Wt Dry Sample + Tare	126.2	178.3	128.5	144.2	159.7
Wt Water	52.9	75.3	28.5	43.8	52.0
Wt Tare	4.8	4.2	4.3	4.4	4.7
Wt Dry Sample	121.4	174.1	124.2	139.8	155.0
Moisture Content (%)	**43.6**	**43.3**	**22.9**	**31.3**	**33.5**
Test Hole No.	2	2	2	2	2
ID	2-4	2-5	2-6	2-7	2-8
Tare No.					
Wt Wet Sample + Tare	188	208.7	271.3	216.7	228.6
Wt Dry Sample + Tare	144.2	164.8	210.2	164	163.8
Wt Water	43.8	43.9	61.1	52.7	64.8
Wt Tare	4.3	5.3	4.5	4.4	4.4
Wt Dry Sample	139.9	159.5	205.7	159.6	159.4
Moisture Content (%)	**31.3**	**27.5**	**29.7**	**33.0**	**40.7**
Test Hole No.	3	3	3	3	3
ID	3-1	3-2	3-3	3-4	3-5
Tare No.					
Wt Wet Sample + Tare	224.4	194.4	204.3	194.4	209.3
Wt Dry Sample + Tare	162.8	144.3	153.2	144.3	153.2
Wt Water	61.6	50.1	51.1	50.1	56.1
Wt Tare	4.3	4.7	4.7	4.3	4.3
Wt Dry Sample	158.5	139.6	148.5	140.0	148.9
Moisture Content (%)	**38.9**	**35.9**	**34.4**	**35.8**	**37.7**

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MOISTURE CONTENT OF SOIL (ASTM D2216)

CLIENT: Aecom	TEST NO: 1	PROJECT NO: 112-2101
PROJECT: University Crescent	DATE SAMPLED: Mar 1 & 2	SAMPLED BY: ET
PROJECT CONTACT: Ryan Cunningham	DATE TESTED: Mar 03, 2021	TESTED BY: GM/EI

Test Hole No.	3	3	4	4	4
ID	3-6	3-7	4-1	4-2	4-3
Tare No.					
Wt Wet Sample + Tare	209.2	199.8	136.2	205.5	219.5
Wt Dry Sample + Tare	155.1	141.7	99.4	153.9	162.9
Wt Water	54.1	58.1	36.8	51.6	56.6
Wt Tare	4.1	4.2	4.7	4.3	4.2
Wt Dry Sample	151.0	137.5	94.7	149.6	158.7
Moisture Content (%)	**35.8**	**42.3**	**38.9**	**34.5**	**35.7**
Test Hole No.	4	4	4	4	5
ID	4-4	4-5	4-6	4-7	5-1
Tare No.					
Wt Wet Sample + Tare	175.4	207.2	205.2	199.6	233.1
Wt Dry Sample + Tare	139.4	147.8	143.8	139.3	183.2
Wt Water	36.0	59.4	61.4	60.3	49.9
Wt Tare	4.3	5.2	4.3	4.3	4.3
Wt Dry Sample	135.1	142.6	139.5	135.0	178.9
Moisture Content (%)	**26.6**	**41.7**	**44.0**	**44.7**	**27.9**
Test Hole No.	5	5	5	5	5
ID	5-2	5-3	5-4	5-5	5-6
Tare No.					
Wt Wet Sample + Tare	158.3	176.2	208.7	205.7	202.7
Wt Dry Sample + Tare	117.2	126.2	146.6	141.6	134.5
Wt Water	41.1	50.0	62.1	64.1	68.2
Wt Tare	4.3	4.3	4.3	4.3	4.6
Wt Dry Sample	112.9	121.9	142.3	137.3	129.9
Moisture Content (%)	**36.4**	**41.0**	**43.6**	**46.7**	**52.5**
Test Hole No.	5	6	6	6	6
ID	5-7	6-1	6-2	6-3	6-4
Tare No.					
Wt Wet Sample + Tare	233.3	155	161.2	236.4	161.2
Wt Dry Sample + Tare	157.6	112.9	116.3	166.4	115
Wt Water	75.7	42.1	44.9	70.0	46.2
Wt Tare	4.6	4.2	4.4	4.3	4.4
Wt Dry Sample	153.0	108.7	111.9	162.1	110.6
Moisture Content (%)	**49.5**	**38.7**	**40.1**	**43.2**	**41.8**

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MOISTURE CONTENT OF SOIL (ASTM D2216)

CLIENT: Aecom	TEST NO: 1	PROJECT NO: 112-2101
PROJECT: University Crescent	DATE SAMPLED: Mar 1 & 2	SAMPLED BY: ET
PROJECT CONTACT: Ryan Cunningham	DATE TESTED: Mar 03, 2021	TESTED BY: GM/EI

Test Hole No.	6	6	6	7	7
ID	6-5	6-6	6-7	7-1	7-2
Tare No.					
Wt Wet Sample + Tare	229.5	214	177.5	245.6	206
Wt Dry Sample + Tare	158	144.3	118.8	183.5	157.4
Wt Water	71.5	69.7	58.7	62.1	48.6
Wt Tare	4.9	5.1	4.8	4.6	4.4
Wt Dry Sample	153.1	139.2	114.0	178.9	153.0
Moisture Content (%)	**46.7**	**50.1**	**51.5**	**34.7**	**31.8**
Test Hole No.	7	7	7	7	7
ID	7-3	7-4	7-5	7-6	7-7
Tare No.					
Wt Wet Sample + Tare	235.1	264.3	208.1	228.1	201.3
Wt Dry Sample + Tare	169.6	187.9	149.1	166	134.3
Wt Water	65.5	76.4	59.0	62.1	67.0
Wt Tare	4.3	4.1	4.3	4.3	5.1
Wt Dry Sample	165.3	183.8	144.8	161.7	129.2
Moisture Content (%)	**39.6**	**41.6**	**40.7**	**38.4**	**51.9**
Test Hole No.	8	8	8	8	8
ID	8-1	8-2	8-3	8-4	8-5
Tare No.					
Wt Wet Sample + Tare	160.6	168.7	144.7	214	191.2
Wt Dry Sample + Tare	124	132	106.7	151.5	137.1
Wt Water	36.6	36.7	38.0	62.5	54.1
Wt Tare	4.2	4.2	4.4	4.5	5.5
Wt Dry Sample	119.8	127.8	102.3	147.0	131.6
Moisture Content (%)	**30.6**	**28.7**	**37.1**	**42.5**	**41.1**
Test Hole No.	8	8	9	9	9
ID	8-6	8-7	9-1	9-2	9-3
Tare No.					
Wt Wet Sample + Tare	167.4	189.8	195.5	200	197.7
Wt Dry Sample + Tare	124.1	128.1	149.5	153.2	154.7
Wt Water	43.3	61.7	46.0	46.8	43.0
Wt Tare	4.5	4.8	4.6	4.6	4.2
Wt Dry Sample	119.6	123.3	144.9	148.6	150.5
Moisture Content (%)	**36.2**	**50.0**	**31.7**	**31.5**	**28.6**

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MOISTURE CONTENT OF SOIL (ASTM D2216)

CLIENT: Aecom	TEST NO: 1	PROJECT NO: 112-2101
PROJECT: University Crescent	DATE SAMPLED: Mar 1 & 2	SAMPLED BY: ET
PROJECT CONTACT: Ryan Cunningham	DATE TESTED: Mar 03, 2021	TESTED BY: GM/EI

Test Hole No.	9	9	9	9	16
ID	9-4	9-5	9-6	9-7	16-1
Tare No.					
Wt Wet Sample + Tare	158.7	172.1	192.1	143.7	209.7
Wt Dry Sample + Tare	115.9	118	150.7	104	161.2
Wt Water	42.8	54.1	41.4	39.7	48.5
Wt Tare	4.3	4.2	4.2	4.3	4.6
Wt Dry Sample	111.6	113.8	146.5	99.7	156.6
Moisture Content (%)	**38.4**	**47.5**	**28.3**	**39.8**	**31.0**
Test Hole No.	16	16	16	16	13
ID	16-2	16-3	16-4	16-5	13-1
Tare No.					
Wt Wet Sample + Tare	143.7	157.9	205.7	264.9	164.1
Wt Dry Sample + Tare	104	110.5	161.2	186.2	127.7
Wt Water	39.7	47.4	44.5	78.7	36.4
Wt Tare	4.4	4.8	4.3	4.2	4.8
Wt Dry Sample	99.6	105.7	156.9	182.0	122.9
Moisture Content (%)	**39.9**	**44.8**	**28.4**	**43.2**	**29.6**
Test Hole No.	13	13	13	13	13
ID	13-2	13-3	13-4	13-5	13-6
Tare No.					
Wt Wet Sample + Tare	187.5	142.4	227.1	154.6	148.8
Wt Dry Sample + Tare	136.4	104.7	185.3	121.1	107.1
Wt Water	51.1	37.7	41.8	33.5	41.7
Wt Tare	4.9	5.0	4.3	4.4	4.5
Wt Dry Sample	131.5	99.7	181.0	116.7	102.6
Moisture Content (%)	**38.9**	**37.8**	**23.1**	**28.7**	**40.6**
Test Hole No.	13	15	15	15	15
ID	13-7	15-1	15-2	15-3	15-4
Tare No.					
Wt Wet Sample + Tare	232.4	185.6	169.4	149.1	189.1
Wt Dry Sample + Tare	168.5	176.7	127.7	114.6	141.8
Wt Water	63.9	8.9	41.7	34.5	47.3
Wt Tare	4.4	4.3	4.5	4.2	4.4
Wt Dry Sample	164.1	172.4	123.2	110.4	137.4
Moisture Content (%)	**38.9**	**5.2**	**33.8**	**31.3**	**34.4**

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MOISTURE CONTENT OF SOIL (ASTM D2216)

CLIENT: Aecom	TEST NO: 1	PROJECT NO: 112-2101
PROJECT: University Crescent	DATE SAMPLED: Mar 1 & 2	SAMPLED BY: ET
PROJECT CONTACT: Ryan Cunningham	DATE TESTED: Mar 03, 2021	TESTED BY: GM/EI

Test Hole No.	15	15	15	10	10
ID	15-5	15-6	15-7	10-1	10-2
Tare No.				g79	
Wt Wet Sample + Tare	135.6	141.1	137.7	135.6	233.1
Wt Dry Sample + Tare	94.8	100.5	98.2	94.8	165.9
Wt Water	40.8	40.6	39.5	40.8	67.2
Wt Tare	4.4	4.3	5.9	4.5	4.3
Wt Dry Sample	90.4	96.2	92.3	90.3	161.6
Moisture Content (%)	**45.1**	**42.2**	**42.8**	**45.2**	**41.6**
Test Hole No.	10	10	10	10	10
ID	10-3	10-4	10-5	10-6	10-7
Tare No.					
Wt Wet Sample + Tare	142.1	219.9	153.6	186.4	175.9
Wt Dry Sample + Tare	100.5	152.7	124.3	131.2	134.6
Wt Water	41.6	67.2	29.3	55.2	41.3
Wt Tare	4.2	5.2	5.0	4.6	4.3
Wt Dry Sample	96.3	147.5	119.3	126.6	130.3
Moisture Content (%)	**43.2**	**45.6**	**24.6**	**43.6**	**31.7**
Test Hole No.	10	17	17	17	17
ID	10-8	17-1	17-2	17-3	17-4
Tare No.					
Wt Wet Sample + Tare	176.7	153.4	171.6	168.3	174.8
Wt Dry Sample + Tare	126.8	112.2	124	131.9	135
Wt Water	49.9	41.2	47.6	36.4	39.8
Wt Tare	4.2	4.4	4.4	4.2	4.3
Wt Dry Sample	122.6	107.8	119.6	127.7	130.7
Moisture Content (%)	**40.7**	**38.2**	**39.8**	**28.5**	**30.5**
Test Hole No.	17	18	18	18	18
ID	17-5	18-1	18-2	18-3	18-4
Tare No.					
Wt Wet Sample + Tare	169.9	241.2	268.2	252.9	159.6
Wt Dry Sample + Tare	120.6	175.8	192.8	178.1	125.1
Wt Water	49.3	65.4	75.4	74.8	34.5
Wt Tare	4.3	4.1	4.6	4.5	4.5
Wt Dry Sample	116.3	171.7	188.2	173.6	120.6
Moisture Content (%)	**42.4**	**38.1**	**40.1**	**43.1**	**28.6**

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MOISTURE CONTENT OF SOIL (ASTM D2216)

CLIENT: Aecom	TEST NO: 1	PROJECT NO: 112-2101
PROJECT: University Crescent	DATE SAMPLED: Mar 1 & 2	SAMPLED BY: ET
PROJECT CONTACT: Ryan Cunningham	DATE TESTED: Mar 03, 2021	TESTED BY: GM/EI

Test Hole No.	18	12	12	12	12
Depth	18-5	12-1	12-2	12-3	12-4
Tare No.					
Wt Wet Sample + Tare	214.4	169.9	168.4	161.4	186.5
Wt Dry Sample + Tare	164.9	120.6	122.9	125.1	150.9
Wt Water	49.5	49.3	45.5	36.3	35.6
Wt Tare	4.2	4.5	4.2	4.4	4.5
Wt Dry Sample	160.7	116.1	118.7	120.7	146.4
Moisture Content (%)	**30.8**	**42.5**	**38.3**	**30.1**	**24.3**
Test Hole No.	12	12	12	19	19
Depth	12-5	12-6	12-7	19-1	19-2
Tare No.					
Wt Wet Sample + Tare	209.4	234.2	249.9	161.9	282.3
Wt Dry Sample + Tare	154.7	172.3	175.3	120.2	184.8
Wt Water	54.7	61.9	74.6	41.7	97.5
Wt Tare	4.3	3.3	4.3	4.4	4.2
Wt Dry Sample	150.4	169.0	171.0	115.8	180.6
Moisture Content (%)	**36.4**	**36.6**	**43.6**	**36.0**	**54.0**
Test Hole No.	19	19	19	14	14
Depth	19-3	19-4	19-5	14-1	14-2
Tare No.					
Wt Wet Sample + Tare	228.4	301.2	154.4	145.4	168
Wt Dry Sample + Tare	157.7	198.6	115.3	104.2	122.2
Wt Water	70.7	102.6	39.1	41.2	45.8
Wt Tare	4.3	4.4	4.3	4.3	4.2
Wt Dry Sample	153.4	194.2	111.0	99.9	118.0
Moisture Content (%)	**46.1**	**52.8**	**35.2**	**41.2**	**38.8**
Test Hole No.					
Depth	14-3	14-4	14-5	14-6	14-7
Tare No.					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
Moisture Content (%)					

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MOISTURE CONTENT OF SOIL (ASTM D2216)

CLIENT: Aecom	TEST NO: 1	PROJECT NO: 112-2101
PROJECT: University Crescent	DATE SAMPLED: Mar 1 & 2	SAMPLED BY: ET
PROJECT CONTACT: Ryan Cunningham	DATE TESTED: Mar 03, 2021	TESTED BY: GM/EI

Test Hole No.	14	11	11	11	11
Depth	14-8	11-1	11-2	11-3	11-4
Tare No.					
Wt Wet Sample + Tare	214.4	238.1	168.4	294.3	246.2
Wt Dry Sample + Tare	164.9	176.9	122.9	213.2	175.1
Wt Water	49.5	61.2	45.5	81.1	71.1
Wt Tare	4.2	4.5	4.2	4.4	4.5
Wt Dry Sample	160.7	172.4	118.7	208.8	170.6
Moisture Content (%)	**30.8**	**35.5**	**38.3**	**38.8**	**41.7**
Test Hole No.	11	11			
Depth	11-5	11-6			
Tare No.					
Wt Wet Sample + Tare	218.4	239.2			
Wt Dry Sample + Tare	153.3	168.3			
Wt Water	65.1	70.9			
Wt Tare	4.3	3.3			
Wt Dry Sample	149.0	165.0			
Moisture Content (%)	**43.7**	**43.0**			
Test Hole No.					
Depth					
Tare No.					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
Moisture Content (%)					
Test Hole No.					
Depth					
Tare No.					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
Moisture Content (%)					

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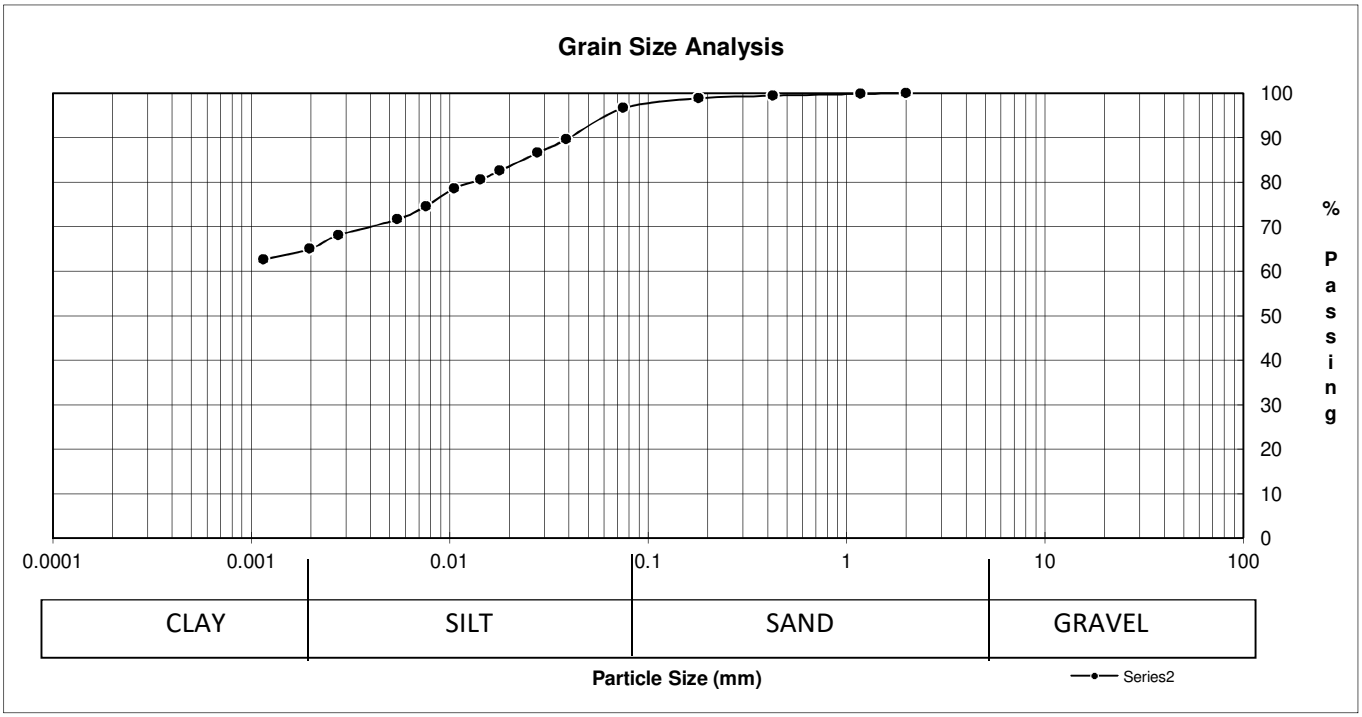
PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

CLIENT:	AECOM	PROJECT No.:	112-2101
	99 Commerce Drive	PSA Test No.:	1
	Winnipeg MB R3P 0Y7	LAB No.:	HM 021
ATTENTION:	Ryan Cunningham		
PROJECT:	2021-22 University Cr. Pavement Renewals		
	University Crescent from Chancellor Matheson to Pembina Highway		

Date Sampled:	1-Mar-21	Date Received:	1-Mar-21
Sampled By:	PB/ET	Date Tested:	11-Mar-21

Material Identification	
B.H./T.H. No.	TH 1
Depth	0.5 to 1.4 m
Sample Source	
Specific Gravity of Material:	2.65

Sieve Analysis		Hydrometer Analysis	
Sieve (mm)	% Passing	Diameter	% Finer
50.00	100.0		
37.50	100.0		
25.00	100.0		
19.00	100.0		
16.00	100.0		
12.50	100.0	0.0387	89.6
9.50	100.0	0.0278	86.6
4.75	100.0	0.0179	82.6
2.00	100.0	0.0143	80.6
1.18	99.8	0.0105	78.6
0.425	99.4	0.0076	74.6
0.180	98.8	0.0054	71.6
0.075	96.6	0.0012	62.6



SOIL DESCRIPTION	% Composition		D10	
		Gravel	D30	
	3.4	Sand	D60	0.00117
	31.6	Silt	Cu	
	65.0	Clay	Cc	

Remarks: Test Method: ASTM D7928, D2216, D4318

Technician: IA

Reviewed by: Paul Bevel

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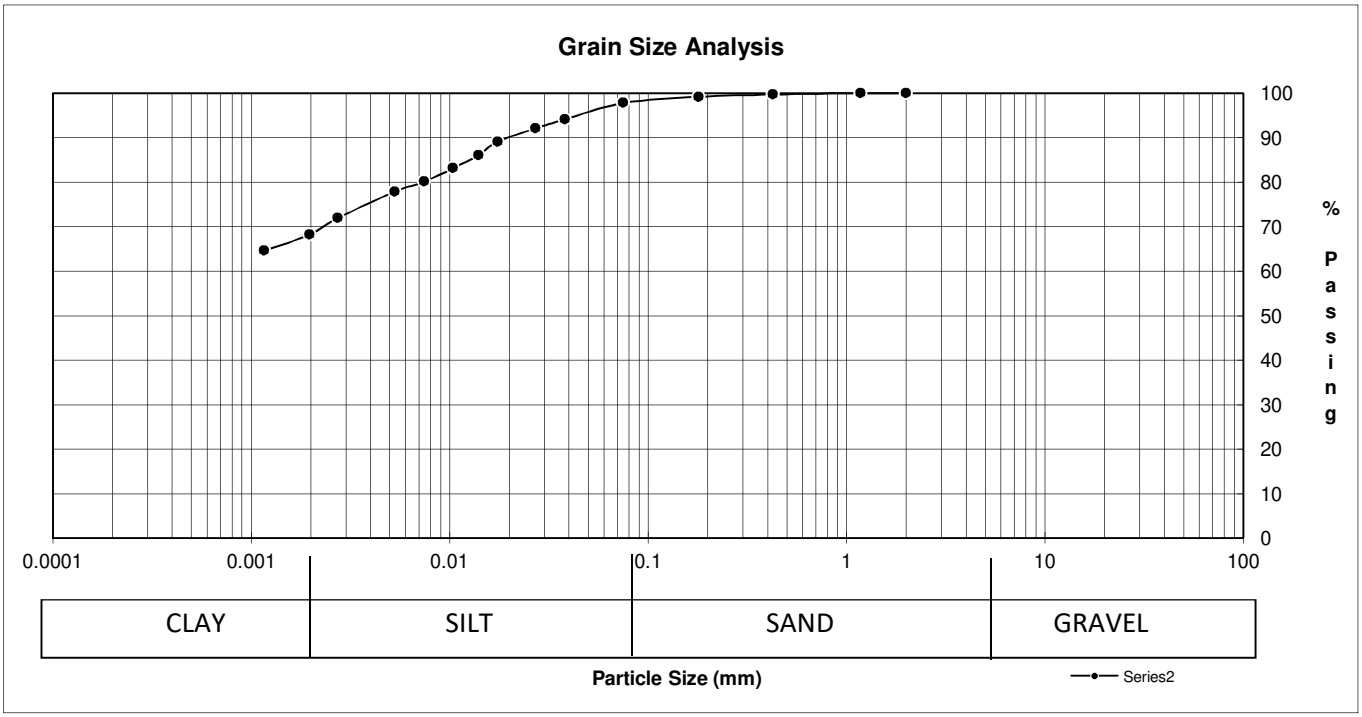
PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

