

# **APPENDIX 'A'**

# **GEOTECHNICAL REPORT**

CITY OF WINNIPEG

# 2017 LOCAL RENEWALS

GEOTECHNICAL REPORT

MAY 2017





**2017 LOCAL RENEWALS  
GEOTECHNICAL REPORT  
City of Winnipeg**

**GEOTECHNICAL REPORT**

Project: 171-01397-00  
Date: May 2017

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# REVISION HISTORY

VERSION	DATE	DESCRIPTION
1	MAY 18, 2017	Final Report



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# SIGNATURES

PREPARED BY



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REVIEWED BY



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## APPENDICES

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# 1 INTRODUCTION

A geotechnical investigation was conducted by WSP Canada Inc. for the proposed 2017 Local Renewals 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.

Seven alleys were drilled, which includes the following alleys:

1. East/west alley between Havelock Ave and Portland Ave from St. George Rd to St. Andrew Rd
2. North/south alley between Birchdale Ave and Lawndale Ave from Coniston St to Highfield St
3. North/south alley between Lawndale Ave and Ferndale Ave from Highfield St to Kirkdale St
4. East/west alley between Calrossie Blvd and Byng Pl from Pembina Hwy and Riverside Dr
5. East/west alley between Somerville Ave and Somerset Ave from Point Rd to Riverside Dr
6. North/south alley between Claremont Ave and Monck Ave from Highfield St to Kirkdale St
7. East/west alley between Dumoulin St and Provencher Blvd from Langevin St to St. Jean Baptiste St

# 2 SUB-SURFACE INVESTIGATION AND TESTING

The field investigation was undertaken on February 27, 2017 and was completed on March 9, 2017. A total of 21 test holes 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 GeoProbe 7822DT rig also equipped with a 125 mm auger. All test holes were backfilled with auger cuttings, bentonite and capped with silica sand. Test hole locations are noted on the test hole 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 (one per alley). No groundwater seepage or sloughing was encountered in the test holes during drilling.

Detailed descriptions of the soil profiles for each test hole are included on the logs in Appendix A. The material test results are included in Appendix B.

### 3 TEST HOLE SUMMARY TABLES

**Table 3-1 - Havelock/Portland Alley**

TEST HOLE NO.	TESTHOLE LOCATION	PAVEMENT SURFACE		SOIL DESCRIPTION	BOREHOLE DEPTH (m)	No. of Samples Taken
		Type	Thickness (mm)			
TH1	5523376 m N 636333 m E North side of Alley behind 152 Havelock Ave	Granular Fill	450	Clay	3.05	8
TH2	5523414 m N 636405 m E South side of Alley behind 172 Havelock Ave	Granular Fill	300	Clay/Silt	3.05	8
TH3	5523456 m N 636475 m E North side of Alley behind 192 Havelock Ave	Granular Fill	300	Clay	1.83	6

**Table 3-2 - Birchdale/Lawndale Alley**

TEST HOLE NO.	TESTHOLE LOCATION	PAVEMENT SURFACE		SOIL DESCRIPTION	BOREHOLE DEPTH (m)	No. of Samples Taken
		Type	Thickness (mm)			
TH4	5526427 m N 634401 m E Centre of Alley behind 111 Lawndale Ave	Granular Fill	150	Clay	3.05	8
TH5	5526377 m N 634400 m E Centre of Alley behind 101 Lawndale Ave	Granular Fill (sandy, trace of fine gravel)	300	Clay	3.05	8
TH6	5526377 m N 634399 m E Centre of Alley behind 77 Lawndale Ave	Granular Fill	80	Clay	3.05	8

**Table 3-3 - Lawndale/Ferndale Alley**

TEST HOLE NO.	TESTHOLE LOCATION	PAVEMENT SURFACE		SOIL DESCRIPTION	BOREHOLE DEPTH (m)	No. of Samples Taken
		Type	Thickness (mm)			
TH7	5526501 m N 634501 m E Centre of Alley behind 129/133 Ferndale Ave	Granular Fill	450	Clay	3.05	8
TH8	5526547 m N 634502 m E Centre of Alley behind 145/149 Ferndale Ave	Granular Fill	450	Clay	3.05	8

TH9	5526631 m N 634505 m E Centre of Alley behind 165 Ferndale Ave	Granular Fill	450	Clay	3.05	8
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**Table 3-4 - Calrossie/Byng Alley**

TEST HOLE NO.	TESTHOLE LOCATION	PAVEMENT SURFACE		SOIL DESCRIPTION	BOREHOLE DEPTH (m)	No. of Samples Taken
		Type	Thickness (mm)			
TH10	5523594 m N 632889 m E Centre of Alley behind 978 Calrossie Blvd	Granular Fill	300	Clay/Silt	3.05	8
TH11	5523666 m N 633019 m E Centre of Alley behind 936 Calrossie Blvd	Granular Fill	250	Clay/Silt	3.05	8
TH12	5523709 m N 633097 m E Centre of Alley behind 918 Calrossie Blvd	Granular Fill	250	Clay/Silt	3.05	8

**Table 3-5 - Somerville/Somerset Alley**

TEST HOLE NO.	TESTHOLE LOCATION	PAVEMENT SURFACE		SOIL DESCRIPTION	BOREHOLE DEPTH (m)	No. of Samples Taken
		Type	Thickness (mm)			
TH13	5523475 m N 633211 m E Centre of Alley behind 803 Somerset Ave	Granular Fill (mixed with organics)	600	Clay/Silt	3.05	8
TH14	5523412 m N 633102 m E Centre of Alley behind 833/835 Somerset Ave	Granular Fill	600	Clay/Silt	3.05	8
TH15	5523367 m N 633016 m E Centre of Alley behind 964 Somerville Ave	Granular Fill	450	Clay/Silt	3.05	8

**Table 3-6 - Claremont/Monck Alley**

TEST HOLE NO.	TESTHOLE LOCATION	PAVEMENT SURFACE		SOIL DESCRIPTION	BOREHOLE DEPTH (m)	No. of Samples Taken
		Type	Thickness (mm)			
TH16	5526488 m N 634700 m E Centre of Alley behind 129 Claremont Ave	Granular Fill	300	Clay	3.05	8

TH17	5526555 m N 634703 m E Centre of Alley behind 145 Claremont Ave	Granular Fill	250	Clay	3.05	8
TH18	5526615 m N 634704 m E Centre of Alley behind 163 Claremont Ave	Granular Fill	150	Clay	3.05	8

**Table 3-7 - Dumoulin/Provencher 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)			
TH19	5528491 m N 635108 m E Centre of Alley behind 255 Provencher Blvd	Asphalt	60	Granular Fill	240	Clay/Silt	3.05	8
TH20	5528515 m N 635168 m E Centre of Alley behind 271 Provencher Blvd	Asphalt	60	Granular Fill	190	Clay/Silt	3.05	8
TH21	5528548 m N 635244 m E Centre of Alley behind 287 Provencher Blvd	Asphalt	75	Granular Fill	375	Clay/Silt	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

TEST HOLE LOGS





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 DRILLING METHOD Continuous Auger  
 LOGGED BY Silvestre Urbano CHECKED BY Silvestre Urbano  
 NOTES Alley btw. Havelock & Portland from St. George to St. Andrew

PROJECT NAME 2017 Local Renewals  
 PROJECT LOCATION Winnipeg, MB  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

GENERAL BH PLOTS - WSP 2017 LOCAL RENEWALS - TESTHOLE LOGS.GPJ GINT STD CANADA.GDT 5/18/17

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲	
							PL	MC
							20	40 60 80
							20	40 60 80
							□ FINES CONTENT (%) □	
							20	40 60 80
0.0 - 0.5		GRANULAR FILL - 450 mm layer	MC = 5%			5		
0.5 - 2.5		CLAY FILL - Mixed black/brown - Frost to 1.2 m	MC = 27%			27		
			MC = 26%			26		
			MC = 22%			22		
			MC = 22%			22		
			MC = 28%			28		
			MC = 30%			30		
2.5 - 3.0		CLAY - Firm to soft - SILTY, moist to wet, tan-brown  Testhole dry after the completion of drilling	PP = 25 kPa		25			
			PP = 75 kPa MC = 32%		75	32		
Bottom of hole at 3.05 m.								



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							20	40	60
0.0 - 0.3		GRANULAR FILL - 300 mm layer							
0.3 - 0.8		CLAY FILL - Mixed black/brown	MC = 7%			7			
0.8 - 1.2		SILT - Tan-brown, dry, frozen - Frost to 1.2 m	MC = 25%			25			
1.2 - 1.4			MC = 16%			16			
1.4 - 1.6			MC = 15%			15			
1.6 - 3.0		CLAY - Brown, stiff, fissured  Testhole dry after the completion of drilling	PP = 150 kPa MC = 24%		150	24			
			MC = 43%			43			
			MC = 48%			48			
3.0			PP = 100 kPa MC = 55%		100	55			

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP 2017 LOCAL RENEWALS - TESTHOLE LOGS.GPJ - GINT STD CANADA.GDT 5/18/17



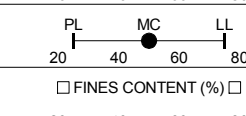
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							20	40	60
0.0 - 0.3		GRANULAR FILL - 300 mm layer							
0.3 - 1.8		CLAY FILL - Mixed brown/black - Frost to 1.2 m  Stopped at 1.8 m due to suspected LDS close to test hole	MC = 6%			6			
			MC = 35%			35			
			MC = 42%			42			
			MC = 35%			35			
			MC = 37%			37			
			MC = 37%			37			
2.0 - 3.0									
Bottom of hole at 3.05 m.									





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							20	40	60
	GRANULAR FILL	GRANULAR FILL - 150 mm layer							
	CLAY FILL	CLAY FILL - Mixed brown/black - Trace fine gravel from 0.3 m to 0.6 m	MC = 13%			13			
0.5			MC = 29%			29			
	CLAY	CLAY - Brown, fissured - Frost to 1.5 m - Stiff below 1.5 m  Test hole dry after completion of drilling	MC = 27%			27			
1.0			MC = 24%			24			
1.5			MC = 24%			24			
2.0			PP = 150 kPa MC = 27%		150	27			
2.5			MC = 28%			28			
3.0			PP = 150 kPa MC = 29%		150	29			
Bottom of hole at 3.05 m.									



