

# **APPENDIX 'A'**

# **GEOTECHNICAL REPORT**

CITY OF WINNIPEG

# 2018 ALLEY RENEWALS - CONTRACT 3 GEOTECHNICAL REPORT

MARCH 20, 2018





2018 ALLEY RENEWALS  
- CONTRACT 3  
GEOTECHNICAL REPORT  
CITY OF WINNIPEG

FINAL REPORT

PROJECT NO.: 17M-02283-00  
DATE: MARCH 20, 2018

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# SIGNATURES

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REVIEWED BY



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This report was prepared by WSP Canada Inc. for the account of CITY OF WINNIPEG, in accordance with the professional services agreement. The disclosure of any information contained in this report is the sole responsibility of the intended recipient. The material in it reflects WSP Canada Inc.'s best judgement in light of the information available to it at the time of preparation. Any use which 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. WSP Canada Inc. accepts no responsibility for damages, if any, suffered by any third party as a result of decisions made or actions based on this report. This limitations statement is considered part of this report.

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## APPENDICES

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# 1 INTRODUCTION

A geotechnical investigation was conducted by WSP Canada Inc. for the proposed 2018 Alley Renewals – Contract 3 Project in Winnipeg, Manitoba. 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.

Six alleys were cored and drilled, which includes the following alleys:

- A. West/east alley between Melrose Ave W and Pandora Ave W from Bond St to Winona St
- B. West/east alley between Kildare Ave E and Brighton Court from Southampton Pl to Wayoata St
- C. Alleys bounded by Home St and Ethelbert St, Preston Ave and Westminster Ave
- D. Alleys bounded by Dundurn Pl and Wolseley Ave, Walnut St and Maryland St
- E. North/south alley between Furby St and Langside St from Westminster Ave to Sara Ave
- F. North/south alley between Lenore St and Evanson St from Wolseley Ave to Wellington Ave

# 2 SUB-SURFACE INVESTIGATION AND TESTING

The field investigation was undertaken on February 8, 2018 and was completed on February 14, 2018. A total of 16 test holes and 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 B-40 rig equipped with a 125 mm auger as well as track-mounted GeoProbe 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 after the completion of the drilling and patched with either cold mix asphalt or quick setting concrete. Testhole locations are noted on the testhole logs and within the test hole summary tables.

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 were submitted for grain size analysis (minimum one per alley). The pavement cores were measured for their thickness and each core was photographed. No groundwater seepage or sloughing was encountered in the test holes during drilling.

The photos of the pavement cores, detailed descriptions of the soil profiles for each test hole, the material test results and the testholes maps are included in Appendices, organized by alley.

### 3 TESTHOLE SUMMARY TABLES

**Table 3-1 – Melrose/Pandora Alley**

TEST HOLE NO.	TESTHOLE LOCATION	PAVEMENT SURFACE		PAVEMENT STRUCTURE MATERIAL		SOIL DESCRIPTION	BOREHOLE DEPTH (m)	No. of Samples Taken
		Type	Thickness (mm)	Type	Thickness (mm)			
A-TH1	643215.9 m E 5528733.6 m N South side of Alley behind 111 Bond St	Asphalt & Concrete	30 & 150	Fill (Clayey)	270	Clay	3.05	8

**Table 3-2 – Kildare/Brighton Alley**

TEST HOLE NO.	TESTHOLE LOCATION	PAVEMENT SURFACE		PAVEMENT STRUCTURE MATERIAL		SOIL DESCRIPTION	BOREHOLE DEPTH (m)	No. of Samples Taken
		Type	Thickness (mm)	Type	Thickness (mm)			
B-TH1	644433.9 m E 5529598.5 m N Centre of Alley behind 601 Kildare Ave E	Concrete	140	Clay	Bottom of testhole	Clay	3.05	8
B-TH2	644557.6 m E 5529600.4 m N Centre of Alley behind 633 Kildare Ave E	Concrete	150	Clay	Bottom of testhole	Clay	3.05	8
B-TH3	644666.9 m E 5529601.9 m N Centre of Alley beside 3 Southampton Pl	Concrete	150	Fill (Clayey)	450	Clay	3.05	8

**Table 3-3 – Home/Ethelbert Alley**

TEST HOLE NO.	TESTHOLE LOCATION	PAVEMENT SURFACE		PAVEMENT STRUCTURE MATERIAL		SOIL DESCRIPTION	BOREHOLE DEPTH (m)	No. of Samples Taken
		Type	Thickness (mm)	Type	Thickness (mm)			
C-TH1	631621.2 m E 5527104.9 m N Centre of Alley behind 177 Home St	Concrete	170	Fill (sandy/silty)	280	Fill/Silt/Clay	3.05	8
C-TH2	631622.0 m E 5527165.1 m N Centre of Alley behind 189 Home St	Asphalt & Concrete	60 & 120	Fill (sandy/silty)	270	Fill/Clay/Silt/Clay	3.05	8
C-TH3	631624.8 m E 5527253.7 m N Centre of Alley behind 203 Home St	Asphalt & Concrete	30 & 140	Fill (clayey)	730	Fill/Clay	3.05	8
C-TH4	631641.4 m E 5527299.8 m N South side of Alley behind 226 Ethelbert St	Concrete	170	Fill (clayey)	1030	Fill/Clay	3.05	8

**Table 3-4 – Dundurn/Wolseley Alley**

TEST HOLE NO.	TESTHOLE LOCATION	PAVEMENT SURFACE		PAVEMENT STRUCTURE MATERIAL		SOIL DESCRIPTION	BOREHOLE DEPTH (m)	No. of Samples Taken
		Type	Thickness (mm)	Type	Thickness (mm)			
D-TH1	631923.6 m E 5526998.5 m N Centre of Alley behind 50 Dundurn Pl	Concrete (broken)	250	Fill (clayey)	2150	Fill/Clay	3.05	8
D-TH2	632073.7 m E 5527016.2 m N East side of Alley beside 12 Dundurn Pl	Asphalt & Concrete (broken)	50 & 100	Fill (sandy/silty)	250	Fill/Clay	3.05	8



**Table 3-5 – Furby/Langside Alley**

TEST HOLE NO.	TESTHOLE LOCATION	PAVEMENT SURFACE		PAVEMENT STRUCTURE MATERIAL		SOIL DESCRIPTION	BOREHOLE DEPTH (m)	No. of Samples Taken
		Type	Thickness (mm)	Type	Thickness (mm)			
E-TH1	632381.6 m E 5527136.6 m N Centre of Alley behind 114 Langside St	Concrete	150	Fill (clayey)	750	Fill/Silt/Clay	3.05	8
E-TH2	632382.9 m E 5527219.4 m N Centre of Alley behind 134 Langside St	Concrete	180	Fill (clayey)	270	Fill/Clay	3.05	8
E-TH3	632384.0 m E 5527312.5 m N Centre of Alley behind 164 Langside St	Concrete	180	Fill (clayey)	910	Fill/Silt/Clay	3.05	8

**Table 3-6 – Evanson/Lenore Alley**

TEST HOLE NO.	TESTHOLE LOCATION	PAVEMENT SURFACE		PAVEMENT STRUCTURE MATERIAL		SOIL DESCRIPTION	BOREHOLE DEPTH (m)	No. of Samples Taken
		Type	Thickness (mm)	Type	Thickness (mm)			
F-TH1	631381.1 m E 5526856.3 m N Centre of Alley behind 77 Lenore St	Concrete	120	Fill (clayey)	630	Fill/Clay/Silt/Clay	3.05	8
F-TH2	631381.8 m E 5526947.3 m N Centre of Alley behind 97 Lenore St	Asphalt & Concrete (deteriorated)	30 & 140	Granular Fill	130	Fill/Silt/Clay	3.05	8
F-TH3	631384.0 m E 5527031.5 m N Centre of Alley behind 123 Lenore St	Asphalt & Concrete (deteriorated)	50 & 50	Granular Fill	170	Fill/Clay/Silt/Clay	3.05	8

## 4 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**

MELROSE / PANDORA ALLEY





REVISION:	
DRAWING NO:	GT-A

SCALE:	1:1000
DATE:	2018/03/20
PROJECT NO:	17M-02283-00

TITLE:

2018 ALLEY RENEWALS – CONTRACT 3  
 MELROSE/PANDORA/BOND/WINONA ALLEY  
 TESTHOLE LOCATIONS



1600 BUFFALO PLACE  
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 CANADA R3T 6B8  
 PHONE: 204-477-6650 FAX : 204-474-2864  
 WWW.WSPGROUP.COM

STAMP

XREF



WSP  
 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
 Telephone: (204)-477-6650

CLIENT City of Winnipeg  
 PROJECT NUMBER 17M-02283-00  
 DATE STARTED 2/14/18 COMPLETED 2/14/18  
 DRILLING CONTRACTOR Maple Leaf Drilling  
 DRILLING METHOD Solid Stem Auger - CME  
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano  
 NOTES South side of alley: 643215.9 m E, 5528733.6 m N

PROJECT NAME 2018 Alley Renewals - Contract 3  
 PROJECT LOCATION Melrose/Pandorra Alley  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲			
									PL	MC	LL	
									20	40	60	80
									20	40	60	80
									PP	Su (kPa)	Field Vane	*
									100	200	300	400
	ASPHALT - 30 mm thick											
	CONCRETE - 150 mm thick, intact											
0.5	FILL - Clayey, grey-black, trace sand and f. gravel				GB 1			25				
	CLAY (CH) - Grey				GB 2			39				
1.0	- 61.3% clay; 37.9% silt, 0.8% sand at 0.9 m				GB 3			35				
1.5	- Frost to 1.35 m - Mottled grey and brown, stiff, moist below 1.35 m				GB 4			33				
					GB 5			31				
2.0	- Silt pocket, soft, brown from 1.8 m to 1.95 m - Brown, stiff, moist below 1.95 m				GB 6			38				
					GB 7			48				
3.0					GB 10			49				

- Testhole open to bottom after completion  
 - Backfilled with auger cuttings and bentonite, patched with concrete

GENERAL BH PLOTS - WSP ALLEY\_RENEWALS\_CONTRACT\_3\_BOND.GPJ GINT STD CANADA.GDT 3/20/18



Figure 1 – TH1 Melrose/Pandora

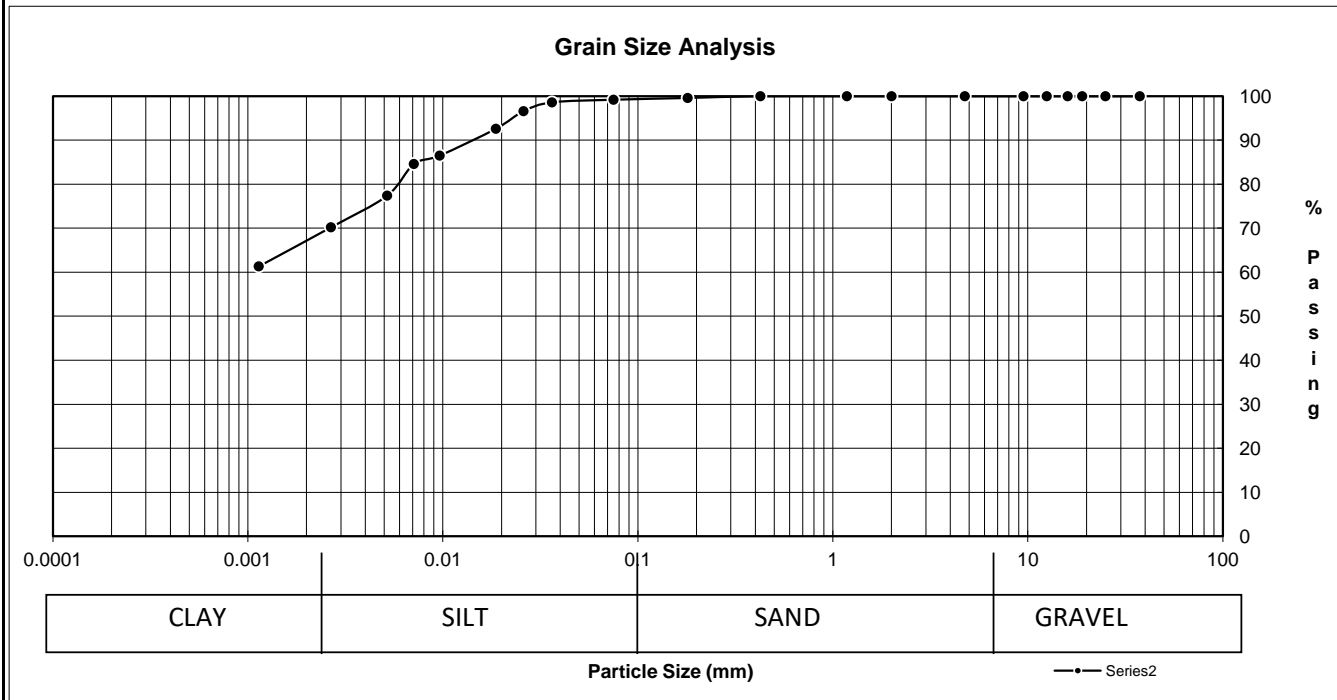
## PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

