

APPENDIX 'A'

GEOTECHNICAL REPORT

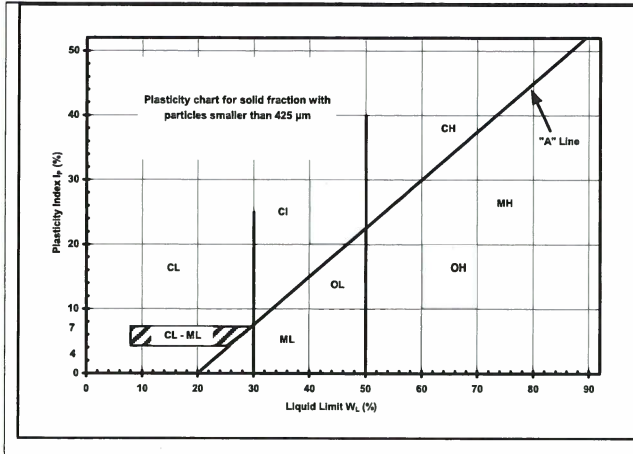
EXPLANATION OF FIELD & LABORATORY TEST DATA

Description		UMA Log Symbols	USCS Classification	Laboratory Classification Criteria					
				Fines (%)	Grading	Plasticity	Notes		
COARSE GRAINED SOILS	GRAVELS (More than 50% of coarse fraction of gravel size)	CLEAN GRAVELS (Little or no fines)	Well graded gravels, sandy gravels, with little or no fines		GW	0-5	$C_u > 4$ $1 < C_c < 3$	Dual symbols if 5-12% fines. Dual symbols if above "A" line and $4 < W_p < 7$ $C_u = \frac{D_{60}}{D_{10}}$ $C_c = \frac{(D_{30})^2}{D_{10} \times D_{60}}$	
			Poorly graded gravels, sandy gravels, with little or no fines		GP	0-5	Not satisfying GW requirements		
		DIRTY GRAVELS (With some fines)	Silty gravels, silty sandy gravels		GM	> 12			Atterberg limits below "A" line or $W_p < 4$
			Clayey gravels, clayey sandy gravels		GC	> 12			Atterberg limits above "A" line or $W_p < 7$
	SANDS (More than 50% of coarse fraction of sand size)	CLEAN SANDS (Little or no fines)	Well graded sands, gravelly sands, with little or no fines		SW	0-5	$C_u > 6$ $1 < C_c < 3$		
			Poorly graded sands, gravelly sands, with little or no fines		SP	0-5	Not satisfying SW requirements		
		DIRTY SANDS (With some fines)	Silty sands, sand-silt mixtures		SM	> 12			Atterberg limits below "A" line or $W_p < 4$
			Clayey sands, sand-clay mixtures		SC	> 12			Atterberg limits above "A" line or $W_p < 7$
FINE GRAINED SOILS	SILTS (Below 'A' line negligible organic content)	$W_L < 50$	Inorganic silts, silty or clayey fine sands, with slight plasticity		ML		Classification is Based upon Plasticity Chart		
		$W_L > 50$	Inorganic silts of high plasticity		MH				
	CLAYS (Above 'A' line negligible organic content)	$W_L < 30$	Inorganic clays, silty clays, sandy clays of low plasticity, lean clays		CL				
		$30 < W_L < 50$	Inorganic clays and silty clays of medium plasticity		CI				
		$W_L > 50$	Inorganic clays of high plasticity, fat clays		CH				
	ORGANIC SILTS & CLAYS (Below 'A' line)	$W_L < 50$	Organic silts and organic silty clays of low plasticity		OL				
		$W_L > 50$	Organic clays of high plasticity		OH				
	HIGHLY ORGANIC SOILS	Peat and other highly organic soils		Pt		Von Post Classification Limit		Strong colour or odour, and often fibrous texture	
	Asphalt		Till			AECOM			
	Concrete		Bedrock (Undifferentiated)						
	Fill		Bedrock (Limestone)						

When the above classification terms are used in this report or test hole logs, the designated fractions may be visually estimated and not measured.

NOT USED TO CLASSIFY SUBGRADE. REFER TO CITY OF WINNIPEG SPECIFICATIONS FOR GEOTECHNICAL INVESTIGATION REQUIREMENTS FOR PUBLIC WORKS PROJECTS (SEPTEMBER, 2015)

NOT USED TO CLASSIFY SUBGRADE. REFER TO CITY OF WINNIPEG SPECIFICATIONS FOR GEOTECHNICAL INVESTIGATION REQUIREMENTS FOR PUBLIC WORKS PROJECTS (SEPTEMBER, 2015)



FRACTION	SEIVE SIZE (mm)		DEFINING RANGES OF PERCENTAGE BY WEIGHT OF MINOR COMPONENTS	
	Passing	Retained	Percent	Identifier
Gravel	Coarse	76	19	35-50 and
	Fine	19	4.75	
Sand	Coarse	4.75	2.00	20-35 "y" or "ey" *
	Medium	2.00	0.425	
	Fine	0.425	0.075	
Silt (non-plastic) or Clay (plastic)	< 0.075 mm		10-20	some
			1-10	trace

* for example: gravelly, sandy clayey, silty

Definition of Oversize Material
COBBLES: 76mm to 300mm diameter
BOULDERS: >300mm diameter

LEGEND OF SYMBOLS

Laboratory and field tests are identified as follows:

- q_u - undrained shear strength (kPa) derived from unconfined compression testing.
- T_v - undrained shear strength (kPa) measured using a torvane
- p_p - undrained shear strength (kPa) measured using a pocket penetrometer.
- L_v - undrained shear strength (kPa) measured using a lab vane.
- F_v - undrained shear strength (kPa) measured using a field vane.
- γ - bulk unit weight (kN/m^3).
- SPT - Standard Penetration Test. Recorded as number of blows (N) from a 63.5 kg hammer dropped 0.76 m (free fall) which is required to drive a 51 mm O.D. Raymond type sampler 0.30 m into the soil.
- DPPT - Drive Point Pentrometer Test. Recorded as number of blows from a 63.5 kg hammer dropped 0.76 m (free fall) which is required to drive a 50 mm drive point 0.30 m into the soil.
- w - moisture content (W_L, W_P)

The undrained shear strength (S_u) of a cohesive soil can be related to its consistency as follows:

S_u (kPa)	CONSISTENCY
<12	very soft
12 - 25	soft
25 - 50	medium or firm
50 - 100	stiff
100 - 200	very stiff
200	hard

The resistance (N) of a non-cohesive soil can be related to compactness condition as follows

N - BLOWS/0.30 m	COMPACTNESS
0 - 4	very loose
4 - 10	loose
10 - 30	compact
30 - 50	dense
50	very dense

F2. SEWER TELEVISION GUIDELINES FOR PUBLIC WORKS PROJECTS (JANUARY 2009)

- F2.1 The Consultant is required to assess the extent of Closed Circuit Television (CCTV) inspection for all combined, wastewater, land drainage and storm relief sewers to confirm any sewer repairs required in the right-of-way within the limits of the street renewal.
- F2.2 The criteria provided are general guidelines and are not intended to replace sound municipal engineering judgement specific to the individual Project scope and/or location.
- F2.3 The available sewer televising information is contained within the City of Winnipeg's Sewer Management System (SMS) application.
- F2.4 Confirm televising requirements with Project Manager.
- F2.5 CCTV inspection general guidelines:
- (a) Confirm CCTV requirements with Water & Waste Department for sewers 1050 mm and larger in diameter;
 - (b) Televising if no previous CCTV inspections have been completed;
 - (c) Re-televising sewers in Categories A/B/C/X with a Structural Performance Grade (SPG) of 3 or higher that have not been televised in the previous 5 years;
 - (d) Sewers located more than two metres from the curb line (i.e. not located under pavement) do not need to be re-televised if previous CCTV inspection data exist. If a sewer repair or renewal requiring excavation is noted, contact the WWD;
 - (e) On all street reconstructions, regardless of location of the sewer (within the right-of-way);
 - (f) If the street exhibits obvious distress at/along the underground plant;
 - (g) Of all CB leads to be reused, as part of a street reconstruction or major rehabilitation.
- F2.6 For any uncertain situations and/or locations, contact the Project Manager.
- F2.7 The Consultant is required to coordinate the sewer-televising contract and communicate the results to the Water & Waste Department. Any repairs or other activities deemed necessary from these inspections must be coordinated with the Water & Waste Department.

