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APPENDIX 'G' GEOTECHNICAL REPORTS



Morrison Hershfield

2014 Local Streets Package (PW File #: 14-R-01)

Prepared for:

Distribution:

Morrison Hershfield 25 Scurfield Blvd, Unit 1 Winnipeg, MB R3Y IG4 Attention: Ron Bruce

Ron Bruce, P.Eng.

Project Number: 0035 011 00

Date:

February 21, 2014 Final Report



Quality Engineering | Valued Relationships

February 21, 2014

Our File No. 0035 011 00

Ron Bruce, P.Eng. Morrison Hershfield 25 Scurfield Blvd, Unit 1 Winnipeg, MB R3Y 1G4

RE:

Sub-Surface Investigation Report for

2014 Local Streets Package (PW File #: 14-R-01)

TREK Geotechnical Inc. is pleased to submit our report for the sub-surface investigations for the 2014 Local Streets Package (PW File #: 14-R-01).

Please contact the undersigned if you have any questions. Thank you for the opportunity to serve you on this assignment.

Sincerely,

TREK Geotechnical Inc.

Per:

Nelson John Ferreira, M. Sc., P. Eng. Geotechnical Engineer, Principal

Tel: 204.975.9433 ext. 103

cc: Beta Taryana, E.I.T. (TREK Geotechnical)



Revision History

Revision No.	Author	Issue Date	Description
0	ВТ	February 21, 2014	Final Report

Authorization Signatures

Prepared By:

Beta Taryana, EIT

Geotechnical Engineer-in-Training



Reviewed By:

Nelson John Ferreira, M. Sc., P.Eng. Geotechnical Engineer





Table of Contents

Letter of Transmitta	Letter	of]	Frans	mitta
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Revision History and Au	thorization Signatures
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1.0	Introduction
2.0	Sub-Surface Investigation and Laboratory Program

List of Figures

Figure 01	Test Hole Location Plan – Victor Street
Figure 02	Test Hole Location Plan - Furby Street
Figure 03	Test Hole Location Plan - Heritage Boulevard

List of Appendices

Appendix A Victor St. between Sargent Ave. and Ellice Ave.

Appendix B Furby St. between Ellice Ave. and Furby Place

Appendix C Heritage Blvd. between Valley View Dr. and Fieldstone Bay



1.0 Introduction

This report summarizes the results of the sub-surface investigation completed for the 2014 Local Street Package (PW File #: 14-R-01). Information regarding the asphalt, concrete, road base for the existing road and the soil stratigraphy beneath the pavement structure is provided.

2.0 Sub-Surface Investigation and Laboratory Program

A total of 16 test holes were drilled along Victor St., Furby St., and Heritage Blvd. as part of the sub-surface investigation. The test holes drilled at each location are listed in Table 1 and are shown on Figures 01, Figure 02 and Figure 03.

Street Location

Test Hole

Victor St., between Sargent Ave. and Ellice Ave.

TH14-01, TH14-02, TH14-03, TH14-04, TH14-05, TH14-06, TH14-06, TH14-07 and TH14-08

Furby St., between Ellice Ave. and Furby Place

TH14-09, TH14-10, TH14-11, TH14-12 and TH14-13

Heritage Blvd., between Valey View Dr. and Fieldstone Bay

TH14-14, TH14-15 and TH14-16

Table 1. List of Test Holes Drilled at Each Location

The sub-surface investigation was conducted from January 13 to 14, 2014. The test holes were drilled to a depth of 3.2 m to 3.4 m below road surface. Test holes were drilled by Paddock Drilling Ltd. with an MP8 truck mounted drill rig equipped with 125 mm diameter solid stem augers. The pavement structure (asphalt and/or concrete) was cored by TREK using a portable coring drill press equipped with a hollow 150 mm diameter diamond core drill bit. The sub-surface conditions were observed during drilling and visually classified by Martial Lemoine, EIT of TREK Geotechnical Inc. (TREK). Other pertinent information such as groundwater and drilling conditions were also recorded during the drilling investigation.

Disturbed (auger cuttings) samples retrieved during the sub-surface investigation were transported to TREK's material testing laboratory for further testing. Pavement core samples were also retrieved and logged at TREK's material testing laboratory. The laboratory testing program consisted of moisture content determination on all samples, and Atterberg limits and grain size analysis (hydrometer method) on select samples.

Information gathered for each street is included in separate appendices (Appendix A to C). The information provided in the Appendices includes test hole logs, laboratory testing summary tables and results, and photos of the asphalt and concrete cores.

Test hole locations shown on Figures 01, Figure 02 and Figure 03 are based on measured distances from the nearest house and/or edge of pavement.



Figures

TREK

0035 011 00 Morrison Hershfield 2014 Local Street Package 14-R-01

AGNES ST.

WANTED TORONTO ST.

TORONTO ST.

TORONTO ST.

REVPLAN

0 12.5 25 37.5 50m SCALE: 1:1250 (279mm x 432mm) LEGEND : TEST HOLE (TREK, 2014) NOTES :

1. IMAGE FROM GOOGLE EARTH ON JUNE 22, 2012 AND MAY 2, 2013

Figure 01
Test Hole Location Plan
Victor Street



0035 011 00 Morrison Hershfield 2014 Local Street Package 14-R-01



0 12.5 25 37.5 50m SCALE: 1:1250 (279man x 432mm)

TEST HOLE (TREK, 2014)

1. MAGE FROM GOOGLE EARTH ON JUNE 22, 2012 AND MAY 2, 2013

Figure 02
Test Hole Location Plan Furby Street





Appendix A

Victor St. between Sargent Ave. and Ellice Ave.

1 of 1

TREK

	ECHNI													
Client:	Morrison He	rshfield	·		Project N	lumber:	0035	011 00						
Project Nan	ne: 2014 Local S	Streets Package (PV	V File #: 14-R-0	01)	Location	:	Victor	St b	etween	Sargent	Ave. an	d Ellice	Ave.	
Contractor:					Ground E	Elevation:	Top o	Paver	nent				_	
Method:	125mm Solid S	Stem Auger, Acker MP8	Truck Mount		Date Dril	led:	13 Ja	nuary 2	2014				<u>.</u>	
Sample	е Туре:	Grab (G)		Shelby Tube (T)	Split	Spoon (SS	3) 🔼	Spl	it Barre	d (SB)	C	ore (C)		
Particle	e Size Legend:	Fines	Clay	Silt	••••	Sand		Grav		بيه	obbles		Boulders	
Depth (m)	ASPHALT (105 CONCRETE (11	mm thick)	ATERIAL DESC	CRIPTION	()		Sample Type	ample Nun	16 17	Bulk Unit (kN/m³) 18 19 rticle Size 40 60 MC 40 60	20 21 (%) 80 100	•	ndrained Strength (k Test Typ △ Torvane Pocket Pe ⊠ Qu ⊠ Field Var 100 15	Pa) <u>e</u> en. —O en. —O
-0.5-	- dark brow - frozen to (- high plasti	0.4 m, moist and fire	n to stiff when		-			G01 G02		•		Φ Δ		
1.0	- dark brown beli	-	, , , , , , , , , , , , , , , , , , , 				4	G03				6 2	S.	
-1.5-	SILT - some clay - brown - moist, soft - low plastic - trace clay below	aity	organics, trace	oxidation			4	G04 G05						
-2.0-	- firm below 1.7 i	m					4	G06						
	CLAY - silty, trac	e fine sand					4	G07	•					
-1.5- -2.0- -3.0-	- grey - moist, stiff - high plasti	f icity						G08	•			·or	\	
-3.0-	- very stiff below	3.1 m HOLE AT 3.2 m IN C	CLAY					G09			10 10 or 10 10 10 10 10 10 10 10 10 10 10 10 10		Δ	
	Notes: 1. No sloughing of 2. Backfilled test cold patch to top	or seepage observed hole with auger cut of pavement. ted on southbound \	d. tings, sand to 0	·	-	•								
Logged By:	Beta Taryana		Reviewed	I By: Brent Hay	1		F	roject	Engin	eer: <u>N</u>	elson Fe	rreira		



						···												
Client:		Morrison He					Project Number											
-		e: 2014 Local :		ackage (PV	/ File #: 14-	R-01)	Location:						rgent	Ave. an	d Ellic	æ Av	θ.	
Contra	ctor:	Paddock Dri					Ground Elevation	on: <u>T</u>	op of	Pave	ment							
Method	1:	125mm Solid S	Stem Auge	r, Acker MP8	Truck Mount		Date Drilled:	_1;	3 Jan	uary :	2014							
S	ample	Туре:		Grab (G)		Shelby Tube (T)	Split Spoon	(SS)	X	Sp	lit Bar	rrel (S	B)		ore (C	c)		
P	article	Size Legend:		Fines	Clay	/ Siit	Sand	•	H	Grav		67		obbles	•	Вс	oulders	3
	_	9							0	Эēг	40.4-	□ Bul _ (k	k Unit N/m³) 19	Wt			ained S ngth (k	
\$	Soil Symbol								Sample Type	Sample Number		Partick	- 32		1	I	st Typ	<u>e</u>
Depth (m)	Sy			M.ª	ATERIAL DE	SCRIPTION			eg.	Se P	0 20			80 100	o	Po	orvane cket Pe	អា. 💠
	တိ								San	am		\vdash	MC		1	O Fi	d Qu⊠ eld Vaun	le O
		ASPHALT (100	mm thic	k)					+		0 20	40	60	80 100	0 5	0 1	00 15	0 200
3		CONCRETE (17			-					C03								
				·						C04	aa							
- I		CLAY - silty, tra - dark grey		i, trace orga	nics, trace o	oxidation			4	G01		•						
0.5			0.4 m, m	oist and firm	n when thav	ved				ļ		and the same and the same of						
		- mgn piasi	y							G02		•						
														**1	- Paralle Services			
1									Ц									
-10-		- brown, soft bel	ow 0.9 m	n					4	G03		•						
		SILT - trace clay		and, trace o	xidation to 1	.5 m				G04								
]		light browmoist, sof																
_ [- low plastic							Ц									
1.5									4	G05	•							
- 1										G06	•							
]																		
-2.0-									Ц				-v n (5)4-					
] [4	G07								
. 41																		
		CLAY - silty, tra	ce silt inc	dusions (<10	0 mm diam.)				G08		•				۰	Δ	
-2.5-		- grey - moist, stif		·		•												
		- high plast	icity	Juli														
//																		
3.0																		
									Z	G09		•				con titre	NOTE:	
		END OF TEST I Notes:	HOLE AT	3.3 m IN C	CLAY													
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		cold patch to top	of paver	nent.			f pavement and asp											
		 Test hole loca Victor St. 	ted on so	outhbound \	rictor St. bel	ween Sargent Ave.	and Ellice Ave., in fr	ront of										
		· · · · · · · · · · · · · · · · · ·																
														-				
Logged	By:	Beta Taryana	ERN HOUSE		Reviev	ved By: Brent Ha	/		Pı	rojec	t Eng	ineer	r: <u>N</u>	elson Fe	erreira			

TREK

Client	•	Morrison He	<u>arshfield</u>						Project	t Number:	0035	011 0	0	_						
Ртојес	t Nam	ne: 2014 Local :	Streets F	ackage (P	W File#	: 14-R	<u>₹-01)</u>		Locatio	on:	Victor	St	betwe	en Sarg	ent A	ve. and	l Ellice	Ave.		
Contra	actor:	Paddock Dri	illing Ltd.	<u></u>					Ground	d Elevation:	Top of	Pave	ment	<u>t</u>						
Metho	d:	125mm Solid S	Stem Auge	ar, Acker MP8	3 Truck Mc	<u>ount</u>			Date D	rilied:	13 Ja	nuary	2014							
Ş	Sample	Type:		Grab (G)			Shell	by Tube (T)	⊠ sr	olit Spoon (SS	3) 🔼	Sp	dit Ba	rrel (SB) [Cc	ore (C)			
F	² article	Size Legend:		Fines		Clay		Silt	• • • •	Sand		Gra	vel	62				Bould	lers	
Depth (m)	Soil Symbol			М	IATERIAI	T DES	3CRIP	TION			Sample Type	Sample Number		Particle :	(m³) 19 Size (% 60 C L	20 21 %) 80 100 LL	•	Indraine Strengti Test △ Torv Pocket ☑ Q ○ Field	th (kPa) Type vane △ vt Pen. • tu ⊠ Vane ○) •
1200		ASPHALT (70 n CONCRETE (15	50 mm th	hick)								C05 C06	0 2	0 40	60	80 100	0 50	100	150	20025
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A STATE OF THE STA			•								4	G02		•			\$4			
-1.0		SILT - clayey, tra - light brow - moist, sof - low plastic	vn oft	I						E	4	G03								
1	, , ,										4	G04								
-1.5												G05								
-2.0												G06								
2.0											4	G07		•						
2.5		CLAY - silty, trad - dark grey - moist, stif - high plast	/ iff	, trace silt i	nclusion	is (<10	0 mm c	diam.)				G08					œ	7		
												G09		•						
	1 2 0	END OF TEST I Notes: 1. No sloughing 2. Backfilled test cold patch to top 3. Test hole loca 563 Victor St.	or seepa t hole with p of paver	age observe th auger cut ment.	ed. Ittings, sa					•							. 11			
	d Bv	Beta Taryana			- Rr		ed By:	: Brent Ha		-V		rojec	+ Fn	gineer:	Nel	 eon Fe				

TREK GEOTECHNICAL

	Marriage			·									
Client:	Morrison He				Project Number:	0035							
-		Streets Package (PW	File #: 14-K-I	01)	Location:				n Sargen	t Ave. an	d Ellice	Ave.	
Contractor:					Ground Elevation:								
Method:		Stem Auger, Acker MP8 Tr			Date Drilled:		nuary	2014					
Sampl	le Туре:	Grab (G)		Shelby Tube (T)	Split Spoon (S	S)	Sp	lit Barr	el (SB)	C	ore (C)		
Particl	e Size Legend:	Fines	Clay	Silt	Sand	X	Gra			Cobbles		Boulde	ers
					-	9	ЭӨГ		Bulk Uni (kN/m)	t Wt	1 .	Indrained Strength	
Symbol						Sample Type	Sample Number	16 17	18 1 article Siz	- 0	-	Test Ty	YD6
Depth (m)		MAT	ERIAL DESC	CRIPTION		읦	Je N	0 20	40 6			△ Torva	Pen. 💠
Soil						San	amb	Pl -		"		⊠ Qu Field Va	ane O
	ASPHALT (55 m	nm thick)					C07	0 20	40 6	0 80 100	0 50	100 1	150 200250
	CONCRETE (12		<u> </u>			/	C08						
		ce silt inclusions (<5 n	nm diam.), tra	ace organics			G01		•				-
	- dark grey - frozen, m	oist and firm when tha	wed, high pla	asticity				4					
-0.5-	SILT - clayey, tra	ace sand, trace oxidati	ion			\dashv	000						
1	- light brow - moist, firm	n					G02		•				
<u> </u>	- low plastic	zity											
1							G03	1					
1.0-													
1111	- trace clay below	w 1 1 m					C04						
<u> </u>	- date day belot						G04						
1111						ļ							
4.5	CLAY - silty, trad - grey	ce silt inclusions (<5 m	nm diam.)			4	G05					△	
1.5	- moist, stiff							in the professional rate date is used			M - x - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2 - 2		
	- high plasti SILT - trace clay						G06						
]	- light brow	n					500		30		100		201 201 201 201 201 201 201 201 201 201
_	- moist, soft - low plastic												
2.0							G07	•					
	CLAY - silty, trad - brown	ce silt inclusions (<5 m	nm diam.)					and and					
-////	- moist, ven - high plasti						G08				• 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		
	- riigii piasu	uty					300	i				2	
2.5-											A		
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3.0-													
							G09						
	END OF TEST H Notes:	HOLE AT 3.2 m IN CL	AY										
	1. No sloughing	or seepage observed.	0	. 									
	cold patch to top	of pavement.			f pavement and asphal								
	Test hole localVictor St.	ted on northbound Vic	tor St. betwe	en Sargent Ave.	and Ellice Ave., in front	t of							
	5 . · · · · · · · · · · · · · · · · · ·												
													I
_ogged By:	Beta Taryana		Reviewed	By: Brent Ha	/	i	Projec	t Engi	neer: <u> </u>	<u>lelson Fe</u>	rreira		



