APPENDIX 'A'

GEOTECHNICAL REPORT

APPENDIX 'A' - GEOTECHNICAL REPORT

GEOTECHNICAL REPORTS FOR:

- I. Bannerman Avenue from McPhillips Street to Airlies Street
- II. Garden Grove Drive from Burrows Avenue to Fairgrove Bay (West Leg)
- III. Fife Street from Burrows Avenue to College Avenue
- IV. Chambers Street from Alexander Avenue to Logan Avenue

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

2018 Local Street Renewals

Geotechnical Investigation for 2018 Local Street Renewals on Bannerman Avenue (McPhillips Street to Airlies Street)



Prepared for: City of Winnipeg Public Works Department 106-1155 Pacific Avenue Winnipeg, MB R3E 3P1

Prepared by: Stantec Consulting Ltd. 500-311 Portage Avenue Winnipeg, MB R3B 2B9

December 20, 2017



Stantec Consulting Ltd. Suite 500, 311 Portage Avenue Winnipeg MB Canada R3B 2B9 Tel. 204.489.5900 Fax. 204.453.9012 www.stantec.com



IMAGE SOURCE: GOOGLE EARTH

2018 LOCAL STREET RENEWALS ON BANNERMAN AVENUE MCPHILLIPS ST TO AIRLIES ST - WINNIPEG, MANITOBA Figure No. Title **TESTHOLE LOCATION PLAN**



TABLE 1 BANNERMAN AVENUE MCPHILLIPS STREET TO AIRLIES STREET

Testhole	Core Location	Pavemer	nt Surface	Pavement Mate		Sample Description	Sample	Moisture		Particle Siz	e Analysis		٩	Atterberg Limit	s
ID		Туре	Thickness (mm)	Туре	Thickness (mm)	Description	Depth (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
TH01	Bannerman Avenue Eastbound Iane,	Asphalt	20	Crushed	-										
INUI	10 m east of McPhillips Street 1 m north of curb	Concrete	195	Limestone	-	-	-	-	-	-	-	-	-	-	-
	Bannerman Avenue Center line of Bannerman Avenue,	Asphalt	80	Crushed											
IHUZ	125 m east of McPhillips Street	Concrete	190	Limestone	-	-	-	-	-	-	-	-	-	-	-
TH03	Bannerman Avenue Westbound lane,	Asphalt	45	Crushed											
THU3	240 m east of McPhillips Street 1 m south of curb	Concrete	260	Limestone	-	-	-	-	-	-	-	-	-	-	-
1104	Bannerman Avenue Eastbound Iane,	Asphalt	70	Crushed											
TH04	355 m east of McPhillips Street 1 m north of curb	Concrete	170	Limestone	-	-	-	-	-	-	-	-	-	-	-
	Bannerman Avenue	Asphalt	135	Crushed											
	Center line of Bannerman Avenue, 470 m east of McPhillips Street	Concrete	160	Limestone	-	-	-	-	-	-	-	-	-	-	-
110/	Bannerman Avenue Westbound lane,	Asphalt	40	Crushed											
TH06	585 m east of McPhillips Street 1 m south of curb	Concrete	190	Limestone	-	-	-	-	-	-	-	-	-	-	-





Bannerman Avenue – McPhillips Street to Airlies Street

Figure 1 – TH01 Core



Figure 2 – TH02 Core





Bannerman Avenue – McPhillips Street to Airlies Street

Figure 3 – TH03 Core



Figure 4 – TH04 Core





Bannerman Avenue – McPhillips Street to Airlies Street

Figure 5 – TH05 Core



Figure 6 – TH06 Core

2018 Local Street Renewals

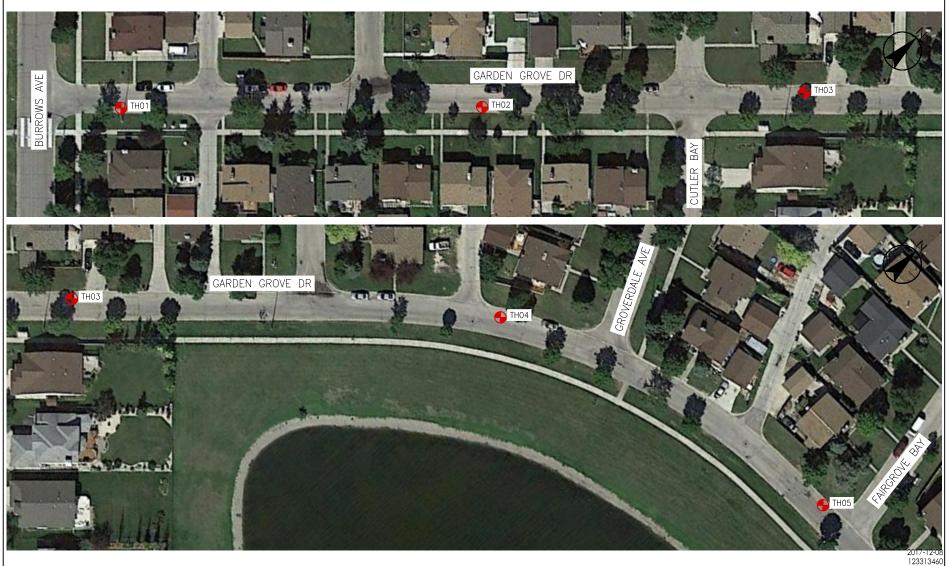
Geotechnical Investigation for 2018 Local Street Renewals on Garden Grove Drive (Burrows Avenue to Fairgrove Bay)



Prepared for: City of Winnipeg Public Works Department 106-1155 Pacific Avenue Winnipeg, MB R3E 3P1

Prepared by: Stantec Consulting Ltd. 500-311 Portage Avenue Winnipeg, MB R3B 2B9

December 20, 2017



ORIGINAL SHEET - ISO 8.5x11 H - v17.05



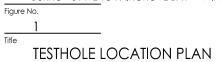
Stantec Consulting Ltd. Suite 500, 311 Portage Avenue Winnipeg MB Canada R3B 2B9 Tel. 204.489.5900 Fax. 204.453.9012 www.stantec.com Legend



IMAGE SOURCE: GOOGLE EARTH

Notes

Project CITY OF WINNIPEG, PUBLIC WORKS DEPARTMENT 2018 LOCAL STREET RENEWALS ON GARDEN GROVE DRIVE BURROWS AVE TO FAIRGROVE BAY - WINNIPEG, MANITOBA



Client/Project



TABLE 1 GARDEN GROVE BURROWS AVENUE TO FAIRGROVE BAY

Testhole	Testhole Location	Pavemer	nt Surface	Pavemen Mat		Sample	Sample	Moisture		Particle Siz	e Analysis		م	tterberg Limit	s
ID		Туре	Thickness (mm)	Туре	Thickness (mm)	Description	Depth (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
THO1	Garden Grove Drive Eastbound lane, 16 m east of Burrows Avenue 1 m north of curb	Asphalt	105	Crushed Limestone	200	-	-	-	-	-	-	-	-	-	-
THO2	Garden Grove Drive Eastbound lane, 114 m east of Burrows Avenue 1 m north of curb	Asphalt	105	Crushed Limestone	200	-	-	-	-	-	-	-	-	-	-
THO3	Garden Grove Drive Westbound lane, 200 m east of Burrows Avenue 1 m soutth of curb	Asphalt	115	Crushed Limestone	200	-	-	-	-	-	-	-	-	-	-
TH04	Garden Grove Drive Westtbound lane, 24 m east of Groverdale Avenue 2 m south of curb	Asphalt	100	Crushed Limestone	200	-	-	-	-	-	-	-	-	-	-
THO5	Garden Grove Drive Eastbound lane, 7 m east of Fairgrove Bay 1 m south of curb	Asphalt	90	Crushed Limestone	200	-	-	-	-	-	-	-	-	-	-