CLIENT:	AECOM	PROJECT No.:	112-2101
	99 Commerce Drive	PSA Test No.:	2
	Winnipeg MB R3P 0Y7	LAB No.:	HM 021-1B
ATTENTION:	Ryan Cunningham		
PROJECT:	2021-22 University Cr. Pavement Renewals		
	University Crescent from Chancellor Matheson to Pembina Highway		

Date Sampled:	1-Mar-21	Date Received:	1-Mar-21
Sampled By:	PB/ET	Date Tested:	11-Mar-21

Material Identification	
B.H./T.H. No.	TH 3
Depth	0.5-1.6 m
Sample Source	
Specific Gravity of Material:	2.65

Sieve Analysis		Hydrometer Analysis	
Sieve (mm)	% Passing	Diameter	% Finer
50.00	100.0		
37.50	100.0		
25.00	100.0		
19.00	100.0		
16.00	100.0		
12.50	100.0	0.0380	94.1
9.50	100.0	0.0272	92.1
4.75	100.0	0.0174	89.1
2.00	100.0	0.0140	86.1
1.18	100.0	0.0104	83.1
0.425	99.7	0.0074	80.1
0.180	99.2	0.0053	77.9
0.075	97.8	0.0012	64.5



SOIL DESCRIPTION	% Composition		D10	
		Gravel	D30	
	2.22	Sand	D60	
	29.78	Silt	Cu	
	68.00	Clay	Cc	

Remarks: Test Method: ASTM D7928, D2216, D4318

Technician: IA

Reviewed by: Paul Bevel

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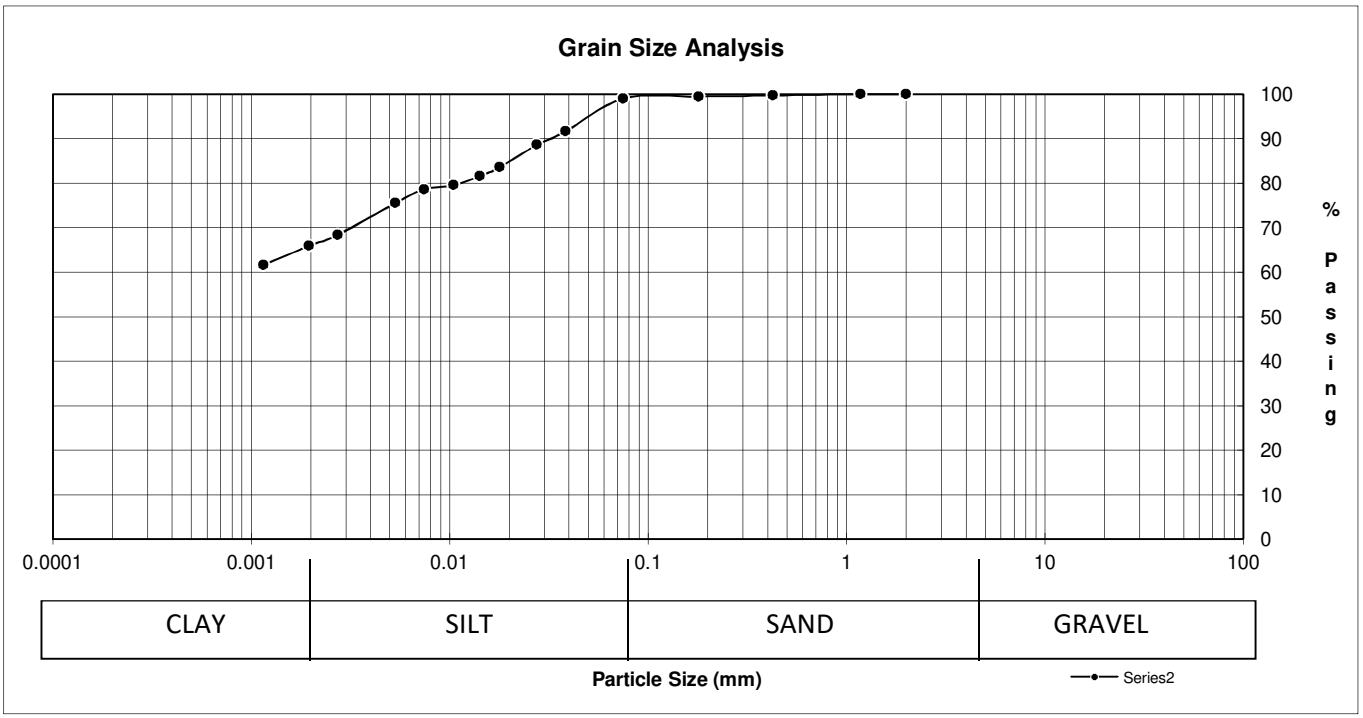
PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

CLIENT:	AECOM	PROJECT No.:	112-2101
	99 Commerce Drive	PSA Test No.:	3
	Winnipeg MB R3P 0Y7	LAB No.:	HM 021
ATTENTION:	Ryan Cunningham		
PROJECT:	2021-22 University Cr. Pavement Renewals		
	University Crescent from Chancellor Matheson to Pembina Highway		

Date Sampled:	1-Mar-21	Date Received:	1-Mar-21
Sampled By:	PB/ET	Date Tested:	11-Mar-21

Material Identification	
B.H./T.H. No.	TH 5
Depth	0.5-1.6 m
Sample Source	
Specific Gravity of Material:	2.65

Sieve Analysis		Hydrometer Analysis	
Sieve (mm)	% Passing	Diameter	% Finer
50.00	100.0		
37.50	100.0		
25.00	100.0		
19.00	100.0		
16.00	100.0		
12.50	100.0	0.0384	91.6
9.50	100.0	0.0275	88.6
4.75	100.0	0.0178	83.6
2.00	100.0	0.0142	81.6
1.18	100.0	0.0105	79.6
0.425	99.7	0.0075	78.6
0.180	99.5	0.0053	75.6
0.075	99.0	0.0012	61.6



SOIL DESCRIPTION	% Composition		
		Gravel	D10
		Gravel	D30
	1.0	Sand	D60
	33.0	Silt	Cu
	66.0	Clay	Cc

Remarks: Test Method: ASTM D7928, D2216, D4318

Technician: IA

Reviewed by: Paul Bevel

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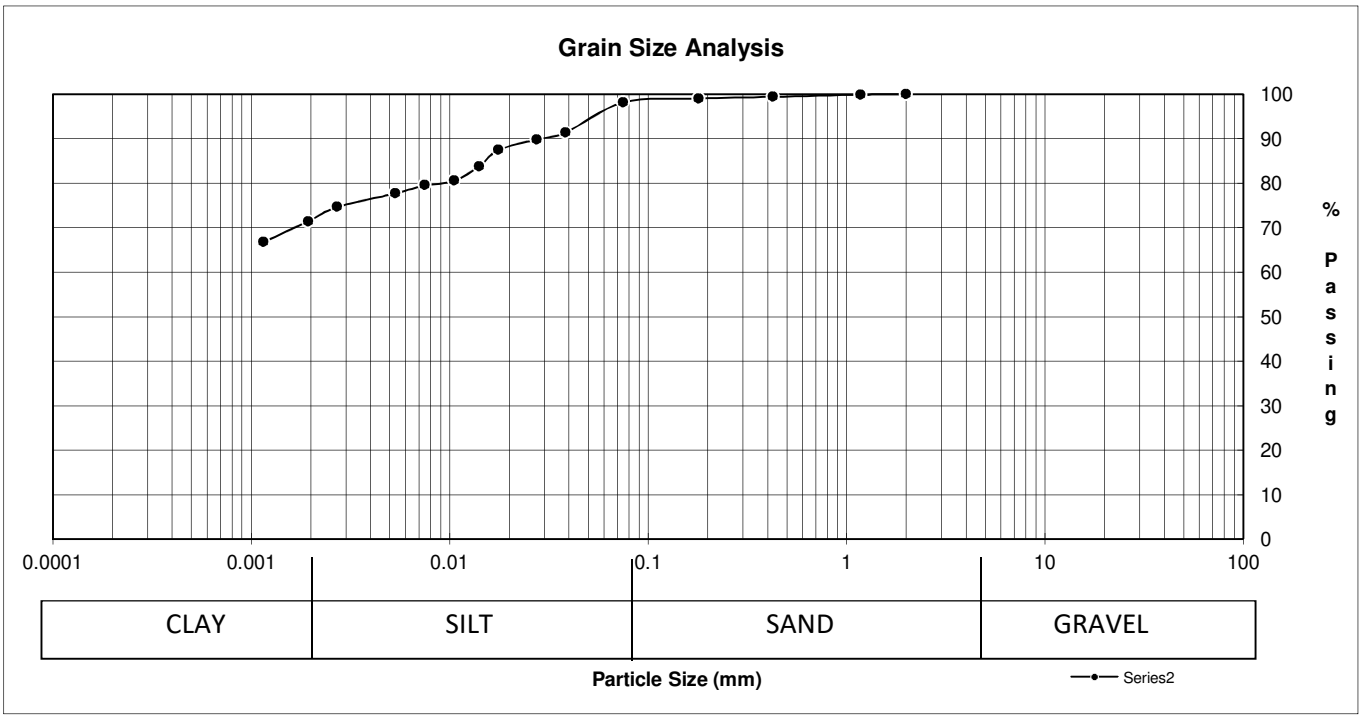
PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

CLIENT:	AECOM	PROJECT No.:	112-2101
	99 Commerce Drive	PSA Test No.:	4
	Winnipeg MB R3P 0Y7	LAB No.:	HM 021
ATTENTION:	Ryan Cunningham		
PROJECT:	2021-22 University Cr. Pavement Renewals		
	University Crescent from Chancellor Matheson to Pembina Highway		

Date Sampled:	1-Mar-21	Date Received:	1-Mar-21
Sampled By:	PB/ET	Date Tested:	11-Mar-21

Material Identification	
B.H./T.H. No.	TH 7
Depth	0.5-1.5
Sample Source	
Specific Gravity of Material:	2.65

Sieve Analysis		Hydrometer Analysis	
Sieve (mm)	% Passing	Diameter	% Finer
50.00	100.0		
37.50	100.0		
25.00	100.0		
19.00	100.0		
16.00	100.0		
12.50	100.0	0.0385	91.4
9.50	100.0	0.0274	89.8
4.75	100.0	0.0176	87.4
2.00	100.0	0.0141	83.8
1.18	99.9	0.0105	80.5
0.425	99.4	0.0075	79.5
0.180	99.0	0.0053	77.7
0.075	98.1	0.0012	66.7



SOIL DESCRIPTION	% Composition		D10	
		Gravel	D30	
	1.9	Sand	D60	
	26.7	Silt	Cu	
	71.4	Clay	Cc	

Remarks: Test Method: ASTM D7928, D2216, D4318

Technician: IA

Reviewed by: Paul Bevel

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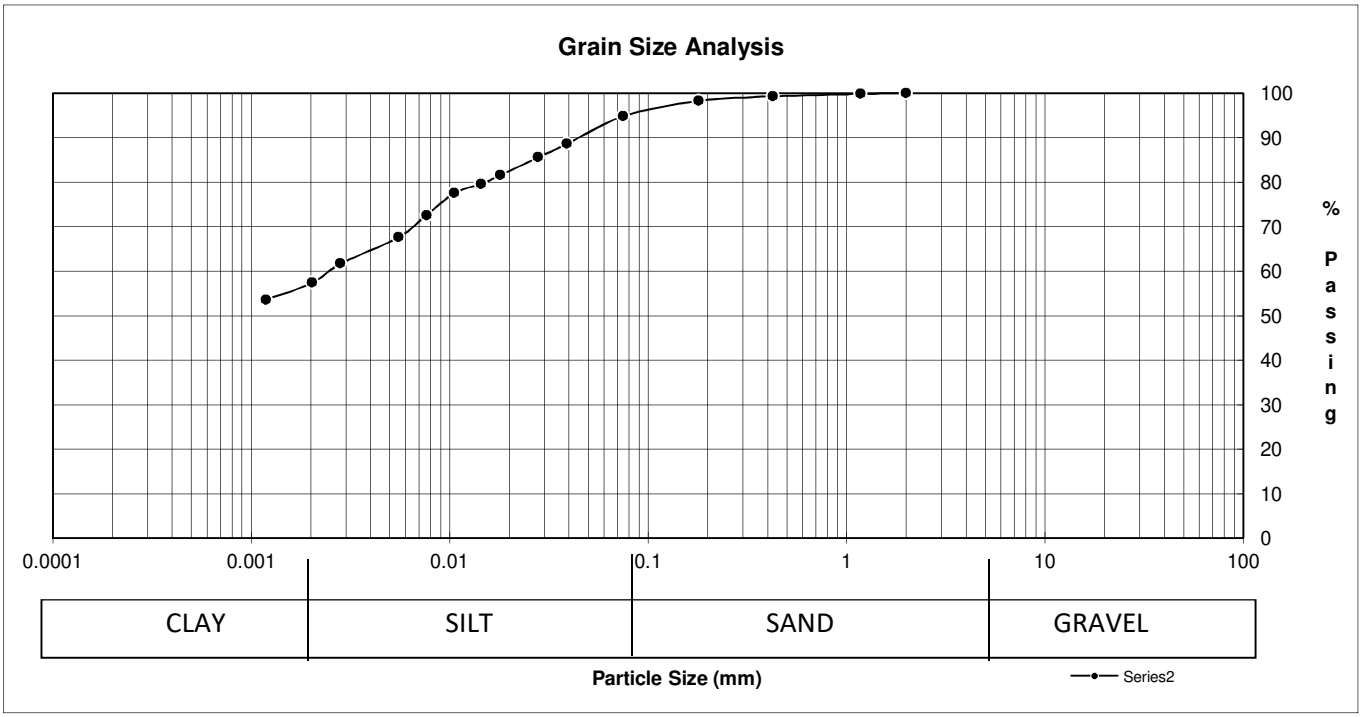
PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

CLIENT:	AECOM	PROJECT No.:	112-2101
	99 Commerce Drive	PSA Test No.:	5
	Winnipeg MB R3P 0Y7	LAB No.:	HM 021
ATTENTION:	Ryan Cunningham		
PROJECT:	2021-22 University Cr. Pavement Renewals		
	University Crescent from Chancellor Matheson to Pembina Highway		

Date Sampled:	1-Mar-21	Date Received:	1-Mar-21
Sampled By:	PB/ET	Date Tested:	11-Mar-21

Material Identification	
B.H./T.H. No.	TH 9
Depth	0.6-1.5 m
Sample Source	
Specific Gravity of Material:	2.65

Sieve Analysis		Hydrometer Analysis	
Sieve (mm)	% Passing	Diameter	% Finer
50.00	100.0		
37.50	100.0		
25.00	100.0		
19.00	100.0		
16.00	100.0		
12.50	100.0	0.0389	88.6
9.50	100.0	0.0279	85.6
4.75	100.0	0.0180	81.6
2.00	100.0	0.0144	79.6
1.18	99.8	0.0106	77.6
0.425	99.3	0.0077	72.6
0.180	98.3	0.0055	67.6
0.075	94.8	0.0012	53.6



SOIL DESCRIPTION	% Composition		D10	
		Gravel	D30	
	5.2	Sand	D60	0.00117
	37.5	Silt	Cu	
	57.3	Clay	Cc	

Remarks: Test Method: ASTM D7928, D2216, D4318

Technician: IA

Reviewed by: Paul Bevel

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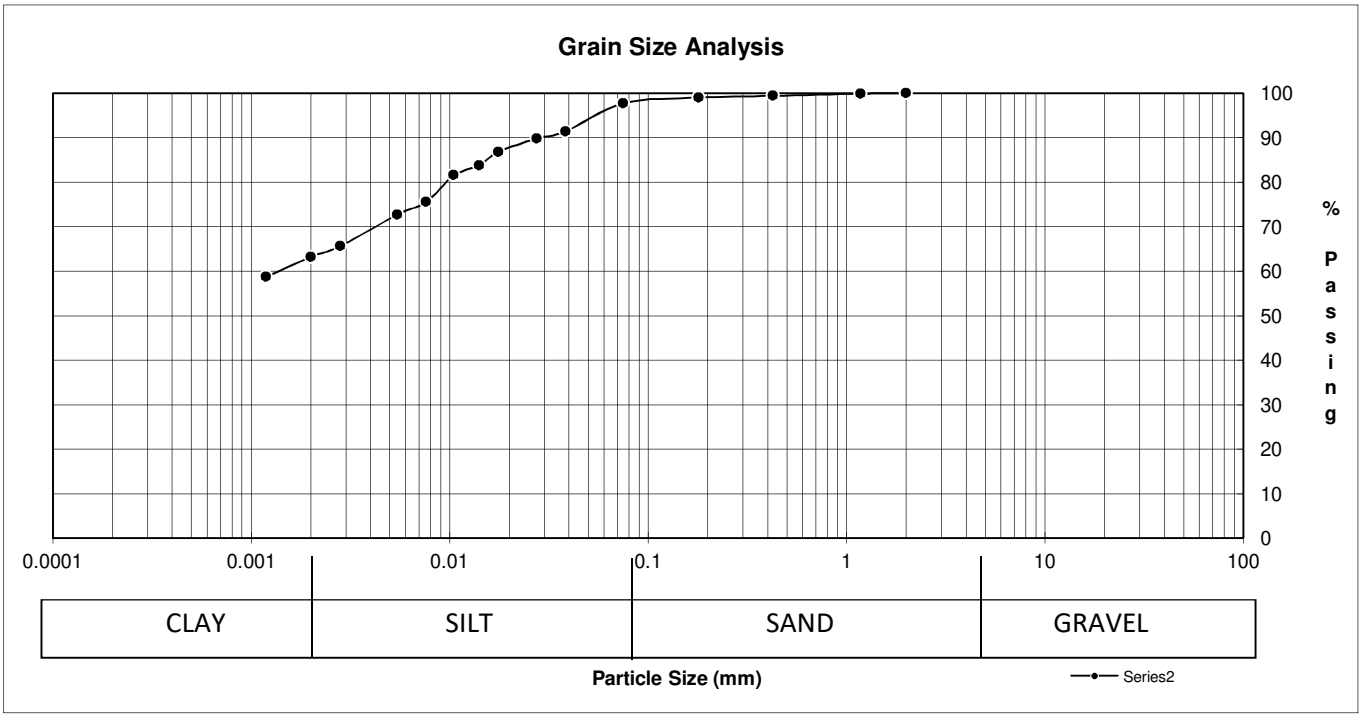
PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

CLIENT:	AECOM	PROJECT No.:	112-2101
	99 Commerce Drive	PSA Test No.:	6
	Winnipeg MB R3P 0Y7	LAB No.:	HM 021
ATTENTION:	Ryan Cunningham		
PROJECT:	2021-22 University Cr. Pavement Renewals		
	University Crescent from Chancellor Matheson to Pembina Highway		

Date Sampled:	2-Mar-21	Date Received:	2-Mar-21
Sampled By:	PB/ET	Date Tested:	11-Mar-21

Material Identification	
B.H./T.H. No.	TH 11
Depth	0.6-1.6
Sample Source	
Specific Gravity of Material:	2.65

Sieve Analysis		Hydrometer Analysis	
Sieve (mm)	% Passing	Diameter	% Finer
50.00	100.0		
37.50	100.0		
25.00	100.0		
19.00	100.0		
16.00	100.0		
12.50	100.0	0.0385	91.4
9.50	100.0	0.0274	89.8
4.75	100.0	0.0176	86.8
2.00	100.0	0.0141	83.8
1.18	99.9	0.0105	81.5
0.425	99.4	0.0076	75.5
0.180	99.0	0.0055	72.7
0.075	97.7	0.0012	58.7



SOIL DESCRIPTION	% Composition		
		Gravel	D10
		Gravel	D30
	2.3	Sand	D60
	34.5	Silt	Cu
	63.2	Clay	Cc

Remarks: Test Method: ASTM D7928, D2216, D4318

Technician: IA

Reviewed by: Paul Bevel

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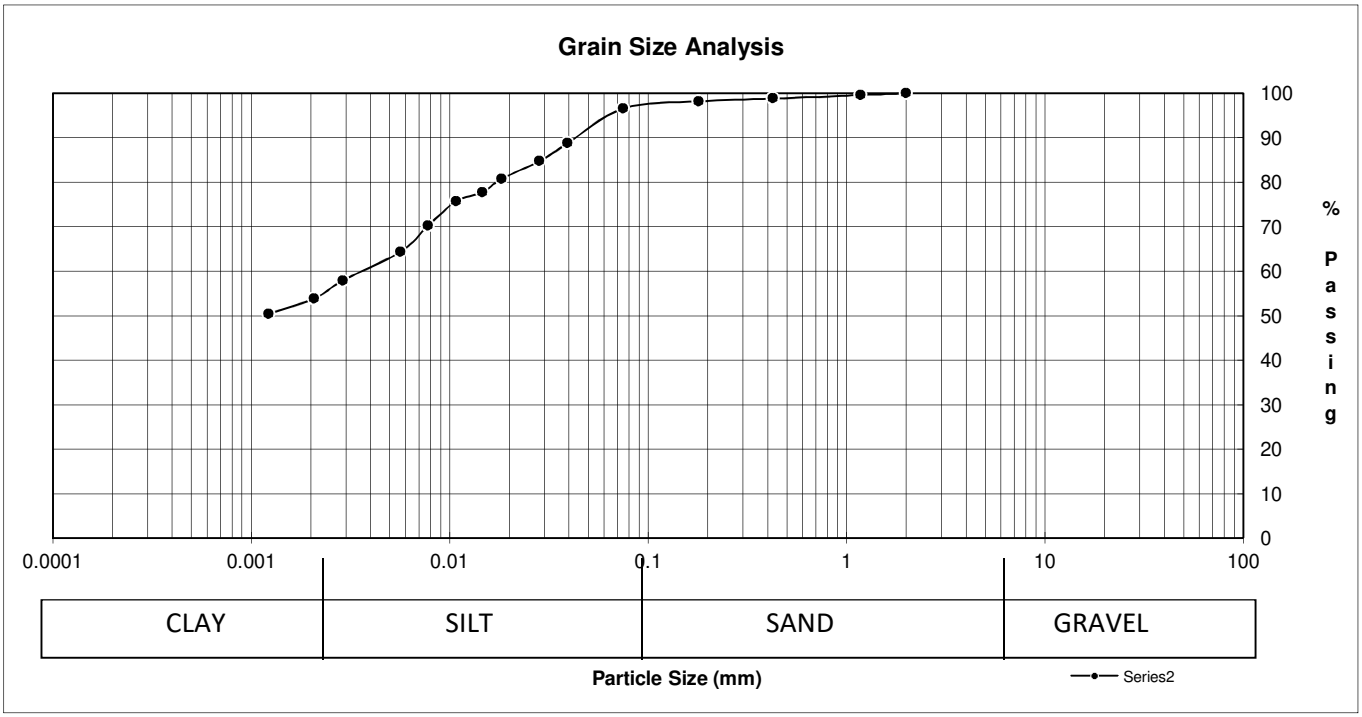
PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