**CLIENT:** WSP Canada Group Limited  
 Suite 111-93 Lombard Avenue  
 Winnipeg, MB R3B 3B1  
**ATTENTION:** Dana Bredin  
**PROJECT:** 17M-02283-00  
 Bond

**PROJECT NO.** 103-1804

Date Sampled: 20-Feb-18	Date Received: 20-Feb-18	Sieve Analysis		Hydrometer Analysis	
Sampled By: Client	Date Tested: 26-Feb-18	Sieve (mm)	% Passing	Diameter	% Finer
		50.00	100.0		
		37.50	100.0		
		25.00	100.0		
		19.00	100.0		
		16.00	100.0		
		12.50	100.0	0.0363	98.6
		9.50	100.0	0.0259	96.6
		4.75	100.0	0.0187	92.6
		2.00	100.0	0.0096	86.5
		1.18	100.0	0.0071	84.6
		0.425	100.0	0.0052	77.4
		0.180	99.6	0.0027	70.2
		0.075	99.2	0.0011	61.3

**Material Identification**  
 B.H./T.H. No. **TH 1 @3'**  
**Sample No.** **3**  
 Sample Source  
 Specific Gravity of Material: 2.65



SOIL DESCRIPTION	% Composition		D10	D30	D60	
	CLAY	0.8	Gravel			
37.9		Sand				
61.3		Silt				
		Clay				
			Cu			#DIV/0!
			Cc			#DIV/0!

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: GM



Reviewed by: Hermie Manalo

**MOISTURE CONTENT OF SOIL (ASTM D2216)**

CLIENT: WSP	TEST NO: 18- 011	PROJECT NO: 103-1804
PROJECT: 17M-02283-00	DATE SAMPLED: 20-Feb-2018	SAMPLED BY: Client
PROJECT CONTACT: Dana Bredin	DATE TESTED: 23-Feb-2018	TESTED BY: Greg Manalo
TEST LOCATION: Bond		

Description	TH1	TH1	TH1	TH1	TH1
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	130.20	153.70	273.70	164.00	145.20
Wt Dry Sample + Tare	104.80	112.00	203.60	124.80	112.10
Wt Water	25.40	41.70	70.10	39.20	33.10
Wt Tare	4.20	4.20	4.10	4.10	4.20
Wt Dry Sample	100.60	107.80	199.50	120.70	107.90
<b>Moisture Content (%)</b>	<b>25.2</b>	<b>38.7</b>	<b>35.1</b>	<b>32.5</b>	<b>30.7</b>

Description	TH1	TH1	TH1		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	164.10	139.60	185.50		
Wt Dry Sample + Tare	119.90	95.90	126.00		
Wt Water	44.20	43.70	59.50		
Wt Tare	4.10	4.10	4.10		
Wt Dry Sample	115.80	91.80	121.90		
<b>Moisture Content (%)</b>	<b>38.2</b>	<b>47.6</b>	<b>48.8</b>		

Description					
Depth (ft)					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
<b>Moisture Content (%)</b>					

Description					
Depth (ft)					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
<b>Moisture Content (%)</b>					



# APPENDIX

**B**

KILDARE / BRIGHTON ALLEY





SOUTHAMPTON PL

BRIGHTON COURT

KILDARE AVE E

WAYOATA ST

B-TH3

B-TH2

B-TH1

REVISION:

SCALE:	1:1250
DATE:	2018/03/20
PROJECT NO:	17M-02283-00
DRAWING NO:	GT-B

TITLE:

2018 ALLEY RENEWALS – CONTRACT 3  
 KILDARE/BRIGHTON/SOUTHAMPTON/WAYOATA ALLEY  
 TESTHOLE LOCATIONS



1600 BUFFALO PLACE  
 WINNEPEG, MANITOBA  
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 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
 Telephone: (204)-477-6650

**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-02283-00  
**DATE STARTED** 2/14/18 **COMPLETED** 2/14/18  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Solid Stem Auger - CME  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** CL of alley: 644433.9 m E, 5529598.5 m N

**PROJECT NAME** 2018 Alley Renewals - Contract 3  
**PROJECT LOCATION** Brighton/Kildare Alley  
**GROUND ELEVATION** \_\_\_\_\_ **HOLE SIZE** 125 mm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

GENERAL BH PLOTS - WSP ALLEY\_RENEWALS\_CONTRACT\_3\_KILDARE.GPJ GINT STD CANADA GDT 3/20/18

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲	
									20	40 60 80
									PL	MC LL
									20	40 60 80
									PP	Su (kPa) Field Vane
									100	200 300 400 *
				CONCRETE - 140 mm thick, intact						
0.5				CLAY (CH) - Grey, frozen	GB 1			39		
				- Mottled grey and brown below 0.6 m	GB 2			40		
1.0				- Frost to 1.2 m - Brown, silty, stiff, moist below 1.35 m	GB 3			36		
				- Trace silt inclusions below 1.65 m	GB 4			34		
1.5					GB 5			31		
2.0					GB 6			41		
2.5					GB 7			45		
3.0					GB 8			51		

- Testhole open to bottom after completion  
 - Backfilled with auger cutting and bentonite, patched with concrete



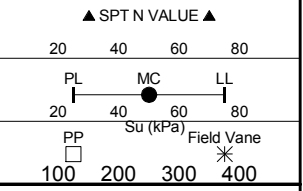
WSP  
 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
 Telephone: (204)-477-6650

**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-02283-00  
**DATE STARTED** 2/14/18 **COMPLETED** 2/14/18  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Solid Stem Auger - CME  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** CL of alley: 644557.6 m E, 5529600.4 m N

**PROJECT NAME** 2018 Alley Renewals - Contract 3  
**PROJECT LOCATION** Brighton/Kildare Alley  
**GROUND ELEVATION** \_\_\_\_\_ **HOLE SIZE** 125 mm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

GENERAL BH PLOTS - WSP ALLEY\_RENEWALS\_CONTRACT\_3\_KILDARE.GPJ GINT STD CANADA GDT 3/20/18

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲	
									PL	MC
0.0 - 0.1				CONCRETE - 150 mm thick, intact						
0.1 - 0.5				CLAY (CH) - Grey, frozen	GB 1			40		
0.5 - 1.0				-Brown, silty (varved) below 0.6 m  - 55.4% clay, 43.8% silt, 0.8% sand at 0.9 m	GB 2 GB 3			35 34		
1.0 - 1.5				- Frost to 1.35 m - Stiff, moist, trace silt inclusions below 1.35 m	GB 4 GB 5			31 41		
1.5 - 2.0					GB 6			45		
2.0 - 2.5					GB 7			46		
2.5 - 3.0				- Silty from 2.7 m to 2.9 m, brown, soft, trace oxidation						
3.0 - 3.5					GB 8			55		



- Testhole open to bottom after completion  
 - Backfilled with auger cuttings and bentonite, patched with concrete



WSP  
 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
 Telephone: (204)-477-6650

**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-02283-00  
**DATE STARTED** 2/14/18 **COMPLETED** 2/14/18  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Solid Stem Auger - CME  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** CL of alley: 644666.9 m E, 5529601.9 m N

**PROJECT NAME** 2018 Alley Renewals - Contract 3  
**PROJECT LOCATION** Brighton/Kildare Alley  
**GROUND ELEVATION** \_\_\_\_\_ **HOLE SIZE** 125 mm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

GENERAL BH PLOTS - WSP ALLEY\_RENEWALS\_CONTRACT\_3\_KILDARE.GPJ GINT STD CANADA GDT 3/20/18

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲	
									20	40 60 80
									PL	MC LL
									20	40 60 80
									PP	Su (kPa) Field Vane
									100	200 300 400
				CONCRETE - 150 mm thick, intact						
0.5				FILL - Clayey, grey-black, trace sand and f. gravel	GB 1			34		
					GB 2			39		
1.0				CLAY (CH) - Grey, frozen	GB 3			36		
					GB 4			33		
1.5				- Frost to 1.35 m - Stiff, moist below 1.35 m - Silty, brown, firm to soft, moist from 1.5 m to 1.8 m	GB 5			34		
					GB 6			27		
2.0					GB 7			43		
2.5										
3.0					GB 8			50		

- Testhole open to bottom after completion  
 - Backfilled with auger cuttings and bentonite, patched with concrete



Figure 2 - TH1 Kildare/Brighton



Figure 3 - TH2 Kildare/Brighton



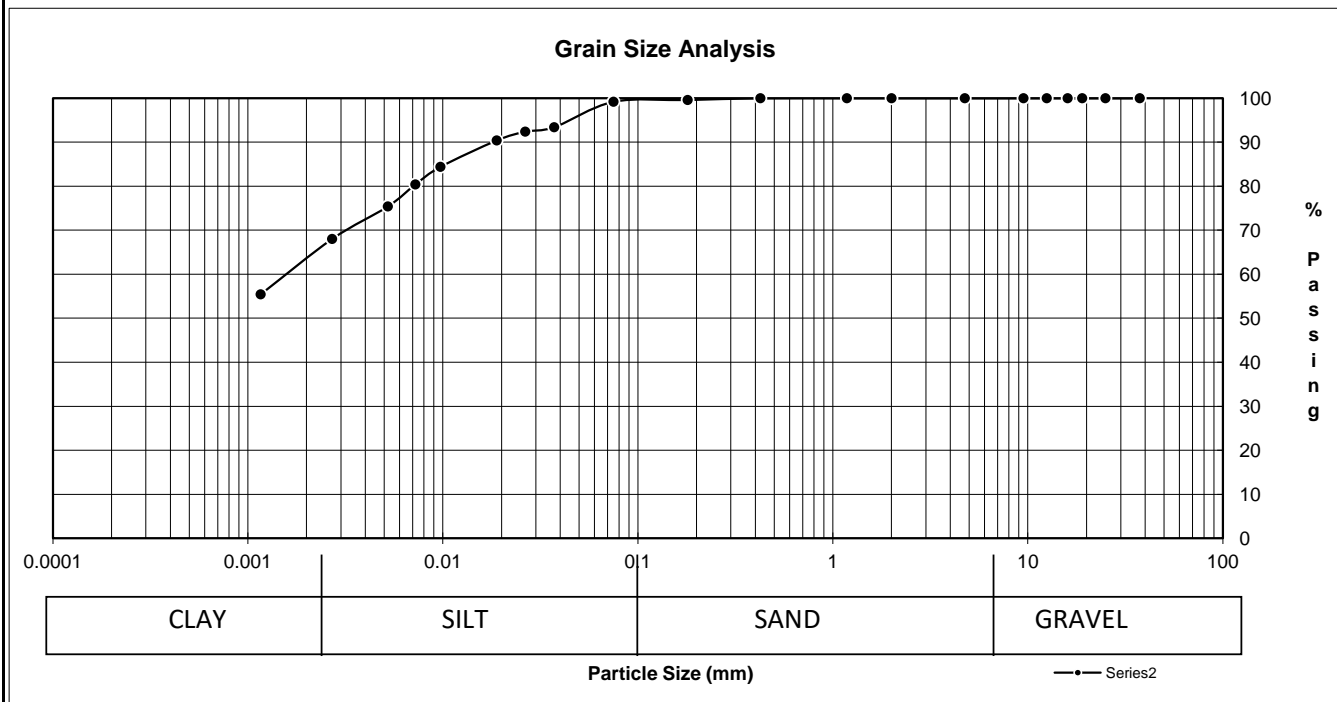
Figure 4 - TH3 Kildare/Brighton

## PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

**CLIENT:** WSP Canada Group Limited  
 Suite 111-93 Lombard Avenue  
 Winnipeg, MB R3B 3B1  
**ATTENTION:** Dana Bredin  
**PROJECT:** 17M-02283-00  
 Kildare