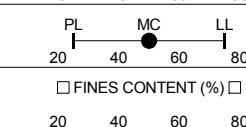
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							20	40	60	80
0.0 - 0.2		GRANULAR FILL - Sandy with a trace of fine gravel								
0.2 - 3.0		CLAY - Grey-black - Brown at 0.45 m, fissured - Frost to 1.8 m - Stiff below 1.8 m  Test hole dry after completion of drilling	MC = 7%  MC = 32%  MC = 28%  MC = 28%  MC = 31%  PP = 150 kPa MC = 28%  MC = 28%  PP = 150 kPa MC = 29%			7  32  28  28  31  28  28				
Bottom of hole at 3.05 m.										







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							20	40	60
0.0 - 0.05		GRANULAR FILL - 80 mm layer							
0.05 - 0.3		CLAY FILL - Grey-black - Trace of fine gravel and sand above 0.3 m - Clayey below 0.3 m	MC = 27%			27			
0.3 - 1.8		CLAY - Brown, fissured - Frost to 1.8 m - Stiff below 1.8 m	MC = 28%			28			
1.8 - 3.0		Test hole dry after completion of drilling	MC = 26%			26			
			MC = 28%			28			
			MC = 28%			28			
			MC = 30%			30			
			MC = 30%			30			
			MC = 30%			30			
			MC = 30%			30			

Bottom of hole at 3.05 m.

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							20	40	60
0.0 - 0.5		GRANULAR FILL - 450 mm layer, limestone	MC = 9%			9			
0.5 - 0.6		CLAY FILL - Grey-black, mixed with trace of fine gravel	MC = 35%			35			
0.6 - 3.0		CLAY - Grey-black, fissured - Frost to 1.5 m - Brown, stiff below 1.5 m  Test hole dry after completion of drilling	MC = 35%			35			
			MC = 36%			36			
			PP = 150 kPa MC = 34%		150	34			
			MC = 30%			30			
			MC = 30%			30			
			PP = 150 kPa MC = 28%		150	28			
Bottom of hole at 3.05 m.									

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							20	40	60
0.0 - 0.5		GRANULAR FILL - 450 mm layer, limestone	MC = 12%			12			
0.5 - 0.75		CLAY FILL - Grey-black with trace of fine gravel	MC = 33%			33			
0.75 - 1.0		CLAY - Grey-black - Brown below .75 m - Frost to 1.5 m - Stiff below 1.5 m	MC = 30%			30			
1.0 - 1.5		Test hole dry after completion of drilling	MC = 33%			33			
1.5 - 2.0			PP = 125 kPa MC = 30%		125	30			
2.0 - 2.5			MC = 27%			27			
2.5 - 3.0			MC = 30%			30			
3.0 - 3.05			PP = 150 kPa MC = 31%		150	31			

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP 2017 LOCAL RENEWALS - TESTHOLE LOGS.GPJ GINT STD CANADA.GDT 5/18/17



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							20	40	60
0.0 - 0.5		GRANULAR FILL - 450 mm layer, limestone, geo-grid	MC = 6%			6			
0.5 - 0.8		CLAY FILL - Mixed grey-black	MC = 32%			32			
0.8 - 1.0		CLAY - Brown, fissured - Frost to 1.2 m - Stiff below 1.2 m	MC = 33%			33			
1.0 - 1.5		Test hole dry after completion of drilling	MC = 36%			36			
1.5 - 2.0			PP = 200 kPa MC = 27%		200	27			
2.0 - 2.5			MC = 33%			33			
2.5 - 3.0			MC = 29%			29			
3.0 - 3.05			MC = 31%			31			

Bottom of hole at 3.05 m.

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 PROJECT LOCATION Winnipeg, MB  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

GENERAL BH PLOTS - WSP 2017 LOCAL RENEWALS - TESTHOLE LOGS.GPJ GINT STD CANADA.GDT 5/18/17

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.3		GRANULAR FILL - 300 mm layer							
0.3 - 1.2		CLAY - Black above 0.6 m - Grey below 0.6 m - Frost to 1.2 m	MC = 6%			6			
1.2 - 1.7		SILT - Tan-brown, soft, moist	MC = 32%			32			
1.7 - 2.1			MC = 27%			27			
2.1 - 2.4			MC = 30%			30			
2.4 - 2.8		CLAY - Brown, stiff - SILTY at 2.4 m - Silt inclusions below 2.4 m	MC = 24%			24			
2.8 - 3.0		Test hole dry after completion of drilling	MC = 23%			23			
3.0 - 3.05			MC = 36%			36			
3.05		Bottom of hole at 3.05 m.	MC = 45%			45			



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CLIENT City of Winnipeg  
 PROJECT NUMBER 171-01397-00  
 DATE STARTED 3/9/17 COMPLETED 3/9/17  
 DRILLING CONTRACTOR Maple Leaf Drilling  
 DRILLING METHOD Continuous Auger  
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano  
 NOTES Alley btw. Calrossie & Byng from Pembina to Riverside

PROJECT NAME 2017 Local Renewals  
 PROJECT LOCATION Winnipeg, MB  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

GENERAL BH PLOTS - WSP 2017 LOCAL RENEWALS - TESTHOLE LOGS.GPJ GINT STD CANADA.GDT 5/18/17

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.25		GRANULAR FILL - 250 mm layer							
0.25 - 1.0		CLAY - Grey-black	MC = 8%			8			
1.0 - 1.2		SILT - Tan-brown, soft, moist - Frost to 1.2 m	MC = 34%			34			
1.2 - 1.5			MC = 29%			29			
1.5 - 2.0			MC = 29%			29			
2.0 - 2.4		CLAY - Brown, stiff - SILTY at 2.4 m - Silt inclusions below 2.4 m	MC = 22%			22			
2.4 - 2.5			MC = 33%			33			
2.5 - 3.0		Test hole dry after completion of drilling	MC = 35%			35			
3.0 - 3.05			MC = 45%			45			

Bottom of hole at 3.05 m.



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GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
GROUND WATER LEVELS:  
AT TIME OF DRILLING ---  
AT END OF DRILLING ---  
AFTER DRILLING ---

GENERAL BH PLOTS - WSP 2017 LOCAL RENEWALS - TESTHOLE LOGS.GPJ GINT STD CANADA.GDT 5/18/17

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.25		GRANULAR FILL - 250 mm layer							
0.25 - 1.65		CLAY - Grey-black	MC = 10%			10			
0.45			MC = 45%			45			
0.95			MC = 38%			38			
1.35			MC = 44%			44			
1.65 - 2.15		SILT - Tan-brown, soft, moist - Frost to 1.35 m	MC = 25%			25			
2.15 - 2.85		CLAY - Brown, stiff  Test hole dry after completion of drilling	MC = 36%			36			
2.85 - 3.05			MC = 36%			36			
3.05			MC = 47%			47			

Bottom of hole at 3.05 m.



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 NOTES Alley btw. Somerville & Somerset from Point to Riverside

PROJECT NAME 2017 Local Renewals  
 PROJECT LOCATION Winnipeg, MB  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.5		GRANULAR FILL - 600 mm layer - Mixed with organics below 0.15 m	MC = 8%			8			
		CLAY FILL - Mixed grey-black - Trace of fine gravel	MC = 28%			28			
1.0		SILT - Tan-brown - Frost to 1.2 m - Soft, moist below 1.2 m	MC = 24%			24			
1.5			MC = 22%			22			
2.0			MC = 23%			23			
			MC = 24%			24			
2.0		CLAY - Brown, stiff  Test hole dry after completion of drilling	MC = 37%			37			
2.5									
3.0			MC = 41%			41			

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP 2017 LOCAL RENEWALS - TESTHOLE LOGS.GPJ - GINT STD CANADA.GDT 5/18/17





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 NOTES Alley btw. Somerville & Somerset from Point to Riverside

PROJECT NAME 2017 Local Renewals  
 PROJECT LOCATION Winnipeg, MB  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲			
							20	40	60	80
0.5		GRANULAR FILL - 600 mm layer	MC = 8%			8				
1.0		CLAY FILL - Mixed grey-black - Trace of fine gravel - Frost to 1.2 m	MC = 27%			27				
1.5		CLAY - Grey, stiff	MC = 29%			29				
2.0			MC = 32%			32				
2.5		SILT - Tan-brown, soft, moist to wet	MC = 30%			30				
3.0		CLAY - Brown, SILTY	MC = 28%			28				
Test hole dry after completion of drilling										

GENERAL BH PLOTS - WSP 2017 LOCAL RENEWALS - TESTHOLE LOGS.GPJ GINT STD CANADA.GDT 5/18/17

Bottom of hole at 3.05 m.



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 AT END OF DRILLING ---  
 AFTER DRILLING ---

GENERAL BH PLOTS - WSP 2017 LOCAL RENEWALS - TESTHOLE LOGS.GPJ GINT STD CANADA.GDT 5/18/17

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.5		GRANULAR FILL - 450 mm layer	MC = 11%			11			
0.5 - 1.0		CLAY FILL - Mixed grey-black - Trace of fine gravel	MC = 30%			30			
1.0 - 1.5		CLAY - Grey - Brown below 1.05 m - Frost to 1.05 m - SILTY below 1.2 m	MC = 29%			29			
1.5 - 2.0		SILT - Tan-brown, soft, moist	MC = 26%			26			
2.0 - 2.5			MC = 26%			26			
2.5 - 3.0			MC = 24%			24			
3.0		CLAY - Brown, stiff  Test hole dry after completion of drilling	MC = 38%			38			

Bottom of hole at 3.05 m.



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**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 171-01397-00  
**DATE STARTED** 3/9/17 **COMPLETED** 3/9/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** Alley btw. Claremont & Monck from Kirkdale to Highfield

**PROJECT NAME** 2017 Local Renewals  
**PROJECT LOCATION** Winnipeg, MB  
**GROUND ELEVATION** \_\_\_\_\_ **HOLE SIZE** 125 mm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.3		GRANULAR FILL - 300 mm layer							
0.3 - 3.0		CLAY - Grey-black - Frost to 1.2 m - Brown, stiff below 1.2 m - Trace of silt inclusions below 1.2 m  Test hole dry after completion of drilling	MC = 9%  MC = 34%  MC = 34%  MC = 34%  MC = 30%  MC = 27%  MC = 27%  MC = 25%			9  34  34  34  30  27  27  25			
Bottom of hole at 3.05 m.									