CLIENT:	AECOM	PROJECT No.:	112-2101
	99 Commerce Drive	PSA Test No.:	7
	Winnipeg MB R3P 0Y7	LAB No.:	HM 021
ATTENTION:	Ryan Cunningham		
PROJECT:	2021-22 University Cr. Pavement Renewals		
	University Crescent from Chancellor Matheson to Pembina Highway		

Date Sampled:	2-Mar-21	Date Received:	2-Mar-21
Sampled By:	PB/ET	Date Tested:	11-Mar-21

Material Identification	
B.H./T.H. No.	TH 13
Depth	0.5-1.5
Sample Source	
Specific Gravity of Material:	2.65

Sieve Analysis		Hydrometer Analysis	
Sieve (mm)	% Passing	Diameter	% Finer
50.00	100.0		
37.50	100.0		
25.00	100.0		
19.00	100.0		
16.00	100.0		
12.50	100.0	0.0392	88.7
9.50	100.0	0.0283	84.7
4.75	100.0	0.0182	80.7
2.00	100.0	0.0146	77.7
1.18	99.6	0.0108	75.7
0.425	98.8	0.0078	70.2
0.180	98.2	0.0056	64.3
0.075	96.6	0.0012	50.4



SOIL DESCRIPTION	% Composition		D10	
		Gravel	D30	
	3.4	Sand	D60	0.00203
	42.6	Silt	Cu	
	54.0	Clay	Cc	

Remarks: Test Method: ASTM D7928, D2216, D4318

Technician: IA

Reviewed by: Paul Bevel

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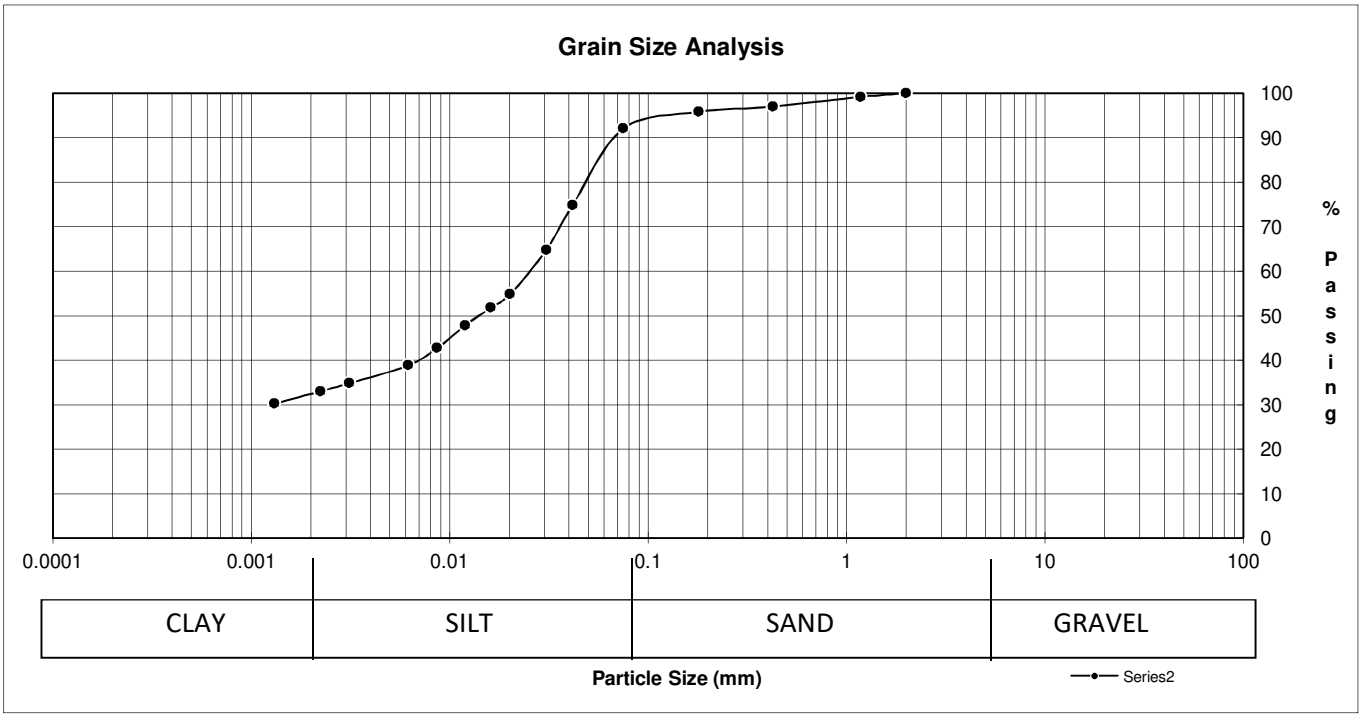
PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

CLIENT:	AECOM	PROJECT No.:	112-2101
	99 Commerce Drive	PSA Test No.:	8
	Winnipeg MB R3P 0Y7	LAB No.:	HM 021
ATTENTION:	Ryan Cunningham		
PROJECT:	2021-22 University Cr. Pavement Renewals		
	University Crescent from Chancellor Matheson to Pembina Highway		

Date Sampled:	2-Mar-21	Date Received:	2-Mar-21
Sampled By:	PB/ET	Date Tested:	11-Mar-21

Material Identification	
B.H./T.H. No.	TH 15
Depth	0.6-1.5 m
Sample Source	
Specific Gravity of Material:	2.65

Sieve Analysis		Hydrometer Analysis	
Sieve (mm)	% Passing	Diameter	% Finer
50.00	100.0		
37.50	100.0		
25.00	100.0		
19.00	100.0		
16.00	100.0		
12.50	100.0	0.0416	74.8
9.50	100.0	0.0307	64.8
4.75	100.0	0.0202	54.8
2.00	100.0	0.0161	51.8
1.18	99.2	0.0119	47.8
0.425	97.0	0.0087	42.7
0.180	95.8	0.0062	38.8
0.075	92.0	0.0013	30.2



SOIL DESCRIPTION	% Composition		D10	
		Gravel	D30	0.00226
	8.0	Sand	D60	0.02018
	59.2	Silt	Cu	
	32.8	Clay	Cc	

Remarks: Test Method: ASTM D7928, D2216, D4318

Technician: IA

Reviewed by: Paul Bevel

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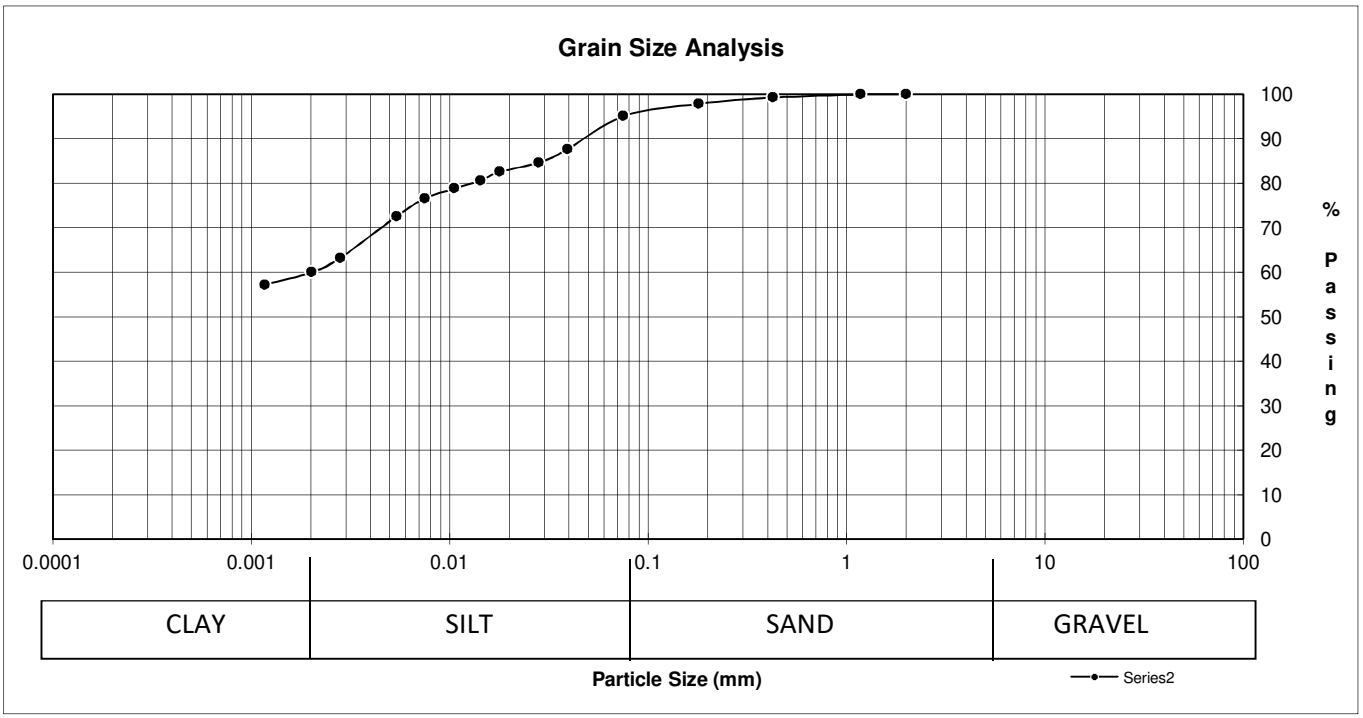
PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

CLIENT:	AECOM	PROJECT No.:	112-2101
	99 Commerce Drive	PSA Test No.:	9
	Winnipeg MB R3P 0Y7	LAB No.:	HM 021
ATTENTION:	Ryan Cunningham		
PROJECT:	2021-22 University Cr. Pavement Renewals		
	University Crescent from Chancellor Matheson to Pembina Highway		

Date Sampled:	2-Mar-21	Date Received:	2-Mar-21
Sampled By:	PB/ET	Date Tested:	11-Mar-21

Material Identification	
B.H./T.H. No.	TH 16
Depth	0.3-1.4 m
Sample Source	
Specific Gravity of Material:	2.65

Sieve Analysis		Hydrometer Analysis	
Sieve (mm)	% Passing	Diameter	% Finer
50.00	100.0		
37.50	100.0		
25.00	100.0		
19.00	100.0		
16.00	100.0		
12.50	100.0	0.0391	87.6
9.50	100.0	0.0281	84.6
4.75	100.0	0.0179	82.6
2.00	100.0	0.0143	80.6
1.18	99.9	0.0105	78.8
0.425	99.2	0.0075	76.6
0.180	97.8	0.0054	72.6
0.075	95.0	0.0012	57.2



SOIL DESCRIPTION	% Composition		
		Gravel	D10
	5.0	Sand	D30
	35.0	Silt	D60
	60.0	Clay	Cu
			Cc

Remarks: Test Method: ASTM D7928, D2216, D4318

Technician: IA

Reviewed by: Paul Bevel

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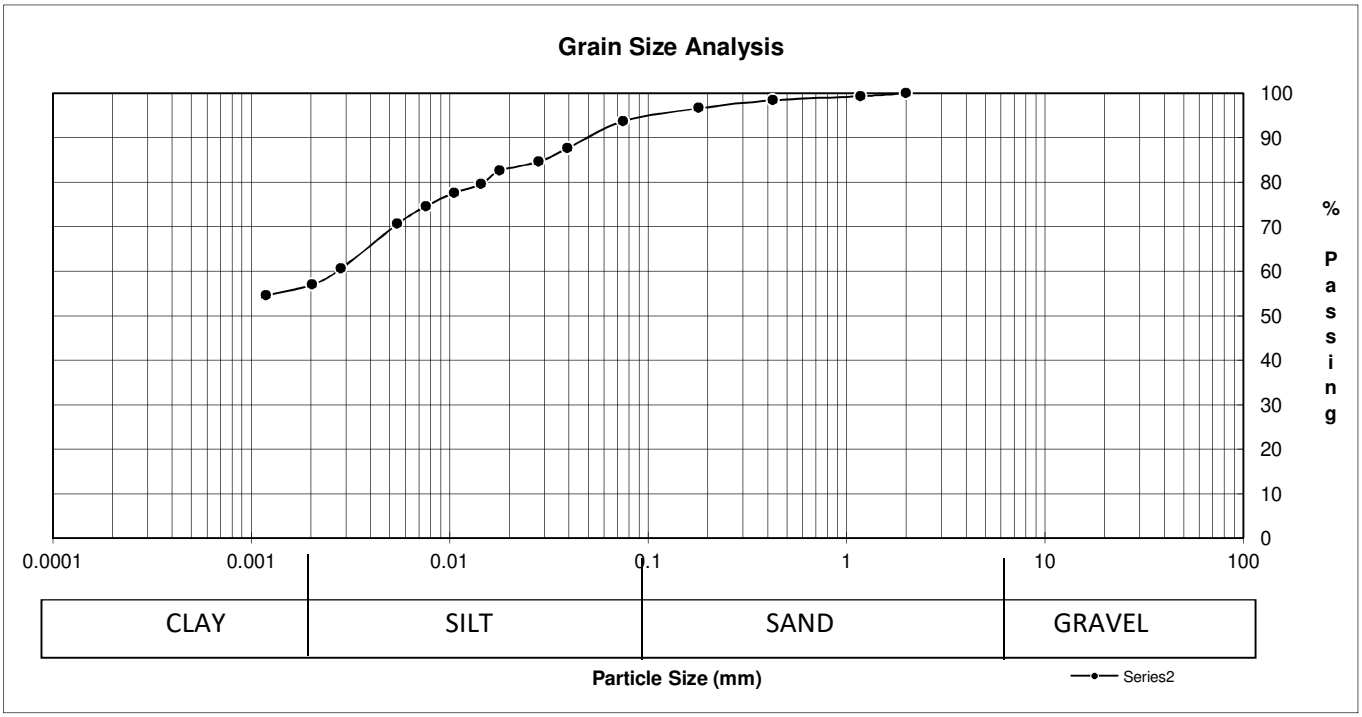
PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

CLIENT:	AECOM	PROJECT No.:	112-2101
	99 Commerce Drive	PSA Test No.:	10
	Winnipeg MB R3P 0Y7	LAB No.:	HM 021
ATTENTION:	Ryan Cunningham		
PROJECT:	2021-22 University Cr. Pavement Renewals		
	University Crescent from Chancellor Matheson to Pembina Highway		

Date Sampled:	2-Mar-21	Date Received:	2-Mar-21
Sampled By:	PB/ET	Date Tested:	11-Mar-21

Material Identification	
B.H./T.H. No.	TH 19
Depth	0.3-1.2 m
Sample Source	
Specific Gravity of Material:	2.65

Sieve Analysis		Hydrometer Analysis	
Sieve (mm)	% Passing	Diameter	% Finer
50.00	100.0		
37.50	100.0		
25.00	100.0		
19.00	100.0		
16.00	100.0		
12.50	100.0	0.0391	87.6
9.50	100.0	0.0281	84.6
4.75	100.0	0.0179	82.6
2.00	100.0	0.0144	79.6
1.18	99.3	0.0106	77.6
0.425	98.4	0.0076	74.6
0.180	96.6	0.0055	70.6
0.075	93.7	0.0012	54.6



SOIL DESCRIPTION	% Composition		
		Gravel	D10
	6.3	Sand	D30
	36.5	Silt	D60
	57.2	Clay	Cu
			Cc

Remarks: Test Method: ASTM D7928, D2216, D4318

Technician: IA

Reviewed by: Paul Bevel

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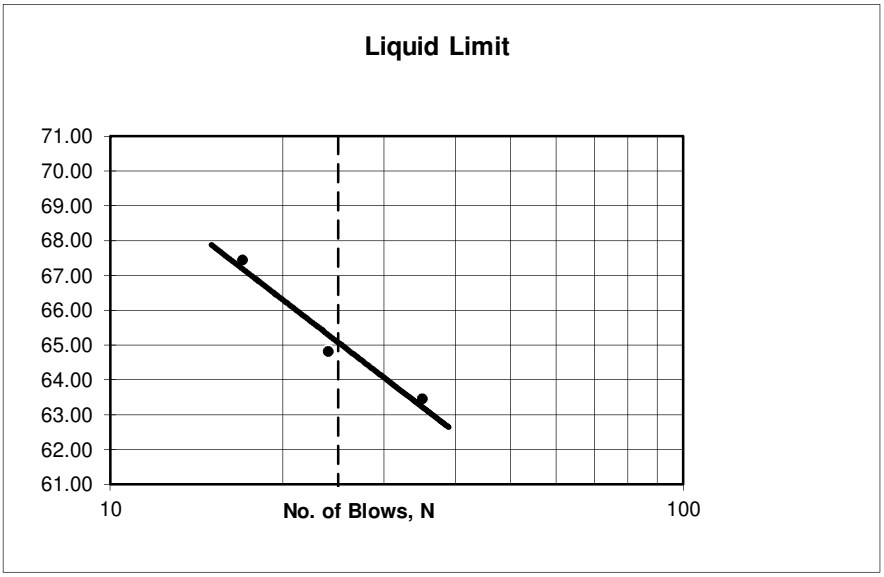
Atterberg Limits (ASTM D4318)

Client:	AECOM 99 Commerce Drive Winnipeg MB R3P 0Y7	Project No.:	112-2101
		Test No.	3
		Lab No.:	HM 021
Attention.:	Ryan Cunningham	Date Received:	1-Mar-21
Project:	2021-22 University Cr. Pavement Renewals University Crescent from Chancellor Matheson to Pembina Highway	Date Tested / By:	15-Mar-21 / GM

Liquid Limit Determination

Dish No.:	1	2	3		Liquid Limit 25 Blows
Wet Soil + Dish:	13.44	14.32	14.41		
Dry Soil + Dish:	9.95	10.45	10.35		
Moisture:	3.49	3.87	4.06		
Dish:	4.45	4.48	4.33		
Dry Soil:	5.5	5.97	6.02		
% Moisture:	63.45	64.82	67.44		
No. of Blows:	35	24	17		
Liquid Limit:					**65**



Material Identification:

T.H./B.H. No. **TH 1**

Depth:

Liquid Limit, %: **65**
Plastic Limit, %: **26**
Plasticity Index: **39**
(LL-PL)

Plastic Limit Determination

Dish No.:	1	2	3		
Wet Soil + Dish:	13.79	13.58	13.95		
Dry Soil + Dish:	11.85	11.73	12.03		
Moisture:	1.94	1.85	1.92		
Dish:	4.33	4.46	4.71		
Dry Soil:	7.52	7.27	7.32		
% Moisture:	25.80	25.45	26.23		
Average:					**26**

Test Method : ASTM: D4318, D2216

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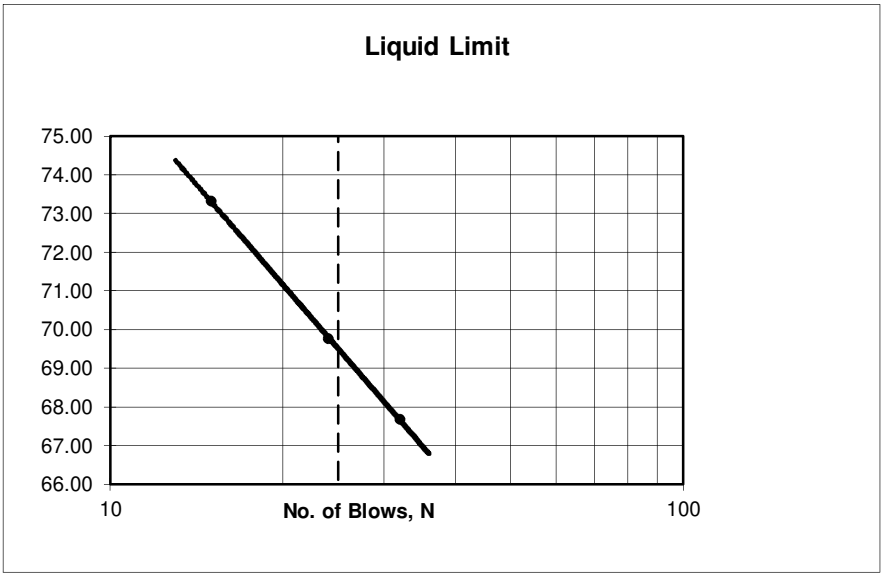
Atterberg Limits (ASTM D4318)

Client:	AECOM 99 Commerce Drive Winnipeg MB R3P 0Y7	Project No.:	112-2101
		Test No.	2
		Lab No.:	HM 021
Attention.:	Ryan Cunningham	Date Received:	1-Mar-21
Project:	2021-22 University Cr. Pavement Renewals University Crescent from Chancellor Matheson to Pembina Highway	Date Tested / By:	15-Mar-21 / GM

Liquid Limit Determination

Dish No.:	1	2	3		Liquid Limit 25 Blows
Wet Soil + Dish:	12.98	12.58	12.01		
Dry Soil + Dish:	9.44	9.14	8.74		
Moisture:	3.54	3.44	3.27		
Dish:	4.21	4.21	4.28		
Dry Soil:	5.23	4.93	4.46		
% Moisture:	67.69	69.78	73.32		
No. of Blows:	32	24	15		
Liquid Limit:					**69**



Material Identification:

T.H./B.H. No.	**TH 3**
Depth:	
Liquid Limit, %:	**69**
Plastic Limit, %:	**29**
Plasticity Index: (LL-PL)	**41**

Plastic Limit Determination

Dish No.:	1	2	3		
Wet Soil + Dish:	10.85	11.26	11.04		
Dry Soil + Dish:	9.38	9.72	9.52		
Moisture:	1.47	1.54	1.52		
Dish:	4.27	4.29	4.32		
Dry Soil:	5.11	5.43	5.2		
% Moisture:	28.77	28.36	29.23		
Average:					**29**

