CITY OF WINNIPEG

2017 LOCAL STREET RENWALS PACKAGE 17-R-02

GEOTECHNICAL REPORT

APRIL 2017



2017 LOCAL STREET RENWALS PACKAGE 17-R-02 GEOTECHNICAL REPORT

City of Winnipeg

GEOTECHNICAL REPORT

Project: 17M-00182-00 Date: April 2017

WSP Canada Inc. 1600 Buffalo Place Winnipeg, MB R3T 6B8

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REVISION HISTORY

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1	APRIL 13, 2017	Issued for Tender

SIGNATURES

PREPARED BY

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TABLE OF CONTENTS

1	INTRODUCTION	1
2	SUB-SURFACE INVESTIGATION AND TESTING	1
3	CLOSURE	1

APPENDICES

APPENDIX A	TEST HOLE LOCATIONS
APPENDIX B	TEST HOLE LOGS
APPENDIX C	MATERIAL TEST RESULTS
APPENDIX D	PAVEMENT CORE PHOTOS

1 INTRODUCTION

A geotechnical investigation was conducted by WSP Canada Inc. for the proposed 2017 Local Street Renewals Package 17-R-02 in Winnipeg, Manitoba. Three streets were cored and drilled including Chrislind Street from Regent Avenue W to Ravelston Avenue W, Kernaghan Avenue from Plessis Road to Robson Street, and Pinecrest Bay. One street, Moncton Avenue from Gateway Road to Grey Street was only cored. The purpose of this investigation was to assess the general subsurface conditions with respect to identifying the existing pavement structure and the underlying soil profile.

2 SUB-SURFACE INVESTIGATION AND TESTING

The field investigation was undertaken on March 23, 2017 and was completed on March 29, 2017. A total of 14 test holes and 17 cores were completed by Maple Leaf Drilling. The test holes were drilled to a depth of 3.05 m below the road surface using a truck-mounted CME 55 rig equipped with a 125 mm auger, as well as a track-mounted B54X rig also equipped with a 125 mm auger. The pavement was cored using a 150 mm diameter coring press. All test holes were backfilled with auger cuttings and bentonite and capped with cold mix asphalt after the completion of the drilling. Test hole locations are noted on the test hole logs and are shown on the maps included in Appendix A.

The soils encountered were visually classified to the full extent of the test hole. Representative soil samples were recovered at regular intervals, every 0.3 m to 2.1 m as well as one sample at 3.0 m. All of the soil samples were tested for their moisture contents and selected soil samples (one per street) were submitted for grain size analysis. The pavement cores were measured for their thickness and each core was photographed, if intact. Any groundwater seepage and sloughing encountered in the test holes were noted.

Detailed descriptions of the soil profiles for each test hole are included on the logs in Appendix B. The material test results are included in Appendix C. The photos of the pavement cores are included in Appendix D.

3 CLOSURE

The findings and recommendations provided in this report were prepared by WSP Canada Inc. (the Consultant) in accordance with generally accepted professional engineering principles and practices. The recommendations are based on the results of field and laboratory investigations and are reflective only of the actual test hole(s) and/or excavation(s) examined. If conditions encountered during construction appear to be different than those shown by the test hole(s) and/or excavation(s) at this site, the Consultant should be notified immediately in order that the recommendations can be reviewed and modified as necessary to address actual site conditions.

This report is limited in scope to only those items that are specifically referenced in this report. There may be existing conditions that were not recorded in this report. Such conditions were not apparent to the Consultant due to the limitations imposed by the scope of work. The Consultant, therefore, accepts no

liability for any costs incurred by the Client for subsequent discovery, manifestation or rectification of such conditions.

This report is intended solely for the Client named as a general indication of the visible or reported physical condition of the items addressed in the report at the time of the geotechnical investigation. The material in this report reflects the Consultant's best judgment in light of the information available to it at the time of preparation.

This report and the information and data contained herein are to be treated as confidential and may be used only by the Client and its officers and employees in relation to the specific project that it was prepared for. Any use a third party makes of this report, or any reliance on or decisions to be made based on it, are the responsibility of such third parties. The Consultant accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report.

The report has been written to be read in its entirety, do not use any part of this report as a separate entity.

All files, notes, source data, test results and master files are retained by the Consultant and remain the property of the Consultant.

Appendix A

TEST HOLE LOCATIONS

-tab:LAYOUT 17-R-02\MMM Drawings\Sketches\17M-00182-00-SK-01 Chrislind Street Test Hole Locations 2017.02.08.dwg Rene Streets Feb 10, 2017 – 9:08am P:\2017\17M-00182-00 – 2017 Local



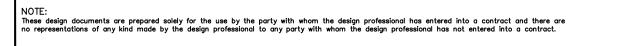


METRIC

WHOLE NUMBERS INDICATE MILLIMETRES DECIMALIZED NUMBERS INDICATE METRES

ted	2017 LOCAL RENEWAL PROGRAM									
ve. 3B1 178	CHRISLIND STREET - REGENT AVENUE W TO RAVELSTON AVENUE W TEST HOLE LOCATIONS									
948 om	SCALE: NTS	DATE: 08-FEB-2017	DWG. No. 17M-00182-00-SK-01							







METRIC

WHOLE NUMBERS INDICATE MILLIMETRES DECIMALIZED NUMBERS INDICATE METRES

2017 LOCAL RENEWAL PROGRAM KERNAGHAN AVENUE - ROBSON STREET TO PLESSIS ROAD TEST HOLE LOCATIONS

SCALE: NTS DATE: 08-FEB-2017 DWG. No. 17M-00182-00-SK-02



NOTE: These design documents are prepared solely for the use by the party with whom the design professional has entered into a contract and there are no representations of any kind made by the design professional to any party with whom the design professional has not entered into a contract.





METRIC

WHOLE NUMBERS INDICATE MILLIMETRES DECIMALIZED NUMBERS INDICATE METRES

mited Ave. 3 3B1 3178 4948	PINECRE
l.com	SCALE: NTS

2017 LOCAL RENEWAL PROGRAM CREST BAY - DONWOOD DRIVE TO DONWOOD DRIVE

TEST HOLE LOCATIONS

DATE: DW 08-FEB-2017

DWG. No. 17M-00182-00-SK-03

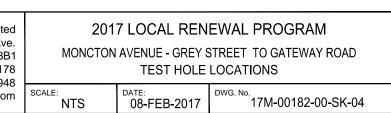


NOTE: These design documents are prepared solely for the use by the party with whom the design professional has entered into a contract and there are no representations of any kind made by the design professional to any party with whom the design professional has not entered into a contract.

METRIC WHOLE NUMBERS INDICATE MILLIMETRES DECIMALIZED NUMBERS INDICATE METRES



MMM Group Limited Suite 111 - 93 Lombard Ave. Winnipeg, MB R3B 3B1 t. 204.943.3178 f. 204.943.4948 www.mmmgrouplimited.com





