AECOM

APPENDIX A
LOGAN AVENUE
GEOTECHNICAL REPORT

m SCALE 1:1500

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AECOM FILE NAME: 60212147-01-B-F01-R0X.dwg
Saved By: cloustonc
PLOT: 11/04/18 9:30:58 AM
B SIZE 11" x 17" (279.4mm x 431.8mm)

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City of Winnipeg Public Works
Logan Ave./McPhillips St. Package

Test Hole Location Plan

Figure - 01

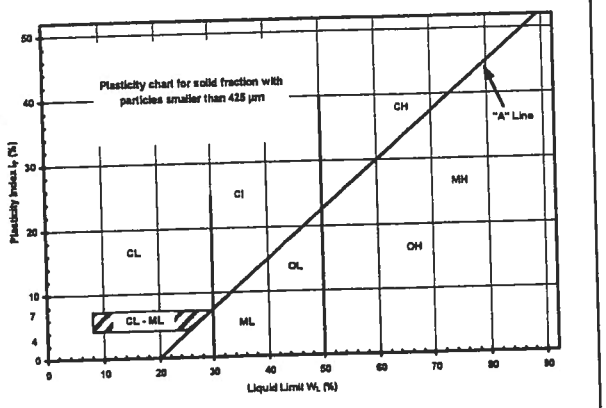
EXPLANATION OF FIELD & LABORATORY TEST DATA

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 $4<W_P<7$ $C_U = \frac{D_{60}}{D_{10}}$ $C_C = \frac{(D_{30})^2}{D_{10} x D_{60}}$
			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 ORGAINIC SOILS			Peat and other highly organic soils		Pt	Von Post Classification Limit		Strong colour or odour, and often fibrous texture	

	Asphalt		Till		
	Concrete		Bedrock (Undifferentiated)		AECOM
	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. REFER TO CITY OF WINNIPEG SPECS FOR GEOTECHNICAL INVESTIGATION STREET RECONSTRUCTION (OCT. 08)



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	10-20	some
Silt (non-plastic) or Clay (plastic)		< 0.075 mm		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

pp - 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 (Su) of a cohesive soil can be related to its consistency as follows:

Su (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

PROJECT: Logan Avenue Reconstruction	CLIENT: City of Winnipeg	TESTHOLE NO: **TH11-01**
LOCATION: 55 m West of Railway Tracks, Westbound Median Lane, 5.5 m South of curb		PROJECT NO.: 60212147
CONTRACTOR: Paddock Drilling Ltd.	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS: Becker; Dynamic Cone; SPT (Standard Pen Test) (Blows/300mm) 0 20 40 60 80 100; Total Unit Wt (kN/m³) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100	UNDRAINED SHEAR STRENGTH: Torvane; QU; Lab Vane; Pocket Pen.; Field Vane (kPa) 50 100 150 200	COMMENTS	DEPTH
0		ASPHALT (thickness = 230 mm)						
		CONCRETE (thickness = 320 mm)						
		CRUSHED LIMESTONE BASE (<50 mm)						
		GRAVEL and CLAY FILL						
1		CLAY - silt pockets - dark brown, frozen, moist when thawed - high plasticity		G28				1
				G29				
		SILT - light brown - frozen, moist when thawed - low plasticity		G30				
2		CLAY - trace silt - dark brown, frozen to 1.7m, moist, firm when thawed - high plasticity		G31				2
				G32				
		END OF TEST HOLE AT 2.1 m in clay. NOTES: 1. No sloughing observed 2. Seepage at 1.0 m 1. Test hole backfilled with auger cuttings, bentonite, sand and asphalt cold patch to surface. 2. Drilled with 150 mm diamond core to 0.56 m, solid stem augers to 2.1 m.						
3								3
4								

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.10 m
REVIEWED BY: Faris Khalil	COMPLETION DATE: 4/6/11
PROJECT ENGINEER: Faris Khalil	Page 1 of 1