		<u> LLMIIII</u>		·											
Client:		Morrison Her	shfield				Project Number:	0035	011 (00					
Project	Name	: 2014 Local S	treets P	ackage (P\	N File #: 14-F	₹-01)	Location:	Victo	r St	betwe	en Sarge	ent Ave. a	nd Ellica	e Ave.	
Contrac	ctor:	Paddock Drill	ling Ltd.				Ground Elevation:	Top o	of Pav	ement					
Method	l:	125mm Solid S	tem Auge	r, Acker MP8	Truck Mount		Date Drilled:	13 Ja	anuary	2014					
Sa	ample	Туре:		Grab (G)		Shelby Tube (T)	Split Spoon (S	S) 🕨	s	plit Ba	rel (SB)		Core (C)	
Pa	article	Size Legend:		Fines	Clay	Silt	Sand		Gra		بسلك	Cobbles		Boulder	s
									ē	i	□ Bulk U (kN/r 18			Undrained S Strength (I	
.	Soil Symbol							Sample Type	Sample Number	16 17			21	Test Tyr	
Depth (m)	<u>Ş</u>			M	ATERIAL DE	SCRIPTION		음	<u>0</u>	0 20	Particle S	60 80 10	00 4	△ Torvano Pocket P	
	Sol							Sam	dme	1 1	PL MC		-	⊠ Qu⊠ O Field Va	3
								0,	Š	0 20	40	60 80 10		100 15	
		SPHALT (108 i		<u>· </u>					C09						1
	4 4	ONCRETE (11		·					C10						
		LAY - silty, trac - black	e sand,	trace rootle	ets, trace orga	anics			G01		•		•	Δ	
		- frozen to 0).4 m, m	oist and st	iff to very stiff	when thawed									
0.5		- high plasti	city						G02						
	/// -	brown below 0.8	6 m						G02	1					
F - 1/2												-			
									G03				:		
-1.0-														200 A 100 A 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
									ļ						
		trace gravel bei	ow 1.1 n	n				4	G04		•			• 🗠	
				et.											
									G05	-					
T1.5-									- 555						
	/// -	firm below 1.7 r	n						G06		•				
-2.0-	/// -	light brown belo	w 1.9 m	1										(0.00)	
								4	G07	-					
		ILT - trace sand	1												
[]		 light brown)						G08	1					
25		 moist, firm low plastic 							-						
			e sand,	trace grave	d, trace silt in	clusions (<5 mm di	am.)								
		brownmoist, firm										0.00			
		- high plastic	city								F 14 14 18 19 19 18 18 1 1 1 1 1 1 1 1 1 1 1 1				
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									G09	۱ .					
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		otes: . No sloughing o	nr seena	ne ohserve	d										
	2	Backfilled test	hole with	h auger cut	ttings, sand to	0.1 m below top o	f pavement and asphalt	t							
	3	old patch to top Test hole locat	of paven ed on no	nent. orthbound \	Victor St. betv	veen Sarcent Ave.	and Ellice Ave., in front	of							
	5	35 Victor St.			30 500			J.							
Logged	By:	Beta Taryana			Review	red By: Brent Ha	/		Proje	ct Eng	ineer:	Nelson F	erreira		

TREK

Client:	Morrison Her	shfield			Project Number:	0035	011 00				
Project Name	e: 2014 Local S	Streets Package (F	W File #: 14-F	₹-01)	Location:	Victor	St be	tween Sarge	ent Ave. and	d Ellice Ave.	
Contractor:	Paddock Dril	ling Ltd.			Ground Elevation:	Top of	Paver	ent			
Method:	125mm Solid S	tem Auger, Acker MF	8 Truck Mount		Date Drilled:	13 Ja	nuary 2	014			
Sample	Туре:	Grab (G)		Shelby Tube (T)	Split Spoon (SS	3)	Split	Barrel (SB)	C	ore (C)	
Particle	Size Legend:	Fines	Clay	Silt	Sand	34	Grave	ــــــــــــــــــــــــــــــــــــــ	Cobbles	Boule	ders
Depth (m) Soil Symbol	ACDUALT (FO		MATERIAL DE	SCRIPTION		Sample Type	Sample Nun	PL MC	n ³) 19 20 21 ize (%) 60 80 100	Streng Iest △ Ton Pocke ○ C ○ Field	ed Shear th (kPa) Type vane △ tt Pen. • tu ⊠ Vane ○ 150 2002
	ASPHALT (50 m CONCRETE (22					-/1	C11 C12				
-0.5	- black	0.4 m, moist and f		•	nm diam.), trace rootlets		G01 G02				
-1.0-	mottled grey an	d brown below 0.9	m			4	G03	•			
-1.5	brown below 1.	5 m				4	G04 G05			•	
2.0-	some sand, sor	ne gravel, mottled	brown and gre	ey below 1.8 m			G06				
	CLAY - siltv. trac	e sand, trace grav	el. trace silt in	clusions (<5 mm dia	am.)	- 4	G07				
2.5	- brown - moist, firm - high plasti	to stiff	, 	, C	,		G08			-2-2	
3.0	END OF TEST H	OLE AT 3.3 m IN	CI AV				G09				
N 1 2 0 3	Notes: No sloughing of Backfilled test and patch to top	or seepage observ hole with auger cu of pavement.	ed. Ittings, sand to		f pavement and asphalt and Ellice Ave., in front						
Logged By:	Beta Taryana		Review	red By: Brent Hay	/	P	roiect	Engineer:	Nelson Fe	rreira	

Test Hole TH14-07

1 of 1

Sub-Surface Log

TREK

MATERIAL DESCRIPTION	G E	UT	<u>ECHNI</u>	<u>cal</u>												
Contractor: Paddock Drilling Ltd.			'				Project N	umber:	0035	011 00						
Method: 125mm Solid Stem Auger, Acker MP8 Truck Mount Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) Split Barrel (SB) Core (C) Particle Size Legend: Fines Clay Silt Silt Sand Gravel Grave	Proje	ct Nam			W File #: 14-R-0	01)	Location	: <u>-</u>	Victor	St bet	ween Sar	gent Ave.	and E	Ellice A	v e.	
Sample Type: Grab (G) Shelby Tube (T) Split Spoon (SS) Split Barrel (SB) Core (C) Particle Size Legend: Fines Clay Silt Silt Sand Grave G	Contr	ractor:	Paddock Dri	lling Ltd.			Ground E	levation:	Top of	Paveme	ent					
Particle Size Legend: Fines Clay Silt Sand Gravel Cobbles Boulder Streng Issue Cobbles MATERIAL DESCRIPTION MATERIAL DESCRIPTION ASPHALT (45 mm thick) CONCRETE (130 mm thick) CLAY - silty, trace sand, trace gravel, trace silt inclusions (<5 mm diam.), trace organincs to 0.8 m - black - frozen to 0.4 m, moist and stiff to very stiff when thawed - high plasticity Bould Unit Wit (Nymr) 20 21 Issue Trace Silt Inclusions (<5 mm diam.), trace organincs to 0.8 m GO2 GO3 GO3 GO3	Metho	od:	125mm Solid S	Stem Auger, Acker MP8	3 Truck Mount		Date Dril	led:	13 Jan	uary 20	14					
MATERIAL DESCRIPTION Strength Strength		Sample	Туре:	Grab (G)		Shelby Tube (T)	Split	Spoon (SS) 🔀	Split	Barrel (SE	3)	Core) (C)		
MATERIAL DESCRIPTION Strength 16 17 18 19 20 21 18 18 19 20 21 18 18 19 20 21 18 18 19 20 21 18 19 20 21 18 19 20 21 18 19 20 21 18 19 20 21 18 19 20 21 19 20 21 19 20 21 19 20 21 19 20 21 19 20 20 21 19 2		Particle	Size Legend:	Fines	Clay	Silt		Sand	34	Gravel	57	Cobbles	s I	В	Boulders	;
- frozen to 0.4 m, moist and stiff to very stiff when thawed - high plasticity G02 G03	Depth (m)		CONCRETE (13 CLAY - silty, trad	nm thick) 30 mm thick)			am.), trace o	ganines to	_	C13 C14	17 18 Particle 20 40 PL N	19 20 Size (%) 60 80	100	Str A Pr O F	Irained S rength (k Test Type Torvane Ocket Pe ⊠ Qu ⊠ Field Van 100 150	Pa) e en. op
-1.5-	-0.5		- frozen to	0.4 m, moist and st icity	iff to very stiff w	hen thawed					•				Δ	
-2.5 END OF TEST HOLE AT 3.2 m IN CLAY Notes: 1. No sloughing or seepage observed. 2. Backfilled test hole with auger cuttings, sand to 0.1 m below top of pavement and asphalt cold patch to top of pavement. 3. Test hole located on Victor St. between Sargent Ave. and Ellice Ave., center line of road in between 499 and 497 Victor St.	-1.0- - - -1.5-										•		III	•		
END OF TEST HOLE AT 3.2 m IN CLAY Notes: 1. No sloughing or seepage observed. 2. Backfilled test hole with auger cuttings, sand to 0.1 m below top of pavement and asphalt cold patch to top of pavement. 3. Test hole located on Victor St. between Sargent Ave. and Ellice Ave., center line of road in between 499 and 497 Victor St.	-2.0-		trace silt inclus	ions (<10 mm diam	ı.) below 1.7 m						•					
END OF TEST HOLE AT 3.2 m IN CLAY Notes: 1. No sloughing or seepage observed. 2. Backfilled test hole with auger cuttings, sand to 0.1 m below top of pavement and asphalt cold patch to top of pavement. 3. Test hole located on Victor St. between Sargent Ave. and Ellice Ave., center line of road in between 499 and 497 Victor St.	-2.5 - - -3.0									G08	•			٥	υ Δ	
END OF TEST HOLE AT 3.2 m IN CLAY Notes: 1. No sloughing or seepage observed. 2. Backfilled test hole with auger cuttings, sand to 0.1 m below top of pavement and asphalt cold patch to top of pavement. 3. Test hole located on Victor St. between Sargent Ave. and Ellice Ave., center line of road in between 499 and 497 Victor St.										G09	•					
		1 2 0 3	Notes: I. No sloughing of Backfilled test cold patch to top B. Test hole locar	or seepage observe hole with auger cur of pavement. ted on Victor St. be	ed. ttings, sand to 0			-	1	,						
Logged By: Beta Taryana Reviewed By: Brent Hay Project Engineer: Nelson Ferreira	Logge	ed By:	Beta Taryana		Reviewer	d By: Brent Ha			Pi	roject F	ngineer:	Nelson	Ferre	ira		

TREK

Client	<u>-</u>	Morrison He					Project Number	0035	244 (20					
1.00		me: 2014 Local S				D 04)	-				- Carne	ent Ave. a		A	
	ct nam ractor:				V FII⊌ #. 1	<u><-01)</u>					9 1 1 ວະນຸບູເ	BNT AVU. a	NO EIIICO	Ave.	
Metho					Tarab Maunt		Ground Elevation:	-							
			Stem Auge	er, Acker MP8	Truck Mount					2014					
		е Туре:	73377	Grab (G)		Shelby Tube (T)	Split Spoon (SS				rel (SB)		Core (C)		
	Particle	e Size Legend:		Fines	Clay	y III Silt	Sand		Gra			Cobbles	•	Boulde	
	-	1						_ g	je je	16 17	☐ Bulk U (kN/n 18	JnjitWt n³) 19 20 2		Indrained Strength (
ぎご	Soil Symbol	1			BF			Sample Type	Sample Number	7.1	1,8 Particle S		-	Test Ty	<u>/pe</u>
Depth (m)	S	1		MA	ATERIAL DE	SCRIPTION		nple	- Be	0 20	40	60 80 10		△ Torvar Pocket F	Pen. 🗣
	တိ	1						Sar	Sam		L MC			⊠ Qul Field Va	ane O
		ASPHALT (115	mm thic	~ L /				+	ļ	0 20	40	60 80 10	00 0 50	100 1	50 20025
. 1		-						+	C15						
_ #	-	CLAY - silty, trad	ace grave	el				+	G01			-			
F		 mottled bl 	black and	dark brown	n m to stiff whe	on thousand				1					
05		- high plast	ticity		// to Suit wite	in triawed									
*		- dark grey below	w 0.5 m						G02] (•		•		
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. 1		i						4	G03						
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. 1		l							G04	1	•				
- 7		i										1-1-			-
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		i							G06		•			•	
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· *		l						4	G07		•				
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. <i>1</i>		- brown below 2.	∕.3 m						G08				••		
1									GUU	1		1			
-2.5-7		Í													
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· 7		Í													-
Y		1													
-3.0-		1													
. 7									G09	-	•				
<u>*</u>		END OF TEST H	HOLE A	Г 3.2 m IN C	LAY				-	- 1	10		_الال		(11)
i		Notes: 1. No sloughing of	or seep	age observer	d.										
	- 2	2. Backfilled test	t hole wit	ith auger cutti	tings, sand to	ວ 0.1 m below top of	f pavement and asphalt								
		cold patch to top 3. Test hole locar	ated on V	ment. /ictor St. bet	ween Sarger	nt Ave. and Ellice A	ve., center line of road in	1							
	1	front of 483 Victo	or St.		-										
·															
-2.5- -3.0-	d By:	Beta Taryana			Review	wed By: Brent Hay	V		Proje	ct Eng	ineer:	Nelson F	erreira		
	_				_0:			-							



2014 Local Streets Package (PW File #: 14-R-01) Sub-Surface Investigation Victor Street

Test Hole		Paveme	ent Surface	Pavement Str	ucture Material		Sample	Depth (m)	Moisture		Grain Siz	a Analysis	,	A	terberg L	imits
No.	Test Hole Location	Туре	Thickness	Туре	Thickness	Subgrade Description	Тор	Bottom	Content	Gravel	Sand	Silt	Clay	St		Plasticity
		1300	(mm)	1,970	(mm)		(m)	(m)	(%)	(%)	(%)	(%)	(%)	Plastic	Liquid	Index
		Asphalt	105	Concrete	115											
						Clay	0.2	0.3	36							
						Clay	0.5	0.6	24							
	Victor St. between					Clay	0.8	0.9	28							
TH14-01	Sargent Ave. and Ellice					Silt	1.1	1.2	29							
	Ave., east side of 690					Silt	1.4	1.5	20							
	Sargent Ave.					Silt	1.7	1.8	19							
						Silt	2.0	2.1	22							
						Clay	2.3	2.4	31							
						Clay	3.1	3.2	32					L	L	
		Asphalt	100	Concrete	170									L		
						Clay	0.3	0.4	27							
						Clay	0.6	0.7	27							
	Victor St. between					Clay	0.9	1.0	30							
TH14-02	Sargent Ave. and Ellice					Silt	1.2	1.3	21							
	Ave., In front of 579 Victor St.					Silt	1.5	1.6	19							
						Silt	1.8	1.9	. 17							
						Silt	2,1	2.2	22							
						Clay	2.4	2.5	35							
						Clay	3.2	3.3	30							
		Asphalt	70	Concrete	150	<u></u>									L	
						Clay	0.2	0.3	29							
						Clay	0.5	0.6	29							
	Victor St. between					Silt	0.8	0.9	28	0	1	69	30	16	29	13
TH14-03	Sargent Ave. and Ellice					Silt	1.1	1.2	21							
	Ave., in front of 563 Victor St.					Silt	1.4	1.5	21							
1 1	St.					Silt	1,7	1.8	23	\Box						
1						Sint	2.0	2.1	22							
1						Clay	2.3	2.4	41							
						Clay	3.1	3.2	35					\Box		
		Asphalt	55	Concrete	125											
						Clay	0.2	0.3	33							
				L		Silt	0,5	0.6	32							
	Victor St. between					Silt	8,0	0.9	26							
TH14-04	Sargent Ave. and Ellice					Silt	1.1	1,2	20							
	Ave., in front of 547 Victor St.					Clay	1.4	1.5	38	oxdot						
	ol.					Silt	1.7	1.8	24							
1 1						Silt	2.0	2.1	23							
						Clay	2.3	2.4	32							
						Clay	3.1	3.2	36							



2014 Local Streets Package (PW File \$: 14-R-01) Sub-Surface investigation Victor Street

Test Hole		Pavemo	ent Surface	Pavement Str	ucture Material		Sample	Depth (m)	Moisture		Grain Siz	e Analysi:	1	A	tterberg L	imits
No.	Test Hole Location	Туре	Thickness (mm)	Туре	Thickness (mm)	Subgrade Description	Top (m)	Bottom (m)	Content (%)	Gravel (%)	Sand (%)	Sift (%)	Clay (%)	Plastic	Liquid	Plasticity Index
		Asphalt	108	Concrete	118							\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \	(,	-		
			1			Clay	0.2	0.3	27							
						Clay	0.5	0.6	23				$\overline{}$		1	
	Victor St. between					Clay	0.8	0.9	24	0	8	29	64	18	61	43
TH14-05	Sargent Ave. and Ellice					Clay	1.1	1.2	25							
1111440	Ave., in front of 535 Victor		l			Clay	1.4	1.5	27						1	
	St.					Clay	1.7	1.8	27							
						Clay	2.0	2.1	25							
						Silt	2,3	2.4	19							
						Clay	3.1	3.2	25							
		Asphalt	50	Concrete	220											
		20				Clay (Fili)	0.3	0.4	32							
					_	Clay (Fill)	0.6	0.7	25	5	12	24	59	17	66	49
	Victor St. between					Clay (Fill)	0.9	1.0	20							
TH14-06	CH14-06 Sargent Ave. and Ellice Ave., in front of 521 Victor St.					Clay (Fill)	1.2	1.3	24							
						Clay (Fill)	1.5	1.6	23							
	St.					Clay (Fill)	1.8	1.9	18							
						Clay (Fili)	2.1	2.2	19							
						Clay	2.4	2.5	17							
						Clay	3.2	3.3	39							
		Asphalt	45	Concrete	130	<u> </u>		ļ								
						Clay	0.2	0.3	32							
	Victor St. between					Clay	0.5	0.6	29							
	Sargent Ave. and Ellice					Clay	8.0	0.9	26					<u> </u>		
TH14-07	Ave., center line of road					Clay	1.1	1.2	27	0	3	24	73	19	74	55
	in front of 499 and 497					Clay	1.4	1.5	27							
	Victor St.					Clay	1.7	1.8	27							
						Clay	2.0	2.1	26							
						Clay	2,3	2.4	39							
		Asshalt	445	0	25	Clay	3.1	3.2	40						<u> </u>	
		Asphalt	115	Concrete	95	01-			47					<u> </u>		
į						Clay	0.2	0.3	17	—		<u> </u>		<u> </u>		<u> </u>
	16-4 Ot 15-4					Clay	0.5	0.6	26				<u> </u>	<u> </u>		<u> </u>
	Victor St. between Sargent Ave. and Etlice					Clay	0.8	0.9	24	\vdash			ļ			<u> </u>
TH14-08	Ave., center line of road					Clay	1.1	1.2	27				<u> </u>	<u> </u>	<u> </u>	
	in front of 483 Victor St.					Clay	1.4	1.5	28	\vdash			<u> </u>	—		
						Clay	1.7	1.8	27	\vdash		<u> </u>			\vdash	
						Clay	2.0	2.1	28			-				<u> </u>
						Clay	2.3	2.4	23					<u> </u>	-	
						Clay	3.1	3.2	28					L	L	



Project No.