Appendix B

TEST HOLE LOGS

	WY S	SP 1600 Buffalo Place Winnipeg, MB R3T 6B8 Telephone: (204)-477-6650							PAC	GE 1 O
	IT _City	v of Winnipeg	PROJECT NAME	2017 Stree	et Ren	ewals	- 17-R	-02		
		MBER 17M-00182-00	PROJECT LOCAT	ION _Chrisl	ind St	btw. R	egent	Av W	& Rave	Iston Av
ATE	START	ED <u>3/29/17</u> COMPLETED <u>3/29/17</u>	GROUND ELEVATION			HOL	E SIZE	E <u>125</u>	i mm	
RILL	ING CO	NTRACTOR Maple Leaf Drilling	GROUND WATER LEV	ELS:						
RILL	ING ME	THOD Continuous Auger	AT TIME OF DR	ILLING						
ogg	ED BY	Dana Bredin CHECKED BY Silvestre Urbano	AT END OF DRI	LLING						
OTE	s		AFTER DRILLIN	IG						
					Ż	(%		▲ SF	PT N VALU	JE 🔺
E	GRAPHIC LOG		TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	:			0 80
L (m)	LOC	MATERIAL DESCRIPTION	ANC		(KP %P	IST		PL 20 4	MC 40 60	
	5			<u> </u>	00	NON NO		-	S CONTEN	
	PB	CONCRETE			<u> </u>			<u>20</u>	40 60	0 80
_	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	- 190 mm layer, deteriorated								
_		GRANULAR FILL								
_		 - 80 mm layer 	MC = 29%			29				
_		CLAY - Brown								
0.5		- Frost to 1.35 m - Stiff below 1.35 m								
		- Stratified with SILT below 2.3 m, soft						:		
_		- Test hole dry after completion, no seepage or sloughing n	oted MC = 44%			44				
-										
-									······	
-			MC = 39%			39		•	•	
1.0								<u>;</u>	:	
-									:	
_			MC = 34%			34		•		
_										
_										
1.5			MC = 40%			40			•	
_										
_										
_			MC = 37%			37		_		
-						51				
2.0								.,		
								:		
-			MC = 39%			39		•	•	
-										
-										
-										
2.5								:	: :	
-									· · · · · · · · · · · · · · · · · · ·	
_										
_										
_										
3.0			MC = 43%			43				<u> </u>
	\langle / \rangle		1010 - 4370		1	43		:		

	WS	WSP Canada Inc. 1600 Buffalo Place Winnipeg, MB R3T 6B8 Telephone: (204)-477-6650								TH2
CLIEN	IT _City	of Winnipeg	PROJECT NAME	2017 Stree	et Ren	ewals -	17-R-0)2		
PROJ	ECT NU	MBER 17M-00182-00	PROJECT LOCAT	ION Christ	lind St	btw. R	egent A	w W &	Ravels	ston Av
DATE	STARTI	ED <u>3/29/17</u> COMPLETED <u>3/29/17</u>	GROUND ELEVATION	l		HOL	E SIZE	_125 r	nm	
DRILL	ING CO	NTRACTOR Maple Leaf Drilling	GROUND WATER LEV	/ELS:						
DRILL	ING ME	THOD Continuous Auger								
		Dana Bredin CHECKED BY Silvestre Urbano	AT END OF DRILLING							
NOTE	s		AFTER DRILLIN	IG						
					<u>۲</u> .	(9)		▲ SPT	N VALUE	Ξ▲
Ξ	GRAPHIC LOG		TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	20		60	
DEPTH (m)	LOC	MATERIAL DESCRIPTION	ANC	BLOW	(KP RET	TEN	20	PL 40	MC 60	LL
	5			os	00	NON NON] FINES C		
	~ 5 4	CONCRETE			ļ —	Ŭ	20) 40	60	80
-	4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	CONCRETE - 200 mm layer, intact								
-		GRANULAR FILL - 150 mm layer					:			
-		•	MC = 32%			32		••••		•••••
- 0.5	\otimes	CLAY FILL - Black-grey mixed								
0.5		- Trace of fine gravel								
-		CLAY	MC = 32%			32		•••••		
-		- Grey					· · · · · · · · · · · · · · · · · · ·	·····:	· · · · · · · · · ·	
-		- Frost to 1.35 m - Brown, stiff below 1.35 m								
_		- Trace of silt inclusions below 2.1 m - Soft below 2.1 m	MC = 31%			31				
1.0		- Test hole dry after completion, no seepage or sloughing n	atad							
_		- restricte dry alter completion, no seepage of sloughing h	oleu							
			MC = 29%			29	:		:	
_			WC - 2976			29	į		į	
-										
- 1.5										
1.5			MC = 30%			30		•		
-										
-										
-			MC = 39%			39				
-										
2.0								<u></u>		
_			MC = 38%			38				
_										
-							:		:	
- 2.5							:	•••••••••••••••••••••••••••••••••••••••		
2.0								·····		
-								· · · · · · · · · · · · · · · · · · ·		
-								· · · · · · · · · · · · · · · · · · ·		
-										
_										
3.0			MC = 45%			45				
	$\langle / / \rangle$	Bottom of hole at 3.05 m.	1010 - 45%			+5			-	

	W	WSP Canada Inc. 1600 Buffalo Place Winnipeg, MB R3T Telephone: (204)-2	- 6B8						٦	Н03 РА	-	130) OF 1
CLIE	NT _Cit	y of Winnipeg		PR		2017 Stree	t Rene	ewals -	- 17-R-02			
PRO.	JECT NU	JMBER		PR	OJECT LOCAT	ION Chrisli	nd St I	btw. R	egent Av V	V & Rave	elston .	Av
DATE	E START	ED 3/29/17	COMPLETED	GROUN	ID ELEVATION			HOL	E SIZE 1	25 mm		
DRIL	LING CO	ONTRACTOR Maple Leaf	f Drilling	GROUN	ID WATER LEV	ELS:						
DRIL	LING MI	ETHOD Continuous Auge	er	A	T TIME OF DR	ILLING						
LOG	GED BY	Dana Bredin	CHECKED BY Silvestre Urbano	4	T END OF DRI	LLING						
NOT	ES			4	FTER DRILLIN	IG						
										SPT N VAL	UE 🛦	
т	⊇				x s	, sie	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	20	40 6	30 8	80
DEPTH (m)	GRAPHIC LOG	MAT	ERIAL DESCRIPTION		TESTS AND REMARKS	BLOW COUNTS (N VALUE)	(ET	STU EN	PL	MC		
B	GR						۲ ک ک	I O N C	20	40 (ES CONTE		80
							۲ ۲	-0	20			80
	A 6 4	ASPHALT										
-				/								
-	-	- 80 mm layer, deterior	rated	/								
-	-	GRANULAR FILL - 230 mm layer			MC = 6%			6	•			
+	-	CLAY FILL										
0.5		 Black-grey mixed Trace of fine gravel 									<u>:</u>	÷
		-			MC = 33%			33				
											:	:
											-	
Ē												
		CLAY			MC = 34%			34	·····	•		
_ 1.0		- Brown - Frost to 1.35 m									<u>:</u>	
-		- 1103110 1.00 m										
-					MC = 36%			36		•		
		SILT									<u>.</u>	
1.5		- Tan-brown, moist, so	ft		MC = 25%			25			-	
					WIC - 25%			20		÷		:
4/11/											:	:
ADA.		CLAX			MC = 33%			33	•••••	•		
- CAN		CLAY - Brown, stiff, cohesive)									
2.0		- Test hole dry after co	mpletion, no seepage or sloughing	noted					:		<u>:</u>	<u>:</u> :
		· · · · · · · · · · · · · · · · · · ·			MC = 39%			39			÷	
GP -											÷	
N											<u>.</u>	
HRIS											-	
5 5 2.5											÷	
00- <u>2.0</u>												
- NSP									· · · · · · · · · · · · · · · · · · ·			
TS-												
a a					MC = 42%			42			<u>;</u>	<u>.</u>
GENERAL BH PLOTS - WSP 17M-00182 - CHRISLIND.GPJ GNT STD CANADA.GDT 4/11/17 8 0 5 5 6 6 7 1 1 1 1 1 1 1 1 1 1 1 1 1	$\langle 1 \rangle$	Bc	ottom of hole at 3.05 m.			I	<u> </u>		:		<u>:</u>	<u>:</u>
8		-										

