
**GEOTECHNICAL STREET TESTING PROGRAM
OXFORD ST. / CAMBRIDGE ST. ALLEY,
WAVERLEY ST. / OXFORD ST. ALLEY, WATERLOO ST. / ASH ST. ALLEY,
GROSVENOR AVE. / DORCHESTER AVE. ALLEY,
STRADBROOK AVE. / WARDLAW AVE. ALLEY, KRAMBELE PLACE ALLEY,
WINNIPEG, MANITOBA**

Prepared for:

**City of Winnipeg
Public Works Department**

**Project No: 151 13889 00
April 6, 2016**



**WSP Canada Inc.
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TABLE OF CONTENTS

1.0 SUMMARY 2

2.0 INTRODUCTION 2

2.1 SCOPE OF WORK/ BACKGROUND 2

2.2 PROPOSED STREET RECONSTRUCTION AND UPGRADES 2

3.0 FIELD METHODOLOGY 3

4.0 FIELD TESTING 3

5.0 TEST RESULTS 3

6.0 CLOSURE 5

- Appendix A – Oxford St. / Cambridge St. Alley**
- Appendix B –Waverley St. / Oxford St. Alley**
- Appendix C –Waterloo St. / Ash St. Alley**
- Appendix D –Grosvenor Ave. / Dorchester Ave. Alley**
- Appendix E –Stradbroke Ave. / Wardlaw Ave. Alley**
- Appendix F –Krambele Place Alley**

1.0 SUMMARY

A geotechnical investigation was conducted for the proposed back lane upgrade projects in Winnipeg, Manitoba. The purpose of this investigation was to assess the general subsurface conditions with respect to identifying the existing pavement structure and the underlying soil profile.

Six Alleys (Oxford St. / Cambridge St. Alley from Grosvenor Avenue to Corydon Avenue, Waverley St. / Oxford St. Alley from Grosvenor Avenue to Kingsway Avenue, Waterloo St. / Ash St. Alley from Wellington Crescent to Academy Road, Grosvenor Ave. / Dorchester Ave. Alley from Lilac Street to Wentworth Street, Stradbrook Ave. / Wardlaw Ave. Alley from Scott Street to Donald Street, Krambele Place Alley from Crossgate Road to Whitehall Boulevard) were cored and drilled to at least 2.13m depth in conjunction with City of Winnipeg (COW) geotechnical investigation guideline.

The subsurface conditions under the investigated streets are summarized in Appendix A to F consisting of a Table, Site Plan, Testhole Logs and Photographs.

2.0 INTRODUCTION

2.1 SCOPE OF WORK/ BACKGROUND

WSP Inc. was retained to undertake a soils investigation for a proposed alley reconstruction and upgrade in Winnipeg, Manitoba. The purpose of this work was to establish the soil and groundwater conditions at the sites, of which the pavement structure is identified and soil stratigraphy is profiled using the City of Winnipeg (COW) geotechnical investigation guideline. Authorization to proceed with the work was provided by City of Winnipeg.

2.2 PROPOSED ALLEY RECONSTRUCTION AND UPGRADES

The proposed alleys are from Oxford St. / Cambridge St. Alley (Grosvenor Avenue to Corydon Avenue), Waverley St. / Oxford St. Alley (Grosvenor Avenue to Kingsway Avenue), Waterloo St. / Ash St. Alley (Wellington Crescent to Academy Road), Grosvenor Ave. / Dorchester Ave. Alley (Lilac Street to Wentworth Street), Stradbrook Ave. / Wardlaw Ave. Alley (Scott Street to Donald Street) and Krambele Place Alley (Crossgate Road to Whitehall

Boulevard).

3.0 FIELD METHODOLOGY

The subsoils encountered were visually classified to the full extent in the testhole and representative soil samples were recovered at regular depth intervals (every 300mm down to 2.13m). For confirmation, all of the soil samples are tested for moisture contents and selected soil samples (minimum one per street) between the depth of 0.3m and 0.9m were submitted for Atterberg Limit test and Particle Size Analysis test (PSA). The asphalt and concrete cores were measured for thicknesses and assess its condition (poor or good). In addition, each core was photograph. Any groundwater seepage and sloughing encountered in the testholes were noted.

4.0 FIELD TESTING

The field investigation was undertaken on January 7, 2016 and January 28, 2016. A total of 17 testholes (TH1 to TH15, TH37 and TH38) were cored and drilled down to 2.13m depth using a truck-mounted CME rig equipped with 125mm auger. All testholes were backfilled with auger cuttings/bentonite and capped with cold mix asphalt after completion of drilling. The testhole locations and ground elevations were surveyed using a GPS and are shown on the site plan, attached with the Testhole Logs for every alleys.

Detailed descriptions of the soil profiles in each testhole are shown on the attached logs

5.0 TEST RESULTS

The subsurface conditions under the investigated streets are summarized using a Table, Site Plan, Testhole Logs and Photographs. The test results which include a Table, Site Plan, Testhole Logs and Photographs for alley are arranged using Appendices A to F.

6.0 CLOSURE

The findings and recommendations provided in this report were prepared by WSP 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 testhole(s) and/or excavation(s) examined.

If conditions encountered during construction appear to be different than those shown by the testhole(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.