**PROJECT NO.** 103-1804

Date Sampled:	20-Feb-18	Date Received:	20-Feb-18	Sieve Analysis		Hydrometer Analysis	
Sampled By:	Client	Date Tested:	26-Feb-18	Sieve (mm)	% Passing	Diameter	% Finer
<b>Material Identification</b> B.H./T.H. No. <b>TH 2 @3'</b> <b>Sample No.</b> <b>4</b> Sample Source Specific Gravity of Material:    2.65		50.00	100.0				
		37.50	100.0				
		25.00	100.0				
		19.00	100.0				
		16.00	100.0				
		12.50	100.0	0.0372	93.4		
		9.50	100.0	0.0264	92.4		
		4.75	100.0	0.0189	90.4		
		2.00	100.0	0.0097	84.4		
		1.18	100.0	0.0072	80.4		
	0.425	100.0	0.0052	75.4			
	0.180	99.6	0.0027	68.0			
	0.075	99.2	0.0012	55.4			



SOIL DESCRIPTION	% Composition		D10	
	SILTY CLAY	0.8	Gravel	D30
43.8		Sand	D60	0.00116
55.4		Silt	Cu	#DIV/0!
55.4		Clay	Cc	#DIV/0!

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: GM



Reviewed by: Hermie Manalo



### MOISTURE CONTENT OF SOIL (ASTM D2216)

CLIENT: WSP	TEST NO: 18- 013	PROJECT NO: 103-1804
PROJECT: 17M-02283-00	DATE SAMPLED: 20-Mar-2018	SAMPLED BY: Client
PROJECT CONTACT: Dana Bredin	DATE TESTED: 23-Feb-2018	TESTED BY: Irvin Araquil
TEST LOCATION: Kildare		

Description	TH1	TH1	TH1	TH1	TH1
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	150.40	162.80	161.10	161.50	167.30
Wt Dry Sample + Tare	109.50	117.60	119.50	121.50	129.00
Wt Water	40.90	45.20	41.60	40.00	38.30
Wt Tare	4.20	4.20	4.20	4.20	4.20
Wt Dry Sample	105.30	113.40	115.30	117.30	124.80
<b>Moisture Content (%)</b>	<b>38.8</b>	<b>39.9</b>	<b>36.1</b>	<b>34.1</b>	<b>30.7</b>

Description	TH1	TH1	TH1		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	155.90	152.80	157.50		
Wt Dry Sample + Tare	112.00	106.60	105.60		
Wt Water	43.90	46.20	51.90		
Wt Tare	4.20	4.20	4.20		
Wt Dry Sample	107.80	102.40	101.40		
<b>Moisture Content (%)</b>	<b>40.7</b>	<b>45.1</b>	<b>51.2</b>		

Description	TH2	TH2	TH2	TH2	TH2
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	155.60	168.00	260.80	166.10	152.60
Wt Dry Sample + Tare	112.60	125.70	196.20	127.50	109.70
Wt Water	43.00	42.30	64.60	38.60	42.90
Wt Tare	4.20	4.20	4.20	4.20	4.20
Wt Dry Sample	108.40	121.50	192.00	123.30	105.50
<b>Moisture Content (%)</b>	<b>39.7</b>	<b>34.8</b>	<b>33.6</b>	<b>31.3</b>	<b>40.7</b>

Description	TH2	TH2	TH2		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	165.40	161.30	156.00		
Wt Dry Sample + Tare	115.60	111.70	102.50		
Wt Water	49.80	49.60	53.50		
Wt Tare	4.20	4.20	4.20		
Wt Dry Sample	111.40	107.50	98.30		
<b>Moisture Content (%)</b>	<b>44.7</b>	<b>46.1</b>	<b>54.4</b>		

**MOISTURE CONTENT OF SOIL (ASTM D2216)**

CLIENT: WSP	TEST NO: 18- 013	PROJECT NO: 103-1804
PROJECT: 17M-02283-00	DATE SAMPLED: 20-Mar-2018	SAMPLED BY: Client
PROJECT CONTACT: Dana Bredin	DATE TESTED: 23-Feb-2018	TESTED BY: Irvin Araquil
TEST LOCATION: Kildare		

Description	TH3	TH3	TH3	TH3	TH3
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	151.00	158.90	158.50	153.60	155.60
Wt Dry Sample + Tare	113.80	115.20	118.00	116.30	117.00
Wt Water	37.20	43.70	40.50	37.30	38.60
Wt Tare	4.20	4.20	4.20	4.20	4.20
Wt Dry Sample	109.60	111.00	113.80	112.10	112.80
<b>Moisture Content (%)</b>	<b>33.9</b>	<b>39.4</b>	<b>35.6</b>	<b>33.3</b>	<b>34.2</b>

Description	TH3	TH3	TH3		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	165.60	157.90	160.20		
Wt Dry Sample + Tare	131.70	111.70	108.10		
Wt Water	33.90	46.20	52.10		
Wt Tare	4.20	4.20	4.20		
Wt Dry Sample	127.50	107.50	103.90		
<b>Moisture Content (%)</b>	<b>26.6</b>	<b>43.0</b>	<b>50.1</b>		

Description					
Depth (ft)					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
<b>Moisture Content (%)</b>					

Description					
Depth (ft)					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
<b>Moisture Content (%)</b>					

# APPENDIX

C

HOME / ETHELBERT ALLEY





WESTMINSTER AVE

ETHELBERT ST

HOME ST

PRESTON AVE

C-TH1

C-TH2

C-TH3

C-TH4

REVISION:

SCALE:  
1:1250

DATE:  
2018/03/20

PROJECT NO:  
17M-02283-00

DRAWING NO:

GT-C

TITLE:

2018 ALLEY RENEWALS - CONTRACT 3  
HOME/ETHELBERT/PRESTON/WESTMINSTER ALLEY  
TESTHOLE LOCATIONS



1600 BUFFALO PLACE  
WINNEPEG, MANITOBA  
CANADA R3T 6B6  
PHONE: 204-477-6650 FAX: 204-474-2864  
WWW.WSPGROUP.COM

STAMP

REF



WSP  
 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
 Telephone: (204)-477-6650

CLIENT City of Winnipeg  
 PROJECT NUMBER 17M-02283-00  
 DATE STARTED 2/9/18 COMPLETED 2/9/18  
 DRILLING CONTRACTOR Maple Leaf Drilling  
 DRILLING METHOD Solid Stem Auger - Geoprobe  
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano  
 NOTES CL of alley: 631621.2 m E, 5527104.9 m N

PROJECT NAME 2018 Alley Renewals - Contract 3  
 PROJECT LOCATION Home/Ethelbert Alley  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

GENERAL BH PLOTS - WSP ALLEY\_RENEWALS\_CONTRACT\_3\_HOME.GPJ\_GINT STD CANADA GDT 3/20/18

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲			
									PL	MC	LL	
									20	40	60	80
									20	40	60	80
									PP	Su (kPa)	Field Vane	*
									100	200	300	400
				CONCRETE - 170 mm thick, intact								
0.5				FILL - Sandy, silty, trace f. gravel - Clay and silt mixed, grey below 0.45 m	Hand GB 1			9				
					Hand GB 2			22				
1.0					Hand GB 3			17				
					Hand GB 4			33				
1.5				SILT (ML) - Tan-brown - Frost to 1.35 m - Dry below 1.35 m	Hand GB 5			19				
2.0				CLAY (CH) - Brown, stiff, moist  - Trace silt inclusions below 2.1 m	Hand GB 6			37				
					Hand GB 7			43				
2.5				- Silty, trace oxidation from 2.55 m to 2.7 m								
3.0					Hand GB 8			49				



WSP  
 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
 Telephone: (204)-477-6650

CLIENT City of Winnipeg  
 PROJECT NUMBER 17M-02283-00  
 DATE STARTED 2/9/18 COMPLETED 2/9/18  
 DRILLING CONTRACTOR Maple Leaf Drilling  
 DRILLING METHOD Solid Stem Auger - Geoprobe  
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano  
 NOTES CL of alley: 631622.0 m E, 5527165.1 m N

PROJECT NAME 2018 Alley Renewals - Contract 3  
 PROJECT LOCATION Home/Ethelbert Alley  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲	
									20	40
0.0	ASPHALT			- 60 mm thick						
0.0	CONCRETE			- 120 mm thick, intact	GB 1			11		
0.5	FILL			- Sandy, silty, trace f. gravel - Clay mixed with silt, trace sand below 0.45 m	GB 2			19		
1.0				- 50.8% clay; 38.4% silt, 10.8% sand at 0.9 m	GB 3			26		
1.5				- Frost to 1.35 m	GB 4			29		
1.5	CLAY (CH)			- Brown, silty, stiff, fissured	GB 5			27		
2.0	SILT (ML)			- Tan-brown, moist, soft	GB 6			23		
2.5				- Trace f. gravel at 2.4 m	GB 7			23		
3.0	CLAY (CH)			- Brown, stiff, moist, trace silt inclusions	GB 8			38		

- Testhole open to bottom after completion  
 - Backfilled with auger cuttings and patched with concrete

GENERAL BH PLOTS - WSP ALLEY\_RENEWALS\_CONTRACT\_3\_HOME.GPJ\_GINT STD CANADA GDT 3/20/18



WSP  
 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
 Telephone: (204)-477-6650

CLIENT City of Winnipeg  
 PROJECT NUMBER 17M-02283-00  
 DATE STARTED 2/9/18 COMPLETED 2/9/18  
 DRILLING CONTRACTOR Maple Leaf Drilling  
 DRILLING METHOD Solid Stem Auger - Geoprobe  
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano  
 NOTES CL of alley: 631624.8 m E, 5527253.7 m N

