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APPENDIX 'G' GEOTECHNICAL REPORT



Morrison Hershfield

2018 Local Streets Package (PW File #: 18-R-05)

Prepared for:

Distribution:

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

Project Number:

0035 057 00

Date:

February 2, 2018 Final Report



Quality Engineering | Valued Relationships

February 2, 2018

Our File No. 0035 057 00

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

RE:

Sub-Surface Investigation Report for

2018 Local Streets Package (PW File #: 18-R-05)

TREK Geotechnical Inc. is pleased to submit our report for the sub-surface investigations for the 2018 Local Streets Package (PW File #: 18-R-05).

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, Ph.D., P. Eng. Geotechnical Engineer, Principal

Tel: 204.975.9433 ext. 103

cc: Angela Fidler-Kliewer C.Tech. (TREK Geotechnical)



Revision History

Revision No.	Author	Issue Date	Description
0	AFK	February 2, 2018	Final Report

Authorization Signatures

Prepared By:

Angela Fidler-Kliewer C.Tech.



Certificate of Authorization
Tiek Geotechnical Inc.
No. 4877 Date: Feb 2,2016

Reviewed By:

Nelson John Ferreira, Ph.D., P.Eng. Geotechnical Engineer



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Appendix B Test Hole Logs, Summary Table & Lab Data - Culross Bay



1.0 Introduction

This report summarizes the results of the sub-surface investigation completed for the 2018 Local Streets Package 18-R-05 project. The streets included Tache Avenue, Oxford Street, and Culross Bay. The information collected describes the pavement structure of the existing road as well as the soil stratigraphy beneath the pavement structure.

2.0 Sub-Surface Investigation and Laboratory Program

For each street test holes were drilled approximately every 50m of street length with specific locations shown on Figure 01 to Figure 02. The test holes were drilled in order to determine sub-surface conditions for the reconstruction of the road segment.

The sub-surface investigation was conducted between December 14, 2017 and December 22, 2017. The test holes were drilled to a depth of 3.0 m below road surface by Maple Leaf Drilling Ltd. using their B40 Mobile truck mounted drill rig equipped with 125 mm diameter solid stem augers. The pavement structure (asphalt or concrete) was cored by Harsimran Singh of TREK Geotechnical Inc. (TREK) using a portable coring press equipped with a hollow 150 mm diameter diamond core drill bit. The subsurface conditions were observed during drilling and visually classified by Dawn Sellick of 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. Core samples were also retrieved and logged at TREK's material testing laboratory.

The laboratory testing program consisted of moisture content determination, Atterberg limits, and grain size analysis (mechanical sieve and hydrometer methods) on select samples between 0.5 and 1.0 m below pavement. Information gathered for each street is included in separate appendices (Appendices A and B). The information provided in the Appendices includes test hole logs, laboratory testing summary tables and results, and photos of the concrete cores.

Test hole locations noted on the test hole logs and shown on Figure 01 and Figure 02 are based on their location relative to the nearest address, and measured distances from the edge of pavement or other permanent features.

3.0 Closure

The information provided in this report is in accordance with current engineering principles and practices (Standard of Practice). The findings of this report were based on information provided (field investigation, laboratory testing, geometries). Soil conditions are natural deposits that can be highly variable across a site. If sub-surface conditions are different than the conditions previously encountered on-site or those presented here, we should be notified to adjust our findings if necessary.

All information provided in this report is subject to our standard terms and conditions for engineering services, a copy of which is provided to each of our clients with the original scope of work, or a mutually executed standard engineering services agreement. If these conditions are not attached, and you are not



already in possession of such terms and conditions, contact our office and you will be promptly provided with a copy.

This report has been prepared by TREK Geotechnical Inc. (the Consultant) for the exclusive use of Morrison Hershfield (the Client) and their agents for the work product presented in the report. Any findings or recommendations provided in this report are not to be used or relied upon by any third parties, except as agreed to in writing by the Client and Consultant prior to use.



Figures







NOTES: 1.



Appendix A

Tache Ave., between St. Mary's Ave. and Lyndale Drive.

Test Hole Logs, Summary Table, Lab Data and Photographs of Pavement Core Samples



EXPLANATION OF FIELD AND LABORATORY TESTING

GENERAL NOTES

- 1. Classifications are based on the United Soil Classification System and include consistency, moisture, and color. Field descriptions have been modified to reflect results of laboratory tests where deemed appropriate.
- 2. Descriptions on these test hole logs apply only at the specific test hole locations and at the time the test holes were drilled. Variability of soil and groundwater conditions may exist between test hole locations.
- 3. When the following classification terms are used in this report or test hole logs, the primary and secondary soil fractions may be visually estimated.

Ma	jor Div	isions	USCS Classi- fication	Symbols	Typical Names		Laboratory Classific	cation Criteria		ς,			
	action	gravel no fines)	GW	36	Well-graded gravels, gravel-sand mixtures, little or no fines		$C_U = \frac{D_{60}}{D_{10}}$ greater than 4	4; $C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3		ASTM Sieve sizes	#10 to #4	#40 to #10	< #200
sieve size)	Gravels (More than half of coarse fraction is larger than 4.75 mm)	Clean gravel (Little or no fines)	GP	.A.	Poorly-graded gravels, gravel-sand mixtures, little or no fines	urve, 200 sievej nbols*	Not meeting all gradation	requirements for GW	0	STMS	#10	#40 t	* V
No. 200 s	Gray than half o	Gravel with fines (Appreciable amount of fines)	GM		Silty gravels, gravel-sand-silt mixtures	rain size c r than No. g dual sym	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are border-	Particle Size	⋖			
ained soils larger thar	(More	Gravel w (Appre amount	GC		Clayey gravels, gravel-sand-silt mixtures	vel from g on smaller llows: W, SP SM, SC SM, SC	Atterberg limits above "A" line or P.I. greater than 7	line cases requiring use of dual symbols	Part		22	00 ۾د	9
Coarse-Grained soils (More than half the material is larger than No. 200 sieve size)	action	sands no fines)	SW	****	Well-graded sands, gravelly sands, little or no fines	Determine percentages of sand and gravel from grain size curve, depending on percentage of fines (fraction smaller than No. 200 sieve) coarse-grained soils are classified as follows: Less than 5 percent GW, GP, SW, SP More than 12 percent GM, GC, SM, SC 6 to 12 percent Borderline case4s requiring dual symbols*	$C_U = \frac{D_{60}}{D_{10}}$ greater than 6	$C_C = \frac{(D_{30})^2}{D_{10} \times D_{60}}$ between 1 and 3		E	2.00 to 4.75	0.425 to 2.00	< 0.075
half the r	Sands If of coarse fr	Clean sands (Little or no fines)	SP		Poorly-graded sands, gravelly sands, little or no fines	ages of sarentage of farentage of farentage of farentage of farentage.	Not meeting all gradation	requirements for SW			•	0 0	<i>i</i>
(More than	(More than half the material Sands (More than half of coarse fraction is smaller than 4.75 mm) Sands with fines (Appreciable amount of fines) Sands (More than half the material is smaller than 4.75 mm) Sands (Appreciable (Little on of fine amount of fines) Sands Sands Clean sands Clean sands Chapter of the material is smaller than 5 mm Chapter of the material is smaller than 5 mm Chapter of the material is smaller than 1.5 mm Chapter of the material		SM		Silty sands, sand-silt mixtures	ne percentarion percentarion percentarion percentarion percentarion percentarion percentarion 12 percentarion	Atterberg limits below "A" line or P.I. less than 4	Above "A" line with P.I. between 4 and 7 are border-	rial				Clay
			SC		Clayey sands, sand-clay mixtures	Determin dependin coarse-g Less t More	Atterberg limits above "A" line or P.I. greater than 7	line cases requiring use of dual symbols	Material	0000	Coarse	Medium	Silt or Clay
size)	ys.		ML		Inorganic silts and very fine sands, rock floor, silty or clayey fine sands or clayey silts with slight plasticity	80 Plasticity	Plasticity (Chart	i	Sizes	. <u>.</u> . <u>.</u> :	2	i ii
. 200 sieve	Silts and Clar	(Liquid limit less than 50)	CL		Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	70 – 60 –	an 0.425 mm	"I III" I III	9	ASTM Sieve Sizes	3 in. to 12 in.	3/4 in 40 3 in	3/4 III. (0 3 III #4 to 3/4 in.
soils er than No	is.	<u> </u>	OL		Organic silts and organic silty clays of low plasticity	NDEX (%)		CA CA	Particle Size	AS			_
e-Grained al is small	iys	t 50)	MH	Ш	Inorganic silts, micaceous or distomaceous fine sandy or silty soils, organic silts	PLASTICITY INDEX				mm *300	75 to 300	 	19 to 75 4.75 to 19
Fine the materi.	Silts (Lio		Inorganic clays of high plasticity, fat clays	20 -	0	MH OR OH		<u>-</u>	75 to		4.75		
than half			Organic clays of medium to high plasticity, organic silts	7 4 0 10	ML or OL 16 20 30 40 50 LIQUID LIM	60 70 80 90 100 110 IIT (%)	rial	9	S S				
(More	Highly	Organic Soils	Pt	6 46 46 47 47 4	Peat and other highly organic soils	d other highly organic soils Van Bast Classification Limit Stroi	rong colour or odour, nd often fibrous texture	Material	Double	Cobbles	Gravel	Fine	