	W	WSP Canada Inc. 1600 Buffalo Place Winnipeg, MB R3T 6B8							AGE 1 0
		Telephone: (204)-477-6650							
		y of Winnipeg							
		JMBER 17M-00182-00							
		ED 3/24/17 COMPLETED 3/24/17				HOL	E SIZE $_1$	25 mm	
		DNTRACTOR Maple Leaf Drilling							
		ETHOD _ Continuous Auger _ Dana Bredin CHECKED BY _ Silvestre Urbano_							
			AFTER DRILLIN						
	•			lo		1	1		
			۵ ۵	<i>a</i> 	z.	MOISTURE CONTENT (%)	20	SPT N VA	
UEPIH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	INT NTR	PL	MC	LL
ц С	LC	WATERIAL DESCRIPTION	EMA	BLOW COUNT	١ <u>א</u>	NTE	20	40	
			<u>۳</u>		Ğ	≥S	□ FII	NES CONT	ENT (%) 🗌
	044	CONCRETE					20	40	<u>60 80</u>
_	7 4 4 9 4 7 9 4 7	- 180 mm layer, deteriorated							
-		GRANULAR FILL							
-		- 300 mm layer	MC = 21%			21			
_									
0.5		CLAY FILL							
	\bigotimes	- Grey, trace of fine gravel	MC = 32%			32			
_	\bigotimes		IVIC = 32%			32			
_									
-		CLAY - Brown, stratified with silt							
-		- Frost to 1.5 m - SILTY from 1.5 m to 2.0 m	MC = 40%			40		•••••	:
1.0		- Stiff, cohesive below 2.0 m							
-		- Test hole dry after completion, no seepage or sloughing r	noted						
_			MC = 37%			37		•	
_									
_									
1.5			MC = 40%			40			
			IVIC - 40%			40			
-									
-									
-			MC = 39%			39		• • • • • • • • • • • • • • • • • • • •	
-									
2.0									<u> </u>
-			MC = 29%			29	•••••)	
_									
_									
_									
2.5									
								:	
-									
-									
-									
_									
3.0			MC = 41%			41			
		Bottom of hole at 3.05 m.	I	L	1	I			

	VV S	SP 1600 Buffalo Place Winnipeg, MB R3T 6B8 Telephone: (204)-477-6650						I	PAGE	1 0
LIEN	T_City	v of Winnipeg	PROJECT NAME	2017 Stree	et Ren	ewals	- 17-R-02	2		
		IMBER 17M-00182-00	PROJECT LOCAT						avelsto	on Av
DATE	START	ED _3/24/17 COMPLETED _3/24/17	GROUND ELEVATION			HOL	E SIZE	125 mn	n	
		DINTRACTOR _ Maple Leaf Drilling				-	_			
		THOD Continuous Auger			-					
.OGG	ED BY	Dana Bredin CHECKED BY Silvestre Urbano								
IOTES	S		AFTER DRILLIN	IG						
								SPT N	VALUE	•
т	<u></u> ⊆		ks s	_ ຮ ອ	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	20	40	60	80
UEPIH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	(ET)	STU EN-	PL			LL
ב	GR		REAT		NO E	NO NO	20	40 FINES CON		
					۱ ط	- ō	20	40	60	80
	A 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	CONCRETE - 180 mm layer, deteriorated								
-	A A A A									
-		GRANULAR FILL - 300 mm layer							:	
-			MC = 20%			20	•••••••••••••••••••••••••••••••••••••••		••••	
0.5		CLAY FILL								
-		- Grey, trace of fine gravel	MC = 35%			35		•••		
_										
_										
_	\otimes		MC = 34%			34				
1.0		CLAY - Grey								
		- Frost to 1.5 m								
		- Brown, stiff, cohesive below 1.5 m - Trace of silt inclusions below 2.4 m								
-		- Test hole dry after completion, no seepage or sloughing r	MC = 40%			40		••••		
-										
-										
1.5			MC = 38%			38		•		
-									:	
-									• • • • •	
-			MC = 40%			40				
-										
2.0										
			MC = 41%			41				
						''		-		
-									:	
								•••••		•••••
2.5									 :	
-										
-										
-										
_										
3.0			MC = 43%			43	L			
	\langle / \rangle	Bottom of hole at 3.05 m.	1010 - 43 /0							

	W	WSP Canada Inc. 1600 Buffalo Place Winnipeg, MB R3T Telephone: (204)-4	- 6B8						•		-	[H31) 1 OF 1
CLIE	NT _City	y of Winnipeg		PROJ		2017 Stree	t Rene	ewals -	17-R-02			
PROJ	IECT NU	IMBER 17M-00182-00		PROJ	JECT LOCATI	ON Kerna	ghan A	Av btw.	Plessis F	Rd & Ro	obson	St
DATE	START	ED 3/29/17	COMPLETED <u>3/29/17</u>	GROUND	ELEVATION			HOL	E SIZE _1	25 mn	<u>n</u>	
DRILI		ONTRACTOR Maple Leaf	Drilling	GROUND	WATER LEV	'ELS:						
DRILI	LING ME	THOD Continuous Auge	er	AT	TIME OF DR	ILLING						
LOGO	GED BY	Dana Bredin	CHECKED BY Silvestre Urbano	AT	END OF DRI	LLING						
NOTE	S			AF	TER DRILLIN	G						
										SPTN	VALUE	
	₽				ks Ks	_si≘	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	20	40	60	80
DEPTH (m)	RAPHIC LOG	MAT	ERIAL DESCRIPTION		TESTS AND REMARKS	BLOW COUNTS (N VALUE)	(Pa)	STU EN	PL	M	—	
ä	GR				REN		lõ =	ION	20	40 NES COM		80
							۲ ۲	- ŏ		40		80
		CONCRETE - 170 mm intact										
		- 170 min intact										
-		CLAY FILL - Black-grey mixed										
-		- Trace of SILT			MC = 28%			28	••••			
-		- Trace of fine gravel										
0.5										<u> </u>		
					MC = 32%			32				
											÷	
Γ										÷		
					MC = 33%			33		•		
1.0												
		CLAY										
		- Brown - Frost to 1.35 m			MC = 28%			28	•			
1.5					MC = 26%			26		:		
		SILT			IVIC = 20%			20				
T 4/1		- Tan-brown, moist, so	ft									
- 10- 10- 10- 10- 10- 10- 10- 10- 10- 10										••••	••••	
	-				MC = 24%			24	•			
		CLAY - Brown, stiff, cohesive										
<u>0 2.0</u>			mpletion, no seepage or sloughing	noted								
					MC = 41%			41				
GHAI												
ANN .										:		
≝- ‱ 2.5												
2.5												·····
- 14 -												
ASP -										· · · ·		
s												
GENERAL BH PLOTS - WSP 17M-00182 - KERNAGHAN GPJ GINT STD CANADA GDT 4/11/17 2 0 2 0 2 0 2 0 2 0 2 0 2 0 2 0					MC = 45%			45				
	$\langle / /$	Ro	ttom of hole at 3.05 m.		10 - 40%			+0				
Ш О												