Test Method : ASTM: D4318, D2216

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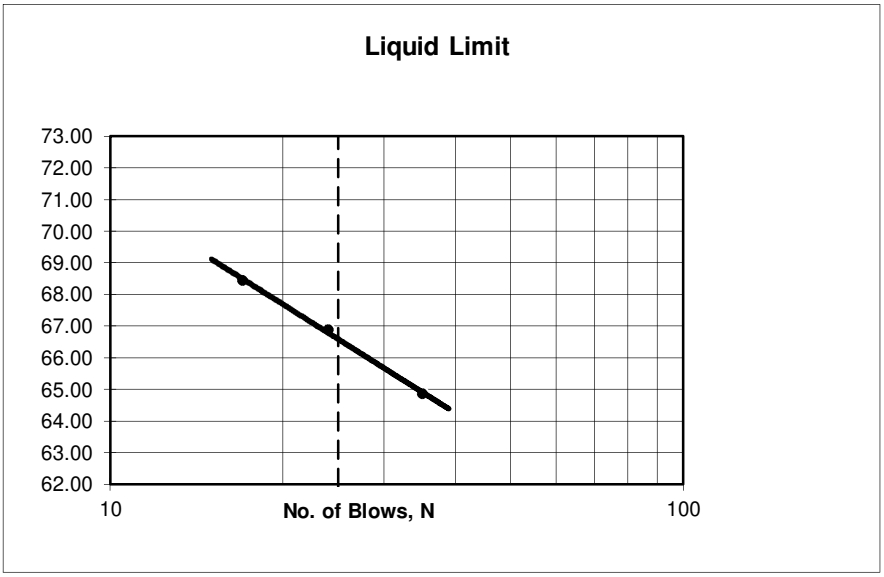
Atterberg Limits (ASTM D4318)

Client:	AECOM 99 Commerce Drive Winnipeg MB R3P 0Y7	Project No.:	112-2101
		Test No.	3
		Lab No.:	HM 021
Attention.:	Ryan Cunningham	Date Received:	Feb. 2021
Project:	2021-22 University Cr. Pavement Renewals University Crescent from Chancellor Matheson to Pembina Highway	Date Tested / By:	2021-03-15/GM

Liquid Limit Determination

Dish No.:	1	2	3		Liquid Limit 25 Blows
Wet Soil + Dish:	12.82	14.56	12.23		
Dry Soil + Dish:	9.57	10.52	9.02		
Moisture:	3.25	4.04	3.21		
Dish:	4.56	4.48	4.33		
Dry Soil:	5.01	6.04	4.69		
% Moisture:	64.87	66.89	68.44		
No. of Blows:	35	24	17		
Liquid Limit:					**66**



Material Identification:

T.H./B.H. No. **TH 5**

Depth:

Liquid Limit, %: **66**
Plastic Limit, %: **28**
Plasticity Index: **38**
(LL-PL)

Plastic Limit Determination

Dish No.:	1	2	3		
Wet Soil + Dish:	12.77	12.92	13.32		
Dry Soil + Dish:	10.91	10.99	11.44		
Moisture:	1.86	1.93	1.88		
Dish:	4.25	4.31	4.74		
Dry Soil:	6.66	6.68	6.7		
% Moisture:	27.93	28.89	28.06		
Average:					**28**

Test Method : ASTM: D4318, D2216

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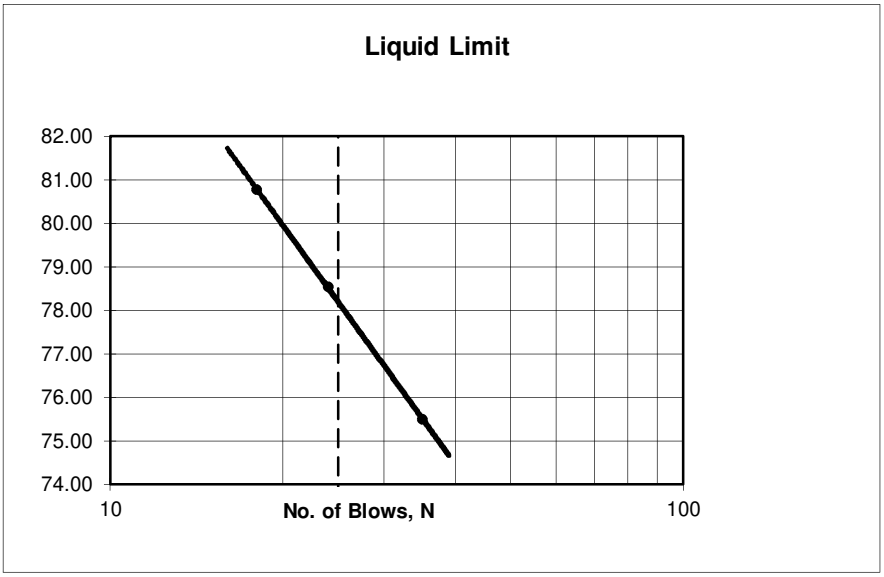
Atterberg Limits (ASTM D4318)

Client:	AECOM 99 Commerce Drive Winnipeg MB R3P 0Y7	Project No.:	112-2101
		Test No.	4
		Lab No.:	HM 021
Attention.:	Ryan Cunningham	Date Received:	1-Mar-21
Project:	2021-22 University Cr. Pavement Renewals University Crescent from Chancellor Matheson to Pembina Highway	Date Tested / By:	15-Mar-21 /GM

Liquid Limit Determination

Dish No.:	1	2	3		Liquid Limit 25 Blows
Wet Soil + Dish:	11.20	13.31	11.31		
Dry Soil + Dish:	8.21	9.54	8.16		
Moisture:	2.99	3.77	3.15		
Dish:	4.25	4.74	4.26		
Dry Soil:	3.96	4.8	3.9		
% Moisture:	75.51	78.54	80.77		
No. of Blows:	35	24	18		
Liquid Limit:					**78**



Material Identification:

T.H./B.H. No.	**TH 7**
Depth:	
Liquid Limit, %:	**78**
Plastic Limit, %:	**31**
Plasticity Index: (LL-PL)	**47**

Plastic Limit Determination

Dish No.:	1	2	3		
Wet Soil + Dish:	10.93	11.55	11.42		
Dry Soil + Dish:	9.37	9.8	9.76		
Moisture:	1.56	1.75	1.66		
Dish:	4.25	4.47	4.25		
Dry Soil:	5.12	5.33	5.51		
% Moisture:	30.47	32.83	30.13		
Average:					**31**

Test Method : ASTM: D4318, D2216

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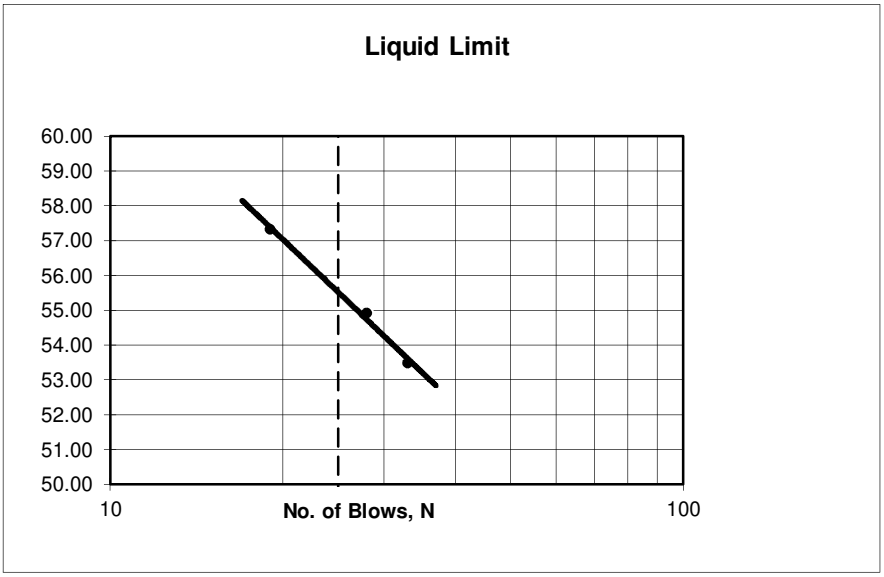
Atterberg Limits (ASTM D4318)

Client:	AECOM 99 Commerce Drive Winnipeg MB R3P 0Y7	Project No.:	112-2101
		Test No.	5
		Lab No.:	HM 021
Attention.:	Ryan Cunningham	Date Received:	1-Mar-21
Project:	2021-22 University Cr. Pavement Renewals University Crescent from Chancellor Matheson to Pembina Highway	Date Tested / By:	15-Mar-21 / GM

Liquid Limit Determination

Dish No.:	1	2	3		Liquid Limit 25 Blows
Wet Soil + Dish:	15.32	13.54	12.49		
Dry Soil + Dish:	11.64	10.25	9.48		
Moisture:	3.68	3.29	3.01		
Dish:	4.76	4.26	4.23		
Dry Soil:	6.88	5.99	5.25		
% Moisture:	53.49	54.92	57.33		
No. of Blows:	33	28	19		
Liquid Limit:					**55**



Material Identification:

T.H./B.H. No. **TH 9**

Depth:

Liquid Limit, %: **55**
Plastic Limit, %: **23**
Plasticity Index: **32**
(LL-PL)

Plastic Limit Determination

Dish No.:	1	2	3		
Wet Soil + Dish:	10.25	10.27	10.55		
Dry Soil + Dish:	9.15	9.11	9.37		
Moisture:	1.1	1.16	1.18		
Dish:	4.28	4.27	4.2		
Dry Soil:	4.87	4.84	5.17		
% Moisture:	22.59	23.97	22.82		
Average:					**23**

Test Method : ASTM: D4318, D2216

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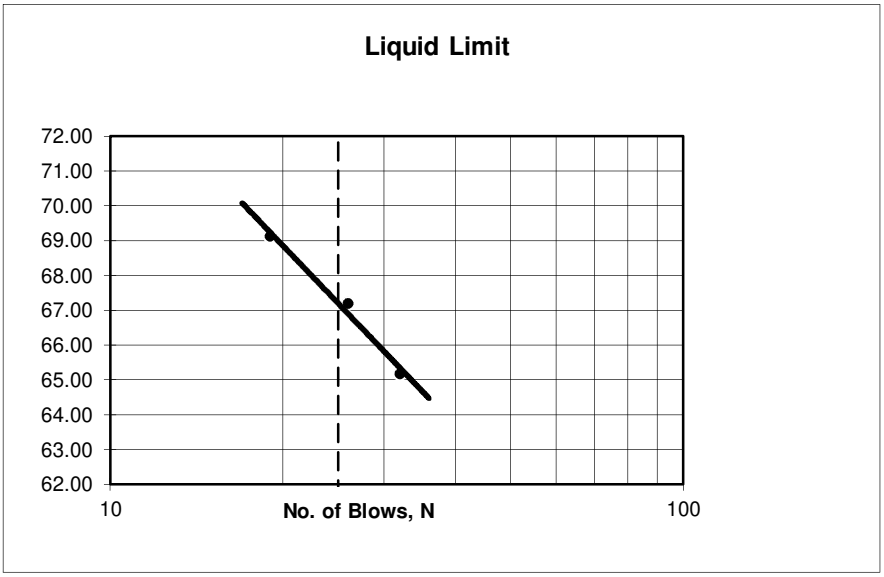
Atterberg Limits (ASTM D4318)

Client:	AECOM 99 Commerce Drive Winnipeg MB R3P 0Y7	Project No.:	112-2101
		Test No.	6
		Lab No.:	HM 021
Attention.:	Ryan Cunningham	Date Received:	2-Mar-21
Project:	2021-22 University Cr. Pavement Renewals University Crescent from Chancellor Matheson to Pembina Highway	Date Tested / By:	15-Mar-21 / GM

Liquid Limit Determination

Dish No.:	1	2	3		Liquid Limit 25 Blows
Wet Soil + Dish:	12.46	11.55	11.88		
Dry Soil + Dish:	9.41	8.60	8.88		
Moisture:	3.05	2.95	3		
Dish:	4.73	4.21	4.54		
Dry Soil:	4.68	4.39	4.34		
% Moisture:	65.17	67.20	69.12		
No. of Blows:	32	26	19		
Liquid Limit:					**67**



Material Identification:

T.H./B.H. No. **TH 6**

Depth:

Liquid Limit, %: **67**
Plastic Limit, %: **26**
Plasticity Index: **41**
(LL-PL)

Plastic Limit Determination

Dish No.:	1	2	3		
Wet Soil + Dish:	11.34	11.47	12.05		
Dry Soil + Dish:	9.91	10.03	10.53		
Moisture:	1.43	1.44	1.52		
Dish:	4.55	4.32	4.77		
Dry Soil:	5.36	5.71	5.76		
% Moisture:	26.68	25.22	26.39		
Average:					**26**

Test Method : ASTM: D4318, D2216

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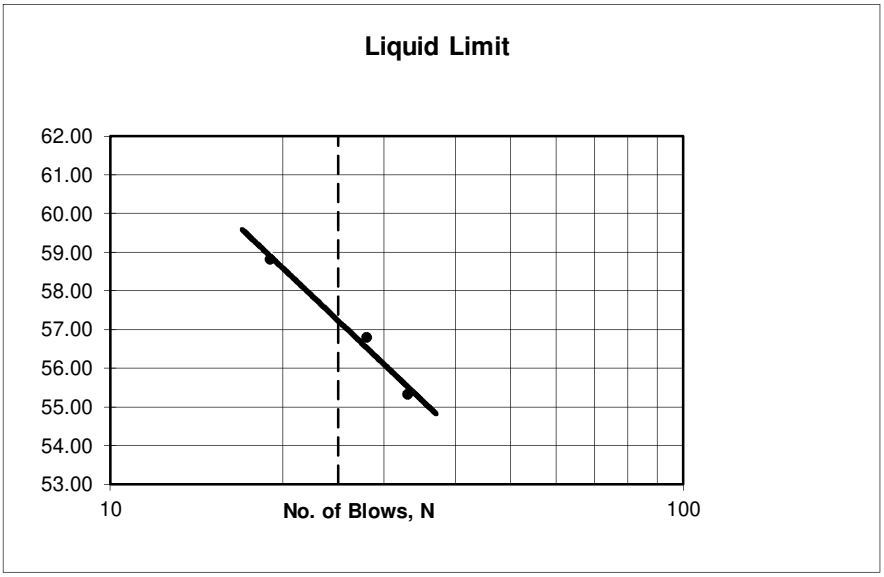
Atterberg Limits (ASTM D4318)

Client:	AECOM 99 Commerce Drive Winnipeg MB R3P 0Y7	Project No.:	112-2101
		Test No.	7
		Lab No.:	HM 021
Attention.:	Ryan Cunningham	Date Received:	1-Mar-21
Project:	2021-22 University Cr. Pavement Renewals University Crescent from Chancellor Matheson to Pembina Highway	Date Tested / By:	15-Mar-21 / GM

Liquid Limit Determination

Dish No.:	1	2	3		Liquid Limit 25 Blows
Wet Soil + Dish:	15.82	13.59	14.49		
Dry Soil + Dish:	11.88	10.21	10.69		
Moisture:	3.94	3.38	3.8		
Dish:	4.76	4.26	4.23		
Dry Soil:	7.12	5.95	6.46		
% Moisture:	55.34	56.81	58.82		
No. of Blows:	33	28	19		
Liquid Limit:					**57**



Material Identification:

T.H./B.H. No. **TH 13**

Depth:

Liquid Limit, %: **57**
Plastic Limit, %: **20**
Plasticity Index: **37**
(LL-PL)

Plastic Limit Determination

Dish No.:	1	2	3		
Wet Soil + Dish:	10.65	10.42	10.51		
Dry Soil + Dish:	9.6	9.4	9.45		
Moisture:	1.05	1.02	1.06		
Dish:	4.28	4.27	4.2		
Dry Soil:	5.32	5.13	5.25		
% Moisture:	19.74	19.88	20.19		
Average:					**20**

Test Method : ASTM: D4318, D2216

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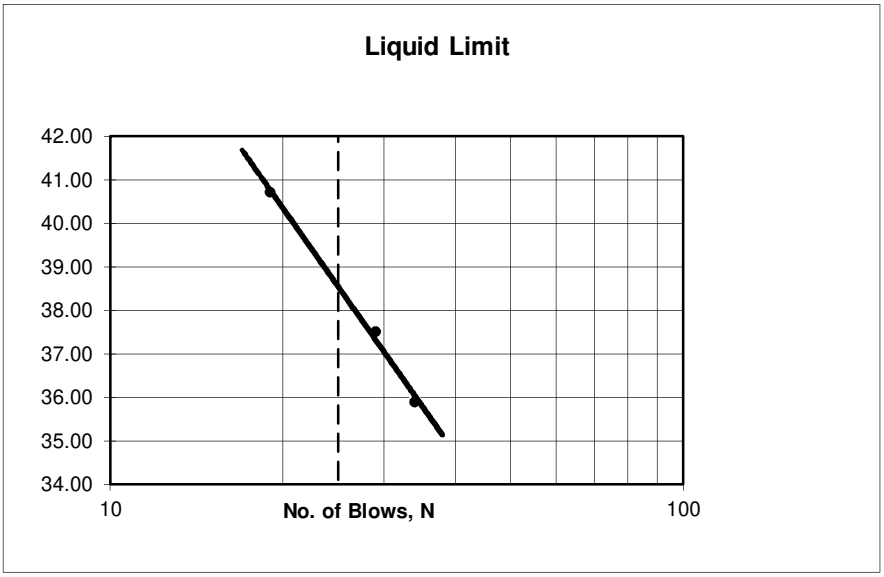
Atterberg Limits (ASTM D4318)

Client:	AECOM 99 Commerce Drive Winnipeg MB R3P 0Y7	Project No.:	112-2101
		Test No.	8
		Lab No.:	HM 021
Attention.:	Ryan Cunningham	Date Received:	2-Mar-21
Project:	2021-22 University Cr. Pavement Renewals University Crescent from Chancellor Matheson to Pembina Highway	Date Tested / By:	15-Mar-21 /GM

Liquid Limit Determination

Dish No.:	1	2	3		Liquid Limit 25 Blows
Wet Soil + Dish:	14.70	13.7	14.45		
Dry Soil + Dish:	11.95	11.13	11.49		
Moisture:	2.75	2.57	2.96		
Dish:	4.29	4.28	4.22		
Dry Soil:	7.66	6.85	7.27		
% Moisture:	35.90	37.52	40.72		
No. of Blows:	34	29	19		
Liquid Limit:					**38**



Material Identification:

T.H./B.H. No. **TH 15**

Depth:

Liquid Limit, %: **38**
Plastic Limit, %: **13**
Plasticity Index: **26**
(LL-PL)

Plastic Limit Determination

Dish No.:	1	2	3		
Wet Soil + Dish:	11.46	11.37	11.34		
Dry Soil + Dish:	10.69	10.53	10.55		
Moisture:	0.77	0.84	0.79		
Dish:	4.26	4.23	4.42		
Dry Soil:	6.43	6.3	6.13		
% Moisture:	11.98	13.33	12.89		
Average:					**13**

Test Method : ASTM: D4318, D2216

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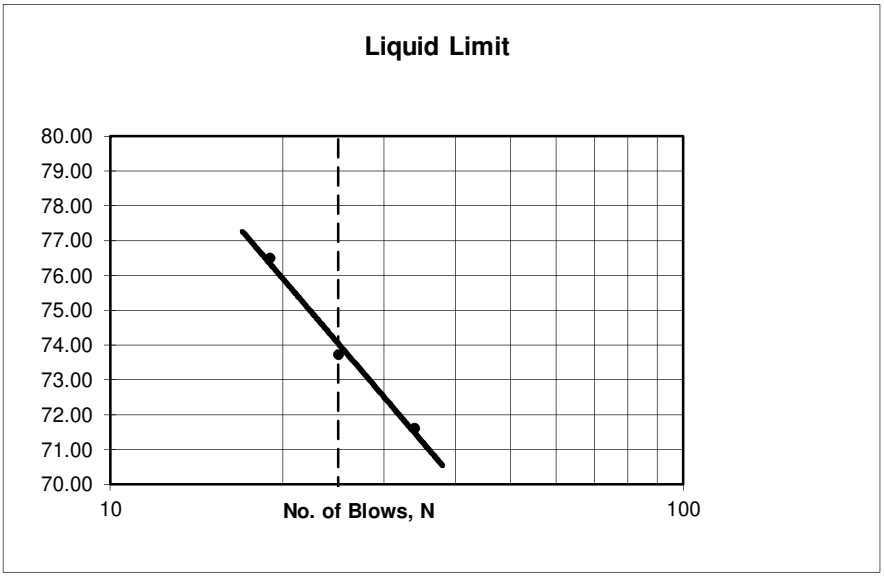
Atterberg Limits (ASTM D4318)

Client:	AECOM 99 Commerce Drive Winnipeg MB R3P 0Y7	Project No.:	112-2101
		Test No.	9
		Lab No.:	HM 021
Attention.:	Ryan Cunningham	Date Received:	Feb. 2021
Project:	2021-22 University Cr. Pavement Renewals University Crescent from Chancellor Matheson to Pembina Highway	Date Tested / By:	2021-03-15/GM

Liquid Limit Determination

Dish No.:	1	2	3		Liquid Limit 25 Blows
Wet Soil + Dish:	13.62	13.57	13.68		
Dry Soil + Dish:	9.91	9.95	9.74		
Moisture:	3.71	3.62	3.94		
Dish:	4.73	5.04	4.59		
Dry Soil:	5.18	4.91	5.15		
% Moisture:	71.62	73.73	76.50		
No. of Blows:	34	25	19		
Liquid Limit:					**74**



Material Identification:

T.H./B.H. No. **TH 16**

Depth:

Liquid Limit, %: **74**
Plastic Limit, %: **29**
Plasticity Index: **45**
(LL-PL)

Plastic Limit Determination

Dish No.:	1	2	3		
Wet Soil + Dish:	13.11	12.74	12.47		
Dry Soil + Dish:	11.22	10.85	10.62		
Moisture:	1.89	1.89	1.85		
Dish:	4.81	4.28	4.24		
Dry Soil:	6.41	6.57	6.38		
% Moisture:	29.49	28.77	29.00		
Average:					**29**