Garden Grove Drive – Burrows Ave to Fairgrove Bay

Figure 1 – TH01 Core



Figure 2 – TH02 Core





Garden Grove Drive – Burrows Ave to Fairgrove Bay

Figure 3 – TH03 Core



Figure 4 – TH04 Core





Garden Grove Drive – Burrows Ave to Fairgrove Bay

Figure 5 – TH05 Core

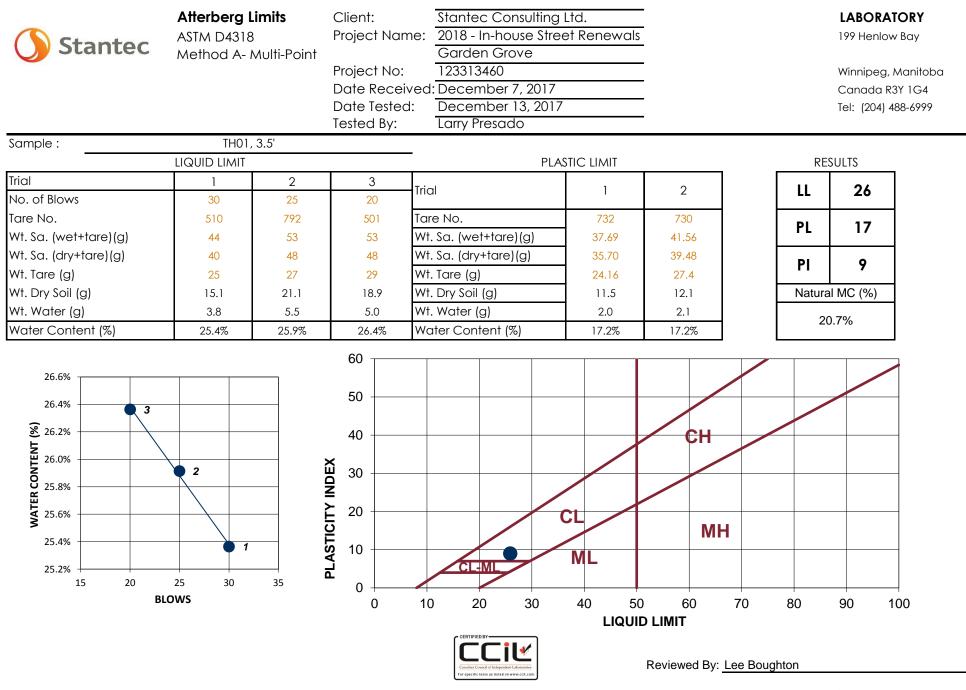
TH01TES'CLIENTCity of Winnipeg, Public Works DepartmentPROJECT2018 Local Street RenewalsLOCATIONGarden Grove Dr (Burrows Ave to FairgroveDRILLING DATEDecember 7, 2017DRILLING CO. Map	e Bay)	E	DATUM	I I TION	Geo	detic	:			NOR EAS	JECT THIN TING <u>12</u> :	IG _	55 62	<u>331</u> 3358 801	34	0
DEPTH (m) SOIL TYPE SOIL SOIL SOIL SOIL SOIL SOIL OF SOUL OF S	TYPE	NUMBER	MOISTURE A CONTENT (%)		ocket	Pene 50k	W _L I M	eter (kF	Pa) 100kl	Pa ntent a	1: & Atter tion Te	on San 50kPa berg Li st, blov 60	mits	200k	Pa 9	DEPTH (ft)
AS Asphalt GW Crushed Limestone GW FILL: stiff brown clay and silt - some fine to coarse sand, trace gravel - moist	GS		16			o										
 SILT: light brown some clay, trace fine sand moist Grain Size Analysis @ 1.0 m: 0.0% Gravel, 6.0% Sand, 74.0% Silt, 20.0% Clay 	GS GS GS GS		27 21 21 21			r c c	0))									- 2 - - - - - - - - - - - - - - - - - -
 TESTHOLE LOCATION: 16 m east of Garden Grove Drive and Burrows Avenue, eastbound lane, 1 m north of curb. No groundwater seepage Sloughing was observed upon completion of drilling, testhole open to 1.5 m. Testhole terminated at depth of 2.0 m. Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Cost - St - Shelby Tube PT - Piston Tube VT - Shear V Piezometer Bentonite Percentage	ore ane Test	. –	21 ogged by eviewed			Ighton Leal)					St	an	+ <i>c</i>		- 8 - 8 - 10

Pl L	ROЛ ОСА	ECT TION	TH02TESTCity of Winnipeg, Public Works Department2018 Local Street RenewalsGarden Grove Dr (Burrows Ave to FairgroveDATEDecember 7, 2017DRILLING CO.Maple	Bay)	. I) I	DATUN	I <u>G</u> FION	eode	tic			NOF EAS	DJECT THING TING D 125	G	628	<u>313</u> 4 3654 076	
DEPTH (m)	SOIL TYPE	L	SOIL DESCRIPTION			MOISTURE 3 CONTENT (%)	□ Ins △ Poo Wp	itu She cket Pe 5 W O	ear Va enetro 0kPa W_L W_L	ine (kF imeter Mois Stan	Pa) (kPa) 10(ture C dard I	DkPa) Content Penetra	orvane o 15(& Atterb tion Tes	n Sam OkPa erg Lin	ples (kF 2(nits rs/0.3m	00kPa ⊣	DEPTH
- 0	AS GW		Asphalt Crushed Limestone	GS		8	o	10	20	30	4	.0 5	0 6	0	70	80	90 - - -
	-		FILL: stiff grey clay and silt - trace fine to coarse sand, trace gravel - moist	XGS		22			Ē								2
- 1 -	FL			GS	5	23			œ		1 3 3 2 2 3 3 3 3 4 3 3 5 3 3 6 3 3 6 3 3 6 3 3 7 3 3 8 3 3 9 3 3 9 3 3 9 3 4 9 3 4 9 3 4 9 4 4 9 4 4 9 4 4 9 4 4 9 4 4 9 4 4 9 4 4 9 4 4 9 4 4 9 4 4 9 4 4 9 4 4						-
-				X GS		22		ſ	•								- 4 - 4
	-			X GS		24			۵								-
- 2 -	СН		stiff grey fat CLAY (CH) - silty, trace fine sand - moist	GS		41						o					- 6 - - -
	-		• TESTHOLE LOCATION: 114 m east of Garden														- 8
-			 Grove Drive and Burrows Avenue, eastbound lane, 1 m north of curb. No groundwater seepage or sloughing was observed upon completion of drilling. Testhole terminated at depth of 2.0 m. 														-
- 3 -	Pie	zomet	ype: GS - Grab Sample SS - Split Spoon RC - Rock Cor ST - Shelby Tube PT - Piston Tube VT - Shear Va er Type: Bentonite Drill Cuttings Sand Slow	ne Tes	+ -	Logged by Reviewed		Bought man Lea				Q		Sti	an	te	10 C

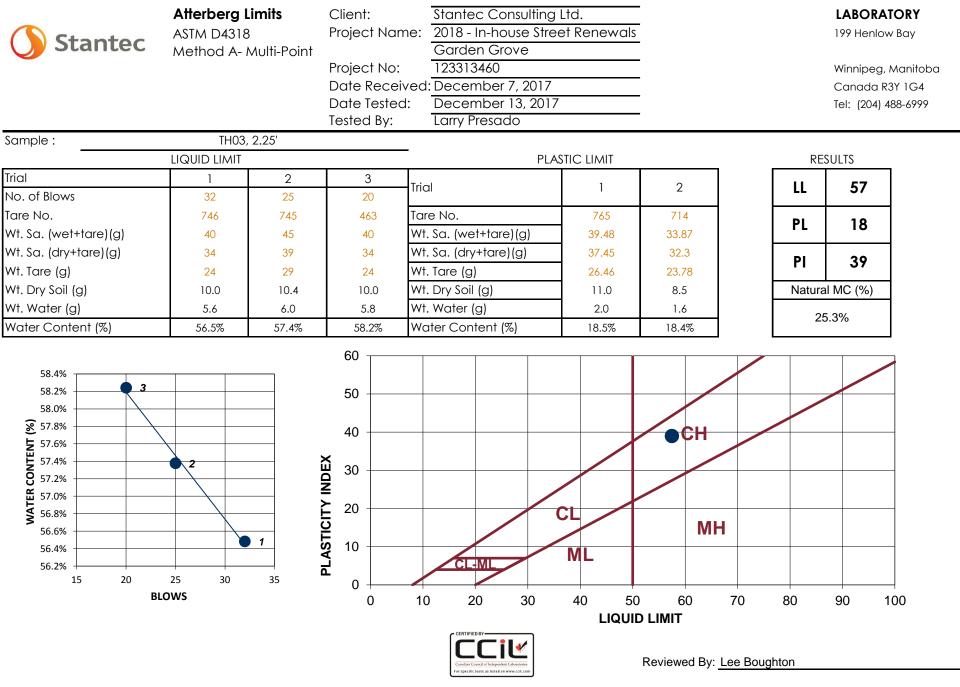
P L	ROЛ ОСА	ECT TION	TH03TESTCity of Winnipeg, Public Works Department2018 Local Street RenewalsGarden Grove Dr (Burrows Ave to FairgroveDATEDecember 7, 2017DRILLING CO.Maple	Bay)	I E	DATUM	í <u>G</u> fion	ieodet	ic	LING MI	NOF EAS	DJECT 1 RTHINC TING D <u>125</u>	i	5533 628		<u>50</u>
DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	ίς TYPE	NUMBER	MOISTURE CONTENT (%)	Po ₩p	50 W O	netrome DkPa ₩L I N ● S	eter (kPa) 100 Ioisture C))kPa Content Penetra	& Atterbe	kPa erg Lim	20 nits s/0.3m	0kPa ⊣	0 DEPTH (ft)
	AS GW		FILL: very stiff grey clay and silt	GS		19		ç	þ							
	FL		 some fine to coarse sand, trace gravel moist Grain Size Analysis @ 0.7 m: 0.1% Gravel, 16.9% Sand, 40.0% Silt, 43.0% Clay SILT: light brown 	X GS		27		ŀ	o							2
- 1 -	-		- some clay, trace fine sand - moist	X GS		23			o							4
	- ML			X GS		22			© O							
- 2 -	CH		stiff grey fat CLAY (CH) - silty, trace fine sand - moist			26			o							- 6
· · ·	-		• TESTHOLE LOCATION: 200 m east of Garden													8
– –	-		 Grove Drive and Burrows Avenue, westbound lane, 1 m south of curb. No groundwater seepage Sloughing was observed upon completion of drilling, testhole open to 1.5 m. Testhole terminated at depth of 2.0 m 													
- 3 -	Piez	zome	Fype: GS - Grab Sample SS - Split Spoon RC - Rock Con ST - Shelby Tube PT - Piston Tube VT - Shear Va	ne Test	. –	ogged by eviewed		Boughto			Q		Sta	ant	tee	