	W	WSP Canada Inc. 1600 Buffalo Place Winnipeg, MB R3T 6B8 Telephone: (204)-477-6650					Т		(TH32) E 1 OF 1
CLIE	NT <u>Cit</u>	y of Winnipeg	PROJECT NAME	2017 Stree	et Rene	ewals -	- 17-R-02		
PROJ	IECT NU	JMBER 17M-00182-00	PROJECT LOCAT	ION Kerna	ghan A	Av btw.	Plessis Ro	& Robso	on St
DATE	START	ED3/29/17 COMPLETED3/29/17	GROUND ELEVATION			HOL	E SIZE _ 12	25 mm	
DRILI	LING CO	ONTRACTOR Maple Leaf Drilling	GROUND WATER LEV	/ELS:					
DRILI	LING ME	ETHOD Continuous Auger	AT TIME OF DR	ILLING					
LOGO	GED BY	Dana Bredin CHECKED BY Silvestre Urbano	AT END OF DRI	LLING					
NOTE	S		AFTER DRILLIN	IG					
					_;			SPT N VALU	EA
Ξ	₽		TESTS AND REMARKS	S⊤S	POCKET PEN. (kPa)	MOISTURE CONTENT (%)		40 60	
DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	AND	BLOW COUNTS (N VALUE)	KPa K	ISTU	PL 	40 60	LL 80
	Ь		RET	۳٥ź	00	NON NO		ES CONTEN	
					<u> </u>	0	20	40 60	80
		CONCRETE - 170 mm intact							
		CLAY FILL - Grey, mixed							
-		- Trace of SILT - Trace of fine gravel	MC = 31%			31	••••		
0.5		Ŭ						· · · · · · · · · · · · · · · · · · ·	
0.5									
			MC = 33%			33	••••••	•	
-									
			MC = 34%			34			
1.0								<u></u>	
		CLAY							
		- Brown	MC = 39%			39			
		- Frost to 1.35 m - SILTY from 1.35 m to 1.5 m, soft	1010 - 3978			39			
		- Stiff, cohesive below 1.5 m - Soft below 2.4 m							
1.5		- Test hole dry after completion, no seepage or sloughing no	oted					Ì	
			MC = 35%			35			
								:	
- NAD			MC = 41%			41		•	
D CA									
<u>10</u> 2.0									
5			MC = 43%			43		•	
N.GP									
AGHA									
ERN								į	
× & 2.5									
1-00								: :	
171									
- WSI									
- 01S									
H H									
GENERAL BH PLOTS - WSP 17M-00182 - KERNAGHAN GPJ GINT STD CANADA GDT 4/11/17 0 0 0 0 0 0 0 0 0 0 0 0 0			MC = 43%			43		•	
GENE		Bottom of hole at 3.05 m.							

	W	WSP Canada Inc. 1600 Buffalo Place Winnipeg, MB R3T Telephone: (204)-4	6B8 77-6650						Tł	-	TH33) = 1 OF 1
CLIE	NT _City	y of Winnipeg		PRO		2017 Stree	et Rene	ewals -	- 17-R-02		
PROJ	JECT NU	IMBER 17M-00182-00		PRO	DJECT LOCAT	ION Kerna	ghan /	Av btw.	Plessis Rd	& Robsor	n St
DATE	START	ED _ 3/29/17	COMPLETED 3/29/17	GROUN	D ELEVATION			HOL	E SIZE 125	mm	
DRILI		NTRACTOR Maple Leaf	Drilling								
		THOD Continuous Auge			T TIME OF DR						
			CHECKED BY Silvestre Urbano		T END OF DRI	LLING					
NOTE	S			A	FTER DRILLIN	G					
DEPTH (m)	GRAPHIC LOG	MATE	ERIAL DESCRIPTION		TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	20 4 PL 20 4	PT N VALUE 0 60 MC 0 60 0 60 5 CONTENT	80 80
							۲ ۵	- ŏ		0 60	80
		CONCRETE - 150 mm intact CLAY FILL - Grey - Trace of fine gravel			MC = 25%			25	•		
 					MC = 31%			31	•		·····
_ <u>1.0</u> 		CLAY - Brown - Frost to 1.2 m - SILTY from 1.5 m to 1 - Stiff, cohesive below - Soft below 2.1 m	I.65 m, soft 1.65 m		MC = 30% MC = 29%			30 29	•		·····
1.5		- Test hole dry after co	mpletion, no seepage or sloughing	noted	MC = 31%			31	•		·····
					MC = 39%			39		•	
GENERAL BH PLOIS - WSP 17M-00182 - KERNAGHAN GPJ GIN I SID CANNDA GDI 4/11/17 2.0 2.0 2.0 2.0					MC = 44%			44		•	
					M0 - 40%			40			
		Dat	ttom of hole at 3.05 m.		MC = 49%			49		•	
Ш О		ВО									

		WSP Canada Inc.					TH04 (TH34)
		SP 1600 Buffalo Place Winnipeg, MB R3T 6B8					PAGE 1 OF 1
		Telephone: (204)-477-6650		2017 Street	t Don		17 D 00
		ty of Winnipeg UMBER _17M-00182-00					. Plessis Rd & Robson St
		TED 3/29/17 COMPLETED 3/29/17					
		ONTRACTOR Maple Leaf Drilling					
DRI	LLING N	IETHOD Continuous Auger	AT TIME OF DR	ILLING			
LOG	GED B	CHECKED BY Silvestre Urbano	AT END OF DRI	LLING			
NOT	TES		AFTER DRILLIN	G			
					ż	%)	▲ SPT N VALUE ▲
E	(III) GRAPHIC LOG		TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	20 40 60 80 PL MC LL
DEPTH		MATERIAL DESCRIPTION	EMA	BLC SOUI	KP (KP	OIST	20 40 60 80
	0		Ω.	02	PO(ΣŌ	□ FINES CONTENT (%) □
	P 6 4	CONCRETE					20 40 60 80
F		- 160 mm intact					
F		CLAY FILL - Grey, mixed					
F		- Frost 1.2 m - Mixed with SILT below 1.2 m, soft	MC = 31%			31	
- 0.5	🔆						
0.0	'-						
F			MC = 34%			34	•
F							
F							
-			MC = 36%			36	•
	, - XXX						······
F							
F			MC = 42%			42	••••••
-							· · · · · · · · · · · · · · · · · · ·
- 1.5	, - 💓						
			MC = 31%			31	•
T 4/1							
DA.GD							
		CLAY	MC = 45%			45	•
2.0		- Brown, stiff, cohesive					
GINT		- Test hole dry after completion, no seepage or sloughing n				07	
- GPJ			MC = 37%			37	
- HAN							
- L							
₩- 8_2.5	5						
M-001							
171 171							
- WS							
PLOT							
GENERAL BH PLOTS - WSP 17M-00182 - KERNAGHAN.GPJ GINT STD CANADA GDT 4/1/1/1 C C C C C C C C C C C C C C C C						40	
	$\nabla / /$	Bottom of hole at 3.05 m.	MC = 48%			48	
Ö							

WSP 1600 E Winnip	Canada Inc. 3uffalo Place yeg, MB R3T 6B8 yone: (204)-477-6650					TH01 PAGE 1 OF 1
	lone. (204)-477-0050	PROJECT NAME	2017 Stree	et Ren	ewals .	- 17-R-02
	1-00182-00					
	COMPLETED 3/24/17				-	
	Maple Leaf Drilling					
	n CHECKED BY _Silvestre Urbano					
NOTES _ Pavement cored		AFTER DRILLI				
DEPTH (m) CRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	1	▲ SPT N VALUE ▲ 20 40 60 80 PL MC LL 20 40 60 80
		۲. ۲	02	PO	ΣÖ	□ FINES CONTENT (%) □
CONCRE 170 mm	TE layer, intact					
	COMPLETE TESTHOLE DUE TO AN OBSTRU Bottom of hole at 0.17 m.			I		· · · ·
GENERAL BH PLOTS - WSP 17M-00182 - PINECREST.GPJ GINT STD CANADA.GDT 4/11/17						