LOG OF TEST HOLE LOGAN AVE.GPJ UMA.WINN.GDT 4/18/11

PROJECT: Logan Avenue Reconstruction	CLIENT: City of Winnipeg	TESTHOLE NO: TH11-02
LOCATION: 117 m West of Railway Tracks, Eastbound Median Lane, 6.2 m North of curb		PROJECT NO.: 60212147
CONTRACTOR: Paddock Drilling Ltd.	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS (✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100; ■ Total Unit Wt ■ (kN/m³) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 60 100)	UNDRAINED SHEAR STRENGTH (+ Torvane + × QU × □ Lab Vane □ △ Pocket Pen. △ ● Field Vane ● (kPa) 50 100 150 200)	COMMENTS	DEPTH
0		ASPHALT (thickness = 190 mm)						
		CONCRETE (thickness = 110 mm)						
		GRAVEL FILL - frozen, poorly graded (< 25.0 mm) - wood railway tie found below concrete		G21				
1		SILTY CLAY - some sand - black, frozen, moist when thawed - high plasticity		G22			Gradation: Sand = 16.8%, Silt = 34.1%, Clay = 49.0%	1
		CLAY - trace silt - brown, frozen to 1.5m, moist when thawed - high plasticity		G23				
				G24				
2		SILT - trace clay, trace sand - light brown, soft, moist - low plasticity		G25				2
				G26				
3		END OF TEST HOLE AT 2.1 m in silt. NOTES: 1. No sloughing observed 2. No seepage observed 3. Test hole backfilled with auger cuttings, bentonite, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.32 m, hollow stem augers to 2.1 m.						3
4								

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.10 m
REVIEWED BY: Faris Khalil	COMPLETION DATE: 4/6/11
PROJECT ENGINEER: Faris Khalil	Page 1 of 1

LOG OF TEST HOLE LOGAN AVE.GPJ UMA WINN.GDT 4/18/11

PROJECT: Logan Avenue Reconstruction	CLIENT: City of Winnipeg	TESTHOLE NO: TH11-03
LOCATION: 165 m West of Railway Tracks, Westbound Median Lane, 5.2 m South of curb		PROJECT NO.: 60212147
CONTRACTOR: Paddock Drilling Ltd.	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS
0		ASPHALT (thickness = 320 mm)			
		CONCRETE -Wood Railway tie found just below pavement			
		CLAY FILL - evidences of clay pipe found with water present			
1		CLAYEY SILT - some sand - light brown, frozen, moist when thawed - intermediate plasticity		G33	Gradation: Sand = 21.1%, Silt = 52.6%, Clay = 26.3%
		CLAY - trace silt - dark brown, frozen to 1.5 m, moist, stiff when thawed - high plastictiy		G34	
				G35	
2				G36	
		END OF TEST HOLE AT 2.1 m in clay. NOTES: 1. No sloughing observed 2. No seepage observed 3. Test hole backfilled with auger cuttings, bentonite, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.3 m, solid stem augers to 2.1 m.			
3					
4					

PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100 ■ Total Unit Wt ■ (kN/m³) 16 17 18 19 20 21 Plastic MC Liquid 20 40 60 80 100

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

DEPTH

LOG OF TEST HOLE LOGAN AVE.GPJ UMA WINN.GDT 4/18/11

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.10 m
REVIEWED BY: Faris Khalil	COMPLETION DATE: 4/6/11
PROJECT ENGINEER: Faris Khalil	Page 1 of 1

PROJECT: Logan Avenue Reconstruction	CLIENT: City of Winnipeg	TESTHOLE NO: **TH11-04**
LOCATION: 209 m West of Railway Tracks, Eastbound Median Lane, 6.15 m North of curb		PROJECT NO.: 60212147
CONTRACTOR: Paddock Drilling Ltd.	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

PENETRATION TESTS: Becker | Dynamic Cone | SPT (Standard Pen Test) (Blows/300mm) 0 20 40 60 80 100 | Total Unit Wt (kN/m³) 16 17 18 19 20 21 | Plastic MC Liquid 20 40 60 80 100