0035 011 00

Client

Morrison Hershfield

Project

Local Streets Package 14-R-01 Victor Street

Sample Date

12-Jan-14

Test Date

20-Jan-14

Technician

Hachem Ahmed

Test Pit	TH14-01	TH14-01	TH14-01	TH14-01	TH14-01	TH14-01
Depth (m)	0.2 - 0.3	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5	1.7 - 1.8
Sample #	G1	G2	G3	G4	G5	G6
Tare ID	C8	E4	E89	F56	P29	W107
Mass of tare	8.2	8.4	8.5	8.3	8.3	8.4
Mass wet + tare	138.6	180.6	249.0	273.9	185.8	168.8
Mass dry + tare	104.3	147.3	195.9	214.0	156.2	143.2
Mass water	34.3	33.3	53.1	59.9	29.6	25.6
Mass dry soil	96.1	138.9	187.4	205.7	147.9	134.8
Moisture %	35.7%	24.0%	28.3%	29.1%	20.0%	19.0%

Test Pit	TH14-01	TH14-01	TH14-01	TH14-02	TH14-02	TH14-02
Depth (m)	2.0 - 2.1	2.3 - 2.4	3.1 - 3.2	0.3 - 0.4	0.6 - 0.7	0.9 - 1.0
Sample #	G7	G8	G9	G1	G2	G3
Tare ID	E143	E52	Z-87	C2	E125	F90
Mass of tare	8.4	8.4	8.3	8.3	8.3	8.3
Mass wet + tare	202.2	270.1	256.1	223.2	215.7	229.2
Mass dry + tare	167.3	208.2	196.6	176.9	171.6	178.5
Mass water	34.9	61.9	59.5	46.3	44.1	50.7
Mass dry soil	158.9	199.8	188.3	168.6	163.3	170.2
Moisture %	22.0%	31.0%	31.6%	27.5%	27.0%	29.8%

Test Pit	TH14-02	TH14-02	TH14-02	TH14-02	TH14-02	TH14-02
Depth (m)	1.2 - 1.3	1.5 - 1.6	1.8 - 1.9	2.1 - 2.2	2.4 - 2.5	3.2 - 3.3
Sample #	G4	G5	G6	G7	G8	G9
Tare ID	D21	H5	P36	W05	Z 96	K36
Mass of tare	8.4	8.3	8.5	8.3	8.3	8.3
Mass wet + tare	300.8	247.8	286.7	265.2	267.5	251.3
Mass dry + tare	249.7	209.1	246.3	219.4	199.9	195.5
Mass water	51.1	38.7	40.4	45.8	67.6	55.8
Mass dry soil	241.3	200.8	237.8	211.1	191.6	187.2
Moisture %	21.2%	19.3%	17.0%	21.7%	35.3%	29.8%



Project No. 0035 011 00

Client Morrison Hershfield

Project Local Streets Package 14-R-01 Victor Street

Sample Date 12-Jan-14
Test Date 20-Jan-14

Technician Hachem Ahmed

Test Pit	TH14-03	TH14-03	TH14-03	TH14-03	TH14-03	TH14-03
Depth (m)	0.2 - 0.3	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5	1.7 - 1.8
Sample #	G1	G2	G3	G4	G5	G6
Tare ID	F4	E88	E98	D17	A14	H37
Mass of tare	8.5	8.5	8.5	8.4	8.3	8.3
Mass wet + tare	235.7	255.0	252.5	247.4	352.7	274.9
Mass dry + tare	184.4	200.2	198.7	205.7	294.1	225.5
Mass water	51.3	54.8	53.8	41.7	58.6	49.4
Mass dry soil	175.9	191.7	190.2	197.3	285.8	217.2
Moisture %	29.2%	28.6%	28.3%	21.1%	20.5%	22.7%

Test Pit	TH14-03	TH14-03	TH14-03	TH14-04	TH14-04	TH14-04
Depth (m)	2.0 - 2.1	2.3 - 2.4	3.1 - 3.2	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2
Sample #	G7	G8	G9	G2	G3	G4
Tare ID	W70	Z04	E128	W29	D32	K24
Mass of tare	8.4	8.4	8.3	8.3	8.4	8.4
Mass wet + tare	250.2	265.6	265.1	253.9	221.4	198.7
Mass dry + tare	207.1	190.7	199.1	194.1	178.1	167.1
Mass water	43.1	74.9	66.0	59.8	43.3	31.6
Mass dry soil	198.7	182.3	190.8	185.8	169.7	158.7
Moisture %	21.7%	41.1%	34.6%	32.2%	25.5%	19.9%

Test Pit	TH14-04	TH14-04	TH14-04	TH14-04	TH14-05	TH14-05
Depth (m)	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1	2.3 - 2.4	0.2 - 0.3	0.5 - 0.6
Sample #	G5	G6	G7	G8	G1	G2
Tare ID	H60	H79	Z12	СЗ	A30	P06
Mass of tare	8.4	8.4	8.5	8.5	8.3	8.4
Mass wet + tare	245.1	246.8	277.5	217.9	166.9	209.4
Mass dry + tare	179.5	200.4	228.0	167.1	133.1	171.4
Mass water	65.6	46.4	49.5	50.8	33.8	38.0
Mass dry soil	171.1	192.0	219.5	158.6	124.8	163.0
Moisture %	38.3%	24.2%	22.6%	32.0%	27.1%	23.3%

Project No.

0035 011 00

Client

Morrison Hershfield

Project

Local Streets Package 14-R-01 Victor Street

Sample Date

12-Jan-14

Test Date

20-Jan-14

Technician

Hachem Ahmed

Test Pit	TH14-05	TH14-05	TH14-05	TH14-05	TH14-05	TH14-05
Depth (m)	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1	2.3 - 2.4
Sample #	G3	G4	G5	G6	G7	G8
Tare ID	F20	H17	P33	Z79	H90	Z125
Mass of tare	8.3	8.4	8.4	8.7	8.4	8.3
Mass wet + tare	229.4	161.3	200.1	313.2	240.4	284.3
Mass dry + tare	186.6	131.2	158.8	249.0	193.7	240.0
Mass water	42.8	30.1	41.3	64.2	46.7	44.3
Mass dry soil	178.3	122.8	150.4	240.3	185.3	231.7
Moisture %	24.0%	24.5%	27.5%	26.7%	25.2%	19.1%

Test Pit	TH14-05	TH14-06	TH14-06	TH14-06	TH14-06	TH14-06
Depth (m)	3.1 - 3.2	0.3 - 0.4	0.6 - 0.7	0.9 - 1.0	1.2 - 1.3	1.5 - 1.6
Sample #	G9	G1	G2	G3	G4	G5
Tare ID	W75	W35	E107	W21	E45	P11
Mass of tare	8.3	8.4	8.5	8.4	8.5	8.3
Mass wet + tare	235.1	228.8	197.9	263.8	260.9	174.4
Mass dry + tare	190.3	175.9	160.0	221.9	212.1	143.8
Mass water	44.8	52.9	37.9	41.9	48.8	30.6
Mass dry soil	182.0	167.5	151.5	213.5	203.6	135.5
Moisture %	24.6%	31.6%	25.0%	19.6%	24.0%	22.6%

Test Pit	TH14-06	TH14-06	TH14-06	TH14-06	TH14-07	TH14-07
Depth (m)	1.8 - 1.9	2.1 - 2.2	2.4 - 2.5	3.2 - 3.3	0.2 - 0.3	0.5 - 0.6
Sample #	G6	G7	G8	G9	G1	G2
Tare ID	E92	R150	W69	E59	A21	C19
Mass of tare	8.4	4.5	8.3	8.4	8.5	8.3
Mass wet + tare	248.2	288.5	175.4	241.8	197.8	218.9
Mass dry + tare	212.1	242.2	151.2	176.2	151.7	172.1
Mass water	36.1	46.3	24.2	65.6	46.1	46.8
Mass dry soil	203.7	237.7	142.9	167.8	143.2	163.8
Moisture %	17.7%	19.5%	16.9%	39.1%	32.2%	28.6%



Project No.

0035 011 00

Client

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Project

Local Streets Package 14-R-01 Victor Street

Sample Date

12-Jan-14

Test Date

20-Jan-14

Technician

Hachem Ahmed

Test Pit	TH14-07	TH14-07	TH14-07	TH14-07	TH14-07	TH14-07
Depth (m)	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1	2.3 - 2.4
Sample #	G3	G4	G5	G6	G7	G8
Tare ID	Z13	Z86	F1	A108	K6	K26
Mass of tare	8.5	8.3	8.5	8.6	8.5	8.7
Mass wet + tare	302.5	266.5	265.6	238.9	247.4	243.1
Mass dry + tare	241.1	212.0	210.2	189.6	198.1	177.4
Mass water	61.4	54.5	55.4	49.3	49.3	65.7
Mass dry soil	232.6	203.7	201.7	181.0	189.6	168.7
Moisture %	26.4%	26.8%	27.5%	27.2%	26.0%	38.9%

Test Pit	TH14-07	TH14-08	TH14-08	TH14-08	TH14-08	TH14-08
Depth (m)	3.1 - 3.2	0.2 - 0.3	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5
Sample #	G9	G1	G2	G3	G4	G5
Tare ID	E32	НА	F120	E41	A38	N49
Mass of tare	8.4	376.7	8.2	8.4	8.2	8.3
Mass wet + tare	249.1	1099.6	343.8	295.0	234.6	429.5
Mass dry + tare	180.6	996.8	275.3	239.5	186.2	337.8
Mass water	68.5	102.8	68.5	55.5	48.4	91.7
Mass dry soil	172.2	620.1	267.1	231.1	178.0	329.5
Moisture %	39.8%	16.6%	25.6%	24.0%	27.2%	27.8%

Test Pit	TH14-08	TH14-08	TH14-08	TH14-08	
Depth (m)	1.7 - 1.8	2.0 - 2.1	2.3 - 2.4	3.1 - 3.2	
Sample #	G6	G7	G8	G9	
Tare ID	E28	Z10	Z70	P18	
Mass of tare	8.4	8.2	8.4	8.4	
Mass wet + tare	282.3	394.7	258.2	249.2	
Mass dry + tare	224.9	309.2	210.8	196.3	
Mass water	57.4	85.5	47.4	52.9	
Mass dry soil	216.5	301.0	202.4	187.9	
Moisture %	26.5%	28.4%	23.4%	28.2%	



Project No. 0035 011 00

Client Morrison Hershfield

Project Local Streets Package 14-R-01 Victor Street

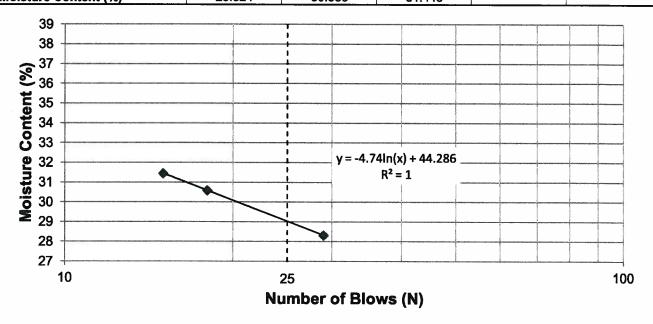
Test Hole TH14-03 Sample # G3 Depth (m) 0.8 - 0.912-Jan-14 Sample Date **Test Date**

Liquid Limit 29 11-Feb-14 **Plastic Limit** 16 **Daniel Mroz Plasticity Index** 13

Liquid Limit

Technician

Trial #	1	2	3	4	5
Number of Blows (N)	29	18	15		
Mass Wet Soil + Tare (g)	24.553	23.042	22.752		
Mass Dry Soil + Tare (g)	22.282	20.938	20.622		
Mass Tare (g)	14.264	14.059	13.849		
Mass Water (g)	2.271	2.104	2.130		
Mass Dry Soil (g)	8.018	6.879	6.773		
Moisture Content (%)	28.324	30.586	31.448		



Trial #	1	2	3	4	5
Mass Wet Soil + Tare (g)	20.151	20.004			
Mass Dry Soil + Tare (g)	19.326	19.185			
Mass Tare (g)	14.066	13.924			
Mass Water (g)	0.825	0.819			
Mass Dry Soil (g)	5.260	5.261			
Moisture Content (%)	15.684	15.567			

0035 011 00 Project No.

Client Morrison Hershfield

Project Local Streets Package 14-R-01 Victor Street

Test Hole TH14-05 Sample # G3

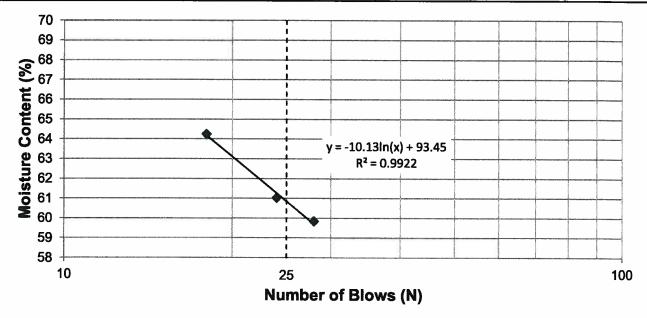
Depth (m) 0.8 - 0.912-Jan-14 Sample Date

Test Date 30-Jan-14 **Technician Hachem Ahmed**

Liquid Limit 61 **Plastic Limit** 18 **Plasticity Index** 43

Liquid Limit

Trial #	1	2	3	4	5
Number of Blows (N)	28	24	18		
Mass Wet Soil + Tare (g)	20.745	21.035	20.803		
Mass Dry Soil + Tare (g)	18.299	18.421	18.166		
Mass Tare (g)	14.212	14.138	14.062		
Mass Water (g)	2.446	2.614	2.637		
Mass Dry Soil (g)	4.087	4.283	4.104		
Moisture Content (%)	59.848	61.032	64.254		



Trial #	1	2	3	4	5
Mass Wet Soil + Tare (g)	20.644	20.555			
Mass Dry Soil + Tare (g)	19.653	19.608			
Mass Tare (g)	14.108	14.123			
Mass Water (g)	0.991	0.947			
Mass Dry Soil (g)	5.545	5.485			
Moisture Content (%)	17.872	17.265			



Project No. 0035 011 00

Client Morrison Hershfield

Daniel Mroz

Project Local Streets Package 14-R-01 Victor Street

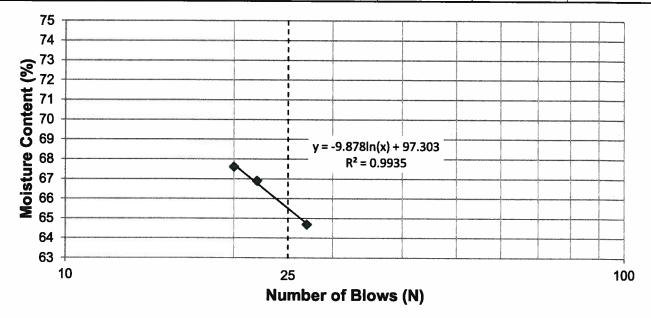
Test Hole TH14-06 Sample # G2 Depth (m) 0.6 - 0.712-Jan-14 Sample Date **Test Date** 11-Feb-14

Liquid Limit 66 **Piastic Limit** 17 **Plasticity Index** 48

Liquid Limit

Technician

Trial #	1	2	3	4	5
Number of Blows (N)	27	22	20		
Mass Wet Soil + Tare (g)	23.266	22.792	22.747		
Mass Dry Soll + Tare (g)	19.655	19.276	19.160		
Mass Tare (g)	14.074	14.021	13.855	**	
Mass Water (g)	3.611	3.516	3.587		
Mass Dry Soil (g)	5.581	5.255	5.305		
Moisture Content (%)	64.702	66.908	67.615	-	



Trial #	1	2	3	4	5
Mass Wet Soil + Tare (g)	20.018	20.355			
Mass Dry Soil + Tare (g)	19.131	19.434			
Mass Tare (g)	14.000	14.125			
Mass Water (g)	0.887	0.921			
Mass Dry Soil (g)	5.131	5.309			
Moisture Content (%)	17.287	17.348			



Project No. 0035 011 00

Client Morrison Hershfield

Project Local Streets Package 14-R-01 Victor Street

Hachem Ahmed

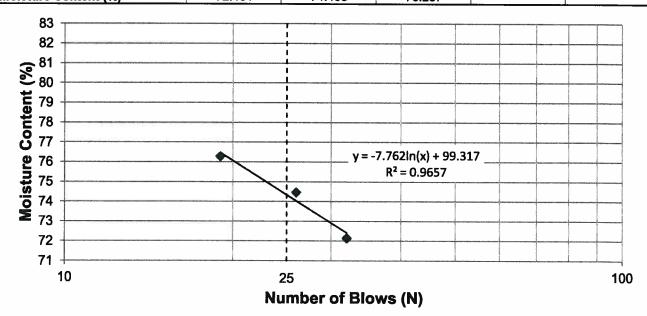
Test Hole TH14-07 Sample # G4 Depth (m) 1.1 - 1.2 12-Jan-14 Sample Date 30-Jan-14 **Test Date**

Liquid Limit 74 **Plastic Limit** 19 **Plasticity Index** 55

Liquid Limit

Technician

Trial #	1	2	3	4	5
Number of Blows (N)	32	26	19		
Mass Wet Soil + Tare (g)	19.443	19.755	19.289		
Mass Dry Soll + Tare (g)	17.145	17.305	17.021		
Mass Tare (g)	13.960	14.015	14.048		
Mass Water (g)	2.298	2.450	2.268		
Mass Dry Soil (g)	3.185	3.290	2.973		
Moisture Content (%)	72.151	74.468	76.287		



Trial #	1	2	3	4	5
Mass Wet Soil + Tare (g)	20.149	20.686			
Mass Dry Soil + Tare (g)	19.140	19.650			
Mass Tare (g)	14.066	14.225			
Mass Water (g)	1.009	1.036			
Mass Dry Soil (g)	5.074	5.425			
Moisture Content (%)	19.886	19.097			

Project No.