GENERAL BH PLOTS - WSP 2017 LOCAL RENEWALS - TESTHOLE LOGS.GPJ GINT STD CANADA.GDT 5/18/17



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TH17

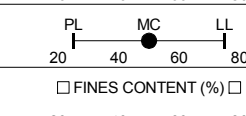
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CLIENT City of Winnipeg  
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 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
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GENERAL BH PLOTS - WSP 2017 LOCAL RENEWALS - TESTHOLE LOGS.GPJ GINT STD CANADA.GDT 5/18/17

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲			
							20	40	60	80
0.0 - 0.25		GRANULAR FILL - 250 mm layer								
0.25 - 3.05		CLAY - Grey-black - Frost to 1.2 m - Brown, stiff below 1.2 m - Stratified with SILT below 1.8 m  Test hole dry after completion of drilling	MC = 15%			15				
			MC = 33%			33				
			MC = 35%			35				
			MC = 28%			28				
			MC = 28%			28				
			MC = 25%			25				
			MC = 27%			27				
			MC = 30%			30				
Bottom of hole at 3.05 m.										





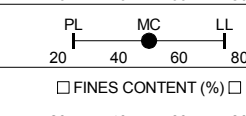
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 AT TIME OF DRILLING ---  
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GENERAL BH PLOTS - WSP 2017 LOCAL RENEWALS - TESTHOLE LOGS.GPJ GINT STD CANADA.GDT 5/18/17

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.15		GRANULAR FILL - 150 mm layer							
0.15 - 3.05		CLAY - Grey-black - Frost to 1.2 m - Brown, stiff below 1.2 m - Stratified with SILT below 1.5 m  Test hole dry after completion of drilling	MC = 13%			13			
			MC = 33%			33			
			MC = 29%			29			
			MC = 30%			30			
			MC = 32%			32			
			MC = 28%			28			
			MC = 25%			25			
			MC = 26%			26			
		Bottom of hole at 3.05 m.							





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 NOTES Alley btw. Dumoulin & Provencher from Langevin to St. Jean Baptiste

PROJECT NAME 2017 Local Renewals  
 PROJECT LOCATION Winnipeg, MB  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.05	ASPHALT - 60 mm layer								
0.05 - 0.3	GRANULAR FILL - 240 mm layer								
0.3 - 1.0	CLAY FILL - Grey-black mixed - Trace of organics at 1.05 m - Frost to 1.05 m	MC = 10%				10			
1.0 - 1.65	CLAY - Grey, stiff - Brown below 1.65 m	MC = 40%				40			
1.65 - 1.8		MC = 36%				36			
1.8 - 2.0		MC = 35%				35			
2.0 - 2.1		MC = 32%				32			
2.1 - 2.5	SILT - Tan-brown, soft, moist	MC = 25%				25			
2.5 - 2.6		MC = 23%				23			
2.6 - 3.0	CLAY - Brown, stiff, cohesive  Test hole dry after completion of drilling	MC = 44%				44			

Bottom of hole at 3.05 m.

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PROJECT NAME 2017 Local Renewals  
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 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.05		ASPHALT - 60 mm layer							
0.05 - 0.15		GRANULAR FILL - 190 mm layer							
0.15 - 1.2		CLAY FILL - Mixed grey-black and brown - Frost to 1.2 m	MC = 15%			15			
0.5			MC = 36%			36			
1.0			MC = 34%			34			
1.5		SILT - Tan-brown, soft, moist	MC = 25%			25			
2.0			MC = 23%			23			
2.2			MC = 22%			22			
2.5		CLAY - Brown, stiff, cohesive  Test hole dry after completion of drilling	MC = 28%			28			
3.0			MC = 46%			46			

Bottom of hole at 3.05 m.

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PROJECT NAME 2017 Local Renewals  
 PROJECT LOCATION Winnipeg, MB  
 GROUND ELEVATION \_\_\_\_\_ HOLE SIZE 125 mm  
 GROUND WATER LEVELS:  
 AT TIME OF DRILLING ---  
 AT END OF DRILLING ---  
 AFTER DRILLING ---

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
0.0 - 0.075		ASPHALT - 75 mm layer							
0.075 - 0.475		GRANULAR FILL - 375 mm layer	MC = 8%			8			
0.475 - 0.975		CLAY FILL - Mixed grey-black, trace of fine gravel	MC = 40%			40			
0.975 - 1.075		SILT - Tan-brown - Frost to 1.05 m - Soft, moist below 1.05 m	MC = 36%			36			
1.075 - 1.375			MC = 23%			23			
1.375 - 1.675			MC = 23%			23			
1.675 - 1.975			MC = 24%			24			
1.975 - 2.275			MC = 32%			32			
2.275 - 3.05		CLAY - Brown, stiff, cohesive  Test hole dry after completion of drilling							
3.05		Bottom of hole at 3.05 m.	MC = 47%			47			

GENERAL BH PLOTS - WSP 2017 LOCAL RENEWALS - TESTHOLE LOGS.GPJ - GINT STD CANADA.GDT 5/18/17





# Appendix B

**MATERIAL TESTING RESULTS**



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

CLIENT: WSP	TEST NO: 3	PROJECT NO: 103-1701
PROJECT: Gravel Alley Renewal Project (WSP# 171-01)	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 4-Mar-2017	TESTED BY: Irvin Araquil
TEST LOCATION: Havelock		

Description	TH 1	TH 1	TH 1	TH 1	TH 1
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	83.10	78.80	69.80	77.40	89.90
Wt Dry Sample + Tare	78.50	59.40	50.40	58.50	66.80
Wt Water	4.50	19.40	19.40	18.90	23.10
Wt Tare	4.70	4.20	4.30	4.20	4.20
Wt Dry Sample	73.80	55.20	46.10	54.30	62.60
<b>Moisture Content (%)</b>	<b>6.2</b>	<b>35.1</b>	<b>42.1</b>	<b>34.8</b>	<b>36.9</b>

Description	TH 1				
Depth (ft)	6				
Wt Wet Sample + Tare	95.90				
Wt Dry Sample + Tare	71.00				
Wt Water	24.90				
Wt Tare	4.20				
Wt Dry Sample	66.80				
<b>Moisture Content (%)</b>	<b>37.3</b>				

Description	TH 2	TH 2	TH 2	TH 2	TH 2
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	101.50	77.60	85.70	70.90	86.50
Wt Dry Sample + Tare	94.90	63.00	74.80	62.40	70.40
Wt Water	6.50	14.60	10.90	8.50	16.10
Wt Tare	4.20	4.20	4.40	4.30	4.40
Wt Dry Sample	90.70	58.80	70.40	58.10	66.00
<b>Moisture Content (%)</b>	<b>7.3</b>	<b>24.8</b>	<b>15.5</b>	<b>14.6</b>	<b>24.4</b>

Description	TH 2	TH 2	TH 2		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	66.90	75.90	53.30		
Wt Dry Sample + Tare	48.00	52.80	36.00		
Wt Water	18.90	23.10	17.30		
Wt Tare	4.30	4.20	4.40		
Wt Dry Sample	43.70	48.60	31.60		
<b>Moisture Content (%)</b>	<b>43.2</b>	<b>47.5</b>	<b>54.7</b>		

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

CLIENT: WSP	TEST NO: 3	PROJECT NO: 103-1701
PROJECT: Gravel Alley Renewal Project (WSP# 171-01)	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 4-Mar-2017	TESTED BY: Irvin Araquil
TEST LOCATION: Havelock		

Description	TH 3	TH 3	TH 3	TH 3	TH 3
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	91.80	69.10	71.80	95.30	82.50
Wt Dry Sample + Tare	87.40	55.40	57.90	78.80	68.60
Wt Water	4.30	13.70	13.90	16.50	13.90
Wt Tare	4.50	4.20	4.30	4.40	4.20
Wt Dry Sample	82.90	51.20	53.60	74.40	64.40
<b>Moisture Content (%)</b>	<b>5.3</b>	<b>26.8</b>	<b>25.9</b>	<b>22.2</b>	<b>21.6</b>

Description	TH 3	TH 3	TH 3		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	91.10	73.50	89.00		
Wt Dry Sample + Tare	71.90	57.40	68.50		
Wt Water	19.20	16.10	20.50		
Wt Tare	4.20	4.20	4.30		
Wt Dry Sample	67.70	53.20	64.20		
<b>Moisture Content (%)</b>	<b>28.4</b>	<b>30.3</b>	<b>31.9</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>					

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

CLIENT: WSP	TEST NO: 1	PROJECT NO: 103-1701
PROJECT: Gravel Alley Renewal Project (WSP# 171-01)	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED:	TESTED BY:
TEST LOCATION: Birchdale		

Description	TH 4	TH 4	TH 4	TH 4	TH 4
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	94.50	94.50	73.70	85.80	74.60
Wt Dry Sample + Tare	84.10	74.20	58.90	70.00	61.00
Wt Water	10.40	20.30	14.80	15.80	13.60
Wt Tare	4.20	4.20	4.20	4.30	4.40
Wt Dry Sample	79.90	70.00	54.70	65.70	56.60
<b>Moisture Content (%)</b>	<b>13.0</b>	<b>29.0</b>	<b>27.1</b>	<b>24.0</b>	<b>24.0</b>

Description	TH 4	TH 4	TH 4		
Depth (ft)	6	6	10		
Wt Wet Sample + Tare	65.70	74.00	70.70		
Wt Dry Sample + Tare	52.80	58.80	55.70		
Wt Water	12.90	15.20	15.00		
Wt Tare	4.30	4.30	4.20		
Wt Dry Sample	48.50	54.50	51.50		
<b>Moisture Content (%)</b>	<b>26.6</b>	<b>27.9</b>	<b>29.1</b>		

Description	TH 5	TH 5	TH 5	TH 5	TH 5
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	86.20	64.00	67.90	62.60	62.50
Wt Dry Sample + Tare	80.70	49.50	54.10	49.90	48.80
Wt Water	5.50	14.50	13.80	12.70	13.70
Wt Tare	4.20	4.30	4.30	4.30	4.30
Wt Dry Sample	76.50	45.20	49.80	45.60	44.50
<b>Moisture Content (%)</b>	<b>7.2</b>	<b>32.1</b>	<b>27.7</b>	<b>27.9</b>	<b>30.8</b>