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

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH
0		ASPHALT (thickness = 140 mm)				
		CONCRETE (thickness = 260 mm)				
		GRAVEL FILL - frozen, poorly graded (< 25.0 mm), moist when thawed		G13		
1		CLAY FILL - frozen, moist when thawed		G14		1
				G15		
		GRAVEL FILL - frozen, poorly graded (< 25.0 mm), moist when thawed		G16		
				G17		
2				G18		2
		SILT - light brown, soft, moist - low plasticity		G19		
		CLAY - brown, firm, moist - high plasticity		G20		
3		END OF TEST HOLE AT 2.7 m in clay. NOTES: 1. No sloughing observed 2. No seepage observed 3. Test hole backfilled with auger cuttings, bentonite, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.4 m, solid stem augers to 2.7 m.				3
4						

LOG OF TEST HOLE LOGAN AVE.GPJ UMA WINN.GDT 4/18/11

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.70 m
REVIEWED BY: Faris Khalil	COMPLETION DATE: 4/6/11
PROJECT ENGINEER: Faris Khalil	Page 1 of 1

PROJECT: Logan Avenue Reconstruction	CLIENT: City of Winnipeg	TESTHOLE NO: TH11-05
LOCATION: 249 m West of Railway Tracks, Westbound Median Lane, 5.1 m South of curb		PROJECT NO.: 60212147
CONTRACTOR: Paddock Drilling Ltd.	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

PENETRATION TESTS: Becker | Dynamic Cone | SPT (Standard Pen Test) (Blows/300mm) 0 20 40 60 80 100 | Total Unit Wt (kN/m³) 16 17 18 19 20 21 | Plastic MC Liquid 20 40 60 80 100

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

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH
0		ASPHALT (thickness = 280 mm)				
		CONCRETE -Wood Railway tie found just below pavement				
1		SILTY CLAY - some sand - brown, frozen, moist when thawed - intermediate plasticity		G37	Gradation: Sand = 15.4%, Silt = 38.7%, Clay = 45.8%	1
		CLAY - trace silt - brown, frozen, moist when thawed - high plasticity		G38		
		CLAYEY SILT - trace sand - brown, frozen to 1.5 m, moist, soft when thawed - intermediate plasticity		G39		
				G40		
2				G41		2
		END OF TEST HOLE AT 2.1 m in silt. NOTES: 1. No sloughing observed 2. No seepage observed 3. Test hole backfilled with auger cuttings, bentonite, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.23 m, solid stem augers to 2.1 m.				
3						3
4						

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.10 m
REVIEWED BY: Faris Khalil	COMPLETION DATE: 4/6/11
PROJECT ENGINEER: Faris Khalil	Page 1 of 1

LOG OF TEST HOLE LOGAN AVE.GPJ UMA WINN.GDT 4/18/11

PROJECT: Logan Avenue Reconstruction	CLIENT: City of Winnipeg	TESTHOLE NO: TH11-06
LOCATION: 286 m West of Railway Tracks, Eastbound Median Lane, 6.1 m North of curb		PROJECT NO.: 60212147
CONTRACTOR: Paddock Drilling Ltd.	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH
0		ASPHALT (thickness = 240 mm)				
		CONCRETE (thickness = 340 mm)				
		CLAY - some silt - brown, frozen to 1.5 m, moist, firm when thawed - high plasticity		G8	Gradation: Sand = 4.0%, Silt = 17.3%, Clay = 78.7%	
1				G9		1
				G10		
		SILT - sandy - light brown - soft, moist		G11		
2				G12		2
		END OF TEST HOLE AT 2.3 m in silt. NOTES: 1. No sloughing observed 2. No seepage observed 3. Test hole backfilled with auger cuttings, bentonite sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.6 m, solid stem augers to 2.3 m.				
3						3
4						

