

CITY OF WINNIPEG

# 2017 LOCAL STREET RENEWALS PACKAGE 17-R-02

GEOTECHNICAL REPORT

APRIL 2017





# 2017 LOCAL STREET RENWALS PACKAGE 17-R-02

## GEOTECHNICAL REPORT

**City of Winnipeg**

### **GEOTECHNICAL REPORT**

Project: 17M-00182-00

Date: April 2017

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#### **WSP Canada Inc.**

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# REVISION HISTORY

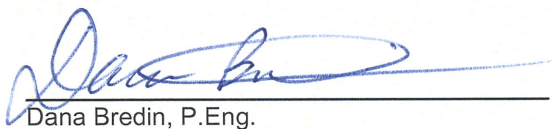
VERSION	DATE	DESCRIPTION
1	APRIL 13, 2017	Issued for Tender



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# SIGNATURES

PREPARED BY



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Geotechnical / Civil Engineer

REVIEWED BY



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Senior Geotechnical Engineer







# TABLE OF CONTENTS

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

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## APPENDICES

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



# 1 INTRODUCTION

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

# 2 SUB-SURFACE INVESTIGATION AND TESTING

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

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

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

# 3 CLOSURE

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

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

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

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

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

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

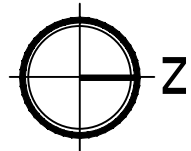
All files, notes, source data, test results and master files are retained by the Consultant and remain the property of the Consultant.

# Appendix A

TEST HOLE LOCATIONS



Feb 10, 2017 - 9:05am  
P:\2017\17M-00182-00 - 2017 Local Streets Renewals 17-R-02\MMM Drawings\Sketches\17M-00182-00-SK-01 Chrislind Street Test Hole Locations 2017.02.08.dwg -tab:LA.YOUT



### METRIC

WHOLE NUMBERS INDICATE MILLIMETRES  
DECIMALIZED NUMBERS INDICATE METRES

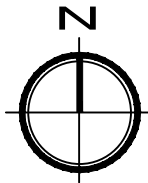
NOTE:  
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2017 LOCAL RENEWAL PROGRAM		
CHRISLIND STREET - REGENT AVENUE W TO RAVELSTON AVENUE W		
TEST HOLE LOCATIONS		
SCALE: NTS	DATE: 08-FEB-2017	DWG. No. 17M-00182-00-SK-01

Feb 10, 2017 - 9:12am  
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**METRIC**

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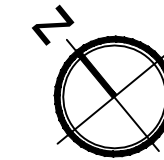


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<b>2017 LOCAL RENEWAL PROGRAM</b>		
<b>KERNAGHAN AVENUE - ROBSON STREET TO PLESSIS ROAD</b>		
<b>TEST HOLE LOCATIONS</b>		
SCALE: NTS	DATE: 08-FEB-2017	DWG. No. 17M-00182-00-SK-02



Feb 10, 2017 - 9:21am  
P:\2017\17M-00182-00 - 2017 Local Streets Renewals\17-R-02\MMM Drawings\Sketches\17M-00182-00-SK-03 Pinecrest Bay Test Hole Locations 2017.02.08.dwg -tab: LAYOUT



### METRIC

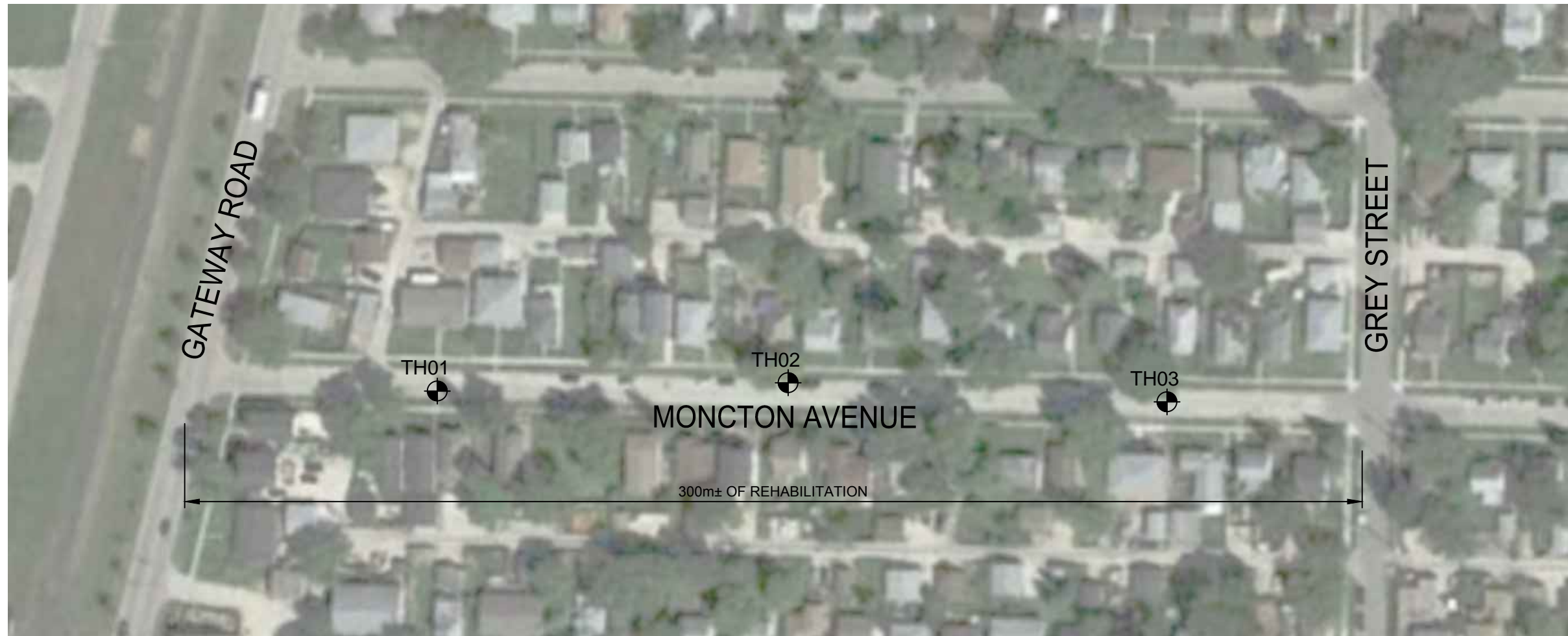
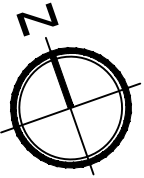
WHOLE NUMBERS INDICATE MILLIMETRES  
DECIMALIZED NUMBERS INDICATE METRES

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2017 LOCAL RENEWAL PROGRAM		
PINECREST BAY - DONWOOD DRIVE TO DONWOOD DRIVE		
TEST HOLE LOCATIONS		
SCALE: NTS	DATE: 08-FEB-2017	DWG. No. 17M-00182-00-SK-03