PROJECT NAME 2018 Alley Renewals - Contract 3  
 PROJECT LOCATION Home/Ethelbert Alley  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲			
									PL	MC	LL	
									20	40	60	80
									20	40	60	80
									PP	Su (kPa)	Field Vane	*
									100	200	300	400
0.0 - 0.3	ASPHALT			ASPHALT - 30 mm thick, deteriorated								
0.3 - 0.5	CONCRETE			CONCRETE - 140 mm thick, intact	GB 1			32				
0.5 - 1.0	FILL			FILL - Clayey, grey, trace sand and f. gravel	GB 2			28				
1.0 - 1.5	CLAY (CH)			CLAY (CH) - Grey, fissured	GB 3			26				
1.5 - 2.0				- Frost to 1.2 m	GB 4			33				
2.0 - 2.5				- Brown, stiff, moist, some silt inclusions below 1.2 m	GB 5			29				
2.5 - 3.0				- Silty below 2.25 m	GB 6			41				
					GB 7			48				
					GB 8			52				

- Testhole open to bottom after completion  
 - Backfilled with auger cuttings and patched with concrete

GENERAL BH PLOTS - WSP ALLEY\_RENEWALS\_CONTRACT\_3\_HOME.GPJ\_GINT STD CANADA GDT 3/20/18



WSP  
 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
 Telephone: (204)-477-6650

CLIENT City of Winnipeg  
 PROJECT NUMBER 17M-02283-00  
 DATE STARTED 2/9/18 COMPLETED 2/9/18  
 DRILLING CONTRACTOR Maple Leaf Drilling  
 DRILLING METHOD Solid Stem Auger - Geoprobe  
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano  
 NOTES South side of alley: 631641.4 m E, 5527299.8 m N

PROJECT NAME 2018 Alley Renewals - Contract 3  
 PROJECT LOCATION Home/Ethelbert Alley  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲			
									PL	MC	LL	
									20	40	60	80
									20	40	60	80
									PP	Su (kPa)	Field Vane	*
									100	200	300	400
				CONCRETE - 170 mm thick, intact								
0.5				FILL - Clayey, grey, trace sand and f. gravel	Hand GB 1			40				
					Hand GB 2			30				
1.0				- Frost to 1.05 m - Trace coarse gravel encountered from 1.05 m to 1.2 m	Hand GB 3			31				
					Hand GB 4			32				
1.5				CLAY (CH) - Grey, stiff, moist, fissured	Hand GB 5			34				
2.0				- Brown, silty, cohesive below 1.8 m	Hand GB 6			42				
					Hand GB 7			50				
3.0					Hand GB 8			40				

- Testhole open to bottom after completion  
 - Backfilled with auger cuttings and patched with concrete

GENERAL BH PLOTS - WSP ALLEY\_RENEWALS\_CONTRACT\_3\_HOME.GPJ\_GINT STD CANADA GDT 3/20/18





Figure 5 – TH1 Home/Ethelbert



Figure 6 – TH2 Home/Ethelbert



Figure 7 - TH3 Home/Ethelbert

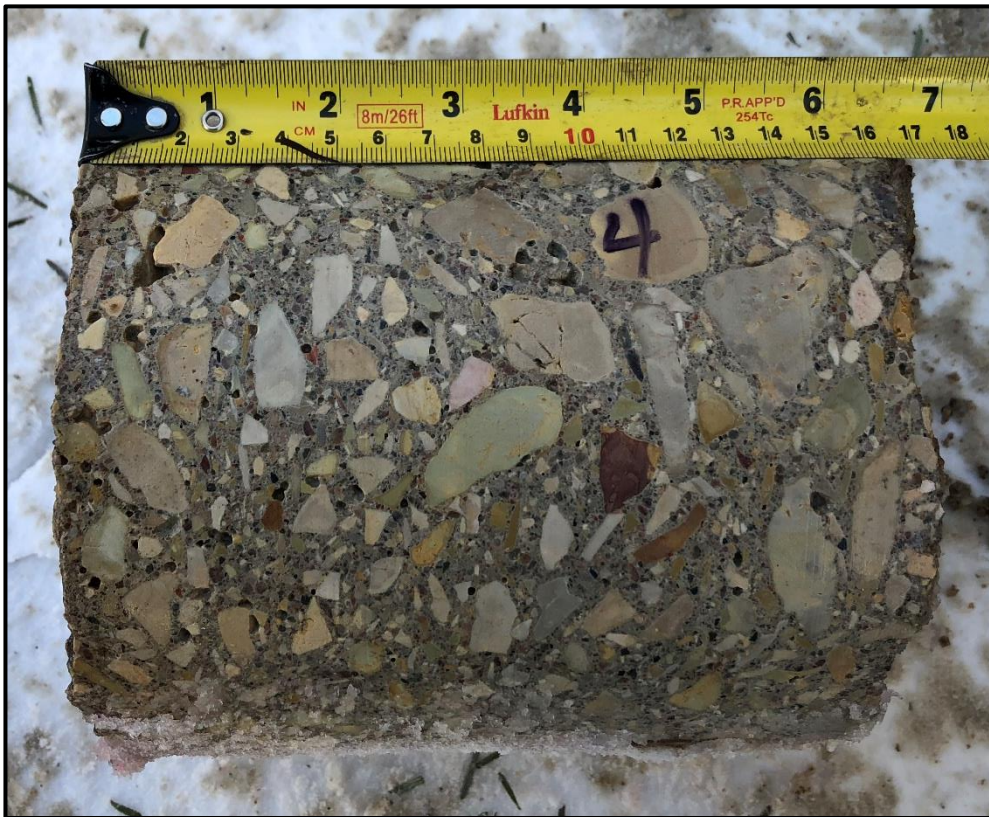


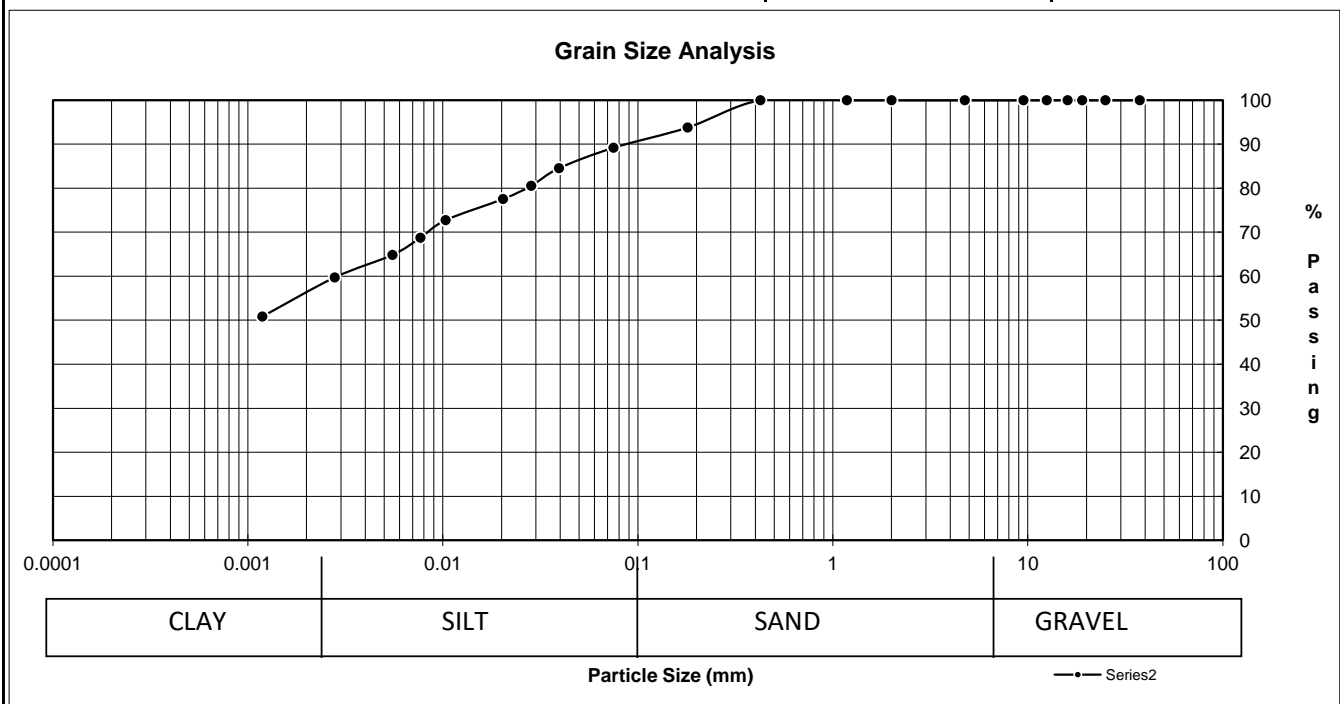
Figure 8 - TH4 Home/Ethelbert

## PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

**CLIENT:** WSP Canada Group Limited  
 Suite 111-93 Lombard Avenue  
 Winnipeg, MB R3B 3B1  
**ATTENTION:** Dana Bredin  
**PROJECT:** 17M-02283-00  
 Home

**PROJECT NO.** 103-1804

Date Sampled:	12-Feb-18	Date Received:	12-Feb-18	Sieve Analysis	Hydrometer Analysis
Sampled By:	Client	Date Tested:	15-Feb-18	Sieve (mm) % Passing	Diameter % Finer
<b>Material Identification</b> B.H./T.H. No. <b>TH 2 @3'</b> <b>Sample No.</b> <b>8</b> Sample Source Specific Gravity of Material: 2.65		50.00	100.0		
		37.50	100.0		
		25.00	100.0		
		19.00	100.0		
		16.00	100.0		
		12.50	100.0	0.0394	84.6
		9.50	100.0	0.0284	80.6
		4.75	100.0	0.0203	77.6
		2.00	100.0	0.0103	72.8
		1.18	100.0	0.0077	68.8
	0.425	100.0	0.0055	64.8	
	0.180	93.8	0.0028	59.7	
	0.075	89.2	0.0012	50.8	



SOIL DESCRIPTION	% Composition		D10	
	SILTY CLAY	10.8	Gravel	D30
38.4		Sand	D60	0.00279
50.8		Silt	Cu	#DIV/0!
50.8		Clay	Cc	#DIV/0!

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: GM



Reviewed by: Hermie Manalo

## MOISTURE CONTENT OF SOIL (ASTM D2216)

CLIENT: WSP	TEST NO: 18- 008	PROJECT NO: 103-1804
PROJECT: 17M-02283-00	DATE SAMPLED: 12-Feb-2018	SAMPLED BY: Client
PROJECT CONTACT: Dana Bredin	DATE TESTED: 13-Feb-2018	TESTED BY: Greg Manalo
TEST LOCATION: Home		

Description	TH1	TH1	TH1	TH1	TH1
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	173.10	125.40	175.30	175.90	187.20
Wt Dry Sample + Tare	159.40	103.30	150.00	133.50	158.60
Wt Water	13.70	22.10	25.30	42.40	28.60
Wt Tare	4.40	4.30	4.60	4.40	4.20
Wt Dry Sample	155.00	99.00	145.40	129.10	154.40
<b>Moisture Content (%)</b>	<b>8.8</b>	<b>22.3</b>	<b>17.4</b>	<b>32.8</b>	<b>18.5</b>

Description	TH1	TH1	TH1		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	172.90	154.80	170.10		
Wt Dry Sample + Tare	127.00	109.60	115.90		
Wt Water	45.90	45.20	54.20		
Wt Tare	4.30	4.20	4.30		
Wt Dry Sample	122.70	105.40	111.60		
<b>Moisture Content (%)</b>	<b>37.4</b>	<b>42.9</b>	<b>48.6</b>		

Description	TH2	TH2	TH2	TH2	TH2
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	175.10	168.30	244.90	172.20	175.90
Wt Dry Sample + Tare	158.70	142.50	196.00	134.50	139.20
Wt Water	16.40	25.80	48.90	37.70	36.70
Wt Tare	4.20	4.40	4.10	4.40	4.20
Wt Dry Sample	154.50	138.10	191.90	130.10	135.00
<b>Moisture Content (%)</b>	<b>10.6</b>	<b>18.7</b>	<b>25.5</b>	<b>29.0</b>	<b>27.2</b>