PENETRATION TESTS: ✳ Becker ✳ | ◇ Dynamic Cone ◇ | ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100 | ■ Total Unit Wt ■ (kN/m³) 16 17 18 19 20 21 | Plastic MC Liquid 20 40 60 80 100

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

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.29 m
REVIEWED BY: Faris Khalil	COMPLETION DATE: 4/6/11
PROJECT ENGINEER: Faris Khalil	Page 1 of 1

LOG OF TEST HOLE LOGAN AVE.GPJ UMA WINN.GDT 4/18/11

PROJECT: Logan Avenue Reconstruction	CLIENT: City of Winnipeg	TESTHOLE NO: TH11-07
LOCATION: 344 m West of Railway Tracks, Westbound Median Lane, 5.3 m South of curb		PROJECT NO.: 60212147
CONTRACTOR: Paddock Drilling Ltd.	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

PENETRATION TESTS: Becker | Dynamic Cone | SPT (Standard Pen Test) (Blows/300mm) 0 20 40 60 80 100; Total Unit Wt (kN/m³) 16 17 18 19 20 21; Plastic MC Liquid 20 40 60 80 100

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

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	COMMENTS	DEPTH
0		ASPHALT (thickness = 160 mm)				
		CONCRETE (thickness = 220 mm)				
		GRAVEL FILL - frozen, poorly graded (< 25.0 mm)				
		CLAY - some silt, trace sand - dark brown, frozen from 0.9 to 1.5 m, moist when thawed - high plasticity		G42	Gradation: Sand = 7.0%, Silt = 21.0%, Clay = 72.1%	
1				G43		1
				G44		
		SILT - light brown, soft, moist		G45		
2				G46		2
		END OF TEST HOLE AT 2.1 m in silt. NOTES: 1. No sloughing observed 2. No seepage observed 3. Test hole backfilled with auger cuttings, bentonite, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.5 m, solid stem augers to 2.1 m.				
3						3
4						

AECOM

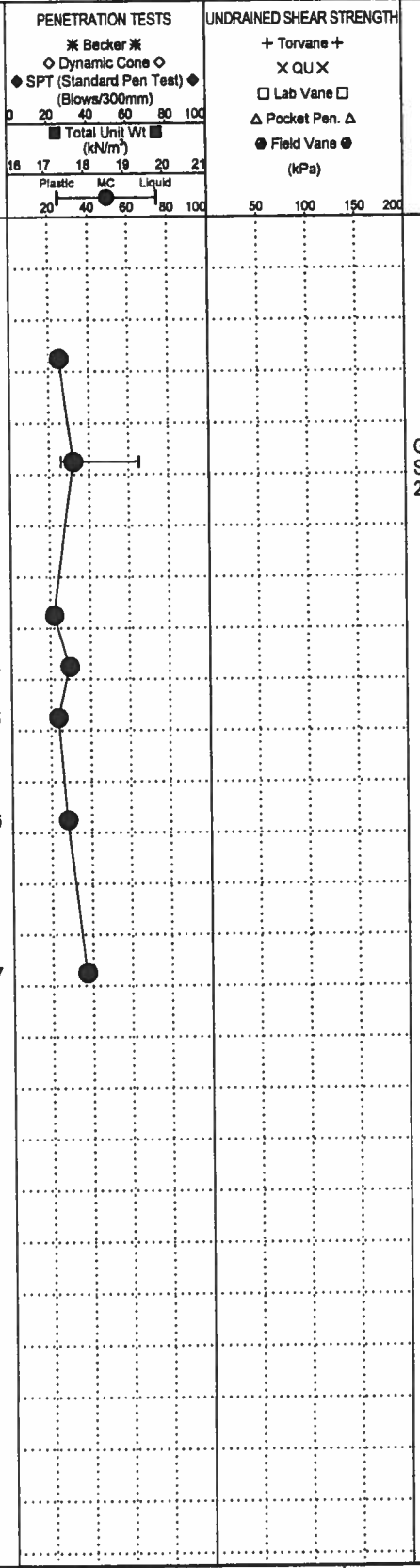
LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.10 m
REVIEWED BY: Faris Khalil	COMPLETION DATE: 4/6/11
PROJECT ENGINEER: Faris Khalil	Page 1 of 1