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2017 LOCAL RENEWAL PROGRAM  
 MONCTON AVENUE - GREY STREET TO GATEWAY ROAD  
 TEST HOLE LOCATIONS

SCALE: NTS	DATE: 08-FEB-2017	DWG. No. 17M-00182-00-SK-04
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# Appendix B

TEST HOLE LOGS





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**TH01 (TH28)**

PAGE 1 OF 1

**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-00182-00  
**DATE STARTED** 3/29/17 **COMPLETED** 3/29/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-02  
**PROJECT LOCATION** Chrislind St btw. Regent Av W & Ravelston Av  
**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
		CONCRETE - 190 mm layer, deteriorated							
		GRANULAR FILL - 80 mm layer							
0.5		CLAY - Brown - Frost to 1.35 m - Stiff below 1.35 m - Stratified with SILT below 2.3 m, soft	MC = 29%			29			
		- Test hole dry after completion, no seepage or sloughing noted	MC = 44%			44			
1.0			MC = 39%			39			
			MC = 34%			34			
1.5			MC = 40%			40			
			MC = 37%			37			
2.0			MC = 39%			39			
2.5									
3.0			MC = 43%			43			

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP 17M-00182 - CHRISLIND.GPJ GINT STD CANADA.GDT 4/11/17



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**TH02 (TH29)**

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**CLIENT** City of Winnipeg  
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**DATE STARTED** 3/29/17 **COMPLETED** 3/29/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-02  
**PROJECT LOCATION** Chrislind St btw. Regent Av W & Ravelston Av  
**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
		CONCRETE - 200 mm layer, intact							
		GRANULAR FILL - 150 mm layer	MC = 32%			32			
0.5		CLAY FILL - Black-grey mixed - Trace of fine gravel	MC = 32%			32			
1.0		CLAY - Grey - Frost to 1.35 m - Brown, stiff below 1.35 m - Trace of silt inclusions below 2.1 m - Soft below 2.1 m	MC = 31%			31			
		- Test hole dry after completion, no seepage or sloughing noted							
1.5			MC = 29%			29			
			MC = 30%			30			
2.0			MC = 39%			39			
			MC = 38%			38			
2.5									
3.0			MC = 45%			45			
Bottom of hole at 3.05 m.									

GENERAL BH PLOTS - WSP 17M-00182 - CHRISLIND.GPJ GINT STD CANADA.GDT 4/11/17



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**TH03 (TH30)**

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**CLIENT** City of Winnipeg  
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**DATE STARTED** 3/29/17 **COMPLETED** 3/29/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-02  
**PROJECT LOCATION** Chrislind St btw. Regent Av W & Ravelston Av  
**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 - 50 mm layer							
0.05 - 0.15		CONCRETE - 80 mm layer, deteriorated							
0.15 - 0.35		GRANULAR FILL - 230 mm layer	MC = 6%			6			
0.35 - 0.95		CLAY FILL - Black-grey mixed - Trace of fine gravel	MC = 33%			33			
0.95 - 1.35		CLAY - Brown - Frost to 1.35 m	MC = 34%			34			
1.35 - 1.85		SILT - Tan-brown, moist, soft	MC = 36%			36			
1.85 - 2.15		SILT - Tan-brown, moist, soft	MC = 25%			25			
2.15 - 2.85		CLAY - Brown, stiff, cohesive - Test hole dry after completion, no seepage or sloughing noted	MC = 33%			33			
2.85 - 3.05		CLAY - Brown, stiff, cohesive - Test hole dry after completion, no seepage or sloughing noted	MC = 39%			39			
3.05 - 3.05		Bottom of hole at 3.05 m.	MC = 42%			42			

GENERAL BH PLOTS - WSP 17M-00182 - CHRISLIND.GPJ GINT STD CANADA.GDT 4/11/17



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**TH04 (TH27)**

PAGE 1 OF 1

**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-00182-00  
**DATE STARTED** 3/24/17 **COMPLETED** 3/24/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-02  
**PROJECT LOCATION** Chrislind St btw. Regent Av W & Ravelston Av  
**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 - 0.15		CONCRETE - 180 mm layer, deteriorated							
0.15 - 0.45		GRANULAR FILL - 300 mm layer	MC = 21%			21			
0.45 - 0.8		CLAY FILL - Grey, trace of fine gravel	MC = 32%			32			
0.8 - 1.5		CLAY - Brown, stratified with silt - Frost to 1.5 m - SILTY from 1.5 m to 2.0 m - Stiff, cohesive below 2.0 m	MC = 40%			40			
1.5 - 1.8		- Test hole dry after completion, no seepage or sloughing noted	MC = 37%			37			
1.8 - 2.1			MC = 40%			40			
2.1 - 2.4			MC = 39%			39			
2.4 - 2.7			MC = 29%			29			
2.7 - 3.0			MC = 41%			41			

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP 17M-00182 - CHRISLIND.GPJ GINT STD CANADA.GDT 4/11/17





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**TH05 (TH26)**

PAGE 1 OF 1

**CLIENT** City of Winnipeg  
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**DATE STARTED** 3/24/17 **COMPLETED** 3/24/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-02  
**PROJECT LOCATION** Chrislind St btw. Regent Av W & Ravelston Av  
**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 - 0.15		CONCRETE - 180 mm layer, deteriorated							
0.15 - 0.45		GRANULAR FILL - 300 mm layer	MC = 20%			20			
0.45 - 0.95		CLAY FILL - Grey, trace of fine gravel	MC = 35%			35			
0.95 - 1.55		CLAY - Grey - Frost to 1.5 m - Brown, stiff, cohesive below 1.5 m - Trace of silt inclusions below 2.4 m	MC = 34%			34			
1.55 - 2.05			MC = 40%			40			
2.05 - 2.45			MC = 38%			38			
2.45 - 2.95			MC = 40%			40			
2.95 - 3.05			MC = 41%			41			
3.05 - 3.05			MC = 43%			43			

Bottom of hole at 3.05 m.

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**TH01 (TH31)**

PAGE 1 OF 1

**CLIENT** City of Winnipeg  
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**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-02  
**PROJECT LOCATION** Kernaghan Av btw. Plessis Rd & Robson St  
**GROUND ELEVATION** \_\_\_\_\_ **HOLE SIZE** 125 mm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

GENERAL BH PLOTS - WSP 17M-00182 - KERNAGHAN.GPJ GINT STD CANADA GDT 4/11/17

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 - 0.17		CONCRETE - 170 mm intact							
0.17 - 1.1		CLAY FILL - Black-grey mixed - Trace of SILT - Trace of fine gravel	MC = 28%			28			
1.1 - 1.15			MC = 32%			32			
1.15 - 1.2			MC = 33%			33			
1.2 - 1.35		CLAY - Brown - Frost to 1.35 m	MC = 28%			28			
1.35 - 1.85		SILT - Tan-brown, moist, soft	MC = 26%			26			
1.85 - 2.0			MC = 24%			24			
2.0 - 3.05		CLAY - Brown, stiff, cohesive  - Test hole dry after completion, no seepage or sloughing noted	MC = 41%			41			
3.05			MC = 45%			45			

Bottom of hole at 3.05 m.