P. L	ROЛ ЭСА	ECT 2	TH04TESTCity of Winnipeg, Public Works Department2018 Local Street RenewalsGarden Grove Dr (Burrows Ave to Fairgrove)DATEDecember 7, 2017DRILLING CO.Maple	Bay)	E	DATUM	I G	eod	etic	;			NC EA	ORTI STII)	<u>123</u> 553 628 SSA	3801	1)
– DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	rype rype	NUMBER	MOISTURE T CONTENT (%)	\square Ins \triangle Po W_P	cket F		trom Pa ^{VL} N	eter (Noistu	kPa) 100 ure C))kPa Conten Peneti	nt & A	150 Atterb	kPa erg Lin t, blow	nits s/0.3m	°a))0kPa ⊣ 80	a 90	DEPTH (ft)
	AS		Asphalt Crushed Limestone FILL: stiff grey clay and silt - trace fine to coarse sand, trace gravel, trace oxidation - moist	XGS		11		o												
· · · · · ·				X GS		29				0										- 2
- - -	FL			X GS		25			C	1 0 0										- 4
- 2 -				X GS		30					0									- 6
- 3 -			 TESTHOLE LOCATION: 24 m east of Garden Grove Drive and Groverdale Avenue, westbound lane, 2 m north of curb. No groundwater seepage or sloughing was observed upon completion of drilling. Testhole terminated at depth of 2.0 m. 																	- 8 - 8
5	Pie	nple T zomet	Type: GS - Grab Sample SS - Split Spoon ST - Shelby Tube PT - Piston Tube VT - Shear Var RC - Rock Cor er Type: Bentonite Drill Cuttings	ne Test	t 🗖	ogged by eviewed		Boug man I					$\left(\right)$)	Sta	an	te)C	- 10

P. L	ROJI ОСА	ECT TION	TH05TESTCity of Winnipeg, Public Works Department2018 Local Street RenewalsGarden Grove Dr (Burrows Ave to Fairgrove Date December 7, 2017 DRILLING CO. Maple	Bay)	I	DATUN ELEVA	г _G	ieode	etic			NOI EAS	DJECT RTHING STING D_125	G	553 628	<u>3134</u> 3828 309		
DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	LYPE S	NUMBER	MOISTURE T CONTENT (%)	Po ₩p	itu She cket P 5 W O		Moi	er (kPa 10 sture (0kPa	& Attert ation Tes	0kPa berg Lin	2(nits s/0.3m	Pa) 20kPa ⊣ 80	90	
- 0	AS GW		Asphalt Crushed Limestone FILL: stiff grey clay and silt	GS		13		o										(
 - -	FL		 trace fine to coarse sand, trace gravel moist 	GS		21			0									2
- 1 -	ML		SILT: light brown - some clay, trace fine sand - moist	GS		26				o						• • • • • • • • • • • • • • • • • • • •		
- - -				GS		25			¢	þ								4
· ·	СН		stiff grey fat CLAY (CH) - silty, trace fine sand - moist	GS		32					0							•
- 2 -	-			X GS		38					0							
	-		 TESTHOLE LOCATION: 7 m west of Garden Grove Drive and Fairgrove Bay, westbound lane, 1 m south of curb. No groundwater seepage Sloughing was observed upon completion of drilling, testhole open to 1.5 m. 															Ę
- 3 -	Piez	zome	Testhole terminated at depth of 2.0. Type: GS - Grab Sample SS - Split Spoon ST - Shelby Tube PT - Piston Tube RC - Rock Cor VT - Shear Var	ne Test	+ -	logged by		Bough man Le						Sta	an	te	C	1



Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. STANTEC is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of STANTEC.



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LABORATORY

199 Henlow Bay Winnipeg MB R3Y 1G4 Tel: (204) 488-6999

PARTICLE SIZE ANALYSIS ASTM D422

PROJECT: 2018 In-house Street Renewals Garden Grove

Stantec Consulting Ltd. 500-311 Portage Avenue Winnipeg, Manitoba R3B 2B9

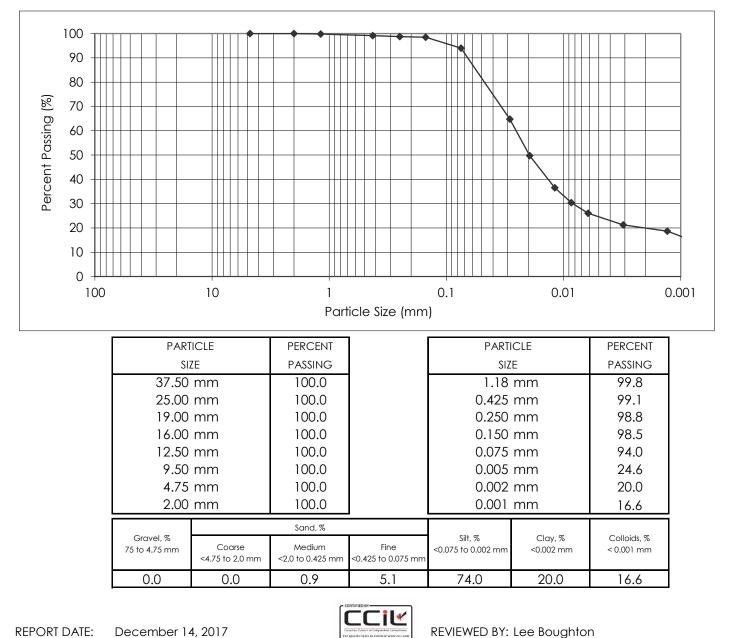
Attention:

PROJECT NO.: 123313460

SAMPLED BY:Lee BoughtonSAMPLE ID:TH01, 3.5'

Lee Boughton

DATE RECEIVED: December 7, 2017 TESTED BY: Tabea Kleineberg, M.Sc., GIT



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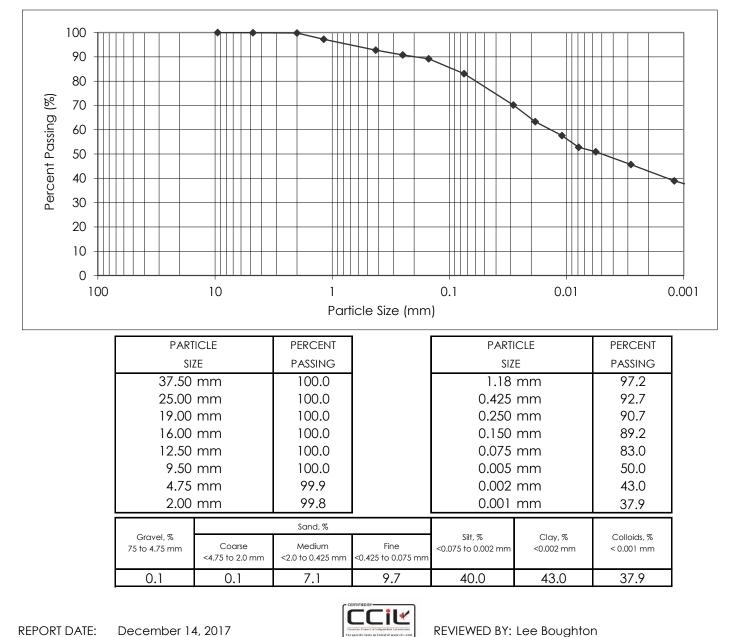
Attention:

PROJECT NO.: 123313460

SAMPLED BY: Lee Boughton SAMPLE ID: TH03, 2.25'

Lee Boughton

DATE RECEIVED: December 7, 2017 TESTED BY: Tabea Kleineberg, M.Sc., GIT



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2018 Local Street Renewals

Geotechnical Investigation for 2018 Local Street Renewals on Fife Street (Burrows Avenue to College Avenue)



Prepared for: City of Winnipeg Public Works Department 106-1155 Pacific Avenue Winnipeg, MB R3E 3P1

Prepared by: Stantec Consulting Ltd. 500-311 Portage Avenue Winnipeg, MB R3B 2B9

December 20, 2017



ORIGINAL SHEET - ISO 8.5x11 H - v17.05



Stantec Consulting Ltd. Suite 500, 311 Portage Avenue Winnipeg MB Canada R3B 2B9 Tel. 204.489.5900 Fax. 204.453.9012 www.stantec.com Legend



IMAGE SOURCE: GOOGLE EARTH

Notes

Client/Project CITY OF WINNIPEG, PUBLIC WORKS DEPARTMENT 2018 LOCAL STREET RENEWALS ON FIFE STREET BURROWS AVE TO COLLEGE AVE - WINNIPEG, MANITOBA Figure No. 1 Title

TESTHOLE LOCATION PLAN



TABLE 1 FIFE STREET BURROWS AVENUE TO COLLEGE AVENUE

Testhole	Testhole Location	Pavemer	nt Surface	Pavemen Mat		Sample	Sample	Moisture		Particle Siz	e Analysis		م	Atterberg Limit	s
ID		Туре	Thickness (mm)	Туре	Thickness (mm)	Description	Depth (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index
THOI	Fife Street Northbound Iane, 19 m north of Burrows Avenue 1 m west of curb	Concrete	180	Crushed Limestone	50	-	-	-	-	-	-	-	-	-	-
THO2	Fife Street Southbound lane, 65 m north of Burrows Avenue 1 m east of curb	Concrete	170	Crushed Limestone	50	Silt	1.0	23	1.5	3.4	66	29.1	31	17	14
TUO2	Fife Street Northbound Iane, 122 m north of Burrows Avenue 1 m west of curb	Concrete	165	Crushed Limestone	50	-	-	-	-	-	-	-	-	-	-
TUOA	Fife Street Northbound Iane, 179 m north of Burrows Avenue 1 m west of curb	Concrete	165	Crushed Limestone	50	Clay	1.0	31	0.3	3.3	25.2	71.2	69	21	48
THO5	Fife Street Northbound Iane, 221 m north of Burrows Avenue 1 m west of curb	Concrete	170	Crushed Limestone	50	Fill	0.7	26	1.5	9.2	35.6	53.7	62	20	42
	Fife Street	Asphalt	90	Crushed	50										
	Center line of Fife Street, 270 m north of Burrows Avenue	Concrete	165	Limestone	50	-	-	-	-	-	-	-	-	-	-
	Fife Street Northbound lane,	Asphalt	65	Crushed	50										
TH07	326 m north of Burrows Avenue 1 m west of curb	Concrete	180	Limestone	50	-	-	-	-	-	-	-	-	-	-
	Fife Street Northbound lane,	Asphalt	100	Crushed	50										
IHU8	397 m north of Burrows Avenue 1 m west of curb	Concrete	220	Limestone	50	-	-	-	-	-	-	-	-	-	-

Note: 1. TH02 was moved from the centerline to the southbound lane due to underground utilities.