Description	TH2	TH2	TH2		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	181.10	179.30	139.10		
Wt Dry Sample + Tare	148.40	146.10	101.80		
Wt Water	32.70	33.20	37.30		
Wt Tare	4.20	4.30	4.20		
Wt Dry Sample	144.20	141.80	97.60		
<b>Moisture Content (%)</b>	<b>22.7</b>	<b>23.4</b>	<b>38.2</b>		

### MOISTURE CONTENT OF SOIL (ASTM D2216)

CLIENT: WSP	TEST NO: 18- 008	PROJECT NO: 103-1804
PROJECT: 17M-02283-00	DATE SAMPLED: 12-Feb-2018	SAMPLED BY: Client
PROJECT CONTACT: Dana Bredin	DATE TESTED: 13-Feb-2018	TESTED BY: Greg Manalo
TEST LOCATION: Home		

Description	TH3	TH3	TH3	TH3	TH3
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	159.40	153.80	154.70	160.80	187.40
Wt Dry Sample + Tare	121.90	121.30	123.80	122.40	146.80
Wt Water	37.50	32.50	30.90	38.40	40.60
Wt Tare	4.60	4.50	4.10	4.30	4.30
Wt Dry Sample	117.30	116.80	119.70	118.10	142.50
<b>Moisture Content (%)</b>	<b>32.0</b>	<b>27.8</b>	<b>25.8</b>	<b>32.5</b>	<b>28.5</b>

Description	TH3	TH3	TH3		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	149.40	194.10	168.00		
Wt Dry Sample + Tare	107.50	132.60	112.20		
Wt Water	41.90	61.50	55.80		
Wt Tare	4.20	4.40	4.30		
Wt Dry Sample	103.30	128.20	107.90		
<b>Moisture Content (%)</b>	<b>40.6</b>	<b>48.0</b>	<b>51.7</b>		

Description	TH4	TH4	TH4	TH4	TH4
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	186.50	157.30	147.90	164.30	200.60
Wt Dry Sample + Tare	134.70	121.90	113.70	126.30	150.80
Wt Water	51.80	35.40	34.20	38.00	49.80
Wt Tare	4.80	4.50	4.30	7.20	4.30
Wt Dry Sample	129.90	117.40	109.40	119.10	146.50
<b>Moisture Content (%)</b>	<b>39.9</b>	<b>30.2</b>	<b>31.3</b>	<b>31.9</b>	<b>34.0</b>

Description	TH4	TH4	TH4		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	148.80	172.60	156.80		
Wt Dry Sample + Tare	106.40	116.70	113.70		
Wt Water	42.40	55.90	43.10		
Wt Tare	4.40	4.20	4.30		
Wt Dry Sample	102.00	112.50	109.40		
<b>Moisture Content (%)</b>	<b>41.6</b>	<b>49.7</b>	<b>39.4</b>		

# APPENDIX

**D**

DUNDURN / WOLSELEY ALLEY





REVISION:

SCALE:	1:1000
DATE:	2018/03/20
PROJECT NO:	17M-02283-00

TITLE:

2018 ALLEY RENEWALS – CONTRACT 3  
 DUNDURN/WOLSELEY/MARYLAND/WALNUT ALLEY  
 TESTHOLE LOCATIONS



1600 BUFFALO PLACE  
 WINNEPEG, MANITOBA  
 CANADA R3T 6B8  
 PHONE: 204-477-6650 FAX : 204-474-2864  
 WWW.WSPGROUP.COM

DRAWING NO:  
 GT-D

STAMP

REF



WSP  
 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
 Telephone: (204)-477-6650

CLIENT City of Winnipeg  
 PROJECT NUMBER 17M-02283-00  
 DATE STARTED 2/8/18 COMPLETED 2/8/18  
 DRILLING CONTRACTOR Maple Leaf Drilling  
 DRILLING METHOD Solid Stem Auger - B40 Truck Rig  
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano  
 NOTES CL of alley: 631923.6 m E, 5526998.5 m N

PROJECT NAME 2018 Alley Renewals - Contract 3  
 PROJECT LOCATION Dundurn/Wolseley Alley  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

GENERAL BH PLOTS - WSP ALLEY\_RENEWALS\_CONTRACT\_3\_DUNDURN.GPJ GINT STD CANADA GDT 3/20/18

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲			
									PL	MC	LL	
									20	40	60	80
									20	40	60	80
									PP	Su (kPa)	Field Vane	*
									100	200	300	400
				CONCRETE - 250 mm thick, broken								
0.5				FILL - Clayey, silty, trace sand and f. gravel, grey  - 53.7% clay; 37.5% silt; 8.8% sand at 0.6 m	Hand GB 1			38				
					Hand GB 2			36				
1.0					Hand GB 3			38				
					Hand GB 4			40				
1.5				- Frost to 1.5 m - Brown, silty, stiff, moist below 1.5 m	Hand GB 5			39				
					Hand GB 6			46				
2.0				- Trace brick below 2.1 m	Hand GB 7			48				
2.5				CLAY (CH) - Brown, stiff, moist, high plasticity								
3.0					Hand GB 10			52				

- Testhole open to bottom after completion  
 - Backfilled with auger cuttings and patched with asphalt





WSP  
 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
 Telephone: (204)-477-6650

CLIENT City of Winnipeg  
 PROJECT NUMBER 17M-02283-00  
 DATE STARTED 2/8/18 COMPLETED 2/8/18  
 DRILLING CONTRACTOR Maple Leaf Drilling  
 DRILLING METHOD Solid Stem Auger - B40 Truck Rig  
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano  
 NOTES East side of alley: 632073.7 m E, 5527016.2 m N

PROJECT NAME 2018 Alley Renewals - Contract 3  
 PROJECT LOCATION Dundurn/Wolseley Alley  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲	
									20	40 60 80
				ASPHALT - 50 mm thick					PL	MC
				CONCRETE - 150 mm thick, broken					20	40 60 80
0.5				FILL - Sandy, silty, trace f. gravel, trace rootlets	Hand GB 1			13		Field Vane
				CLAY (CH) - Grey, fissured - Trace rootlets above 0.75 m	Hand GB 2			33		
1.0					Hand GB 3			32		
					Hand GB 4			32		
1.5				- Frost to 1.5 m	Hand GB 5			32		
				- Silt pocket, tan-brown, soft, moist from 1.5 m to 1.65 m						
				- Brown, stiff, moist, cohesive, trace silt inclusions below 1.65 m	Hand GB 6			40		
2.0					Hand GB 7			40		
2.5										
3.0					Hand GB 10			49		

- Testhole open to bottom after completion  
 - Backfilled with auger cuttings and patched with asphalt

GENERAL BH PLOTS - WSP ALLEY\_RENEWALS\_CONTRACT\_3\_DUNDURN.GPJ, GINT STD CANADA, GDT, 3/20/18



Figure 9 - TH1 Beverley/Toronto



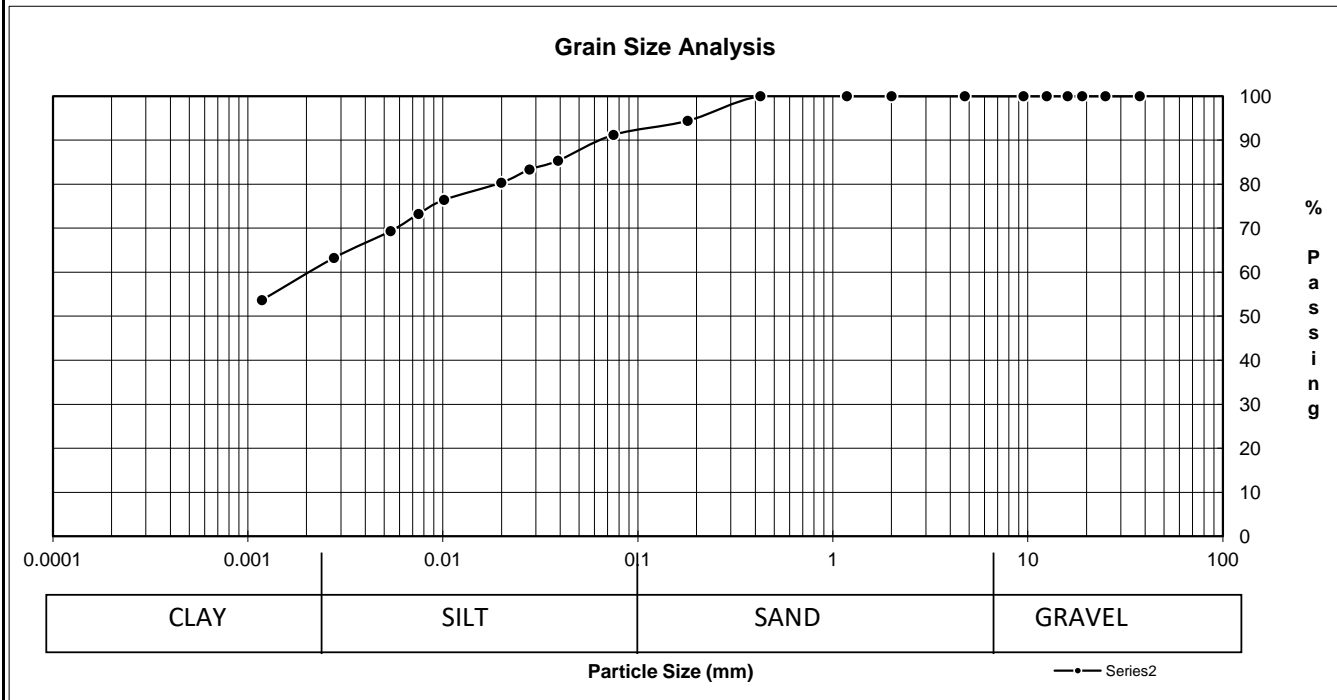
Figure 10 - TH2 Beverley/Toronto

## PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

**CLIENT:** WSP Canada Group Limited  
 Suite 111-93 Lombard Avenue  
 Winnipeg, MB R3B 3B1  
**ATTENTION:** Dana Bredin  
**PROJECT:** 17M-02283-00  
 Dundurn

**PROJECT NO.** 103-1804

Date Sampled:	12-Feb-18	Date Received:	Sieve Analysis		Hydrometer Analysis		
Sampled By:	Client	Date Tested:	15-Feb-18	Sieve (mm)	% Passing	Diameter	% Finer
<b>Material Identification</b> B.H./T.H. No. <b>TH 1 @2'</b> Sample No. <b>7</b> Sample Source Specific Gravity of Material: 2.65			50.00	100.0			
			37.50	100.0			
			25.00	100.0			
			19.00	100.0			
			16.00	100.0			
			12.50	100.0	0.0389	85.3	
			9.50	100.0	0.0278	83.3	
			4.75	100.0	0.0199	80.3	
			2.00	100.0	0.0101	76.4	
			1.18	100.0	0.0075	73.2	
		0.425	100.0	0.0054	69.3		
		0.180	94.4	0.0028	63.2		
		0.075	91.2	0.0012	53.7		



SOIL DESCRIPTION	% Composition		SOIL CHARACTERISTICS	
	SILTY CLAY	8.8	Gravel	D10
37.5		Sand	D30	
53.7		Silt	D60	0.00118
		Clay	Cu	#DIV/0!
		Cc	#DIV/0!	