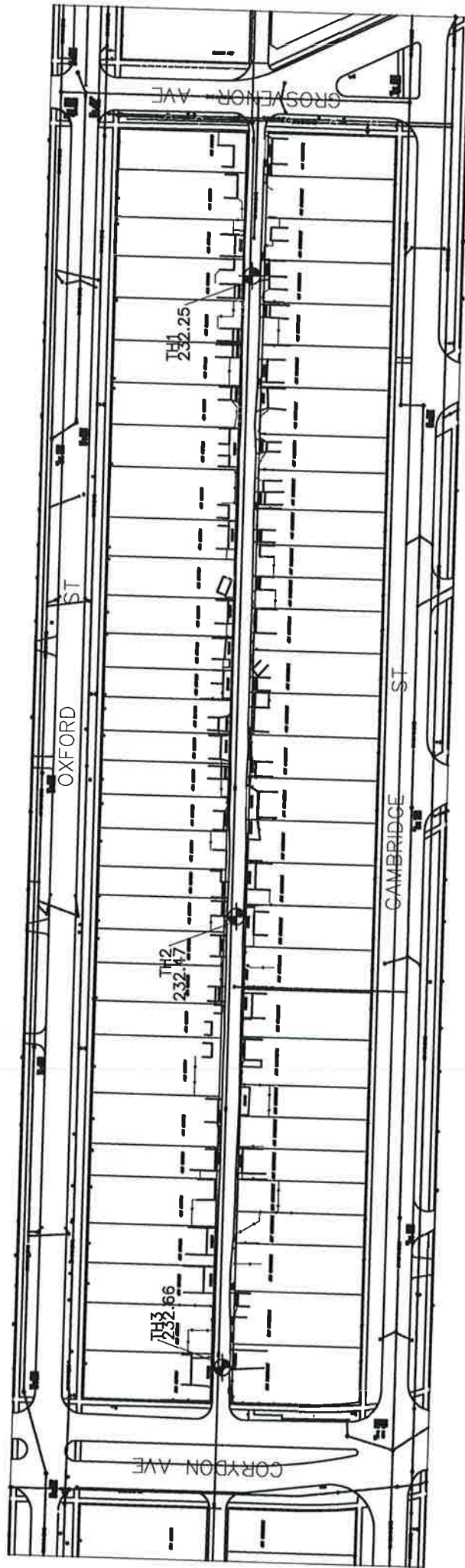
Prepared by: Silvestre S. Urbano Jr., P.Eng.

Reviewed by: Scott Minty, P.Eng.



APPENDIX A

Oxford Street/ Cambridge Street Alley





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TH1

PAGE 1 OF 1

CLIENT City of Winnipeg PROJECT NAME 2016 Alley Reconstructions
 PROJECT NUMBER 151-13889-00 PROJECT LOCATION Winnipeg, MB
 DATE STARTED 1/7/16 COMPLETED 1/7/16 GROUND ELEVATION 100 m HOLE SIZE 125 mm
 DRILLING CONTRACTOR Maple Leaf Drilling GROUND WATER LEVELS:
 DRILLING METHOD Continuous Auger AT TIME OF DRILLING --
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano AT END OF DRILLING --
 NOTES Oxford/Cambridge Alley from Grosvenor to Corydon AFTER DRILLING --

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲	
							PL	MC LL
							20 40 60 80	20 40 60 80
							□ FINES CONTENT (%) □	
							20 40 60 80	
		ASPHALT - 13 mm of intact ASPHALT over 75 mm of STRATIFIED ASPHALT and GRANULAR FILL						
		GRANULAR FILL - 150 mm thick						
0.5		CLAY FILL - mixed brown and black Frost to 0.91 m	MC = 37%			37		
			MC = 26%			26		
1.0		CLAY - brown, stiff, fissured	MC = 27%			27		
			MC = 33%			33		
1.5			PP = 175 kPa MC = 37%		175	37		
			MC = 44%			44		
2.0			MC = 47%			47		
2.5								
3.0			PP = 100 kPa MC = 49%		100	49		

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP_COW ALLEY RENEWALS.GPJ_GINT STD CANADA.GDT_4/6/16



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 1600 Buffalo Place
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CLIENT City of Winnipeg PROJECT NAME 2016 Alley Reconstructions
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 NOTES Oxford/Cambridge Alley from Grosvenor to Corydon 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								
							PL MC LL 20 40 60 80 <input type="checkbox"/> FINES CONTENT (%) <input type="checkbox"/> 20 40 60 80											
		CONCRETE - 162.5 mm thick																
0.5		CLAY - grey-black, fissured; brown at 0.91 m; SILTY at 1.83 m to 2.0 m Frost to 0.61 m	MC = 28%			28												
			MC = 26%			26												
1.0			MC = 29%			29												
			MC = 33%			33												
1.5			PP = 150 kPa MC = 38%		150	38												
			MC = 46%			46												
2.0			MC = 46%			46												
2.5																		
3.0			PP = 100 kPa MC = 53%		100	53												