Test Method : ASTM: D4318, D2216

P. Bevel

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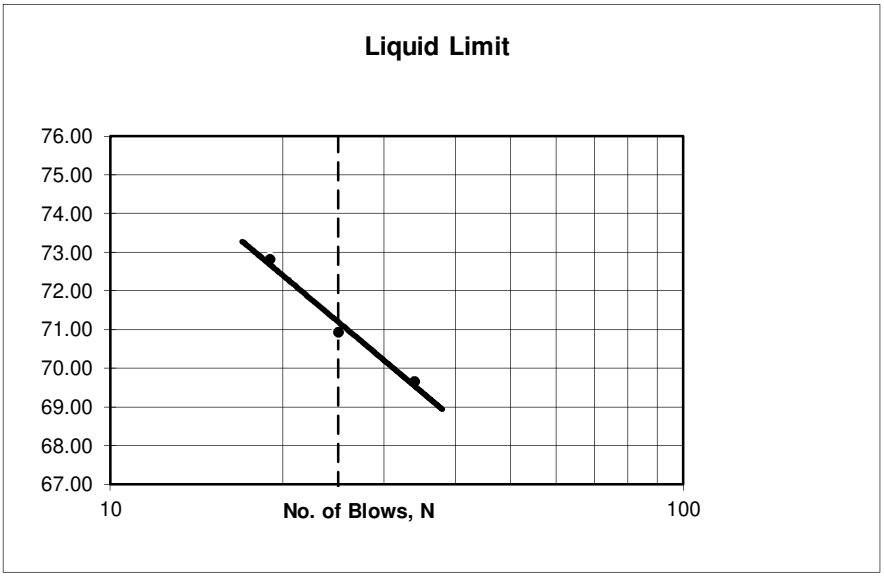
Atterberg Limits (ASTM D4318)

Client:	AECOM 99 Commerce Drive Winnipeg MB R3P 0Y7	Project No.:	112-2101
		Test No.	10
		Lab No.:	HM 021
Attention.:	Ryan Cunningham	Date Received:	2-Mar-21
Project:	2021-22 University Cr. Pavement Renewals University Crescent from Chancellor Matheson to Pembina Highway	Date Tested / By:	15-Mar-21 / GM

Liquid Limit Determination

Dish No.:	1	2	3		Liquid Limit 25 Blows
Wet Soil + Dish:	13.62	13.57	13.68		
Dry Soil + Dish:	9.97	10.03	9.85		
Moisture:	3.65	3.54	3.83		
Dish:	4.73	5.04	4.59		
Dry Soil:	5.24	4.99	5.26		
% Moisture:	69.66	70.94	72.81		
No. of Blows:	34	25	19		
Liquid Limit:					**71**



Material Identification:

T.H./B.H. No. **TH 19**

Depth:

Liquid Limit, %: **71**
Plastic Limit, %: **28**
Plasticity Index: **43**
(LL-PL)

Plastic Limit Determination

Dish No.:	1	2	3		
Wet Soil + Dish:	13.11	12.74	12.47		
Dry Soil + Dish:	11.28	10.88	10.69		
Moisture:	1.83	1.86	1.78		
Dish:	4.81	4.28	4.24		
Dry Soil:	6.47	6.6	6.45		
% Moisture:	28.28	28.18	27.60		
Average:					**28**

Test Method : ASTM: D4318, D2216

P. Bevel

Reviewed by: Paul Bevel

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MAXIMUM DRY DENSITY AND MOISTURE CONTENT - Proctor Method (ASTM D698)

CLIENT	AECOM Canada Ltd. 99 Commerce Drive Winnipeg, MB. R3P 0Y7	PROJECT NO.:	112-2101
		TEST NO.:	1
ATTENTION:	Ryan Cunningham		
PROJECT:	2021-2022 University Crescent Pavement Renewals		

Date Sampled	1-Mar-21	Date Received:	1-Mar-21
Sampled By:	ET/PB	Date Tested	11-Mar-21

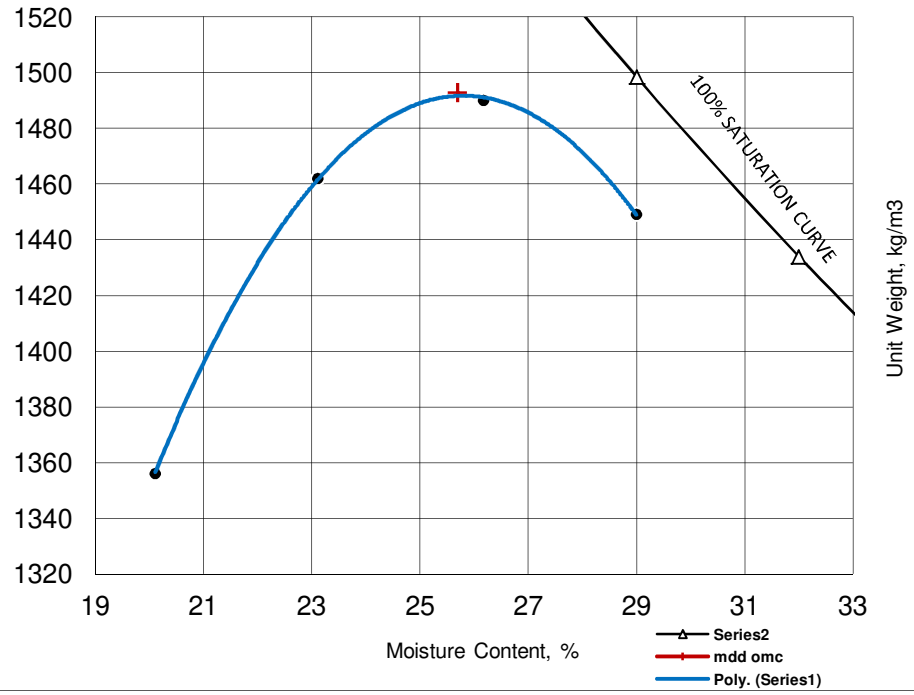
MATERIAL INFORMATION

Material Type:	Clay		
Material Use	-	Material Supplier	-
Maximum Size:	-	Material Source	TH 1

PROCEDURE	A
PREPARATION	Dry
COMPACTION METHOD	Manual
BLOWS PER LAYER	25
NO. OF LAYERS	3
MOLD SIZE	100
MOLD VOLUME	935
WEIGHT OF HAMMER	2.5 kg

Test No.	1	2	3	4	5
Wet Density	1629	1800	1880	1870	0
Moisture Content	20.1	23.1	26.2	29.0	0.0
Dry Density	1356	1462	1490	1449	0

Moisture - Density Relationship



Maximum Dry Density (MDD): 1493 kg/m³

Optimum Moisture Content 25.7 %

STONE CORRECTION (ASTM D 4718)

Retained on 4.75 mm sieve: 0 %

Corrected Moisture: 25.7 %

Corrected Maximum Dry Density: 1493 kg/m³

Remarks:

Tested by: ia

Reviewed By: Hermie Manalo

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CALIFORNIA BEARING RATIO (CBR) TEST - ASTM D 1883

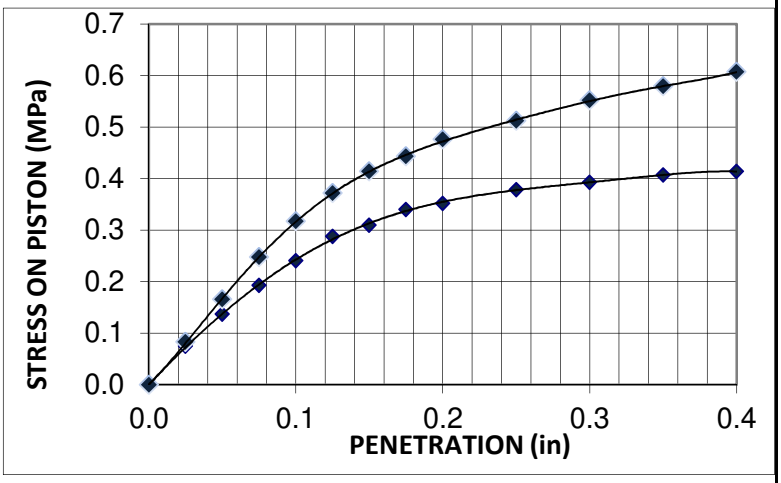
CLIENT:	AECOM 99 Commerce Drive Winnipeg, MB R3P 0Y7	PROJECT NO.:	112-2101
		TEST NO.:	1
ATTENTION:	Ryan Cunningham	DATE RECEIVED :	1-Mar-21
PROJECT:	2021-2022 University Crescent Pavement Renewals	DATE TESTED :	16-Mar-21
		TESTED BY:	ia

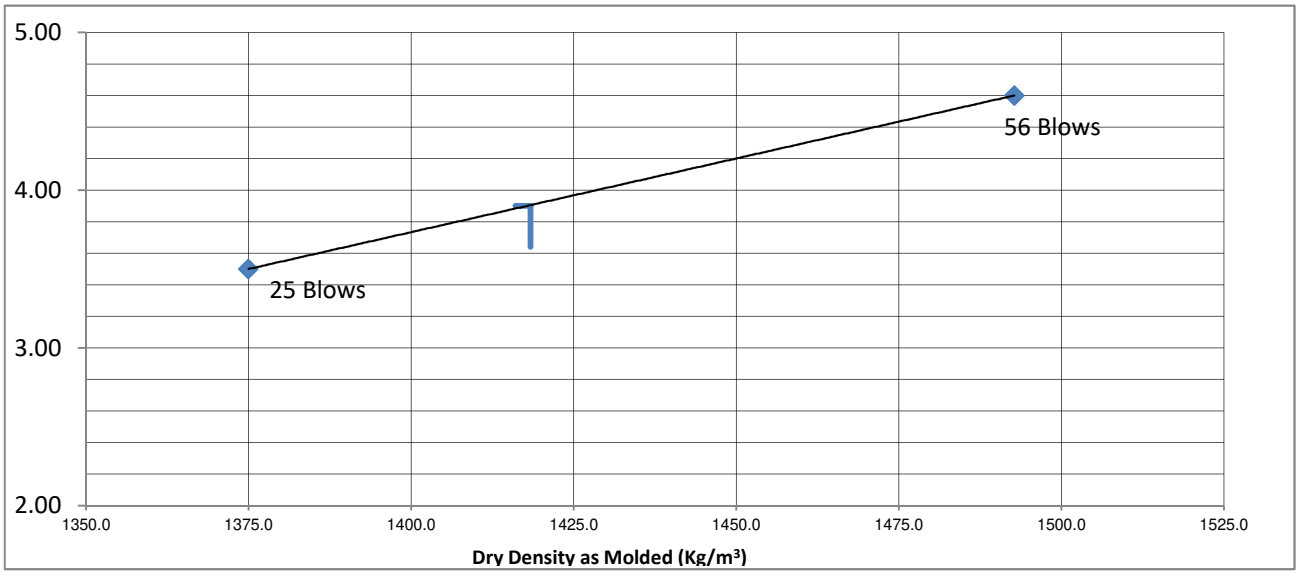
SAMPLE DATA	
Sample ID:	CLAY
Source:	TH1
Sampled by:	ET/PB
Optimum Moisture Content:	25.7%
Maximum Dry Density kg/m^3:	1493
Method of Compaction:	Standard Proctor
Proctor Tested by:	ia

SPECIMEN DATA		
DESCRIPTION	Before Soaking	After Testing
Moisture Content (MC), %	25.5	-
MC of top 25mm layer, %	-	40
Dry Density, kg/m^3	1496	
Compaction,%		
Surcharge Weight, grams	4506	
Swell, %	2.683	

DISPLACEMENT mm	DISPLACEMENT in	STRESS MPa 10 Blows	STRESS MPa 25 Blows	STRESS MPa 56 Blows
0	0		0.000	0.000
0.64	0.025		0.075	0.083
1.27	0.050		0.137	0.166
1.91	0.075		0.193	0.248
2.54	0.100		0.241	0.317
3.18	0.125		0.288	0.372
3.81	0.150		0.310	0.414
4.45	0.175		0.340	0.443
5.08	0.200		0.352	0.476
6.35	0.250		0.379	0.512
7.62	0.300		0.393	0.552
8.89	0.350		0.407	0.579
10.16	0.400		0.414	0.607

LOAD PENETRATION CURVE





CBR @ 95% MDD = 3.9

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MAXIMUM DRY DENSITY AND MOISTURE CONTENT - Proctor Method (ASTM D698)

CLIENT	AECOM Canada Ltd. 99 Commerce Drive Winnipeg, MB. R3P 0Y7	PROJECT NO.:	112-2101
		TEST NO.:	2
ATTENTION:	Ryan Cunningham		
PROJECT:	2021-2022 University Crescent Pavement Renewals		

Date Sampled	1-Mar-21	Date Received:	1-Mar-21
Sampled By:	ET/PB	Date Tested	16-Mar-21

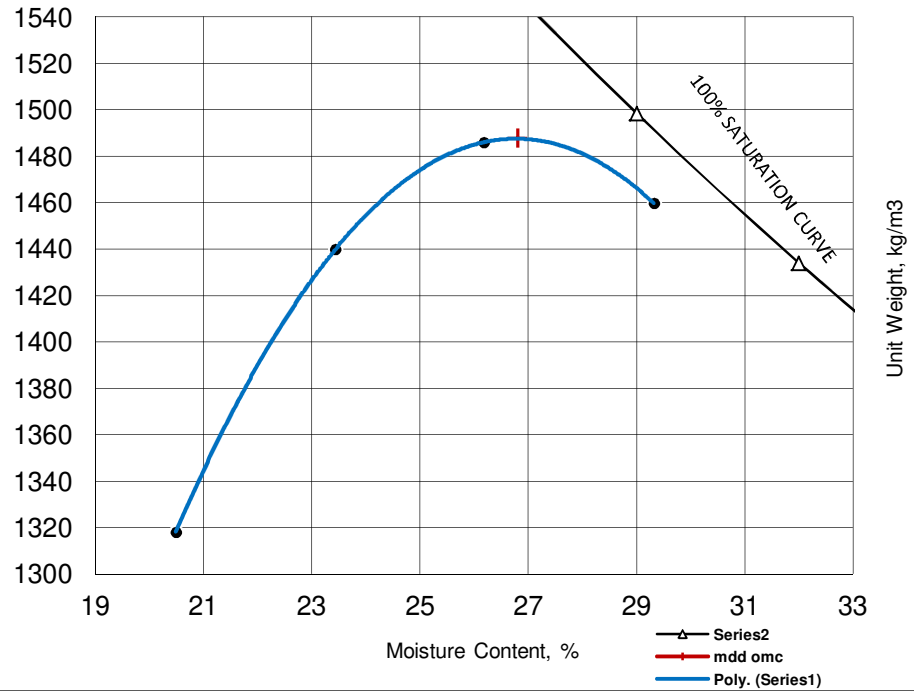
MATERIAL INFORMATION

Material Type:	Clay		
Material Use		Material Supplier	TH3
Maximum Size:	.	Material Source	

PROCEDURE	A
PREPARATION	Dry
COMPACTION METHOD	Manual
BLOWS PER LAYER	25
NO. OF LAYERS	3
MOLD SIZE	100
MOLD VOLUME	935
WEIGHT OF HAMMER	2.5 kg

Test No.	1	2	3	4	5
Wet Density	1588	1778	1875	1888	0
Moisture Content	20.5	23.4	26.2	29.3	0.0
Dry Density	1318	1440	1486	1460	0

Moisture - Density Relationship



Maximum Dry Density (MDD): 1488 kg/m³

Optimum Moisture Content 26.8 %

STONE CORRECTION (ASTM D 4718)

Retained on 4.75 mm sieve: 0 %

Corrected Moisture: 26.8 %

Corrected Maximum Dry Density: 1488 kg/m³

Remarks:

Tested by: ia

Reviewed By: Hermie Manalo

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CALIFORNIA BEARING RATIO (CBR) TEST - ASTM D 1883

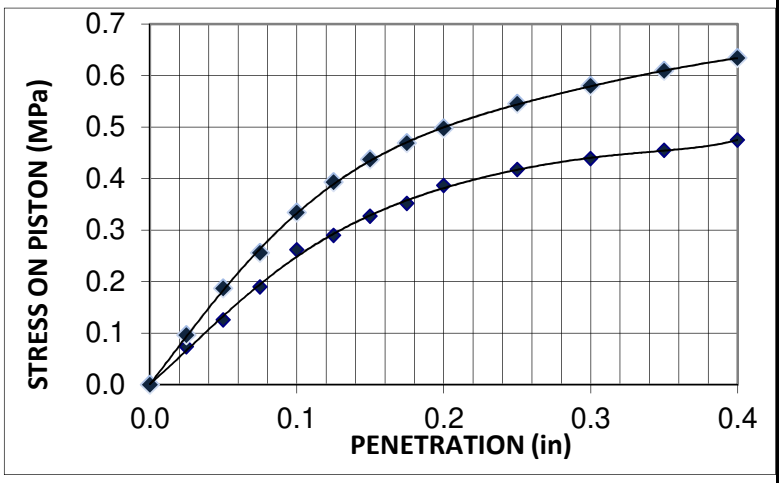
CLIENT:	AECOM 99 Commerce Drive Winnipeg, MB R3P 0Y7	PROJECT NO.:	112-2101
		TEST NO.:	2
ATTENTION:	Ryan Cunningham	DATE RECEIVED :	1-Mar-21
PROJECT:	2021-2022 University Crescent Pavement Renewals	DATE TESTED :	20-Mar-21
		TESTED BY:	ia

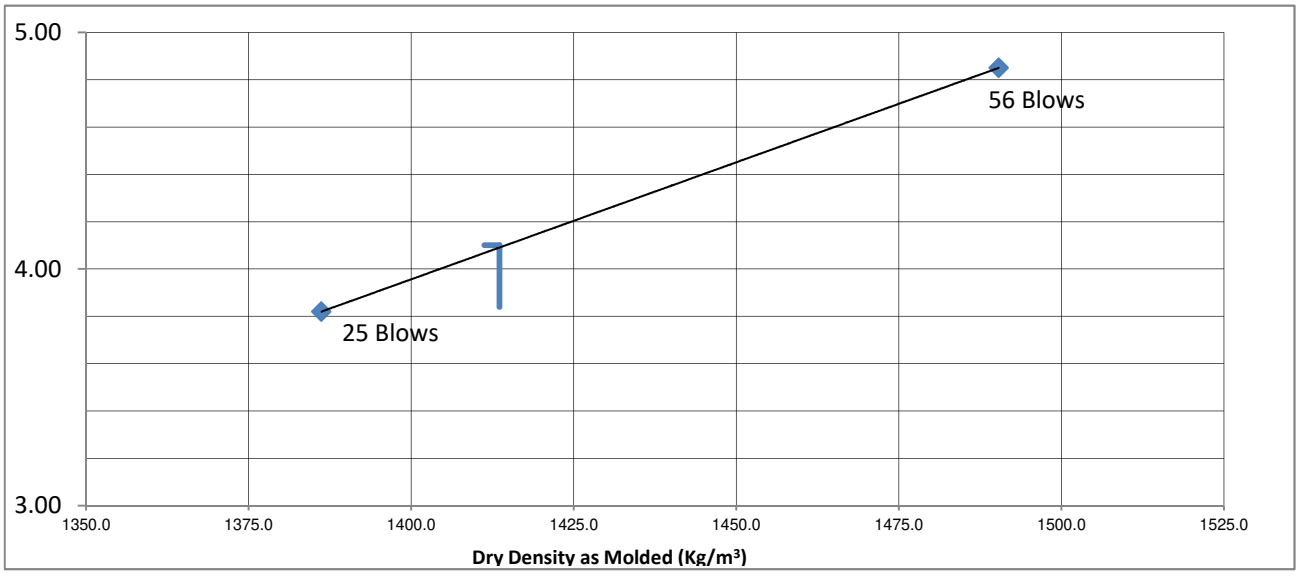
SAMPLE DATA	
Sample ID:	CLAY
Source:	TH 3
Sampled by:	ET/PB
Optimum Moisture Content:	26.8%
Maximum Dry Density kg/m^3:	1488
Method of Compaction:	Standard Proctor
Proctor Tested by:	ia

SPECIMEN DATA		
DESCRIPTION	Before Soaking	After Testing
Moisture Content (MC), %	27.0	-
MC of top 25mm layer, %	-	33.4
Dry Density, kg/m^3	1490	
Compaction,%		
Surcharge Weight, grams	4506	
Swell, %	2.378	

DISPLACEMENT mm	DISPLACEMENT in	STRESS MPa 10 Blows	25 Blows	56 Blows
0	0		0.000	0.000
0.64	0.025		0.074	0.096
1.27	0.050		0.126	0.187
1.91	0.075		0.190	0.256
2.54	0.100		0.262	0.334
3.18	0.125		0.290	0.393
3.81	0.150		0.327	0.437
4.45	0.175		0.352	0.469
5.08	0.200		0.387	0.497
6.35	0.250		0.418	0.545
7.62	0.300		0.439	0.580
8.89	0.350		0.455	0.609
10.16	0.400		0.475	0.634

LOAD PENETRATION CURVE





CBR @ 95% MDD = 4.1

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MAXIMUM DRY DENSITY AND MOISTURE CONTENT - Proctor Method (ASTM D698)

CLIENT	AECOM Canada Ltd.	PROJECT NO.:	112-2101
	99 Commerce Drive	TEST NO.:	3
	Winnipeg, MB. R3P 0Y7		
ATTENTION:	Ryan Cunningham		
PROJECT:	2021-2022 University Crescent Pavement Renewals		

Date Sampled	1-Mar-21	Date Received:	1-Mar-21
Sampled By:	ET/PB	Date Tested	16-Mar-21

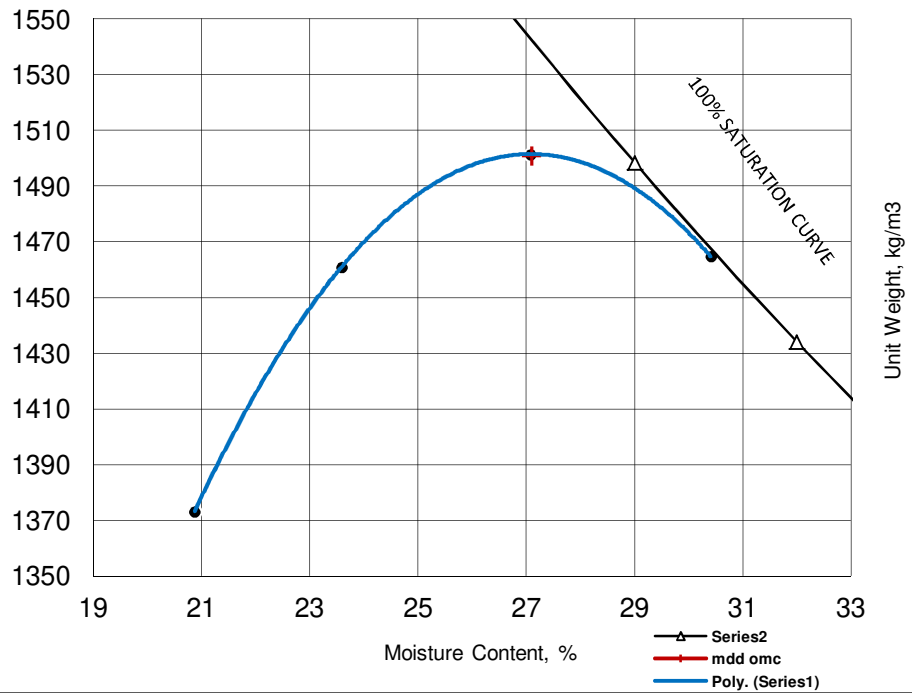
MATERIAL INFORMATION

Material Type:	Clay		
Material Use		Material Supplier	TH5
Maximum Size:	.	Material Source	