Description	TH 5	TH 5	TH 5		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	66.70	76.40	62.60		
Wt Dry Sample + Tare	53.10	60.60	49.60		
Wt Water	13.60	15.80	13.00		
Wt Tare	4.20	4.40	4.20		
Wt Dry Sample	48.90	56.20	45.40		
<b>Moisture Content (%)</b>	<b>27.8</b>	<b>28.1</b>	<b>28.6</b>		

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

CLIENT: WSP	TEST NO: 1	PROJECT NO: 103-1701
PROJECT: Gravel Alley Renewal Project (WSP# 171-01)	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED:	TESTED BY:
TEST LOCATION: Birchdale		

Description	TH 6	TH 6	TH 6	TH 6	TH 6
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	61.30	85.90	85.50	93.00	88.10
Wt Dry Sample + Tare	49.10	68.40	68.70	73.60	70.00
Wt Water	12.20	17.50	16.80	19.40	18.10
Wt Tare	4.30	4.70	4.50	4.30	4.30
Wt Dry Sample	44.80	63.70	64.20	69.30	65.70
<b>Moisture Content (%)</b>	<b>27.2</b>	<b>27.5</b>	<b>26.2</b>	<b>28.0</b>	<b>27.5</b>

Description	TH 6	TH 6	TH 6		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	79.30	63.50	74.60		
Wt Dry Sample + Tare	61.90	50.00	58.50		
Wt Water	17.40	13.50	16.10		
Wt Tare	4.20	4.30	4.30		
Wt Dry Sample	57.70	45.70	54.20		
<b>Moisture Content (%)</b>	<b>30.2</b>	<b>29.5</b>	<b>29.7</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>					

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

CLIENT: WSP	TEST NO: 2	PROJECT NO: 103-1701
PROJECT: Gravel Alley Renewal Project (WSP# 171-01)	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 4-Mar-2017	TESTED BY: Irvin Araquil
TEST LOCATION: Lawndale		

Description	TH 7	TH 7	TH 7	TH 7	TH 7
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	67.20	63.80	92.20	94.70	86.20
Wt Dry Sample + Tare	62.10	48.40	69.40	70.60	65.60
Wt Water	5.10	15.40	22.80	24.10	20.60
Wt Tare	4.30	4.30	4.50	4.30	4.20
Wt Dry Sample	57.80	44.10	64.90	66.30	61.40
<b>Moisture Content (%)</b>	<b>8.8</b>	<b>34.9</b>	<b>35.1</b>	<b>36.3</b>	<b>33.6</b>

Description	TH 7	TH 7	TH 7		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	65.20	84.20	71.60		
Wt Dry Sample + Tare	51.20	65.80	57.00		
Wt Water	14.00	18.40	14.60		
Wt Tare	4.60	4.20	4.60		
Wt Dry Sample	46.60	61.60	52.40		
<b>Moisture Content (%)</b>	<b>30.0</b>	<b>29.9</b>	<b>27.9</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>					



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

CLIENT: WSP	TEST NO: 2	PROJECT NO: 103-1701
PROJECT: Gravel Alley Renewal Project (WSP# 171-01)	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 4-Mar-2017	TESTED BY: Irvin Araquil
TEST LOCATION: Lawndale		

Description	TH 8	TH 8	TH 8	TH 8	TH 8
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	94.90	73.90	71.60	90.00	87.00
Wt Dry Sample + Tare	85.20	56.60	56.00	68.60	68.00
Wt Water	9.70	17.30	15.60	21.40	19.00
Wt Tare	4.40	4.30	4.30	4.20	4.20
Wt Dry Sample	80.80	52.30	51.70	64.40	63.80
<b>Moisture Content (%)</b>	<b>12.0</b>	<b>33.1</b>	<b>30.2</b>	<b>33.2</b>	<b>29.8</b>

Description	TH 8	TH 8	TH 8		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	81.10	81.40	84.90		
Wt Dry Sample + Tare	64.80	63.60	65.60		
Wt Water	16.30	17.80	19.30		
Wt Tare	4.30	4.60	4.20		
Wt Dry Sample	60.50	59.00	61.40		
<b>Moisture Content (%)</b>	<b>26.9</b>	<b>30.2</b>	<b>31.4</b>		

Description	TH 9	TH 9	TH 9	TH 9	TH 9
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	73.90	59.60	61.90	91.50	87.00
Wt Dry Sample + Tare	70.00	46.30	47.60	68.50	69.40
Wt Water	3.90	13.30	14.30	23.00	17.60
Wt Tare	4.40	4.50	4.60	4.30	4.50
Wt Dry Sample	65.60	41.80	43.00	64.20	64.90
<b>Moisture Content (%)</b>	<b>5.9</b>	<b>31.8</b>	<b>33.3</b>	<b>35.8</b>	<b>27.1</b>

Description	TH 9	TH 9	TH 9		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	72.40	81.40	67.80		
Wt Dry Sample + Tare	55.60	63.90	52.70		
Wt Water	16.80	17.50	15.10		
Wt Tare	4.20	4.30	4.20		
Wt Dry Sample	51.40	59.60	48.50		
<b>Moisture Content (%)</b>	<b>32.7</b>	<b>29.4</b>	<b>31.1</b>		

### MOISTURE CONTENT OF SOIL (ASTM D2216)

CLIENT: WSP	TEST NO: 4	PROJECT NO: 103-1701
PROJECT: Gravel Alley Renewal Project (WSP# 171-01)	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 20-Mar-2017	TESTED BY: Greg Manalo
TEST LOCATION: Calrossie		

Description	TH 10	TH 10	TH 10	TH 10	TH 10
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	157.30	140.00	162.30	180.50	186.90
Wt Dry Sample + Tare	148.40	107.50	129.10	139.60	152.10
Wt Water	8.90	32.50	33.20	40.90	34.80
Wt Tare	4.20	4.20	4.20	4.20	4.20
Wt Dry Sample	144.20	103.30	124.90	135.40	147.90
<b>Moisture Content (%)</b>	<b>6.2</b>	<b>31.5</b>	<b>26.6</b>	<b>30.2</b>	<b>23.5</b>

Description	TH 10	TH 10	TH 10		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	177.00	185.90	157.90		
Wt Dry Sample + Tare	144.60	137.40	110.20		
Wt Water	32.40	48.50	47.70		
Wt Tare	4.20	4.20	4.20		
Wt Dry Sample	140.40	133.20	106.00		
<b>Moisture Content (%)</b>	<b>23.1</b>	<b>36.4</b>	<b>45.0</b>		

Description	TH 11	TH 11	TH 11	TH 11	TH 11
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	186.40	173.80	127.10	134.70	189.80
Wt Dry Sample + Tare	173.10	130.80	99.60	105.10	155.80
Wt Water	13.30	43.00	27.50	29.60	34.00
Wt Tare	4.20	4.20	4.20	4.20	4.20
Wt Dry Sample	168.90	126.60	95.40	100.90	151.60
<b>Moisture Content (%)</b>	<b>7.9</b>	<b>34.0</b>	<b>28.8</b>	<b>29.3</b>	<b>22.4</b>

Description	TH 11	TH 11	TH 11		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	180.90	153.00	165.30		
Wt Dry Sample + Tare	137.00	114.70	115.50		
Wt Water	43.90	38.30	49.80		
Wt Tare	4.20	4.20	4.20		
Wt Dry Sample	132.80	110.50	111.30		
<b>Moisture Content (%)</b>	<b>33.1</b>	<b>34.7</b>	<b>44.7</b>		

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

CLIENT: WSP	TEST NO: 4	PROJECT NO: 103-1701
PROJECT: Gravel Alley Renewal Project (WSP# 171-01)	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 20-Mar-2017	TESTED BY: Greg Manalo
TEST LOCATION: Calrossie		

Description	TH 12	TH 12	TH 12	TH 12	TH 12
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	150.40	114.30	134.90	141.20	167.30
Wt Dry Sample + Tare	137.10	79.90	98.80	99.40	134.70
Wt Water	13.30	34.40	36.10	41.80	32.60
Wt Tare	4.60	4.20	4.20	4.20	4.20
Wt Dry Sample	132.50	75.70	94.60	95.20	130.50
<b>Moisture Content (%)</b>	<b>10.0</b>	<b>45.4</b>	<b>38.2</b>	<b>43.9</b>	<b>25.0</b>

Description	TH 12	TH 12	TH 12		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	138.50	142.50	145.10		
Wt Dry Sample + Tare	103.30	106.00	100.50		
Wt Water	35.20	36.50	44.60		
Wt Tare	4.20	4.30	4.60		
Wt Dry Sample	99.10	101.70	95.90		
<b>Moisture Content (%)</b>	<b>35.5</b>	<b>35.9</b>	<b>46.5</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>					

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

CLIENT: WSP	TEST NO: 5	PROJECT NO: 103-1701
PROJECT: Gravel Alley Renewal Project (WSP# 171-01)	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 20-Mar-2017	TESTED BY: Leon Yang

TEST LOCATION:

Description	TH 13	TH 13	TH 13	TH 13	TH 13
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	161.90	187.80	188.60	173.60	175.10
Wt Dry Sample + Tare	150.10	147.80	152.80	142.60	143.50
Wt Water	11.80	40.00	35.80	31.00	31.60
Wt Tare	4.30	4.20	4.30	4.40	4.30
Wt Dry Sample	145.80	143.60	148.50	138.20	139.20
<b>Moisture Content (%)</b>	<b>8.1</b>	<b>27.9</b>	<b>24.1</b>	<b>22.4</b>	<b>22.7</b>

Description	TH 13	TH 13	TH 13		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	175.60	184.30	154.10		
Wt Dry Sample + Tare	142.40	135.50	110.20		
Wt Water	33.20	48.80	43.90		
Wt Tare	4.30	4.20	4.20		
Wt Dry Sample	138.10	131.30	106.00		
<b>Moisture Content (%)</b>	<b>24.0</b>	<b>37.2</b>	<b>41.4</b>		

Description	TH 14	TH 14	TH 14	TH 14	TH 14
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	157.20	159.00	161.40	156.40	180.80
Wt Dry Sample + Tare	146.00	126.30	126.10	119.90	140.20
Wt Water	11.20	32.70	35.30	36.50	40.60
Wt Tare	4.50	4.20	4.40	4.20	4.20
Wt Dry Sample	141.50	122.10	121.70	115.70	136.00
<b>Moisture Content (%)</b>	<b>7.9</b>	<b>26.8</b>	<b>29.0</b>	<b>31.5</b>	<b>29.9</b>