2. TH03 was moved from the southbound lane to the northbound lane due to underground utilities.

3. TH05 was moved from the centerline to the northbound lane due to underground utilities.

4. TH06 was moved from the southbound lane to the centerline due to underground utilities.

5. TH08 was moved from the centerline to the northbound lane due to underground utilities.





Fife Street – Burrows Avenue to College Avenue

Figure 1 – TH01 Core



Figure 2 – TH02 Core





Fife Street – Burrows Avenue to College Avenue

Figure 3 – TH03 Core



Figure 4 – TH04 Core





Fife Street – Burrows Avenue to College Avenue

Figure 5 – TH05 Core



Figure 6 – TH06 Core





Fife Street - Burrows Avenue to College Avenue

Figure 7 – TH07 Core



Figure 8 – TH08 Core

Pl L	ROЛ ОСА	ECT ATION	TH01TESTCity of Winnipeg, Public Works Department2018 Local Street RenewalsFife Street (Burrows Ave to College Ave)DATENovember 20, 2017 DRILLING CO.		E	DATUM	I I FION	Geo	det	ic			NOI EAS	DJECT T RTHING STING D_125	G	553 631	33134 2334 000	
DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	rype Type	NUMBER	MOISTURE T CONTENT (%)		ocket	t Per 50		Moi	r (kPa 100 sture 0))kPa Content	orvane o 15(& Atterb ation Tes	0kPa	2 nits	00kPa	DEPTH (ft)
- 0	CO GW	۵. م	Concrete Granular / FILL: stiff grey clay and silt	-		Ö		10	2	20	30						80	90 0
	FL		- trace fine to coarse sand, trace gravel - moist	GS		29					o							- 2
- 1 -			SILT: light brown	GS		28			• • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • • •		O							
	ML		 clayey, trace fine and coarse sand, trace gravel moist 	X GS		20				о О								- 4
			stiff brown fat CLAY (CH)	GS		26					0							
- 2 -	СН		- silty, trace fine sand - moist	GS		40						•	>					- 6
-			• TESTHOLE LOCATION: 19 m north of Fife Street															8
-			 and Burrows Avenue, northbound lane, 1 m west of curb. No groundwater seepage Sloughing was observed upon completion of drilling, testhole open to 1.1 m. Testhole terminated at depth of 2.0 m. 						• •									-
- 3 -	Pie	zomet	Type: GS - Grab Sample SS - Split Spoon RC - Rock Cor ST - Shelby Tube PT - Piston Tube VT - Shear Var ter Type: Bentonite Drill Cuttings Sand Solo	ne Test	t 🗖	ogged by		e Bou erman					C		Sta	an'	te	10 C

P) L(ROJI OCA	ECT TIOI	TH02 TEST City of Winnipeg, Public Works Department 2018 Local Street Renewals Fife Street (Burrows Ave to College Ave)		. I E	DATUN	I I FION	ieo	leti	ic			_	NOF EAS	DJECT RTHIN TINC	NG i		<u>123</u> 553 631	2378 015	3)
D	RILI I	JNG	DATE <u>November 20, 201</u> 7 DRILLING CO. <u>Maple</u>			-	1		_ 1	DRI	LLN	NG N	ЛЕТ	HOI	5_12	5 m	m	SA			
– DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	TYPE S	NUMBER	MOISTURE CONTENT (%)	\square In: \triangle Pc W_p \vdash		Pen 50		Moi	er (kP 10 isture	'a) 00kl	Pa ntent netra		50kF	Pa J Limi	ts ′0.3m	a) 00kPa 	a 90	 DEPTH (ft)
- 0	со	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Concrete																		
-	GW	A .	Granular FILL: stiff grey clay and silt - trace fine to coarse sand, trace gravel - moist	GS	6	30					0										-
	FL			GS		30					0										- 2
- - 1 -			 SILT: light brown clayey, trace fine and coarse sand, trace gravel moist Grain Size Analysis @ 1.0 m: 1.5% Gravel, 3.4% Sand, 66% Silt, 29.1% Clay 	XGS	•	23			ŀ	0											-
-	ML			X GS		23				o				1 2 1 2 3 4 5 6 7 .							- 4 - -
-	-			GS	6	23				o											-
-	-			XGS		23				0											- 6
- 2 -	-																				-
	-		• TESTHOLE LOCATION: 65 m north of Fife Street and Burrows Avenue, southbound lane, 1 m east of curb.																		- 8
- - - 3 -	-		 No groundwater seepage Sloughing was observed upon completion of drilling, testhole open to 1.7 m. Testhole terminated at depth of 2.0 m. 											· · · · · · · · · · · · · · · · · · · · · · · · · · · · · · ·							- -
	San	ple '	J Type: GS - Grab Sample SS - Split Spoon RC - Rock Corr ST Shally: Type RT Pictor Type VCT Share Ver	e T		ogged by	r: Le	e Bou	ghto	n	::1	:::							1::		10
	Piez Bac	zome kfill	ST - Shelby Tube PT - Piston Tube VT - Shear Var ter Type: Bentonite Drill Cuttings Sand Slow		R	eviewed	by: Ge	rman	Leal				_(U		S	ta	n	te	C	

Pl Le	ROJI ОСА	ECT TION	TH03TESTCity of Winnipeg, Public Works Department2018 Local Street RenewalsFife Street (Burrows Ave to College Ave)DATENovember 20, 2017 DRILLING CO.		I E	DATUM	I G	eode	tic			NOF EAS	DJECT RTHIN TING D_12;	IG _	55 63	5324 3104		0
				S	AMP	LES	🗆 Ins	itu She	ar Va	ine (kPa	a)	Пто	orvane	on San	nples ((kPa)		
<u>ب</u>	ш	30L						cket Pe	enetro	meter (kPa)							f)
TH (r	Σ	SYMBOL	SOIL DESCRIPTION	Щ	BER	URE (%		5	0kPa		1001	кРа	13	50kPa		200	кРа	TH (f
DEPTH (m)	SOIL TYPE	SOIL S		ТҮРЕ	NUMBER	MOISTURE CONTENT (%)	₩ _P	W -0	$W_{\rm L}$	Moistu	ire Co	ontent	& Atter	berg Li	mits			DEPTH (ft)
		ũ				ZÔS		10	• 20	Stand 30	ard P 40		tion Te	st, blov 60	ws/0.3	m 80	9	0
- 0		Б. К. 9 С. Д.	Concrete						20	50	40					80		0
-	CO																	
-	GW	X	Granular															
-		\bigotimes	FILL: stiff grey clay and silt - trace fine to coarse sand, trace gravel															
-		\bigotimes	- moist	GS		21			ο									
	FL	\bigotimes																
_		\bigotimes		Maa														- 2
-		\bigotimes		GS		21			ο									
_		\bigotimes																Ĺ
- 1 -			SILT: light brown - clayey, trace fine and coarse sand, trace gravel	Mag		- 22												
-			- moist	GS		22			0									
-																		4
-	ML			Mag		22												
-				GS		32				ШО								
-				GS		40												
-	-		stiff brown fat CLAY (CH)	Mas		40					ιΨ							-
-	СН		- silty, trace fine sand															6
-			- moist	GS		41												
- 2 -				Agg		41												
-																		
-																		
-																		
-																		8
			• TESTHOLE LOCATION: 122 m north of Fife Street and Burrows Avenue, northbound lane, 1 m															-
-			west of curb.															
-			• No groundwater seepage or loughing was observed upon completion of drilling.															
-			• Testhole terminated at depth of 2.0 m.															
-																		
- 3 -			inter CS Carl Samely SS Sulfaborer DC D LC															10
			Ype: GS - Grab Sample SS - Split Spoon RC - Rock Cor ST - Shelby Tube PT - Piston Tube VT - Shear Var	ne Tes	+ -	ogged by eviewed		Bought man Le				\bigwedge		S +	ar	\ +	ec	•
	Piez Bac	zomet kfill	er Type: Bentonite Drill Cuttings Sand Slov	ıgh			,					V			u			•