	W	WSP Canada Inc. 1600 Buffalo Place Winnipeg, MB R3T 6B8 Tolephone: (204) 477,6550								(TH2 Ge 1 0
	T City	Telephone: (204)-477-6650 y of Winnipeg	PROJECT NAME	2017 Stree	et Ren	ewals	- 17-R-	.02		
		JMBER _ 17M-00182-00	PROJECT LOCAT							
		ED 3/24/17 COMPLETED 3/24/17								
		DNTRACTORMaple Leaf Drilling				not		120		
		ETHOD Continuous Auger								
		Dana Bredin CHECKED BY Silvestre Urbano								
			AFTER DRILLIN							
								▲ SF	'T N VALU	JE 🔺
-	<u>ں</u>		s s	ູ ທ <u>ີ</u>	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	2		0 60	
шы (ш)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	ET F	STI EN1		PL	MC	
ב	GR		REVE			NO	2	-	0 60 CONTEN	
					۱ <u>۳</u>	- ŭ			0 60	
	2 4 4 2 4 4 4 4	CONCRETE - 165 mm layer, intact								
_		-								
-		GRANULAR FILL - 150 mm layer								
-		CLAY FILL	MC = 19%			19	· · · · •	,		
-).5	\bigotimes	- Brown, trace of fine gravel								
J.U_	\otimes									<u>:</u>
_			MC = 30%			30		•		
-	\bigotimes									·····:
_		SILT - Tan-brown								
_		- Frost to 1.2 m	MC = 24%			24		•		
1.0										
_										
_			MC = 23%			23		•		
_										
		CLAY								
1.5		- Brown, stiff, cohesive	MC = 23%			23				÷
		- SILTY from 2.7 m to 2.85 m, soft				23				:
		- Test hole dry after completion, no seepage or sloughing	noted							:
_										
_			MC = 43%			43			•	
										·····:: :
2.0										:
-			MC = 44%			44			•	·····:
-										
-										
_										·····
2.5									<u> </u>	<u> </u>
_									· · · · · · · · · · · · · · · · · · ·	
_										
_										
3.0						00				
··•		Bottom of hole at 3.05 m.	MC = 39%			39			<u> </u>	<u> </u>

	WSP Canada Inc. 1600 Buffalo Place Winnipeg, MB R3T 6B8 Telephone: (204)-477-6650							3 (T PAGE	
	City of Winnipeg	PROJECT NAME	2017 Stree	et Rene	ewals	- 17-R-02			
	CT NUMBER 17M-00182-00	PROJECT LOCAT							
ATE S	TARTED _3/24/17 COMPLETED _3/24/17	GROUND ELEVATION			HOL	E SIZE	125 mm	ı	
	IG CONTRACTOR Maple Leaf Drilling								
	IG METHOD _ Continuous Auger								
	D BY _ Dana Bredin CHECKED BY _ Silvestre Urbano								
		AFTER DRILLIN							
							SPT N V		
		S	மி	Ľ.	MOISTURE CONTENT (%)	20		60	80
	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	12 12 12	PL			LL
		EAPE			NTE	20	40	60	80
ľ		<u>۲</u>	02	Q	≥ö	□F	NES CON	ITENT (%) 🗆
P	CONCRETE					20	40	<u>60</u>	80
	- 180 mm layer, intact						····;····		
- <mark>></mark>	GRANULAR FILL						· · · · · · · · · · · · · · · · · · · ·		
	- 150 mm layer	MC = 23%			23		····;····		
	CLAY	100 - 2070							
0.5	- Brown - Frost to 1.2 m								
		MC = 27%			27	•	••••••••••••••••••••••••••••••••••••••		
-							····· :		••••••
-									
_		MC = 30%			30		•		
1.0									
							:		
7								-	
		MC = 29%			29				
-							····.		•••••••
-							····:		
1.5		MC = 29%			29		•		
-	SILT - Tan-brown, soft, moist						·····		
_	- Clayey from 1.8 m to 2.1 m						····;····		
		MC = 24%			24				
					<u>-</u>		:		÷
2.0									
							· · · · · · · · · · · · · · · · · · ·		:
-		MC = 24%			24	•	····; ;	•••••	
-							· · · · · · · · · · · · · · · · · · ·		
-	CLAY						:		
	- Brown, stiff, cohesive						····;····		
2.5	- Test hole dry after completion, no seepage or sloughing	noted					:		:
T									
- E							····· :	••••	
ł							·····		••••
3.0		MC = 47%			47		•		
/	Bottom of hole at 3.05 m.								

	WS	WSP Canada Inc. 1600 Buffalo Place Winnipeg, MB R3T 6B8 Telephone: (204)-477-6650						IH	-	TH2 E 1 OF
	T City	of Winnipeg	PROJECT NAME	2017 Stree	et Rene	ewals	- 17-R-0	2		
		MBER 17M-00182-00	PROJECT LOCATI	ON Pineci	rest Ba	iy btw.	Donwoo	od Dr		
DATE	START	ED _3/24/17 COMPLETED _3/24/17 (GROUND ELEVATION			HOL	E SIZE	125 r	nm	
RILL	ING CO	NTRACTOR _ Maple Leaf Drilling 0	GROUND WATER LEV	ELS:						
RILL	ING ME	THOD Continuous Auger	AT TIME OF DR	LLING						
.OGG	ED BY	Dana Bredin CHECKED BY Silvestre Urbano								
IOTES	s		AFTER DRILLIN	G						
								▲ SPT	N VALUE	
-	<u>ں</u>		s s	s 🗐	EN	MOISTURE CONTENT (%)	20	40	60	80
UEPIH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	STS ND ARI		Pa)	ENT	F	<u>۱</u>	MC	LL
ц С (2 L L L L		TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	SION SION	20		60	80
)	D	20			CONTENT	
		CONCRETE					20	40	<u>60</u>	80
-	2 4 4 2 4 4 2 4 4 2 4 2 4 2 4 2 4 2 4 2	- 180 mm layer, intact						· · · · · ·		· · · · · . :
_		GRANULAR FILL								
_		- 120 mm layer CLAY FILL	MC = 25%			25				
_	\otimes	- Black-grey mixed above 0.6 m								
0.5	\bigotimes	- Trace of fine gravel								
								_	:	
_		CLAY	MC = 30%			30		•		
-		- Brown - Frost to 1.35 m								
_								· · · · · · · · ·		
_			MC = 30%			30		•		
1.0										
			MC - 20%			20		•		
			MC = 30%			30		•		
-										
_		SILT - Tan-brown, soft, moist								
1.5		- ran-biown, son, moist	MC = 27%			27		•		
_								· · · · · · · · · ·		
_		CLAY								
_		- Brown, stiff, cohesive	MC = 31%			31				
		- Test hole dry after completion, no seepage or sloughing no						-		
2.0										
<u></u>								:		<u> </u>
_			MC = 41%			41		••••	····	
_										
_										
_										
2.5								:		
										-
-										
-										
-										
-										
3.0			MC = 47%			47			•	
	///	Bottom of hole at 3.05 m.	,		I	· · ·	L :	:	:	:

WSP Canada Inc. 1600 Buffalo Place Winnipeg, MB R3T 6B8 Telephone: (204)-477-6650	TH05 (TH2 PAGE 1 OF
CLIENT City of Winnipeg	
PROJECT NUMBER _ 17M-00182-00	PROJECT LOCATION _ Pinecrest Bay btw. Donwood Dr
DATE STARTED 3/24/17 COMPLETED 3/24/17	GROUND ELEVATION HOLE SIZE _125 mm
DRILLING CONTRACTOR Maple Leaf Drilling	GROUND WATER LEVELS:
DRILLING METHOD Continuous Auger	AT TIME OF DRILLING
LOGGED BYDana Bredin CHECKED BYSilvestre Urbano	AT END OF DRILLING
NOTES	AFTER DRILLING
	Z ULS ASPT N VALUE ▲
HLAN () () () () () () () () () () () () () (
MATERIAL DESCRIPTION	
	LEST N VALUE A AND AND AND AND AND AND AND AN
CONCRETE	20 40 60 80
- 170 mm layer, intact	
GRANULAR FILL	
	MC = 29%
- Brown	
0.5 - Trace of fine gravel	
CLAY	MC = 28% 28 ●
 Brown, stratified with silt Frost to 1.35 m 	
SILTY below 1.2 m - Trace oxidation at 1.5 m	
	MC = 27%
1.0	
	MC = 26%
1.5	MC = 28%
	MC = 28%
SILT - Tan-brown, soft, moist to wet	
	MC = 24%
	MC = 23%
CLAY - Brown, stiff	
- SILTY below 2.7 m, soft	
- Test hole dry after completion, no seepage or sloughing	noted
	MC = 44%
SILT - Tan-brown, soft, moist to wet 	