Description	TH 14	TH 14	TH 14		
Depth (ft)	6	8	10		
Wt Wet Sample + Tare	181.10	174.70	151.40		
Wt Dry Sample + Tare	142.20	142.00	119.10		
Wt Water	38.90	32.70	32.30		
Wt Tare	4.20	4.30	4.30		
Wt Dry Sample	138.00	137.70	114.80		
<b>Moisture Content (%)</b>	<b>28.2</b>	<b>23.7</b>	<b>28.1</b>		

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

CLIENT: WSP	TEST NO: 5	PROJECT NO: 103-1701
PROJECT: Gravel Alley Renewal Project (WSP# 171-01)	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 20-Mar-2017	TESTED BY: Leon Yang

TEST LOCATION:

Description	TH 20	TH 20	TH 20	TH 20	TH 20
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	196.10	151.20	158.00	178.90	125.50
Wt Dry Sample + Tare	171.20	112.10	119.40	144.30	103.00
Wt Water	24.90	39.10	38.60	34.60	22.50
Wt Tare	4.20	4.60	4.30	4.30	4.60
Wt Dry Sample	167.00	107.50	115.10	140.00	98.40
<b>Moisture Content (%)</b>	<b>14.9</b>	<b>36.4</b>	<b>33.5</b>	<b>24.7</b>	<b>22.9</b>

Description	TH 20	TH 20	TH 20		
Depth (ft)	6	7.5	10		
Wt Wet Sample + Tare	141.30	158.80	122.60		
Wt Dry Sample + Tare	116.70	124.80	85.60		
Wt Water	24.60	34.00	37.00		
Wt Tare	4.10	4.20	4.20		
Wt Dry Sample	112.60	120.60	81.40		
<b>Moisture Content (%)</b>	<b>21.8</b>	<b>28.2</b>	<b>45.5</b>		

Description	TH 15	TH 15	TH 15	TH 15	TH 15
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	130.20	138.80	180.60	170.10	163.20
Wt Dry Sample + Tare	118.20	107.90	141.00	133.10	130.00
Wt Water	12.00	30.90	39.60	37.00	33.20
Wt Tare	4.30	4.20	4.30	4.30	4.10
Wt Dry Sample	113.90	103.70	136.70	128.80	125.90
<b>Moisture Content (%)</b>	<b>10.5</b>	<b>29.8</b>	<b>29.0</b>	<b>28.7</b>	<b>26.4</b>

Description	TH 15	TH 15	TH 15		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	142.50	151.70	131.10		
Wt Dry Sample + Tare	114.10	123.20	96.50		
Wt Water	28.40	28.50	34.60		
Wt Tare	4.40	4.40	4.20		
Wt Dry Sample	109.70	118.80	92.30		
<b>Moisture Content (%)</b>	<b>25.9</b>	<b>24.0</b>	<b>37.5</b>		

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

CLIENT: WSP	TEST NO: 5	PROJECT NO: 103-1701
PROJECT: Gravel Alley Renewal Project (WSP# 171-01)	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 20-Mar-2017	TESTED BY: Leon Yang

TEST LOCATION:

Description	TH 16	TH 16	TH 16	TH 16	TH 16
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	130.00	111.60	146.20	124.10	129.50
Wt Dry Sample + Tare	119.20	84.30	110.50	93.80	100.90
Wt Water	10.80	27.30	35.70	30.30	28.60
Wt Tare	4.30	4.30	4.20	4.50	4.70
Wt Dry Sample	114.90	80.00	106.30	89.30	96.20
<b>Moisture Content (%)</b>	<b>9.4</b>	<b>34.1</b>	<b>33.6</b>	<b>33.9</b>	<b>29.7</b>

Description	TH 16	TH 16	TH 16		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	148.50	145.30	144.30		
Wt Dry Sample + Tare	117.60	115.80	116.30		
Wt Water	30.90	29.50	28.00		
Wt Tare	4.20	4.30	4.30		
Wt Dry Sample	113.40	111.50	112.00		
<b>Moisture Content (%)</b>	<b>27.2</b>	<b>26.5</b>	<b>25.0</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>					

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

CLIENT: WSP	TEST NO: 5	PROJECT NO: 103-1701
PROJECT: Gravel Alley Renewal Project (WSP# 171-01)	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 20-Mar-2017	TESTED BY: Leon Yang

TEST LOCATION:

Description	TH 19	TH 19	TH 19	TH 19	TH 19
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	157.60	152.10	151.20	190.20	181.20
Wt Dry Sample + Tare	144.10	110.40	112.60	142.00	138.20
Wt Water	13.50	41.70	38.60	48.20	43.00
Wt Tare	4.60	4.70	4.30	4.20	4.20
Wt Dry Sample	139.50	105.70	108.30	137.80	134.00
<b>Moisture Content (%)</b>	<b>9.7</b>	<b>39.5</b>	<b>35.6</b>	<b>35.0</b>	<b>32.1</b>

Description	TH 19	TH 19	TH 19		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	175.80	179.00	158.50		
Wt Dry Sample + Tare	141.30	146.40	111.70		
Wt Water	34.50	32.60	46.80		
Wt Tare	4.20	4.20	4.20		
Wt Dry Sample	137.10	142.20	107.50		
<b>Moisture Content (%)</b>	<b>25.2</b>	<b>22.9</b>	<b>43.5</b>		

Description	TH 17	TH 17	TH 17	TH 17	TH 17
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	123.10	129.00	121.70	145.10	123.40
Wt Dry Sample + Tare	107.30	97.80	91.00	114.00	97.30
Wt Water	15.80	31.20	30.70	31.10	26.10
Wt Tare	4.50	4.20	4.20	4.20	4.10
Wt Dry Sample	102.80	93.60	86.80	109.80	93.20
<b>Moisture Content (%)</b>	<b>15.4</b>	<b>33.3</b>	<b>35.4</b>	<b>28.3</b>	<b>28.0</b>

Description	TH 17	TH 17	TH 17		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	139.40	141.90	153.90		
Wt Dry Sample + Tare	112.50	112.60	119.00		
Wt Water	26.90	29.30	34.90		
Wt Tare	4.30	4.10	4.20		
Wt Dry Sample	108.20	108.50	114.80		
<b>Moisture Content (%)</b>	<b>24.9</b>	<b>27.0</b>	<b>30.4</b>		

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

CLIENT: WSP	TEST NO: 5	PROJECT NO: 103-1701
PROJECT: Gravel Alley Renewal Project (WSP# 171-01)	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 20-Mar-2017	TESTED BY: Leon Yang

TEST LOCATION:

Description	TH 18	TH 18	TH 18	TH 18	TH 18
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	119.70	143.80	151.10	144.70	152.30
Wt Dry Sample + Tare	106.70	108.90	118.10	112.70	116.50
Wt Water	13.00	34.90	33.00	32.00	35.80
Wt Tare	4.20	4.20	4.30	4.30	4.10
Wt Dry Sample	102.50	104.70	113.80	108.40	112.40
<b>Moisture Content (%)</b>	<b>12.7</b>	<b>33.3</b>	<b>29.0</b>	<b>29.5</b>	<b>31.9</b>

Description	TH 18	TH 18	TH 18		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	141.60	142.80	161.40		
Wt Dry Sample + Tare	111.80	114.90	129.10		
Wt Water	29.80	27.90	32.30		
Wt Tare	4.50	4.30	4.60		
Wt Dry Sample	107.30	110.60	124.50		
<b>Moisture Content (%)</b>	<b>27.8</b>	<b>25.2</b>	<b>25.9</b>		

Description	TH 21	TH 21	TH 21	TH 21	TH 21
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	136.00	135.80	154.10	160.60	128.20
Wt Dry Sample + Tare	126.30	98.40	114.90	131.00	105.00
Wt Water	9.70	37.40	39.20	29.60	23.20
Wt Tare	4.50	4.20	4.50	4.30	4.40
Wt Dry Sample	121.80	94.20	110.40	126.70	100.60
<b>Moisture Content (%)</b>	<b>8.0</b>	<b>39.7</b>	<b>35.5</b>	<b>23.4</b>	<b>23.1</b>

Description	TH 21	TH 21	TH 21		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	167.10	160.90	153.10		
Wt Dry Sample + Tare	135.70	122.60	105.60		
Wt Water	31.40	38.30	47.50		
Wt Tare	4.20	4.30	4.20		
Wt Dry Sample	131.50	118.30	101.40		
<b>Moisture Content (%)</b>	<b>23.9</b>	<b>32.4</b>	<b>46.8</b>		