F3. GEOTECHNICAL INVESTIGATION REQUIREMENTS FOR PUBLIC WORKS PROJECTS (OCTOBER 2008)

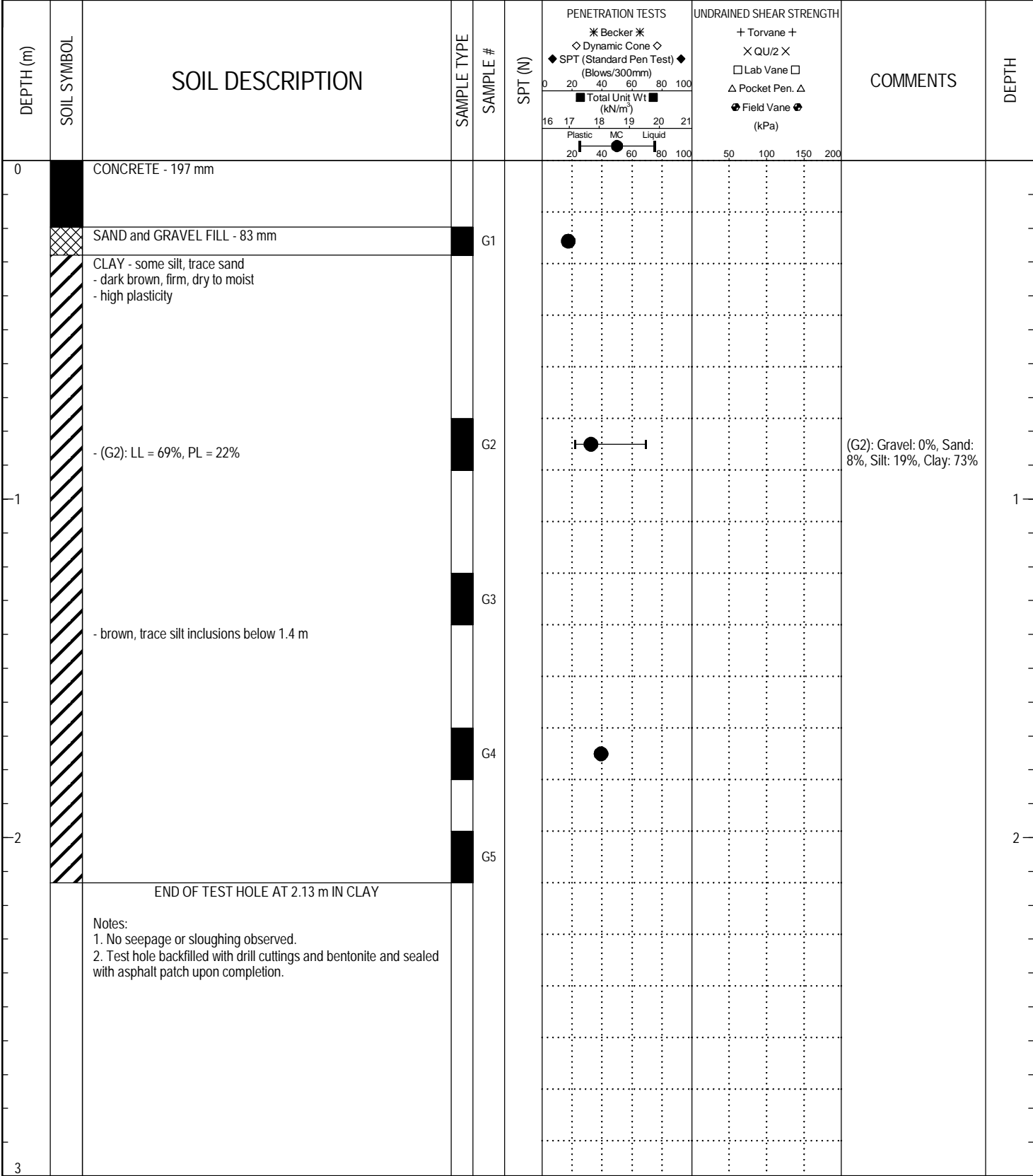
- F3.1 Fieldwork
- (a) Clear all underground services at each test-hole location.
 - (b) As this street project is greater than 500 metres, test holes may be taken every 100 m. More or fewer test-holes may be required depending upon Site conditions – confirm with the Project Manager.
 - (c) Record location of test-hole (offset from curb, distance from cross street and house number).
 - (d) Drill 150 mm-diameter cores in pavement.
 - (e) Drill 125 mm-diameter test-holes into fill materials and subgrade.
 - (f) If a service trench backfilled with granular materials is encountered, another hole shall be drilled to define the existing sub-surface conditions.
 - (g) Test-holes shall be drilled to depth of 2 m \pm 150 mm below surface of the pavement.
 - (h) Recover pavement core sample and representative samples of soil (fill materials, pavement structure materials and subgrade).
 - (i) Measure and record pavement section exposed in the test-hole (thickness of concrete or asphalt and different types of pavement structure materials).

- (j) Pavement structure materials to be identified as crushed limestone or granular fill and the maximum aggregate size of the material (20 mm, 50 mm or 150 mm).
- (k) Log soil profile for the subgrade.
- (l) Representative samples of soil must be obtained at the following depths below the bottom of the pavement structure materials – 0.1 m, 0.4 m, 0.7 m, 1.0 m, 1.3 m, 1.6 m, etc. Ensure a sample is obtained from each soil type encountered in the test-hole.
- (m) Make note of any water seepage into the test-hole.
- (n) Backfill test-hole with native materials and additional granular fill, if required. Patch pavement surface with hot mix asphalt or high strength durable concrete mix.
- (o) Return core sample from the pavement and soil samples to the laboratory.

F3.2 Lab Work

- (a) Test all soil samples for moisture content.
- (b) Photograph core samples recovered from the pavement surface.
- (c) Conduct tests for plasticity index and hydrometer analysis on selected soil samples which are between 0.5 m and 1 m below top of pavement (this is the sub-grade on which the pavement and sub-base will be built). The selection will be based upon visual classification and moisture content test results, with a minimum of one sample of each soil type per street to be tested.
- (d) Prepare test-hole logs and classify subgrade (based on hydrometer) as follows:
 - < 30% silt - classify as clay
 - 30% - 50% silt - classify as silty clay
 - 50% - 70% silt - classify as clayey silt
 - > 70% silt - classify as silt
- (e) For any uncertain situations and/or locations, or clarification of these requirements, contact the Project Manager.