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**TH02 (TH32)**

PAGE 1 OF 1

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**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-02  
**PROJECT LOCATION** Kernaghan Av btw. Plessis Rd & Robson St  
**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 - 0.1		CONCRETE - 170 mm intact							
0.1 - 1.0		CLAY FILL - Grey, mixed - Trace of SILT - Trace of fine gravel	MC = 31%			31			
0.5			MC = 33%			33			
1.0			MC = 34%			34			
1.0 - 1.5		CLAY - Brown - Frost to 1.35 m - SILTY from 1.35 m to 1.5 m, soft - Stiff, cohesive below 1.5 m - Soft below 2.4 m	MC = 39%			39			
1.5			MC = 35%			35			
2.0			MC = 41%			41			
2.5			MC = 43%			43			
3.0			MC = 43%			43			

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP 17M-00182 - KERNAGHAN.GPJ GINT STD CANADA GDT 4/11/17



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**TH03 (TH33)**

PAGE 1 OF 1

**CLIENT** City of Winnipeg  
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**DATE STARTED** 3/29/17 **COMPLETED** 3/29/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-02  
**PROJECT LOCATION** Kernaghan Av btw. Plessis Rd & Robson St  
**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 - 0.15		CONCRETE - 150 mm intact							
0.15 - 1.0		CLAY FILL - Grey - Trace of fine gravel	MC = 25%			25			
1.0 - 1.2		CLAY - Brown - Frost to 1.2 m	MC = 31%			31			
1.2 - 1.65		- SILTY from 1.5 m to 1.65 m, soft	MC = 30%			30			
1.65 - 2.1		- Stiff, cohesive below 1.65 m	MC = 29%			29			
2.1 - 2.5		- Soft below 2.1 m	MC = 31%			31			
2.5 - 2.9			MC = 39%			39			
2.9 - 3.05			MC = 44%			44			
3.05 - 3.05			MC = 49%			49			

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP 17M-00182 - KERNAGHAN.GPJ GINT STD CANADA GDT 4/11/17



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 Telephone: (204)-477-6650

**TH04 (TH34)**

PAGE 1 OF 1

**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-00182-00  
**DATE STARTED** 3/29/17 **COMPLETED** 3/29/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-02  
**PROJECT LOCATION** Kernaghan Av btw. Plessis Rd & Robson St  
**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 - 0.1		CONCRETE - 160 mm intact							
0.1 - 2.1		CLAY FILL - Grey, mixed - Frost 1.2 m - Mixed with SILT below 1.2 m, soft	MC = 31%			31			
0.5			MC = 34%			34			
1.0			MC = 36%			36			
1.5			MC = 42%			42			
2.0		CLAY - Brown, stiff, cohesive - Test hole dry after completion, no seepage or sloughing noted	MC = 31%			31			
2.1			MC = 45%			45			
2.5			MC = 37%			37			
3.0			MC = 48%			48			
Bottom of hole at 3.05 m.									

GENERAL BH PLOTS - WSP 17M-00182 - KERNAGHAN.GPJ GINT STD CANADA GDT 4/11/17




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**TH01**

PAGE 1 OF 1

**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-00182-00  
**DATE STARTED** 3/24/17 **COMPLETED** 3/24/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** \_\_\_\_\_  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** Pavement cored only

**PROJECT NAME** 2017 Street Renewals - 17-R-02  
**PROJECT LOCATION** Pinecrest Bay btw. Donwood Dr  
**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
		CONCRETE - 170 mm layer, intact								

DID NOT COMPLETE TESTHOLE DUE TO AN OBSTRUCTION  
 Bottom of hole at 0.17 m.



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**TH02 (TH22)**

PAGE 1 OF 1

**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-00182-00  
**DATE STARTED** 3/24/17 **COMPLETED** 3/24/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-02  
**PROJECT LOCATION** Pinecrest Bay btw. Donwood Dr  
**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 - 0.165		CONCRETE - 165 mm layer, intact							
0.165 - 0.315		GRANULAR FILL - 150 mm layer	MC = 19%			19			
0.315 - 0.8		CLAY FILL - Brown, trace of fine gravel	MC = 30%			30			
0.8 - 1.2		SILT - Tan-brown - Frost to 1.2 m	MC = 24%			24			
1.2 - 1.5		CLAY - Brown, stiff, cohesive	MC = 23%			23			
1.5 - 2.7		- SILTY from 2.7 m to 2.85 m, soft	MC = 23%			23			
2.7 - 2.85		- Test hole dry after completion, no seepage or sloughing noted	MC = 43%			43			
2.85 - 3.0			MC = 44%			44			
3.0 - 3.05			MC = 39%			39			

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP 17M-00182 - PINECREST.GPJ GINT STD CANADA.GDT 4/11/17



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**TH03 (TH23)**

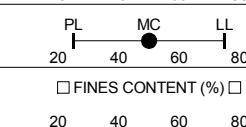
PAGE 1 OF 1

**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-00182-00  
**DATE STARTED** 3/24/17 **COMPLETED** 3/24/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-02  
**PROJECT LOCATION** Pinecrest Bay btw. Donwood Dr  
**GROUND ELEVATION** \_\_\_\_\_ **HOLE SIZE** 125 mm  
**GROUND WATER LEVELS:**  
**AT TIME OF DRILLING** ---  
**AT END OF DRILLING** ---  
**AFTER DRILLING** ---

GENERAL BH PLOTS - WSP 17M-00182 - PINECREST.GPJ GINT STD CANADA.GDT 4/11/17

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		CONCRETE - 180 mm layer, intact							
0.15 - 0.35		GRANULAR FILL - 150 mm layer	MC = 23%			23			
0.35 - 1.75		CLAY - Brown - Frost to 1.2 m	MC = 27%			27			
1.00 - 1.15			MC = 30%			30			
1.15 - 1.30			MC = 29%			29			
1.30 - 1.50			MC = 29%			29			
1.50 - 2.30		SILT - Tan-brown, soft, moist - Clayey from 1.8 m to 2.1 m	MC = 24%			24			
2.30 - 2.50			MC = 24%			24			
2.50 - 3.05		CLAY - Brown, stiff, cohesive - Test hole dry after completion, no seepage or sloughing noted	MC = 47%			47			
Bottom of hole at 3.05 m.									