0035 011 00

Client

Morrison Hershfield

Project

Local Streets Package 14-R-01 Victor Street

Test Hole

TH14-03

Sample #

G3

Depth (m) Sample Date

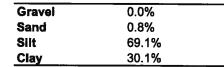
0.8 - 0.9

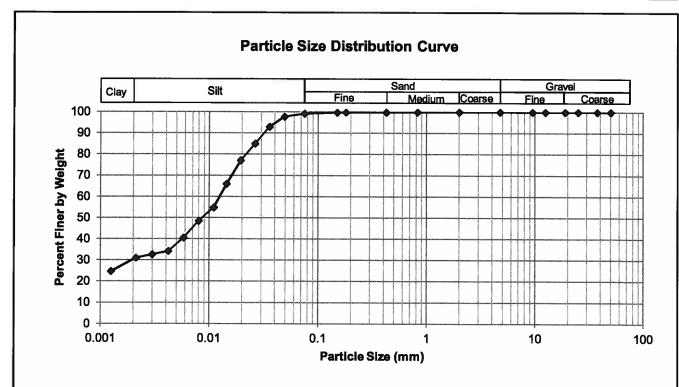
Test Date
Technician

12-Jan-14 11-Feb-14

1

Daniel Mroz





Gra	avel	Sa	ind	Silt an	d Clay
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	100.00	0.0750	99.16
37.5	100.00	2.00	99.99	0.0492	97.68
25.0	100.00	0.825	99.88	0.0357	92.92
19.0	100.00	0.425	99.79	0.0264	84.98
12.5	100.00	0.180	99.71	0.0194	77.03
9.50	100.00	0.150	99.70	0.0144	65.92
4.75	100.00	0.075	99.16	0.0110	54.80
				0.0080	48.45
				0.0058	40.51
				0.0042	34.15
****				0.0030	32.57
				0.0021	30.98
				0.0013	24.63

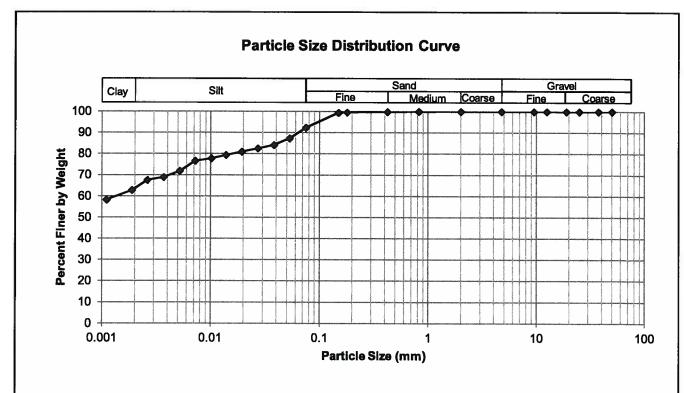
Project No. 0035 011 00

Client Morrison Hershfield

Project Local Streets Package 14-R-01 Victor Street

Test Hole TH14-05
Sample # G3
Depth (m) 0.8 - 0.9
Sample Date 12-Jan-14
Test Date 27-Jan-14
Technician Hachem Ahmed

Gravel	0.0%
Sand	7.7%
Silt	28.8%
Clay	63.5%



Gravel		Sand		Silt and Clay	
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	100.00	0.0750	92.33
37.5	100.00	2.00	100.00	0.0530	87.27
25.0	100.00	0.825	99.92	0.0381	84.09
19.0	100.00	0.425	99.81	0.0272	82.51
12.5	100.00	0.180	99.50	0.0194	80.92
9.50	100.00	0.150	99.33	0.0138	79.33
4.75 100.00	100.00	0.075	92.33	0.0102	77.74
				0.0072	76.58
				0.0052	71.81
				0.0037	68.86
				0.0026	67.51
				0.0019	62.74
				0.0011	58.23



Project No.

Technician

0035 011 00

Daniel Mroz

Client

Morrison Hershfield

Project

Local Streets Package 14-R-01 Victor Street

 Test Hole
 TH14-06

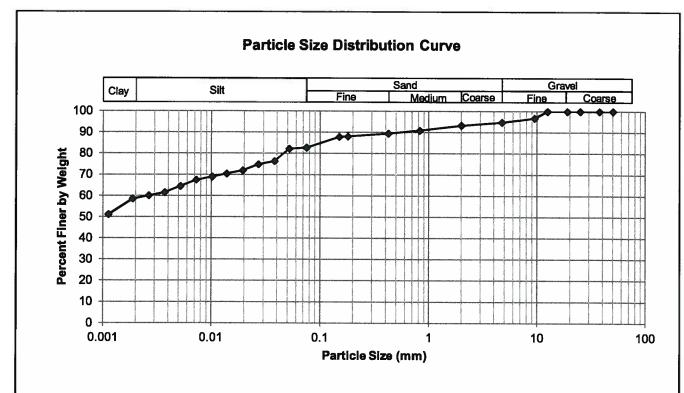
 Sample #
 G2

 Depth (m)
 0.6 - 0.7

 Sample Date
 12-Jan-14

 Test Date
 11-Feb-14

Gravel	5.2%
Sand	12.1%
Silt	24.0%
Clay	58.7%



Gravel		Sand		Silt and Clay	
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	94.78	0.0750	82.70
37.5	100.00	2.00	93.28	0.0519	82.22
25.0	100.00	0.825	90.92	0.0379	76.30
19.0	100.00	0.425	89.43	0.0270	74.81
12.5	100.00	0.180	88.03	0.0194	71.85
9.50	96.74	0.150	87.81	0.0138	70.37
4.75 94.78	0.075	82.70	0.0102	68.89	
				0.0072	67.41
_				0.0052	64.45
				0.0037	61.48
			0.0026	60.00	
				0.0019	58.52
				0.0011	51.11

Project No.

0035 011 00

Client

Morrison Hershfield

Project

Local Streets Package 14-R-01 Victor Street

Test Hole

TH14-07

Sample #

G4

Depth (m)

1.1 - 1.2

Sample Date

12-Jan-14 27-Jan-14

Test Date Technician

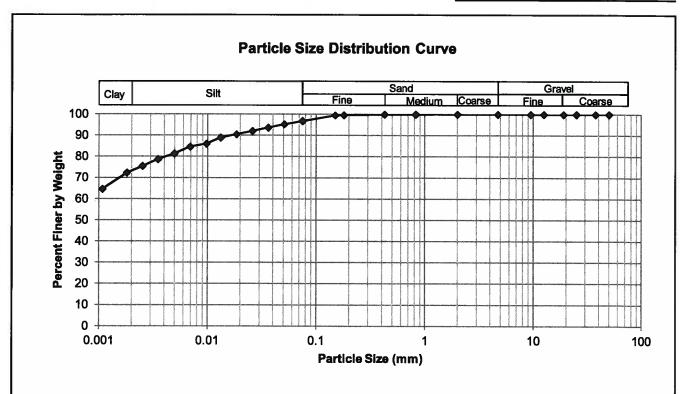
Hachem Ahmed

 Gravel
 0.0%

 Sand
 3.2%

 Silt
 23.6%

 Clay
 73.1%



Gravel		Sand		Silt and Clay	
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	100.00	0.0750	96.76
37.5	100.00	2.00	100.00	0.0508	95.21
25.0	100.00	0.825	99.93	0.0362	93.62
19.0	100.00	0.425	99.86	0.0258	92.04
12.5	100.00	0.180	99.54	0.0184	90.45
9.50	100.00	0.150	99.41	0.0131	88.86
4.75	100.00	0.075	96.76	0.0097	85.89
				0.0069	84.52
				0.0050	81.34
				0.0035	78.63
				0.0025	75.45
				0.0018	72.27
				0.0011	64.58



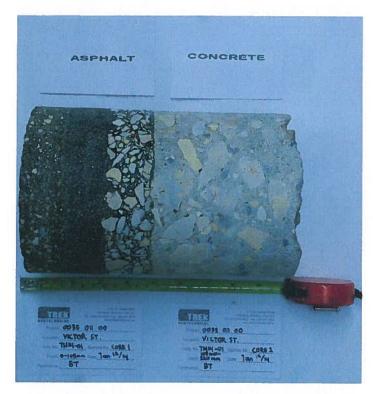


Photo 1: Asphalt and Concrete Core Sample from Test Hole TH14-01



Photo 2: Asphalt and Concrete Core Sample from Test Hole TH14-02



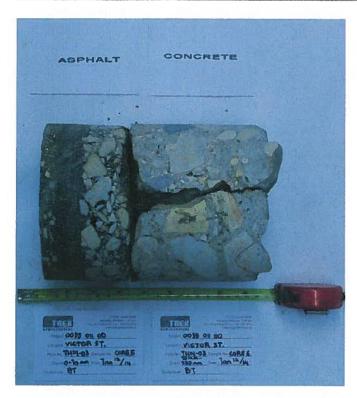


Photo 3: Asphalt and Concrete Core Sample from Test Hole TH14-03

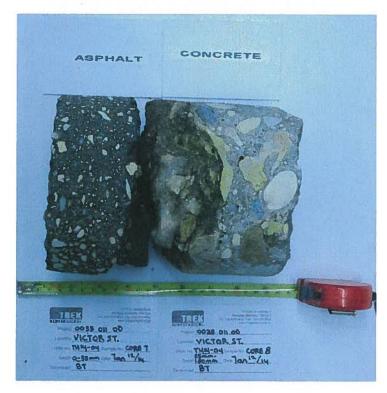


Photo 4: Asphalt and Concrete Core Sample from Test Hole TH14-04



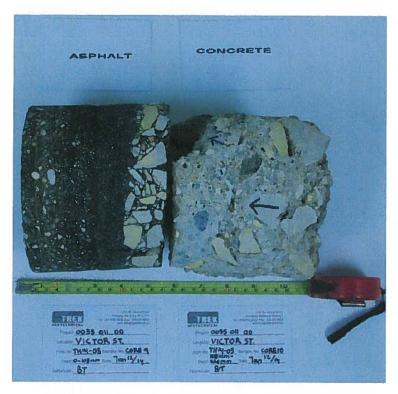


Photo 5: Asphalt and Concrete Core Sample from Test Hole TH14-05

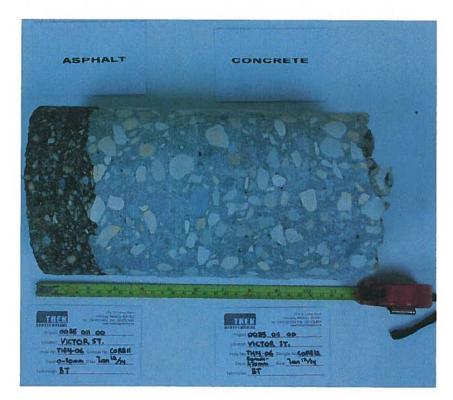


Photo 6: Asphalt and Concrete Core Sample from Test Hole TH14-06

February 2014





Photo 7: Asphalt and Concrete Core Sample from Test Hole TH14-07

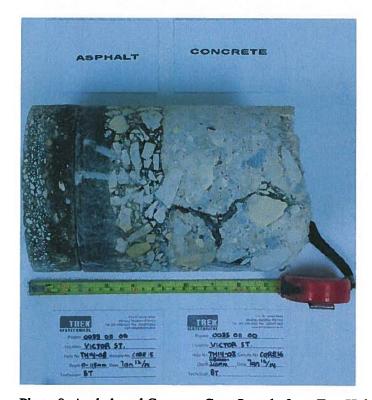


Photo 8: Asphalt and Concrete Core Sample from Test Hole TH14-08



Appendix B

Furby St. between Ellice Ave. and Furby Place

TREK GEOTECHDICAL

Client:	Morrison Her					0035	011 (00						
Project Nar	ne: 2014 Local S	Streets Package - P\	N File #: 14-I	R-01	Location:	Furby	St	betwe	en Ellic	ce Ave	and Fur	by Pla	Ce	
Contractor:	Paddock Drill	ling Ltd.			Ground Elevation:	Гор о	f Pav	emer	ıt					
Method:	125mm Solid S	tem Auger, Acker MP8	Truck Mount		Date Drilled:	14 Ja	nuary	201	4					
Sampl	е Туре:	Grab (G)		Shelby Tube (T)	Split Spoon (SS)		s	plit B	arrel (S	B) [Co	re (C)		
Particl	e Size Legend:	Fines	Clay	Silt	Sand		Gra	ivel	57	<u> </u>	bbles	• • •	Boulde	ers
							Ē		□ Bull (kl	k Unit V N/m³) 19			ndrained Strength	Shear
Depth (m) Soil Symbol						Sample Type	Sample Number	16	17 18 Particle		20 21		Test T	ype
Depth (m)		M/	ATERIAL DES	SCRIPTION		읦	ě	0	20 40		80 100			Pen. 💠
တိ						San	amb			MC	4		⊠ Qu Field V	l⊠ ∕ane ○
	ASPHALT (100 i	mm thick)							20 40	60	80 100	50	100	150 200
20802	CONCRETE (16	•				╣	C09A	1						
- 2.2.		•					C09B							
<i>*////</i>	CLAY - silty, trac - black	e sand, trace grave	l to 0.6 m, tra	ice organics		4	G01		•					
-0.5-	- frozen to (- high plasti	0.4 m, wet and soft	when thawed											
	- nign plasu	aty					G02	1						# 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6
									1					
-1.0	SILT - trace clay - light brown	า				4	G03		•		111 0-1100			
1.07	- moist, soft - low plastic	t												
	CLAY - silty, trac	e silt inclusions (<1	0 mm diam.)	, trace organics, tra	ce oxidation		G04	1				o	Δ	
	- dark grey t - moist, firm	to black		_							Control of the Contro			
	- high plasti					Ц								
-1.5						4	G05		•		mus i	•	Δ	
<i>\\\\\</i>	1													
							G06					•		-
								1				Ī		
2.0														
						4	G07	_	1	•		ΦΔ		
													-	
							G08	-				• • • • • • • • • • • • • • • • • • •		
2.5							000							
								ll a contra						
3.0-														
									1					
								-				or or wor		
	END OF TEST H Notes:	IOLE AT 3.3 m IN C	CLAY											
	1. No sloughing of	or seepage observed	d.											
	cold patch to top	of pavement.			pavement and asphalt									
	3. Test hole local	ted on northbound F 1 m west of east cu	urby St. betw	veen Ellice Ave and	Furby Place, in front of									
	700 i uiby 31., 2.	I III WOOL OF BASE CU	ı.											
ogged Rv	Martial Lemoine	3	Raviaw	ed By: Brent Hay	1		 Proje	et Fe	nineer	- No	lson Fen	reire		
				by. Dient Ha		<u> </u>	- مارد	y, []	A. 1661	. 118	ISUL FE	GII d		