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: GM



Reviewed by: Hermie Manalo

### MOISTURE CONTENT OF SOIL (ASTM D2216)

CLIENT: WSP	TEST NO: 18-007	PROJECT NO: 103-1804
PROJECT: 17M-02283-00	DATE SAMPLED: 12-Feb-2018	SAMPLED BY: Client
PROJECT CONTACT: Dana Bredin	DATE TESTED: 13-Feb-2018	TESTED BY: Greg Manalo
TEST LOCATION: Dundurn		

Description	TH1	TH1	TH1	TH1	TH1
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	141.30	263.70	139.60	162.80	147.70
Wt Dry Sample + Tare	103.80	195.40	102.30	117.70	107.80
Wt Water	37.50	68.30	37.30	45.10	39.90
Wt Tare	4.40	4.30	4.30	4.10	4.20
Wt Dry Sample	99.40	191.10	98.00	113.60	103.60
<b>Moisture Content (%)</b>	<b>37.7</b>	<b>35.7</b>	<b>38.1</b>	<b>39.7</b>	<b>38.5</b>

Description	TH1	TH1	TH1		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	153.40	158.20	149.50		
Wt Dry Sample + Tare	106.50	108.00	99.90		
Wt Water	46.90	50.20	49.60		
Wt Tare	4.50	4.20	4.30		
Wt Dry Sample	102.00	103.80	95.60		
<b>Moisture Content (%)</b>	<b>46.0</b>	<b>48.4</b>	<b>51.9</b>		

Description	TH2	TH2	TH2	TH2	TH2
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	166.60	158.60	151.20	178.40	142.00
Wt Dry Sample + Tare	147.50	120.70	115.30	135.80	109.00
Wt Water	19.10	37.90	35.90	42.60	33.00
Wt Tare	4.20	4.20	4.30	4.40	4.20
Wt Dry Sample	143.30	116.50	111.00	131.40	104.80
<b>Moisture Content (%)</b>	<b>13.3</b>	<b>32.5</b>	<b>32.3</b>	<b>32.4</b>	<b>31.5</b>

Description	TH2	TH2	TH2		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	160.50	164.50	157.40		
Wt Dry Sample + Tare	115.80	118.60	106.80		
Wt Water	44.70	45.90	50.60		
Wt Tare	4.20	4.20	4.20		
Wt Dry Sample	111.60	114.40	102.60		
<b>Moisture Content (%)</b>	<b>40.1</b>	<b>40.1</b>	<b>49.3</b>		

# APPENDIX

**E**

FURBY / LANGSIDE ALLEY





WESTMINSTER AVE

LANGSIDE ST

FURBY ST

SARA AVE

E-TH1

E-TH2

E-TH3

REVISION:

SCALE:  
1:1000

DATE:

2018/03/20

PROJECT NO:

17M-02283-00

DRAWING NO:

GT-E

TITLE:

2018 ALLEY RENEWALS - CONTRACT 3  
FURBY/LANGSIDE/SARA/WESTMINSTER ALLEY  
TESTHOLE LOCATIONS



1600 BUFFALO PLACE  
WINNEPEG, MANITOBA  
CANADA R3T 6B8  
PHONE: 204-477-6650 FAX: 204-474-2864  
WWW.WSPGROUP.COM



WSP  
 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
 Telephone: (204)-477-6650

CLIENT City of Winnipeg

PROJECT NAME 2018 Alley Renewals - Contract 3

PROJECT NUMBER 17M-02283-00

PROJECT LOCATION Langside/Furby Alley

DATE STARTED 2/8/18 COMPLETED 2/8/18

GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm

DRILLING CONTRACTOR Maple Leaf Drilling

GROUND WATER LEVELS:

DRILLING METHOD Solid Stem Auger - B40 Truck Rig

AT TIME OF DRILLING ---

LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano

AT END OF DRILLING ---

NOTES CL of alley: 632381.6 m E, 5527136.6 m N

AFTER DRILLING ---

GENERAL BH PLOTS - WSP ALLEY\_RENEWALS\_CONTRACT\_3 LANGSIDE.GPJ\_GINT STD CANADA GDT 3/20/18

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲	
									20	40
				CONCRETE - 150 mm thick, intact						
0.5				FILL - Clayey, grey-black, trace sand and gravel	GB 1			28		
				- Brown, clay mixed with some silt below 0.75 m	GB 2			39		
1.0				SILT (ML) - Tan-brown, some clay, frozen - 70.1% silt; 24.9% clay, 5.0% sand at 0.9 m	GB 3			21		
					GB 4			22		
1.5				CLAY (CH) - Brown, fissured - Frost to 1.5 m - Stiff, moist, trace silt inclusions below 1.5 m	GB 5			29		
2.0					GB 6			42		
				- Silty, trace oxidation from 2.25 m to 2.4 m	GB 7			44		
3.0					GB 10			51		

- Testhole open to bottom after completion  
 - Backfilled with auger cuttings and patched with asphalt



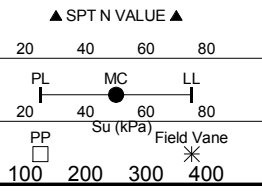
WSP  
 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
 Telephone: (204)-477-6650

CLIENT City of Winnipeg  
 PROJECT NUMBER 17M-02283-00  
 DATE STARTED 2/8/18 COMPLETED 2/8/18  
 DRILLING CONTRACTOR Maple Leaf Drilling  
 DRILLING METHOD Solid Stem Auger - B40 Truck Rig  
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano  
 NOTES CL of alley: 632382.9 m E, 5527219.4 m N

PROJECT NAME 2018 Alley Renewals - Contract 3  
 PROJECT LOCATION Langside/Furby Alley  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

GENERAL BH PLOTS - WSP ALLEY\_RENEWALS\_CONTRACT\_3\_LANGSIDE.GPJ\_GINT STD CANADA GDT 3/20/18

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲					
									20	40	60	80		
0.0 - 0.1				CONCRETE - 180 mm thick, intact										
0.1 - 0.5				FILL - Clayey, grey, trace sand and f. gravel	GB 1			27						
0.5 - 1.0				CLAY (CH) - Grey, fissured	GB 2			36						
1.0 - 1.5					GB 3			35						
1.5 - 2.0				- Frost to 1.35 m - Stiff, moist below 1.35 m - Mottled grey and brown, trace silt inclusions below 1.5 m	GB 4			37						
2.0 - 2.5					GB 5			37						
2.5 - 3.0					GB 6			41						
3.0 - 3.5					GB 7			45						
3.5 - 3.9				- Silty, trace oxidation from 2.7 m to 2.9 m	GB 10			51						







WSP  
 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
 Telephone: (204)-477-6650

CLIENT City of Winnipeg  
 PROJECT NUMBER 17M-02283-00  
 DATE STARTED 2/8/18 COMPLETED 2/8/18  
 DRILLING CONTRACTOR Maple Leaf Drilling  
 DRILLING METHOD Solid Stem Auger - B40 Truck Rig  
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano  
 NOTES CL of alley: 632384.0 m E, 5527312.5 m N

PROJECT NAME 2018 Alley Renewals - Contract 3  
 PROJECT LOCATION Langside/Furby Alley  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

GENERAL BH PLOTS - WSP ALLEY\_RENEWALS\_CONTRACT\_3\_LANGSIDE.GPJ\_GINT STD CANADA GDT 3/20/18

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲									
									20	40	60	80						
				CONCRETE - 140 mm thick, intact														
0.5				FILL - Clayey, grey, trace sand and f. gravel	GB 1			20										
				- Clay mixed with some silt below 0.75 m	GB 2			37										
1.0					GB 3			32										
				SILT (ML) - Tan-brown, some clay, frozen	GB 4			25										
1.5				- Frost to 1.5 m	GB 5			24										
				CLAY (CH) - Brown, stiff, moist	GB 6			44										
2.0				- Trace silt inclusions below 2.1 m	GB 7			47										
2.5																		
3.0				- Silty, trace oxidation from 2.7 m to 2.9 m	GB 10			54										

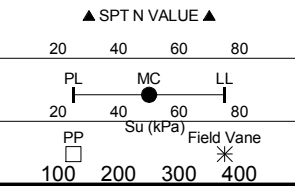




Figure 11 – TH1 Furby/Langside



Figure 12 – TH2 Furby/Langside

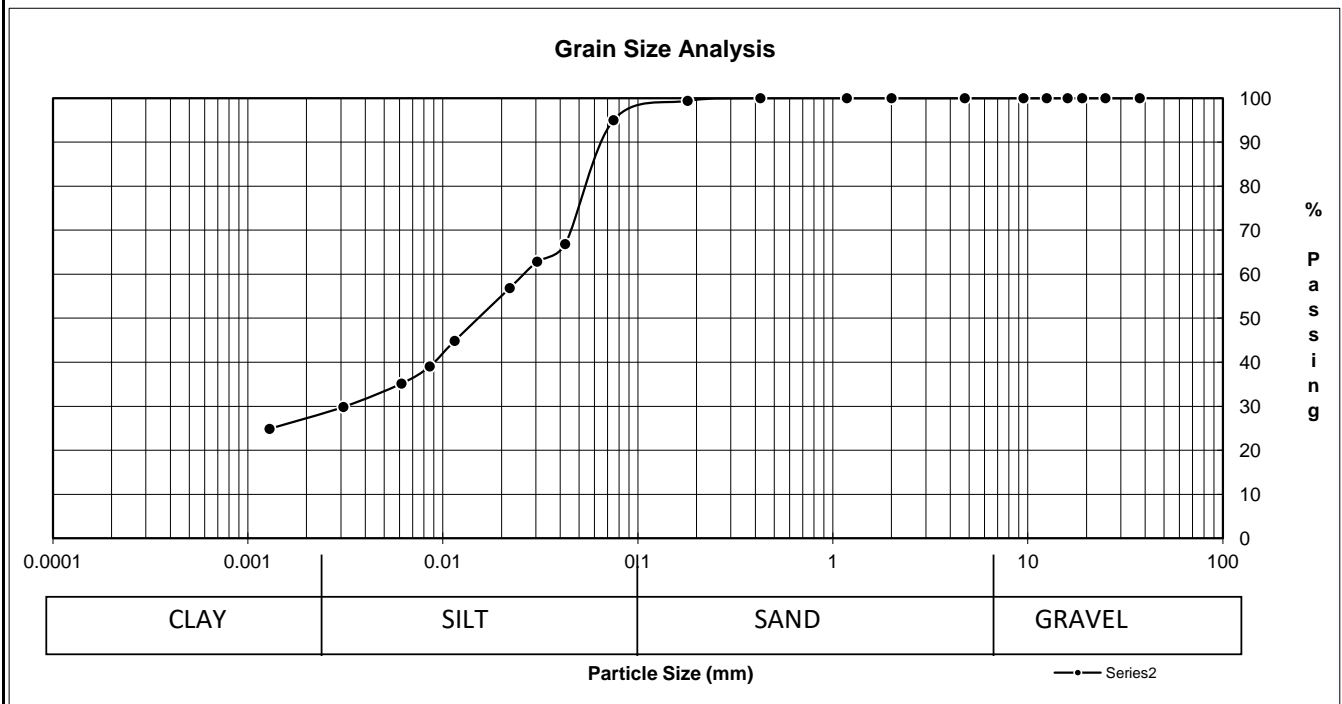


Figure 13 – TH3 Furby/Langside

## PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

CLIENT:	WSP Canada Group Limited Suite 111-93 Lombard Avenue Winnipeg, MB R3B 3B1	PROJECT NO. 103-1804
ATTENTION:	Dana Bredin	
PROJECT:	17M-02283-00 Langside	

Date Sampled: 12-Feb-18	Date Received: 12-Feb-18	Sieve Analysis		Hydrometer Analysis	
Sampled By: Client	Date Tested: 15-Feb-18	Sieve (mm)	% Passing	Diameter	% Finer
<b>Material Identification</b> B.H./T.H. No. <b>TH 1 @3'</b> Sample No. <b>6</b> Sample Source Specific Gravity of Material:    2.65		50.00	100.0		
		37.50	100.0		
		25.00	100.0		
		19.00	100.0		
		16.00	100.0		
		12.50	100.0	0.0424	66.8
		9.50	100.0	0.0304	62.8
		4.75	100.0	0.0220	56.8
		2.00	100.0	0.0115	44.8
		1.18	100.0	0.0086	39.0
0.425	100.0	0.0061	35.1		
0.180	99.4	0.0031	29.8		
0.075	95.0	0.0013	24.9		



SOIL DESCRIPTION	% Composition		D10	
	SILT LOAM	5.0	Gravel	D30
70.1		Sand	D60	0.02202
24.9		Silt	Cu	#DIV/0!
24.9		Clay	Cc	#DIV/0!