PROCEDURE	A
PREPARATION	Dry
COMPACTION METHOD	Manual
BLOWS PER LAYER	25
NO. OF LAYERS	3
MOLD SIZE	100
MOLD VOLUME	935
WEIGHT OF HAMMER	2.5 kg

Test No.	1	2	3	4	5
Wet Density	1660	1805	1908	1910	
Moisture Content	20.9	23.6	27.1	30.4	
Dry Density	1373	1461	1501	1465	

Moisture - Density Relationship



Maximum Dry Density (MDD): 1501 kg/m³

Optimum Moisture Content 27.1 %

STONE CORRECTION (ASTM D 4718)

Retained on 4.75 mm sieve: 0 %

Corrected Moisture: 27.1 %

Corrected Maximum Dry Density: 1501 kg/m³

Remarks:

Tested by: ia

Reviewed By: Hermie Manalo

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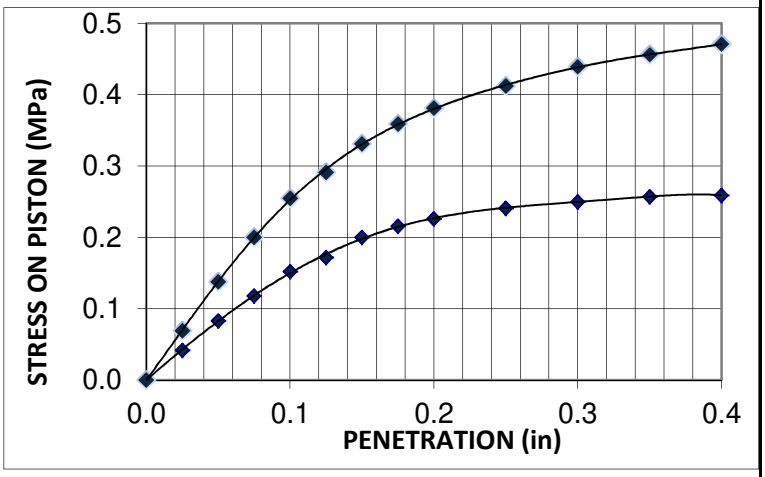
CALIFORNIA BEARING RATIO (CBR) TEST - ASTM D 1883

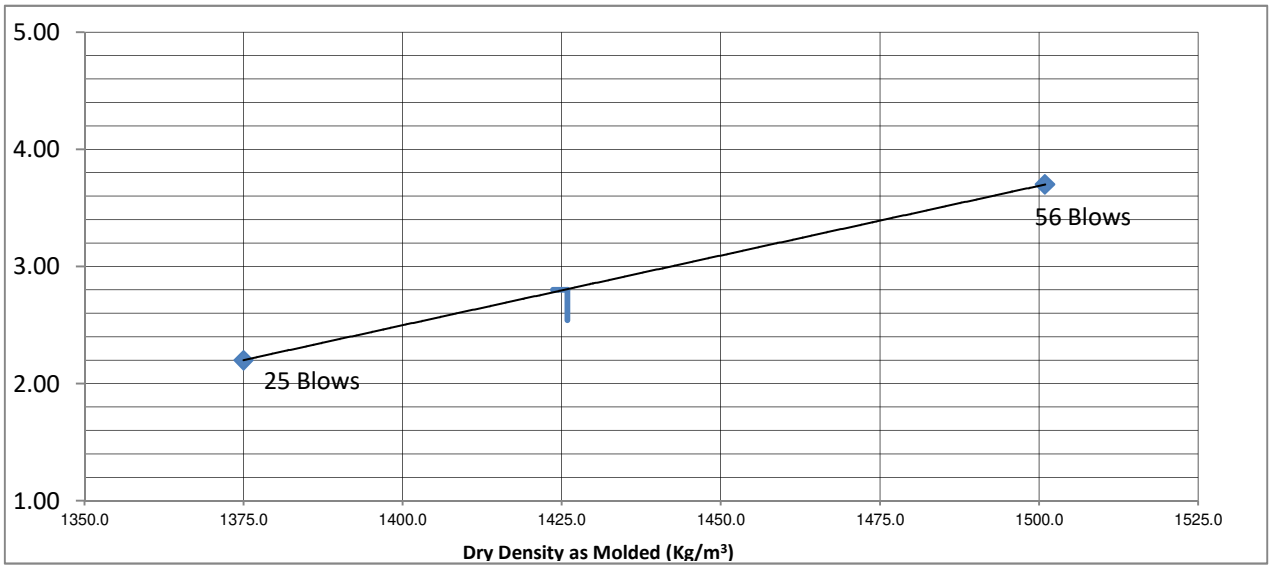
CLIENT:	AECOM 99 Commerce Drive Winnipeg, MB R3P 0Y7	PROJECT NO.: TEST NO.:	112-2101 3
ATTENTION:	Ryan Cunningham	DATE RECEIVED :	1-Mar-21
PROJECT:	2021-2022 University Crescent Pavement Renewals	DATE TESTED : TESTED BY:	20-Mar-21 ia

SAMPLE DATA		SPECIMEN DATA		
Sample ID:	**CLAY**	DESCRIPTION	Before Soaking	After Testing
Source:	TH 5	Moisture Content (MC), %	27.0	-
Sampled by:	ET/PB	MC of top 25mm layer, %	-	38.8
Optimum Moisture Content:	27.1%	Dry Density, kg/m^3	1505	
Maximum Dry Density kg/m^3:	1501	Compaction,%		
Method of Compaction:	Standard Proctor	Surcharge Weight, grams	4506	
Proctor Tested by:	ia	Swell, %	2.487	

DISPLACEMENT		STRESS MPa		
mm	in	10 Blows	25 Blows	56 Blows
0	0		0.000	0.000
0.64	0.025		0.042	0.069
1.27	0.050		0.083	0.138
1.91	0.075		0.118	0.200
2.54	0.100		0.152	0.255
3.18	0.125		0.172	0.291
3.81	0.150		0.200	0.331
4.45	0.175		0.216	0.359
5.08	0.200		0.226	0.381
6.35	0.250		0.241	0.412
7.62	0.300		0.250	0.439
8.89	0.350		0.257	0.456
10.16	0.400		0.259	0.471

LOAD PENETRATION CURVE





CBR @ 95% MDD = 2.8

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MAXIMUM DRY DENSITY AND MOISTURE CONTENT - Proctor Method (ASTM D698)

CLIENT	AECOM Canada Ltd. 99 Commerce Drive Winnipeg, MB. R3P 0Y7	PROJECT NO.:	112-2101
		TEST NO.:	4
ATTENTION:	Ryan Cunningham		
PROJECT:	2021-2022 University Crescent Pavement Renewals		

Date Sampled	1-Mar-21	Date Received:	1-Mar-21
Sampled By:	ET/PB	Date Tested	11-Mar-21

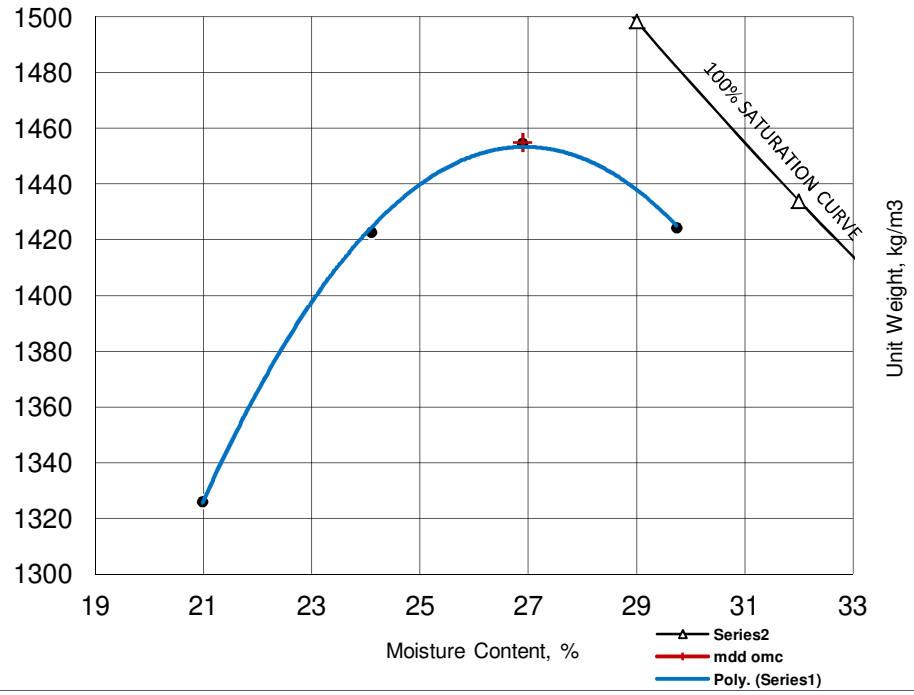
MATERIAL INFORMATION

Material Type:	Clay		
Material Use		Material Supplier	.
Maximum Size:	.	Material Source	TH 7

PROCEDURE	A
PREPARATION	Dry
COMPACTION METHOD	Manual
BLOWS PER LAYER	25
NO. OF LAYERS	3
MOLD SIZE	100
MOLD VOLUME	935
WEIGHT OF HAMMER	2.5 kg

Test No.	1	2	3	4	5
Wet Density	1604	1766	1846	1848	
Moisture Content	21.0	24.1	26.9	29.7	
Dry Density	1326	1423	1455	1425	

Moisture - Density Relationship



Maximum Dry Density (MDD):
1455 kg/m³
Optimum Moisture Content
26.9 %

STONE CORRECTION (ASTM D 4718)

Retained on 4.75 mm sieve:
0 %
Corrected Moisture:
26.9 %
Corrected Maximum Dry Density:
1455 kg/m³

Remarks:

Tested by: ia

Reviewed By: Hermie Manalo

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CALIFORNIA BEARING RATIO (CBR) TEST - ASTM D 1883

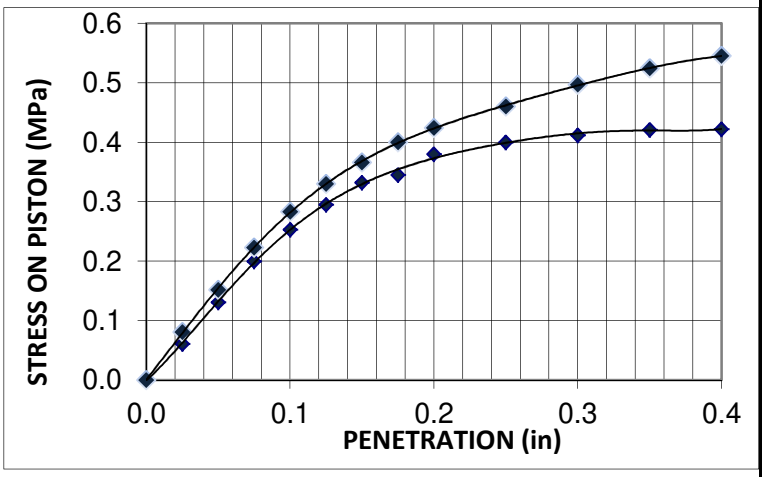
CLIENT:	AECOM 99 Commerce Drive Winnipeg, MB R3P 0Y7	PROJECT NO.:	112-2101
		TEST NO.:	4
ATTENTION:	Ryan Cunningham	DATE RECEIVED :	1-Mar-21
PROJECT:	2021-2022 University Crescent Pavement Renewals	DATE TESTED :	16-Mar-21
		TESTED BY:	

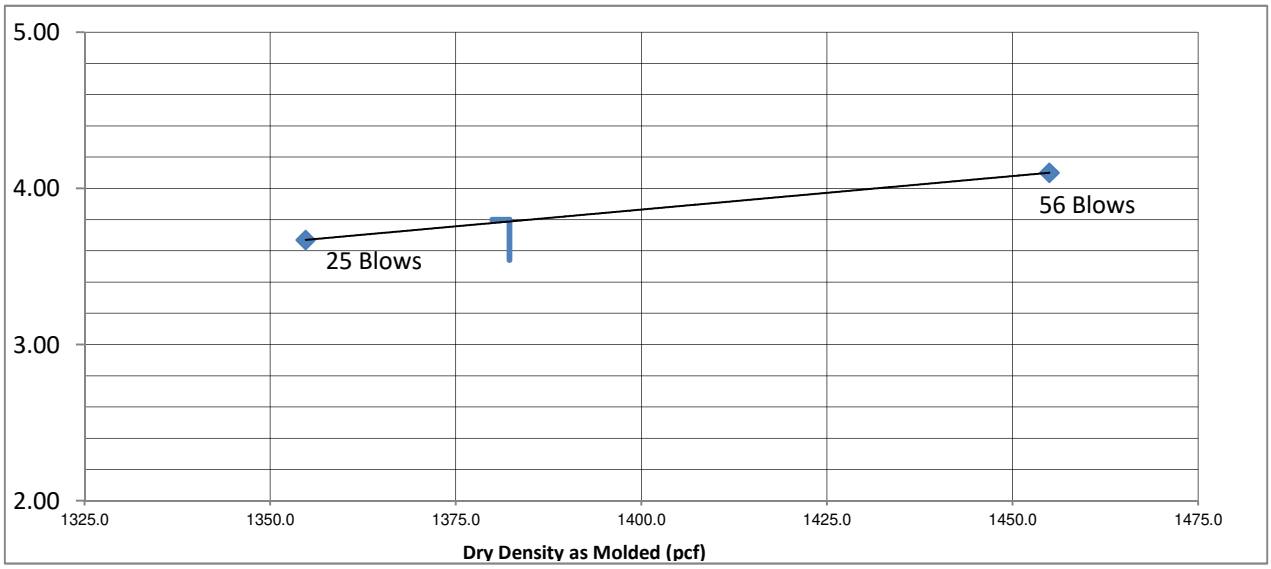
SAMPLE DATA	
Sample ID:	**CLAY**
Source:	TH 7
Sampled by:	ET/PB
Optimum Moisture Content:	26.9%
Maximum Dry Density kg/m^3:	1455
Method of Compaction:	Standard Proctor
Proctor Tested by:	ia

SPECIMEN DATA		
DESCRIPTION	Before Soaking	After Testing
Moisture Content (MC), %	27	-
MC of top 25mm layer, %	-	40.1
Dry Density, kg/m^3	1458	
Compaction,%		
Surcharge Weight, grams	4506	
Swell, %	2.727	

DISPLACEMENT mm	DISPLACEMENT in	STRESS MPa 10 Blows	25 Blows	56 Blows
0	0		0.000	0.000
0.64	0.025		0.061	0.081
1.27	0.050		0.131	0.152
1.91	0.075		0.200	0.223
2.54	0.100		0.253	0.283
3.18	0.125		0.295	0.330
3.81	0.150		0.332	0.366
4.45	0.175		0.345	0.400
5.08	0.200		0.380	0.424
6.35	0.250		0.400	0.460
7.62	0.300		0.412	0.497
8.89	0.350		0.421	0.524
10.16	0.400		0.422	0.545

LOAD PENETRATION CURVE





CBR @95% MDD - 3.8

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MAXIMUM DRY DENSITY AND MOISTURE CONTENT - Proctor Method (ASTM D698)

CLIENT	AECOM Canada Ltd. 99 Commerce Drive Winnipeg, MB. R3P 0Y7	PROJECT NO.:	112-2101
		TEST NO.:	5
ATTENTION:	Ryan Cunningham		
PROJECT:	2021-2022 University Crescent Pavement Renewals		

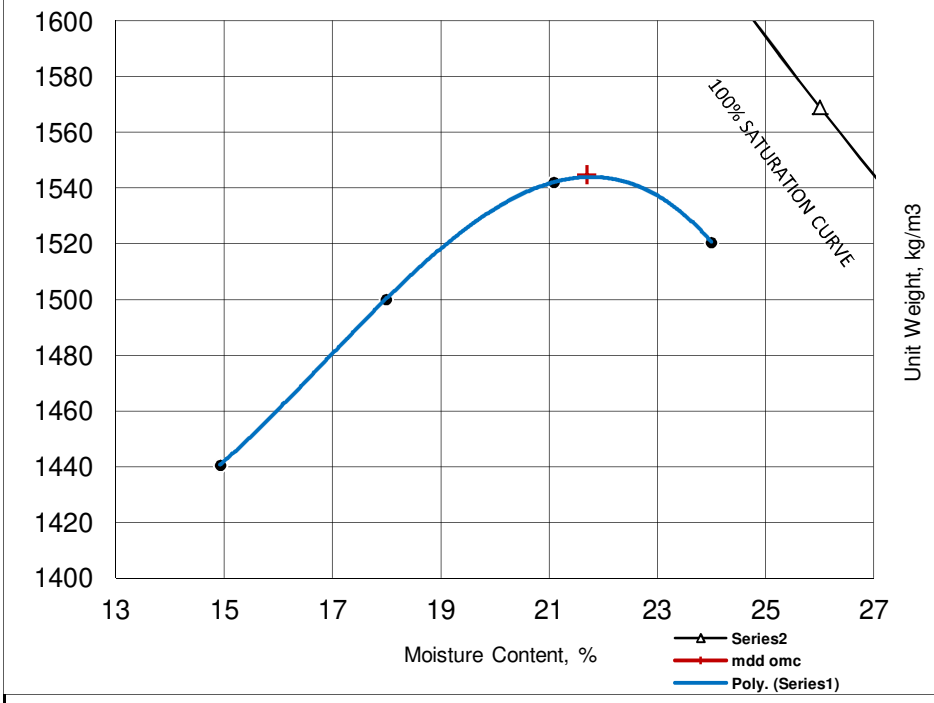
Date Sampled	1-Mar-21	Date Received:	1-Mar-21
Sampled By:	PB	Date Tested	11-Mar-21

MATERIAL INFORMATION

Material Type:	Clay		
Material Use		Material Supplier	TH 9
Maximum Size:	.	Material Source	

PROCEDURE	A
PREPARATION	Dry
COMPACTION METHOD	Manual
BLOWS PER LAYER	25
NO. OF LAYERS	3
MOLD SIZE	100
MOLD VOLUME	935
WEIGHT OF HAMMER	2.5 kg

Test No.	1	2	3	4	5
Wet Density	1656	1770	1867	1886	
Moisture Content	14.9	18.0	21.1	24.0	
Dry Density	1441	1500	1542	1521	



Maximum Dry Density (MDD): 1545 kg/m³

Optimum Moisture Content 21.7 %

STONE CORRECTION (ASTM D 4718)

Retained on 4.75 mm sieve: 0 %

Corrected Moisture: 21.7 %

Corrected Maximum Dry Density: 1545 kg/m³

Remarks:

Tested by: ia

Reviewed By: Hermie Manalo

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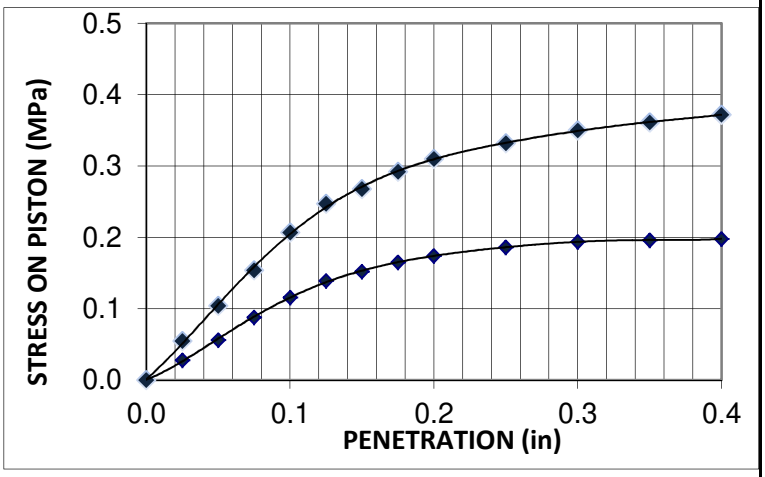
CALIFORNIA BEARING RATIO (CBR) TEST - ASTM D 1883

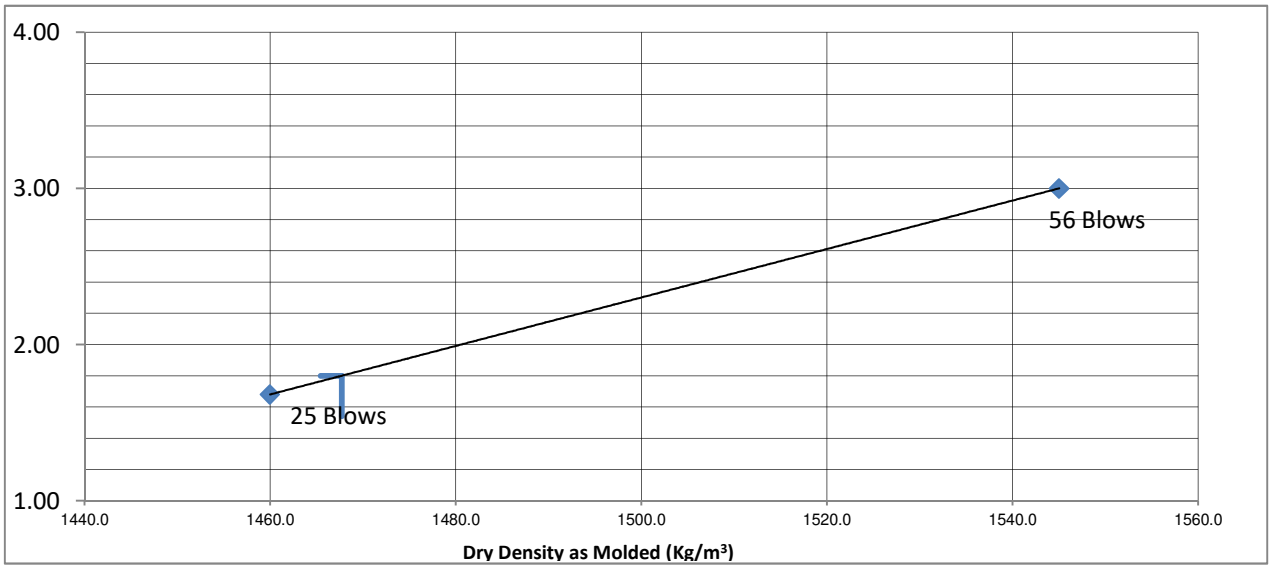
CLIENT:	AECOM 99 Commerce Drive Winnipeg, MB R3P 0Y7	PROJECT NO.: TEST NO.:	112-2101 5
ATTENTION:	Ryan Cunningham	DATE RECEIVED :	1-Mar-21
PROJECT:	2021-2022 University Crescent	DATE TESTED :	16-Mar-21
LOCATION	Pavement Renewals	TESTED BY:	IA/ET