^{*} Borderline classifications used for soils possessing characteristics of two groups are designated by combinations of groups symbols. For example; GW-GC, well-graded gravel-sand mixture with clay binder.

Other Symbol Types

Asphalt	Bedrock (undifferentiated)	Cobbles
Concrete	Limestone Bedrock	Boulders and Cobbles
Fill	Cemented Shale	Silt Till
	Non-Cemented Shale	Clay Till



EXPLANATION OF FIELD AND LABORATORY TESTING

LEGEND OF ABBREVIATIONS AND SYMBOLS

PL - Plastic Limit (%)
PI - Plasticity Index (%)

▼ Water Level at End of Drilling

MC - Moisture Content (%)

Water Level After Drilling as Indicated on Test Hole Logs

SPT - Standard Penetration Test Indicated on Test Hole Logs
RQD - Rock Quality Designation

Su - Undrained Shear Strength VW - Vibrating Wire Piezometer

Qu - Unconfined Compression

SI - Slope Inclinometer

FRACTION OF SECONDARY SOIL CONSTITUENTS ARE BASED ON THE FOLLOWING TERMINOLOGY

TERM	EXAMPLES	PERCENTAGE
and	and CLAY	35 to 50 percent
"y" or "ey"	clayey, silty	20 to 35 percent
some	some silt	10 to 20 percent
trace	trace gravel	1 to 10 percent

TERMS DESCRIBING CONSISTENCY OR COMPACTION CONDITION

The Standard Penetration Test blow count (N) of a non-cohesive soil can be related to compactness condition as follows:

<u>Descriptive Terms</u>	<u>SPT (N) (Blows/300 mm)</u>
Very loose	< 4
Loose	4 to 10
Compact	10 to 30
Dense	30 to 50
Verv dense	> 50

The Standard Penetration Test blow count (N) of a cohesive soil can be related to its consistency as follows:

Descriptive Terms	<u>SPT (N) (Blows/300 mm)</u>
Very soft	< 2
Soft	2 to 4
Firm	4 to 8
Stiff	8 to 15
Very stiff	15 to 30
Hard	> 30

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

Undrained Shear <u>Strength (kPa)</u>
< 12
12 to 25
25 to 50
50 to 100
100 to 200
> 200

1 of 1



	Client	:	Morrison Her	shfield				Project Number:	0035	-057-0	00					
	Projec	t Nam	e: Local Streets	18-R-05 - T	ache Ave			Location:	UTM	N-55	26118,	E-6348	42			
	Contr	actor:	Maple Leaf D	Drilling				Ground Elevation:	Тор	of Pav	ement					
	Metho	d:	125mm Solid St	em Auger, B40	Mobile Truck	k Mount		Date Drilled:	2017	Dece	mber 14	4				
Į	;	Sample	е Туре:	Gra	b (G)	SI	nelby Tube (T)	Split Spoon (S	S)	 S∤	olit Barr	el (SB)	C	ore (C	;)	
	I	Particle	Size Legend:	Fine	es 🏽		Silt	Sand		Gra	vel		Cobbles		Bould	ers
	Depth (m)	Soil Symbol				RIAL DESCF	RIPTION		Sample Type	Sample Number	16 17	Bulk Uni (kN/m ³ 18 19 Arricle Size 40 60 40 60	9 20 21 e (%) 0 80 100		Undrainee Strength Test ↑ △ Torva Pocket ☑ Qu ○ Field \ 0 100	(kPa) Type ane ∆ Pen. Ф
-		D 4 4	CONCRETE - 20 SAND (Fill) - gra - light browi	velly, trace s												
-	-0.5		- frozen, mo	oist and com ed, sub-angu	pact wher lar to ang	i thawed ular gravel				G01						
18-2-1			CLAY - silty, trac - dark grey - frozen to 0 - high plasti	0.8 m, moist						G02		•		△◆		
CHNICAL.GDT	-1.0-		- stiff to very stiff - firm to stiff belo		9 m to 1.1	m				G03 G04		•		Δ	o	-
J TREK GEOTEC	 -1.5-		- stiff below 1.5 r	-						G05	•					
00 0 B NM.GP.			- Sun Delow 1.51	П						G06		•			10	
ACHE_0035-057-00_0_B_NM.GPJ_TREK_GEOTECHNICAL.GDT_18-2-1	-2.0 -									G07		•			△•	
TREETS 18-R-05 1	-2.5															
8-01-25_LOCAL S	-3.0-									G08		•			7 •	
PTH 83 TH LOGS MIT FONT LOGS 2018-01-25_LOCAL STREETS 18-R-05 T				or sloughing. kfilled with a	uger cuttir	ngs, bentonit		and cold patch asphali Westbound curb.			'		1		'	, ,
TH 83 TH LOGS I	Logge	ed Bv:	Dawn Sellick			Reviewed	By: Nelson F	erreira		Proied	ct Engin	eer: N	lelson Fe	erreira		
딥	599	J.											. 5. 5 5 1 1 1 0	511 4		