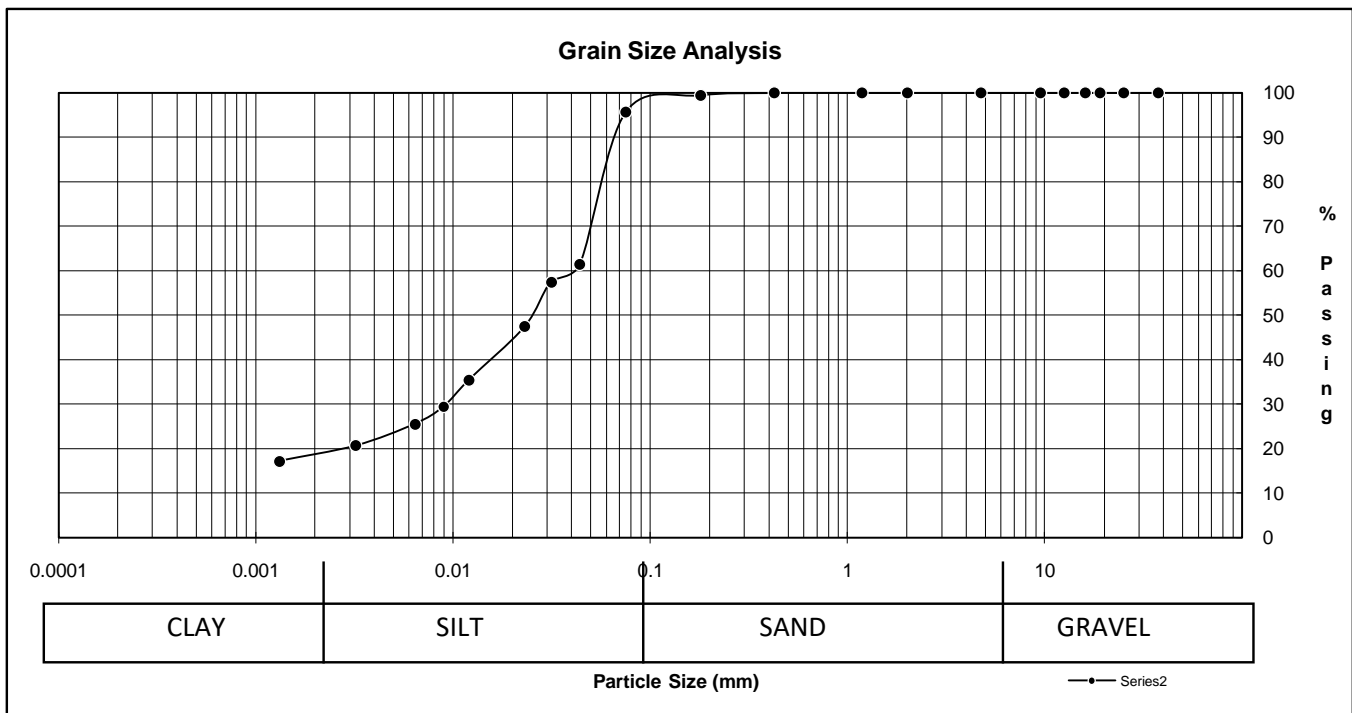


## PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

**CLIENT:** WSP Canada  
 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
**ATTN:** Dana Brendin  
**PROJECT:** Gravel Alley Renewal Project

**PROJECT NO.** 103-1701

Date Sampled:	unknown	Date Received:	29-Mar-17	Sieve Analysis		Hydrometer Analysis	
Sampled By:	Client	Date Tested:	2-May-17	Sieve (mm)	% Passing	Diameter	% Finer
<b>Material Identification</b> B.H./T.H. No. <b>TH2 @ 4'</b> <b>Sample No.</b> <b>23</b> Sample Source <b>Havelock</b> Specific Gravity of Material: <b>2.65</b>				50.00	100.0		
				37.50	100.0		
				25.00	100.0		
				19.00	100.0		
				16.00	100.0		
				12.50	100.0	0.0438	61.5
				9.50	100.0	0.0315	57.5
				4.75	100.0	0.0231	47.5
				2.00	100.0	0.0120	35.5
				1.18	100.0	0.0089	29.5
0.425	100.0	0.0064	25.6				
0.180	99.5	0.0032	20.8				
0.075	95.7	0.0013	17.2				



SOIL DESCRIPTION	% Composition		SOIL CHARACTERISTICS	
	SILT	4	Gravel	D10
78		Sand	D30	0.00894
17		Silt	D60	0.04383
		Clay	Cu	#DIV/0!
			Cc	#DIV/0!

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: BO/GM



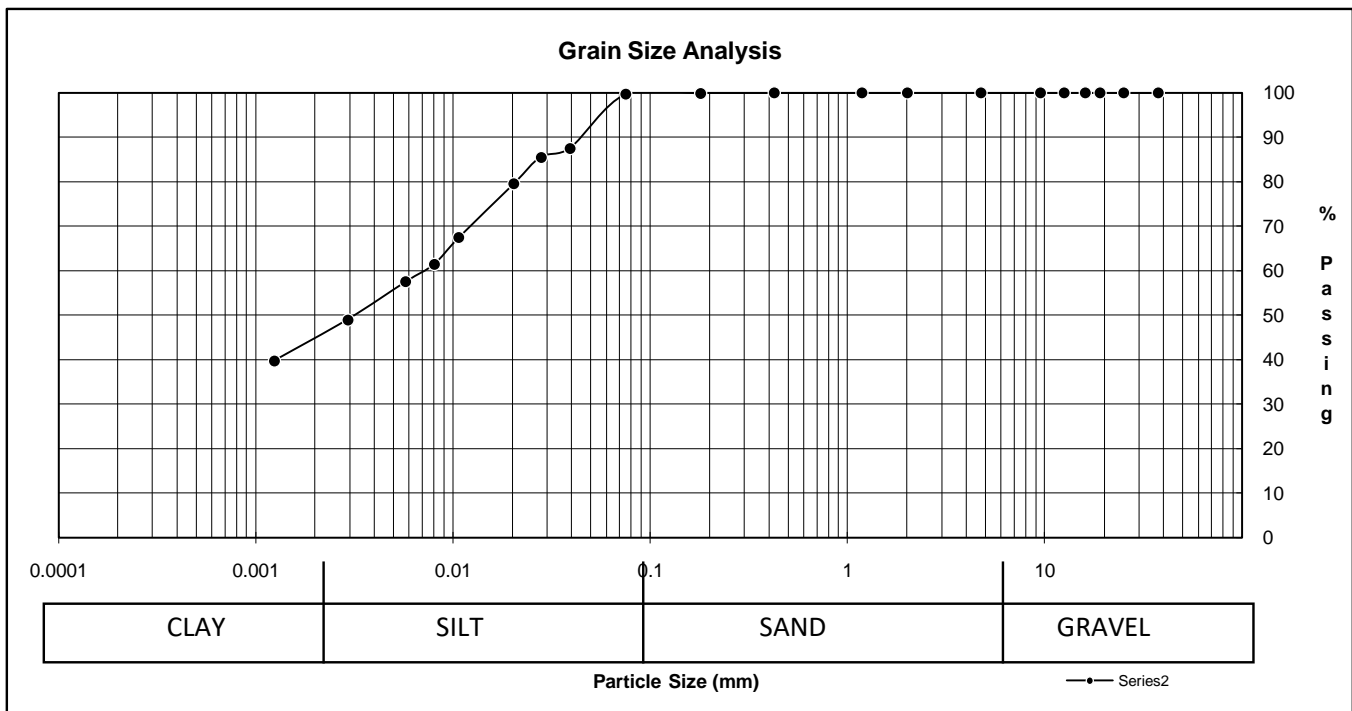
Reviewed by: Hermie Manalo

## PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

**CLIENT:** WSP Canada  
 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
**ATTN:** Dana Brendin  
**PROJECT:** Gravel Alley Renewal Project

**PROJECT NO.** 103-1701

Date Sampled:	unknown	Date Received:	29-Mar-17	Sieve Analysis		Hydrometer Analysis	
Sampled By:	Client	Date Tested:	2-May-17	Sieve (mm)	% Passing	Diameter	% Finer
<b>Material Identification</b> B.H./T.H. No. <b>TH6 @ 4'</b> <b>Sample No.</b> <b>25</b> Sample Source: Birchdale 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	0.0391	87.6
				9.50	100.0	0.0279	85.6
				4.75	100.0	0.0203	79.6
				2.00	100.0	0.0107	67.5
				1.18	100.0	0.0080	61.5
0.425	100.0	0.0057	57.6				
0.180	99.9	0.0029	49.0				
0.075	99.7	0.0012	39.8				



SOIL DESCRIPTION	% Composition		SOIL CHARACTERISTICS	
	CLAYEY SILT	0	Gravel	D10
60		Sand	D30	
40		Silt	D60	0.00800
40		Clay	Cu	#DIV/0!
			Cc	#DIV/0!

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: BO/GM



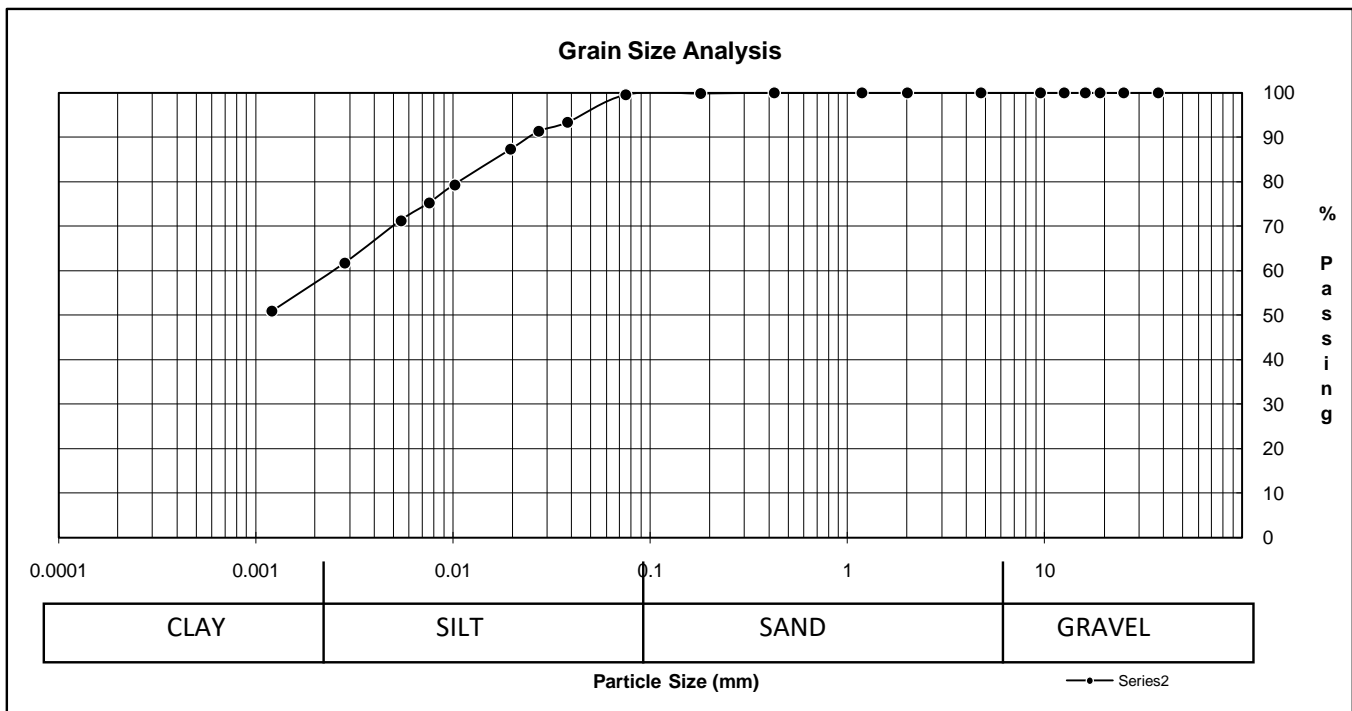
Reviewed by: Hermie Manalo

## PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

**CLIENT:** WSP Canada  
 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
**ATTN:** Dana Brendin  
**PROJECT:** Gravel Alley Renewal Project

**PROJECT NO.** 103-1701

Date Sampled:	unknown	Date Received:	29-Mar-17	Sieve Analysis		Hydrometer Analysis	
Sampled By:	Client	Date Tested:	2-May-17	Sieve (mm)	% Passing	Diameter	% Finer
<b>Material Identification</b> B.H./T.H. No. <b>TH8 @ 3'</b> <b>Sample No.</b> <b>22</b> Sample Source <b>Lawndale</b> Specific Gravity of Material: <b>2.65</b>				50.00	100.0		
				37.50	100.0		
				25.00	100.0		
				19.00	100.0		
				16.00	100.0		
				12.50	100.0	0.0380	93.4
				9.50	100.0	0.0271	91.4
				4.75	100.0	0.0196	87.4
				2.00	100.0	0.0102	79.4
				1.18	100.0	0.0076	75.3
0.425	100.0	0.0054	71.3				
0.180	99.9	0.0028	61.8				
0.075	99.6	0.0012	51.0				



SOIL DESCRIPTION	% Composition		D10	
	SILTY CLAY	0	Gravel	D30
49		Sand	D60	0.00281
51		Silt	Cu	#DIV/0!
51		Clay	Cc	#DIV/0!