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP_COW ALLEY RENEWALS.GPJ_GINT STD CANADA.GDT_4/6/16



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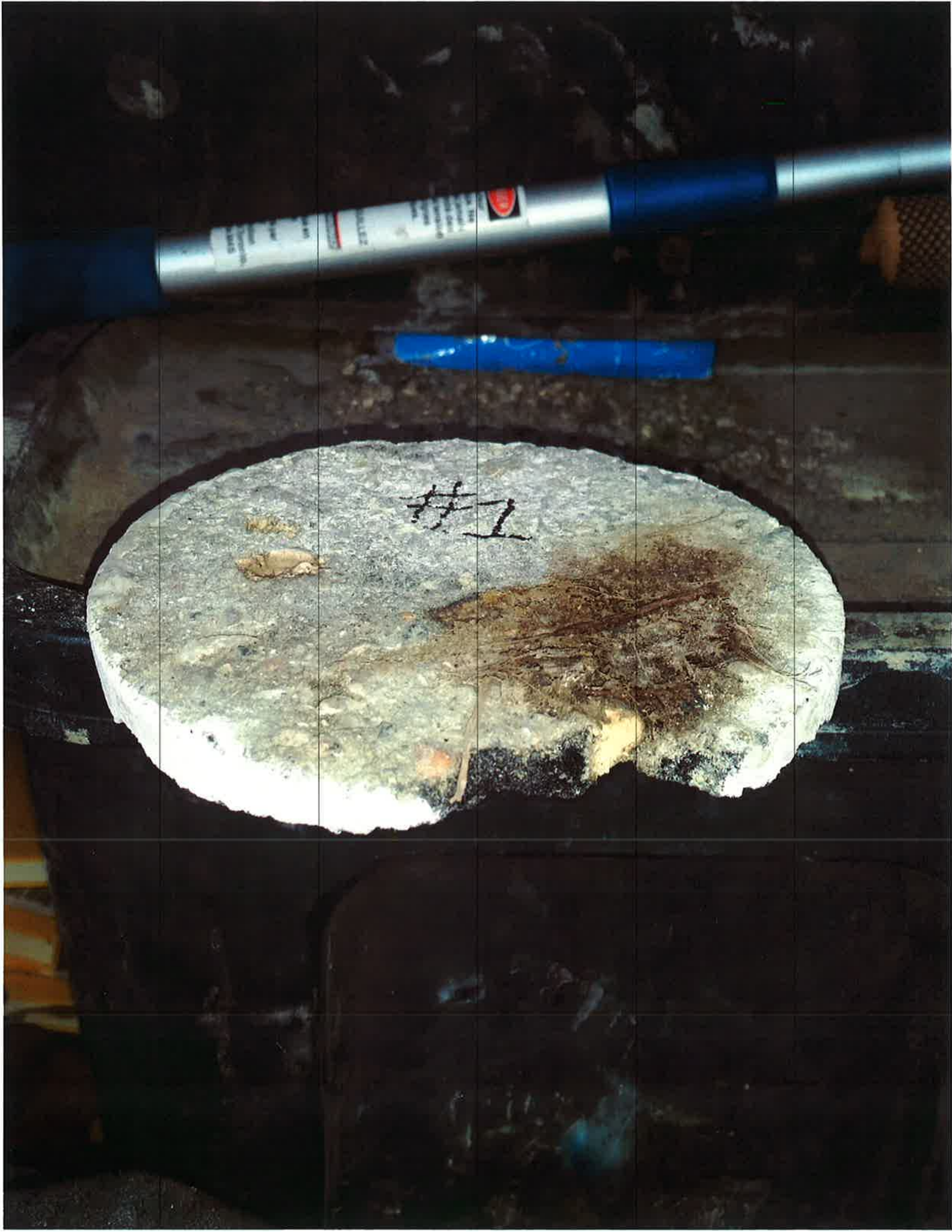
TH3

PAGE 1 OF 1

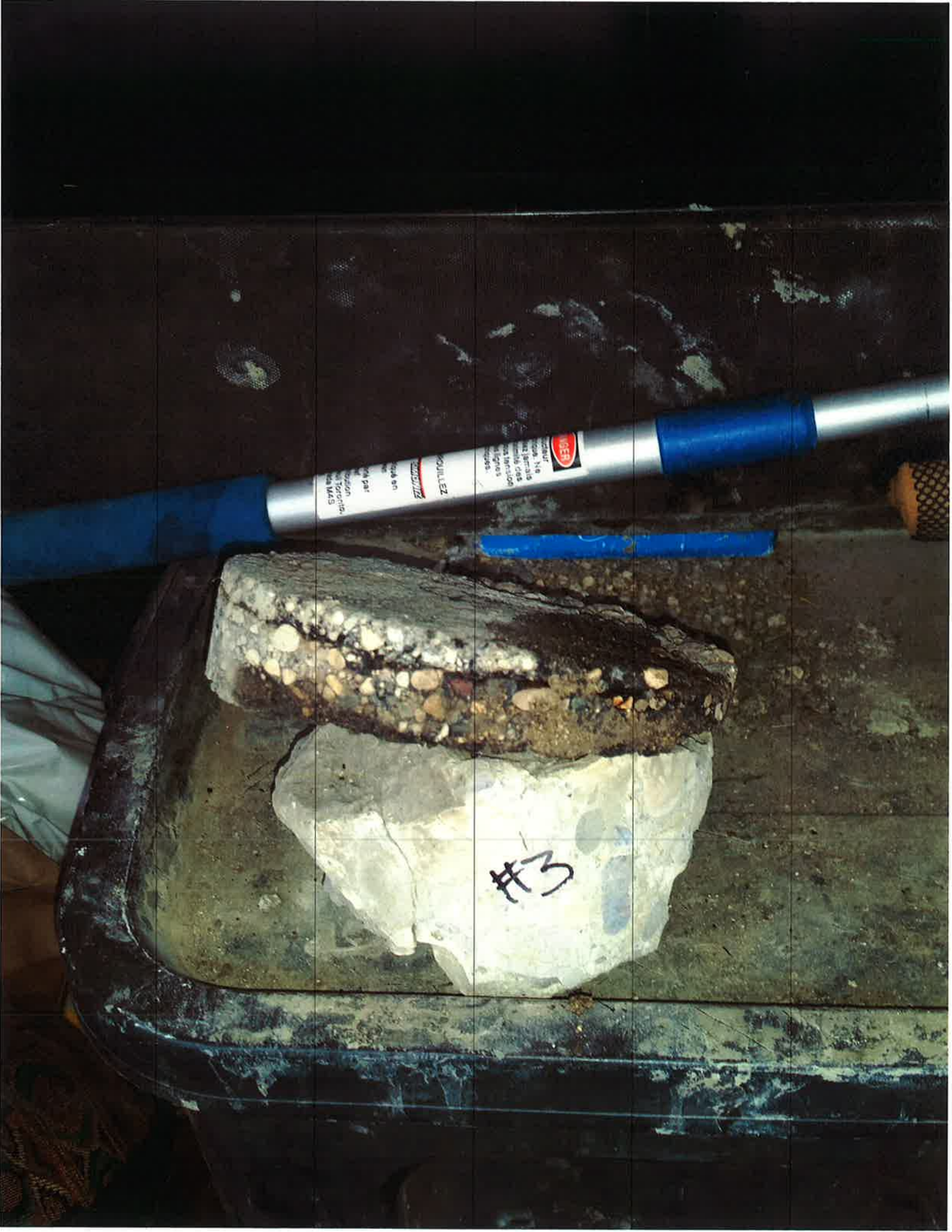
CLIENT City of Winnipeg PROJECT NAME 2016 Alley Reconstructions
 PROJECT NUMBER 151-13889-00 PROJECT LOCATION Winnipeg, MB
 DATE STARTED 1/7/16 COMPLETED 1/7/16 GROUND ELEVATION 100 m HOLE SIZE 125 mm
 DRILLING CONTRACTOR Maple Leaf Drilling GROUND WATER LEVELS:
 DRILLING METHOD Continuous Auger AT TIME OF DRILLING --
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano AT END OF DRILLING --
 NOTES Oxford/Cambridge Alley from Grosvenor to Corydon 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
							PL	MC	LL	
							20	40	60	80
							□ FINES CONTENT (%) □			
							20	40	60	80
0.0 - 0.1		ASPHALT - 25 mm thick								
0.1 - 0.2		GRANULAR FILL - 50 mm thick								
0.2 - 0.3		CONCRETE - 62.5 mm thick								
0.3 - 0.61		CLAY - grey-black down to 0.61 m, fissured Frost to 0.61 m	MC = 36%			36				
0.61 - 1.0		SILT - soft, tan-brown, moist to wet	MC = 42%			42				
1.0 - 1.5			MC = 22%			22				
1.5 - 2.0		CLAY - stiff, brown, fissured	MC = 36%			36				
2.0 - 2.5			PP = 150 kPa MC = 40%		150	40				
2.5 - 3.0			MC = 41%			41				
3.0 - 3.05			MC = 50%			50				
3.05		Bottom of hole at 3.05 m.								
			PP = 100 kPa MC = 50%		100	50				