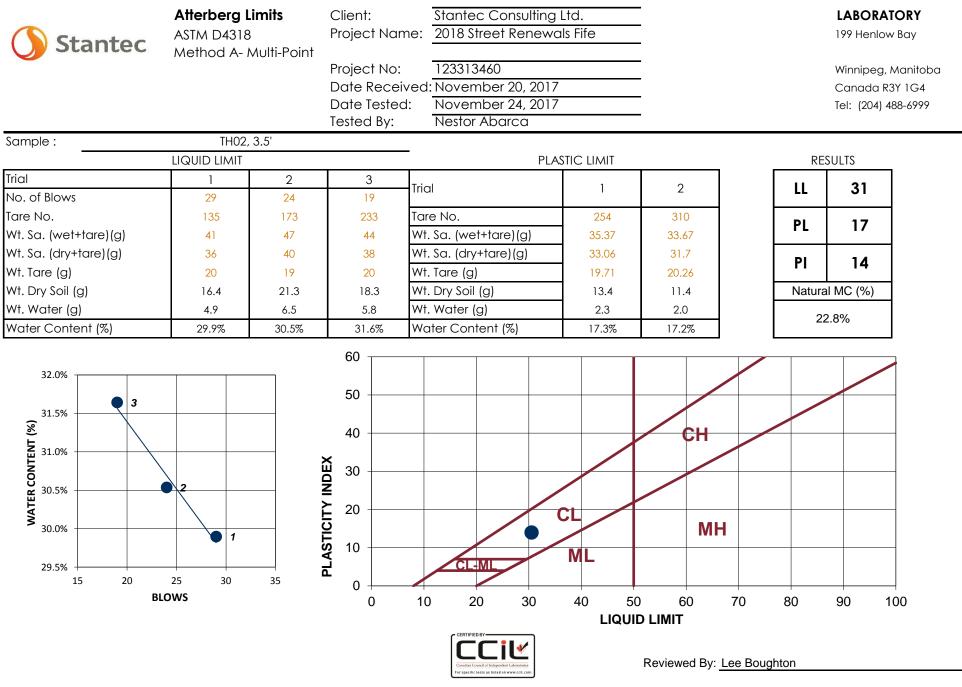
Pl L	ROЛ ОСА	ECT TION	TH04TESTCity of Winnipeg, Public Works Department2018 Local Street RenewalsFife Street (Burrows Ave to College Ave)DATENovember 20, 2017 DRILLING CO.		. D	DATUM	I G	eod	etic			– NC – EA	ORTH STIL		i	5532 631	<u>31346</u> 2479 068	<u>50</u>
			JATE DRILLING CO			-												
– DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	TYPE	NUMBER	MOISTURE A CONTENT (%)	₩p	cket F		romet Pa L Mc Sta	er (kPa 10 Disture andard		nt & A	150 Atterbe	kPa erg Lim	iits s/0.3m	00kPa	1 00 DEPTH (ft)
- U	со	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Concrete															
	GW		Granular	7														
	FL		FILL: stiff grey clay and silt - trace fine to coarse sand, trace gravel - moist	GS		25				Ð								-
		\bigotimes																- 2
-	-		stiff grey fat CLAY (CH) - silty, trace fine sand - moist	GS		27				0								-
· 1 -			- Grain Size Analysis @ 1.0 m: 0.3% Gravel, 3.3%															
			Sand, 25.2% Silt, 71.2% Clay	GS		31			F		0 🗖							- 4
	СН			GS		36					O							
	-																	
	-			GS	<u> </u>	40						Φ						-
-	-			GS		42						o						- 6
- 2 -	-																	
-	-																	-
	-		 TESTHOLE LOCATION: 179 m north of Fife Street and Burrows Avenue, northbound lane, 1 m west of curb. No groundwater seepage Sloughing was observed upon completion of 															- 8
- 3 -			 Stoughing was observed upon completion of drilling, testhole open to 1.5 m. Testhole terminated at depth of 2.0 m. 															- - - - 10
	San	nple T	Type: GS - Grab Sample SS - Split Spoon RC - Rock Cor ST - Shelby Tube PT - Piston Tube VT - Shear Var	re ne Tes	t 🗖	ogged by		Boug				1			`+ -		teo	
		zomet ckfill			K	eviewed	by: Gei	man L	eal				J) 3)lc		lec	

CLIENT City of Winnipeg, Public Works Department					. I F	DATUM Geodetic								NORTHING . EASTING .				5532518 631084			
				S	AMP	LES		situ Sh					То	rvane	on s	Samp	les (k	Pa)			
DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	TYPE	NUMBER	MOISTURE CONTENT (%)	₩p		Pa Ĺ St	1 oisture	00kP	Content & Atterberg Limits Penetration Test, blows/0.3m							DEPTH (ft)		
- 0	со		Concrete						20											0	
-	GW - -		Granular FILL: stiff grey clay and silt - trace fine to coarse sand, trace gravel - moist	GS	k	25				o	Ö									-	
	FL		- Grain Size Analysis @ 0.7 m: 1.5% Gravel, 9.2% Sand, 35.6% Silt, 53.7% Clay	GS		26				•										- 2 -	
- 1 -	- ML		SILT: light brown - clayey, trace fine and coarse sand, trace gravel, moist	GS	k	20			0											-	
	-		stiff grey fat CLAY (CH) - silty, trace fine sand - moist	McG		22														- 4	
	СН			X GS		32					0									-	
	-			GS		43						o									
- 2 -				GS	k	43						o								- 6 - -	
- - -	-																			-	
	-		 TESTHOLE LOCATION: 221 m north of Fife Street and Burrows Avenue, northbound lane, 1 m west of curb. No groundwater seepage or loughing was observed upon completion of drilling. 																	- 8 - - -	
- 3 -			• Testhole terminated at depth of 2.0 m.																	- 10	
Sample Type: GS - Grab Sample SS - Split Spoon ST - Shelby Tube RC - Rock Core PT - Piston Tube Logged by: Lee Bought Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough												J		S	ta	in	t	ec			

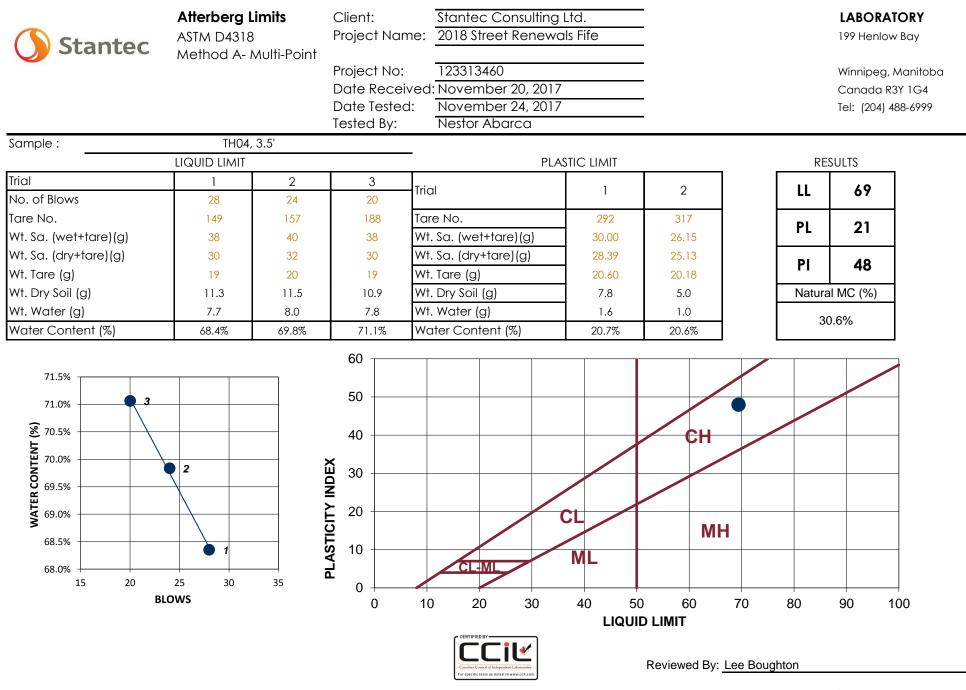
CLIENT <u>City of Winnipeg, Public Works Department</u> PROJECT 2018 Local Street Renewals LOCATION Fife Street (Burrows Ave to College Ave)				DATUM <u>Geodetic</u>											NORTHING EASTING				<u>123313460</u> 5532564 <u>631102</u>				
DRILLING DATE November 20, 2017 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA SAMPLES Insitu Shear Vane (kPa) Torvane on Samples (kPa)																							
– DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	ТҮРЕ	NUMBER	MOISTURE T CONTENT (%)	□ Insitu Shear Vane (kPa) △ Pocket Penetrometer (kPa) 50kPa 100 Wp W WL □ O I Moisture C • Standard F 10 20 30 40							☐ Torvane on Samples (kPa) a) 00kPa 150kPa 200kPa Content & Atterberg Limits Penetration Test, blows/0.3m 40 50 60 70 80)kPa	DEPTH (ft)		
- 0	AS		Asphalt													· · · · · · · · · · · · · · · · · · ·							
-	со		Concrete													· · · · · · · · · · · · · · · · · · ·					-		
-	GW		Granular														· · · · · · · · · · · · · · · · · · ·						
	-	\bigotimes	FILL: stiff grey clay and silt - trace fine to coarse sand, trace gravel - moist	GS	5	28			· · · · · · · · · · · · · · · · · · ·		o										-		
-	FL	\bigotimes	- monst																		- 2		
-	-	\bigotimes		GS	5	18			с							· · · · · · · · · · · · · · · · · · ·					-		
-		\bigotimes							· · · · · · · · · · · · · · · · · · ·							· · · · · · · · · · · · · · · · · · ·							
-		\bigwedge	SILT: light brown	-																			
- 1 -			 - clayey, trace fine and coarse sand, trace gravel - moist 	GS	5	20			· · · ·	6						· · · · · · · · · · · · · · · · · · ·							
_									· · · ·							· · · · · · · · · · · · · · · · · · ·					- 4		
-	ML			X GS	1	30															4		
-	-			VOS	>	30															-		
-				GS	5	36						с				· · · · · · · · · · · · · · · · · · ·							
_			stiff brown fat CLAY (CH) - silty, trace fine sand						· · · · · · · · · · · · · · · · · · ·							· · · · · · · · · · · · · · · · · · ·							
_	СН		- moist																		- 6		
- 2 -				GS	5	35						o				· · · · · · · · · · · · · · · · · · ·							
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-	-								· · · · · · · · · · · · · · · · · · ·							· · · · · · · · · · · · · · · · · · ·					-		
=	-		TESTHOLE LOCATION: 270 m north of Fife											•							- 8		
			Street and Burrows Avenue, centerline of Fife Street.						· · · · · · · · · · · · · · · · · · ·							· · · · · · · · · · · · · · · · · · ·					-		
_			No groundwater seepageSloughing was observed upon completion of																				
_			drilling, testhole open to 1.5 m.														· · · · · ·						
-			• Testhole terminated at depth of 2.0 m.						· · · ·							· · · · · · · · · · · · · · · · · · ·							
- 3 -																· · · · · · · · · · · · · · · · · · ·					10		
	San	ple 7	Type: GS - Grab Sample SS - Split Spoon RC - Rock Cor ST - Shelby Tube PT - Piston Tube VT - Shear Var	e ne Tes	•t 🗖	ogged by		e Bo			· · · I			1			۰ ـ				⊥ 10		
Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough										-	Ú			DTa	ar	11	e						