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**TH04 (TH24)**

PAGE 1 OF 1

**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-00182-00  
**DATE STARTED** 3/24/17 **COMPLETED** 3/24/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-02  
**PROJECT LOCATION** Pinecrest Bay btw. Donwood Dr  
**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 - 0.15		CONCRETE - 180 mm layer, intact							
0.15 - 0.25		GRANULAR FILL - 120 mm layer							
0.25 - 0.6		CLAY FILL - Black-grey mixed above 0.6 m - Trace of fine gravel	MC = 25%			25			
0.6 - 1.35		CLAY - Brown - Frost to 1.35 m	MC = 30%			30			
1.35 - 1.45			MC = 30%			30			
1.45 - 1.6			MC = 30%			30			
1.6 - 1.75		SILT - Tan-brown, soft, moist	MC = 27%			27			
1.75 - 2.0		CLAY - Brown, stiff, cohesive	MC = 31%			31			
2.0 - 2.2		- Test hole dry after completion, no seepage or sloughing noted	MC = 41%			41			
2.2 - 3.0			MC = 47%			47			

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP 17M-00182 - PINECREST.GPJ GINT STD CANADA.GDT 4/11/17



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**TH05 (TH25)**

PAGE 1 OF 1

**CLIENT** City of Winnipeg  
**PROJECT NUMBER** 17M-00182-00  
**DATE STARTED** 3/24/17 **COMPLETED** 3/24/17  
**DRILLING CONTRACTOR** Maple Leaf Drilling  
**DRILLING METHOD** Continuous Auger  
**LOGGED BY** Dana Bredin **CHECKED BY** Silvestre Urbano  
**NOTES** \_\_\_\_\_

**PROJECT NAME** 2017 Street Renewals - 17-R-02  
**PROJECT LOCATION** Pinecrest Bay btw. Donwood Dr  
**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 - 0.1		CONCRETE - 170 mm layer, intact							
0.1 - 0.2		GRANULAR FILL - 100 mm layer							
0.2 - 0.5		CLAY FILL - Brown - Trace of fine gravel	MC = 29%			29			
0.5 - 1.0		CLAY - Brown, stratified with silt - Frost to 1.35 m - SILTY below 1.2 m - Trace oxidation at 1.5 m	MC = 28%			28			
1.0 - 1.5			MC = 27%			27			
1.5 - 2.0			MC = 26%			26			
2.0 - 2.5		SILT - Tan-brown, soft, moist to wet	MC = 28%			28			
2.5 - 3.0		CLAY - Brown, stiff - SILTY below 2.7 m, soft  - Test hole dry after completion, no seepage or sloughing noted	MC = 24%			24			
3.0 - 3.05			MC = 23%			23			
3.0 - 3.05			MC = 44%			44			

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP 17M-00182 - PINECREST.GPJ GINT STD CANADA.GDT 4/11/17

# Appendix C

**MATERIAL TESTING RESULTS**



### MOISTURE CONTENT OF SOIL (ASTM D2216)

CLIENT: WSP	TEST NO: 1	PROJECT NO: 103-1704
PROJECT: 17M-002	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 3-Apr-2017	TESTED BY: Leon Yang
TEST LOCATION: PineCrest		

Description	TH 22	TH 22	TH 22	TH 22	TH 22
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	159.60	153.60	167.50	163.70	177.30
Wt Dry Sample + Tare	135.30	119.30	135.50	134.10	145.40
Wt Water	24.30	34.30	32.00	29.60	31.90
Wt Tare	4.30	4.20	4.30	4.10	4.30
Wt Dry Sample	131.00	115.10	131.20	130.00	141.10
<b>Moisture Content (%)</b>	<b>18.5</b>	<b>29.8</b>	<b>24.4</b>	<b>22.8</b>	<b>22.6</b>

Description	TH 22	TH 22	TH 22		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	199.40	190.40	156.00		
Wt Dry Sample + Tare	141.20	133.20	113.40		
Wt Water	58.20	57.20	42.60		
Wt Tare	4.10	4.20	4.60		
Wt Dry Sample	137.10	129.00	108.80		
<b>Moisture Content (%)</b>	<b>42.5</b>	<b>44.3</b>	<b>39.2</b>		

Description	TH 23	TH 23	TH 23	TH 23	TH 23
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	154.70	149.70	150.30	157.80	157.80
Wt Dry Sample + Tare	126.80	118.80	116.50	122.90	122.90
Wt Water	27.90	30.90	33.80	34.90	34.90
Wt Tare	4.20	4.20	4.60	4.30	4.30
Wt Dry Sample	122.60	114.60	111.90	118.60	118.60
<b>Moisture Content (%)</b>	<b>22.8</b>	<b>27.0</b>	<b>30.2</b>	<b>29.4</b>	<b>29.4</b>

Description	TH 23	TH 23	TH 23		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	174.10	178.50	157.50		
Wt Dry Sample + Tare	141.40	145.10	108.50		
Wt Water	32.70	33.40	49.00		
Wt Tare	4.70	4.30	4.30		
Wt Dry Sample	136.70	140.80	104.20		
<b>Moisture Content (%)</b>	<b>23.9</b>	<b>23.7</b>	<b>47.0</b>		

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

CLIENT: WSP	TEST NO: 1	PROJECT NO: 103-1704
PROJECT: 17M-002	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 3-Apr-2017	TESTED BY: Leon Yang
TEST LOCATION: PineCrest		

Description	TH 24	TH 24	TH 24	TH 24	TH 24
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	165.50	151.70	150.70	163.30	156.70
Wt Dry Sample + Tare	133.20	117.60	117.10	126.20	124.10
Wt Water	32.30	34.10	33.60	37.10	32.60
Wt Tare	4.20	4.30	4.10	4.10	4.10
Wt Dry Sample	129.00	113.30	113.00	122.10	120.00
<b>Moisture Content (%)</b>	<b>25.0</b>	<b>30.1</b>	<b>29.7</b>	<b>30.4</b>	<b>27.2</b>

Description	TH 24	TH 24	TH 24		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	170.60	166.60	167.00		
Wt Dry Sample + Tare	131.70	119.50	114.80		
Wt Water	38.90	47.10	52.20		
Wt Tare	4.20	4.20	4.50		
Wt Dry Sample	127.50	115.30	110.30		
<b>Moisture Content (%)</b>	<b>30.5</b>	<b>40.8</b>	<b>47.3</b>		

Description	TH 25	TH 25	TH 25	TH 25	TH 25
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	173.60	152.40	175.20	206.10	182.10
Wt Dry Sample + Tare	135.60	120.20	139.10	165.00	143.80
Wt Water	38.00	32.20	36.10	41.10	38.30
Wt Tare	4.50	4.30	4.20	4.20	4.70
Wt Dry Sample	131.10	115.90	134.90	160.80	139.10
<b>Moisture Content (%)</b>	<b>29.0</b>	<b>27.8</b>	<b>26.8</b>	<b>25.6</b>	<b>27.5</b>

Description	TH 25	TH 25	TH 25		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	160.00	163.50	159.80		
Wt Dry Sample + Tare	130.00	133.40	112.10		
Wt Water	30.00	30.10	47.70		
Wt Tare	4.30	4.20	4.30		
Wt Dry Sample	125.70	129.20	107.80		
<b>Moisture Content (%)</b>	<b>23.9</b>	<b>23.3</b>	<b>44.2</b>		