LOG OF TEST HOLE LOGAN AVE.GPJ UMA WINN.GDT 4/18/11

PROJECT: Logan Avenue Reconstruction	CLIENT: City of Winnipeg	TESTHOLE NO: **TH11-08**
LOCATION: 393 m West of Railway Tracks, Eastbound Lane, 1.4 m North of curb		PROJECT NO.: 60212147
CONTRACTOR: Paddock Drilling Ltd.	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #
0		ASPHALT (thickness = 100 mm)		
		CONCRETE (thickness = 100 mm)		
		GRAVEL BASE (<12.5 mm)		
		CLAY - some silt, trace sand - dark brown, frozen, moist when thawed - high plasticity	■	G1
			■	G2
1		SILT - trace clay, - light brown, frozen, moist when thawed - low plasticity	■	G3
		CLAY - trace silt, trace gypsum - brown, frozen, moist when thawed - high plasticity	■	G4
		SILT - light brown, moist, soft - low plasticity	■	G5
		CLAY - trace silt - brown, firm, moist - high plasticity	■	G6
2			■	G7
		END OF TEST HOLE AT 2.3 m in clay. NOTES: 1. No sloughing observed 2. No seepage observed 3. Test hole backfilled with auger cuttings, bentonite, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.23 m, solid stem augers to 2.3 m.		
3				
4				



COMMENTS	DEPTH
Gradation: Sand = 5.3%, Silt = 26.0%, Clay = 68.8%	1
	2
	3

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.29 m
REVIEWED BY: Faris Khalil	COMPLETION DATE: 4/6/11
PROJECT ENGINEER: Faris Khalil	Page 1 of 1

LOG OF TEST HOLE LOGAN AVE.GPJ UMA WINN.GDT 4/18/11

PROJECT: Logan Avenue Reconstruction	CLIENT: City of Winnipeg	TESTHOLE NO: TH11-09
LOCATION: Yield Lane, West Bound Logan to North Bound McPhillips, 2.5m from curb		PROJECT NO.: 60212147
CONTRACTOR: Paddock Drilling Ltd.	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS / UNDRAINED SHEAR STRENGTH	COMMENTS	DEPTH
0		ASPHALT (thickness = 260 mm)					
		CONCRETE (thickness = 190 mm)					
		LIMESTONE BASE - well graded (<19.0 mm)					
		GRAVEL and CLAY FILL - frozen, moist when thawed		G47			
				G48			
1				G49			1
		CLAY - brown, frozen to 2.1 m, moist when thawed - high plasticity		G50			
				G51			
2				G52			2
		END OF TEST HOLE AT 2.1 m in clay. NOTES: 1. No sloughing observed 2. No seepage observed 3. Test hole backfilled with auger cuttings, bentonite, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.4 m, solid stem augers to 2.1 m.					
3							3
4							

PENETRATION TESTS: ✳ Becker ✳ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100 ■ Total Unit Wt ■ (kN/m³) 16 17 18 19 20 21 Plastic MC Liquid 20 40 60 80 100

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

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.10 m
REVIEWED BY: Faris Khalil	COMPLETION DATE: 4/6/11
PROJECT ENGINEER: Faris Khalil	Page 1 of 1

LOG OF TEST HOLE LOGAN AVE.GPJ UMA WINN.GDT 4/18/11

PROJECT: Logan Avenue Reconstruction	CLIENT: City of Winnipeg	TESTHOLE NO: TH11-10
LOCATION: In Front of 1114 Logan Avenue, Westbound Median Lane, 4.9m South of curb		PROJECT NO.: 60212147
CONTRACTOR: Paddock Drilling Ltd.	METHOD: 125 mm SSA with 150 mm Coring	ELEVATION (m):