TH07 TESTHOLE RE CLIENT City of Winnipeg, Public Works Department PROJECT 2018 Local Street Renewals DATUM LOCATION Fife Street (Burrows Ave to College Ave) ELEVATION DRILLING DATE November 20, 2017 DRILLING CO. Maple Leaf Drilling											PROJECT No. 123313460 UM Geodetic NORTHING 5532615 VATION EASTING 631126												
DEPTH (m)			SOIL DESCRIPTION			MOISTURE 3 CONTENT (%)	□ Ins △ Poo W _P	itu S	hea Pen 50l	r Var etron kPa <i>W</i> L	ne (kF neter	Pa) (kPa 100	□) 0kPa	l To	rvane	on §	Samp Pa	oles (DEPTH (ft)		
- 0	AS CO	SC	Asphalt Concrete		Z	COM		10	2	•		dard			ion T		olows		n 80		90 0		
	GW FL		Granular FILL: stiff grey clay and silt - trace fine to coarse sand, trace gravel - moist	GS		33					•	D					· ·						
-	-		SILT: light brown - clayey, trace fine and coarse sand, trace gravel	GS		31					E										- 2	:	
- 1 -	-		- moist	GS		19			o							2 0 0 0 0 0 0 0	2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2				- - - 4	1	
	ML			GS		20			¢	•											-		
-	-			GS		19 22			0	0						A A A A					- - - 6	5	
- 2 -	-			AUS																			
	-		• TESTHOLE LOCATION: 326 m north of Fife Street and Burrows Avenue, northbound lane, 1 m west of curb.																		- 8 -	;	
- 3 -	-		 No groundwater seepage Sloughing was observed upon completion of drilling, testhole open to 1.5 m. Testhole terminated at depth of 2.0 m. 													N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N N							
	Piez	ome	Ype: GS - Grab Sample SS - Split Spoon ST - Shelby Tube PT - Piston Tube VT - Shear Var Yer Bentonite Drill Cuttings Sand Sand	ne Test		ogged by eviewed		Boug man l		n		<u> </u>		J		S	ta	ar	nt	e (⊡ 1(C	0	

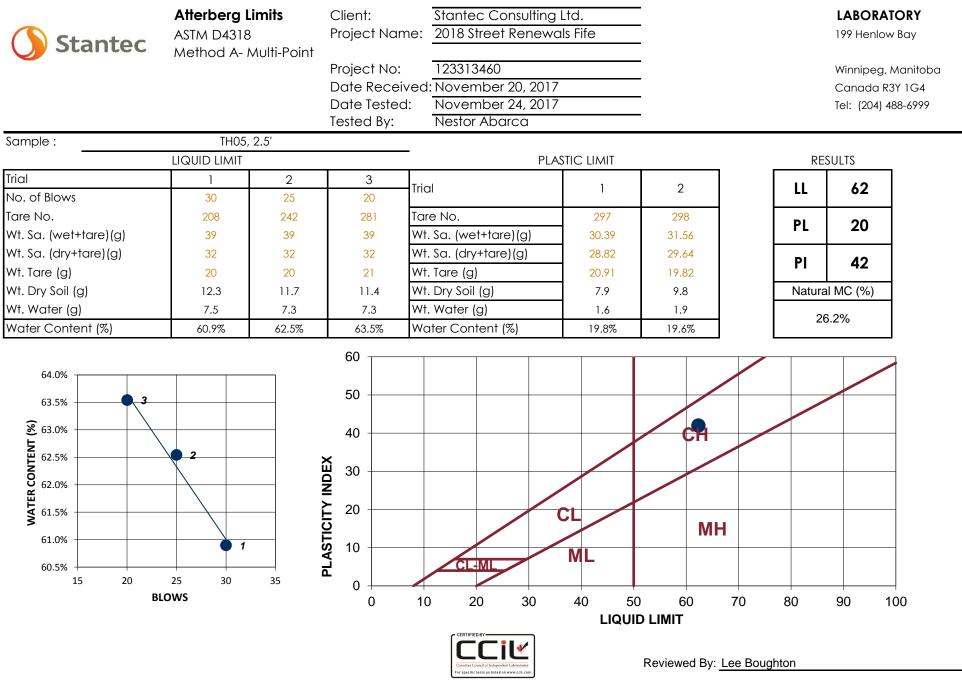
Pl L	ROЛ ОСА	ECT TIOI	TH08TESTCity of Winnipeg, Public Works Department2018 Local Street RenewalsN Fife Street (Burrows Ave to College Ave)	DATUM	ΓΙΟΝ	Geo	det	ic				N E	IOR AS	JEC TH TIN	INC G	i	5: 6	532 311	60			
D	RILI I	JNG	DATE November 20, 2017 DRILLING CO. Maple			-			_	DR	ILLI	ING	M	ETH	IOE)_[25	mm	55	4		
DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	Түре	NUMBER	MOISTURE T CONTENT (%)	ΔF	nsitu Pocke Nocke	t Pe 5(omet I Mc St	ter (l	(Pa) 100 re C ard I))kPa Conte	a ent & etrat	& Att	150 terbe	kPa erg Lir , blow	nits	200)kPa	DEPTH (ft)
- 0	AS		Asphalt																			0
-	CO GW		Granular FILL: stiff grey clay and silt	/ XGS	5	27					10											-
	FL		- trace fine to coarse sand, trace gravel	X GS		22				0												- 2
- 1 -			SILT: light brown - clayey, trace fine and coarse sand, trace gravel - moist	XGS	5	20				•												
	ML			GS	5	22				o												- 4 - -
-	-			GS	5	21				o												- 6
-				X GS	,	21																
- 2 -	-				<u>,</u>					,												_
			• TESTHOLE LOCATION: 397 m north of Fife Street and Burrows Avenue, northbound lane, 1 m west of curb.																			- 8
- 3 -	-		 No groundwater seepage Sloughing was observed upon completion of drilling, testhole open to 1.1 m. Testhole terminated at depth of 2.0 m. 																			
	San	ple '	Type: GS - Grab Sample SS - Split Spoon RC - Rock Cor ST - Shelby Tube PT - Piston Tube VT - Shear Va	re		ogged by	: L	ee Bo	ught	on					7	2		• -	<u> </u>			10
	Pie: Bac	zome kfill			R	eviewed	by: G	ermar	n Lea	1					J	y	S	sta	ar	It	e	C



Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. STANTEC is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of STANTEC.



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199 Henlow Bay Winnipeg MB R3Y 1G4 Tel: (204) 488-6999

PARTICLE SIZE ANALYSIS ASTM D422

PROJECT: 2018 Street Renewals Fife

Stantec Consulting Ltd. 500-311 Portage Avenue Winnipeg, Manitoba R3B 2B9

Lee Boughton Attention: PROJECT NO.: 123313460 SAMPLED BY: Lee Boughton DATE RECEIVED: November 20, 2017 SAMPLE ID: TH02, 3.5' TESTED BY: Tabea Kleineberg, M.Sc., GIT 100 90 80 Percent Passing (%) 70 60 50 40 30 20 10 0 100 10 0.1 0.01 0.001 1 Particle Size (mm) PARTICLE PERCENT PARTICLE PERCENT PASSING PASSING SIZE SIZE 97.6 37.50 mm 100.0 1.18 mm 25.00 mm 100.0 0.425 mm 97.0 100.0 0.250 mm 19.00 mm 96.8 16.00 mm 100.0 0.150 mm 96.6 12.50 mm 99.6 0.075 mm 95.1 9.50 mm 99.1 0.005 mm 36.9 4.75 mm 98.5 0.002 mm 29.1 2.00 mm 97.9 0.001 mm 24.9 Sand, % Gravel, % Silt, % Clay, % Colloids, % Coarse Medium Fine <0.075 to 0.002 mm 75 to 4.75 mm <0.002 mm < 0.001 mm <4.75 to 2.0 mm <2.0 to 0.425 mm <0.425 to 0.075 mm 1.5 0.6 0.9 1.9 66.0 29. 24.9

REPORT DATE: November 27, 2017



REVIEWED BY: Lee Boughton



199 Henlow Bay Winnipeg MB R3Y 1G4 Tel: (204) 488-6999

PARTICLE SIZE ANALYSIS ASTM D422

PROJECT: 2018 Street Renewals Fife

Stantec Consulting Ltd. 500-311 Portage Avenue Winnipeg, Manitoba R3B 2B9

Lee Boughton Attention: PROJECT NO.: 123313460 SAMPLED BY: Lee Boughton DATE RECEIVED: November 20, 2017 SAMPLE ID: TH04, 3.5' TESTED BY: Tabea Kleineberg, M.Sc., GIT 100 90 80 % 70 Percent Passing 60 50 40 30 20 10 0 100 10 0.1 0.01 0.001 1 Particle Size (mm) PARTICLE PERCENT PARTICLE PERCENT PASSING SIZE PASSING SIZE 99.1 37.50 mm 100.0 1.18 mm 25.00 mm 100.0 0.425 mm 98.9 100.0 0.250 mm 19.00 mm 98.7 16.00 mm 100.0 0.150 mm 98.3 12.50 mm 100.0 0.075 mm 96.4 9.50 mm 100.0 0.005 mm 78.7 4.75 mm 99.7 0.002 mm 71.2 2.00 mm 99.3 0.001 mm 63.6 Sand, % Gravel, % Silt, % Clay, % Colloids, % Coarse Medium Fine <0.075 to 0.002 mm 75 to 4.75 mm <0.002 mm < 0.001 mm <4.75 to 2.0 mm <2.0 to 0.425 mm <0.425 to 0.075 mm 0.3 0.4 0.4 2.5 25.2 71.2 63.6 Cil November 27, 2017 **REVIEWED BY: Lee Boughton REPORT DATE:**