1 of 1



	nt:	Morrison Hershfield		Project Number:	0035-0	37-0	J				
Proj	ect Nam	e: Local Streets 18-R-05 - Tache	Ave	Location:	UTM N	N-552	6183, E-	634849			
Con	tractor:	Maple Leaf Drilling		Ground Elevation:	Top of	Pave	ment				
Meth	nod:	125mm Solid Stem Auger, B40 Mobile	Truck Mount	Date Drilled:	2017 D	ecen	nber 14				
	Sample	e Type: Grab (G)	Shelby Tube (T	Split Spoon (S	SS)	Spl	it Barrel ((SB)	Core (C	;)	
	Particle	e Size Legend: Fines	Clay	Sand		Grav	rel 5º	Cobble	s	Bould	ers
Depth (m)	So		ATERIAL DESCRIPTION		Sample Type	ample Nun	PL	cle Size (%) 0 60 80 MC LL	100	Undrained Strength Test T △ Torva Pocket ☑ Qu ○ Field V	(kPa) ype ne ∆ Pen. Ф ⊠
-	-	ASPHALT - 127 mm thick									
-0.5·		SAND (Fill) - silty, gravelly, some of thawed, well graded, no to low pla CLAY - silty, trace sand - grey - frozen to 1.1 m, moist and s	sticity, sub-angular to angular	and compact when		G09 G10	•				
		- high plasticity									
182						G11	•				
1.0						G12					
TECHNIC						G13	•				
-1.5						G14	•				
7-00 0 B NM.C		- stiff to very stiff below 1.7 m				G15	•				/ •
-05TACHE_0035-057-00_0_B_NM.GPJ_TREK_GEOTECHNICAL_GDT_18:2-1						G16	•				0
CAL STREETS 18-R		firm to stiff helpy 2.75 m									
-01-25 LOC 		- firm to stiff below 2.75 m				G17			Δ	•	
PTH 83 TH LOGS MIT FONT LOGS 2018-01-25, LOCAL STREET'S 18-R-05 10-11-11-11-11-11-11-11-11-11-11-11-11-1		END OF HOLE AT 3.0 m DEPTH Notes: 1) No seepage or sloughing. 2) Test hole backfilled with auger of 3) Test hole located at the East side	cuttings, bentonite chips, sand	and cold patch asphalt f Eastbound curb.	<u> </u>						
Log	ged By:	Dawn Sellick	Reviewed By:Nelson l	erreira	_ Pr	oject	Enginee	r: Nelsor	Ferreira		

1 of 1



Cli	ent:	Morrison Her	rshfield			Project Number:	0035-	-057-0	00						
Pro	oject Nam	e: Local Streets	s 18-R-05 - Tache	Ave		Location:	UTM	N-55	26270,	E-6348	45				
Со	ntractor:	Maple Leaf D	Drilling			Ground Elevation:	Тор о	f Pav	ement						
Me	thod:	125mm Solid St	em Auger, B40 Mobile	Truck Mount		Date Drilled:	2017	Dece	mber 1	4					
	Sampl	e Type:	Grab (G)		Shelby Tube (T)	Split Spoon (S	a (SS) Split Barrel (SB) Core (C)								
		••) 01c		.1	
	Partici	e Size Legend:	Fines	Clay	Silt	Sand		Gra		Bulk Un	Cobbles it Wt		Bou	ders ed Shea	
Depth	(m) Soil Symbol	ASPHALT - 178		TERIAL DESC	RIPTION		Sample Type	Sample Number	16 17 P 0 20	(kN/m³ 18 1 article Siz	9 20 21 e (%)		Streng Test △ Tor Pocke □ C ○ Field	th (kPa) Type vane \(\triangle \) ot Pen. \(\frac{1}{2} \) Vane \(\triangle \)) 0
AL.GDT 18-2-1	5-	SAND (Fill) - silt - light browi - frozen, we - well grade - no to low p	y, gravelly, some on et and compact wheed, sub-angular to a plasticity y, some sand, grey be sand	en thawed angular gravel	m, moist and soft	when thawed, high		G18 G19 G20			4		Δ	0	
K GEOTECHNIC,		SILT - clayey, tra - light brown - moist, soft	ace sand n					G21		•		Δ	•		
ICHE 0035-057-00 0 B NM.GPJ TREK GEOTECHNICAL GDT 182-1	5		ermediate plasticity ce sand y stiff					G22 G23 G24	-	•		Δ	Δ •)	
PTH 83 TH LOGS MIT FONT LOGS 2018-01-25 LOCAL STREETS 18-R-05 TAC	5							G25	-	•			A •		
TH LOGS MIT FONT LC		Notes: 1) No seepage of 2) Test hole bac	AT 3.2 m DEPTH I or sloughing. kfilled with auger o ated at the East sid	uttings, benton	ite chips, sand a , 1.0 m South of	nd cold patch asphalt Westbound curb.	t.								
E Lo	gged By:	Dawn Sellick		Reviewed	By: Nelson Fe	erreira	_ F	Projec	t Engi	neer: _N	Nelson Fe	rreira			

1 of 1



Clie	ent:	Morrison Hei	rshfield			Project Number:	0035-	057-0	00								
Pro	ject Nam	e: Local Streets	s 18-R-05 - Tache <i>I</i>	Ave		Location:	UTM	N-55	26346, I	E-63485	51				_		
Coi	ntractor:	Maple Leaf [Drilling			Ground Elevation:	Торо	f Pav	ement						_		
Met	thod:	_125mm Solid St	tem Auger, B40 Mobile	Fruck Mount		Date Drilled:	2017	Dece	mber 14	ļ					_		
	Sample	e Type:	Grab (G)		Shelby Tube (T)	Split Spoon (S	s)	l s	olit Barre	el (SB)	T Co	re (C)					
		e Size Legend:	Fines	Clay	Silt	Sand	Gravel Cobbles Boulders										
-	Fartici	e Size Legeria.	Filles	Clay	ШШ Зііі	e.e.e. Sanu		Gla	-	Bulk Unit			ndrained				
Depth	Soil Symbol	ACDUALT 450		TERIAL DESC	RIPTION		Sample Type	Sample Number	16 17	(kN/m³) 18 19 rticle Size 40 60 MC	20 21	•	Strength Test Torva Torva Pocket Qu Field V	(kPa) y <u>pe</u> ne ∆ Pen. Φ ⊠	250		
ŀ		ASPHALT - 152	mm thick														
E	P 5 4	CONCRETE - 1	02 mm thick														
[SAND (Fill) - silt	ty, gravelly, some claded, no to low plas	ay, light brown	n, frozen, moist a	nd compact when			+ _								
ļ.,			y, gravelly, trace sa			eter)	- /4	G26	•								
-0.5		- grey - frozen, mo	oist and soft when t	hawed				G27		•		Δ.	0				
E			city, hydrocarbon lik														
-2-		CLAY - silty, trad	ce sand														
<u>₽</u>		light greymoist, sof					4	G28									
] -1.0			ate plasticity														
Ş -								G29									
핟	-////																
SEO:							4	G30	•								
ĔĘ,		- grey, firm to sti	iff, high plasticity be	elow 1.4 m													
MN.									1								
0							4	G31		•			2				
21-00																	
ල් <u>–</u> 2.0	-////																
8 #																	
TAC TAC	-////																
R-05		- firm to stiff belo	ow 2.3 m					G32		•		∠ o					
ဗို - ဗ -2.5	-///																
T ST							Ш										
Š.								G33				<u> </u>	•				
71-25									1								
2.6 −3.0		FND OF HOLF	AT 3.0 m DEPTH II	N CLAY													
)GS 2		Notes:		V 02/11													
آ ا		1) No seepage of 2) Test hole bac	kfilled with auger c	uttings, bentor	nite chips, sand a	nd cold patch asphalt	t.										
T FO		3) Test hole loca	ated at house #90,	1.1 m North of	Eastbound curb												
SS M																	
T I I																	
PTH 83 TH LOGS MIT FONT LOGS 2018-01-25_LOCAL STREETS 18-R-05 TACHE_0035-057-00_0_B_NM.GPJ TREK GEOTECHNICAL.GDT 18-2-1																	
E Log	ged By:	Dawn Sellick		Reviewed	l By: Nelson Fe	erreira	_ F	Proje	ct Engine	eer: N	elson Fei	reira					