PROJECT: Industrial Streets - Package 530-2017.1	CLIENT: City of Winnipeg	TESTHOLE NO: TH17-01
LOCATION: Saulteaux Crescent, N leg, south lane, 14U - 0624967 m E, 5528762 m N		PROJECT NO.: 60556452
CONTRACTOR: Maple Leaf Drilling Ltd.	METHOD: Truck-mounted B40, 125 mm SSA	ELEVATION (m): N/A
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	



LOG OF TEST HOLE BOREHOLE LOGS TC REV1.GPJ UMA WINN.GDT 12/15/17



LOGGED BY: Tessa Christi	COMPLETION DEPTH: 2.13 m
REVIEWED BY: Elliott Drumright	COMPLETION DATE: 10/26/17
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

PROJECT: Industrial Streets - Package 530-2017.1	CLIENT: City of Winnipeg	TESTHOLE NO: TH17-02
LOCATION: Saulteaux Crescent, N leg, south lane, 14U - 0625086 m E, 5528758 m N		PROJECT NO.: 60556452
CONTRACTOR: Maple Leaf Drilling Ltd.	METHOD: Truck-mounted B40, 125 mm SSA	ELEVATION (m): N/A
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TESTS		UNDRAINED SHEAR STRENGTH		COMMENTS	DEPTH
						* Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) ■ Total Unit Wt (kN/m³)	+ Torvane + × QU/2 × □ Lab Vane □ △ Pocket Pen. △ ● Field Vane ●				
0		CONCRETE - 171 mm									
		SAND and GRAVEL FILL - 83 mm		G8							
		SILT - sandy, trace clay - light brown, soft to firm, dry to moist - low plasticity		G9							
				G10							
				G11							
		CLAY - some silt - brown, firm, moist - high plasticity		G12							
				G13							
				G14							
		END OF TEST HOLE AT 2.13 m IN CLAY									
		Notes: 1. No seepage or sloughing observed during drilling. 2. Test hole backfilled with drill cuttings and bentonite and sealed with asphalt patch upon completion.									

LOG OF TEST HOLE BOREHOLE LOGS TC REV1.GPJ UMA WINN.GDT 12/15/17



LOGGED BY: Tessa Christi	COMPLETION DEPTH: 2.13 m
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PROJECT ENGINEER: Kevin Rae	Page 1 of 1

PROJECT: Industrial Streets - Package 530-2017.1	CLIENT: City of Winnipeg	TESTHOLE NO: TH17-03
LOCATION: Saulteaux Crescent, E leg, east lane, 14U - 0625129 m E, 5528659 m N		PROJECT NO.: 60556452
CONTRACTOR: Maple Leaf Drilling Ltd.	METHOD: Truck-mounted B40, 125 mm SSA	ELEVATION (m): N/A
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TESTS		UNDRAINED SHEAR STRENGTH	COMMENTS	DEPTH
						* Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) ■ Total Unit Wt (kN/m³)	+ Torvane + × QU/2 × □ Lab Vane □ △ Pocket Pen. △ ● Field Vane ● (kPa)			
0		CONCRETE - 203 mm								
		SAND and GRAVEL FILL - 102 mm		G15						
		CLAY and SILT - trace to some sand - dark grey to black, soft to firm, dry to moist - intermediate to high plasticity		G16						
		SILT - sandy, trace clay - light brown, soft to firm, dry to moist - low plasticity		G17						
		CLAY - silty - brown, firm to stiff, dry to moist - high plasticity		G18						
		SILT - sandy, trace clay - light brown, soft to firm, dry to moist - low plasticity		G19						
		CLAY - some silt - brown, firm to stiff, dry to moist - high plasticity		G20						
		CLAY - some silt - brown, firm to stiff, dry to moist - high plasticity		G21						
		END OF TEST HOLE AT 2.13 m IN CLAY								
		Notes: 1. No seepage or sloughing observed during drilling. 2. Test hole backfilled with drill cuttings and bentonite and sealed with asphalt patch upon completion.								

LOG OF TEST HOLE BOREHOLE LOGS TC REV1.GPJ UMA WINN.GDT 12/15/17



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PROJECT: Industrial Streets - Package 530-2017.1	CLIENT: City of Winnipeg	TESTHOLE NO: TH17-04
LOCATION: Saulteaux Crescent, E leg, west lane, 14U - 0625134 m E, 5528593 m N		PROJECT NO.: 60556452
CONTRACTOR: Maple Leaf Drilling Ltd.	METHOD: Truck-mounted B40, 125 mm SSA	ELEVATION (m): N/A
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TESTS	UNDRAINED SHEAR STRENGTH	COMMENTS	DEPTH
0		CONCRETE - 127 mm							
		SAND and GRAVEL FILL - 101 mm		G22					
		SAND - silty, clayey - dark brown, soft to firm, dry to moist - intermediate plasticity - (G23): LL = 33%, PL = 14%		G23	40			(G23): Gravel: 0%, Sand: 41%, Silt: 30%, Clay: 29%	
		SILT - sandy, trace clay - light brown, soft, dry to moist - low plasticity - wet below 0.9 m		G24					
				G25	50				
		CLAY - some silt, trace sand - dark brown, firm to stiff, dry to moist - high plasticity - trace silt inclusions < 2 mm diam.		G26					
				G27	60				
				G28					
		END OF TEST HOLE AT 2.13 m IN CLAY							
		Notes: 1. No seepage or sloughing observed during drilling. 2. Test hole backfilled with drill cuttings and bentonite and sealed with asphalt patch upon completion.							

LOG OF TEST HOLE BOREHOLE LOGS TC REV1.GPJ UMA WINN.GDT 12/15/17



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PROJECT: Industrial Streets - Package 530-2017.1	CLIENT: City of Winnipeg	TESTHOLE NO: TH17-05
LOCATION: Saulteaux Crescent, S leg, south lane, 14U - 0625062 m E, 5528538 m N		PROJECT NO.: 60556452
CONTRACTOR: Maple Leaf Drilling Ltd.	METHOD: Truck-mounted B40, 125 mm SSA	ELEVATION (m): N/A
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TESTS		UNDRAINED SHEAR STRENGTH		COMMENTS	DEPTH
						* Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) Total Unit Wt (kN/m³)	+ Torvane + X QU/2 X □ Lab Vane □ △ Pocket Pen. △ ● Field Vane ● (kPa)				
0		CONCRETE - 210 mm									
		SAND and GRAVEL FILL - 120 mm		G29	●						
		CLAY - some silt, some sand - dark grey to black, soft to firm, dry to moist - high plasticity (G30): LL = 61%, PL = 19%		G30	●					(G30): Gravel: 0%, Sand: 13%, Silt: 28%, Clay: 59%	
		SILT - sandy, trace to some clay - bluish grey, soft to firm, dry to moist - low plasticity		G31	●						
				G32							
		CLAY - some silt - brown, firm to stiff, dry to moist - high plasticity		G33							
				G34	●						
				G35							
		END OF TEST HOLE AT 2.13 m IN CLAY									
		Notes: 1. No seepage or sloughing observed during drilling. 2. Test hole backfilled with drill cuttings and bentonite and sealed with asphalt patch upon completion.									

LOG OF TEST HOLE BOREHOLE LOGS TC REV1.GPJ UMA WINN.GDT 12/15/17



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PROJECT: Industrial Streets - Package 530-2017.1	CLIENT: City of Winnipeg	TESTHOLE NO: TH17-06
LOCATION: Saulteaux Crescent, S leg, north lane, 14U - 0624965 m E, 5528554 m N		PROJECT NO.: 60556452
CONTRACTOR: Maple Leaf Drilling Ltd.	METHOD: Truck-mounted B40, 125 mm SSA	ELEVATION (m): N/A
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TESTS	UNDRAINED SHEAR STRENGTH	COMMENTS	DEPTH
0		CONCRETE - 205 mm							
		SAND and GRAVEL FILL - 100 mm		G36					
		CLAY and SILT - trace sand - dark grey to black, firm, dry to moist - intermediate to high plasticity		G37					
		CLAY - some silt - dark brown, firm to stiff, dry to moist - high plasticity - silt inclusions < 2 mm diam. - (G38): LL = 70%, PL = 19%		G38					
				G39					
				G40					
		- dark brown below 1.5 m		G41					
				G42					
		END OF TEST HOLE AT 2.13 m IN CLAY							
		Notes: 1. No seepage or sloughing observed during drilling. 2. Test hole backfilled with drill cuttings and bentonite and sealed with asphalt patch upon completion.							