GENERAL BH PLOTS - WSP_COW ALLEY RENEWALS.GPJ_GINT STD CANADA.GDT 4/8/16





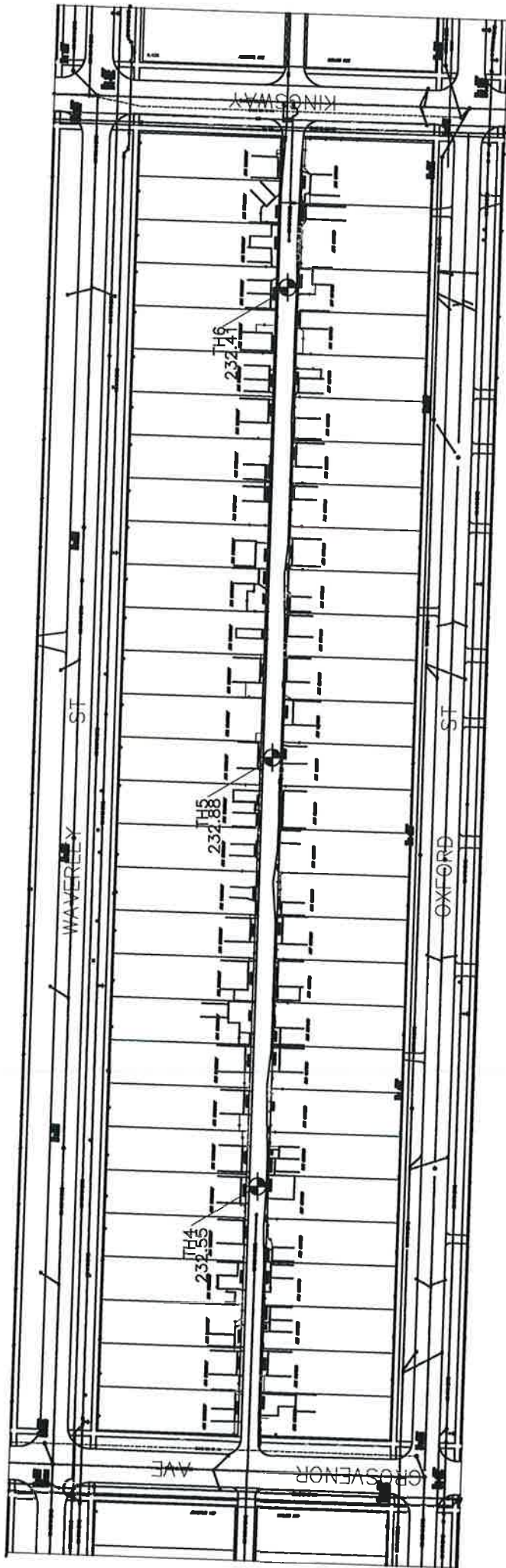


POUILLEZ
100%

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APPENDIX B

Waverley Street/ Oxford Street Alley





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CLIENT City of Winnipeg PROJECT NAME 2016 Alley Reconstructions
 PROJECT NUMBER 151-13889-00 PROJECT LOCATION Winnipeg, MB
 DATE STARTED 1/7/16 COMPLETED 1/7/16 GROUND ELEVATION 100 m HOLE SIZE 125 mm
 DRILLING CONTRACTOR Maple Leaf Drilling GROUND WATER LEVELS:
 DRILLING METHOD Continuous Auger AT TIME OF DRILLING --
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano AT END OF DRILLING --
 NOTES Waverley/Oxford Alley from Kingsway to Grosvenor AFTER DRILLING --