1 of 1



Client:	Morrison Hershfield	Project Number:	0035	-057-0	00					
Project Nar	ne: Local Streets 18-R-05 - Tache Ave	Location:	UTM	N-55	26404,	E-6348	348			
Contractor:	Maple Leaf Drilling	Ground Elevation:	: <u>Top c</u>	of Pav	ement					
Method:	125mm Solid Stem Auger, B40 Mobile Truck Mount	Date Drilled:	2017	Dece	mber 1	4				
Samp	e Type: Grab (G) Shelby Tube (T)	Split Spoon (S	SS)	S	olit Barr	el (SB)	Co	ore (C)		
Partic	e Size Legend: Fines Clay Silt	Sand	R	Gra	vel		Cobbles		Boulder	·s
Depth (m) Soil Symbol	MATERIAL DESCRIPTION		Sample Type	Sample Number	16 17	_ MC	20 21 ze (%) 60 80 100	Sti	rained Stength (k Test Typ Torvane ocket Pe I Qu I Field Var 100 15	kPa) <u>oe</u> e ∆ en. ∳ ☑
	ASPHALT - 102 mm thick CONCRETE - 127 mm thick			G34	1					
-0.5-	CLAY (Fill)- silty, trace sand, trace gravel (<10 mm diameter) - grey - frozen, moist and soft when thawed - low plasticity SILT - some clay, trace sand			G35 G36	•					
-1.0-	- light brown - moist, soft - low plasticity			G37						
-1.5-	CLAY - silty - light brown - moist, soft - intermediate plasticity - grey, very stiff, high plasticity below 1.5 m			G38 G39		•			•	
-2.0-				G40 G41		•			•	
-2.5-	- firm below 2.5 m			G42		•		40		
,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	END OF HOLE AT 2.9 m DEPTH IN CLAY Notes: 1) No seepage or sloughing. 2) Test hole backfilled with auger cuttings, bentonite chips, sand 3) Test hole located between house #105 and 107, 1.4 m South of	and cold patch aspha of Westbound curb.	lt.		,	,		,		·
Logged By:	Dawn Sellick Reviewed By: Nelson F	erreira		Proje	ct Engir	neer: _	Nelson Fe	rreira		

1 of 1



Clie	ent:	Morrison Hei	rshfield			Project Number:	0035-0	057-0	0				
Pro	ject Nam	e: Local Streets	s 18-R-05 - Tache	e Ave		Location:	UTM	N-552	26470, E	-63485	52		
Cor	ntractor:	Maple Leaf [Drilling			Ground Elevation:	Top of	f Pave	ement				
Met	:hod:	125mm Solid St	tem Auger, B40 Mobil	e Truck Mount		Date Drilled:	2017 [Decer	mber 14				
	Sample	е Туре:	Grab (G)		Shelby Tube (T)	Split Spoon (S	S)	Sp	lit Barre	l (SB)	Cor	e (C)	
	Particle	Size Legend:	Fines	Clay	Silt	Sand		Grav	vel [27 C	obbles	Воц	ulders
Depth	Sol	ACDUALT CA		ATERIAL DESC	RIPTION		Sample Type	amp	16 17 Par 0 20 PL	Bulk Unit (kN/m³) 18 19 ticle Size 40 60 MC 40 60	20 21 (%) 80 100	Stren Tes A To Pool O Fiel	ned Shear gth (kPa) st Type orvane ∆ ket Pen. ♣ Qu ⊠ d Vane ○
-0.5	5-	thawed, well gra CLAY (FILL) - si CLAY - silty, trad - grey	91 mm thick y, gravelly, some ided, no to low pla lity, sandy, trace go	asticity, sub-angu	ılar to angular	nd compact when		G43 G44	•				
OT 18-2-		- moist, ver - high plast					4	G45	•			Δ	۰
EOTECHNICAL.GI)- - - -	SILT - trace to s - light brow - dry to moi - low plastic	n st, soft				4	G46 G47	•				<u> </u>
1.057-00 0 B NM.GPJ TREK		CLAY - silty - grey - moist, stiff - high plast						G48		•		Δ	•
L STREETS 18-R-05 TACHE 0035								G49		•		Δ	0
LOCA								G50		•		△	
PTH 83 TH LOGS MIT FONT LOGS 2018-01-25_LOCAL STREETS 18-R-05 TACHE_0035-057-00_0_B_NM.GPJ TREK GEOTECHNICAL.GDT 18-2-1		Notes: 1) No seepage o 2) Test hole bac		cuttings, benton	ite chips, sand a f Eastbound cur	ind cold patch asphalt b.	<u>-</u> -		,	, 1			
Log	ged By:	Dawn Sellick		Reviewed	By: Nelson Fe	erreira	_ P	rojec	t Engine	er: N	elson Ferr	eira	

1 of 1



c	lient:	Morrison He	rshfield			Project Number:	0035-	-057-0	00					
P	roject Na	ne: Local Streets	s 18-R-05 - Tache	Ave		Location:	UTM	N-55	26547	7, E-634	850			
	ontractor	•				Ground Elevation:								
l,	ethod:		Stem Auger, B40 Mobile	Truck Mount		Date Drilled:	2017							
Ë		· · · · · · · · · · · · · · · · · · ·												
L	Samp	ele Type:	Grab (G)		Shelby Tube (T)	Split Spoon (S	S) 🔼	S	olit Ba	rrel (SB) [Co	re (C)		
	Partio	le Size Legend:	Fines	Clay	Silt	Sand		Gra	vel	5-7	Cobbles	В	oulde	rs
								<u></u>		☐ Bulk U	Init Wt		rained S	
	<u>8</u>						/be	πbe	16 17	, (kN/r 18	n) 19 20 21		ength (I	
£	(m) Soil Symbol		NAC	ATERIAL DESC	PIPTIONI		Sample Type	N	-	Particle S	ize (%)	Δ.	est Tyr Torvan	e∆
٥	S = S		IVIZ	TENIAL DESC	IXII TION		ldu	ple	0 20		60 80 100	♣ Po	ocket P ⊠ Qu ∑	en. 💠
	ပိ						Sal	Sample Number		PL MC		OF	ield Va	ne O
<u> </u>								Ø	0 20	40	60 80 100	0 50 1	100 15	0 200 250
ţ	p 6 4	ASPHALT - 64 I		thiak										
ŀ	9 4 4	CONCRETE - 8	NCRETE - 51 mm t	INICK			- / 							
F			ty, gravelly, some c	clay light brown	frozen moist a	nd compact when	-//	G51	•					
F		thawed, well gra	aded, no to low plas	sticity, sub-angu	ılar to angular			G52						
F,	💥		ilty, sandy, trace gr	avel (<10 mm c	liameter), grey, r	noist, low plasticity		002						
-).5–	CLAY - silty, tra	ce sand											
ļ		- grey - moist, sof	ft						1					
Ŀ	<u> </u>	- high plast						G53		•		/0		
8-2-1														
<u>_</u>		- very stiff block	ky between 0.9 m to	o 1.5 m										
J-	.0-	- very sun, block	ty between 0.5 m a	0 1.0 111				G54		•				•
₹.									1					
돬														
								G55		•			۰	
B B									-				_	
Ř.	- ///													
ΣF	.3-	- stiff to very stif	ff below 1.5 m					050						
<u>.</u>								G56		T		Δ	•	
Z L	-////													
									-					
22-0								G57		•			•	
256	2.0-													
8														
影[
5 T														
쏲								G58		•			•	
2 L2	2.5-													
밿														
STE														
₫-	-////													
2 FC														
01-2														
918	,.0	END OF HOLF	AT 3.0 m DEPTH I	IN CLAY										
GS 2		Notes:		OLAI										
의		1) No seepage		outtings boots	ite chine cand a	nd cold natch canhalt								
NO		3) Test hole location	ated between hous	se #137 and #14	ռե տորջ, sand a I1, 1.5 m South ։	nd cold patch asphalt of Westbound curb.	•							
Ĭ.		,												
3S N														
ŏ														
3 TH														
PTH 83 TH LOGS MIT FONT LOGS 2018-01-25_LOCAL STREETS 18-R-05 TACHE_0035-057-00_0_B_NM.GP.J TREK GEOTECHNICAL.GDT 18-2-1	ogged By	: Dawn Sellick		Reviewed	By: Nelson Fe	erreira	_ F	Projec	t Eng	ineer:	Nelson Fer	reira		