LOG OF TEST HOLE BOREHOLE LOGS TC REV1.GPJ UMA WINN.GDT 12/15/17



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PROJECT: Industrial Streets - Package 530-2017.1	CLIENT: City of Winnipeg	TESTHOLE NO: TH17-07
LOCATION: Saskatchewan Avenue, N curb lane, 14U - 0624957 m E, 5529271 m N		PROJECT NO.: 60556452
CONTRACTOR: Maple Leaf Drilling Ltd.	METHOD: Truck-mounted B40, 125 mm SSA	ELEVATION (m): N/A
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TESTS		UNDRAINED SHEAR STRENGTH		COMMENTS	DEPTH
						* Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) ■ Total Unit Wt (kN/m³)	+ Torvane + × QU/2 × □ Lab Vane □ △ Pocket Pen. △ ● Field Vane ● (kPa)				
0		CONCRETE - 205 mm									
		SAND and GRAVEL FILL - 125 mm		G50	45						
		CLAY and SILT - trace to some sand, trace gravel - dark greyish black, firm to stiff, dry to moist - high plasticity		G51							
		(G52): LL = 72%, PL = 25%		G52	55						
				G53							
		CLAY - some silt - brown, firm to stiff, dry to moist - high plasticity		G54							
				G55	55						
				G56							
		END OF TEST HOLE AT 2.13 m IN CLAY									
		Notes: 1. No seepage or sloughing observed during drilling. 2. Test hole backfilled with drill cuttings and bentonite and sealed with asphalt patch upon completion.									

LOG OF TEST HOLE BOREHOLE LOGS TC REV1.GPJ UMA WINN.GDT 12/15/17



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PROJECT: Industrial Streets - Package 530-2017.1	CLIENT: City of Winnipeg	TESTHOLE NO: TH17-08
LOCATION: Saskatchewan Avenue, 2nd lane from S curb, 14U - 0625018 m E, 5529279 m N		PROJECT NO.: 60556452
CONTRACTOR: Maple Leaf Drilling Ltd.	METHOD: Truck-mounted B40, 125 mm SSA	ELEVATION (m): N/A
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TESTS		UNDRAINED SHEAR STRENGTH		COMMENTS	DEPTH
						* Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) Total Unit Wt (kN/m³)	+ Torvane + X QU/2 X □ Lab Vane □ △ Pocket Pen. △ ● Field Vane ● (kPa)				
0		CONCRETE - 205 mm									
		SAND and GRAVEL FILL - 90 mm		G43							
		CLAY and SILT - trace to some sand - dark grey to black, firm to stiff, dry to moist - intermediate to high plasticity		G44							
				G45							
				G46							
		SILT - sandy, some clay - light brown, soft, dry to moist - low to intermediate plasticity		G47							
		CLAY - some silt - brown, firm to stiff, dry to moist - high plasticity - silt inclusions < 2 mm diam. - silt laminations < 2 mm thick		G48							
				G49							
		END OF TEST HOLE AT 2.13 m IN CLAY									
		Notes: 1. No seepage or sloughing observed during drilling. 2. Test hole backfilled with drill cuttings and bentonite and sealed with asphalt patch upon completion.									

LOG OF TEST HOLE BOREHOLE LOGS TC REV1.GPJ UMA WINN.GDT 12/15/17



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PROJECT: Industrial Streets - Package 530-2017.1	CLIENT: City of Winnipeg	TESTHOLE NO: TH17-09
LOCATION: Saskatchewan Avenue, 2nd lane from N curb, 14U - 0625115 m E, 5529288 m N		PROJECT NO.: 60556452
CONTRACTOR: Maple Leaf Drilling Ltd.	METHOD: Truck-mounted B40, 125 mm SSA	ELEVATION (m): N/A
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TESTS		UNDRAINED SHEAR STRENGTH		COMMENTS	DEPTH
						Blows/300mm	Total Unit Wt (kN/m ³)	+	(kPa)		
0		CONCRETE - 255 mm									
		SAND and GRAVEL FILL - 305 mm		G57							
		SAND (Fill) - gravelly, some silt, trace clay - brown, soft, dry to moist - low plasticity - (G58): LL = 15%, PL = 9%		G58	1					(G58): Gravel: 25%, Sand: 53%, Silt: 18%, Clay: 4%	
				G59							
		CLAY - some silt, trace gravel - dark brown, firm, dry to moist - high plasticity - silt laminations < 2 mm thick		G60	1						
				G61							
				G62	1						
		- brown below 1.8 m		G63							
		END OF TEST HOLE AT 2.13 m IN CLAY									
		Notes: 1. No seepage or sloughing observed during drilling. 2. Test hole backfilled with drill cuttings and bentonite and sealed with asphalt patch upon completion.									

LOG OF TEST HOLE BOREHOLE LOGS TC REV1.GPJ UMA WINN.GDT 12/15/17



LOGGED BY: Tessa Christi	COMPLETION DEPTH: 2.13 m
REVIEWED BY: Elliott Drumright	COMPLETION DATE: 10/26/17
PROJECT ENGINEER: Kevin Rae	Page 1 of 1

PROJECT: Industrial Streets - Package 530-2017.1	CLIENT: City of Winnipeg	TESTHOLE NO: TH17-10
LOCATION: Saskatchewan Avenue, S curb lane, 14U - 0625299 m E, 5529326 m N		PROJECT NO.: 60556452
CONTRACTOR: Maple Leaf Drilling Ltd.	METHOD: Truck-mounted B40, 125 mm SSA	ELEVATION (m): N/A
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TESTS	UNDRAINED SHEAR STRENGTH	COMMENTS	DEPTH
0		CONCRETE - 205 mm							
		SAND and GRAVEL FILL - 305 mm		G71					
		SAND and CLAY - silty, trace gravel - dark brown, soft to firm, dry to moist - intermediate to high plasticity		G72					
				G73					
		CLAY - some silt - dark brown, firm to stiff, dry to moist - high plasticity		G74					
				G75					
				G76					
				G77					
		END OF TEST HOLE AT 2.13 m IN CLAY							
		Notes: 1. No seepage or sloughing observed during drilling. 2. Test hole backfilled with drill cuttings and bentonite and sealed with asphalt patch upon completion.							

LOG OF TEST HOLE BOREHOLE LOGS TC REV1.GPJ UMA WINN.GDT 12/15/17



LOGGED BY: Tessa Christi	COMPLETION DEPTH: 2.13 m
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PROJECT: Industrial Streets - Package 530-2017.1	CLIENT: City of Winnipeg	TESTHOLE NO: TH17-11
LOCATION: Fife Street, E curb lane, 14U - 0631525 m E, 5533604 m N		PROJECT NO.: 60556452
CONTRACTOR: Maple Leaf Drilling Ltd.	METHOD: Truck-mounted B40, 125 mm SSA	ELEVATION (m): N/A
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TESTS		UNDRAINED SHEAR STRENGTH	COMMENTS	DEPTH
						* Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) ■ Total Unit Wt (kN/m ³)	+ Torvane + × QU/2 × □ Lab Vane □ △ Pocket Pen. △ ● Field Vane ● (kPa)			
0		CONCRETE - 215 mm								
		SAND and GRAVEL FILL - 40 mm								
		CLAY - silty - brown, firm, dry to moist - high plasticity		G78	~45					
		SAND and SILT - trace clay - light brown, moist to wet		G79						
				G80	~55				(G80): Gravel: 0%, Sand: 45%, Silt: 45%, Clay: 10%	1
		CLAY - some silt to silty - brown, firm, dry to moist - high plasticity		G81						
				G82	~65					
				G83						
				G84						
		END OF TEST HOLE AT 2.13 m IN CLAY								
		Notes: 1. No seepage or sloughing observed during drilling. 2. Test hole backfilled with drill cuttings and bentonite and sealed with asphalt patch upon completion.								