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲	
							PL	MC LL
							20 40 60 80	20 40 60 80
							□ FINES CONTENT (%) □	
							20 40 60 80	20 40 60 80
		CONCRETE - 150 mm thick						
		GRANULAR FILL - 50 mm thick, trace of clay						
		CLAY - grey-black, fissured; brown below 0.76 m, stiff Frost to 0.76 m	MC = 48%			48		
0.5			MC = 41%			41		
1.0			MC = 35%			35		
1.5			MC = 36%			36		
1.5			PP = 175 kPa MC = 44%		175	44		
2.0			MC = 46%			46		
2.5			MC = 50%			50		
3.0			PP = 100 kPa MC = 55%		100	55		

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP - COW ALLEY RENEWALS.GPJ - GINT STD CANADA.GDT 4/6/16



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CLIENT City of Winnipeg PROJECT NAME 2016 Alley Reconstructions
 PROJECT NUMBER 151-13889-00 PROJECT LOCATION Winnipeg, MB
 DATE STARTED 1/7/16 COMPLETED 1/7/16 GROUND ELEVATION 100 m HOLE SIZE 125 mm
 DRILLING CONTRACTOR Maple Leaf Drilling GROUND WATER LEVELS:
 DRILLING METHOD Continuous Auger AT TIME OF DRILLING --
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano AT END OF DRILLING --
 NOTES Waverley/Oxford Alley from Kingsway to Grosvenor AFTER DRILLING --

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲	
							PL	MC LL
		ASPHALT - 25 mm thick						
		CONCRETE - 100 mm thick, disintegrated						
		GRANULAR FILL - 150 mm thick, trace of clay						
0.5		CLAY FILL - 600 mm thick, mixed clay, brown to black	MC = 36%			36		
		Frost to 0.91 m						
			MC = 32%			32		
1.0		CLAY - brown, stiff, fissured	MC = 29%			29		
		SILT - tan-brown, soft, moist to wet	MC = 23%			23		
1.5			MC = 34%			34		
		CLAY - brown, stiff, fissured	PP = 200 kPa		200			
		SILT - tan-brown, soft, moist to wet	MC = 23%			23		
2.0			MC = 34%			34		
		CLAY - brown, stiff, fissured	PP = 250 kPa		250			
2.5								
3.0			PP = 150 kPa MC = 52%		150	52		

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP - COW ALLEY RENEWALS.GPJ - GINT STD CANADA.GDT - 4/8/16



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CLIENT City of Winnipeg PROJECT NAME 2016 Alley Reconstructions
 PROJECT NUMBER 151-13889-00 PROJECT LOCATION Winnipeg, MB
 DATE STARTED 1/7/16 COMPLETED 1/7/16 GROUND ELEVATION 100 m HOLE SIZE 125 mm
 DRILLING CONTRACTOR Maple Leaf Drilling GROUND WATER LEVELS:
 DRILLING METHOD Continuous Auger AT TIME OF DRILLING -
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano AT END OF DRILLING --
 NOTES Waverley/Oxford Alley from Kingsway to Grosvenor AFTER DRILLING -

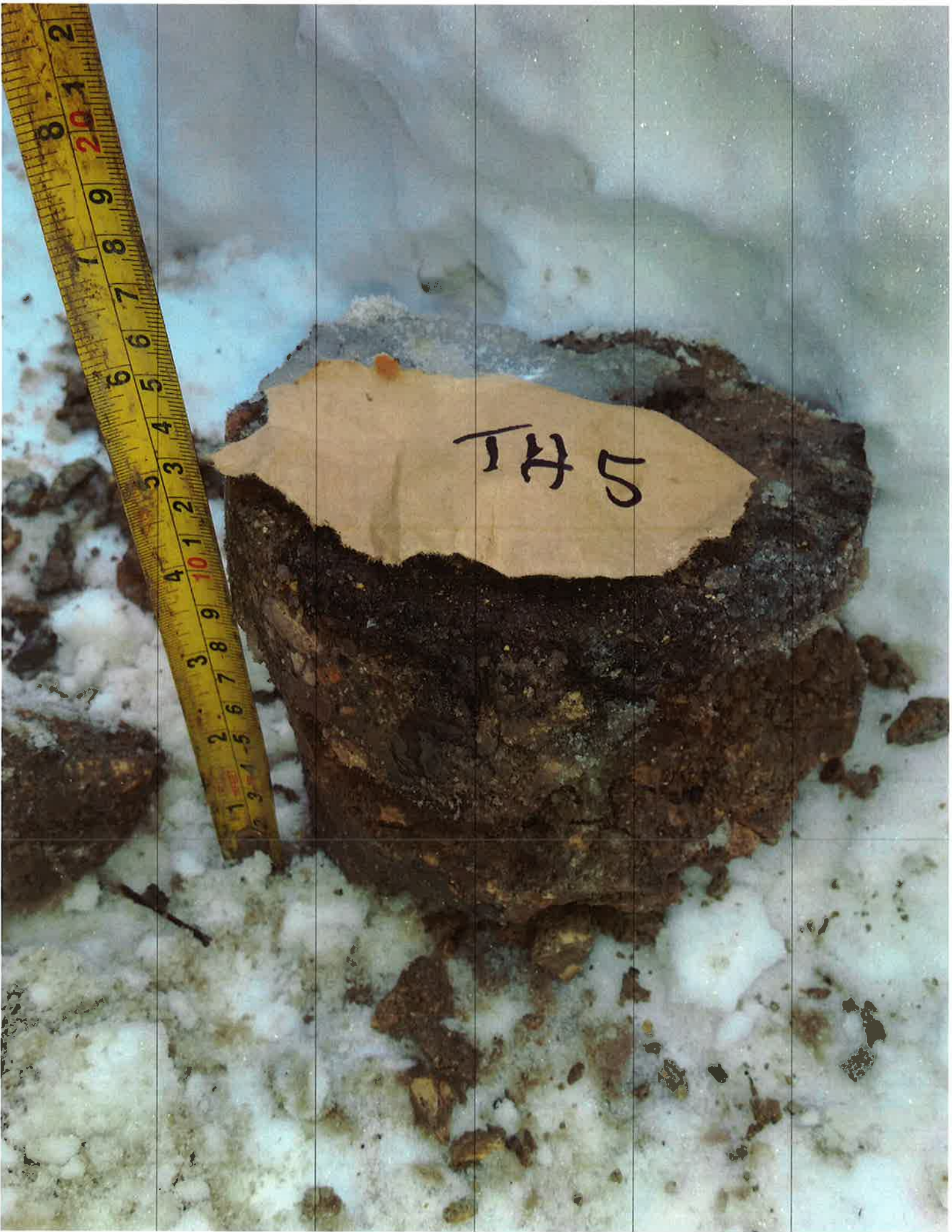
DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲		
							20	40	60
		CONCRETE - 200 mm thick, intact							
0.5		CLAY FILL - 700 mm thick, brown and black mixed Frost to 0.91 m	MC = 38%			38			
			MC = 39%			39			
1.0		CLAY - stiff, brown, fissured	MC = 32%			32			
		SILT - tan-brown, soft, moist to wet	MC = 25%			25			
		CLAY - stiff, brown, fissured	MC = 25%			25			
1.5			PP = 300 kPa MC = 40%		300	40			
		SILT - tan-brown, soft, moist to wet	MC = 35%			35			
2.0			MC = 41%			41			
		CLAY - brown, stiff, fissured	PP = 175 kPa		175				
2.5									
3.0			PP = 100 kPa MC = 53%		100	53			