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Client:	Morrison Hershfie	ld			Project Number:	0035	-057-0	00					
Project Nam	ne: Local Streets 18-F	R-05 - Tache	Ave		Location:	UTM	N-55	26637	, E-6348	357			
Contractor:	Maple Leaf Drilling	g			Ground Elevation:	: <u>Top (</u>	of Pav	ement/					
Method:	125mm Solid Stem Au	ger, B40 Mobile	e Truck Mount		Date Drilled:	2017	Dece	ember 1	14				
Sampl	e Type:	Grab (G)	S	nelby Tube (T)	Split Spoon (S	SS)	S	plit Bar	rel (SB)	Cor	re (C)		
Particl	e Size Legend:	Fines	Clay	Silt	Sand	<u> </u>	Gra	avel	F.S.	Cobbles	В	oulders	
1 3.1.1.5.		<u> </u>	<u>////</u> 5.2,	ШШ э	[····a] = aa		-		□ Bulk Ur	nit Wt		ained Sh	
Depth (m) Soil Symbol	ACDUALT. 450 mm		ATERIAL DESCF	RIPTION		Sample Type	Sample Number	16 17 F 0 20 P 0 20	Particle Size			ength (kFest Type Forvane locket Pel Qu Queld Vano 00 150	e A∆ en. Ф
	ASPHALT - 152 mm	INICK											
P 5 4 9	CONCRETE - 254 mi												
	SAND (Fill) - silty, gra thawed, well graded, CLAY (FILL) - silty, sa	no to low pla	asticity, sub-angu	frozen, moist a ar to angular	and compact when		G59	1					
-0.5-	- grey		•				G60						
	- frozen to 0.6 m - high plasticity	, moist and s	soft when thawed										
	CLAY - silty, trace sar - grey	nd					G61		•		٥		
	- moist, stiff						000	1			, .		
-1.0-	- high plasticity						G62						
							G63		•		Δ	•	
-1.5-													
	- very stiff below 1.7 r	m				4	G64		•		4		
							G65		•			4	
-2.0-													
							G66		•			,	
-2.5													
							G67						
-3.0-							307						
	END OF HOLE AT 3. Notes: 1) No seepage or slot 2) Test hole backfilled 3) Test hole located 3 North of Eastbound c	ughing. d with auger 39.0 m South	cuttings, bentoni	te chips, sand a e and Tache Av	and cold patch aspha ve intersection, 1.0 m	lt.			·	· · · · · · · · · · · · · · · · · · ·	·	-	·
Logged By	Dawn Sellick		Ravioued	By: Nelson F	erreira		Projec	ct Engi	neer:	Nelson Fer	reira		
	Jann Comor			_,. <u> </u>	J J., G		0,00	· · · · · · · · ·			J., u		'



Local Streets Package 18-R-05 Sub-Surface Investigation Tache Avenue

To at I I ala		Paveme	ent Surface	Pavement Str	ucture Material		Sample	Sample Depth (m) Moisture			Grain Size Analysis		3	At	terberg L	imits
Test Hole 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	N/A	Concrete	203							% Fines				
						SAND (FILL)	0.3	0.5	7	27	68	5				
	UTM: 5526118 N,					CLAY	0.6	0.8	37							
	634842 E					CLAY	0.9	1.1	32							
TH17-01	Located East side of					CLAY	1.1	1.2	22							
	House #59, & 1.7 m					CLAY	1.4	1.5	22							
	South of curb					CLAY	1.7	1.8	34							
						CLAY	2.0	2.1	42							
						CLAY	2.7	2.9	42							
		Asphalt	127	Concrete	N/A											
						SAND (FILL)	0.3	0.6	14							
						CLAY	0.5	0.6	20							
	UTM: 5526183 N,					CLAY	0.8	0.9	27							
TH17-02	634849 E Located at House #52, &					CLAY	0.9	1.1	20							
	1.1 m North of curb					CLAY	1.4	1.5	21							
						CLAY	1.7	1.8	33							
						CLAY	2.0	2.1	37							
						CLAY	2.7	2.9	39							
		Asphalt	178	Concrete	N/A											
						SAND (FILL)	0.3	0.5	15							
						CLAY (FILL)	0.6	0.8	28							
	UTM: 5526270 N,					CLAY	0.8	0.9	34	0	1	28	71	26	77	51
TH17-03	634845 E Located at House #71 &					CLAY	1.1	1.2	35							
	1.0 m South of curb.					SILT	1.4	1.5	22							
						CLAY	1.7	1.8	32							
						CLAY	2.0	2.1	42							
						CLAY	2.6	2.7	45							
		Asphalt	152	Concrete	102											
						SAND (FILL)	0.3	0.5	16							
						CLAY	0.5	0.6	34							
	UTM: 5526346 N,					CLAY	0.8	0.9	23							
TH17-04	634851 E Located at House #90, &					CLAY	1.1	1.2	22							
	1.1 m North of curb.					CLAY	1.2	1.4	26							
						CLAY	1.7	1.8	43							
						CLAY	2.3	2.4	37							
						CLAY	2.7	2.9	49							