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

CLIENT: WSP	TEST NO: 2	PROJECT NO: 103-1704
PROJECT: 17M-002	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 3-Apr-2017	TESTED BY: Leon Yang
TEST LOCATION: Chrisund		

Description	TH 26	TH 26	TH 26	TH 26	TH 26
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	190.70	161.10	181.90	152.50	159.50
Wt Dry Sample + Tare	160.20	120.20	137.30	109.90	116.90
Wt Water	30.50	40.90	44.60	42.60	42.60
Wt Tare	4.20	4.20	4.20	4.20	4.60
Wt Dry Sample	156.00	116.00	133.10	105.70	112.30
<b>Moisture Content (%)</b>	<b>19.6</b>	<b>35.3</b>	<b>33.5</b>	<b>40.3</b>	<b>37.9</b>

Description	TH 26	TH 26	TH 26		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	192.40	179.00	189.10		
Wt Dry Sample + Tare	138.30	128.30	133.60		
Wt Water	54.10	50.70	55.50		
Wt Tare	4.40	4.20	4.20		
Wt Dry Sample	133.90	124.10	129.40		
<b>Moisture Content (%)</b>	<b>40.4</b>	<b>40.9</b>	<b>42.9</b>		

Description	TH 27	TH 27	TH 27	TH 27	TH 27
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	198.10	158.20	197.20	185.70	368.50
Wt Dry Sample + Tare	163.90	120.60	142.10	136.60	266.50
Wt Water	34.20	37.60	55.10	49.10	102.00
Wt Tare	4.30	4.20	4.30	4.70	13.20
Wt Dry Sample	159.60	116.40	137.80	131.90	253.30
<b>Moisture Content (%)</b>	<b>21.4</b>	<b>32.3</b>	<b>40.0</b>	<b>37.2</b>	<b>40.3</b>

Description	TH 27	TH 27	TH 27		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	173.60	182.80	173.80		
Wt Dry Sample + Tare	126.30	143.20	124.30		
Wt Water	47.30	39.60	49.50		
Wt Tare	4.10	4.30	4.30		
Wt Dry Sample	122.20	138.90	120.00		
<b>Moisture Content (%)</b>	<b>38.7</b>	<b>28.5</b>	<b>41.2</b>		

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

CLIENT: WSP	TEST NO: 2	PROJECT NO: 103-1704
PROJECT: 17M-002	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 3-Apr-2017	TESTED BY: Leon Yang
TEST LOCATION: Chrisund		

Description	TH 28	TH 28	TH 28	TH 28	TH 28
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	208.20	173.70	160.00	168.20	166.00
Wt Dry Sample + Tare	162.40	121.70	115.90	126.60	120.10
Wt Water	45.80	52.00	44.10	41.60	45.90
Wt Tare	4.40	4.20	4.10	4.40	4.30
Wt Dry Sample	158.00	117.50	111.80	122.20	115.80
<b>Moisture Content (%)</b>	<b>29.0</b>	<b>44.3</b>	<b>39.4</b>	<b>34.0</b>	<b>39.6</b>

Description	TH 28	TH 28	TH 28		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	166.10	154.30	169.60		
Wt Dry Sample + Tare	122.50	112.30	119.60		
Wt Water	43.60	42.00	50.00		
Wt Tare	4.20	4.40	4.40		
Wt Dry Sample	118.30	107.90	115.20		
<b>Moisture Content (%)</b>	<b>36.9</b>	<b>38.9</b>	<b>43.4</b>		

Description	TH 29	TH 29	TH 29	TH 29	TH 29
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	152.00	158.00	155.90	161.90	150.30
Wt Dry Sample + Tare	116.00	121.20	120.00	126.10	116.40
Wt Water	36.00	36.80	35.90	35.80	33.90
Wt Tare	4.20	4.20	4.20	4.30	4.20
Wt Dry Sample	111.80	117.00	115.80	121.80	112.20
<b>Moisture Content (%)</b>	<b>32.2</b>	<b>31.5</b>	<b>31.0</b>	<b>29.4</b>	<b>30.2</b>

Description	TH 29	TH 29	TH 29		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	170.70	168.90	161.50		
Wt Dry Sample + Tare	124.10	123.70	112.70		
Wt Water	46.60	45.20	48.80		
Wt Tare	4.10	4.20	4.20		
Wt Dry Sample	120.00	119.50	108.50		
<b>Moisture Content (%)</b>	<b>38.8</b>	<b>37.8</b>	<b>45.0</b>		



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

CLIENT: WSP	TEST NO: 2	PROJECT NO: 103-1704
PROJECT: 17M-002	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 3-Apr-2017	TESTED BY: Leon Yang
TEST LOCATION: Chrisund		

Description	TH 30	TH 30	TH 30	TH 30	TH 30
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	181.30	164.60	171.20	170.90	159.50
Wt Dry Sample + Tare	171.80	125.10	128.80	127.10	128.50
Wt Water	9.50	39.50	42.40	43.80	31.00
Wt Tare	4.20	4.40	4.30	4.80	4.50
Wt Dry Sample	167.60	120.70	124.50	122.30	124.00
<b>Moisture Content (%)</b>	<b>5.7</b>	<b>32.7</b>	<b>34.1</b>	<b>35.8</b>	<b>25.0</b>

Description	TH 30	TH 30	TH 30		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	191.40	151.80	151.10		
Wt Dry Sample + Tare	145.30	110.10	108.00		
Wt Water	46.10	41.70	43.10		
Wt Tare	4.20	4.30	4.30		
Wt Dry Sample	141.10	105.80	103.70		
<b>Moisture Content (%)</b>	<b>32.7</b>	<b>39.4</b>	<b>41.6</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: 3	PROJECT NO: 103-1704
PROJECT: 17M-002	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 3-Apr-2017	TESTED BY: Leon Yang
TEST LOCATION: Kernaghan		

Description	TH 31	TH 31	TH 31	TH 31	TH 31
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	191.20	155.50	164.60	150.80	172.40
Wt Dry Sample + Tare	150.50	119.30	124.50	118.40	138.10
Wt Water	40.70	36.20	40.10	32.40	34.30
Wt Tare	4.30	4.30	4.50	4.20	4.30
Wt Dry Sample	146.20	115.00	120.00	114.20	133.80
<b>Moisture Content (%)</b>	<b>27.8</b>	<b>31.5</b>	<b>33.4</b>	<b>28.4</b>	<b>25.6</b>

Description	TH 31	TH 31	TH 31		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	162.80	161.50	177.80		
Wt Dry Sample + Tare	132.20	115.60	124.00		
Wt Water	30.60	45.90	53.80		
Wt Tare	4.20	4.30	4.30		
Wt Dry Sample	128.00	111.30	119.70		
<b>Moisture Content (%)</b>	<b>23.9</b>	<b>41.2</b>	<b>44.9</b>		