TREK

Client:	Morrison He							Pı	rolect	Number:	0035	5 01	1 00								
	ne: 2014 Local S			²W Fil <u>e #: 1</u> ₄	4-R <u>-C</u>	01		_	ocatio					veen	Ellice A	Ave ar	nd Fu	rhy P	lace		
Contractor:	Paddock Dri					·		•		 Elevation:					feeting -	100	Pa .	10, .	<u>Kru-</u>		
Method:	125mm Solid S			3 Truck Mount					ate Dr				ary 20								
Sample	Fype:		Grab (G)		\$	Shelby	y Tube (T)	\triangleright	Spl	lit Spoon (S	s)		Split I	Barre	el (SB)			ore (C	= ;)		
Particle	Size Legend:		Fines	Cla	ay .		Silt					_	ravel			Cobbl		• ;	in .	ulders	s
	-									<u>' </u>			5	C	Bulk Ur (kN/m				Undra	nined S	Shear
Depth (m) Soil Symbol											Sample Type	Sample Nimber	16	17 De			20 21		Ie	st Typ	e .
Depth (m)			M	IATERIAL DI	ESCF	RIPTI	ON				plac	عِ ا		20 20	article Siz		0 100		Poc	orvane ket Pe	en. 👁
တိ											San	i i		PL -		4				iQu⊠ aldVan	1e ()
	ASPHALT (60 m	om thick	-1									C10		20	40 6	80 8	0 100	0 50	0 10	0 150	0 20025
	CONCRETE (20									<u></u>	- /1		_1			20					
	•											C10	1000	4							
	CLAY - silty, trad	ce grave	∌i, trace silt i	inclusions (<	:20 m	nm dia	am.), trac	e orga	nics		4	GC	9		•			Φ Δ			
-0.5-	frozen to (high plast	0.4 m, r	noist and so	oft to firm wh	ien tr	hawed	t						4,550								
	SILT - clayey, tra	race sand	d, trace oxid	dation								G1	0	•							
_]	 light brow moist, firm 	vn	•																		
1111	- low plastic																				
10]												G1	1	•							
-1.0-													0.00	->				-10/11/11			
	CLAY - silty, trad	ce sand	trace silt in	nclusions (<	10 m	m dia	m.). trace	organ	ics. tra	ace oxidation	n	G1	2	١,						∆ \$•	
	- dark grey - moist, ver	to black		,	•			- 3	100, 1	100 W.L.		<u> </u>	-	-						-	
	- moist, ver - high plasti																				
-1.5												G1	3		•					Δ	
	- stiff to very stiff	# holow	1 9 m									4 04	-	-		-				-4	
	Still to very sun	/ DOIOW	1.6 111								4	G1	4					ı	Ŷ	Δ	
-2.0														4-0							
	- mottled brown	and gre	y, firm belov	<i>v</i> 2.1 m								G1	5		•			•	7		
													\Box								
_2 5											4	G1	6		•			4			
																				melancia; I	
													1-00	-							
-3.0-													-	-							
												1	_								
	END OF TEST H	HOLE A	T33mIN(CI AY								G1	7					•			
N	Notes:																				
2	 No sloughing (Backfilled test 	t hole wit	th auger cut	o. ttings, sand	to 0.	.1 m b	elow top	of pave	ement	and asphalt	İ										
C	cold patch to top 3. Test hole local	of paver	ement.					-													
Ž	451 Furby St.	100 01.1.	.Or a rooming .	uiby or so	14400.	II Line	A 70 a.	urus)y r⊣ac	<i>1</i> 3, 111 11 11 11 11 11 11 11 11 11 11 11 1	1										
Logged By:	Martial Lemoine	.е		_ Revie	wed	By:	Brent Ha	ly			_	Proj	ect E	ngin	neer:	Nelso	n Fer	reira			

1 of 1

TREK

		Streets Package - PW	V File #: 14-R-	01	Project Number Location:	Furby	y St b	oetween E	llice Ave and Fu	urby Place	8
Contractor					Ground Elevation						
Method:		Stem Auger, Acker MP8 T			Date Drilled:		anuary				
Samp	ple Type:	Grab (G)		Shelby Tube (T)	Split Spoon			olit Barrel	(SB) C	ore (C)	
Partic	cle Size Legend:	Fines	Clay	Silt	Sand		Gra		Cobbles		Boulders
Depth (m) Soil Symbol			ATERIAL DESC	RIPTION		Sample Type	S	Parti 0 20 4	Sulk Unit Wt (kN/m²) 18 19 20 21 icle Size (%) 40 60 80 100 MC LL 40 60 80 100	Str	drained Shear rength (kPa) Test Type Torvane △ Pocket Pen. Ф ⊠ Qu ⊠ Field Vane ○ 100 150 20
Selection of	ASPHALT (110 I						C11A				
	<i>3</i> 4	·					C11B				
-0.5-	trace oxidation - black	oce sand, trace gravel, 0.4 m, moist and soft ticity			liam.), trace organic	S,	G18 G19	•			
1.0-	SILT - clayey, tra - light browr - moist, soft - low plastic	ft	tion				G20				
1							G21				
1.5-	- dark grey	ff to very stiff	טרין אחטובט	lM Cliatrii.j, u accerc	MOSTON		G22 G23				20
2.0							G24		•	4	0 A
2.5							G25		•	0.	Δ
3.0-	- firm to stiff belo	ow 3.1 m					G26		•	• Δ	
	Notes: 1. No sloughing of the standard patch to top 3. Test hole locat	HOLE AT 3.3 m IN CL or seepage observed. t hole with auger cuttir of pavement. ated on northbound Fu 1.8 m west of east curt	I. ings, sand to 0. urby St. betwee					7	1 5	T. (1)	
Logged By	r: Martial Lemoine	16	Reviewer	By: Brent Hay			Projec	t Engine	er: Nelson Fe	erreira	



					•										
Client		Morrison Her						0035				- 727			
		ne: 2014 Local S		ackage - Pv	V File #: 14-h	₹-01					n Ellice A	ve and F	urby Plac	C O	
Contr		Paddock Dril					Ground Elevation:	51127050							
Metho	d:	125mm Solid S	tem Auger	r, Acker MP8	Truck Mount		Date Drilled:	14 Ja	nuary	2014					
	Sample	э Туре:		Grab (G)		Shelby Tube (T)	Split Spoon (SS	S) 🔼	S	plit Barr	el (SB)	C	ore (C)		
	Particle	Size Legend:		Fines	Clay	Silt	Sand		Gra	ivel	[7] C	Cobbles		Boulde	rs
								m	ē		∃ Bulk Uni (kN/m 18 1!	it Wt		drained trength	
5 _	Symbol							Sample Type	Sample Number	16 17	18 19 Particle Size		-	Test Ty	pe
(m)	S			MA	TERIAL DES	CRIPTION		ple	<u>9</u>	0 20		⊖ (%) 0 80 100		∆ Torvar Pocket F	ıe∆ Pen. O
	Soil							Sarr	amp	P	1 1	<u> </u>	1 0	⊠ Qu Field Va	
		ACDUALT (045	45:-1	-\			. <u> </u>		S	0 20	40 6	0 80 100	0 50	100 1	50 2002
3		ASPHALT (245	nm unick	()	4,50,				C12A						
	p 6 4	CONCRETE (11	0 mm th	iak)				4							
}		CLAY (Fill) - silty			ravel trace o	oridation		44	C12B	-					
-0.5		- black							G27						
		 frozen to 0 high plasti).4 m, m city	oist and sof	t to firm whe	n thawed									
		- no longer trace	-	dark grey be	low 0.7 m			Z	G28				$\bullet \triangle$		
										1					
-1 0-		- grey, stiff below	10 m						000						
1.0		- grey, sun belon	1.0 111						G29				•	Δ	
		- firm below 1.3 i	n						G30		•		•		
4		Oll T. same also			. dalastia a			_							
-1.5		SILT - some clay - light browr	1	and, trace o	xidation				G31						
‡		moist, softlow plastic							G 31						
1		F											1		
		CLAY - silty, trac - brown	e sand, t	trace silt inc	lusions (<20	mm diam.), trace o	oxidation		G32		•			• /	Δ
2.0		- moist, very												-	
		high plasti stiff below 2.2 r -	-						G33				•		
			•						033				1		
3															
2.5		- firm to stiff belo	w 2.5 m					4	G34				•		
Ĭ															
3.0								i						-	
7															
										-					
		END OF TEST H	OLE AT	3.4 m IN C	LAY		<u>-</u>		G35				₽ Δ		1 1
		Notes: 1. No sloughing o	r seenar	ne obsen <i>ie</i> d											
		2. Backfilled test	hole with	auger cutti	ings, sand to	0.1 m below top of	pavement and asphalt								
		cold patch to top 3. Test hole locat	ed on no	rthbound F	urby St., betv	veen Ellice Ave and	d Furby Place, in front o	of							
		419 Furby St., 2.	0 m west	t of east cui	ъ.										
														_	
_ogge	d By:	Martial Lemoine			Review	ed By: Brent Hay	<u> </u>	_ F	Projec	ct Engi	neer: <u>N</u>	Velson Fe	птеіга		

1 of 1

	REK
GEOTEC	HNICAL

Client: Me	orrison Hershfield				Project Number:	0035 01	1.00		
Project Name: 20		Packare - Di	V File #- 1 <i>1</i> -0	-01	-			o Avo and F.	urby Place
	ddock Drilling Ltd.		· i ii3 77. 14-15	-VI	Ground Elevation:		between Ellic	e Ave and Fl	II DY FIBC8
	5mm Solid Stem Auge		Truck Mount					*	_
			Truck Mount		Date Drilled:	14 Janua			
Sample Type	GGGGG	Grab (G)		Shelby Tube (T)	Split Spoon (SS	3) 🗶	Split Barrel (SE		ore (C)
Particle Size	Legend:	Fines	Clay		Sand		Gravel 67		Boulders
Depth (m) Soil Symbol	1	MA	TERIAL DES	CRIPTION		Sample Type	16 17 18 Particle 0 20 40 0 20 40	Unit Wt /m³) 20 21 Size (%) 60 80 100 1C LL 60 80 100	⊠ Qu ⊠ ○ Field Vane ○
	ALT (90 mm thick) RETE (105 mm th					C1:			
- SILT -	clayey, trace sand light grey and dark frozen to 0.4 m, m low plasticity	i, trace grave				G:	36		
trace	- silty, trace sand, organics mottled brown and moist, firm to stiff high plasticity	dark grey	, trace silt incl	usions (<20 mm d	diam.), trace oxidation,	∠ G3		3	
						4 G3			•
	stiff below 1.7 m					∡ G4	<u>11</u>		22
-2.0 - firm	o stiff below 2.0 m	1				G 4	12		• Δ
2.5						∡ G4	3	•	Φ Δ
-3.0	OF TEST HOLE AT		LAV			G4	14	•	•
Notes: 1. No : 2. Bac cold pa 3. Tesi	sloughing or seepa kfilled test hole wit tch to top of paver	ge observed h auger cutt nent. orthbound F	ings, sand to (pavement and asphalt				
ogged By: Marti	ol Lomeine		Povince	d Bv: Brent Hav	,	Para i	iect Engineer	Notes 5	



2014 Local Streets Package (PW File #: 14-R-01) Sub-Surface Investigation Furby Street

Test Hole		Paveme	ent Surface	Pavement Str	ucture Material		Sample	Depth (m)	Moisture		Grain Siz	e Analysis	3	A	terberg L	imits
No.	Test Hole Location	Туре	Thickness (mm)	Type	Thickness (mm)	Subgrade Description	Top (m)	Bottom (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Plastic	Liquid	Plasticity
		Asphalt	100	Concrete	160						<u> </u>				 	
						Clay	0,3	0.4	30							
						Clay	0.6	0.7	37	1	i					
	Furby St. between Ellice					Silt	0.9	1.0	27		T					_
TH14-09	Ave and Furby Place, in					Clay	1.2	1.3	40							$\overline{}$
	front of 463 Furby St.					Clay	1.5	1.6	41							
						Clay	1.8	1.9	44							
i	Ì					Clay	2.1	2.2	48							1
						Clay	2.4	2.5	58							
		Asphalt	60	Concrete	205						L					
						Clay (Fill)	0,3	0.4	38							
			ļ			Silt	9.0	0.7	18						L	
	Furby St. between Ellice					Silt	0.9	1.0	23							
TH14-10	Ave and Furby Place, in					Clay	1.2	1.3	28							
	front of 451 Furby St.					Clay	1.5	1.6	38							
						Clay	1.8	1.9	42		L					
						Clay	2.1	2.2	42							
						Clay	2.4	2.5	48							f
						Clay	3.2	3,3	53							
		Asphalt	110	Concrete	135							L				
						Clay (Fill)	0.2	0.3	29							
						Clay (FIII)	0.5	0,6	28							
	Furby St. between Ellice					Silt	8.0	0.9	24	0	7	71	22	17	25	- 8
TH14-11	Ave and Furby Place, in					Silt	1.1	1.2	17							
	front of 433 Furby St.					Clay	1.4	1.5	28							
						Clay	1,7	1.8	37							
						Clay	2.0	2.1	43							
						Clay	2.3	2.4	47							
						Clay	3.1	3.2	49							
		Asphalt	245	Concrete	110										L	
						Clay	0.4	0.5	43							
						Clay	0.7	0.8	36	0	2	28	70	21	77	56
	Furby St., between Ellice					Clay	1.0	1.1	29		11					
TH14-12						Clay	1.3	1.4	32							
	front of 419 Furby St.					Silt	1.6	1.7	20							Γ
						Clay	1.9	2.0	35							
						Clay	2.2	2.3	44							
						Clay	2,5	2.6	46							
						Clay	3.3	3.4	51							



2014 Local Streets Package (PW File #: 14-R-01) Sub-Surface Investigation Furby Street

Test Hole		Paveme	ent Surface	Pavement Str	ucture Material		Sample	Depth (m)	Moisture		Grain Siz	o Analysi	3	At	terberg L	imits
No.	Test Hole Location	Туре	Thickness (mm)	Туре	Thickness (mm)	Subgrade Description	Top (m)	Bottom (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Plastic	Liquid	Plasticity index
		Asphalt	90	Concrete	105					_						
1						Silt	0.2	0.3	29		- 11					
						Silt	0.5	0.6	25							
	Furby St. between Effice		L			Clay	0.8	0.9	25	0	3	31	66	16	54	38
TH14-13						Clay	1.1	1.2	30							
	front of 405 Furby St.					Clay	1.4	1.5	30							
						Clay	1.7	1.8	35				Ι			
						Clay	2.0	2.1	48							
						Clay	2.3	2.4	53							
						Clay	3.1	3.2	54							



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Morrison Hershfield

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Local Streets Package 14-R-01 Furby Street

Sample Date

14-Jan-14

Test Date

27-Jan-14

Technician

Jodie Neumann

Furby St	TH14-09	TH14-09	TH14-09	TH14-09	TH14-09	TH14-09
Depth (m)	0.3 - 0.4	0.6 - 0.7	0.9 - 1.0	1.2 - 1.3	1.5 - 1.6	1.8 - 1.9
Sample #	G1	G2	G3	G4	G5	G6
Tare ID	W41	N92	W24	Z47	Z51	W111
Mass of tare	8.4	8.3	8.4	8.6	8.4	8.3
Mass wet + tare	188.3	286.0	245.2	251.2	247.4	245.8
Mass dry + tare	146.6	211.7	194.4	182.4	177.8	173.4
Mass water	41.7	74.3	50.8	68.8	69.6	72.4
Mass dry soil	138.2	203.4	186.0	173.8	169.4	165.1
Moisture %	30.2%	36.5%	27.3%	39.6%	41.1%	43.9%

Furby St	TH14-09	TH14-09	TH14-10	TH14-10	TH14-10	TH14-10
Depth (m)	2.1 - 2.2	2.4 - 2.5	0.3 - 0.4	0.6 - 0.7	0.9 - 1.0	1.2 - 1.3
Sample #	G7	G8	G9	G10	G11	G12
Tare ID	Z137	W02	W63	Z73	N02	K10
Mass of tare	8.2	8.3	8.4	8.4	8.3	8.3
Mass wet + tare	277.9	243	224.5	241.8	243.1	241.3
Mass dry + tare	190.0	157.3	165.1	206.1	199.7	190.5
Mass water	87.9	85.7	59.4	35.7	43.4	50.8
Mass dry soil	181.8	149.0	156.7	197.7	191.4	182.2
Moisture %	48.3%	57.5%	37.9%	18.1%	22.7%	27.9%

Furby St	TH14-10	TH14-10	TH14-10	TH14-10	TH14-10	TH14-11
Depth (m)	1.5 - 1.6	1.8 - 1.9	2.1 - 2.2	2.4 - 2.5	3.2 - 3.3	0.2 - 0.3
Sample #	G13	G14	G15	G16	G17	G18
Tare ID	Z123	F77	D37	W43	N109	Z22
Mass of tare	8.3	8.4	8.3	8.5	8.3	8.2
Mass wet + tare	249.3	233.7	242.2	231.2	240.3	223.7
Mass dry + tare	186.1	167.5	172.6	159.2	160.2	175.5
Mass water	63.2	66.2	69.6	72.0	80.1	48.2
Mass dry soil	177.8	159.1	164.3	150.7	151.9	167.3
Moisture %	35.5%	41.6%	42.4%	47.8%	52.7%	28.8%



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Local Streets Package 14-R-01 Furby Street