LOG OF TEST HOLE BOREHOLE LOGS TC REV1.GPJ UMA WINN.GDT 12/15/17



LOGGED BY: Tessa Christi	COMPLETION DEPTH: 2.13 m
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PROJECT ENGINEER: Kevin Rae	Page 1 of 1

PROJECT: Industrial Streets - Package 530-2017.1	CLIENT: City of Winnipeg	TESTHOLE NO: TH17-12
LOCATION: Fife Street, 2nd lane from W curb, 14U - 0631482 m E, 5533512 m N		PROJECT NO.: 60556452
CONTRACTOR: Maple Leaf Drilling Ltd.	METHOD: Truck-mounted B40, 125 mm SSA	ELEVATION (m): N/A
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

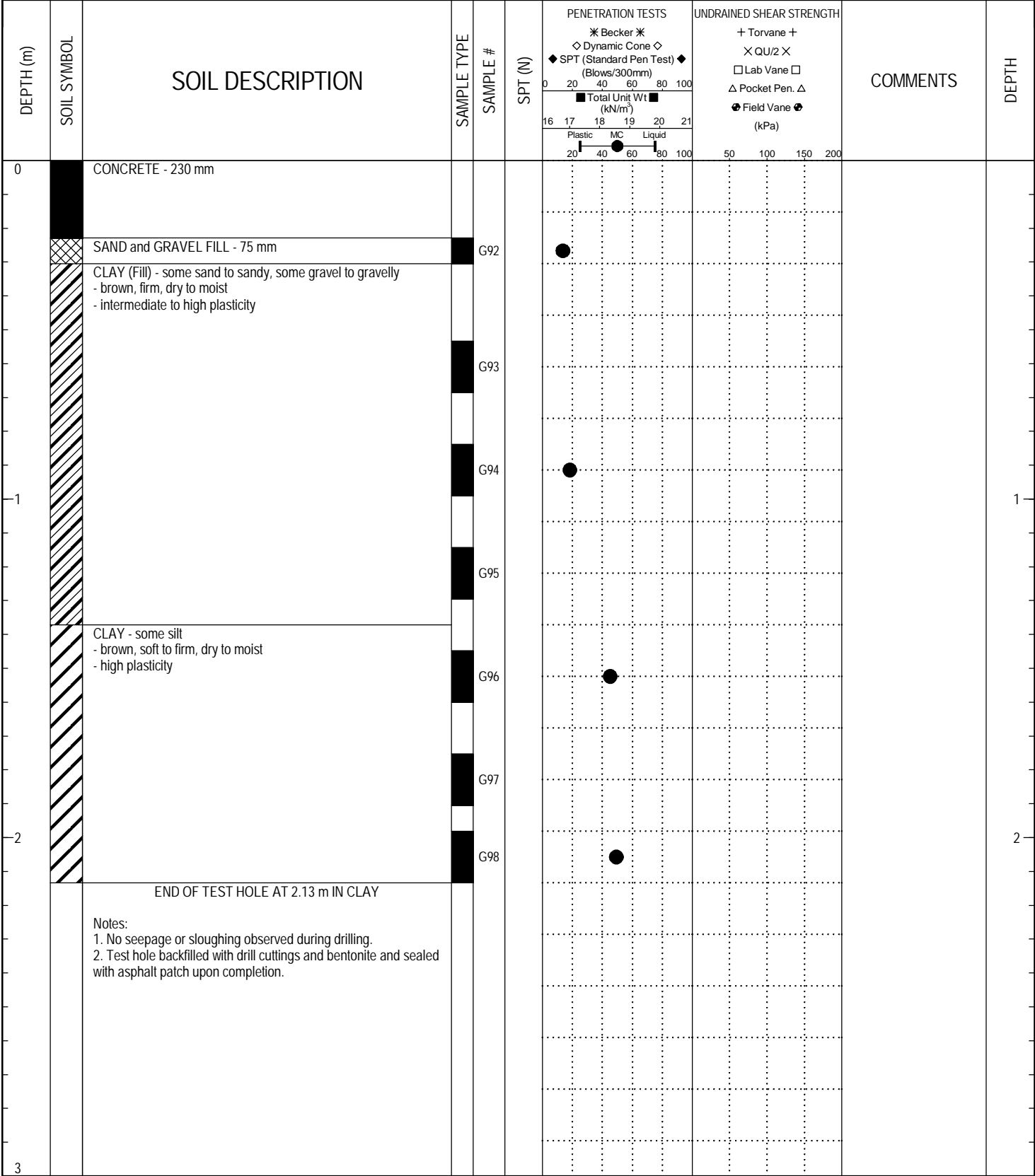
DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TESTS		UNDRAINED SHEAR STRENGTH		COMMENTS	DEPTH
						* Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) ■ Total Unit Wt (kN/m³)	+ Torvane + × QU/2 × □ Lab Vane □ △ Pocket Pen. △ ● Field Vane ● (kPa)				
0		CONCRETE - 210 mm									
		CLAY and SILT - trace sand - dark brown, firm to stiff, dry to moist - intermediate to high plasticity		G85							
				G86							
		SILT - sandy, trace to some clay - light brown, soft, moist to wet - low to intermediate plasticity		G87							
				G88							
		CLAY - trace to some silt - brown, soft to firm, dry to moist - high plasticity - silt pockets < 100 mm diam.		G90							
				G91							
		END OF TEST HOLE AT 2.13 m IN CLAY									
		Notes: 1. No seepage or sloughing observed during drilling. 2. Test hole backfilled with drill cuttings and bentonite and sealed with asphalt patch upon completion.									

LOG OF TEST HOLE BOREHOLE LOGS TC REV1.GPJ UMA WINN.GDT 12/15/17



LOGGED BY: Tessa Christi	COMPLETION DEPTH: 2.13 m
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PROJECT: Industrial Streets - Package 530-2017.1	CLIENT: City of Winnipeg	TESTHOLE NO: TH17-13
LOCATION: Fife Street, W curb lane, 14U - 0631483 m E, 5533394 m N		PROJECT NO.: 60556452
CONTRACTOR: Maple Leaf Drilling Ltd.	METHOD: Truck-mounted B40, 125 mm SSA	ELEVATION (m): N/A
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	



LOG OF TEST HOLE BOREHOLE LOGS TC REV1.GPJ UMA WINN.GDT 12/15/17



LOGGED BY: Tessa Christi	COMPLETION DEPTH: 2.13 m
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PROJECT: Industrial Streets - Package 530-2017.1	CLIENT: City of Winnipeg	TESTHOLE NO: TH17-14
LOCATION: Fife Street, E curb lane, 14U - 0631448 m E, 5533289 m N		PROJECT NO.: 60556452
CONTRACTOR: Maple Leaf Drilling Ltd.	METHOD: Truck-mounted B40, 125 mm SSA	ELEVATION (m): N/A
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TESTS		UNDRAINED SHEAR STRENGTH		COMMENTS	DEPTH
						* Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) ■ Total Unit Wt (kN/m³)	+ Torvane + × QU/2 × □ Lab Vane □ △ Pocket Pen. △ ● Field Vane ● (kPa)				
0		CONCRETE - 230 mm									
		SAND and GRAVEL FILL - 50 mm									
		CLAY (Fill) - some sand to sandy, some gravel to gravelly - brown, firm, dry to moist - intermediate to high plasticity - sand pocket 100 mm thick at 0.3 m		G99							
		CLAY - some silt - brown, firm, dry to moist - high plasticity		G100							
		- (G101): LL = 86%, PL = 25%		G101							
		- trace to some silt below 1.2 m		G102							
				G103							
				G104							
				G105							
		END OF TEST HOLE AT 2.13 m IN CLAY									
		Notes: 1. No seepage or sloughing observed during drilling. 2. Test hole backfilled with drill cuttings and bentonite and sealed with asphalt patch upon completion.									