Appendix C

MATERIAL TESTING RESULTS



CLIENT: WSP		TEST NO:	1	PROJECT NO:	103-1704	
PROJECT: 17M-002		DATE SAMPLED):	SAMPLED BY: Client		
PROJECT CONTACT:	Silvestre Urbano	DATE TESTED:	3-Apr-2017	TESTED BY:	Leon Yang	
TEST LOCATION:	PineCrest					
Description	TH 22	TH 22	TH 22	TH 22	TH 22	
Depth (ft)	1	2	3	4	5	
Wt Wet Sample + Tare	159.60	153.60	167.50	163.70	177.30	
Wt Dry Sample + Tare	135.30	119.30	135.50	134.10	145.40	
Wt Water	24.30	34.30	32.00	29.60	31.90	
Wt Tare	4.30	4.20	4.30	4.10	4.30	
Wt Dry Sample	131.00	115.10	131.20	130.00	141.10	
Moisture Content (%)	18.5	29.8	24.4	22.8	22.6	
Description	TH 22	TH 22	TH 22			
Depth (ft)	6	7	10			
Wt Wet Sample + Tare	199.40	190.40	156.00			
Wt Dry Sample + Tare	141.20	133.20	113.40			
Wt Water	58.20	57.20	42.60			
Wt Tare	4.10	4.20	4.60			
Wt Dry Sample	137.10	129.00	108.80			
Moisture Content (%)	42.5	44.3	39.2			
Description	TH 23	TH 23	TH 23	TH 23	TH 23	
Depth (ft)	1	2	3	4	5	
Wt Wet Sample + Tare	154.70	149.70	150.30	157.80	157.80	
Wt Dry Sample + Tare	126.80	118.80	116.50	122.90	122.90	
Wt Water	27.90	30.90	33.80	34.90	34.90	
Wt Tare	4.20	4.20	4.60	4.30	4.30	
Wt Dry Sample	122.60	114.60	111.90	118.60	118.60	
Moisture Content (%)	22.8	27.0	30.2	29.4	29.4	
Description	TH 23	TH 23	TH 23			
Depth (ft)	6	7	10			
Wt Wet Sample + Tare	174.10	178.50	157.50			
Wt Dry Sample + Tare	141.40	145.10	108.50			
Wt Water	32.70	33.40	49.00			
Wt Tare	4.70	4.30	4.30			
Wt Dry Sample	136.70	140.80	104.20			
Moisture Content (%)	23.9	23.7	47.0			



CLIENT: WSP		TEST NO:	1	PROJECT NO:	103-1704		
PROJECT: 17M-002		DATE SAMPLED:	DATE SAMPLED:		SAMPLED BY: Client		
PROJECT CONTACT:	Silvestre Urbano	DATE TESTED:	3-Apr-2017	TESTED BY:	Leon Yang		
TEST LOCATION:	PineCrest						
Description	TH 24	TH 24	TH 24	TH 24	TH 24		
Depth (ft)	1	2	3	4	5		
Wt Wet Sample + Tare	165.50	151.70	150.70	163.30	156.70		
Wt Dry Sample + Tare	133.20	117.60	117.10	126.20	124.10		
Wt Water	32.30	34.10	33.60	37.10	32.60		
Wt Tare	4.20	4.30	4.10	4.10	4.10		
Wt Dry Sample	129.00	113.30	113.00	122.10	120.00		
Moisture Content (%)	25.0	30.1	29.7	30.4	27.2		
Description	TH 24	TH 24	TH 24				
Depth (ft)	6	7	10				
Wt Wet Sample + Tare	170.60	166.60	167.00				
Wt Dry Sample + Tare	131.70	119.50	114.80				
Wt Water	38.90	47.10	52.20				
Wt Tare	4.20	4.20	4.50				
Wt Dry Sample	127.50	115.30	110.30				
Moisture Content (%)	30.5	40.8	47.3				
Description	TH 25	TH 25	TH 25	TH 25	TH 25		
Depth (ft)	1	2	3	4	5		
Wt Wet Sample + Tare	173.60	152.40	175.20	206.10	182.10		
Wt Dry Sample + Tare	135.60	120.20	139.10	165.00	143.80		
Wt Water	38.00	32.20	36.10	41.10	38.30		
Wt Tare	4.50	4.30	4.20	4.20	4.70		
Wt Dry Sample	131.10	115.90	134.90	160.80	139.10		
Moisture Content (%)	29.0	27.8	26.8	25.6	27.5		
Description	TH 25	TH 25	TH 25				
Depth (ft)	6	7	10				
Wt Wet Sample + Tare	160.00	163.50	159.80				
Wt Dry Sample + Tare	130.00	133.40	112.10				
Wt Water	30.00	30.10	47.70				
Wt Tare	4.30	4.20	4.30				
Wt Dry Sample	125.70	129.20	107.80				
Moisture Content (%)	23.9	23.3	44.2				



CLIENT: WSP		TEST NO:	2	PROJECT NO:	103-1704
PROJECT: 17M-002		DATE SAMPLED:	DATE SAMPLED:		Client
PROJECT CONTACT:	Silvestre Urbano	DATE TESTED:	3-Apr-2017	TESTED BY:	Leon Yang
TEST LOCATION:	Chrisund				
Description	TH 26	TH 26	TH 26	TH 26	TH 26
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	190.70	161.10	181.90	152.50	159.50
Wt Dry Sample + Tare	160.20	120.20	137.30	109.90	116.90
Wt Water	30.50	40.90	44.60	42.60	42.60
Wt Tare	4.20	4.20	4.20	4.20	4.60
Wt Dry Sample	156.00	116.00	133.10	105.70	112.30
Moisture Content (%)	19.6	35.3	33.5	40.3	37.9
Description	TH 26	TH 26	TH 26		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	192.40	179.00	189.10		
Wt Dry Sample + Tare	138.30	128.30	133.60		
Wt Water	54.10	50.70	55.50		
Wt Tare	4.40	4.20	4.20		
Wt Dry Sample	133.90	124.10	129.40		
Moisture Content (%)	40.4	40.9	42.9		
Description	TH 27	TH 27	TH 27	TH 27	TH 27
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	198.10	158.20	197.20	185.70	368.50
Wt Dry Sample + Tare	163.90	120.60	142.10	136.60	266.50
Wt Water	34.20	37.60	55.10	49.10	102.00
Wt Tare	4.30	4.20	4.30	4.70	13.20
Wt Dry Sample	159.60	116.40	137.80	131.90	253.30
Moisture Content (%)	21.4	32.3	40.0	37.2	40.3
Description	TH 27	TH 27	TH 27		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	173.60	182.80	173.80		
Wt Dry Sample + Tare	126.30	143.20	124.30		
Wt Water	47.30	39.60	49.50		
Wt Tare	4.10	4.30	4.30		
Wt Dry Sample	122.20	138.90	120.00		
Moisture Content (%)	38.7	28.5	41.2		