 Remarks: Test Method: ASTM D422, D2216, D4318  
 Technician: GM



Reviewed by: Hermie Manalo

**MOISTURE CONTENT OF SOIL (ASTM D2216)**

CLIENT: WSP	TEST NO: 18- 006	PROJECT NO: 103-1804
PROJECT: 17M-02283-00	DATE SAMPLED: 12-Feb-2018	SAMPLED BY: Client
PROJECT CONTACT: Dana Bredin	DATE TESTED: 13-Feb-2018	TESTED BY: Greg Manalo
TEST LOCATION: Langside		

Description	TH1	TH1	TH1	TH1	TH1
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	134.00	132.40	278.20	173.20	137.50
Wt Dry Sample + Tare	105.30	96.50	231.40	143.00	107.40
Wt Water	28.70	35.90	46.80	30.20	30.10
Wt Tare	4.30	4.10	4.20	4.20	4.20
Wt Dry Sample	101.00	92.40	227.20	138.80	103.20
<b>Moisture Content (%)</b>	<b>28.4</b>	<b>38.9</b>	<b>20.6</b>	<b>21.8</b>	<b>29.2</b>

Description	TH1	TH1	TH1		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	151.00	193.50	143.50		
Wt Dry Sample + Tare	107.50	135.50	96.20		
Wt Water	43.50	58.00	47.30		
Wt Tare	4.20	4.40	4.20		
Wt Dry Sample	103.30	131.10	92.00		
<b>Moisture Content (%)</b>	<b>42.1</b>	<b>44.2</b>	<b>51.4</b>		

Description	TH2	TH2	TH2	TH2	TH2
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	174.40	134.20	148.90	171.40	166.10
Wt Dry Sample + Tare	138.00	99.50	111.00	126.40	122.50
Wt Water	36.40	34.70	37.90	45.00	43.60
Wt Tare	4.40	4.30	4.00	4.30	4.20
Wt Dry Sample	133.60	95.20	107.00	122.10	118.30
<b>Moisture Content (%)</b>	<b>27.2</b>	<b>36.4</b>	<b>35.4</b>	<b>36.9</b>	<b>36.9</b>

Description	TH2	TH2	TH2		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	161.30	165.30	137.80		
Wt Dry Sample + Tare	115.70	115.20	92.60		
Wt Water	45.60	50.10	45.20		
Wt Tare	4.20	4.20	4.40		
Wt Dry Sample	111.50	111.00	88.20		
<b>Moisture Content (%)</b>	<b>40.9</b>	<b>45.1</b>	<b>51.2</b>		

**MOISTURE CONTENT OF SOIL (ASTM D2216)**

CLIENT: WSP	TEST NO: 18- 006	PROJECT NO: 103-1804
PROJECT: 17M-02283-00	DATE SAMPLED: 12-Feb-2018	SAMPLED BY: Client
PROJECT CONTACT: Dana Bredin	DATE TESTED: 13-Feb-2018	TESTED BY: Greg Manalo
TEST LOCATION: Langside		

Description	TH3	TH3	TH3	TH3	TH3
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	138.40	162.60	151.70	158.80	161.10
Wt Dry Sample + Tare	116.50	120.00	116.30	128.40	131.00
Wt Water	21.90	42.60	35.40	30.40	30.10
Wt Tare	4.70	4.20	4.50	4.20	4.20
Wt Dry Sample	111.80	115.80	111.80	124.20	126.80
<b>Moisture Content (%)</b>	<b>19.6</b>	<b>36.8</b>	<b>31.7</b>	<b>24.5</b>	<b>23.7</b>

Description	TH3	TH3	TH3		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	140.20	171.10	147.10		
Wt Dry Sample + Tare	98.60	118.00	96.80		
Wt Water	41.60	53.10	50.30		
Wt Tare	4.20	4.20	4.30		
Wt Dry Sample	94.40	113.80	92.50		
<b>Moisture Content (%)</b>	<b>44.1</b>	<b>46.7</b>	<b>54.4</b>		

Description					
Depth (ft)					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
<b>Moisture Content (%)</b>					

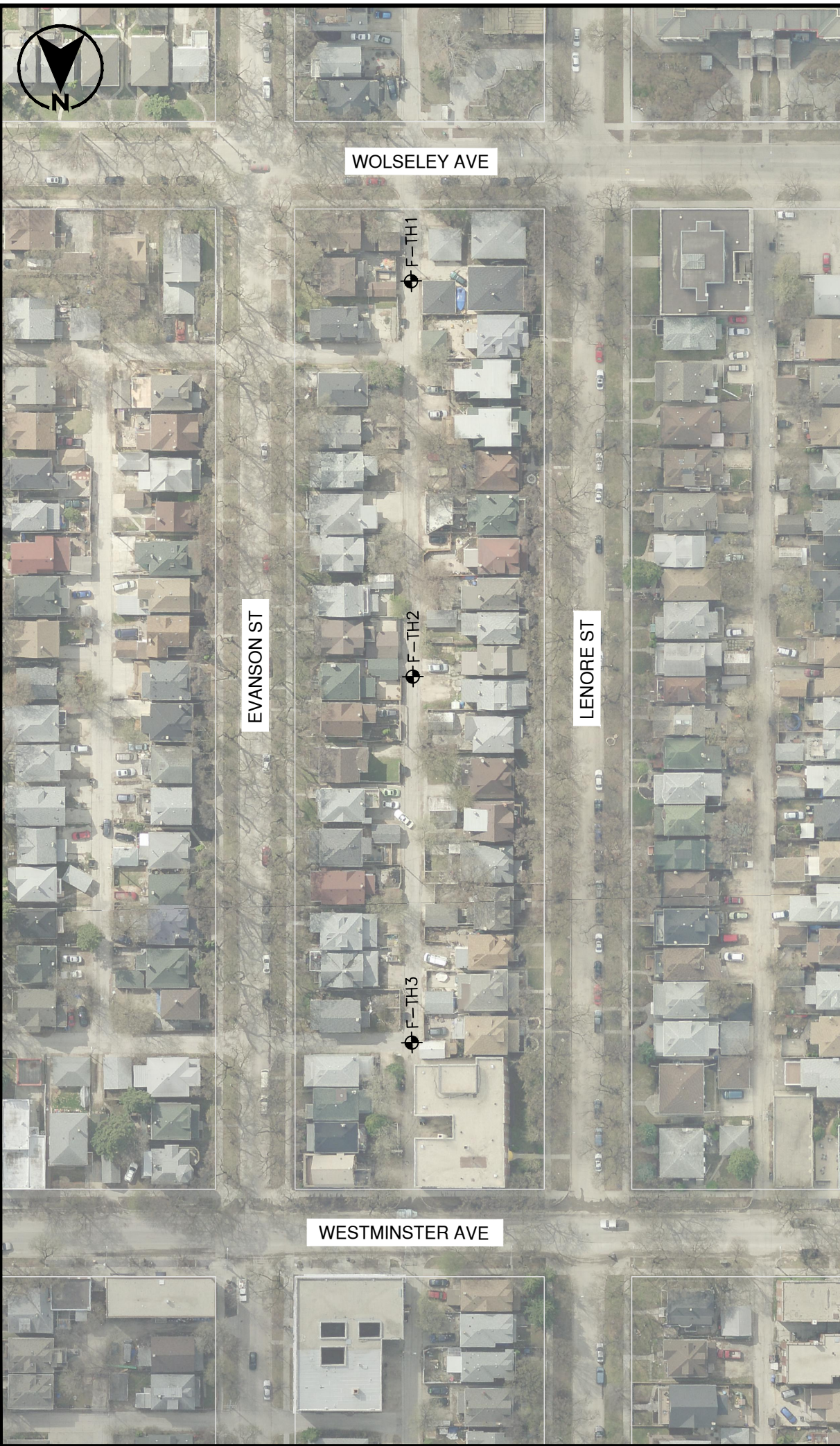
Description					
Depth (ft)					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
<b>Moisture Content (%)</b>					

# APPENDIX

**F**

LENORE / EVANSON ALLEY





WOLSELEY AVE

EVANSON ST

LENORE ST

WESTMINSTER AVE

F-TH1

F-TH2

F-TH3

REVISION:

SCALE:  
1:1250

DATE:

2018/03/20

PROJECT NO:

17M-02283-00

DRAWING NO:

GT-F

TITLE:

2018 ALLEY RENEWALS - CONTRACT 3  
LENORE/EVANSON/WESTMINSTER/WOLSELEY ALLEY  
TESTHOLE LOCATIONS



1600 BUFFALO PLACE  
WINNEPEG, MANITOBA  
CANADA R3T 6B8  
PHONE: 204-477-8650 FAX: 204-474-2864  
WWW.WSPGROUP.COM

STAMP

REF





WSP  
 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
 Telephone: (204)-477-6650

CLIENT City of Winnipeg  
 PROJECT NUMBER 17M-02283-00  
 DATE STARTED 2/9/18 COMPLETED 2/9/18  
 DRILLING CONTRACTOR Maple Leaf Drilling  
 DRILLING METHOD Solid Stem Auger - Geoprobe  
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano  
 NOTES CL of alley: 631380.1 m E, 5526856.3 m N

PROJECT NAME 2018 Alley Renewals - Contract 3  
 PROJECT LOCATION Evanson/Lenore Alley  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

GENERAL BH PLOTS - WSP ALLEY\_RENEWALS\_CONTRACT\_3\_EVANSON.GPJ\_GINT STD CANADA\_GDT 3/20/18

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲	
									20	40 60 80
									PL	MC LL
									20	40 60 80
									PP	Su (kPa) Field Vane
									100	200 300 400
0.0 - 0.1				CONCRETE - 120 mm thick, intact						
0.1 - 0.9				FILL - Clayey, grey, trace sand and f. gravel	GB 1			32		
0.9 - 1.0					GB 2			20		
1.0 - 1.35				CLAY (CH) - Mottled grey and brown, frozen - Silt inclusions below 0.9 m	GB 3			28		
1.35 - 1.5					GB 4			24		
1.5 - 1.6				SILT (ML) - Tan-brown - Frost to 1.35 m - Soft, moist below 1.35 m	GB 5			22		
1.6 - 2.0				CLAY (CH) - Brown, stiff, moist, trace silt inclusions	GB 6			38		
2.0 - 2.9					GB 7			45		
2.9 - 3.0					GB 10			42		

- Testhole open to bottom after completion  
 - Backfilled with auger cuttings and patches with concrete



WSP  
 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
 Telephone: (204)-477-6650

CLIENT City of Winnipeg  
 PROJECT NUMBER 17M-02283-00  
 DATE STARTED 2/9/18 COMPLETED 2/9/18  
 DRILLING CONTRACTOR Maple Leaf Drilling  
 DRILLING METHOD Solid Stem Auger - Geoprobe  
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano  
 NOTES CL of alley: 631381.8 m E, 5526947.3 m N