LOG OF TEST HOLE BOREHOLE LOGS TC REV1.GPJ UMA WINN.GDT 12/15/17



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PROJECT: Industrial Streets - Package 530-2017.1	CLIENT: City of Winnipeg	TESTHOLE NO: TH17-15
LOCATION: Fife Street, W curb lane, 14U - 0631392 m E, 5533190 m N		PROJECT NO.: 60556452
CONTRACTOR: Maple Leaf Drilling Ltd.	METHOD: Truck-mounted B40, 125 mm SSA	ELEVATION (m): N/A
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TESTS		UNDRAINED SHEAR STRENGTH		COMMENTS	DEPTH
						* Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) ■ Total Unit Wt (kN/m³)	+ Torvane + × QU/2 × □ Lab Vane □ △ Pocket Pen. △ ● Field Vane ●				
0		CONCRETE - 205 mm									
		SAND and GRAVEL FILL - 125 mm		G106	~45						
		CLAY (Fill) - some sand to sandy, some silt, some gravel to gravelly - brown, firm, dry to moist - intermediate to high plasticity		G107	~55						
		CLAY - some silt - brown, firm, dry to moist - high plasticity		G109	~65						
				G110	~75						
				G111	~85						
				G112	~95						
		END OF TEST HOLE AT 2.13 m IN CLAY									
		Notes: 1. No seepage or sloughing observed during drilling. 2. Test hole backfilled with drill cuttings and bentonite and sealed with asphalt patch upon completion.									

LOG OF TEST HOLE BOREHOLE LOGS TC REV1.GPJ UMA WINN.GDT 12/15/17



LOGGED BY: Tessa Christi	COMPLETION DEPTH: 2.13 m
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PROJECT: Industrial Streets - Package 530-2017.1	CLIENT: City of Winnipeg	TESTHOLE NO: TH17-16
LOCATION: Fife Street, E curb lane, 14U - 0631338 m E, 5533072 m N		PROJECT NO.: 60556452
CONTRACTOR: Maple Leaf Drilling Ltd.	METHOD: Truck-mounted B40, 125 mm SSA	ELEVATION (m): N/A
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TESTS		UNDRAINED SHEAR STRENGTH		COMMENTS	DEPTH
						* Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) Total Unit Wt (kN/m³)	+ Torvane + X QU/2 X □ Lab Vane □ △ Pocket Pen. △ ● Field Vane ● (kPa)				
0		CONCRETE - 205 mm									
		SAND and GRAVEL FILL - 75 mm		G113							
		SILT (Fill) - clayey, some sand - brown, firm, dry to moist - intermediate plasticity - (G114): LL = 33%, PL = 14%		G114	●					(G114): Gravel: 0%, Sand: 18%, Silt: 53%, Clay: 29%	
		SILT - sandy, trace to some clay - light brown, soft, dry to moist - low plasticity		G115	●						
				G116							
		CLAY - some silt - brown, firm, dry to moist - high plasticity		G117	●						
		SILT - sandy, trace to some clay - light brown, soft, dry to moist - low plasticity		G118	●						
		CLAY - some silt - brown, firm, dry to moist - high plasticity		G119							
		END OF TEST HOLE AT 2.13 m IN CLAY Notes: 1. No seepage or sloughing observed during drilling. 2. Test hole backfilled with drill cuttings and bentonite and sealed with asphalt patch upon completion.									

LOG OF TEST HOLE BOREHOLE LOGS TC REV1.GPJ UMA WINN.GDT 12/15/17



LOGGED BY: Tessa Christi	COMPLETION DEPTH: 2.13 m
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PROJECT: Industrial Streets - Package 530-2017.1		CLIENT: City of Winnipeg		TESTHOLE NO: TH17-17	
LOCATION: Fife Street, 2nd lane from W curb, 14U - 0631311 m E, 5532995 m N				PROJECT NO.: 60556452	
CONTRACTOR: Maple Leaf Drilling Ltd.			METHOD: Truck-mounted B40, 125 mm SSA		ELEVATION (m): N/A
SAMPLE TYPE		<input checked="" type="checkbox"/> GRAB	<input type="checkbox"/> SHELBY TUBE	<input checked="" type="checkbox"/> SPLIT SPOON	<input type="checkbox"/> BULK
		<input type="checkbox"/> NO RECOVERY	<input type="checkbox"/> CORE		

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TESTS		UNDRAINED SHEAR STRENGTH		COMMENTS	DEPTH
						* Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) ■ Total Unit Wt (kN/m³)	+ Torvane + × QU/2 × □ Lab Vane □ △ Pocket Pen. △ ● Field Vane ●				
0		CONCRETE - 215 mm									
		SAND and GRAVEL FILL - 65 mm									
		SILT - sandy, some clay - light brown, soft to firm, dry to moist - low to intermediate plasticity		G141							
				G142							
1		CLAY - silty - brown, firm, dry to moist - high plasticity		G143							
				G144							
				G145							
2				G146							
		END OF TEST HOLE AT 2.13 m IN CLAY									
		Notes: 1. No seepage or sloughing observed during drilling. 2. Test hole backfilled with drill cuttings and bentonite and sealed with asphalt patch upon completion.									

LOG OF TEST HOLE BOREHOLE LOGS TC REV1.GPJ UMA WINN.GDT 12/15/17



LOGGED BY: Tessa Christi	COMPLETION DEPTH: 2.13 m
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PROJECT: Industrial Streets - Package 530-2017.1	CLIENT: City of Winnipeg	TESTHOLE NO: TH17-18
LOCATION: Fife Street, W curb lane, 14U - 0631267 m E, 5532904 m N		PROJECT NO.: 60556452
CONTRACTOR: Maple Leaf Drilling Ltd.	METHOD: Truck-mounted B40, 125 mm SSA	ELEVATION (m): N/A
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TESTS		UNDRAINED SHEAR STRENGTH		COMMENTS	DEPTH
						* Becker * ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) ■ Total Unit Wt (kN/m³)	+ Torvane + × QU/2 × □ Lab Vane □ △ Pocket Pen. △ ● Field Vane ● (kPa)				
0		CONCRETE - 205 mm									
		SAND and GRAVEL FILL - 75 mm									
		CLAY (Fill) - some sand to sandy, some silt, some gravel to gravelly - brown, firm, dry to moist - intermediate to high plasticity		G127							
		SILT - sandy, trace clay - light brown, soft, dry to moist - low plasticity		G128							
				G129							
				G130							
		CLAY - some silt - brown, firm, dry to moist - high plasticity - silt laminations < 2 mm thick		G131							
				G132							
				G133							
		END OF TEST HOLE AT 2.13 m IN CLAY									
		Notes: 1. No seepage or sloughing observed during drilling. 2. Test hole backfilled with drill cuttings and bentonite and sealed with asphalt patch upon completion.									

LOG OF TEST HOLE BOREHOLE LOGS TC REV1.GPJ UMA WINN.GDT 12/15/17



LOGGED BY: Tessa Christi	COMPLETION DEPTH: 2.13 m
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PROJECT: Industrial Streets - Package 530-2017.1	CLIENT: City of Winnipeg	TESTHOLE NO: TH17-19
LOCATION: Fife Street, E curb lane, 14U - 0631226 m E, 5532833 m N		PROJECT NO.: 60556452
CONTRACTOR: Maple Leaf Drilling Ltd.	METHOD: Truck-mounted B40, 125 mm SSA	ELEVATION (m): N/A
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TESTS	UNDRAINED SHEAR STRENGTH	COMMENTS	DEPTH
0		CONCRETE - 205 mm							
		SAND and GRAVEL FILL - 50 mm							
		CLAY (Fill) - some sand to sandy, some silt, some gravel to gravelly - brown, firm, dry to moist - intermediate to high plasticity		G120					
		CLAY - silty - brown, firm, dry to moist - high plasticity - silt inclusions < 2 mm diam.		G121					
				G122					
				G123					
		- reddish brown silt laminations < 2 mm thick below 1.4 m		G124					
				G125					
				G126					
		END OF TEST HOLE AT 2.13 m IN CLAY							
		Notes: 1. No seepage or sloughing observed during drilling. 2. Test hole backfilled with drill cuttings and bentonite and sealed with asphalt patch upon completion.							