Description	TH 32	TH 32	TH 32	TH 32	TH 32
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	164.00	168.40	163.60	334.40	156.50
Wt Dry Sample + Tare	126.10	128.20	123.60	244.40	117.30
Wt Water	37.90	40.20	40.00	90.00	39.20
Wt Tare	4.30	4.40	4.20	14.10	4.30
Wt Dry Sample	121.80	123.80	119.40	230.30	113.00
<b>Moisture Content (%)</b>	<b>31.1</b>	<b>32.5</b>	<b>33.5</b>	<b>39.1</b>	<b>34.7</b>

Description	TH 32	TH 32	TH 32		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	155.80	166.20	157.70		
Wt Dry Sample + Tare	111.90	117.50	111.30		
Wt Water	43.90	48.70	46.40		
Wt Tare	4.30	4.40	4.20		
Wt Dry Sample	107.60	113.10	107.10		
<b>Moisture Content (%)</b>	<b>40.8</b>	<b>43.1</b>	<b>43.3</b>		

### MOISTURE CONTENT OF SOIL (ASTM D2216)

CLIENT: WSP	TEST NO: 3	PROJECT NO: 103-1704
PROJECT: 17M-002	DATE SAMPLED:	SAMPLED BY: Client
PROJECT CONTACT: Silvestre Urbano	DATE TESTED: 3-Apr-2017	TESTED BY: Leon Yang
TEST LOCATION: Kernaghan		

Description	TH 33	TH 33	TH 33	TH 33	TH 33
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	175.50	170.70	158.20	186.60	168.50
Wt Dry Sample + Tare	140.80	131.40	123.00	146.10	129.80
Wt Water	34.70	39.30	35.20	40.50	38.70
Wt Tare	4.20	4.20	4.20	4.20	4.30
Wt Dry Sample	136.60	127.20	118.80	141.90	125.50
<b>Moisture Content (%)</b>	<b>25.4</b>	<b>30.9</b>	<b>29.6</b>	<b>28.5</b>	<b>30.8</b>

Description	TH 33	TH 33	TH 33		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	155.70	156.50	160.00		
Wt Dry Sample + Tare	113.60	109.90	109.20		
Wt Water	42.10	46.60	50.80		
Wt Tare	4.30	4.60	4.40		
Wt Dry Sample	109.30	105.30	104.80		
<b>Moisture Content (%)</b>	<b>38.5</b>	<b>44.3</b>	<b>48.5</b>		

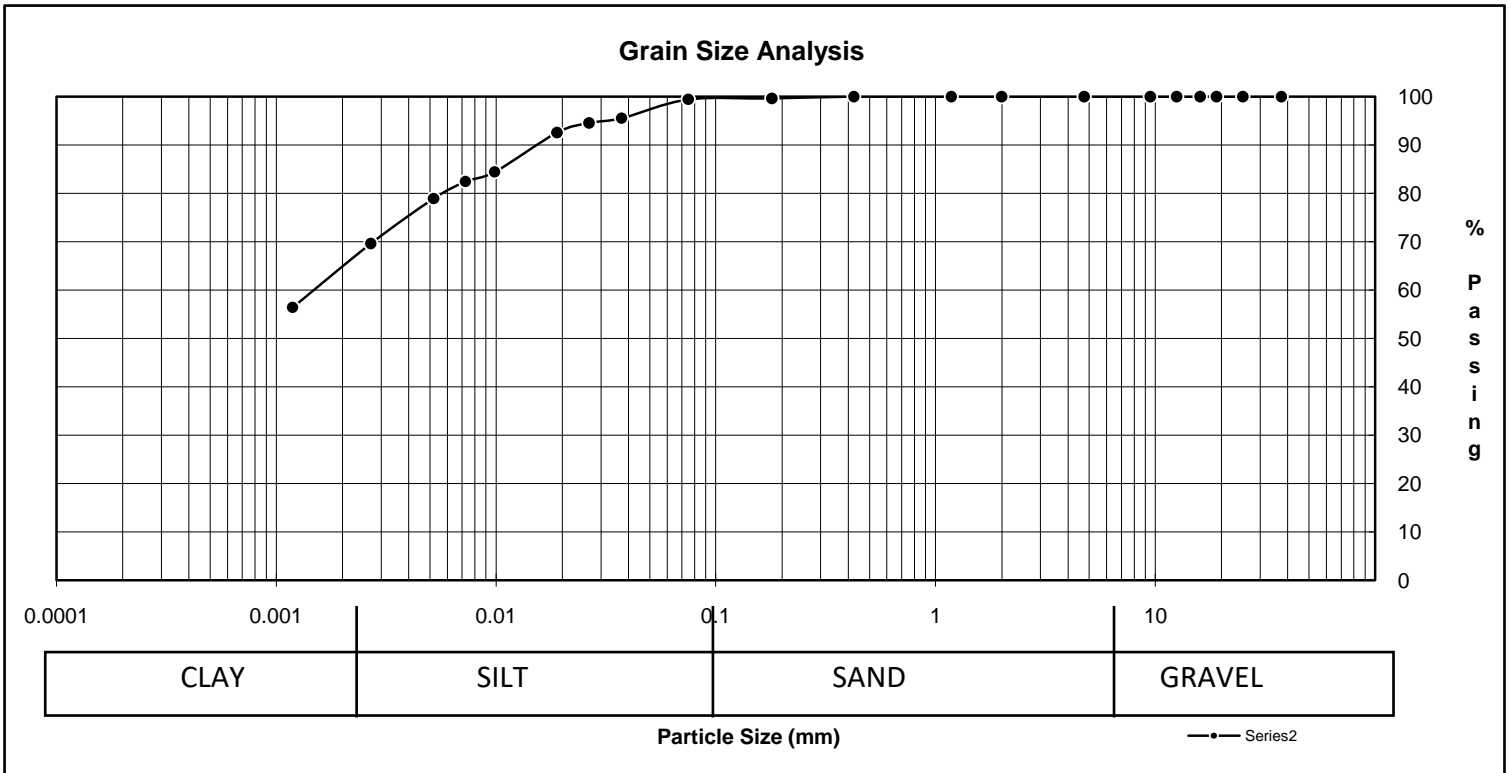
Description	TH 34	TH 34	TH 34	TH 34	TH 34
Depth (ft)	1	2	3	4	5
Wt Wet Sample + Tare	180.30	191.40	156.70	176.20	203.80
Wt Dry Sample + Tare	139.10	144.00	116.60	125.30	156.80
Wt Water	41.20	47.40	40.10	50.90	47.00
Wt Tare	4.20	4.20	4.60	4.20	4.20
Wt Dry Sample	134.90	139.80	112.00	121.10	152.60
<b>Moisture Content (%)</b>	<b>30.5</b>	<b>33.9</b>	<b>35.8</b>	<b>42.0</b>	<b>30.8</b>