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: BO/GM



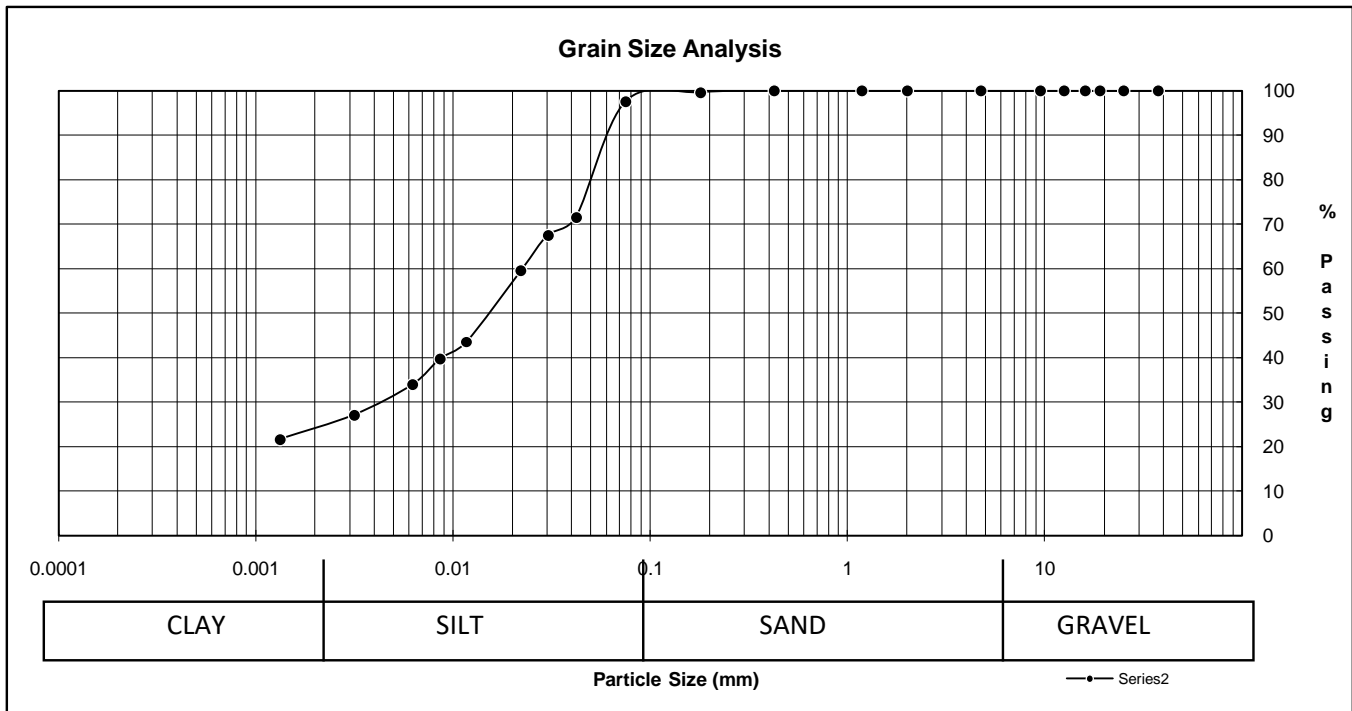
Reviewed by: Hermie Manalo

**PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT**

CLIENT: WSP Canada  
1600 Buffalo Place  
Winnipeg, MB R3T 6B8  
ATTN: Dana Brendin  
PROJECT: Gravel Alley Renewal Project

PROJECT NO. 103-1701

Date Sampled:	unknown	Date Received:	29-Mar-17	Sieve Analysis		Hydrometer Analysis	
Sampled By:	Client	Date Tested:	2-May-17	Sieve (mm)	% Passing	Diameter	% Finer
<b>Material Identification</b> B.H./T.H. No. <b>TH11 @ 3'</b> Sample No. <b>26</b> Sample Source <b>Calrossie</b> Specific Gravity of Material: <b>2.65</b>				50.00	100.0		
				37.50	100.0		
				25.00	100.0		
				19.00	100.0		
				16.00	100.0		
				12.50	100.0	0.0421	71.6
				9.50	100.0	0.0303	67.6
				4.75	100.0	0.0221	59.6
				2.00	100.0	0.0117	43.6
				1.18	100.0	0.0086	39.8
0.425	100.0	0.0062	34.0				
0.180	99.7	0.0031	27.1				
0.075	97.6	0.0013	21.7				



SOIL DESCRIPTION	% Composition		D10	
	SILT	2	Gravel	D30
76		Sand	D60	0.02208
22		Silt	Cu	#DIV/0!
		Clay	Cc	#DIV/0!

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: BO/GM

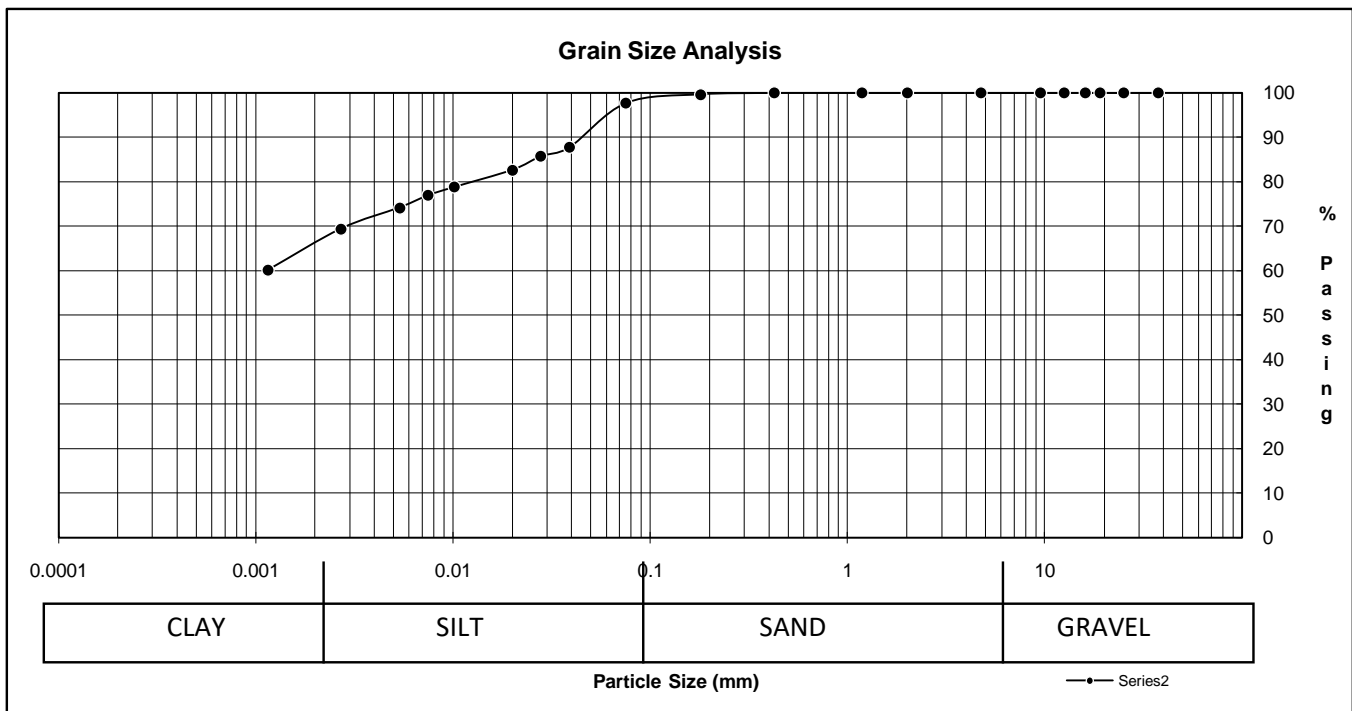
Reviewed by: Hermie Manalo

## PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

**CLIENT:** WSP Canada  
 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
**ATTN:** Dana Brendin  
**PROJECT:** Gravel Alley Renewal Project

**PROJECT NO.** 103-1701

Date Sampled:	unknown	Date Received:	29-Mar-17	Sieve Analysis	Hydrometer Analysis		
Sampled By:	Client	Date Tested:	2-May-17	Sieve (mm) % Passing	Diameter % Finer		
<b>Material Identification</b> B.H./T.H. No. <b>TH15 @ 4'</b> <b>Sample No. 29</b> Sample Source Somerville 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	87.8
				9.50	100.0	0.0278	85.8
				4.75	100.0	0.0200	82.7
				2.00	100.0	0.0101	78.9
				1.18	100.0	0.0075	77.0
0.425	100.0	0.0054	74.2				
0.180	99.6	0.0027	69.4				
0.075	97.7	0.0011	60.1				



SOIL DESCRIPTION	% Composition		D10	
	SILTY CLAY	2	Gravel	D30
38		Sand	D60	0.00115
60		Silt	Cu	#DIV/0!
		Clay	Cc	#DIV/0!