SAMPLE DATA		SPECIMEN DATA		
Sample ID:	**CLAY**	DESCRIPTION	Before Soaking	After Testing
Source:	TH 9	Moisture Content (MC), %	21.9	-
Sampled by:	PB	MC of top 25mm layer, %	-	44
Optimum Moisture Content:	21.7%	Dry Density, kg/m^3	1545	
Maximum Dry Density kg/m^3:	1545	Compaction,%		
Method of Compaction:	Standard Proctor	Surcharge Weight, grams	4506	
Proctor Tested by:	IA	Swell, %	2.574	

DISPLACEMENT		STRESS MPa		
mm	in	10 Blows	25 Blows	56 Blows
0	0		0.000	0.000
0.64	0.025		0.028	0.055
1.27	0.050		0.056	0.104
1.91	0.075		0.088	0.154
2.54	0.100		0.116	0.207
3.18	0.125		0.139	0.247
3.81	0.150		0.152	0.268
4.45	0.175		0.165	0.292
5.08	0.200		0.174	0.310
6.35	0.250		0.186	0.332
7.62	0.300		0.194	0.350
8.89	0.350		0.196	0.361
10.16	0.400		0.198	0.372

LOAD PENETRATION CURVE





CBR @ 95% MDD = 1.8

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hmanalo@mts.net

MAXIMUM DRY DENSITY AND MOISTURE CONTENT - Proctor Method (ASTM D698)

CLIENT	AECOM Canada Ltd. 99 Commerce Drive Winnipeg, MB. R3P 0Y7	PROJECT NO.:	112-2101
		TEST NO.:	6
ATTENTION:	Ryan Cunningham		
PROJECT:	2021-2022 University Crescent Pavement Renewals		

Date Sampled	2-Mar-21	Date Received:	2-Mar-21
Sampled By:	ET/PB	Date Tested	16-Mar-21

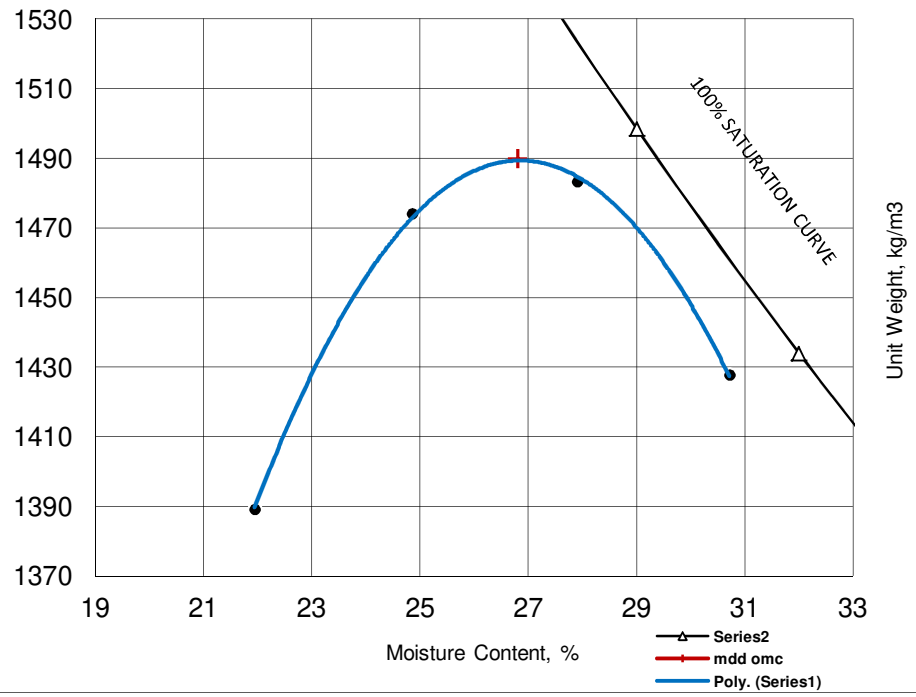
MATERIAL INFORMATION

Material Type:	Clay		
Material Use		Material Supplier	TH11
Maximum Size:	.	Material Source	

PROCEDURE	A
PREPARATION	Dry
COMPACTION METHOD	Manual
BLOWS PER LAYER	25
NO. OF LAYERS	3
MOLD SIZE	100
MOLD VOLUME	935
WEIGHT OF HAMMER	2.5 kg

Test No.	1	2	3	4	5
Wet Density	1694	1841	1897	1866	0
Moisture Content	21.9	24.9	27.9	30.7	0.0
Dry Density	1389	1474	1483	1428	0

Moisture - Density Relationship



Maximum Dry Density (MDD): 1490 kg/m³

Optimum Moisture Content 26.8 %

STONE CORRECTION (ASTM D 4718)

Retained on 4.75 mm sieve: 0 %

Corrected Moisture: 26.8 %

Corrected Maximum Dry Density: 1490 kg/m³

Remarks:

Tested by: ia

Reviewed By: Hermie Manalo

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CALIFORNIA BEARING RATIO (CBR) TEST - ASTM D 1883

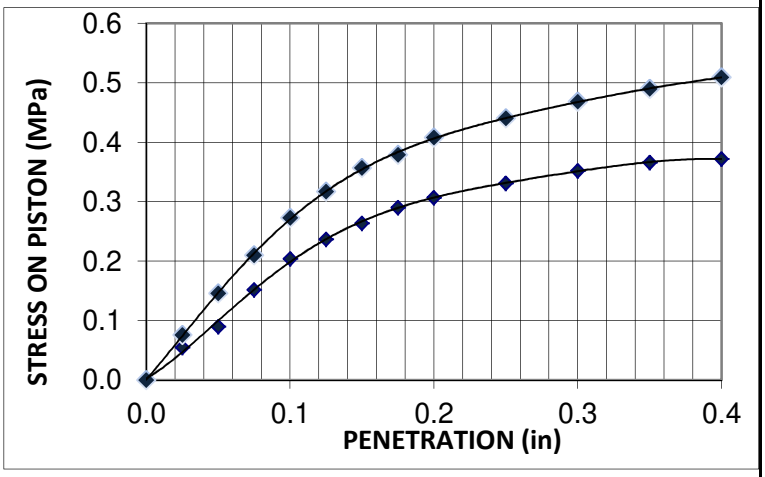
CLIENT:	AECOM 99 Commerce Drive Winnipeg, MB R3P 0Y7	PROJECT NO.: TEST NO.:	112-2101 6
ATTENTION:	Ryan Cunningham	DATE RECEIVED :	2-Mar-21
PROJECT:	2021-2022 University Crescent	DATE TESTED :	20-Mar-21
LOCATION	Pavement Renewals	TESTED BY:	ia

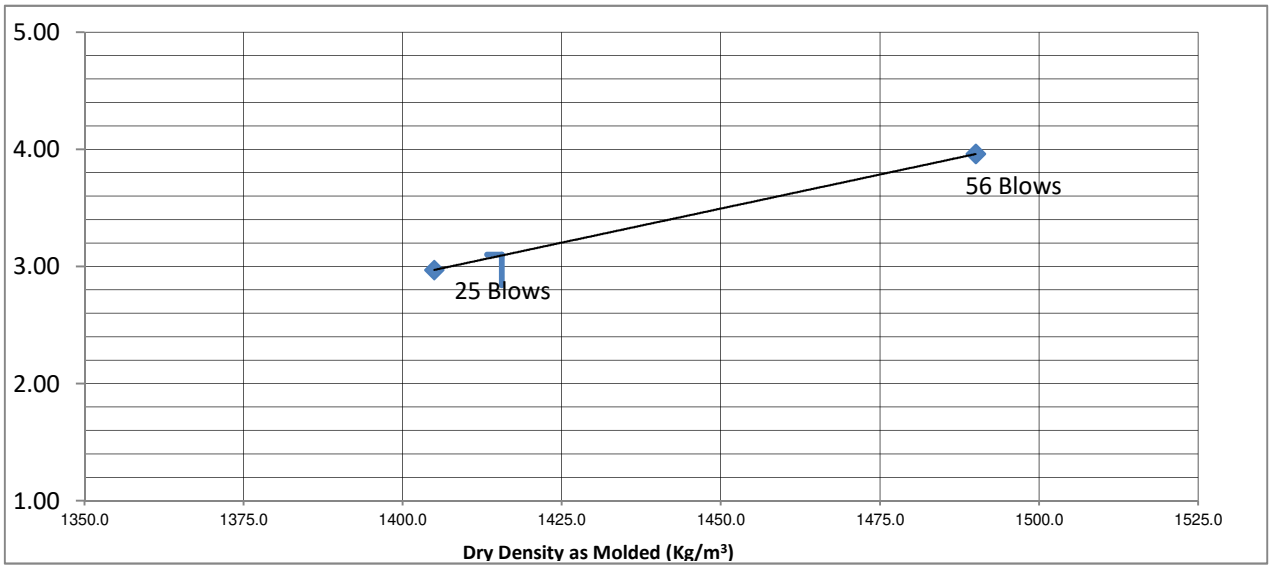
SAMPLE DATA	
Sample ID:	**CLAY**
Source:	TH 11
Sampled by:	ET/PB
Optimum Moisture Content:	26.8%
Maximum Dry Density kg/m^3:	1490
Method of Compaction:	Standard Proctor
Proctor Tested by:	ia

SPECIMEN DATA		
DESCRIPTION	Before Soaking	After Testing
Moisture Content (MC), %	27.0	-
MC of top 25mm layer, %	-	35.6
Dry Density, kg/m^3	1490	
Compaction,%		
Surcharge Weight, grams	4506	
Swell, %	2.400	

DISPLACEMENT mm	DISPLACEMENT in	STRESS MPa 10 Blows	25 Blows	56 Blows
0	0		0.000	0.000
0.64	0.025		0.055	0.076
1.27	0.050		0.090	0.146
1.91	0.075		0.152	0.210
2.54	0.100		0.204	0.273
3.18	0.125		0.237	0.317
3.81	0.150		0.264	0.357
4.45	0.175		0.290	0.379
5.08	0.200		0.307	0.408
6.35	0.250		0.331	0.440
7.62	0.300		0.352	0.468
8.89	0.350		0.366	0.490
10.16	0.400		0.372	0.509

LOAD PENETRATION CURVE





CBR @ 95% MDD = 3.1

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MAXIMUM DRY DENSITY AND MOISTURE CONTENT - Proctor Method (ASTM D698)

CLIENT	AECOM Canada Ltd. 99 Commerce Drive Winnipeg, MB. R3P 0Y7	PROJECT NO.:	112-2101
		TEST NO.:	7
ATTENTION:	Ryan Cunningham		
PROJECT:	2021-2022 University Crescent Pavement Renewals		

Date Sampled	2-Mar-21	Date Received:	2-Mar-21
Sampled By:	ET/PB	Date Tested	16-Mar-21

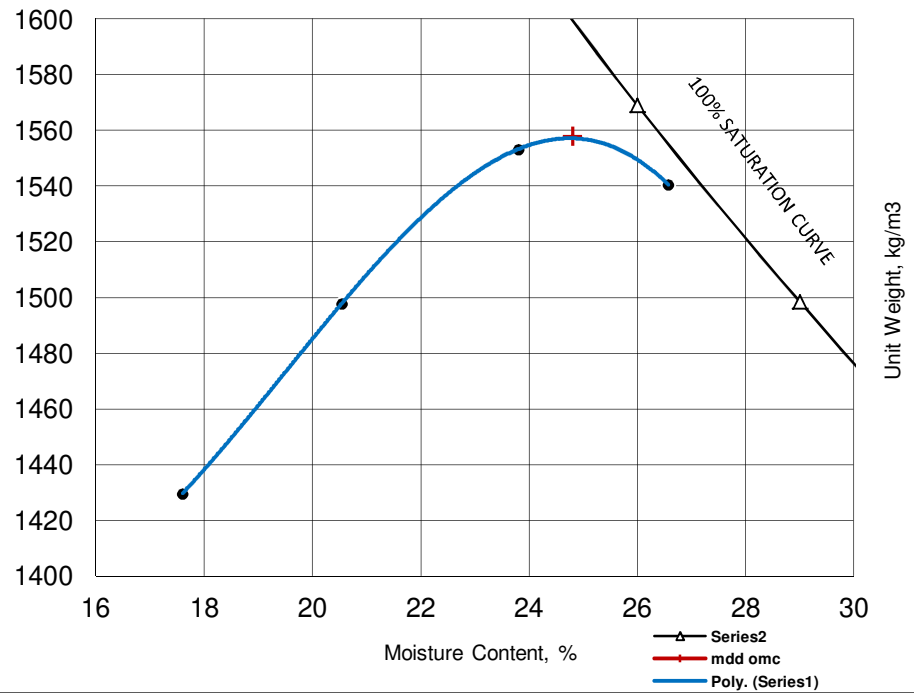
MATERIAL INFORMATION

Material Type:	Clay		
Material Use		Material Supplier	.
Maximum Size:	.	Material Source	TH 13

PROCEDURE	A
PREPARATION	Dry
COMPACTION METHOD	Manual
BLOWS PER LAYER	25
NO. OF LAYERS	3
MOLD SIZE	100
MOLD VOLUME	935
WEIGHT OF HAMMER	2.5 kg

Test No.	1	2	3	4	5
Wet Density	1681	1805	1923	1950	0
Moisture Content	17.6	20.5	23.8	26.6	0.0
Dry Density	1430	1498	1553	1540	0

Moisture - Density Relationship



Maximum Dry Density (MDD):
1558 kg/m³
Optimum Moisture Content
24.8 %

STONE CORRECTION (ASTM D 4718)

Retained on 4.75 mm sieve:
0 %
Corrected Moisture:
24.8 %
Corrected Maximum Dry Density:
1558 kg/m³

Remarks:

Tested by: ia

Reviewed By: Hermie Manalo

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CALIFORNIA BEARING RATIO (CBR) TEST - ASTM D 1883

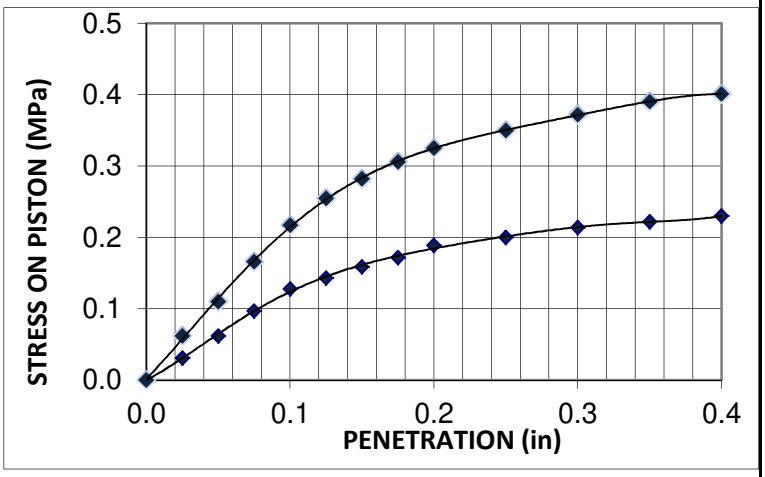
CLIENT:	AECOM 99 Commerce Drive Winnipeg, MB R3P 0Y7	PROJECT NO.: TEST NO.:	112-2101 7
ATTENTION:	Ryan Cunningham	DATE RECEIVED :	2-Mar-21
PROJECT:	2021-2022 University Crescent	DATE TESTED :	20-Mar-21
LOCATION	Pavement Renewals	TESTED BY:	IA

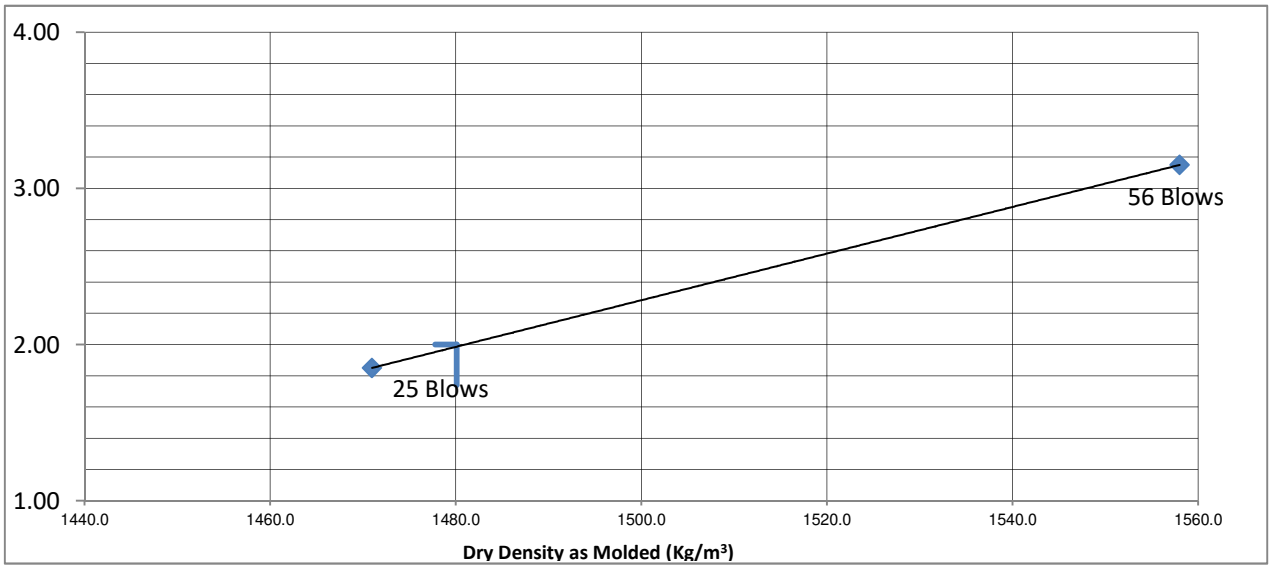
SAMPLE DATA	
Sample ID:	**CLAY**
Source:	TH 13
Sampled by:	ET/PB
Optimum Moisture Content:	24.8%
Maximum Dry Density kg/m^3:	1558
Method of Compaction:	Standard Proctor
Proctor Tested by:	IA

SPECIMEN DATA		
DESCRIPTION	Before Soaking	After Testing
Moisture Content (MC), %	24.6	-
MC of top 25mm layer, %	-	35.3
Dry Density, kg/m^3	1558	
Compaction,%		
Surcharge Weight, grams	4506	
Swell, %	2.334	

DISPLACEMENT mm	DISPLACEMENT in	STRESS MPa 10 Blows	25 Blows	56 Blows
0	0		0.000	0.000
0.64	0.025		0.031	0.062
1.27	0.050		0.062	0.110
1.91	0.075		0.097	0.166
2.54	0.100		0.128	0.217
3.18	0.125		0.143	0.255
3.81	0.150		0.159	0.282
4.45	0.175		0.172	0.306
5.08	0.200		0.189	0.325
6.35	0.250		0.200	0.350
7.62	0.300		0.214	0.372
8.89	0.350		0.222	0.390
10.16	0.400		0.230	0.401

LOAD PENETRATION CURVE





CBR @ 95% MDD = 2.0

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MAXIMUM DRY DENSITY AND MOISTURE CONTENT - Proctor Method (ASTM D698)

CLIENT	AECOM Canada Ltd. 99 Commerce Drive Winnipeg, MB. R3P 0Y7	PROJECT NO.:	112-2101
		TEST NO.:	8
ATTENTION:	Ryan Cunningham		
PROJECT:	2021-2022 University Crescent Pavement Renewals		

Date Sampled		Date Received:	
Sampled By:	PB	Date Tested	11-Mar-21

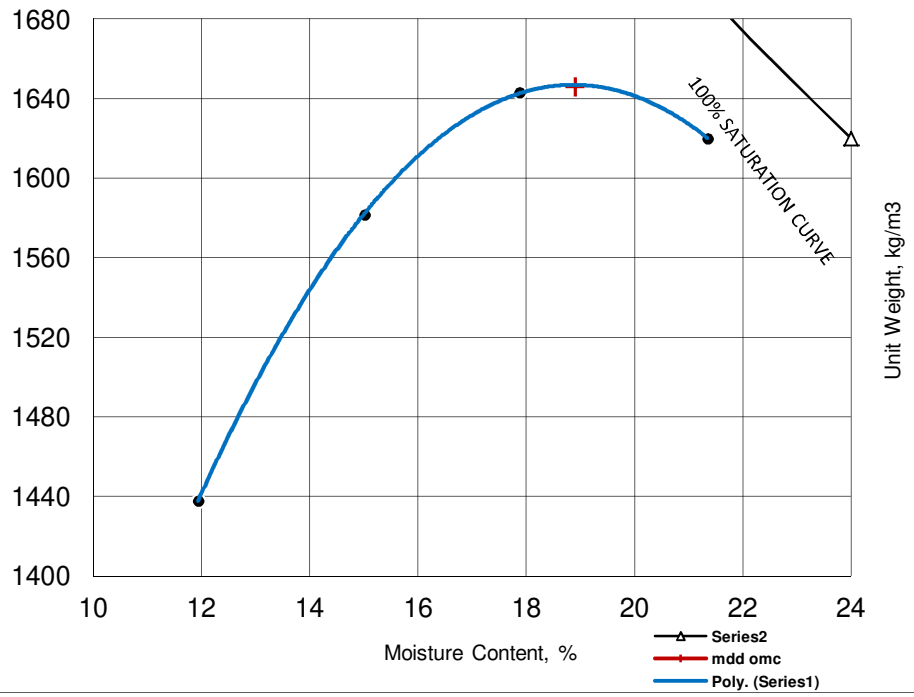
MATERIAL INFORMATION

Material Type:	Clay		
Material Use		Material Supplier	.
Maximum Size:	.	Material Source	TH15

PROCEDURE	A
PREPARATION	Dry
COMPACTION METHOD	Manual
BLOWS PER LAYER	25
NO. OF LAYERS	3
MOLD SIZE	100
MOLD VOLUME	935
WEIGHT OF HAMMER	2.5 kg

Test No.	1	2	3	4	5
Wet Density	1610	1819	1937	1966	
Moisture Content	11.9	15.0	17.9	21.4	
Dry Density	1438	1582	1643	1620	

Moisture - Density Relationship



Maximum Dry Density (MDD):
1646 kg/m³
Optimum Moisture Content
18.9 %

STONE CORRECTION (ASTM D 4718)

Retained on 4.75 mm sieve:
0 %
Corrected Moisture:
18.9 %
Corrected Maximum Dry Density:
1646 kg/m³

Remarks:

Tested by: ia

Reviewed By: Hermie Manalo

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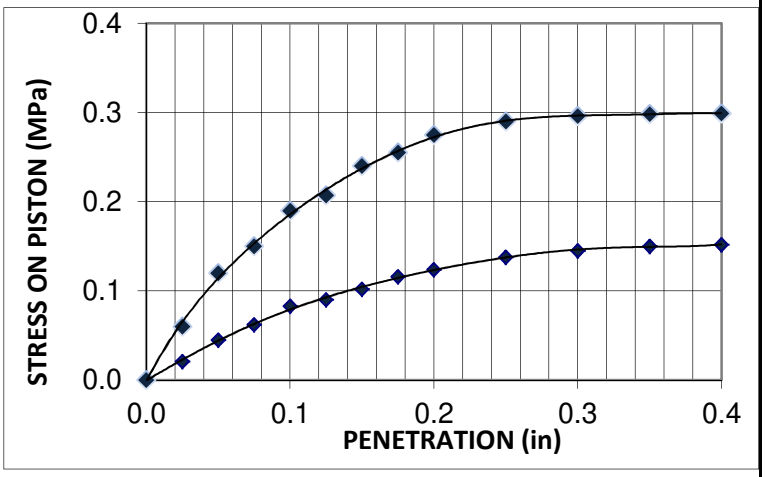
CALIFORNIA BEARING RATIO (CBR) TEST - ASTM D 1883

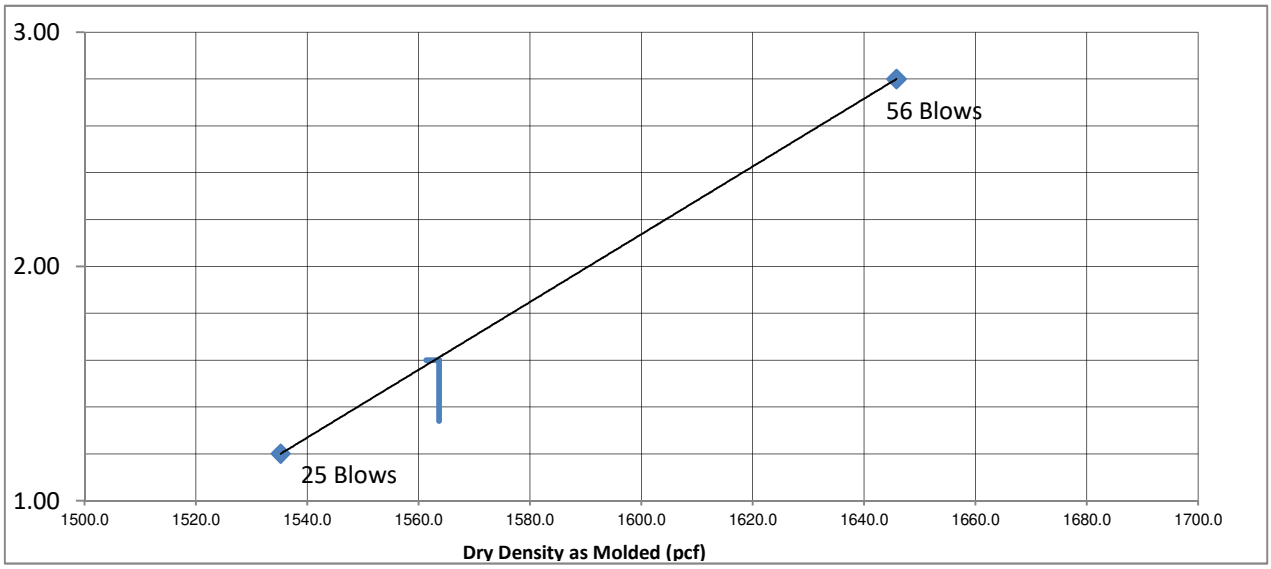
CLIENT:	AECOM 99 Commerce Drive Winnipeg, MB R3P 0Y7	PROJECT NO.:	112-2101
		TEST NO.:	8
ATTENTION:	Ryan Cunningham	DATE RECEIVED :	2-Mar-21
PROJECT:	2021-2022 University Crescent	DATE TESTED :	16-Mar-21
LOCATION	Pavement Renewals	TESTED BY:	IA

SAMPLE DATA		SPECIMEN DATA		
Sample ID:	**CLAY**	DESCRIPTION	Before Soaking	After Testing
Source:	TH 15	Moisture Content (MC), %	19	-
Sampled by:	PB	MC of top 25mm layer, %	-	23.6
Optimum Moisture Content:	18.9%	Dry Density, kg/m^3	1648	
Maximum Dry Density kg/m^3:	1646	Compaction,%		
Method of Compaction:	Standard Proctor	Surcharge Weight, grams	4506	
Proctor Tested by:	IA	Swell, %	2.312	

DISPLACEMENT		STRESS MPa		
mm	in	10 Blows	25 Blows	56 Blows
0	0		0.000	0.000
0.64	0.025		0.021	0.060
1.27	0.050		0.045	0.120
1.91	0.075		0.062	0.150
2.54	0.100		0.083	0.190
3.18	0.125		0.090	0.207
3.81	0.150		0.102	0.240
4.45	0.175		0.116	0.255
5.08	0.200		0.124	0.275
6.35	0.250		0.138	0.290
7.62	0.300		0.145	0.296
8.89	0.350		0.150	0.298
10.16	0.400		0.152	0.299

LOAD PENETRATION CURVE





CBR @95% MDD = 1.6

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MAXIMUM DRY DENSITY AND MOISTURE CONTENT - Proctor Method (ASTM D698)

CLIENT	AECOM Canada Ltd. 99 Commerce Drive Winnipeg, MB. R3P 0Y7	PROJECT NO.:	112-2101
		TEST NO.:	9
ATTENTION:	Ryan Cunningham		
PROJECT:	2021-2022 University Crescent Pavement Renewals		

Date Sampled	2-Mar-21	Date Received:	2-Mar-21
Sampled By:	ET/PB	Date Tested	16-Mar-21

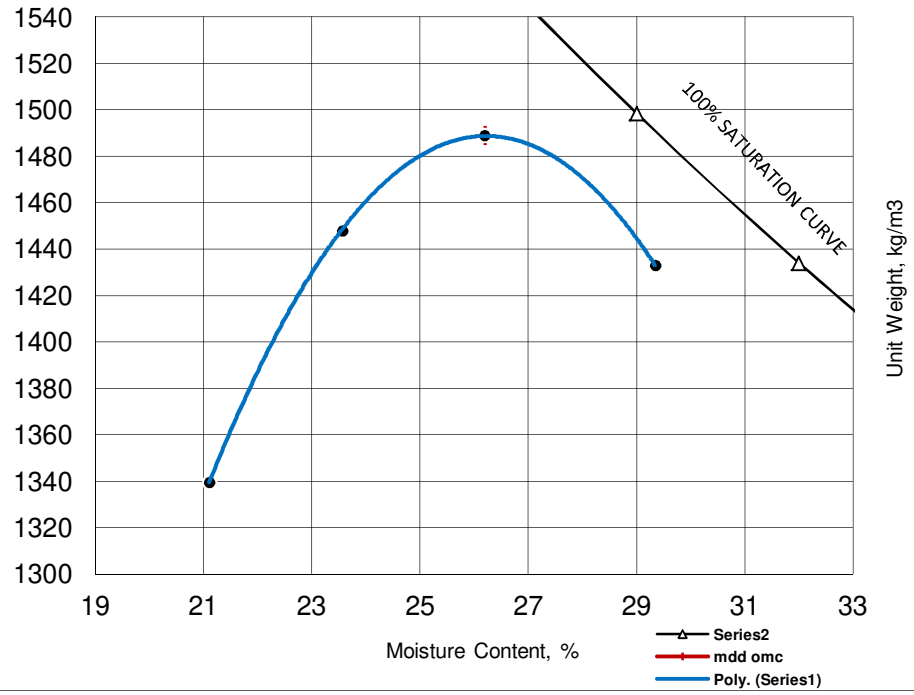
MATERIAL INFORMATION

Material Type:	Clay		
Material Use	-	Material Supplier	TH 16
Maximum Size:	-	Material Source	-

PROCEDURE	A
PREPARATION	Dry
COMPACTION METHOD	Manual
BLOWS PER LAYER	25
NO. OF LAYERS	3
MOLD SIZE	100
MOLD VOLUME	935
WEIGHT OF HAMMER	2.5 kg

Test No.	1	2	3	4	5
Wet Density	1622	1789	1879	1853	0
Moisture Content	21.1	23.6	26.2	29.3	0.0
Dry Density	1340	1448	1489	1433	0

Moisture - Density Relationship



Maximum Dry Density (MDD):
1489 kg/m³
Optimum Moisture Content
26.2 %

STONE CORRECTION (ASTM D 4718)

Retained on 4.75 mm sieve:
0 %
Corrected Moisture:
26.2 %
Corrected Maximum Dry Density:
1489 kg/m³

Remarks:

Tested by: ia

Reviewed By: Hermie Manalo

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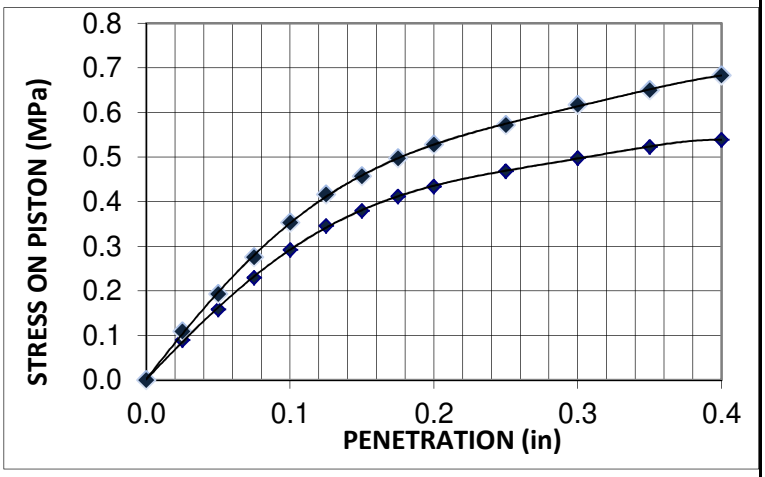
CALIFORNIA BEARING RATIO (CBR) TEST - ASTM D 1883

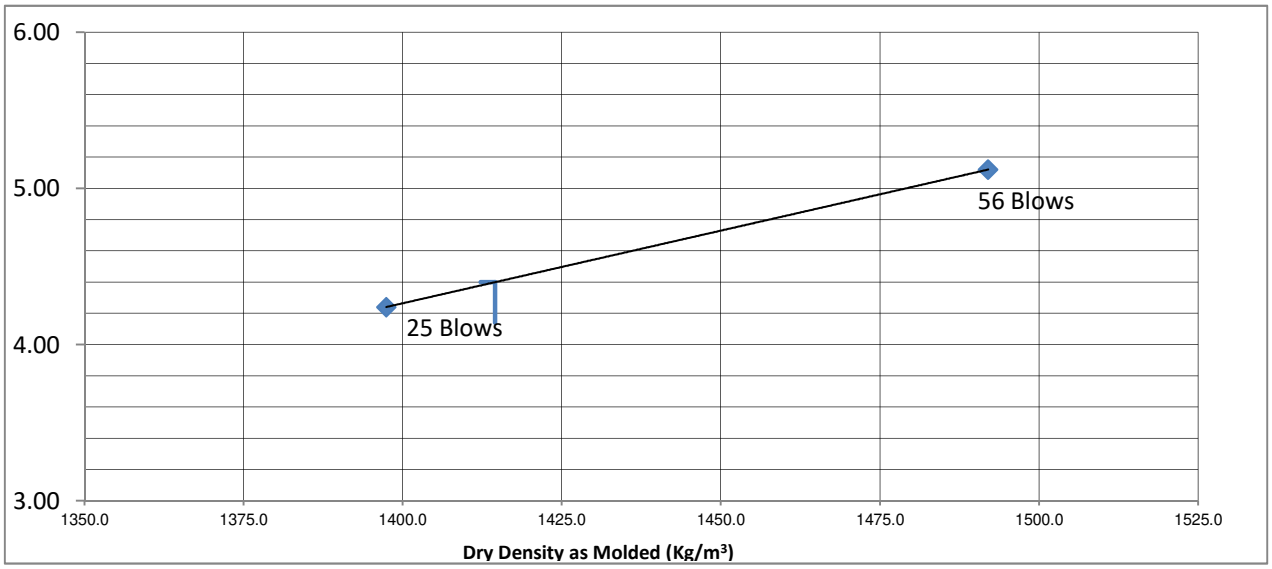
CLIENT:	AECOM 99 Commerce Drive Winnipeg, MB R3P 0Y7	PROJECT NO.: TEST NO.:	112-2101 9
ATTENTION:	Ryan Cunningham	DATE RECEIVED :	2-Mar-21
PROJECT:	2021-2022 University Crescent	DATE TESTED :	20-Mar-21
LOCATION	Pavement Renewals	TESTED BY:	IA

SAMPLE DATA		SPECIMEN DATA		
Sample ID:	**CLAY**	DESCRIPTION	Before Soaking	After Testing
Source:	TH 16	Moisture Content (MC), %	26.4	-
Sampled by:	ET/PB	MC of top 25mm layer, %	-	31.7
Optimum Moisture Content:	26.2%	Dry Density, kg/m^3	1492	
Maximum Dry Density kg/m^3:	1489	Compaction,%		
Method of Compaction:	Standard Proctor	Surcharge Weight, grams	4506	
Proctor Tested by:	ia	Swell, %	2.334	

DISPLACEMENT		STRESS		
mm	in	MPa		
		10 Blows	25 Blows	56 Blows
0	0		0.000	0.000
0.64	0.025		0.090	0.109
1.27	0.050		0.159	0.193
1.91	0.075		0.230	0.276
2.54	0.100		0.292	0.353
3.18	0.125		0.346	0.416
3.81	0.150		0.380	0.457
4.45	0.175		0.412	0.497
5.08	0.200		0.434	0.528
6.35	0.250		0.469	0.572
7.62	0.300		0.498	0.617
8.89	0.350		0.523	0.650
10.16	0.400		0.539	0.683

LOAD PENETRATION CURVE





CBR @ 95% MDD = 4.4

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MAXIMUM DRY DENSITY AND MOISTURE CONTENT - Proctor Method (ASTM D698)

CLIENT	AECOM Canada Ltd. 99 Commerce Drive Winnipeg, MB. R3P 0Y7	PROJECT NO.:	112-2101
		TEST NO.:	10
ATTENTION:	Ryan Cunningham		
PROJECT:	2021-2022 University Crescent Pavement Renewals		

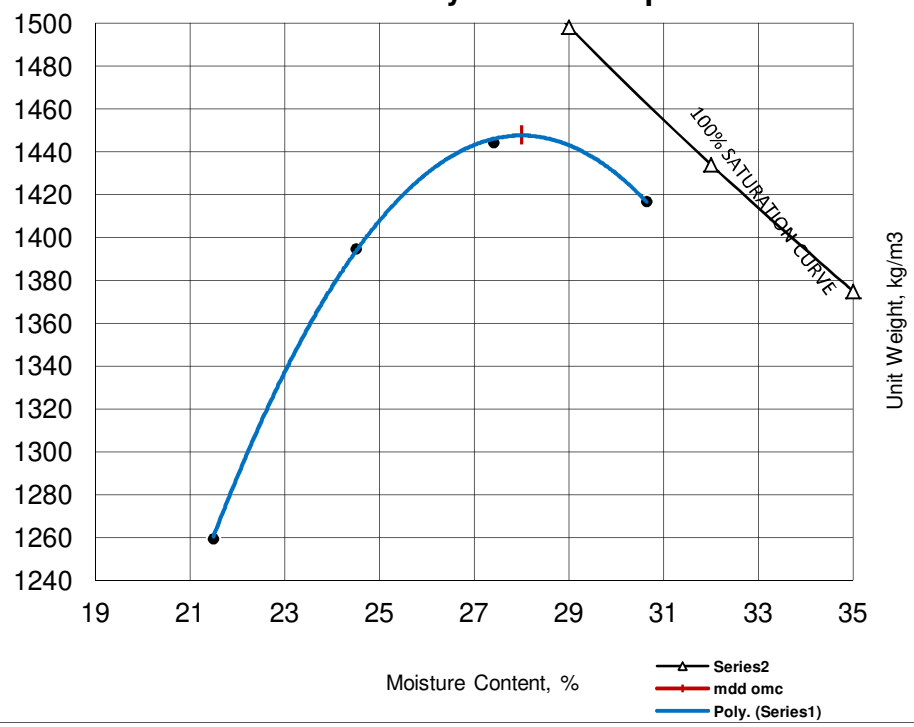
Date Sampled	2-Mar-21	Date Received:	2-Mar-21
Sampled By:	ET/PB	Date Tested	16-Mar-21

MATERIAL INFORMATION

Material Type:	Clay		
Material Use		Material Supplier	.
Maximum Size:	.	Material Source	TH 19

PROCEDURE	A
PREPARATION	Dry
COMPACTION METHOD	Manual
BLOWS PER LAYER	25
NO. OF LAYERS	3
MOLD SIZE	100
MOLD VOLUME	935
WEIGHT OF HAMMER	2.5 kg

Test No.	1	2	3	4	5
Wet Density	1530	1737	1841	1851	
Moisture Content	21.5	24.5	27.4	30.6	
Dry Density	1260	1395	1445	1417	



Maximum Dry Density (MDD): 1448 kg/m³

Optimum Moisture Content 28.0 %

STONE CORRECTION (ASTM D 4718)

Retained on 4.75 mm sieve: 0 %

Corrected Moisture: 28.0 %

Corrected Maximum Dry Density: 1448 kg/m³

Remarks:

Tested by: ia

Reviewed By: Hermie Manalo

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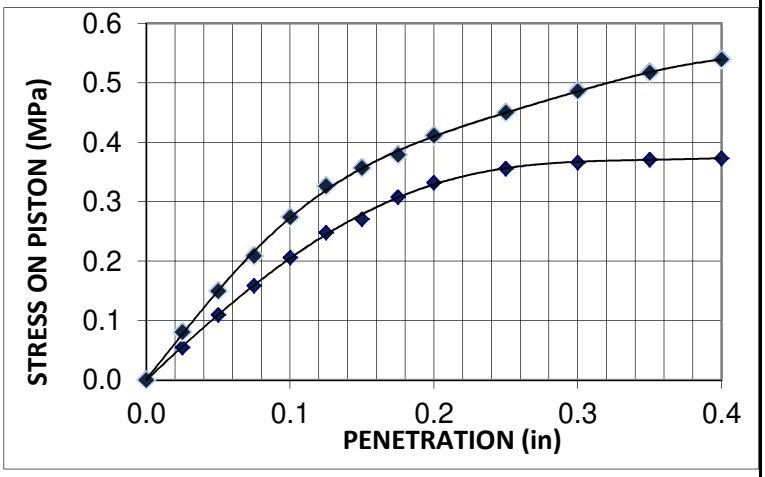
CALIFORNIA BEARING RATIO (CBR) TEST - ASTM D 1883

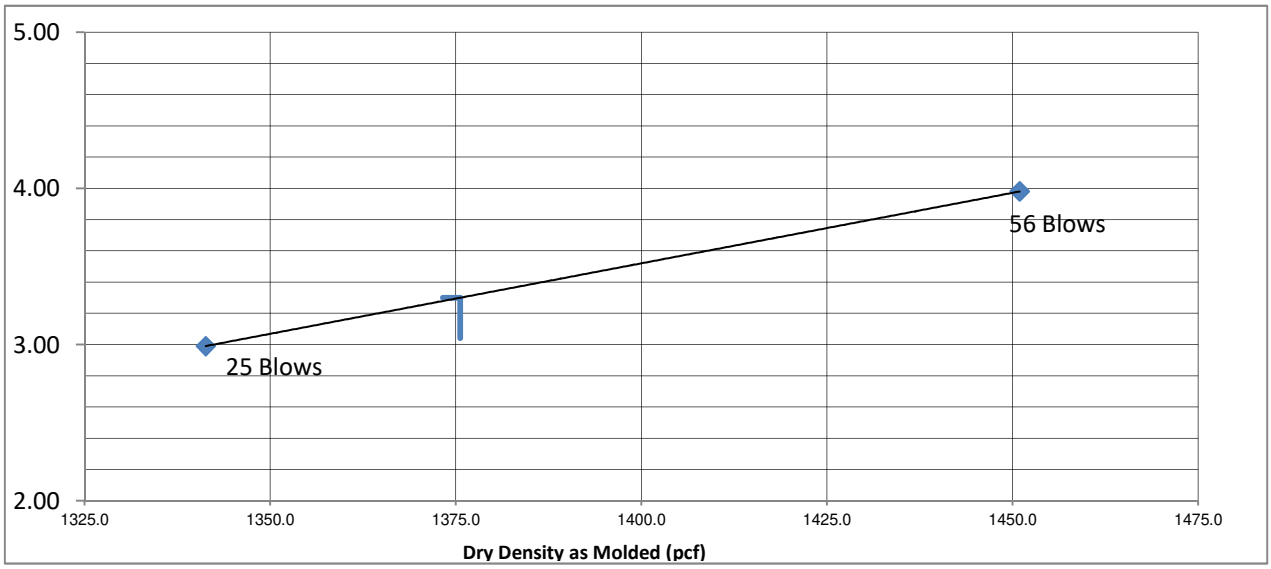
CLIENT:	AECOM 99 Commerce Drive Winnipeg, MB R3P 0Y7	PROJECT NO.: TEST NO.:	112-2101 10
ATTENTION:	Ryan Cunningham	DATE RECEIVED :	2-Mar-21
PROJECT:	2021-2022 University Crescent	DATE TESTED :	20-Mar-21
LOCATION	Pavement Renewals	TESTED BY:	IA

SAMPLE DATA		SPECIMEN DATA		
Sample ID:	**CLAY**	DESCRIPTION	Before Soaking	After Testing
Source:	TH/19	Moisture Content (MC), %	28	-
Sampled by:	PB	MC of top 25mm layer, %	-	38.4
Optimum Moisture Content:	28.0%	Dry Density, kg/m^3	1451	
Maximum Dry Density kg/m^3:	1448	Compaction,%		
Method of Compaction:	Standard Proctor	Surcharge Weight, grams	4506	
Proctor Tested by:	ia	Swell, %	2.640	

DISPLACEMENT		STRESS MPa		
mm	in	10 Blows	25 Blows	56 Blows
0	0		0.000	0.000
0.64	0.025		0.055	0.081
1.27	0.050		0.110	0.150
1.91	0.075		0.159	0.209
2.54	0.100		0.206	0.274
3.18	0.125		0.248	0.326
3.81	0.150		0.271	0.357
4.45	0.175		0.308	0.379
5.08	0.200		0.332	0.411
6.35	0.250		0.356	0.450
7.62	0.300		0.366	0.486
8.89	0.350		0.371	0.517
10.16	0.400		0.373	0.539

LOAD PENETRATION CURVE





CBR @95% MDD - 3.8