Local Streets Package 18-R-05 Sub-Surface Investigation Tache Avenue

Test Hole Test Hole Location		Paveme	ent Surface	Pavement Str	ucture Material		Sample	Depth (m)	Moisture		Grain Siz	e Analysis	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	102	Concrete	127											
						SAND and GRAVEL (FILL)	0.1	0.2	28							
						CLAY (FILL)	0.2	0.3	25							
	UTM: 5526404 N,					CLAY (FILL)	0.5	0.6	20							
TU17.05	634848 E Located between House					SILT	0.8	0.9	18	0	9	71	20	18	24	6
11117-03	#105 and#107, & 1.4 m					CLAY	1.2	1.4	27							
	South of curb					CLAY	1.5	1.7	36							
						CLAY	1.8	2.0	41							
						CLAY	2.1	2.3	44							
						CLAY	2.4	2.6	46							
		Asphalt	64	Concrete	191											
						SAND (FILL)	0.2	0.3	21							
						CLAY (FILL)	0.5	0.6	24							
	UTM: 5526470 N,					CLAY	8.0	0.9	30							
TH17-06	634852 E Located at House #126,					CLAY	0.9	1.1	26							
	& 1.2 m North of curb.					SILT	1.1	1.2	18							
						CLAY	1.5	1.7	38							
						CLAY	2.1	2.3	42							
						CLAY	2.7	2.9	47							
		Asphalt	51	Concrete	127											
						SAND (FILL)	0.2	0.3	15							
	UTM: 5526547 N,					CLAY (FILL)	0.3	0.5	18							
	634850 E					CLAY	0.6	0.8	30							
TH17-07	Located between House					CLAY	0.9	1.1	33							
	#137 and #141, & 1.5 m					CLAY	1.2	1.4	26							
	South of curb.					CLAY	1.5	1.7	31							
						CLAY	1.8	2.0	45							
						CLAY	2.3	2.4	47							
		Asphalt	51	Concrete	127											
						SAND (FILL)	0.2	0.3	18							
	UTM: 5526637 N,					CLAY (FILL)	0.5	0.6	17							
	634857 E				İ	CLAY	0.8	0.9	35							
TH17-08	Located 39 m South of St. Mary's Ave. and					CLAY	0.9	1.1	35							
	Tache Ave. intersection,					CLAY	1.2	1.4	30							
	& 1.0 m North of curb.					CLAY	1.5	1.7	34							
						CLAY	1.8	2.0	34							
						CLAY	2.1	2.3	29							



Project Local Streets 18-R-05 Tache Ave.

Test Pit	TH17-01	TH17-01	TH17-01	TH17-01	TH17-01	TH17-01
Depth (m)	0.3 - 0.5	0.6 - 0.8	0.9 - 1.1	1.1 - 1.2	1.4 - 1.5	1.7 - 1.8
Sample #	G01	G02	G03	G04	G05	G06
Tare ID	DW	E99	W96	N68	K20	F128
Mass of tare	356.9	8.5	8.5	8.5	8.5	8.5
Mass wet + tare	1083.7	403.4	319.4	308.2	320.8	302.9
Mass dry + tare	1035.3	297.1	244.8	255.2	265.2	228.6
Mass water	48.4	106.3	74.6	53.0	55.6	74.3
Mass dry soil	678.4	288.6	236.3	246.7	256.7	220.1
Moisture %	7.1%	36.8%	31.6%	21.5%	21.7%	33.8%

Test Pit	TH17-01	TH17-01	TH17-02	TH17-02	TH17-02	TH17-02
Depth (m)	2.0 - 2.1	2.7 - 2.9	0.3 - 0.5	0.5 - 0.6	0.8 - 0.9	0.9 - 1.1
Sample #	G07	G08	G09	G10	G11	G12
Tare ID	N08	H50	AB61	E48	E143	N83
Mass of tare	8.6	8.5	6.8	8.8	8.4	8.6
Mass wet + tare	317.1	303.6	408.7	411.8	402.9	319.1
Mass dry + tare	225.2	216.9	360.7	345.0	318.8	267.2
Mass water	91.9	86.7	48.0	66.8	84.1	51.9
Mass dry soil	216.6	208.4	353.9	336.2	310.4	258.6
Moisture %	42.4%	41.6%	13.6%	19.9%	27.1%	20.1%

TH17-02	TH17-02	TH17-02	TH17-02	TH17-03	TH17-03
1.4 - 1.5	1.7 - 1.8	2.0 - 2.1	2.7 - 2.9	0.3 - 0.5	0.6 - 0.8
G14	G15	G16	G17	G18	G19
E32	F110	AB86	E26	A27	E35
8.6	8.2	6.7	8.5	8.5	8.5
334.9	308.8	322.1	339.6	353.0	308.5
279.3	233.7	237.3	246.2	307.9	243.5
55.6	75.1	84.8	93.4	45.1	65.0
270.7	225.5	230.6	237.7	299.4	235.0
20.5%	33.3%	36.8%	39.3%	15.1%	27.7%
	1.4 - 1.5 G14 E32 8.6 334.9 279.3 55.6 270.7	1.4 - 1.5	1.4 - 1.5 1.7 - 1.8 2.0 - 2.1 G14 G15 G16 E32 F110 AB86 8.6 8.2 6.7 334.9 308.8 322.1 279.3 233.7 237.3 55.6 75.1 84.8 270.7 225.5 230.6	1.4 - 1.5 1.7 - 1.8 2.0 - 2.1 2.7 - 2.9 G14 G15 G16 G17 E32 F110 AB86 E26 8.6 8.2 6.7 8.5 334.9 308.8 322.1 339.6 279.3 233.7 237.3 246.2 55.6 75.1 84.8 93.4 270.7 225.5 230.6 237.7	1.4 - 1.5 1.7 - 1.8 2.0 - 2.1 2.7 - 2.9 0.3 - 0.5 G14 G15 G16 G17 G18 E32 F110 AB86 E26 A27 8.6 8.2 6.7 8.5 8.5 334.9 308.8 322.1 339.6 353.0 279.3 233.7 237.3 246.2 307.9 55.6 75.1 84.8 93.4 45.1 270.7 225.5 230.6 237.7 299.4



Project Local Streets 18-R-05 Tache Ave.

Test Pit	TH17-03	TH17-03	TH17-03	TH17-03	TH17-03	TH17-03
Depth (m)	0.8 - 0.9	1.1 - 1.2	1.4 - 1.5	1.7 - 1.8	2.0 - 2.1	2.6 - 2.7
Sample #	G20	G21	G22	G23	G24	G25
Tare ID	Z13	Z26	K14	W15	N71	W71
Mass of tare	8.7	8.4	8.5	8.4	8.7	8.5
Mass wet + tare	401.2	306.9	302.4	306.9	300.4	340.3
Mass dry + tare	300.9	228.9	249.5	234.4	213.7	236.9
Mass water	100.3	78.0	52.9	72.5	86.7	103.4
Mass dry soil	292.2	220.5	241.0	226.0	205.0	228.4
Moisture %	34.3%	35.4%	22.0%	32.1%	42.3%	45.3%

Test Pit	TH17-04	TH17-04	TH17-04	TH17-04	TH17-04	TH17-04
Depth (m)	0.3 - 0.5	0.5 - 0.6	0.8 - 0.9	1.1 - 1.2	1.2 - 1.4	1.7 - 1.8
Sample #	G26	G27	G28	G29	G30	G31
Tare ID	H23	W86	A19	Z134	E89	H33
Mass of tare	8.5	8.6	8.6	8.5	8.8	8.6
Mass wet + tare	354.7	306.7	302.7	323.3	308.6	328.8
Mass dry + tare	307.6	231.2	248.7	266.7	247.0	232.3
Mass water	47.1	75.5	54.0	56.6	61.6	96.5
Mass dry soil	299.1	222.6	240.1	258.2	238.2	223.7
Moisture %	15.7%	33.9%	22.5%	21.9%	25.9%	43.1%

Test Pit	TH17-04	TH17-04	TH17-05	TH17-05	TH17-05	TH17-05
Depth (m)	2.3 - 2.4	2.7 - 2.9	0.1 - 0.2	0.2 - 0.3	0.5 - 0.6	0.8 - 0.9
Sample #	G32	G33	G34	G35	G36	G37
Tare ID	E19	N61	N41	N39	E135	F47
Mass of tare	8.4	8.6	8.4	8.3	8.4	8.4
Mass wet + tare	349.1	348.6	312.3	310.8	316.6	420.6
Mass dry + tare	257.8	236.4	246.7	250.9	264.3	356.5
Mass water	91.3	112.2	65.6	59.9	52.3	64.1
Mass dry soil	249.4	227.8	238.3	242.6	255.9	348.1
Moisture %	36.6%	49.3%	27.5%	24.7%	20.4%	18.4%



Project Local Streets 18-R-05 Tache Ave.