CLIENT: WSP		TEST NO:	2	PROJECT NO:	103-1704		
PROJECT: 17M-002		DATE SAMPLED:	DATE SAMPLED:		SAMPLED BY: Client		
PROJECT CONTACT:	Silvestre Urbano	DATE TESTED:	3-Apr-2017	TESTED BY:	Leon Yang		
TEST LOCATION:	Chrisund						
Description	TH 28	TH 28	TH 28	TH 28	TH 28		
Depth (ft)	1	2	3	4	5		
Wt Wet Sample + Tare	208.20	173.70	160.00	168.20	166.00		
Wt Dry Sample + Tare	162.40	121.70	115.90	126.60	120.10		
Wt Water	45.80	52.00	44.10	41.60	45.90		
Wt Tare	4.40	4.20	4.10	4.40	4.30		
Wt Dry Sample	158.00	117.50	111.80	122.20	115.80		
Moisture Content (%)	29.0	44.3	39.4	34.0	39.6		
Description	TH 28	TH 28	TH 28				
Depth (ft)	6	7	10				
Wt Wet Sample + Tare	166.10	154.30	169.60				
Wt Dry Sample + Tare	122.50	112.30	119.60				
Wt Water	43.60	42.00	50.00				
Wt Tare	4.20	4.40	4.40				
Wt Dry Sample	118.30	107.90	115.20				
Moisture Content (%)	36.9	38.9	43.4				
Description	TH 29	TH 29	TH 29	TH 29	TH 29		
Depth (ft)	1	2	3	4	5		
Wt Wet Sample + Tare	152.00	158.00	155.90	161.90	150.30		
Wt Dry Sample + Tare	116.00	121.20	120.00	126.10	116.40		
Wt Water	36.00	36.80	35.90	35.80	33.90		
Wt Tare	4.20	4.20	4.20	4.30	4.20		
Wt Dry Sample	111.80	117.00	115.80	121.80	112.20		
Moisture Content (%)	32.2	31.5	31.0	29.4	30.2		
Description	TH 29	TH 29	TH 29				
Depth (ft)	6	7	10				
Wt Wet Sample + Tare	170.70	168.90	161.50				
Wt Dry Sample + Tare	124.10	123.70	112.70				
Wt Water	46.60	45.20	48.80				
Wt Tare	4.10	4.20	4.20				
Wt Dry Sample	120.00	119.50	108.50				
Moisture Content (%)	38.8	37.8	45.0				



CLIENT: WSP		TEST NO:	2	PROJECT NO:	103-1704	
PROJECT: 17M-002		DATE SAMPLED:		SAMPLED BY: Client		
PROJECT CONTACT:	Silvestre Urbano	DATE TESTED:	3-Apr-2017	TESTED BY: Leon Yang		
TEST LOCATION:	Chrisund					
Description	TH 30	TH 30	TH 30	TH 30	TH 30	
Depth (ft)	1	2	3	4	5	
Wt Wet Sample + Tare	181.30	164.60	171.20	170.90	159.50	
Wt Dry Sample + Tare	171.80	125.10	128.80	127.10	128.50	
Wt Water	9.50	39.50	42.40	43.80	31.00	
Wt Tare	4.20	4.40	4.30	4.80	4.50	
Wt Dry Sample	167.60	120.70	124.50	122.30	124.00	
Moisture Content (%)	5.7	32.7	34.1	35.8	25.0	
Description	TH 30	TH 30	TH 30			
Depth (ft)	6	7	10			
Wt Wet Sample + Tare	191.40	151.80	151.10			
Wt Dry Sample + Tare	145.30	110.10	108.00			
Wt Water	46.10	41.70	43.10			
Wt Tare	4.20	4.30	4.30			
Wt Dry Sample	141.10	105.80	103.70			
Moisture Content (%)	32.7	39.4	41.6			
Description						
Depth (ft)						
Wt Wet Sample + Tare						
Wt Dry Sample + Tare						
Wt Water						
Wt Tare						
Wt Dry Sample						
Moisture Content (%)						
Description						
Depth (ft)						
Wt Wet Sample + Tare						
Wt Dry Sample + Tare						
Wt Water						
Wt Tare						
Wt Dry Sample						
Moisture Content (%)						



CLIENT: WSP		TEST NO:	3	PROJECT NO:	103-1704	
PROJECT: 17M-002		DATE SAMPLED:		SAMPLED BY: Client		
PROJECT CONTACT:	Silvestre Urbano	DATE TESTED:	3-Apr-2017	TESTED BY:	Leon Yang	
TEST LOCATION:	Kernaghan					
Description	TH 31	TH 31	TH 31	TH 31	TH 31	
Depth (ft)	1	2	3	4	5	
Wt Wet Sample + Tare	191.20	155.50	164.60	150.80	172.40	
Wt Dry Sample + Tare	150.50	119.30	124.50	118.40	138.10	
Wt Water	40.70	36.20	40.10	32.40	34.30	
Wt Tare	4.30	4.30	4.50	4.20	4.30	
Wt Dry Sample	146.20	115.00	120.00	114.20	133.80	
Moisture Content (%)	27.8	31.5	33.4	28.4	25.6	
Description	TH 31	TH 31	TH 31			
Depth (ft)	6	7	10			
Wt Wet Sample + Tare	162.80	161.50	177.80			
Wt Dry Sample + Tare	132.20	115.60	124.00			
Wt Water	30.60	45.90	53.80			
Wt Tare	4.20	4.30	4.30			
Wt Dry Sample	128.00	111.30	119.70			
Moisture Content (%)	23.9	41.2	44.9			
Description	TH 32	TH 32	TH 32	TH 32	TH 32	
Depth (ft)	1	2	3	4	5	
Wt Wet Sample + Tare	164.00	168.40	163.60	334.40	156.50	
Wt Dry Sample + Tare	126.10	128.20	123.60	244.40	117.30	
Wt Water	37.90	40.20	40.00	90.00	39.20	
Wt Tare	4.30	4.40	4.20	14.10	4.30	
Wt Dry Sample	121.80	123.80	119.40	230.30	113.00	
Moisture Content (%)	31.1	32.5	33.5	39.1	34.7	
Description	TH 32	TH 32	TH 32			
Depth (ft)	6	7	10			
Wt Wet Sample + Tare	155.80	166.20	157.70			
Wt Dry Sample + Tare	111.90	117.50	111.30			
Wt Water	43.90	48.70	46.40			
Wt Tare	4.30	4.40	4.20			
Wt Dry Sample	107.60	113.10	107.10			
Moisture Content (%)	40.8	43.1	43.3			



CLIENT: WSP		TEST NO:	3	PROJECT NO:	103-1704	
PROJECT: 17M-002		DATE SAMPLED:		SAMPLED BY: Client		
PROJECT CONTACT:	Silvestre Urbano	DATE TESTED:	3-Apr-2017	TESTED BY:	Leon Yang	
TEST LOCATION:	Kernaghan					
Description	TH 33	TH 33	TH 33	TH 33	TH 33	
Depth (ft)	1	2	3	4	5	
Wt Wet Sample + Tare	175.50	170.70	158.20	186.60	168.50	
Wt Dry Sample + Tare	140.80	131.40	123.00	146.10	129.80	
Wt Water	34.70	39.30	35.20	40.50	38.70	
Wt Tare	4.20	4.20	4.20	4.20	4.30	
Wt Dry Sample	136.60	127.20	118.80	141.90	125.50	
Moisture Content (%)	25.4	30.9	29.6	28.5	30.8	
Description	TH 33	TH 33	TH 33			
Depth (ft)	6	7	10			
Wt Wet Sample + Tare	155.70	156.50	160.00			
Wt Dry Sample + Tare	113.60	109.90	109.20			
Wt Water	42.10	46.60	50.80			
Wt Tare	4.30	4.60	4.40			
Wt Dry Sample	109.30	105.30	104.80			
Moisture Content (%)	38.5	44.3	48.5			
Description	TH 34	TH 34	TH 34	TH 34	TH 34	
Depth (ft)	1	2	3	4	5	
Wt Wet Sample + Tare	180.30	191.40	156.70	176.20	203.80	
Wt Dry Sample + Tare	139.10	144.00	116.60	125.30	156.80	
Wt Water	41.20	47.40	40.10	50.90	47.00	
Wt Tare	4.20	4.20	4.60	4.20	4.20	
Wt Dry Sample	134.90	139.80	112.00	121.10	152.60	
Moisture Content (%)	30.5	33.9	35.8	42.0	30.8	
Description	TH 34	TH 34	TH 34			
Depth (ft)	6	7	10			
Wt Wet Sample + Tare	155.00	197.50	169.70			
Wt Dry Sample + Tare	108.00	145.40	115.90			
Wt Water	47.00	52.10	53.80			
Wt Tare	4.30	4.30	4.80			
Wt Dry Sample	103.70	141.10	111.10			
Moisture Content (%)	45.3	36.9	48.4			