Sample Date

14-Jan-14

Test Date

27-Jan-14

Technician

Jodie Neumann

Furby St	TH14-11	TH14-11	TH14-11	TH14-11	TH14-11	TH14-11
Depth (m)	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1
Sample #	G19	G20	G21	G22	G23	G24
Tare ID	F114	N46	Z126	K14	E95	Z07
Mass of tare	8.2	8.2	8.3	8.4	8.4	8.4
Mass wet + tare	240.6	257.2	232.8	283.0	231.6	283.4
Mass dry + tare	189.4	209.7	199.8	223.7	171.4	201.0
Mass water	51.2	47.5	33.0	59.3	60.2	82.4
Mass dry soil	181.2	201.5	191.5	215.3	163.0	192.6
Moisture %	28.3%	23.6%	17.2%	27.5%	36.9%	42.8%

Furby St	TH14-11	TH14-11	TH14-12	TH14-12	TH14-12	TH14-12
Depth (m)	2.3 - 2.4	3.1 - 3.2	0.4 - 0.5	0.7 - 0.8	1.0 - 1.1	1.3 - 1.4
Sample #	G25	G26	G27	G28	G29	G30
Tare ID	D46	E19	W74	F113	E90	F141
Mass of tare	8.4	8.3	8.2	8.2	8.4	8.3
Mass wet + tare	290.7	289.7	229.9	361.1	231.6	267.1
Mass dry + tare	200.6	197.7	162.7	267.3	181.4	204.8
Mass water	90.1	92.0	67.2	93.8	50.2	62.3
Mass dry soil	192.2	189.4	154.5	259.1	173.0	196.5
Moisture %	46.9%	48.6%	43.5%	36.2%	29.0%	31.7%

Furby St	TH14-12	TH14-12	TH14-12	TH14-12	TH14-12	TH14-13
Depth (m)	1.6 - 1.7	1.9 - 2.0	2.2 - 2.3	2.5 - 2.6	3.3 - 3.4	0.2 - 0.3
Sample #	G31	G32	G33	G34	G35	G36
Tare ID	W18	N42	F83	N70	Z35	W102
Mass of tare	8.3	8.3	8.3	8.3	8.4	8.3
Mass wet + tare	238.7	238.3	269.5	290.2	259.4	317.7
Mass dry + tare	200.6	179.3	190.3	201.8	174.3	247.6
Mass water	38.1	59.0	79.2	88.4	85.1	70.1
Mass dry soil	192.3	171.0	182.0	193.5	165.9	239.3
Moisture %	19.8%	34.5%	43.5%	45.7%	51.3%	29.3%



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Local Streets Package 14-R-01 Furby Street

Sample Date

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Test Date

27-Jan-14

Technician

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Furby St	TH14-13	TH14-13	TH14-13	TH14-13	TH14-13	TH14-13
Depth (m)	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1
Sample #	G37	G38	G39	G40	G41	G42
Tare ID	K25	K17	F11	D45	P19	W66
Mass of tare	8.4	8.3	8.4	8.3	8.5	8.3
Mass wet + tare	385.9	354.0	357.3	350.4	400.7	356.8
Mass dry + tare	311.4	284.5	277.1	271.0	299.7	246.2
Mass water	74.5	69.5	80.2	79.4	101.0	110.6
Mass dry soil	303.0	276.2	268.7	262.7	291.2	237.9
Moisture %	24.6%	25.2%	29.8%	30.2%	34.7%	46.5%

Furby St	TH14-13	TH14-13	
Depth (m)	2.3 - 2.4	3.1 - 3.2	
Sample #	G43	G44	
Tare ID	E46	W71	
Mass of tare	8.4	8.3	
Mass wet + tare	385.7	300.2	
Mass dry + tare	254.3	198.2	
Mass water	131.4	102.0	
Mass dry soil	245.9	189.9	
Moisture %	53.4%	53.7%	

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Project No. 0035 011 00

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Local Streets Package 14-R-01 Furby Street

Test Hole Sample #

TH14-11

Sample #

G20

Depth (m) Sample Date 0.8 - 0.9

Test Date

14-Jan-14 11-Feb-14

Liquid Limit
Plastic Limit
Plasticity Index

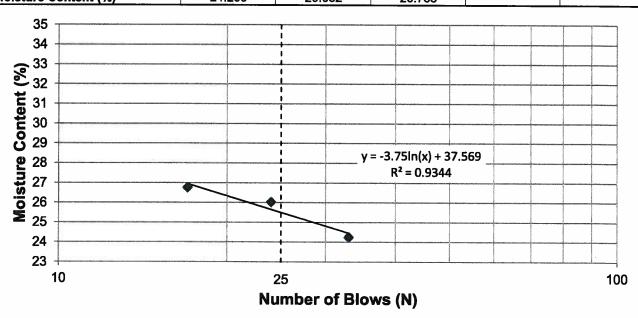
25 17 9

Technician

Daniel Mroz

Liquid Limit

Trial #	1	2	3	4	5
Number of Blows (N)	33	24	17		
Mass Wet Soil + Tare (g)	23.058	22.554	23.800	-	
Mass Dry Soil + Tare (g)	21.287	20.789	21.716	-	
Mass Tare (g)	13.987	14.009	13.929		
Mass Water (g)	1.771	1.765	2.084		
Mass Dry Soil (g)	7.300	6.780	7.787		
Moisture Content (%)	24.260	26.032	26.763		



Trial #	1	2	3	4	5
Mass Wet Soil + Tare (g)	20.565	20.406			
Mass Dry Soil + Tare (g)	19.611	19.489			
Mass Tare (g)	14.041	14.011			
Mass Water (g)	0.954	0.917			
Mass Dry Soil (g)	5.570	5.478			
Moisture Content (%)	17.127	16.740			



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Local Streets Package 14-R-01 Furby Street

Test Hole Sample # TH14-12 G28

Depth (m)

Sample Date

0.7 - 0.814-Jan-14

Test Date Technician 12-Feb-14

Hachem Ahmed

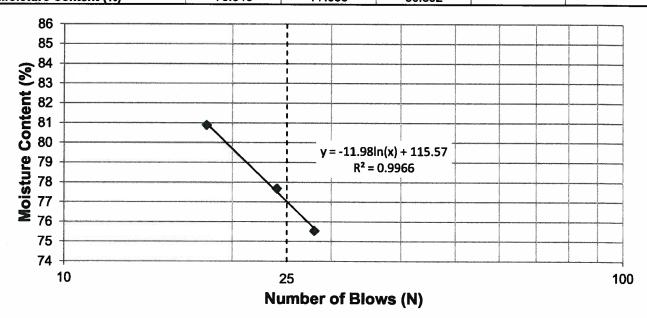
Liquid Limit Plastic Limit

77 21

Plasticity Index 56

Liquid Limit

Trial #	1	2	3	4	5
Number of Blows (N)	28	24	18	·	
Mass Wet Soil + Tare (g)	19.988	20.567	19.347	**	
Mass Dry Soil + Tare (g)	17.430	17.733	16.845		
Mass Tare (g)	14.044	14.085	13.752		
Mass Water (g)	2.558	2.834	2.502		
Mass Dry Soil (g)	3.386	3.648	3.093		
Moisture Content (%)	75.546	77.686	80.892		



Trial #	1	2	3	4	5
Mass Wet Soil + Tare (g)	20.140	19.863			
Mass Dry Soil + Tare (g)	19.046	18.768			
Mass Tare (g)	13.949	13.643			
Mass Water (g)	1.094	1.095			
Mass Dry Soil (g)	5.097	5.125			
Moisture Content (%)	21.464	21.366			



Project No. 0035 011 00

Client Morrison Hershfield

Project Local Streets Package 14-R-01 Furby Street

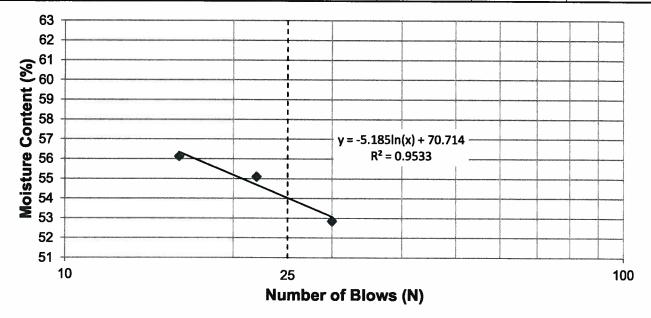
Test Hole TH14-13 Sample # G38 Depth (m) 0.8 - 0.9Sample Date 14-Jan-14 **Test Date**

Liquid Limit 54 12-Feb-14 **Plastic Limit** 16 **Daniel Mroz Plasticity Index** 38

Liquid Limit

Technician

Trial #	1	2	3	4	5
Number of Blows (N)	30	22	16		
Mass Wet Soil + Tare (g)	24.012	23.968	23.704		
Mass Dry Soil + Tare (g)	20.555	20.448	20.189		
Mass Tare (g)	14.016	14.060	13.927		A
Mass Water (g)	3.457	3.520	3.515		
Mass Dry Soil (g)	6.539	6.388	6.262	-	
Moisture Content (%)	52.867	55.103	56.132		



Trial #	1	2	3	4	5
Mass Wet Soil + Tare (g)	20.430	20.400			
Mass Dry Soil + Tare (g)	19.528	19.545			
Mass Tare (g)	14.073	14.177			
Mass Water (g)	0.902	0.855			
Mass Dry Soil (g)	5.455	5.368			-
Moisture Content (%)	16.535	15.928			

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Local Streets Package 14-R-01 Furby Street

Test Hole

TH14-11

Sample #

G20

Depth (m)

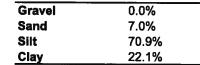
0.8 - 0.9

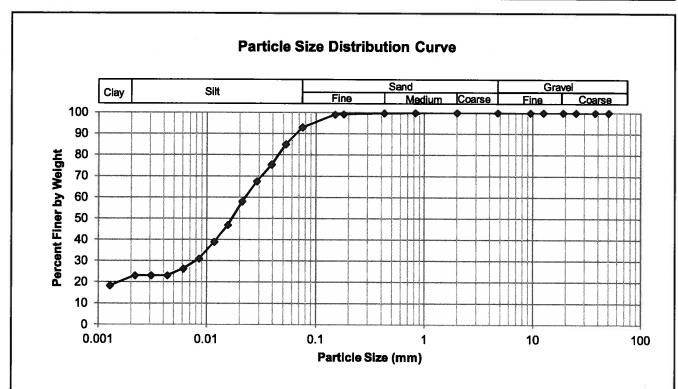
Sample Date Test Date

14-Jan-14 11-Feb-14

Technician

Daniel Mroz





Gra	avel	Sa	ind	Silt an	d Clay
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	100.00	0.0750	92.98
37.5	100.00	2.00	100.00	0.0527	84.98
25.0	100.00	0.825	99.90	0.0391	75.45
19.0	100.00	0.425	99.72	0.0286	67.51
12.5	100.00	0.180	99.24	0.0211	57.98
9.50	100.00	0.150	99.09	0.0156	46.86
4.75	100.00	0.075	92.98	0.0117	38.92
				0.0085	30.98
				0.0061	26.21
				0.0044	23.04
				0.0031	23.04
				0.0022	23.04
				0.0013	18.27

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Local Streets Package 14-R-01 Furby Street

Test Hole Sample #

TH14-12 G28

Depth (m)
Sample Date

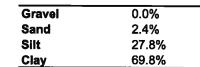
0.3 - 0.4

Sample Date
Test Date

14-Jan-14 11-Feb-14

Technician

Daniel Mroz



Particle Size Distribution Curve Sand Gravel Clay Silt Fine Medium Coarse Fine Coarse 100 90 80 Percent Finer by Weight 70 60 50 40 30 20 10 0 0.001 0.01 0.1 10 100 Particle Size (mm)

Gra	avel	Sand		Silt an	d Clay
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	100.00	0.0750	97.60
37.5	100.00	2.00	99.99	0.0505	92.92
25.0	100.00	0.825	99.93	0.0364	89.74
19.0	100.00	0.425	99.79	0.0259	88.15
12.5	100.00	0.180	99.62	0.0185	86.56
9.50	100.00	0.150	99.58	0.0133	83.39
4.75	100.00	0.075	97.60	0.0098	81.80
				0.0070	80.21
				0.0050	77.03
				0.0036	75.45
-				0.0026	72.27
				0.0018	69.09
				0.0011	64.33

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Morrison Hershfield

Project

Local Streets Package 14-R-01 Furby Street

Test Hole

TH14-13

Sample #

G38

Depth (m)

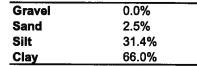
0.8 - 0.9

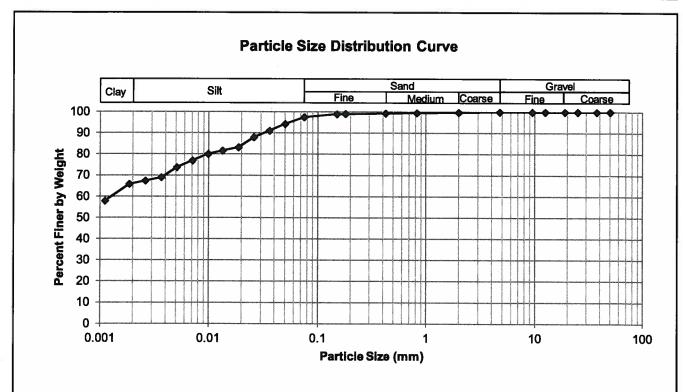
Sample Date Test Date

14-Jan-14 11-Feb-14

Technician

Daniel Mroz





Gra	avel	Sa	ind	Silt an	d Clay
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	100.00	0.0750	97.46
37.5	100.00	2.00	99.73	0.0501	94.25
25.0	100.00	0.825	99.51	0.0360	91.08
19.0	100.00	0.425	99.30	0.0259	87.92
12.5	100.00	0.180	99.02	0.0188	83.16
9.50	100.00	0.150	98.94	0.0134	81.58
4.75	100.00	0.075	97.46	0.0099	80.00
				0.0071	76.83
				0.0051	73.66
				0.0037	68.91
				0.0026	67.33
				0.0019	65.74
				0.0011	57.82



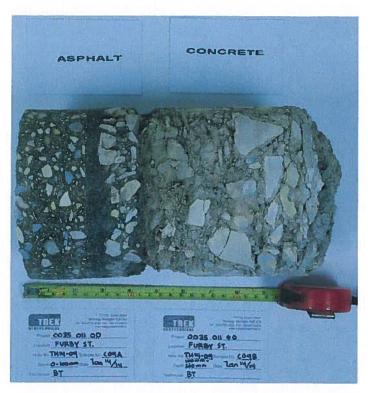


Photo 1: Asphalt and Concrete Core Sample from Test Hole TH14-09



Photo 2: Asphalt and Concrete Core Sample from Test Hole TH14-10



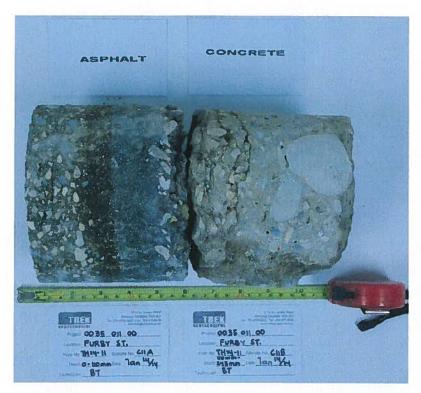


Photo 3: Asphalt and Concrete Core Sample from Test Hole TH14-11



Photo 4: Asphalt and Concrete Core Sample from Test Hole TH14-12





Photo 5: Asphalt and Concrete Core Sample from Test Hole TH14-13



Appendix C

Heritage Blvd. between Valley View Dr. and Fieldstone Bay



Client:	Morrison He	ershfield			Project Number:	0035	011 0	0					
Project Nan	e: 2014 Local	Streets Package - P	W File #: 14-R	R-01	Location:	Herita	ge Bh	vd be	tween Val	ey View	Dr. and	Fieldst	one Bay
Contractor:	Paddock Dr	illing Ltd.			Ground Elevation:								
Method:	125mm Solid	Stem Auger, Acker MP8	Truck Mount		Date Drilled:	14 Jai	nuary	2014					
Sample	Туре:	Grab (G)		Shelby Tube (T)	Split Spoon (SS								
Particle	Size Legend:	Fines	Clay	Silt	Sand		Gra			obbles	•	Boulde	rs
							ē	[☐ Bulk Unit (kN/m³) 18 19	Wt		ndrained Strength	
epth (m) Symbol						Sample Type	를		18 19 Particle Size			Test Ty	7De
Depth (m)		М	ATERIAL DES	CRIPTION		ald	S S	0 20				△ Torvar Pocket F	Pen. 🗘
Soil						San	Sample Number	PI	_	ц'		⊠ Qu Field Va	
6.6	CONCRETE (1	50 mm thick)						0 20	40 60	80 100	0 50	100 1	50 20025
***		-	ad trans grays	l manine firms into		4	C14						
		ly, gravelly, trace sa ice sand, trace oxida			mediate plasticity	- 4	G63					MAN STATE OF A STATE OF THE PERSONS ASSESSED.	er garantekter jamin a pan a r i jija jugunga sara y
	 dark grev 		_										
-0.5	- high plas	ticity				4	G64	•		The second second second			
-///							G65				•		
													6
-1.0-									_		The section of the se		
	 very stiff below trace silt inclus 	v 1.1 m sions (<15 mm diam	.), brown belov	v 1.2m		4	G66	l l				•	
-///			.,, 5.0								State of source (10) assessed		
	- firm to stiff bel	ow 1.4 m				4	G67		•			e .	
1.5													
							G68					2	
													The state of the s
						Ц							
2.0						4	G69		•		•		
							G70		•		٠	Δ	
///													
-2.5									- Angelief - Angelief - Pring 1-4		*		
									**************************************	Market Control of the second of	100	1 Martin 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1	
30													
3.0							G71		•		ΦΔ		
		HOLE AT 3.2m IN C	LAY	····	_ =		<u></u>			· V	-		
	Notes: 1. No sloughing	or seepage observe	d.										
	cold patch to top	of pavement.			f pavement and asphalt								
	Test hole loca	ated on northbound l 30 Heritage Blvd., 2.	Heritage Blvd. I 5 m west of ea	between Valey Vie st curb	w Dr. and Fieldstone								
										_			
Logged By:	Beta Taryana		Reviewe	d By: Brent Hay		P	rojec	t Engi	neer: Ne	elson Fe	rreira		