Test Pit	TH17-05	TH17-05	TH17-05	TH17-05	TH17-05	TH17-06
Depth (m)	1.2 - 1.4	1.5 - 1.7	1.8 - 2.0	2.1 - 2.3	2.4 - 2.6	0.2 - 0.3
Sample #	G38	G39	G40	G41	G42	G43
Tare ID	Z31	K2	E106	AA09	E102	P04
Mass of tare	8.5	8.6	8.7	7.0	8.8	9.3
Mass wet + tare	323.3	301.9	345.2	312.0	337.7	307.9
Mass dry + tare	256.4	223.7	248.0	219.3	234.7	255.5
Mass water	66.9	78.2	97.2	92.7	103.0	52.4
Mass dry soil	247.9	215.1	239.3	212.3	225.9	246.2
Moisture %	27.0%	36.4%	40.6%	43.7%	45.6%	21.3%

Test Pit	TH17-06	TH17-06	TH17-06	TH17-06	TH17-06	TH17-06
Depth (m)	0.5 - 0.6	0.8 - 0.9	0.9 - 1.1	1.1 - 1.2	1.5 - 1.7	2.1 - 2.3
Sample #	G44	G45	G46	G47	G48	G49
Tare ID	W47	AB17	E42	F105	E88	Z02
Mass of tare	8.7	6.8	8.5	8.4	8.5	8.5
Mass wet + tare	314.4	323.1	321.6	327.4	328.1	314.3
Mass dry + tare	256.1	249.5	257.5	279.7	240.2	223.3
Mass water	58.3	73.6	64.1	47.7	87.9	91.0
Mass dry soil	247.4	242.7	249.0	271.3	231.7	214.8
Moisture %	23.6%	30.3%	25.7%	17.6%	37.9%	42.4%

Test Pit	TH17-06	TH17-07	TH17-07	TH17-07	TH17-07	TH17-07
Depth (m)	2.7 - 2.9	0.2 - 0.3	0.3 - 0.5	0.6 - 0.8	0.9 - 1.1	1.2 - 1.4
Sample #	G50	G51	G52	G53	G54	G55
Tare ID	N11	N112	P85	W25	Z63	N99
Mass of tare	8.6	8.4	8.6	8.3	8.4	8.4
Mass wet + tare	300.2	310.6	304.7	307.4	313.6	331.9
Mass dry + tare	207.0	272.2	258.8	238.7	237.7	265.2
Mass water	93.2	38.4	45.9	68.7	75.9	66.7
Mass dry soil	198.4	263.8	250.2	230.4	229.3	256.8
Moisture %	47.0%	14.6%	18.3%	29.8%	33.1%	26.0%



Project Local Streets 18-R-05 Tache Ave.

Test Pit	TH17-07	TH17-07	TH17-07	TH17-08	TH17-08	TH17-08
Depth (m)	1.5 - 1.7	1.8 - 2.0	2.3 - 2.4	0.2 - 0.3	0.5 - 0.6	0.8 - 0.9
Sample #	G56	G57	G58	G59	G60	G61
Tare ID	AC22	F145	E77	AB67	AC40	AB76
Mass of tare	6.7	8.4	8.4	6.9	6.6	6.8
Mass wet + tare	323.8	318.3	363.8	325.9	334.6	304.2
Mass dry + tare	231.5	228.2	257.5	276.5	286.0	227.4
Mass water	92.3	90.1	106.3	49.4	48.6	76.8
Mass dry soil	224.8	219.8	249.1	269.6	279.4	220.6
Moisture %	41.1%	41.0%	42.7%	18.3%	17.4%	34.8%

Test Pit	TH17-08	TH17-08	TH17-08	TH17-08	TH17-08	
Depth (m)	0.9 - 1.1	1.2 - 1.4	1.5 - 1.7	1.8 - 2.0	2.1 - 2.3	
Sample #	G62	G63	G64	G65	G66	
Tare ID	AC19	Z44	F145	E120	K16	
Mass of tare	6.7	8.6	8.6	8.5	8.6	
Mass wet + tare	310.2	325.3	347.9	341.9	340.1	
Mass dry + tare	231.8	251.4	262.2	257.3	265.4	
Mass water	78.4	73.9	85.7	84.6	74.7	
Mass dry soil	225.1	242.8	253.6	248.8	256.8	
Moisture %	34.8%	30.4%	33.8%	34.0%	29.1%	



Project No.0035-057-00ClientMorrision HershfieldProjectLocal Streets 18-R-05 Tache Ave.

 Test Hole
 TH17-03

 Sample #
 G20

 Depth (m)
 0.8 - 0.9

 Sample Date
 14-Dec-17

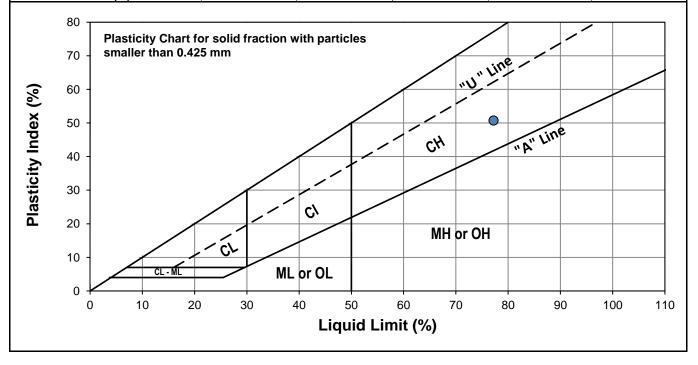
 Test Date
 7-Jan-18

 Technician
 JB

Liquid Limit 77
Plastic Limit 26
Plasticity Index 51

Liquid Limit

Liquid Littit				
Trial #	1	2	3	
Number of Blows (N)	18	23	30	
Mass Wet Soil + Tare (g)	27.507	24.169	27.043	
Mass Dry Soil + Tare (g)	21.676	19.734	21.512	
Mass Tare (g)	14.346	14.069	14.193	
Mass Water (g)	5.831	4.435	5.531	
Mass Dry Soil (g)	7.330	5.665	7.319	
Moisture Content (%)	79.550	78.288	75.570	



Plastic Limit

Trial #	1	2	3	4	5
Mass Tare (g)	19.034	19.804			
Mass Wet Soil + Tare (g)	18.042	18.612			
Mass Dry Soil + Tare (g)	14.289	14.117			
Mass Water (g)	0.992	1.192			
Mass Dry Soil (g)	3.753	4.495			
Moisture Content (%)	26.432	26.518			

Project No. 0035-057-00

Client Morrision Hershfield

Project Local Streets 18-R-05 Tache Ave.