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: BO/GM



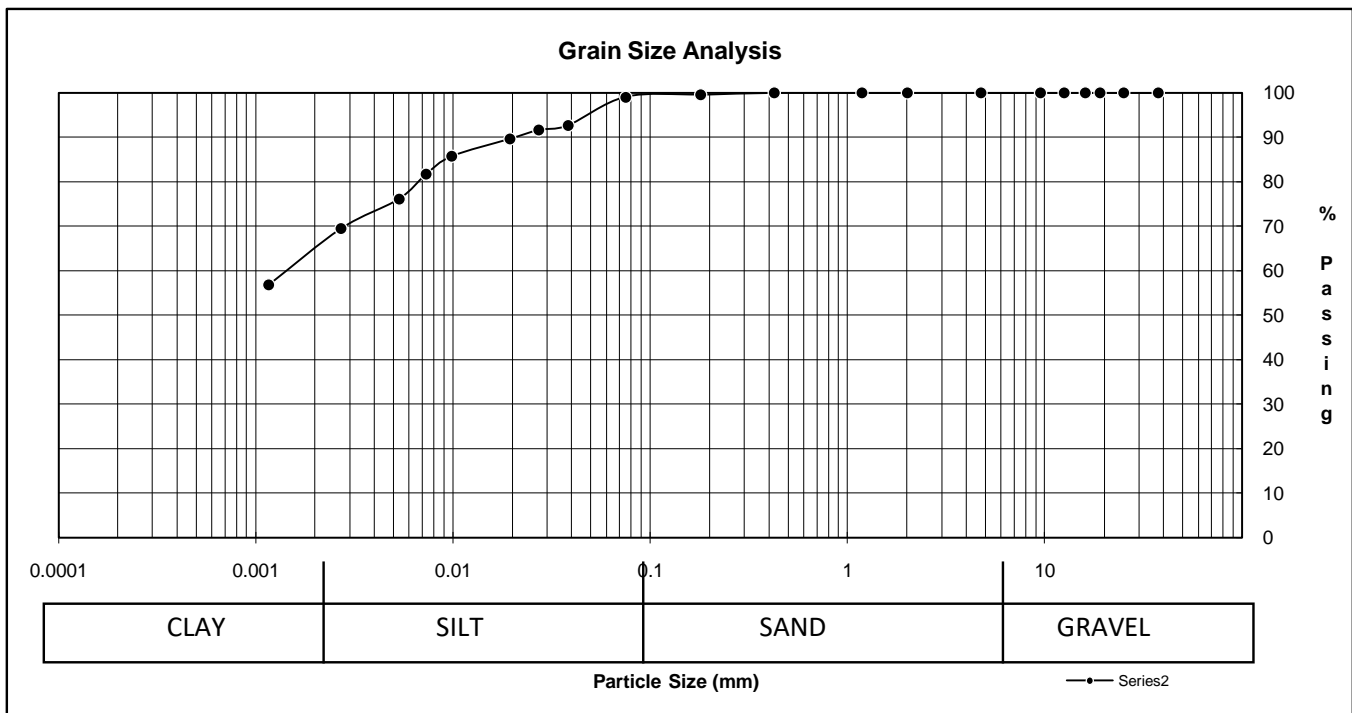
Reviewed by: Hermie Manalo

**PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT**

CLIENT: WSP Canada  
1600 Buffalo Place  
Winnipeg, MB R3T 6B8  
ATTN: Dana Brendin  
PROJECT: Gravel Alley Renewal Project

PROJECT NO. 103-1701

Date Sampled:	unknown	Date Received:	29-Mar-17	Sieve Analysis		Hydrometer Analysis	
Sampled By:	Client	Date Tested:	2-May-17	Sieve (mm)	% Passing	Diameter	% Finer
<b>Material Identification</b> B.H./T.H. No. <b>TH17 @ 3'</b> Sample No. <b>31</b> Sample Source <b>Claremont</b> Specific Gravity of Material: <b>2.65</b>				50.00	100.0		
				37.50	100.0		
				25.00	100.0		
				19.00	100.0		
				16.00	100.0		
				12.50	100.0	0.0382	92.7
				9.50	100.0	0.0271	91.7
				4.75	100.0	0.0194	89.7
				2.00	100.0	0.0098	85.8
				1.18	100.0	0.0073	81.8
0.425	100.0	0.0053	76.2				
0.180	99.6	0.0027	69.5				
0.075	99.1	0.0012	56.8				



SOIL DESCRIPTION	% Composition		D10	
	SILTY CLAY	1	Gravel	D30
42		Sand	D60	0.00270
57		Silt	Cu	#DIV/0!
		Clay	Cc	#DIV/0!

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: BO/GM

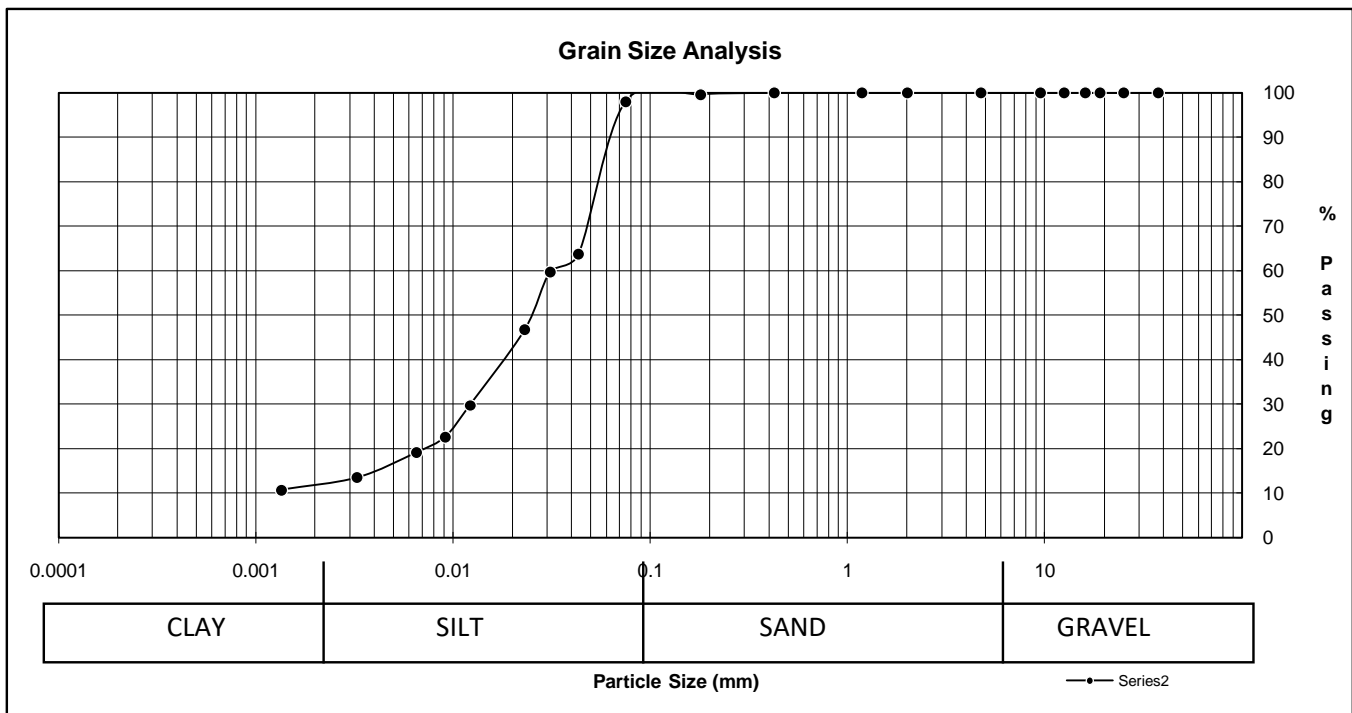
Reviewed by: Hermie Manalo

## PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

**CLIENT:** WSP Canada  
 1600 Buffalo Place  
 Winnipeg, MB R3T 6B8  
**ATTN:** Dana Brendin  
**PROJECT:** Gravel Alley Renewal Project

**PROJECT NO.** 103-1701

Date Sampled:	unknown	Date Received:	29-Mar-17	Sieve Analysis	Hydrometer Analysis		
Sampled By:	Client	Date Tested:	2-May-17	Sieve (mm) % Passing	Diameter % Finer		
<b>Material Identification</b> B.H./T.H. No. <b>TH20 @ 4'</b> <b>Sample No. 30</b> Sample Source Dumoulin 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	0.0432	63.8
				9.50	100.0	0.0310	59.8
				4.75	100.0	0.0230	46.8
				2.00	100.0	0.0122	29.8
				1.18	100.0	0.0091	22.7
0.425	100.0	0.0065	19.2				
0.180	99.7	0.0033	13.5				
0.075	98.1	0.0013	10.8				



SOIL DESCRIPTION	% Composition		D10	
	SILT	2	Gravel	D30
87		Sand	D60	0.03104
11		Silt	Cu	#DIV/0!
		Clay	Cc	#DIV/0!

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: BO/GM



Reviewed by: Hermie Manalo

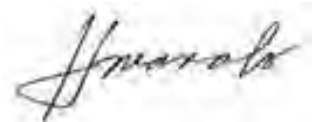


## PARTICLE SIZE ANALYSIS SUMMARY

Client:	WSP Canada 1600 Buffalo Place Winnipeg, MB R3T 6B8	Project No. 103-1701
Attention:	Dana Brendin	
Project:	Gravel Alley Renewal Project	

Test Hole ID	Sample Depth (m)	Gravel	Particle Size Analysis			Sample Description
			Sand (%)	Silt (%)	Clay (%)	
Lawndale - TH8	0.93	0	0	49	51	Silty Clay
Havelock - TH2	1.24	0	4	78	17	Silt
Birchdale - TH6	1.24	0	0	60	40	Clayey Silt
Calrossie - TH11	0.93	0	2	76	22	Silt
Somerville - TH15	1.24	0	2	38	60	Silty Clay
Dumoulin - TH20	1.24	0	2	87	11	Silt
Claremont - TH17	0.93	0	1	42	57	Silty Clay

Note: The City of Winnipeg guidelines was followed to determine the sample description.



Reviewed by:

Hermie Manalo