LOG OF TEST HOLE BOREHOLE LOGS TC REV1.GPJ UMA WINN.GDT 12/15/17



LOGGED BY: Tessa Christi	COMPLETION DEPTH: 2.13 m
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PROJECT: Industrial Streets - Package 530-2017.1	CLIENT: City of Winnipeg	TESTHOLE NO: TH17-20
LOCATION: Fife Street, 2nd lane from E curb, 14U - 0631179 m E, 5532717 m N		PROJECT NO.: 60556452
CONTRACTOR: Maple Leaf Drilling Ltd.	METHOD: Truck-mounted B40, 125 mm SSA	ELEVATION (m): N/A
SAMPLE TYPE	<input checked="" type="checkbox"/> GRAB <input type="checkbox"/> SHELBY TUBE <input checked="" type="checkbox"/> SPLIT SPOON <input type="checkbox"/> BULK <input checked="" type="checkbox"/> NO RECOVERY <input type="checkbox"/> CORE	

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	SPT (N)	PENETRATION TESTS	UNDRAINED SHEAR STRENGTH	COMMENTS	DEPTH
0		CONCRETE - 230 mm							
		SAND and GRAVEL FILL - 50 mm	<input checked="" type="checkbox"/>	G134					
		CLAY - silty - dark brown, firm to stiff, dry to moist - intermediate to high plasticity	<input checked="" type="checkbox"/>	G135					
		SILT - sandy, trace clay - light brown mottled grey, soft, dry to moist - low plasticity	<input checked="" type="checkbox"/>	G136					
		CLAY - silty - brown, firm to stiff, dry to moist - high plasticity	<input checked="" type="checkbox"/>	G137					
		CLAY - silty - brown, firm to stiff, dry to moist - high plasticity	<input checked="" type="checkbox"/>	G138					
		CLAY - silty - brown, firm to stiff, dry to moist - high plasticity	<input checked="" type="checkbox"/>	G139					
		CLAY - silty - brown, firm to stiff, dry to moist - high plasticity	<input checked="" type="checkbox"/>	G140					
		END OF TEST HOLE AT 2.13 m IN CLAY							
		Notes: 1. No seepage or sloughing observed during drilling. 2. Test hole backfilled with drill cuttings and bentonite and sealed with asphalt patch upon completion.							

LOG OF TEST HOLE BOREHOLE LOGS TC REV1.GPJ UMA WINN.GDT 12/15/17



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City of Winnipeg

Industrial Streets – Package 530-2017.1

Geotechnical Investigation

Table 01- Summary of Laboratory Soil Testing (Streets for Reconstruction)

Test Hole No.	Test Hole Location	Pavement Structure		Subgrade Description *	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits			
		Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index	
TH17-01	Saulteaux Crescent N leg, south lane 14U – 0624967 m E, 5528762 m N	Concrete	195	SAND AND GRAVEL FILL	0.20	17.4								
				CLAY	0.76	32.6	0	8	19	73	69	22	47	
				CLAY	1.22	--								
				CLAY	1.68	39.3								
				CLAY	1.98	--								
TH17-02	Saulteaux Crescent N leg, south lane 14U – 0625086 m E, 5528758 m N	Concrete	170	SAND AND GRAVEL FILL	0.17	--								
				SANDY SILT	0.53	19.1								
				SANDY SILT	0.84	--								
				SANDY SILT	1.14	21.1								
				CLAY	1.45	--								
				CLAY	1.75	41.4								
				CLAY	1.98	--								
TH17-03	Saulteaux Crescent E leg, east lane 14U – 0625129 m E, 5528659 m N	Concrete	205	SAND AND GRAVEL FILL	0.20	19.1								
				CLAY AND SILT	0.53	30.3								
				SILT	0.84	--								
				SILT	1.14	17.6								
				CLAY	1.45	29.2								
				SILT	1.75	--								
				CLAY	1.98	--								
TH17-04	Saulteaux Crescent E leg, west lane 14U – 0625134 m E, 5528593 m N	Concrete	125	SAND AND GRAVEL FILL	0.17	--								
				SILTY CLAYEY SAND	0.53	27.8	0	41	30	29	33	14	19	
				SANDY SILT	0.84	--								
				SANDY SILT	1.14	38.0								
				CLAY	1.45	--								
				CLAY	1.75	40.5								
				CLAY	1.98	--								
TH17-05	Saulteaux Crescent S leg, south lane 14U – 0625062 m E, 5528538 m N	Concrete	210	SAND AND GRAVEL FILL	0.21	6.7								
				CLAY	0.53	31.4	0	13	28	59	61	19	42	
				SANDY SILT	0.84	25.5								
				SANDY SILT	1.14	--								
				CLAY	1.45	--								
				CLAY	1.75	41.4								
				CLAY	1.98	--								

* Note – Subgrade Description based on City of Winnipeg Specifications for Geotechnical Investigation Requirements for Public Works Projects (September 2015)

Test Hole No.	Test Hole Location	Pavement Structure		Subgrade Description *	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits		
		Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH17-06	Saulteaux Crescent S leg, north lane 14U – 0624965 m E, 5528554 m N	Concrete	205	SAND AND GRAVEL FILL	0.20	15.6							
				CLAY AND SILT	0.53	31.2							
				CLAY	0.84	33.6				70	19	51	
				CLAY	1.14	--							
				CLAY	1.45	--							
				CLAY	1.75	44.6							
				CLAY	1.98	--							
TH17-07	Saskatchewan Avenue N curb lane 14U – 0624957 m E, 5529271 m N	Concrete	205	SAND AND GRAVEL FILL	0.20	11.1							
				CLAY AND SILT	0.53	--							
				CLAY AND SILT	0.84	36.8				72	25	47	
				CLAY AND SILT	1.14	--							
				CLAY	1.45	--							
				CLAY	1.75	37.8							
				CLAY	1.98	--							
TH17-08	Saskatchewan Avenue 2 nd lane from S curb 14U – 0625018 m E, 5529279 m N	Concrete	205	SAND AND GRAVEL FILL	0.20	--							
				CLAY AND SILT	0.53	29.2							
				CLAY AND SILT	0.84	--							
				CLAY AND SILT	1.14	31.6							
				SANDY SILT	1.45	26.5							
				CLAY	1.75	--							
				CLAY	1.98	30.2							
TH17-09	Saskatchewan Avenue 2 nd lane from N curb 14U – 0625115 m E, 5529288 m N	Concrete	255	SAND AND GRAVEL FILL	0.27	--							
				SAND (FILL)	0.56	7.7	25	53	18	4	15	9	6
				SAND FILL	0.84	--							
				CLAY	1.14	36.7							
				CLAY	1.45	--							
				CLAY	1.75	36.2							
				CLAY	1.98	--							
TH17-10	Saskatchewan Avenue S curb lane 14U – 0625299 m E, 5529326 m N	Concrete	205	SAND AND GRAVEL FILL	0.23	26.8							
				SAND AND CLAY	0.53	--							
				SAND AND CLAY	0.84	9.4							
				CLAY	1.14	--							
				CLAY	1.45	28.3							
				CLAY	1.75	--							
				CLAY	1.98	--							

* Note – Subgrade Description based on City of Winnipeg Specifications for Geotechnical Investigation Requirements for Public Works Projects (September 2015)