Description	TH 34	TH 34	TH 34		
Depth (ft)	6	7	10		
Wt Wet Sample + Tare	155.00	197.50	169.70		
Wt Dry Sample + Tare	108.00	145.40	115.90		
Wt Water	47.00	52.10	53.80		
Wt Tare	4.30	4.30	4.80		
Wt Dry Sample	103.70	141.10	111.10		
<b>Moisture Content (%)</b>	<b>45.3</b>	<b>36.9</b>	<b>48.4</b>		

**PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT**

CLIENT: WSP PROJECT NO. 103-1704  
1600 Buffalo Place  
Winnipeg, MB R3T 6B8  
ATTN: Silvestre Urbano  
PROJECT: 17M-002

Date Sampled:	unknown	Date Received:	29-Mar-17	Sieve Analysis		Hydrometer Analysis	
Sampled By:	Client	Date Tested:	3-Apr-17	Sieve (mm)	% Passing	Diameter	% Finer
<b>Material Identification</b> B.H./T.H. No. TH24 @ 5' Sample No. 14 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	0.0373	95.6
				9.50	100.0	0.0265	94.6
				4.75	100.0	0.0190	92.6
				2.00	100.0	0.0099	84.5
				1.18	100.0	0.0073	82.5
			0.425	100.0	0.0052	78.9	
			0.180	99.6	0.0027	69.6	
			0.075	99.4	0.0012	56.4	



SOIL DESCRIPTION	% Composition		D10	D30	D60	Cu	Cc
	Gravel	Sand					
SILTY CLAY	0.6	Sand					0.00270
	43.0	Silt					#DIV/0!
	56.4	Clay					#DIV/0!

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: IA/GM

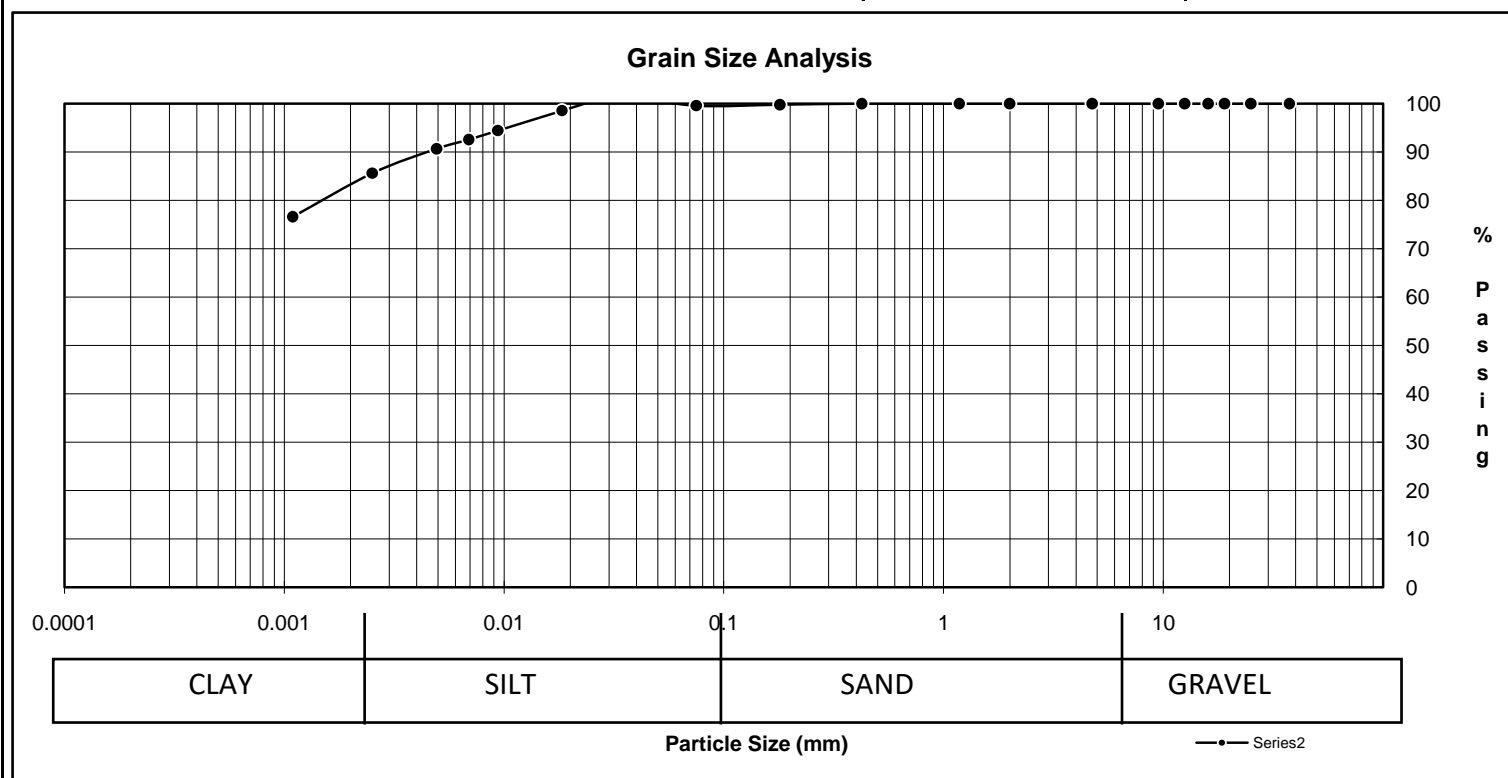
Reviewed by: Hermie Manalo



**PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT**

CLIENT: WSP PROJECT NO. 103-1704  
1600 Buffalo Place  
Winnipeg, MB R3T 6B8  
ATTN: Silvestre Urbano  
PROJECT: 17M-002

Date Sampled:	unknown	Date Received:	29-Mar-17	Sieve Analysis		Hydrometer Analysis	
Sampled By:	Client	Date Tested:	3-Apr-17	Sieve (mm)	% Passing	Diameter	% Finer
<b>Material Identification</b> B.H./T.H. No. <b>TH32 @ 4'</b> Sample No. <b>16</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	0.0361	101.6
				9.50	100.0	0.0257	100.6
				4.75	100.0	0.0184	98.6
				2.00	100.0	0.0094	94.5
				1.18	100.0	0.0069	92.6
0.425	100.0	0.0049	90.7				
0.180	99.8	0.0025	85.6				
0.075	99.6	0.0011	76.6				



SOIL DESCRIPTION	% Composition		D10	
	HEAVY CLAY	0.4	Gravel	D30
23.0		Sand	D60	
76.6		Silt	Cu	#DIV/0!
		Clay	Cc	#DIV/0!