Test Hole TH17-05

 Sample #
 G37

 Depth (m)
 0.8 - 0.9

 Sample Date
 14-Dec-17

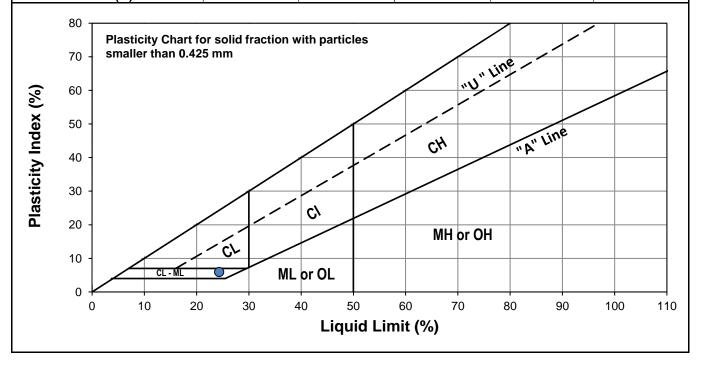
 Test Date
 7-Jan-18

 Technician
 JB

Liquid Limit 24
Plastic Limit 18
Plasticity Index 6

Liquid Limit

Liquid Liitiit				
Trial #	1	2	3	
Number of Blows (N)	18	26	30	
Mass Wet Soil + Tare (g)	24.465	23.181	22.708	
Mass Dry Soil + Tare (g)	22.480	21.434	20.979	
Mass Tare (g)	14.496	14.210	13.798	
Mass Water (g)	1.985	1.747	1.729	
Mass Dry Soil (g)	7.984	7.224	7.181	
Moisture Content (%)	24.862	24.183	24.077	



Plastic Limit

Trial #	1	2	3	4	5
Mass Tare (g)	20.088	20.792			
Mass Wet Soil + Tare (g)	19.228	19.758			
Mass Dry Soil + Tare (g)	14.531	14.164			
Mass Water (g)	0.860	1.034			
Mass Dry Soil (g)	4.697	5.594			
Moisture Content (%)	18.310	18.484			



Project Local Streets 18-R-03 Tache Ave.

 Test Hole
 TH17-03

 Sample #
 G20

 Depth (m)
 0.8 - 0.9

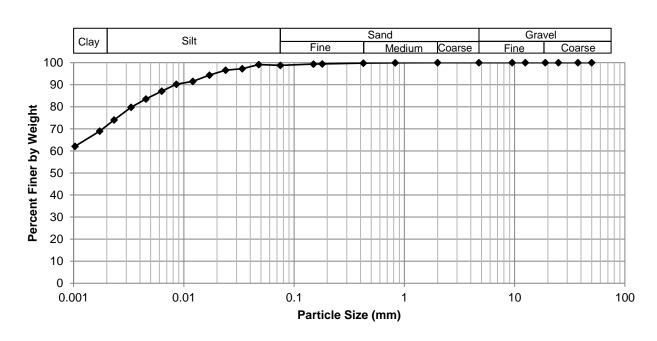
 Sample Date
 14-Dec-17

 Test Date
 5-Jan-18

 Technician
 LI/DS

Gravel	0.0%
Sand	1.2%
Silt	27.5%
Clay	71.3%

Particle Size Distribution Curve



Gra	Gravel		ınd	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	98.81
37.5	100.00	2.00	100.00	0.0479	99.14
25.0	100.00	0.825	99.92	0.0338	97.24
19.0	100.00	0.425	99.78	0.0239	96.60
12.5	100.00	0.180	99.43	0.0171	94.38
9.50	100.00	0.150	99.34	0.0121	91.52
4.75	100.00	0.075	98.81	0.0085	90.25
				0.0063	87.07
				0.0045	83.58
				0.0033	79.77
				0.0023	74.05
				0.0017	68.97
				0.0010	62.11



Project Local Streets 18-R-03 Tache Ave.

 Test Hole
 TH17-05

 Sample #
 G37

 Depth (m)
 0.8 - 0.9

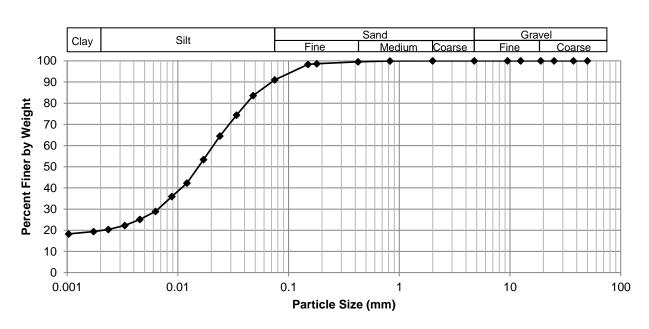
 Sample Date
 14-Dec-17

 Test Date
 5-Jan-18

 Technician
 LI/DS

Gravel	0.0%
Sand	9.0%
Silt	71.2%
Clay	19.8%

Particle Size Distribution Curve



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	91.02
37.5	100.00	2.00	100.00	0.0479	83.58
25.0	100.00	0.825	99.91	0.0338	74.37
19.0	100.00	0.425	99.59	0.0239	64.52
12.5	100.00	0.180	98.63	0.0171	53.40
9.50	100.00	0.150	98.37	0.0121	42.28
4.75	100.00	0.075	91.02	0.0088	35.93
				0.0063	28.94
				0.0045	25.13
				0.0033	22.27
				0.0024	20.37
				0.0017	19.41
				0.0010	18.27



Project Local Streets 18-R-03 Tache Ave.

 Test Hole
 TH17-01

 Sample #
 G01

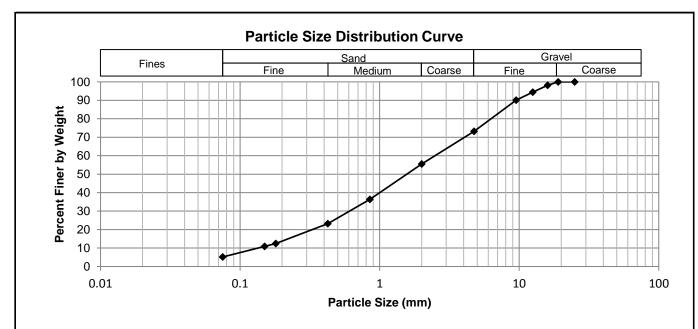
 Depth (m)
 1.0 - 1.5

 Date Sampled
 17-Dec-17

 Date Tested
 7-Jan-18

 Technician
 DS

Total Weight (g)	534.5		
Gravel %	26.8		
Sand %	68.1		
Fines %	5.2		



Sieve Number	Sieve Opening (mm)	Percent Passing	Specification (Min-Max)
6"	150		
5"	125		
4"	100		
3"	75.0		
2"	50.0		
1 1/2"	37.5		
1"	25.0	100	
3/4"	19.0	100	
5/8"	16.0	98	
1/2"	12.5	94	
3/8"	9.50	90	
no. 4	4.75	73	
no. 10	2.00	56	
no. 20	0.850	36	
no. 40	0.425	23	
no. 80	0.180	12	
no. 100	0.150	11	
no. 200	0.075	5	





Photo 1: Pavement Core Sample at Test Hole TH17-01



Photo 2: Pavement Core Sample at Test Hole TH17-02





Photo 3: Pavement Core Sample at Test Hole TH17-03



Photo 4: Pavement Core Sample at Test Hole TH17-04





Photo 5: Pavement Core Sample at Test Hole TH17-05



Photo 6: Pavement Core Sample at Test Hole TH17-06





Photo 7: Pavement Core Sample at Test Hole TH17-07



Photo 8: Pavement Core Sample at Test Hole TH17-08