199 Henlow Bay Winnipeg MB R3Y 1G4 Tel: (204) 488-6999

PARTICLE SIZE ANALYSIS ASTM D422

PROJECT: 2018 Street Renewals Fife

Stantec Consulting Ltd. 500-311 Portage Avenue Winnipeg, Manitoba R3B 2B9

R3B 2B9 Lee Boughton Attention: PROJECT NO.: 123313460 SAMPLED BY: Lee Boughton DATE RECEIVED: November 20, 2017 SAMPLE ID: TH05, 2.5' TESTED BY: Tabea Kleineberg, M.Sc., GIT 100 90 80 % 70 Percent Passing 60 50 40 30 20 10 0 100 10 0.1 0.01 0.001 1 Particle Size (mm) PARTICLE PERCENT PARTICLE PERCENT PASSING PASSING SIZE SIZE 37.50 mm 100.0 1.18 mm 96.2 94.4 25.00 mm 100.0 0.425 mm 100.0 0.250 mm 19.00 mm 93.4 16.00 mm 100.0 0.150 mm 92.4 12.50 mm 100.0 0.075 mm 89.3 9.50 mm 99.8 0.005 mm 59.1 4.75 mm 98.5 0.002 mm 53.7 2.00 mm 97.3 0.001 mm 48.6 Sand, % Gravel, % Silt, % Clay, % Colloids, % Coarse Medium Fine <0.075 to 0.002 mm 75 to 4.75 mm <0.002 mm < 0.001 mm <4.75 to 2.0 mm <2.0 to 0.425 mm <0.425 to 0.075 mm 1.5 1.2 2.9 5.1 35.6 53.7 48.6

REPORT DATE: November 27, 2017



REVIEWED BY: Lee Boughton

2018 Local Street Renewals

Geotechnical Investigation for 2018 Local Street Renewals on Chambers Street (Logan Avenue to Alexander Avenue)



Prepared for: City of Winnipeg Public Works Department 106-1155 Pacific Avenue Winnipeg, MB R3E 3P1

Prepared by: Stantec Consulting Ltd. 500-311 Portage Avenue Winnipeg, MB R3B 2B9

December 20, 2017



V:\1233\active\12331346\0300_drawing\0302_sheet_files\02_crivil\13460_fhlp-chambers.dwg ISO_8X11_HORIZ 2017/11/29 12:13 PM By: Boughton, Lee

ORIGINAL SHEET - ISO 8.5x11 H - v17.05



Stantec Consulting Ltd. Suite 500, 311 Portage Avenue Winnipeg MB Canada R3B 2B9 Tel. 204.489.5900 Fax. 204.453.9012 www.stantec.com Legend



IMAGE SOURCE: GOOGLE EARTH

Notes

2017-11-29 123313460

	CITY OF WINNIPEG, PUBLIC WORKS DEPARTMENT
	2018 LOCAL STREET RENEWALS ON CHAMBERS STREET LOGAN AVE TO ALEXANDER AVE - WINNIPEG, MANITOBA
Figure	No.
	1
Title	TESTHOLE LOCATION PLAN

Client/Project



TABLE 1 CHAMBERS STREET LOGAN AVENUE TO ALEXANDER AVENUE

Testhole	Testhole Location	Pavemer	nt Surface	Pavement Mate		Sample	Sample	Moisture		Particle Siz	e Analysis	Atterberg Limits				
ID		Туре	Thickness (mm)	Туре	Thickness (mm)	Description	Depth (m)	Content (%)	Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index	
	Chambers Street Southbound Iane,	Asphalt	30													
TH01	13 m south of Logan Avenue 1 m east of curb	Concrete	220	Clay (Fill)	-	-	-	-	-	-	-	-	-	-	-	
	Chambers Street Northbound lane,	Asphalt	35	Crushed	50	Clay	1.0	44	0.0	0.4	9.2	90.4	103	27	76	
INUZ	57 m south of Logan Avenue 1 m west of curb	Concrete	265	Limestone	50	Cidy	1.0	44	0.0	0.4	9.2	90.4	103	27	76	
	Chambers Street Northbound lane,	Asphalt	45	Crushed	50	Silt	0.7	22	0.0	47	80.2	15.1	20	10	10	
103	90 m south of Logan Avenue 1 m west of curb	Concrete	225	Limestone	50	SIIT	0.7	22	0.0	0.0 4.7		15.1	20	10	10	

Note: 1. TH01 was moved from the centerline to the northbound lane due to underground utilities.





Chambers Street – Logan Avenue to Alexander Avenue

Figure 1 – TH01 Core



Figure 2 – TH02 Core





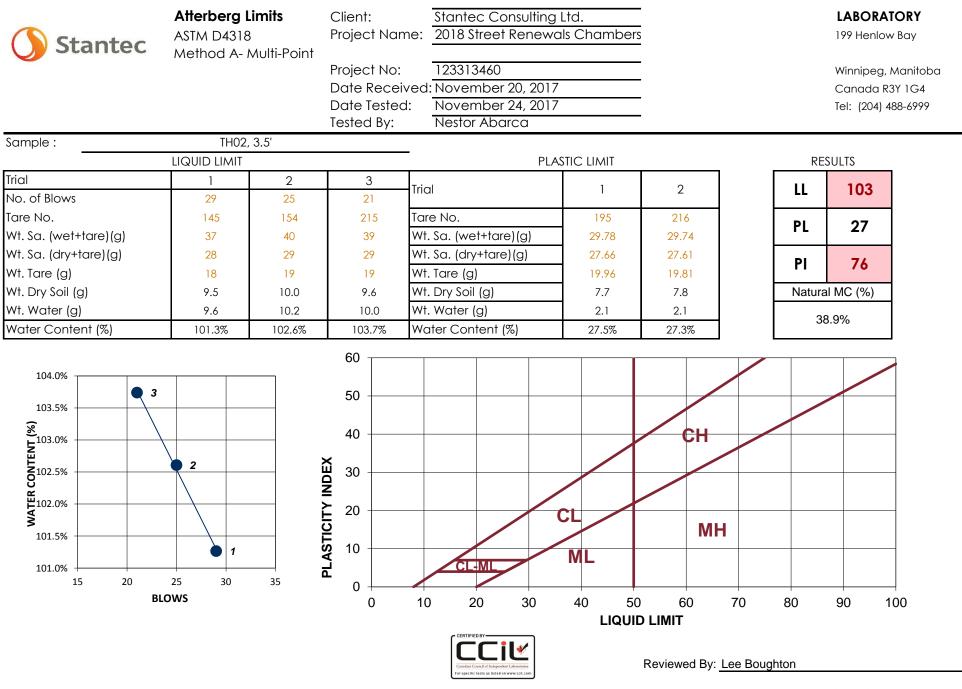
Chambers Street – Logan Avenue to Alexander Avenue

Figure 3 – TH03 Core

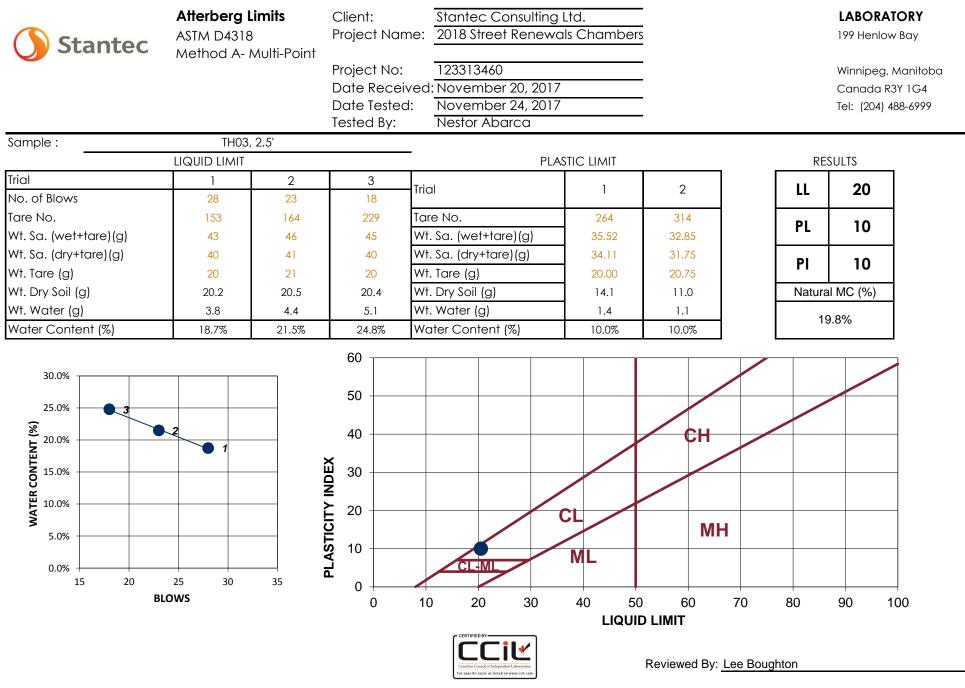
PROJECT 2018 Local Street Renewals DATUM Geodetic NORTHING 553															3313460 30048.7 2567.6							
DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	TYPE	NUMBER	MOISTURE ST CONTENT (%)		cket Pe	enetron OkPa WL	e (kPa) neter (kPa 10 Moisture	a) OkPa		0kPa	20	'a))0kPa ⊣	DEPTH (ft)						
		S				20 0		10	• 20	Standard	Penetra 40	80	90									
- 0	AS CO	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Asphalt	-												0						
-	FL		FILL: very stiff dark grey fat clay - silty, trace organics, trace fine sand, moist	GS		33				o	0					F						
	-		SILT: light brown - some clay, trace fine sand - moist	AGS												- 2						
-	ML	r .		GS		19			o							-						
- 1 - - 1 -	СН		stiff brown fat CLAY (CH) - some silt - moist	GS		35				D O						- -						
-	ML		SILT: light brown - some clay, trace fine sand - moist	GS		23			o							- 4						
				GS		24			0													
-	СН		stiff brown fat CLAY (CH) - some silt - moist													- 6						
- 2 -				GS		40					о					-						
-	-															- - - - -						
	-		• TESTHOLE LOCATION: 13 m south of Chambers Street and Logan Avenue, southbound lane, 1 m east of curb													- 8						
- 3 -	-		 No groundwater seepage Sloughing was observed upon completion of drilling, testhole open to 1.7 m. Testhole terminated at depth of 2.0 m. 																			
	Sar	⊥ nple 7	ype: GS - Grab Sample SS - Split Spoon RC - Rock Cor	e l		ogged by	: Lee	Bought	ton	<u>: :::</u>			1::::	1::::	1::::	10						
	Sample Type: GS - Grab Sample SS - Split Spoon ST - Shelby Tube RC - Rock Core VT - Shear Vane Test Logged by: Lee Boughton Piezometer Backfill Type: Bentonite Drill Cuttings Sand Slough												Sta	ant	te	C						