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

DEPTH (m)	SOIL SYMBOL	SOIL DESCRIPTION	SAMPLE TYPE	SAMPLE #	PENETRATION TESTS / UNDRAINED SHEAR STRENGTH	COMMENTS	DEPTH
0		ASPHALT (thickness = 40 mm) CONCRETE (thickness = 240 mm)					
		LIMESTONE BASE - well graded (<19 mm)		G53			
		GRAVEL and CLAY FILL - frozen, moist when thawed		G54			
1				G55			1
		SILT - brown, frozen, moist when thawed		G56			
		CLAY - silt inclusions (<10mm) - dark brown, frozen to 1.8 m, moist, stiff when thawed - high plasticity		G57			
2				G58			2
		END OF TEST HOLE AT 2.1 m in clay. NOTES: 1. No sloughing observed 2. No seepage observed 3. Test hole backfilled with auger cuttings, bentonite, sand and asphalt cold patch to surface. 4. Drilled with 150 mm diamond core to 0.28 m, solid stem augers to 2.1 m.					
3							3
4							

PENETRATION TESTS: ✱ Becker ✱ ◇ Dynamic Cone ◇ ◆ SPT (Standard Pen Test) ◆ (Blows/300mm) 0 20 40 60 80 100 ■ Total Unit Wt ■ (kN/m³) 16 17 18 19 20 21 Plastic MC Liquid 20 40 60 80 100

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

AECOM

LOGGED BY: Stephen Petsche	COMPLETION DEPTH: 2.10 m
REVIEWED BY: Faris Khalil	COMPLETION DATE: 4/6/11
PROJECT ENGINEER: Faris Khalil	Page 1 of 1