1 of 1

TREK

Project Nar Contractor Method:	r: 2014 Local Paddock Dri 125mm Solid	lling Ltd.			R-01	Location: Ground Elevation: Date Drilled:	Top of		ent	aley View	Dr. and	Fieldstone B
Samp	ole Type:		Grab (G)		Shelby Tube (T)	Split Spoon (SS	s) 🔼	Split i	Barrel (SB)	C	ore (C)	
Partic	de Size Legend:		Fines	Clay	Sit	Sand	H	Gravel	[2]	Cobbles		Boulders
Depth (m) (m) Soil Symbol	CONCRETE (1	53 mm thi		TERIAL DES	SCRIPTION		Sample Type	Sample Nur	Bulk Un (kN/m) 17 18 1	9 20 21 26 (%) 50 80 100	•	drained Shear strength (kPa) Test Type △ Torvane △ Pocket Pen. Φ ☒ Qu ☒ Field Vane ○ 100 150 2
***								C15				
	GRANULAR (F SILT - trace sar - light brow	d, trace o	xidation		awed, low plasticity	, compact to dense		G54	WIND STREET, STREET, AND THE REAL PARK THE STREET, ADDRESS.		er 4 menete 4 make pro krasan	
0.5	CLAY - silty, sar - light brow - frozen, m - intermedi - stiff, high plast	n to brow oist and s ate plastic	n soft when th xity	awed			4	G55 //				
1.0	SILT - trace clay - light brow - moist, so - low plasti	, trace sa n ft					4	G57				
1.5	CLAY - silty, tra (<5 mm diam.), - mottled b - moist, stil - high plast	trace orga rown and if to very s	anics, trace dark grev	trace silt incoxidation	clusions (<20 mm c	liam.), trace precipitates		G58 G59				Φ Δ
2.0-							4	G60				•
2.5-	- firm to stiff bel	ow 2.3 m						G61			•	
3.0								G62			Φ Δ	
	cold patch to top	or seepag hole with of pavem ted on no	ge observed auger cutti nent. rthbound H	ngs, sand to	between Valey Vie	pavement and asphalt w Dr. and Fieldstone						
ogged By:	Beta Taryana			Review	ed By: Brent Hay			roiect E	ngineer:	Nelson Fe	rreira	

1 of 1

TREK

Client: Draiget Nam	Morrison He		TII- # 44 D 04	-	0035 011 00		
		Streets Package - PW F	ile #: 14-R-U1	Location:			w Dr. and Fieldstone Ba
Contractor:	Paddock Dri		* * * *	Ground Elevation:			
lethod:		Stem Auger, Acker MP8 True		Date Drilled:	14 January 2		
Sample	Туре:	Grab (G)	Shelby Tube (T)	Split Spoon (S	S) North	t Barrel (SB)	Core (C)
Particle	Size Legend:	Fines	Clay Silt	Sand	Grave	<u> </u>	
_						☐ Bulk Unit Wt (kN/m³) 6 17 18 19 20	Undrained Shear Strength (kPa)
Symbol		10			Sample Type Sample Number	Particle Size (%)	Test Type
(m)		MATE	RIAL DESCRIPTION		ple P	20 40 60 80 1	△ Torvane △ O Pocket Pen. Q Qu
Soil					Sam	PL MC LL	○ Field Vane ○
2 2 2	CONCRETE (16	68 mm thick)				20 40 60 80 1	00 0 50 100 150 200
2 4	<u></u>				C16		
	 light brow 				G45	•	
]	- frozen, m	oist and soft when thaw	ed, low plasticity				
0.5	CLAY - silty, tra	ce sand, trace silt inclus	sions (<5 mm diam.), trace pro	ecipitates (<5 mm dian	n.), G46	-	• ۵
	trace oxidation - mottled d	ark grey and brown					
-///	frozen tohigh plast	0.9 m, moist and firm to	stiff when thawed		4 047		a .
		-			G47		∯ •△
1.0							
					G48	•	Φ Δ
-///							
					■ G49		•
1.5-					G49		
-///					G50		• A
2.0-					G51		• •
							_
-///					2.5		
					G52	•	ΦΔ
2.5-							
-///							
3.0							
	ND OF TEXT	IOLEATOR BLOCK	,		G53	•	Φ Δ
	Notes:	HOLE AT 3.2m IN CLAY	r				
:	 No sloughing of the state of th	or seepage observed. thole with auger cutting	s, sand to 0.1 m below top of	pavement and asphalt	•		
	cold patch to top	of pavement.	tage Blvd. between Valey View				
Ē	Bay, in front of fo	ence between 73 and 75	tage blvd. between valey viet 5 Heritage Blvd., 1.2 m east o	r Dr. and Fieldstone f west curb.			
ogged By:	Beta Taryana		Reviewed By: Brent Hay		Project	Engineer: Nelson F	erreira



2014 Local Streets Package (PW File \$: 14-R-01) Sub-Surface Investigation Heritage Boulevard

Test Hole		Paveme	ent Surface	Pavement St	ructure Material	· ·	Sample	Depth (m)	Moisture		Grain Siz	e Analysi	8	At	terberg L	Imits
No.	Test Hole Location	Туре	Thickness (mm)	Туре	Thickness (mm)	Subgrade Description	Top (m)	Bottom (m)	Content (%)	Gravel (%)	Sand (%)	Slit (%)	Ctay (%)	Plastic	Liquid	Plasticity Index
		Concrete	150									<u> </u>	` '			
						Clay (Fill)	0.2	0.3	22			1				
					-	Clay	0.5	0.6	22			1				$\overline{}$
	Heritage Blvd. between					Clay	0.8	0.9	26						-	
TH14-14	Valey View Dr. and					Clay	1.1	1.2	28			i –				
1114-14	Fieldstone Bay, in front of					Clay	1.4	1.5	34							
	90 Heritage Blvd.					Clay	1.7	1.8	40			i	\vdash			
						Clay	2.0	2.1	45							
			L		1	Clay	2.3	2.4	46			î T				
						Clay	3.1	3.2	45							
		Concrete	153													
						Silt	0.2	0.3	16				i –		—	
						Clay	0.5	0.6	17	0	29	30	40	12	31	19
	Heritage Blvd. between					Clay	0.8	0.9	29							
TH14-15	Valey View Dr. and					Silt	1.1	1.2	20			i	i		—	
1114-10	Fieldstone Bay, in front of					Silt	1.4	1.5	16							
	80 Heritage Blvd.					Clay	1.7	1.8	40							
						Clay	2.0	2.1	42			ì				
						Clay	2.3	2.4	45							
						Clay	3.1	3.2	47	-						
		Concrete	168												ì	
						Silt	0.2	0.3	18							
	Name of the same o					Clay	0.5	0.6	31							
	Heritage Blvd. between Valey View Dr. and					Clay	8.0	0.9	38	0	0	3	96	23	93	70
TU14-18	Fieldstone Bay, in front of					Clay	1.1	1.2	40							
11114-10	fence between 73 and 75					Clay	1.4	1.5	41							
	Heritage Blvd.					Clay	1.7	1.8	48			T				
						Clay	2.0	2.1	46							
						Clay	2.3	2.4	46							
						Clay	3.1	3.2	44			1			i	

Project No.

0035 011 00

Client

Morrison Hershfield

Project

Local Streets Package 14-R-01 Heritage Blvd

Sample Date

14-Jan-14

Test Date

23-Jan-14

Technician

Hachem Ahmed

Heritage Blvd	TH14-14	TH14-14	TH14-14	TH14-14	TH14-14	TH14-14
Depth (m)	0.2 - 0.3	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5	1.7 - 1.8
Sample #	G63	G64	G65	G66	G67	G68
Tare ID	F58	F130	A28	P24	H35	E53
Mass of tare	8.5	8.5	8.2	8.5	8.4	8.4
Mass wet + tare	240.2	235.0	227.4	239.3	204.7	223.8
Mass dry + tare	198.8	193.7	182.4	189.3	154.4	161.8
Mass water	41.4	41.3	45.0	50.0	50.3	62.0
Mass dry soil	190.3	185.2	174.2	180.8	146.0	153.4
Moisture %	21.8%	22.3%	25.8%	27.7%	34.5%	40.4%

Heritage Blvd	TH14-14	TH14-14	TH14-14	TH14-15	TH14-15	TH14-15
Depth (m)	2.0 - 2.1	2.3 - 2.4	3.1 - 3.2	0.2 - 0.3	0.5 - 0.6	0.8 - 0.9
Sample #	G69	G70	G71	G54	G55	G56
Tare ID	W45	N60	N28	D30	F99	Z115
Mass of tare	8.3	8.2	8.2	8.3	8.5	8.1
Mass wet + tare	225.4	423	263.5	259.4	251.4	259.6
Mass dry + tare	158.3	291.9	184.4	225.0	215.3	203.1
Mass water	67.1	131.1	79.1	34.4	36.1	56.5
Mass dry soil	150.0	283.7	176.2	216.7	206.8	195.0
Moisture %	44.7%	46.2%	44.9%	15.9%	17.5%	29.0%

Heritage Blvd	TH14-15	TH14-15	TH14-15	TH14-15	TH14-15	TH14-15
Depth (m)	1.1 - 1.2	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1	2.3 - 2.4	3.1 - 3.2
Sample #	G57	G58	G59	G60	G61	G62
Tare ID	W79	Z32	Z116	E99	Z67	Z33
Mass of tare	8.4	8.5	8.3	4.3	8.4	8.3
Mass wet + tare	289.7	239.6	286.8	278.1	236.1	275.6
Mass dry + tare	243.6	207.6	207.3	197.5	165.8	190.6
Mass water	46.1	32.0	79.5	80.6	70.3	85.0
Mass dry soil	235.2	199.1	199.0	193.2	157.4	182.3
Moisture %	19.6%	16.1%	39.9%	41.7%	44.7%	46.6%



Project No.

0035 011 00

Client

Morrison Hershfield

Project

Local Streets Package 14-R-01 Heritage Blvd

Sample Date

14-Jan-14

Test Date

23-Jan-14

Technician

Hachem Ahmed

Heritage Blvd	TH14-16	TH14-16	TH14-16	TH14-16	TH14-16	TH14-16
Depth (m)	0.2 - 0.3	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5	1.7 - 1.8
Sample #	G45	G46	G47	G48	G49	G50
Tare ID	W95	W34	N36	P03	E104	H48
Mass of tare	8.3	8.2	8.2	8.5	8.3	8.3
Mass wet + tare	315.6	242.1	224.3	238.2	219.6	258.9
Mass dry + tare	269.1	186.1	165.1	172.3	157.8	177.1
Mass water	46.5	56.0	59.2	65.9	61.8	81.8
Mass dry soil	260.8	177.9	156.9	163.8	149.5	168.8
Moisture %	17.8%	31.5%	37.7%	40.2%	41.3%	48.5%

Heritage Blvd	TH14-16	TH14-16	TH14-16			
Depth (m)	2.0 - 2.1	2.3 - 2.4	3.1 - 3.2			
Sample #	G51	G52	G53			·
Tare ID	E47	N62	E69			
Mass of tare	8.4	8.4	8.4			
Mass wet + tare	245.4	240.5	287.9			
Mass dry + tare	171.2	167.0	203.1			
Mass water	74.2	73.5	84.8			
Mass dry soil	162.8	158.6	194.7			
Moisture %	45.6%	46.3%	43.6%			



Project No. 0035 011 00

Client Morrison Hershfield

Project Local Streets Package 14-R-01 Heritage Blvd

Test Hole TH14-15 Sample # **G55** Depth (m) 0.5 - 0.6Sample Date 14-Jan-14

Test Date 30-Jan-14

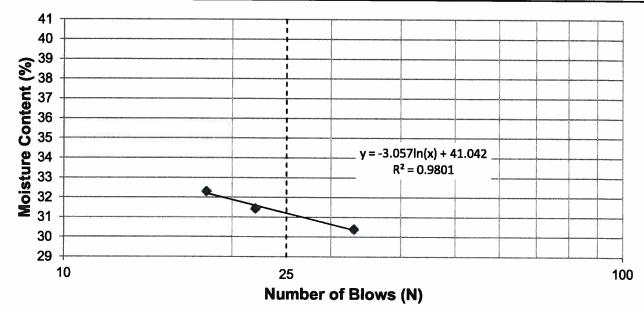
Hachem Ahmed

Liquid Limit 31 **Plastic Limit** 12 **Plasticity Index** 19

Liquid Limit

Technician

Trial #	1	2	3	4	5
Number of Blows (N)	33	22	18		
Mass Wet Soil + Tare (g)	22.024	21.907	20.876		
Mass Dry Soil + Tare (g)	20.166	20.019	19.184		
Mass Tare (g)	14.055	14.014	13.947		
Mass Water (g)	1.858	1.888	1.692		
Mass Dry Soil (g)	6.111	6.005	5.237		
Moisture Content (%)	30.404	31.440	32.309		



Trial #	1	2	3	4	5
Mass Wet Soil + Tare (g)	20.290	20.775			
Mass Dry Soil + Tare (g)	19.595	20.076			
Mass Tare (g)	13.906	14.065			
Mass Water (g)	0.695	0.699			
Mass Dry Soil (g)	5.689	6.011			
Moisture Content (%)	12.217	11.629			



www.trekgeotechnical.ca 1712 St. James Street Winnipeg, MB R3H 0L3

Tel: 204.975.9433 Fax: 204.975.9435

Project No.

0035 011 00

Client

Morrison Hershfield

Project

Local Streets Package 14-R-01 Heritage Blvd

Test Hole

TH14-16

Sample #

G47

Depth (m)

0.8 -0.9

Sample Date

14-Jan-14

Test Date Technician 12-Feb-14

Daniel Mroz

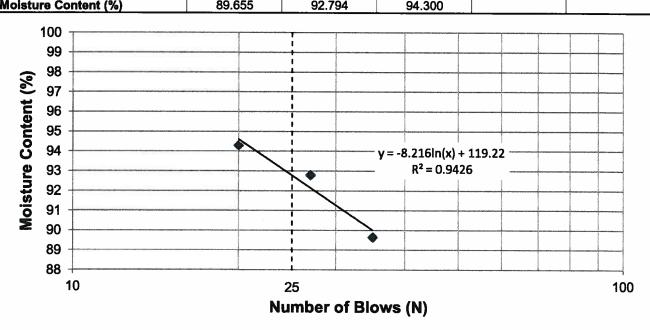
Liquid Limit Plastic Limit 93 23

Plasticity Index

70

Liquid Limit

Trial #	1	2	3	4	5
Number of Blows (N)	35	27	20		
Mass Wet Soil + Tare (g)	23.176	22.494	22.035		
Mass Dry Soil + Tare (g)	18.782	18.425	18.180		
Mass Tare (g)	13.881	14.040	14.092		
Mass Water (g)	4.394	4.069	3.855		
Mass Dry Soil (g)	4.901	4.385	4.088		
Moisture Content (%)	89.655	92.794	94.300	***	



Trial #	1	2	3	4	5
Mass Wet Soil + Tare (g)	20.064	20.750			
Mass Dry Soil + Tare (g)	18.965	19.493			
Mass Tare (g)	14.059	13.964			
Mass Water (g)	1.099	1.257			
Mass Dry Soil (g)	4.906	5.529			
Moisture Content (%)	22.401	22.735			

0035 011 00

Cilent

Morrison Hershfield

Project

Local Streets Package 14-R-01 Heritage Blvd

Test Hole

TH14-15

Sample # Depth (m) G55

Depth (m)
Sample Date

0.5 - 0.6 14-Jan-14

Test Date

14-Jan-14 27-Jan-14

Technician

Hachem Ahmed



Particle Size Distribution Curve Sand Gravel Clay Silt Fine Coarse Medium Fine Coarse 100 90 80 Percent Finer by Weight 70 60 50 40 30 20 10 0 0.001 0.01 0.1 10 100 Particle Size (mm)