Test Hole No.	Test Hole Location	Pavement Structure		Subgrade Description *	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits		
		Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH17-11	Fife Street E curb lane 14U – 0631525 m E, 5533604 m N	Concrete	215	CLAY	0.25	29.9							
				SAND AND SILT	0.61	--							
				SAND AND SILT	0.84	22.1	0	45	45	10	Non Plastic	Non Plastic	Non Plastic
				CLAY	1.22	--							
				CLAY	1.45	42.3							
				CLAY	1.75	--							
				CLAY	1.98	--							
TH17-12	Fife Street 2 nd lane from W curb 14U – 0631482 m E, 5533512 m N	Concrete	210	CLAY AND SILT	0.23	32.2							
				CLAY AND SILT	0.53	--							
				SANDY SILT	0.84	22.2							
				SANDY SILT	1.30	--							
				CLAY	1.60	52.2							
				CLAY	1.98	--							
TH17-13	Fife Street W curb lane 14U – 0631483 m E, 5533394 m N	Concrete	230	SAND AND GRAVEL	0.23	13.6							
				CLAY FILL	0.53	--							
				CLAY FILL	0.84	18.3							
				CLAY FILL	1.14	--							
				CLAY	1.45	45.2							
				CLAY	1.75	--							
				CLAY	1.98	49.3							
TH17-14	Fife Street E curb lane 14U – 0631448 m E, 5533289 m N	Concrete	230	CLAY FILL	0.30	13.7							
				CLAY	0.53	--							
				CLAY	0.84	37.0					86	25	61
				CLAY	1.14	--							
				CLAY	1.45	42.0							
				CLAY	1.75	--							
				CLAY	1.98	--							
TH17-15	Fife Street W curb lane 14U – 0631392 m E, 5533190 m N	Concrete	205	SAND AND GRAVEL FILL	0.23	10.0							
				CLAY FILL	0.84	15.8							
				CLAY	1.14	--							
				CLAY	1.45	23.2							
				CLAY	1.75	--							
				CLAY	1.98	42.1							

Test Hole No.	Test Hole Location	Pavement Structure		Subgrade Description *	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits			
		Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index	
TH17-16	Fife Street E curb lane 14U – 0631338 m E, 5533072 m N	Concrete	205	SAND AND GRAVEL FILL	0.20	--								
				SILT FILL	0.53	17.2	0	18	53	29	33	14	19	
				SANDY SILT	0.84	21.5								
				SANDY SILT	1.14	--								
				CLAY	1.45	23.7								
				SANDY SILT	1.75	26.8								
				CLAY	1.98	--								
TH17-17	Fife Street 2 nd lane from W curb 14U – 0631311 m E, 5532995 m N	Concrete	215	SANDY SILT	0.22	--								
				SANDY SILT	0.53	20.1								
				CLAY	0.99	29.6								
				CLAY	1.30	--								
				CLAY	1.60	41.9								
				CLAY	1.98	--								
TH17-18	Fife Street W curb lane 14U – 0631267 m E, 5532904 m N	Concrete	205	CLAY FILL	0.30	--								
				SANDY SILT	0.53	17.2								
				SANDY SILT	0.84	--								
				SANDY SILT	1.14	30.4								
				CLAY	1.45	--								
				CLAY	1.75	52.0								
				CLAY	1.98	--								
TH17-19	Fife Street E curb lane 14U – 0631226 m E, 5532833 m N	Concrete	205	CLAY FILL	0.25	17.5								
				CLAY	0.53	--								
				CLAY	0.84	31.0								
				CLAY	1.14	--								
				CLAY	1.45	44.5								
				CLAY	1.75	--								
				CLAY	1.98	--								
TH17-20	Fife Street 2 nd lane from E curb 14U – 0631179 m E, 5532717 m N	Concrete	230	SAND AND GRAVEL FILL	0.23	25.6								
				SANDY SILT	0.53	--								
				SANDY SILT	0.84	20.9								
				SANDY SILT	1.14	--								
				CLAY	1.45	--								
				CLAY	1.75	40.1								
				CLAY	1.98	--								

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Geotechnical Investigation

Table 02 - Summary of Pavement Core Thicknesses (Streets for Rehabilitation)

Test Hole No.	Test Hole Location	Pavement Structure	
		Type	Thickness (mm)
PC17-21	Moray Street 23 S of N leg of Saulteaux Crescent 1.6 m W of E curb 14U - 0624892 m E, 5528710 m N	Asphalt	50
		Concrete	215
PC17-22	Moray Street 35 m S of S leg of Saulteaux Crescent 1.1 m E of W curb 14U - 0624880 m E, 5528498 m N	Asphalt	--
		Concrete	205
PC17-23	Moray Street 1.4 m E of W curb 14U – 0624883 m E, 5528639 m N	Asphalt	60
		Concrete	205
PC17-24	Moray Street 45 m S of Murray Park 0.9 m E of W curb 14U - 0624877 m E, 5528308 m N	Asphalt	--
		Concrete	205
PC17-25	Saskatchewan Avenue 1.1 m S of N curb 14U - 0624769 m E, 5529256 m N	Asphalt	--
		Concrete	195
PC17-26	Saskatchewan Avenue 1.4 m N of S curb 14U – 0624057 m E, 5529163 m N	Asphalt	--
		Concrete	205
PC17-27	Saskatchewan Avenue 1.5 m S of N curb 14U – 0624563 m E, 5529232 m N	Asphalt	--
		Concrete	195
PC17-28	Saskatchewan Avenue 1.1 m N of S curb 14U - 0624272, 5529193	Asphalt	--
		Concrete	190
PC17-29	Hutchings Street 0.6 m E of W curb 14U – 0630585 m E, 5534033 m N	Asphalt	--
		Concrete	185

Test Hole No.	Test Hole Location	Pavement Structure	
		Type	Thickness (mm)
PC17-30	Hutchings Street 1.4 m W of E curb 14U – 0630489 m E, 5533802 m N	Asphalt	--
		Concrete	215
PC17-31	Hutchings Street 1.7 m E of W curb 14U – 0630402 m E, 5533639 m N	Asphalt	--
		Concrete	215
PC17-32	Hutchings Street 1.1 m W of E curb 14U - 0630350, 5533364	Asphalt	--
		Concrete	220
PC17-33	Hutchings Street 1.7 m E of W curb 14U – 0630372, 5533234	Asphalt	--
		Concrete	190



Photograph 1: Test Hole TH17-01 – Saulteaux Crescent



Photograph 2: Test Hole TH17-02 – Saulteaux Crescent



Photograph 3: Test Hole TH17-03 – Saulteaux Crescent



Photograph 4: Test Hole TH17-04 – Saulteaux Crescent



Photograph 5: Test Hole TH17-05 – Saulteaux Crescent



Photograph 6: Test Hole TH17-06 – Saulteaux Crescent



Photograph 7: Test Hole TH17-07 – Saskatchewan Avenue



Photograph 8: Test Hole TH17-08 – Saskatchewan Avenue



Photograph 9: Test Hole TH17-09 – Saskatchewan Avenue



Photograph 10: Test Hole TH17-10 – Saskatchewan Avenue



Photograph 11: Test Hole TH17-11 – Fife Street



Photograph 12: Test Hole TH17-12 – Fife Street



Photograph 13: Test Hole TH17-13 – Fife Street



Photograph 14: Test Hole TH17-14 – Fife Street



Photograph 15: Test Hole TH17-15 – Fife Street



Photograph 16: Test Hole TH17-16 – Fife Street



Photograph 17: Test Hole TH17-17 – Fife Street



Photograph 18: Test Hole TH17-18 – Fife Street



Photograph 19: Test Hole TH17-19 – Fife Street



Photograph 20: Test Hole TH17-20 – Fife Street



Photograph 21: Pavement Core PC17-21 – Moray Street



Photograph 22: Pavement Core PC17-22 – Moray Street



Photograph 23: Pavement Core PC17-23 – Moray Street



Photograph 24: Pavement Core PC17-24 – Moray Street



Photograph 25: Pavement Core PC17-25 – Saskatchewan Avenue



Photograph 26: Pavement Core PC17-26 – Saskatchewan Avenue



Photograph 27: Pavement Core PC17-27 – Saskatchewan Avenue



Photograph 28: Pavement Core PC17-28 – Saskatchewan Avenue



Photograph 29: Pavement Core PC17-29 – Hutchings Street



Photograph 30: Pavement Core PC17-30 – Hutchings Street



Photograph 31: Pavement Core PC17-31 – Hutchings Street



Photograph 32: Pavement Core PC17-32 – Hutchings Street



Photograph 33: Pavement Core PC17-33 – Hutchings Street