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP COW ALLEY RENEWALS.GPJ GINT STD CANADA.GDT 4/16/16



#4



TH 5



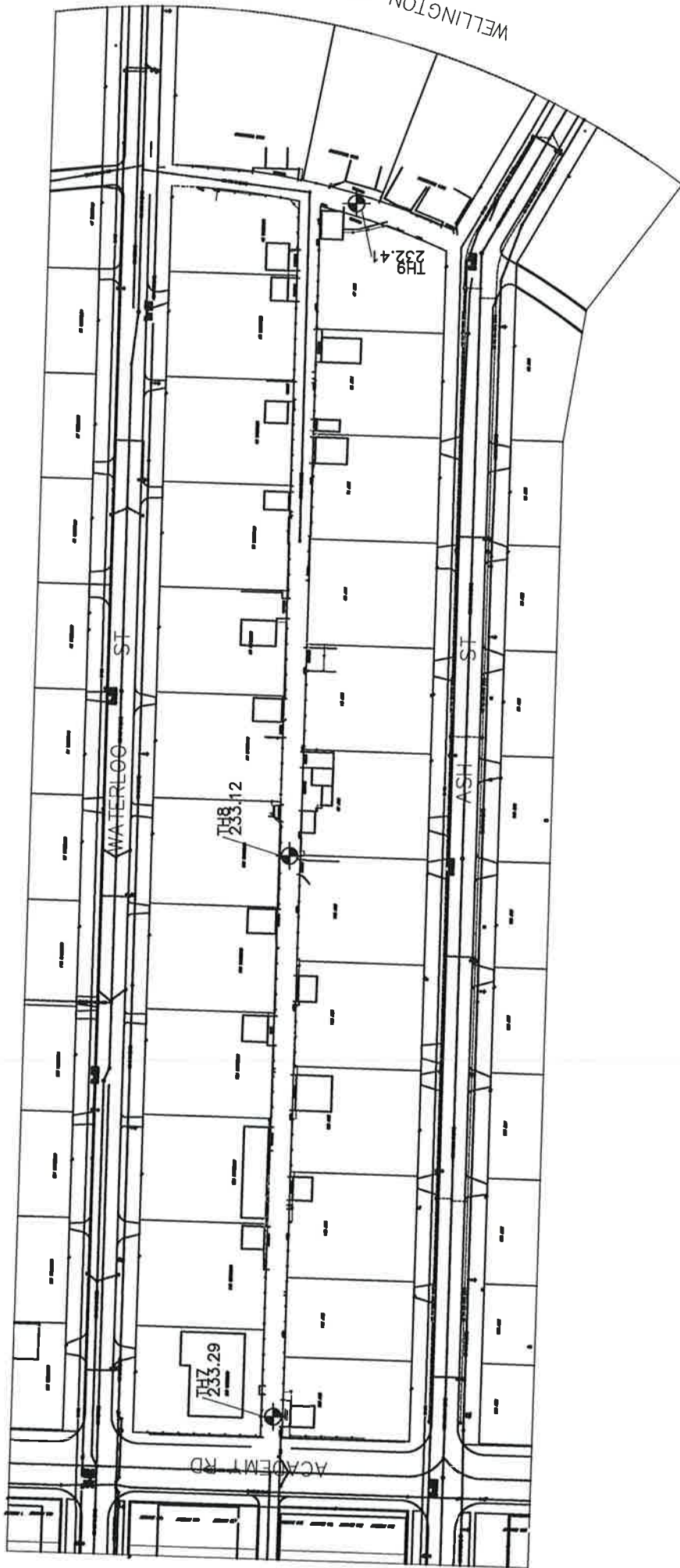
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THC

APPENDIX C

Waterloo Street/ Ash Street Alley

WELLINGTON CRES





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CLIENT City of Winnipeg PROJECT NAME 2016 Alley Reconstructions
 PROJECT NUMBER 151-13889-00 PROJECT LOCATION Winnipeg, MB
 DATE STARTED 1/12/16 COMPLETED 1/12/16 GROUND ELEVATION 100 m HOLE SIZE 125 mm
 DRILLING CONTRACTOR Maple Leaf Drilling GROUND WATER LEVELS:
 DRILLING METHOD Continuous Auger AT TIME OF DRILLING --
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano AT END OF DRILLING --
 NOTES Waterloo/Ash Alley from Wellington Cres to Academy AFTER DRILLING --