Gravel		Sand		Silt and Clay	
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	100.00	0.0750	70.67
37.5	100.00	2.00	100.00	0.0611	55.72
25.0	100.00	0.825	99.92	0.0432	55.72
19.0	100.00	0.425	99.81	0.0308	54.13
12.5	100.00	0.180	99.48	0.0221	49.36
9.50	100.00	0.150	99.26	0.0157	47.99
4.75	100.00	0.075	70.67	0.0115	47.99
				0.0082	44.81
				0.0057	43.69
				0.0041	43.69
				0.0029	42.10
				0.0021	40.51
				0.0012	39.17

0035 011 00

Client

Morrison Hershfield

Project

Local Streets Package 14-R-01 Heritage Blvd

Test Hole

TH14-16

Sample # Depth (m) G47

Depth (m) Sample Date 0.8 - 0.9

Test Date
Technician

14-Jan-14 11-Feb-14

D

0.001

Daniel Mroz

0.01

 Gravel
 0.0%

 Sand
 0.3%

 Silt
 3.3%

 Clay
 96.4%

10

Particle Size Distribution Curve Sand Gravel Clay Silt Fine Medium Coarse Fine Coarse 100 90 80 Percent Finer by Weight 70 60 50 40 30 20 10

0.1

1

Gravel		Sand		Silt and Clay	
Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing	Particle Size (mm)	Percent Passing
50.0	100.00	4.75	100.00	0.0750	99.72
37.5	100.00	2.00	99.98	0.0487	99.25
25.0	100.00	0.825	99.90	0.0344	99.25
19.0	100.00	0.425	99.78	0.0243	99.25
12.5	100.00	0.180	99.76	0.0172	99.25
9.50	100.00	0.150	99.76	0.0122	99.25
4.75	100.00	0.075	99.72	0.0089	99.25
				0.0063	99.25
				0.0044	99.25
				0.0031	99.25
				0.0022	97.67
				0.0016	94.49
				0.0010	86.55

Particle Size (mm)

100



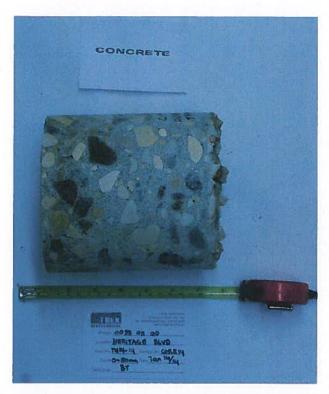


Photo 1: Asphalt and Concrete Core Sample from Test Hole TH14-14



Photo 2: Asphalt and Concrete Core Sample from Test Hole TH14-15



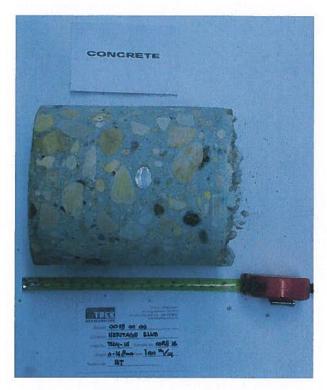


Photo 3: Asphalt and Concrete Core Sample from Test Hole TH14-16



Morrison Hershfield

Coring for Wellington Crescent Pathway

Prepared for:

Morrison Hershfield 25 Scurfield Blvd, Unit I Winnipeg, MB R3Y IG4 Attention: Ron Bruce

Project Number: 0035 012 00

Date: February 21, 2014 Final Report

Distribution:

Ron Bruce, P.Eng.



Quality Engineering | Valued Relationships

February 21, 2014

Our File No. 0035 012 00

Ron Bruce, P.Eng. Morrison Hershfield 25 Scurfield Blvd. Unit 1 Winnipeg, MB R3Y 1G4

RE:

Pavement Structure Investigation Report for

Wellington Crescent Pathway

TREK Geotechnical Inc. is pleased to submit our report for the pavement structure investigation on Wellington Crescent Pathway

Please contact the undersigned if you have any questions. Thank you for the opportunity to serve you on this assignment.

Sincerely,

TREK Geotechnical Inc.

Per:

Nelson John Ferreira, M. Sc., P. Eng. Geotechnical Engineer, Principal

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Revision History

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0	BT	February 21, 2014	Final Report

Authorization Signatures

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Table of Contents

Letter of Tra	nsmittal
Revision His	tory and Authorization Signatures
1.0 Introd	luction
2.0 Paver	nent Structure Investigation and Laboratory Program
List of Figure 01	gure Test Hole Location Plan – Wellington Crescent Pathway
List of A	ppendices
Appendix A	Pavement Structure Summary Table
Appendix B	Photographs of Pavement Core Samples



1.0 Introduction

This report summarizes the results of the pavement structure investigation completed for Wellington Crescent multi-use pathway between Academy Rd. and Park Blvd. N. Information regarding the asphalt and granular base is provided.

2.0 Pavement Structure Investigation and Laboratory Program

A total of 12 test holes were drilled on Wellington Crescent multi-use pathway between Academy Rd. and Park Blvd. N. at the locations shown on Figure 01. The test holes were drilled in order to determine the pavement conditions for rehabilitation of the pathway along this stretch.

The pavement structure investigation was conducted January 24 to January 25, 2014. The pavement structure (asphalt and granular base) were cored by TREK using a portable coring drill press equipped with a hollow 150 mm diameter diamond core drill bit. Core samples were retrieved and the thickness was logged at TREK's materials testing laboratory. Below the core sample a 100 to 240 mm thick granular layer was encountered (19 mm down limestone and/or sand and gravel A-Base). The test hole locations are noted accordingly in the pavement structure summary table included in Appendix A. Photos of the asphalt core and granular base are included in Appendix B.

Test hole locations shown on the figure are based on handheld GPS coordinates. Approximate street address are also provided.



Figure

TREK SEDITECTION OF Wellington Crescent Pathway

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NOTES:

1. IMAGE FROM GOOGLE EARTH ON MAY 2, 2013

LEGEND:

TEST HOLE (TREK, JANUARY, 2014)

KEY PLAN SCALE : N.T.S.

Test Hole Location Plan Wellington Crescent Pathway

Figure 01



Appendix A

Pavement Structure Summary Table



Coring for Wellington Crescent Pathway Pavement Structure Investigation

Test Hole No.	Test Hole Location	Pavement		Granular Base Material	
	Approximate Street Address (UTM Coordinates)	Туре	Thickness (mm)	Туре	Thickness (mm)
TH14-01	West side of 696 Academy Rd. (628796.84E, 5526224.71N)	Asphalt	58	19 mm Down Limestone	202
TH14-02	West side of 1674 Wellington Crescent (628785.16E, 5526130.66N)	Asphalt	65	19 mm Down Limestone	195
TH14-03	North east of 123 Duncaster St. (628708.38E, 5526081.44N)	Asphalt	105	Sand and Gravel (A-Base)	145
TH14-04	North west of 123 Duncaster St. (628613.99E, 5526071.13N)	Asphalt	140	Sand and Gravel (A-Base)	100
TH14-05	North east of 101 Chataway Blvd. (628520.7E, 5526087N)	Asphalt	68	19 mm Down Limestone	232
TH14-05B	North of 1800 Wellington Crescent (628520.7E, 5526087N)	Asphalt	60	19 mm Down Limestone	240
TH14-06	North of 102 Chataway Blvd. (628430.84E, 5526118.66N)	Asphalt	68	19 mm down Limestone over sand and gravel (A-Base)	237
TH14-07	North of 102 Girton Blvd. (628337.55E, 5526113.27N)	Asphalt	62	19 mm Down Limestone	238
TH14-08	North west of 101 Grenfell Blvd. (628337.55E, 5526113.27N)	Asphalt	128	19 mm Down Limestone	187
TH14-09	North of 101 Handsart Blvd. (628161.93E, 5526089.25N)	Asphalt	150	19 mm Down Limestone	150
TH14-10	North east of 103 Lamont Blvd. (628074E, 5526059.62N)	Asphalt	120	19 mm Down Limestone over Sand and Gravel with some Silt and some Clay	180
TH14-11	North of 100 Lamont Blvd. (628008.81E, 5526004.6N)	Asphalt	88	Sand and Gravel (A-Base)	175
TH14-12	North west of 101 Park Blvd. N. (627927.6E, 5525968.95N)	Asphalt	76	Sand and Gravel (A-Base) over Sand and Gravel (A- Base) with some Silt and some Clay	154



Appendix B

Photographs of Pavements Core Samples



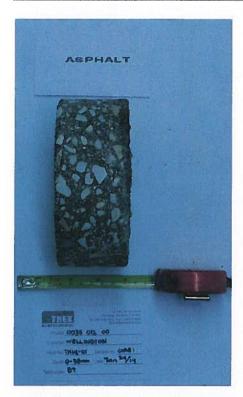


Photo 1: Asphalt Core Sample from Test Hole TH14-01

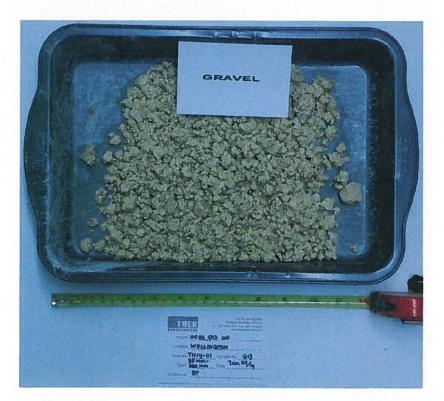


Photo 2: 19 mm Down Limestone Sample from Test Hole TH14-01





Photo 3: Asphalt Core Sample from Test Hole TH14-02

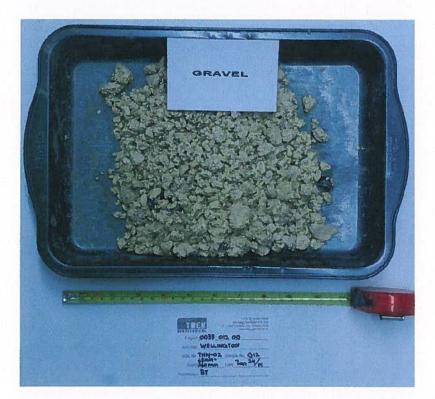


Photo 4: 19 mm Down Limestone Sample from Test Hole TH14-02



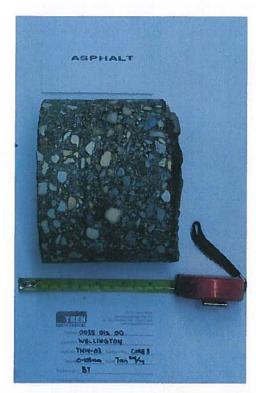


Photo 5: Asphalt Core Sample from Test Hole TH14-03



Photo 6: Sand and Gravel (A-Base) Sample from Test Hole TH14-03



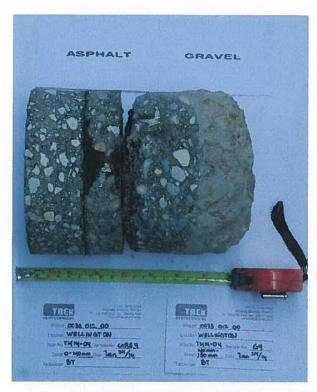


Photo 7: Asphalt Core and 19 mm Down Limestone Sample from Test Hole TH14-04



Photo 8: Sand and Gravel (A-Base) Sample from Test Hole TH14-04



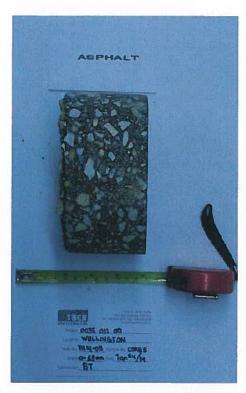


Photo 9: Asphalt Core Sample from Test Hole TH14-05

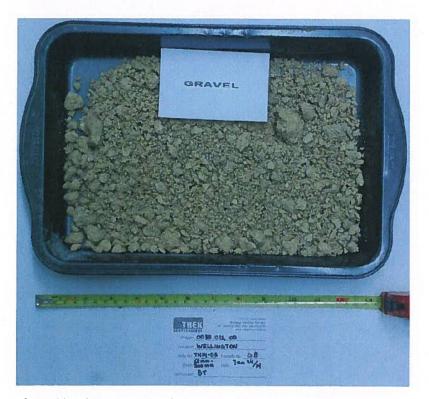


Photo 10: 19 mm Down Limestone Sample from Test Hole TH14-05





Photo 11: Asphalt Core Sample from Test Hole TH14-05B

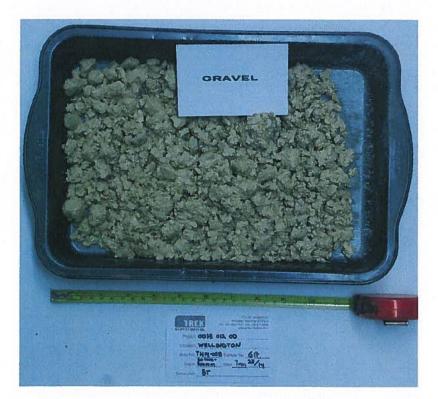


Photo 12: 19 mm Down Limestone Sample from Test Hole TH14-05B





Photo 13: Asphalt Core Sample from Test Hole TH14-06



Photo 14: 19 mm Down Limestone over Sand and Gravel (A-Base) Sample from Test Hole TH14-06





Photo 15: Asphalt Core Sample from Test Hole TH14-07



Photo 16: 19 mm Down Limestone Sample from Test Hole TH14-07



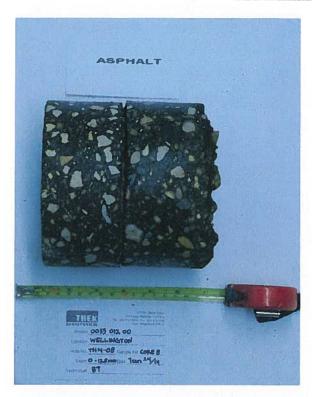


Photo 17: Asphalt Core Sample from Test Hole TH14-08

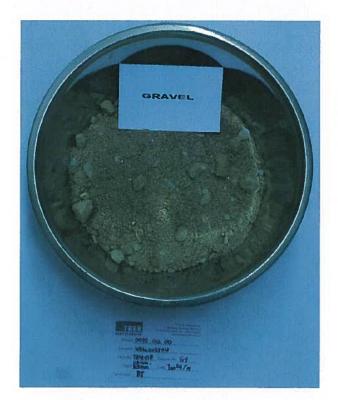


Photo 18: 19 mm Down Limestone Sample from Test Hole TH14-08



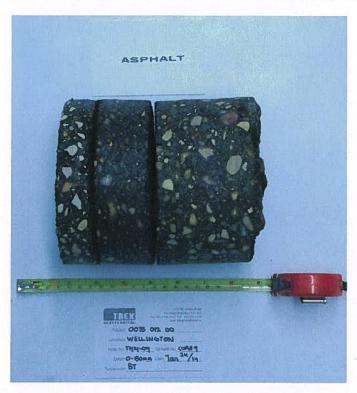


Photo 19: Asphalt Core Sample from Test Hole TH14-09



Photo 20: 19 mm Down Limestone Sample from Test Hole TH14-09



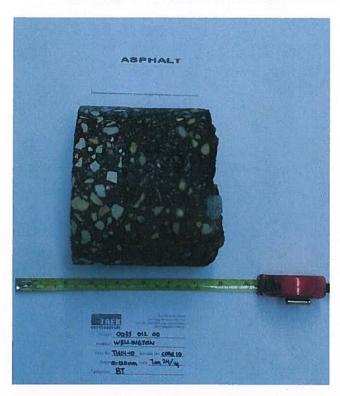


Photo 21: Asphalt Core Sample from Test Hole TH14-10

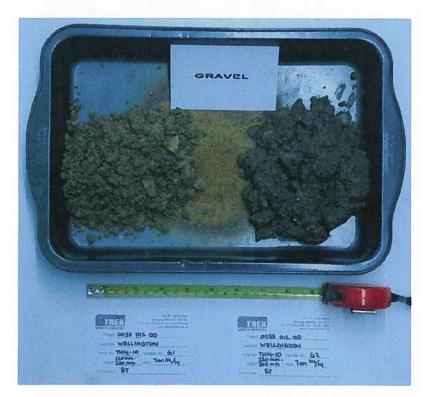


Photo 22: 19 mm Down Limestone over Sand and Gravel with some Silt and some Clay Sample from Test Hole TH14-10





Photo 23: Asphalt Core Sample from Test Hole TH14-11



Photo 24: Sand and Gravel (A-Base) Sample from Test Hole TH14-11





Photo 25: Asphalt Core Sample from Test Hole TH14-12

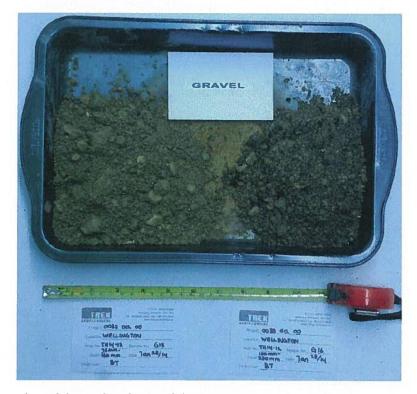


Photo 26: Sand and Gravel (A-Base) over Sand and Gravel (A-Base) with some Silt and some Clay Sample from Test Hole TH14-12