PI Lo	TH02 TESTHOLE RECORD CLIENT City of Winnipeg, Public Works Department PROJECT No. 12331340 PROJECT 2018 Local Street Renewals DATUM Geodetic NORTHING 5530008. LOCATION Chambers Street (Logan Ave to Alexander Ave) ELEVATION EASTING 632550.4 DRILLING DATE November 20, 2017 DRILLING CO. Maple Leaf Drilling DRILLING METHOD 125 mm SSA															8					
			JATE INOVEHIUEL 20, 2017 DRILLING CO. IMapre			-															<u> </u>
DEPTH (m)	SOIL TYPE	SOIL SYMBOL	SOIL DESCRIPTION	TYPE	PMBER NUMBER	\triangle Pocket Penetrometer (kPa)									& At	150 tterbe	, blow	nits	200	kPa	DEPTH (ft)
- 0	AS		Asphalt																		
-	со		Concrete																		
-	GW		\Limestone /	-								· · · · ·				· · · · · ·	· · · · · ·		· · · · ·		
	FL	\bigotimes	FILL: stiff brown fat clay - silty, trace fine sand, moist	GS		22				0											-
-			stiff brown fat CLAY (CH)																		- 2
_			- some silt - moist	GS		29			· · · · ·		· 0	· · · · · · · · · · · · · · · · · · ·							· · · ·	· · · · · · · · · · · · · · · · · · ·	
-																					-
- 1 -			- Grain Size Analysis @ 1.0 m: 0.0% Gravel, 0.4% Sand, 9.2% Silt, 90.4% Clay	GS		39					Ļ		0							~~>>	- - - -
-	СН			Mag		42															-4
-				XGS		43							0								-
-				Vcs		20															
-				X GS		39							U								
-																					- 6
- 2 -				GS		48								o			· · · · · ·			· · · · · · · · · · · · · · · · · · ·	
-																			· · · · · · · · · · · · · · · · · · ·		
-																	I I I I I I			· ·	-
			• TESTHOLE LOCATION: 57 m south of Chambers									• • • • • •									- 8
-			Street and Logan Avenue, northbound lane, 1 m west of curb.No groundwater seepageSloughing was observed upon completion of																		-
-			drilling, testhole open to 1.7 m.																		-
- 3 -			• Testhole terminated at depth of 2.0 m.																		
	San	nple T	ype: GS - Grab Sample SS - Split Spoon RC - Rock Core ST - Shelby Tube PT - Piston Tube VT - Shear Van	e ne Tesi	t ⊢	ogged by			ought					1			۔ م		┈╨		
	Piez Bac	zomet ckfill [er Dontonito Duill Cuttings Cond Balan		R	eviewed	by: G	ierma	an Lea	al			_\(J		2	στα	an	JL	e	

TH03 TESTHOLE RECORD CLIENT City of Winnipeg, Public Works Department PROJECT 2018 Local Street Renewals DATUM Geodetic LOCATION Chambers Street (Logan Ave to Alexander Ave) ELEVATION														CT N HING NG 125		<u>123</u> 552 632 SSA)		
		SYMBOL		S	AMP	LES	🗆 Ins	itu Sh cket P	ear Va	ane (k omete	(Pa) er (kPa				Sam	oles (kF	Pa)	a	H (ff)
DEPTH (m)	SOIL TYPE	SOIL	SOIL DESCRIPTION	ТҮРЕ	NUMBER	MOISTURE CONTENT (%)	$\begin{array}{c ccccccccccccccccccccccccccccccccccc$, blow	s/0.3m	80	90	DEPTH (ft)
- 0 - -	AS CO GW	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	Asphalt																- 0
	FL	\mathbb{X}	Limestone FILL: stiff dark grey fat clay - silty, trace organics, moist SILT: light brown	GS		26				0									-
-	-		 some clay, trace oxidation, trace fine sand moist Grain Size Analysis @ 0.7 m: 0.0% Gravel, 4.7% 	GS		20			-0										- 2
- 1 -	ML	,	Sand, 80.2% Silt, 15.1% Clay	XGS		22			0										-
-	-																		- - 4
	-		stiff grey fat CLAY (CH)	XGS -		20			0										-
-	СН		- some silt - moist	GS		23			o										- 6
- 2 -	-			GS		38					o				· ·				-
	-		• TESTHOLE LOCATION: 90 m south of Chambers																- 8
-	 Street and Logan Avenue, northbound lane, 1 m west of curb. No groundwater seepage Sloughing was observed upon completion of drilling, testhole open to 1.2 m. Testhole terminated at depth of 2.0 m. 																	-	
- 3 -	3 - Sample Type: GS - Grab Sample SS - Split Spoon RC - Rock Core ST - Shelby Tube PT - Piston Tube VT - Shear Vane Test Piezometer Backfill Type: Bentonite Drill Cuttings Sand Solugh) S	Sta	an [.]	te)C	- 10



Reporting of these test results constitutes a testing service only. Engineering interpretation or evaluation of the test results is provided only on written request. The data presented above is for the sole use of the client stipulated above. STANTEC is not responsible, nor can be held liable, for the use of this report by any other party, with or without the knowledge of STANTEC.





199 Henlow Bay Winnipeg MB R3Y 1G4 Tel: (204) 488-6999

PARTICLE SIZE ANALYSIS ASTM D422

PROJECT: 2018 Street Renewals Chambers

Stantec Consulting Ltd. 500-311 Portage Avenue Winnipeg, Manitoba R3B 2B9

Lee Boughton Attention: PROJECT NO.: 123313460 SAMPLED BY: Lee Boughton DATE RECEIVED: November 20, 2017 SAMPLE ID: TH02, 3.5' TESTED BY: Tabea Kleineberg, M.Sc., GIT 100 90 80 Percent Passing (%) 70 60 50 40 30 20 10 0 100 10 0.1 0.01 0.001 1 Particle Size (mm) PARTICLE PERCENT PARTICLE PERCENT PASSING SIZE PASSING SIZE 37.50 mm 100.0 1.18 mm 100.0 99.9 25.00 mm 100.0 0.425 mm 100.0 0.250 mm 19.00 mm 99.9 16.00 mm 100.0 0.150 mm 99.9 12.50 mm 100.0 0.075 mm 99.6 9.50 mm 100.0 0.005 mm 94.0 4.75 mm 100.0 0.002 mm 90.4 2.00 mm 100.0 0.001 mm 83.7 Sand, % Gravel, % Silt, % Clay, % Colloids, % Coarse Medium Fine <0.075 to 0.002 mm 75 to 4.75 mm <0.002 mm < 0.001 mm <4.75 to 2.0 mm <2.0 to 0.425 mm <0.425 to 0.075 mm 0.0 0.0 0.1 0.3 9.2 90.4 83.7 Cil November 27, 2017 **REVIEWED BY: Lee Boughton REPORT DATE:**



199 Henlow Bay Winnipeg MB R3Y 1G4 Tel: (204) 488-6999

PARTICLE SIZE ANALYSIS ASTM D422

PROJECT: 2018 Street Renewals Chambers

Stantec Consulting Ltd. 500-311 Portage Avenue Winnipeg, Manitoba R3B 2B9

Lee Boughton Attention: PROJECT NO.: 123313460 SAMPLED BY: Lee Boughton DATE RECEIVED: November 20, 2017 TH03, 2.5' SAMPLE ID: TESTED BY: Tabea Kleineberg, M.Sc., GIT 100 90 80 % 70 Percent Passing 60 50 40 30 20 10 0 100 10 0.1 0.01 0.001 1 Particle Size (mm) PARTICLE PERCENT PARTICLE PERCENT PASSING SIZE PASSING SIZE 99.9 37.50 mm 100.0 1.18 mm 25.00 mm 100.0 0.425 mm 99.8 100.0 0.250 mm 19.00 mm 99.8 16.00 mm 100.0 0.150 mm 99.7 12.50 mm 100.0 0.075 mm 95.3 9.50 mm 100.0 0.005 mm 21.2 4.75 mm 100.0 0.002 mm 15.1 2.00 mm 99.9 0.001 mm 10.2 Sand, % Gravel, % Silt, % Clay, % Colloids, % Coarse Medium Fine <0.075 to 0.002 mm 75 to 4.75 mm <0.002 mm < 0.001 mm <4.75 to 2.0 mm <2.0 to 0.425 mm <0.425 to 0.075 mm 0.0 0.1 0.1 4.5 80.2 15.1 10.2 Cil November 27, 2017 **REVIEWED BY: Lee Boughton REPORT DATE:**