PROJECT NAME 2018 Alley Renewals - Contract 3  
 PROJECT LOCATION Evanson/Lenore Alley  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

GENERAL BH PLOTS - WSP ALLEY\_RENEWALS\_CONTRACT\_3\_EVANSON.GPJ\_GINT STD CANADA\_GDT 3/20/18

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲	
									20	40 60 80
									PL	MC LL
									20	40 60 80
									PP	Su (kPa) Field Vane
									100	200 300 400
0.0 - 0.3	ASPHALT			- 30 mm thick						
0.3 - 0.5	CONCRETE			- 140 mm thick, deteriorated						
0.5 - 0.8	GRANULAR FILL			- 130 mm thick	GB 1			33		
0.8 - 1.0	FILL			- Clayey, grey-black, trace sand and f. gravel	GB 2			30		
1.0 - 1.5	SILT (ML)			- Light grey, clayey to 0.9 m - Tan-brown below 0.9 m - 59.1% silt; 34.7% clay, 6.2% sand at 0.9 m	GB 3			37		
1.5 - 1.8				- Frost to 1.35 m - Soft, moist below 1.35 m	GB 4			26		
1.8 - 2.0					GB 5			30		
2.0 - 2.5	CLAY (CH)			- Brown, stiff, moist, trace silt inclusions	GB 6			30		
2.5 - 2.8					GB 7			38		
2.8 - 3.0					GB 10			42		



WSP  
 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
 Telephone: (204)-477-6650

CLIENT City of Winnipeg  
 PROJECT NUMBER 17M-02283-00  
 DATE STARTED 2/9/18 COMPLETED 2/9/18  
 DRILLING CONTRACTOR Maple Leaf Drilling  
 DRILLING METHOD Solid Stem Auger - Geoprobe  
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano  
 NOTES CL of alley: 631384.0 m E, 5527031.5 m N

PROJECT NAME 2018 Alley Renewals - Contract 3  
 PROJECT LOCATION Evanson/Lenore Alley  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

GENERAL BH PLOTS - WSP ALLEY\_RENEWALS\_CONTRACT\_3\_EVANSON.GPJ GINT STD CANADA GDT 3/20/18

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲			
									PL	MC	LL	
									20	40	60	80
									20	40	60	80
									PP	Su (kPa)	Field Vane	*
									100	200	300	400
0.0 - 0.5	ASPHALT - 50 mm thick CONCRETE - 50 mm thick, deteriorated GRANULAR FILL - 170 mm thick CLAY - Grey, fissured				GB 1			26				
0.5 - 1.0	SILT (ML) - Tan-brown				GB 2 GB 3			21 24				
1.0 - 1.5	- Frost to 1.35 m - Soft, moist, clayey below 1.35 m				GB 4 GB 5			22 26				
1.5 - 2.0	CLAY (CH) - Brown, stiff, moist - Fissured to 1.8 m				GB 6			30				
2.0 - 2.5	- Some silt inclusions, trace oxidations below 2.1 m				GB 7			42				
2.5 - 3.0					GB 10			46				

- Testhole open to bottom after completion  
 - Backfilled with auger cuttings and patched with concrete



Figure 14 - TH1 Lenore/Evanson



Figure 15 - TH2 Lenore/Evanson



Figure 16 - TH3 Lenore/Evanson

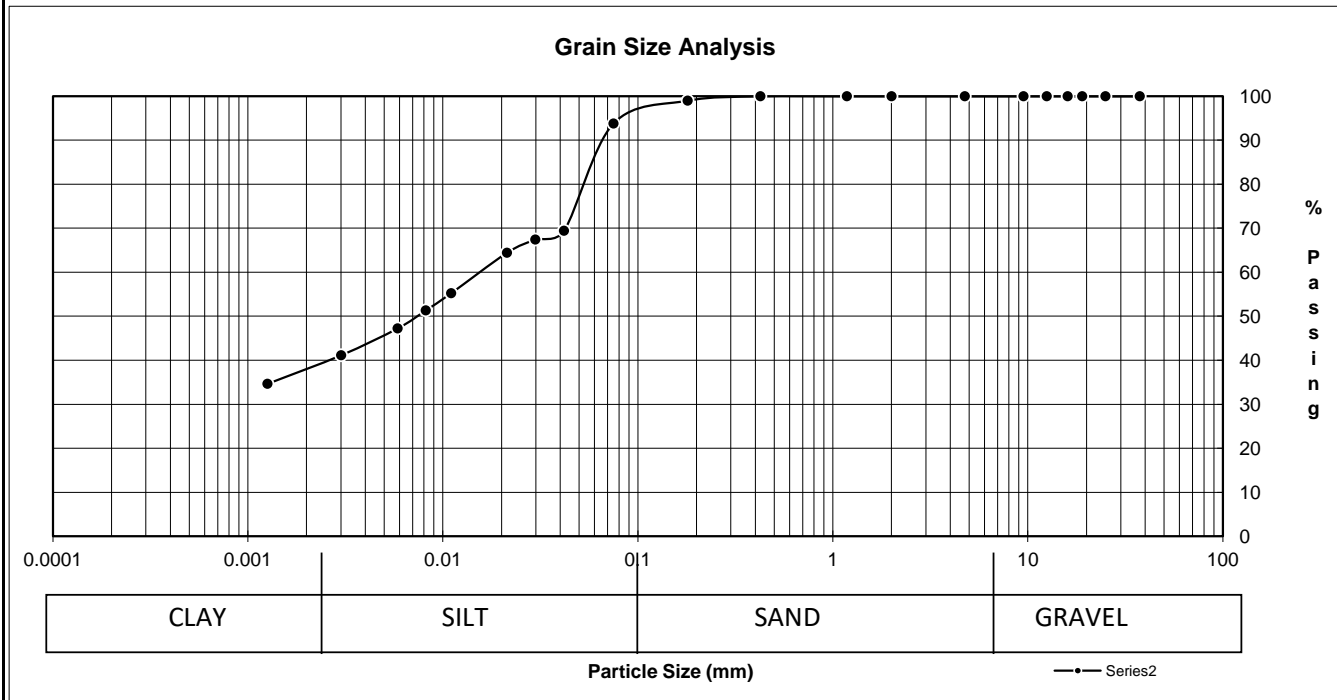
## PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

**CLIENT:** WSP Canada Group Limited  
 Suite 111-93 Lombard Avenue  
 Winnipeg, MB R3B 3B1  
**ATTENTION:** Dana Bredin  
**PROJECT:** 17M-02283-00  
 Evanson

**PROJECT NO.** 103-1804

Date Sampled: 12-Feb-18	Date Received: 12-Feb-18	Sieve Analysis		Hydrometer Analysis	
Sampled By: Client	Date Tested: 15-Feb-18	Sieve (mm)	% Passing	Diameter	% Finer
		50.00	100.0		
		37.50	100.0		
		25.00	100.0		
		19.00	100.0		
		16.00	100.0		
		12.50	100.0	0.0418	69.4
		9.50	100.0	0.0298	67.4
		4.75	100.0	0.0213	64.4
		2.00	100.0	0.0110	55.2
		1.18	100.0	0.0082	51.3
		0.425	100.0	0.0059	47.2
		0.180	99.0	0.0030	41.1
		0.075	93.8	0.0013	34.7

**Material Identification**  
 B.H./T.H. No. **TH 2 @3'**  
**Sample No.** **9**  
 Sample Source  
 Specific Gravity of Material: 2.65



SOIL DESCRIPTION	% Composition		D10	D30	D60
	SILTY CLAY LOAM	6.2	Gravel		
59.1		Sand			0.01103
59.1		Silt	Cu	#DIV/0!	
34.7		Clay	Cc	#DIV/0!	

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: GM



Reviewed by: Hermie Manalo

### MOISTURE CONTENT OF SOIL (ASTM D2216)

CLIENT: WSP	TEST NO: 18- 009	PROJECT NO: 103-1804
PROJECT: 17M-02283-00	DATE SAMPLED: 12-Feb-2018	SAMPLED BY: Client
PROJECT CONTACT: Dana Bredin	DATE TESTED: 13-Feb-2018	TESTED BY: Greg Manalo
TEST LOCATION: Evanson		

Description	TH1	TH1	TH1	TH1	TH1
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	161.30	165.10	164.10	178.00	188.60
Wt Dry Sample + Tare	123.60	138.00	129.30	144.60	155.20
Wt Water	37.70	27.10	34.80	33.40	33.40
Wt Tare	4.30	4.20	4.30	4.10	4.20
Wt Dry Sample	119.30	133.80	125.00	140.50	151.00
<b>Moisture Content (%)</b>	<b>31.6</b>	<b>20.3</b>	<b>27.8</b>	<b>23.8</b>	<b>22.1</b>

Description	TH1	TH1	TH1		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	155.00	170.80	156.90		
Wt Dry Sample + Tare	113.70	119.40	112.10		
Wt Water	41.30	51.40	44.80		
Wt Tare	4.20	4.10	4.10		
Wt Dry Sample	109.50	115.30	108.00		
<b>Moisture Content (%)</b>	<b>37.7</b>	<b>44.6</b>	<b>41.5</b>		

Description	TH2	TH2	TH2	TH2	TH2
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	156.00	152.00	274.20	166.80	196.20
Wt Dry Sample + Tare	118.80	117.50	202.00	133.60	151.50
Wt Water	37.20	34.50	72.20	33.20	44.70
Wt Tare	4.30	4.10	4.50	4.10	4.10
Wt Dry Sample	114.50	113.40	197.50	129.50	147.40
<b>Moisture Content (%)</b>	<b>32.5</b>	<b>30.4</b>	<b>36.6</b>	<b>25.6</b>	<b>30.3</b>

Description	TH2	TH2	TH2		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	153.70	162.60	165.10		
Wt Dry Sample + Tare	119.10	119.10	117.70		
Wt Water	34.60	43.50	47.40		
Wt Tare	4.20	4.10	4.10		
Wt Dry Sample	114.90	115.00	113.60		
<b>Moisture Content (%)</b>	<b>30.1</b>	<b>37.8</b>	<b>41.7</b>		

**MOISTURE CONTENT OF SOIL (ASTM D2216)**

CLIENT: WSP	TEST NO: 18- 009	PROJECT NO: 103-1804
PROJECT: 17M-02283-00	DATE SAMPLED: 12-Feb-2018	SAMPLED BY: Client
PROJECT CONTACT: Dana Bredin	DATE TESTED: 13-Feb-2018	TESTED BY: Greg Manalo
TEST LOCATION: Evanson		

Description	TH3	TH3	TH3	TH3	TH3
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	175.00	179.70	184.00	179.50	176.30
Wt Dry Sample + Tare	140.00	149.90	149.80	147.50	140.50
Wt Water	35.00	29.80	34.20	32.00	35.80
Wt Tare	4.20	4.10	4.20	4.10	4.10
Wt Dry Sample	135.80	145.80	145.60	143.40	136.40
<b>Moisture Content (%)</b>	<b>25.8</b>	<b>20.4</b>	<b>23.5</b>	<b>22.3</b>	<b>26.2</b>

Description	TH3	TH3	TH3		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	158.10	162.20	149.90		
Wt Dry Sample + Tare	122.90	115.90	104.10		
Wt Water	35.20	46.30	45.80		
Wt Tare	4.20	4.20	4.10		
Wt Dry Sample	118.70	111.70	100.00		
<b>Moisture Content (%)</b>	<b>29.7</b>	<b>41.5</b>	<b>45.8</b>		

Description					
Depth (ft)					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
<b>Moisture Content (%)</b>					

Description					
Depth (ft)					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
<b>Moisture Content (%)</b>					