LOG OF TEST HOLE LOGAN AVE.GPJ UMA WINN.GDT 4/18/11

Photograph 1. – TH11-01

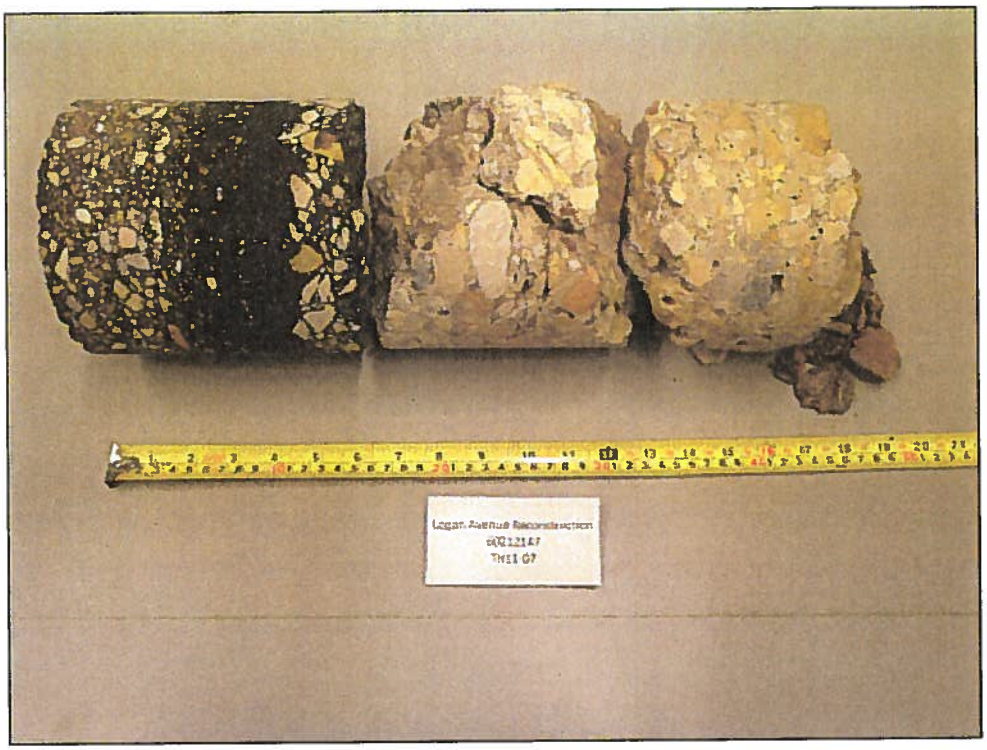
Photograph 2. – TH11-02

Photograph 3. – TH11-03

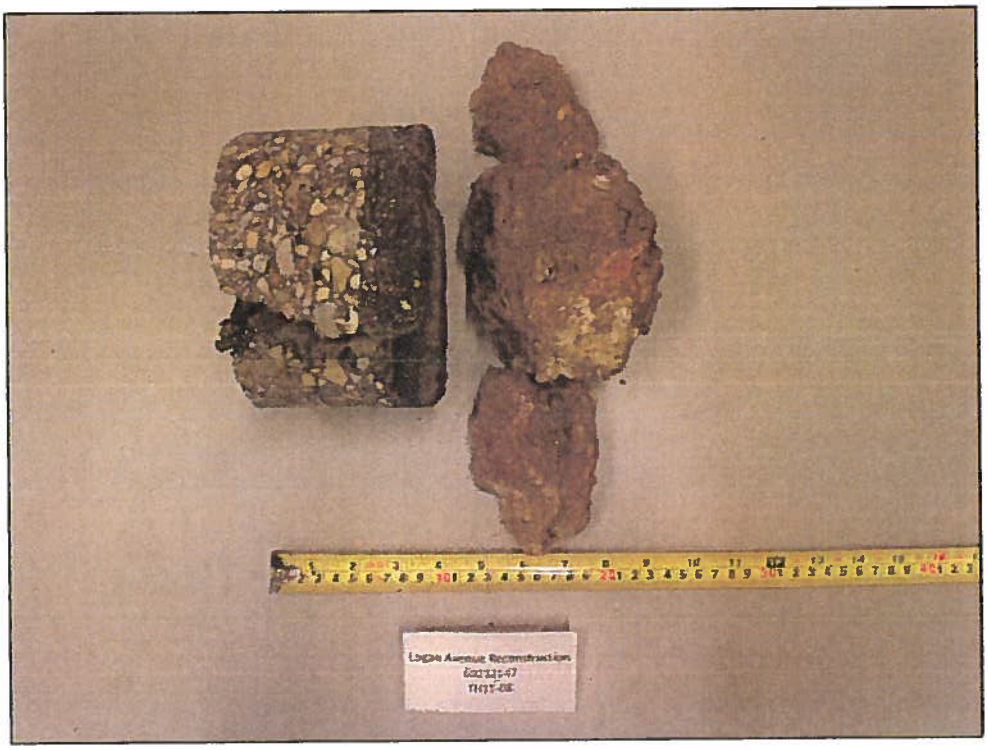
Photograph 4. – TH11-04

Photograph 5. – TH11-05

Photograph 6. – TH11-06



Photograph 7. – TH11-07



Photograph 8. – TH11-08

Photograph 9. – TH11-09

Photograph 10. – TH11-10

City of Winnipeg
Logan Avenue Reconstruction
Geotechnical Investigation

Test Hole No.	Testhole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits		
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH11-01	55 m West of Railway Tracks, Westbound Median Lane, 5.5 m South of Curb	Asphalt	230	Limestone Base (<50 mm)	210	Gravel/Clay Fill	0.9	27.3							
						Clay	1.2	26.8							
		Concrete	320			Silt	1.5	23.2							
						Clay	1.8	33.7							
						Clay	2.1	33.3							
TH11-02	117 m West of Railway Tracks, Eastbound Median Lane, 6.2 m North of Curb	Asphalt	190	None	n/a	Gravel Fill	0.6	6.3							
						Silty Clay	0.9	30.2	0.0	16.8	34.1	49.0	61.1	26.4	34.7
						Clay	1.2	30.1							
						Clay	1.5	27.2							
		Concrete	110			Silt	1.8	22.1							
						Silt	2.1	23.9							
TH11-03	165 m West of Railway Tracks, Westbound Median Lane, 5.2 m South of Curb	Asphalt	320	None	n/a	Clayey Silt	1.2	23.4	0.0	21.1	52.6	26.3	30.6	15.7	14.9
						Clay	1.5	29.7							
						Clay	1.8	35.3							
						Clay	2.1	44.0							
TH11-04	209 m West of Railway Tracks, Eastbound Median Lane, 6.15 m North of Curb	Asphalt	140	None	n/a	Gravel Fill	0.6	4.6							
						Clay Fill	0.9	34.0							
						Clay Fill	1.2	9.8 .							
		Concrete	260			Gravel Fill	1.5	4.7							
						Gravel Fill	1.8	4.2							
						Gravel Fill	2.1	6.8							
						Silt	2.3	34.2							
						Clay	2.4	46.3							
TH11-05	249 m West of Railway Tracks, Westbound Median Lane, 5.1 m South of Curb	Asphalt	280	None	n/a	Clay	1.0	24.4	0.0	15.4	38.7	45.8	45.7	19.4	26.3