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲	
							PL	LL
0.0 - 0.46		ASPHALT - 25 mm thick GRANULAR FILL - 425 mm thick, limestone Frost to 0.46 m	MC = 9%			9		
0.46 - 0.7		CLAY FILL - 300 mm thick, mixed, brown and black	MC = 22%			22		
0.7 - 1.0		SILT - tan-brown, soft, moist to wet	MC = 24%			24		
1.0 - 1.5		CLAY - stiff, brown, fissured	MC = 32%			32		
1.5 - 2.0			PP = 100 kPa MC = 35%		100	35		
2.0 - 2.5			MC = 34%			34		
2.5 - 3.0			MC = 40%			40		
3.0 - 3.05			PP = 100 kPa MC = 41%		100	41		

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP - COW ALLEY RENEWALS.GPJ - GINT STD CANADA.GDT 4/8/16



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CLIENT City of Winnipeg **PROJECT NAME** 2016 Alley Reconstructions
PROJECT NUMBER 151-13889-00 **PROJECT LOCATION** Winnipeg, MB
DATE STARTED 1/12/16 **COMPLETED** 1/12/16 **GROUND ELEVATION** 100 m **HOLE SIZE** 125 mm
DRILLING CONTRACTOR Maple Leaf Drilling **GROUND WATER LEVELS:**
DRILLING METHOD Continuous Auger **AT TIME OF DRILLING** --
LOGGED BY Dana Bredin **CHECKED BY** Silvestre Urbano **AT END OF DRILLING** --
NOTES Waterloo/Ash Alley from Wellington Cres to Academy **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 - 0.2		CONCRETE - 225 mm thick, intact							
0.2 - 0.46		GRANULAR FILL - 225 mm thick, limestone Frost to 0.46 m	MC = 25%			25			
0.46 - 1.2		SILT - tan-brown, soft, moist to wet	MC = 26%			26			
1.2 - 1.5		CLAY - firm, fissured, SILTY; clayey below 2.29 m, stiff	MC = 22%			22			
1.5 - 1.7			MC = 22%		50	25			
1.7 - 2.0			MC = 22%			22			
2.0 - 2.29			MC = 24%			24			
2.29 - 3.0			PP = 50 kPa MC = 25%						
3.0			PP = 250 kPa MC = 38%		250	38			

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP COW ALLEY RENEWALS.GPJ GINT STD CANADA.GDT 4/8/16

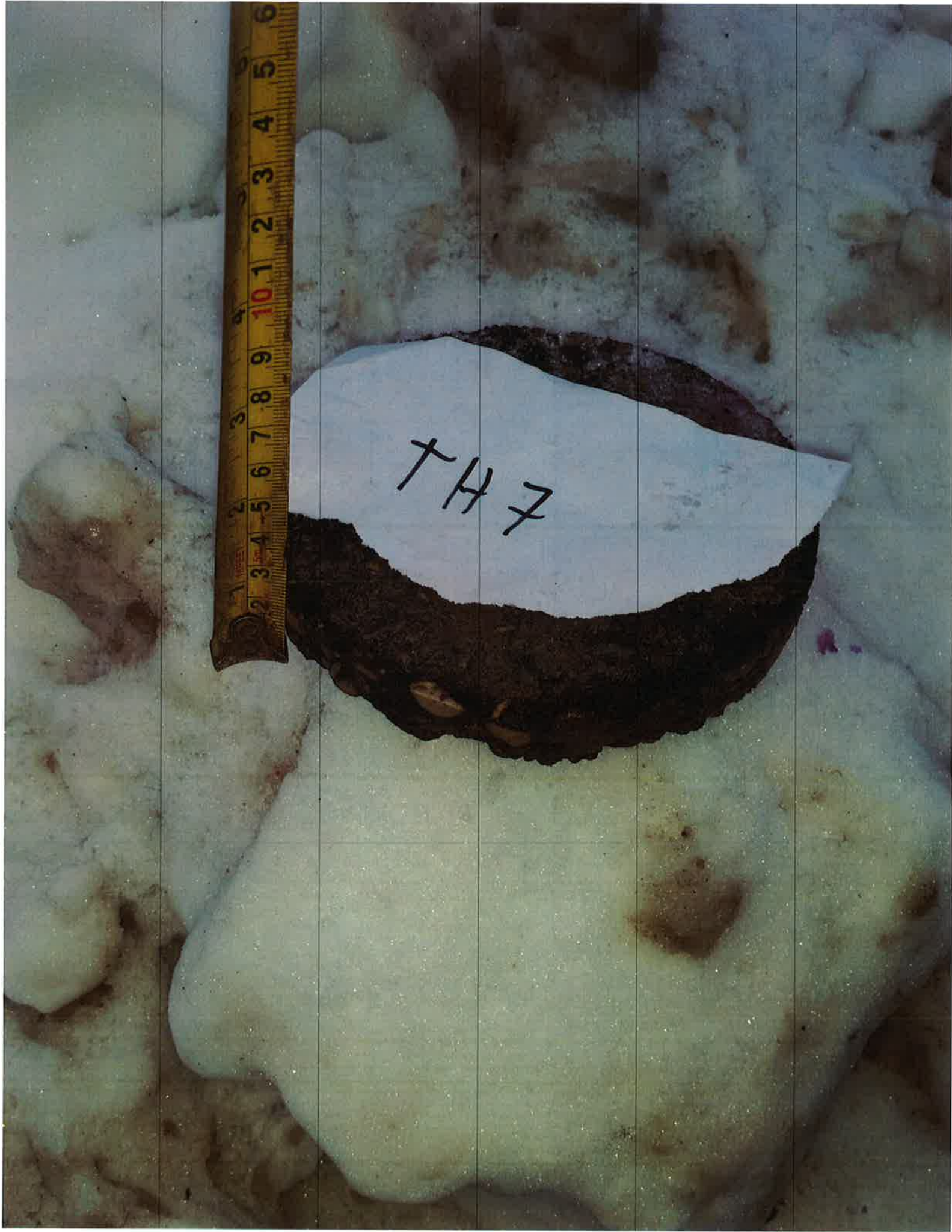


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 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano AT END OF DRILLING --
 NOTES Waterloo/Ash Alley from Wellington Cres to Academy AFTER DRILLING --