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PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

CLIENT:	WSP 1600 Buffa			PRO	JECT NO.	103-1704	
		MB R3T 6B8					
TTN:	Silvestre L	Jrbano					
ROJECT:	17M-002						
Date Sampled:	unknown	Date Received:	29-Mar-17	Sieve Ar	alysis	Hydromete	er Analysis
ampled By:	Client	Date Tested:	3-Apr-17	Sieve (mm)	-	Diameter	% Finer
			•	50.00	100.0		
				37.50	100.0		
				25.00	100.0		
				19.00	100.0		
				16.00	100.0		
Aaterial Identi	fication			12.50	100.0	0.0373	95.6
B.H./T.H. No.		TH24 @ 5'		9.50	100.0	0.0265	94.6
Sample No.		14		4.75	100.0	0.0190	92.6
Sample Source		14		2.00	100.0	0.0099	84.5
Specific Gravity		2.65		1.18	100.0	0.0099	84.5 82.5
		2.00		0.425	100.0	0.0073	78.9
				0.423	99.6	0.0032	69.6
				0.100	99.4	0.0027	56.4
				•			
		Grai	n Size Analysi	S			
			-0	••	┌─┬┩─┬┬┬┩─●)- -	100 ר
							- 90
							- 80
	++++++				+ + + + + + + + + + + + + + + + + + +		- 70 %
							60 P
							a
							50 s
							- ⁴⁰ i
							30 n
							g
							- 20
							- 10
0.0001	0.001	0.01	0.1	1	10		
CLAY SILT SA			AND	G	RAVEL	7	
		P	article Size (mm)		I	Series2	
	SOIL D	ESCRIPTION		% Compo	osition Gravel	D10 D30	
					Sand	D30 D60	0.00270
	SIL	TY CLAY			Silt	Cu	#DIV/0!
	21-				Clay	Cc	#DIV/0!
emarks: Test Metho	d: ASTM D422, D22	16. D4318			- I	11	

Technician: IA/GM

Amaralo

Reviewed by: Hermie Manalo



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PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

	.,			00.20			
LIENT:	WSP			PRO	JECT NO.	103-1704	
	1600 Buffa						
		MB R3T 6B8					
TTN:	Silvestre l	Jrbano					
ROJECT:	17M-002						
Date Sampled:	unknown	Date Received:	29-Mar-17	Sieve An	alysis	Hydromete	-
Sampled By:	Client	Date Tested:	3-Apr-17	Sieve (mm) %	6 Passing	Diameter	% Finer
				50.00	100.0		
				37.50	100.0		
				25.00	100.0		
				19.00	100.0		
				16.00	100.0		
laterial Identif	ication			12.50	100.0	0.0412	74.6
3.H./T.H. No.		TH27 @ 5'		9.50	100.0	0.0294	72.6
Sample No.		15		4.75	100.0	0.0213	66.6
Sample Source				2.00	100.0	0.0114	48.6
Specific Gravity	of Material:	2.65		1.18	100.0	0.0084	42.8
				0.425	100.0	0.0061	34.9
				0.180	99.7	0.0031	31.5
				0.075	99.2	0.0013	22.4
		<u>Cro</u>	n Size Analysi	e			
		Grai		s 			100
							90
							80
							70 %
							₆₀ P
							а
							50 s s
							40 i
							30 n
	•						20 g
							10
0.0001	0.001	0.01	0 . 1		I 10		0
				-			-
CL	AY	SILT	5.	AND	G	RAVEL	
		P	article Size (mm)			Series2	
				% Compo	sition	D10	
	SUIL D	ESCRIPTION			Gravel	D30	0.02131
					and	D60	0.00270
	SI	LT LOAM			Silt Slov	Cu	#DIV/0!
	: ASTM D422, D22			<mark>22.4</mark> C	lay	Сс	#DIV/0!

Technician: IA/GM

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Reviewed by: Hermie Manalo



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PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

	17.1.110						
CLIENT:	WSP			PRO	JECT NO.	103-1704	
	1600 Buffalo	Place					
	Winnipeg, N	1B R3T 6B8					
ATTN:	Silvestre Ur						
PROJECT:	17M-002						
Date Sampled:	unknown	Date Received:	29-Mar-17	Sieve An	alvsis	Hydromete	er Analysis
Sampled By:	Client	Date Tested:	3-Apr-17	Sieve (mm) %	-	Diameter	% Finer
			• • • •	50.00	100.0		
				37.50	100.0		
				25.00	100.0		
				19.00	100.0		
				16.00	100.0		
Aaterial Identific	ation			12.50	100.0	0.0361	101.6
3.H./T.H. No.		TH32 @ 4'		9.50	100.0	0.0257	100.6
Sample No.		16		4.75	100.0	0.0184	98.6
Sample Source				2.00	100.0	0.0094	94.5
Specific Gravity of	Material [.]	2.65		1.18	100.0	0.0069	94.5 92.6
	a.ci.a.	2.00		0.425	100.0	0.0049	90.7
				0.180	99.8	0.0025	85.6
				0.075	99.6	0.0011	76.6
				-			
		Grai	n Size Analysi	s			
			•	●┬┬┬┬●───♥──	┌─┬ ┩─┬┬┬┩─●	-•• - ••	100
		•			-		90
							80
							%
							1 /0
							60 P a
							50 s
							s
							30 g
							20
							10
0.0001	0.001	0.01	0.1	1	10		
CLA	(SILT	S	AND	G	RAVEL	
		P	article Size (mm)			Series2	
	SOIL DE	SCRIPTION		% Compo	osition Gravel	D10 D30	
					Sand	D60	
	HEAV	Y CLAY			Silt	Cu	#DIV/0!
					Clay	Сс	#DIV/0!

Technician: IA/GM

Amaralo

Reviewed by: Hermie Manalo

Appendix D

PHOTOS OF PAVEMENT CORES

Chrislind Street from Regent Ave W to Ravelston Avenue W (Site #7)



TH02 – 200 mm intact

***TH01, TH03, TH04, TH05, concrete was deteriorated and no intact core could be recovered.

Kernaghan Avenue from Plessis Road to Robson Street (Site #8)



TH01 – 170 mm intact (mislabelled in photo, BH6 = TH01)



TH02 – 170 mm intact (mislabelled in photo, BH7 = TH02)



TH03 – 150 mm intact (mislabelled in photo, BH8 = TH03)



TH04 – 160 mm intact (site # mislabelled in photo)



TH01 – 170 mm intact

Pinecrest Bay (Site #9)



TH02 – 165 mm intact



TH03 – 180 mm intact



TH04 – 180 mm intact



TH05 – 170 mm intact

Moncton Avenue from Gateway Road to Grey Street (Site #10)



TH01 – 150 mm intact



TH02 – 150 mm intact



TH03 – 155 mm intact