						Clay	1.2	32.9							
						Silt	1.5	25.0							
						Silt	1.8	22.0							
						Silt	2.1	22.8							

City of Winnipeg
Logan Avenue Reconstruction
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Test Hole No.	Testhole Location	Pavement Surface		Pavement Structure Material		Subgrade Description	Sample Depth (m)	Moisture Content (%)	Hydrometer Analysis				Atterberg Limits		
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH11-06	286 m West of Railway Tracks, Eastbound Median Lane, 6.1 m North of Curb	Asphalt	240	None	n/a	Clay	0.9	34.4	0.0	4.0	17.3	78.7	79.9	29.3	50.6
						Clay	1.2	31.5							
		Concrete	340			Clay	1.5	30.2							
						Silt	1.8	24.2							
						Silt	2.1	25.4							
TH11-07	344 m West of Railway Tracks, Westbound Median Lane, 5.3 m South of Curb	Asphalt	160	None	n/a	Clay	0.9	33.5	0.0	7.0	21.0	72.1	74.2	28.9	45.3
						Clay	1.2	26.6							
		Concrete	220			Clay	1.5	25.0							
						Silt	1.8	23.7							
						Silt	2.1	23.1							
TH11-08	393 m West of Railway Tracks, Eastbound Lane, 1.4 m North of Curb	Asphalt	100	Gravel Base (<12.5 mm)	100	Clay	0.5	25.2							
						Clay	0.8	32.1	0.0	5.3	26.0	68.8	65.1	25.8	39.3
		Concrete	100			Silt	1.2	21.8							
						Clay	1.4	29.5							
						Silt	1.5	23.5							
						Clay	1.8	28.0							
						Clay	2.3	37.0							
TH11-09	Yield Lane, Westbound Logan to Northbound McPhillips, 2.5 m from Curb	Asphalt	260	Limestone Base (19.0 mm)	60	Gravel/Clay Fill	0.6	7.2							
						Gravel/Clay Fill	0.9	7.8							
						Gravel/Clay Fill	1.2	9.5							
		Concrete	190			Clay	1.5	29.8							
						Clay	1.8	39.8							
						Clay	2.1	43.1							
TH11-10	In Front of 1114 Logan Avenue, Westbound Median Lane, 4.9 m South of Curb	Asphalt	40	Limestone Base (<19 mm)	175	Limestone Base	0.45	6.5							
						Gravel/Clay Fill	0.9	7.5							
						Gravel/Clay Fill	1.2	7.7							
		Concrete	240			Silt	1.5	24.5							
						Clay	1.8	33.7							
						Clay	2.1	46.1							