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: IA/GM

Reviewed by: Hermie Manalo

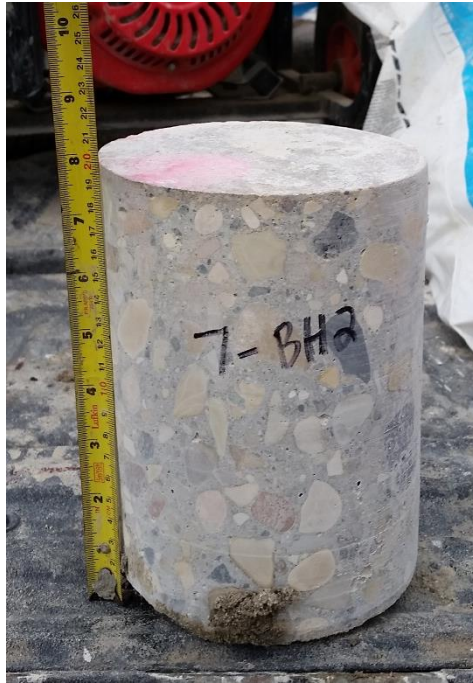
# Appendix D

PHOTOS OF PAVEMENT CORES





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



**TH02** – 200 mm intact

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

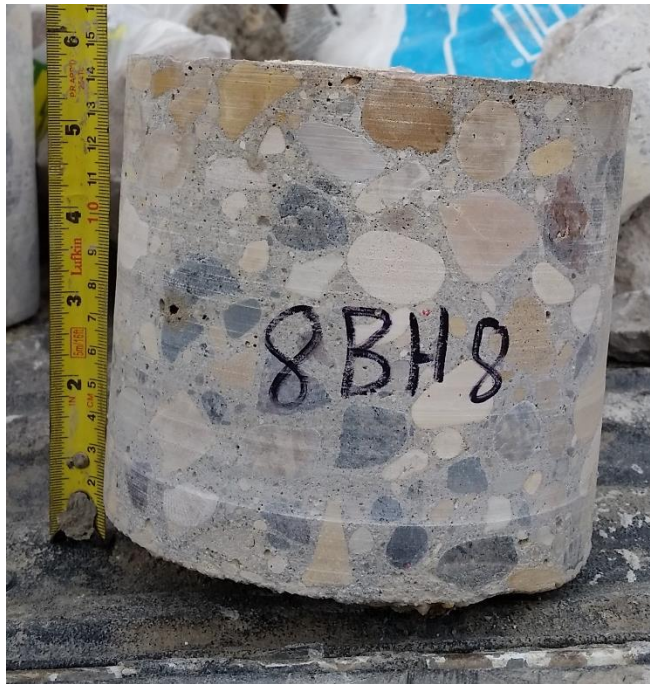
**Kernaghan Avenue from Plessis Road to Robson Street (Site #8)**



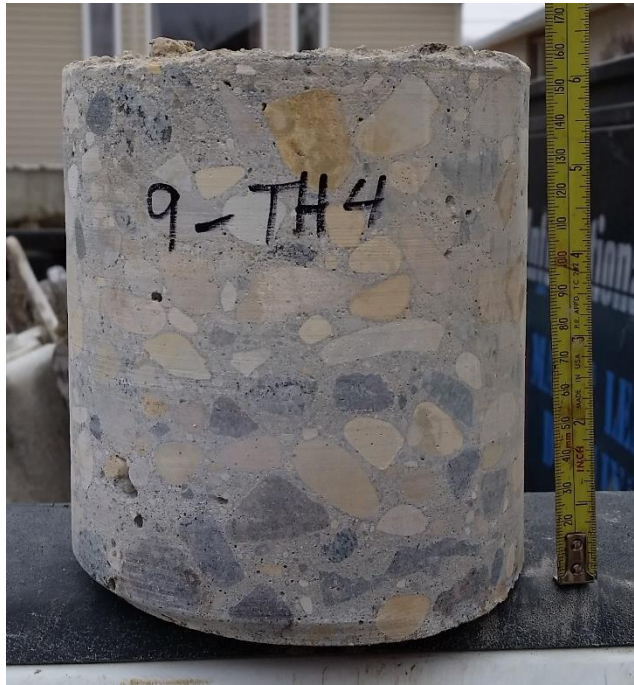
**TH01** – 170 mm intact (mislabelled in photo, BH6 = TH01)



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

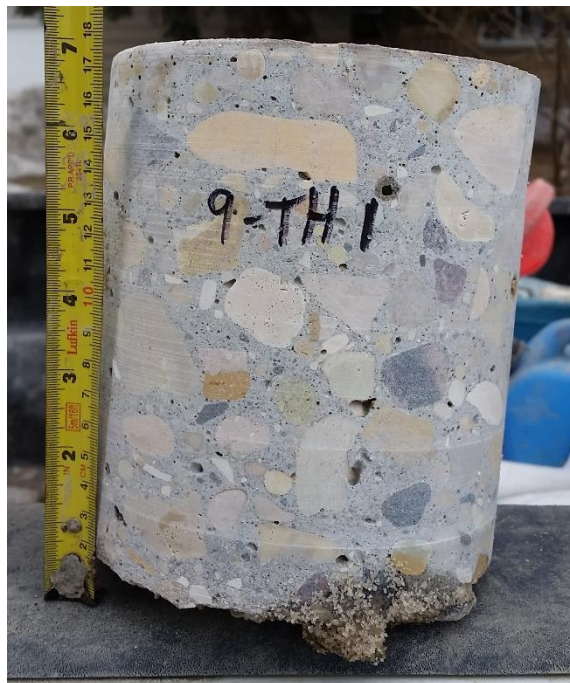


**TH03** – 150 mm intact (mislabelled in photo, BH8 = TH03)



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

**Pinecrest Bay (Site #9)**



**TH01** – 170 mm intact



**TH02 – 165 mm intact**



**TH03 – 180 mm intact**



**TH04 – 180 mm intact**

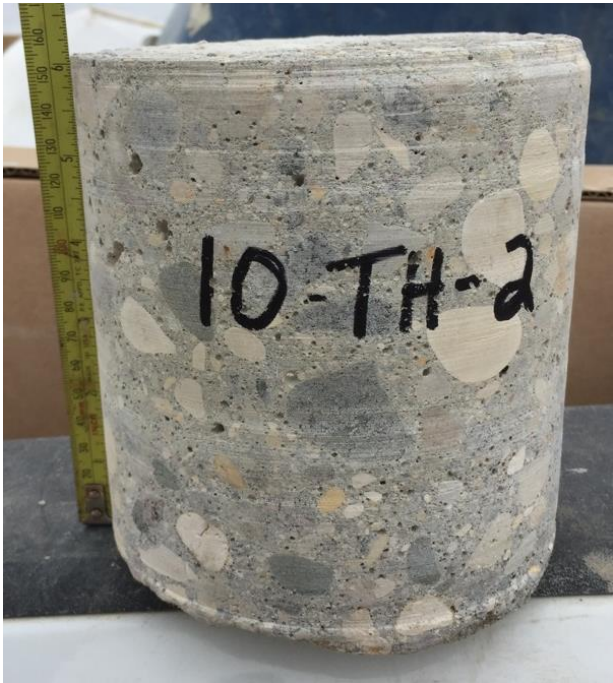


**TH05 – 170 mm intact**

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



**TH01 – 150 mm intact**



**TH02 – 150 mm intact**



TH03 – 155 mm intact