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
							PL	MC	LL	
							20	40	60	80
							□ FINES CONTENT (%) □			
							20	40	60	80
0.0 - 0.5		ASPHALT - 50 mm thick CONCRETE - 400 mm thick, disintegrated	MC = 28%			28				
0.5 - 0.8		CLAY FILL - 300 mm thick, mixed, brown and black Frost to 0.46 m	MC = 32%			32				
0.8 - 1.0		CLAY - stiff, brown, fissured	MC = 37%			37				
1.0 - 1.5			MC = 41%			41				
1.5 - 2.0			PP = 175 kPa MC = 42%		175	42				
2.0 - 2.5			MC = 41%			41				
2.5 - 3.0			MC = 42%			42				
3.0		Bottom of hole at 3.05 m.	PP = 100 kPa MC = 50%		100	50				

GENERAL BH PLOTS - WSP - COW ALLEY RENEWALS.GPJ GINT STD CANADA.GDT 4/8/16



TH 7



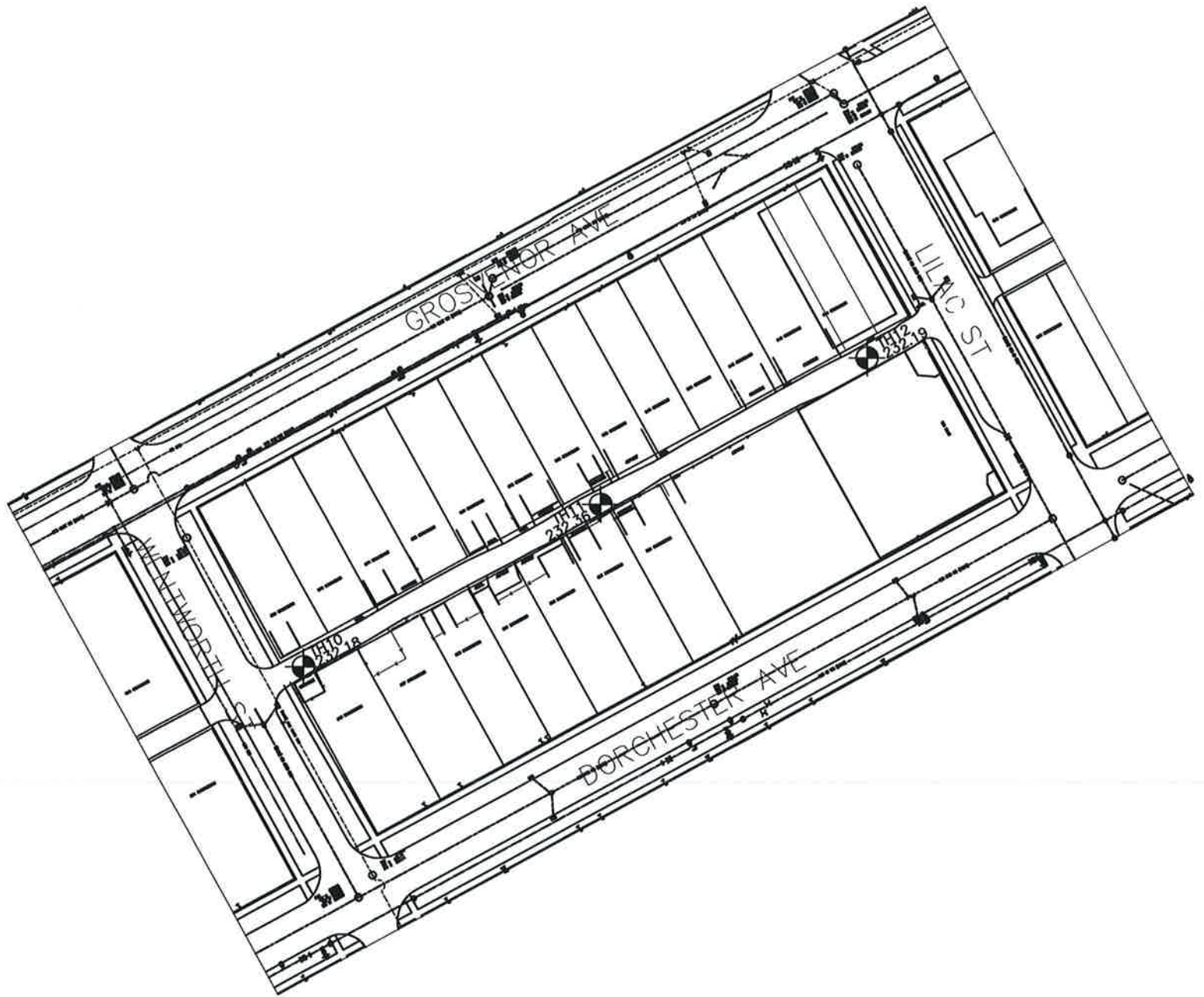
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APPENDIX D

Grosvenor Avenue/ Dorchester Avenue Alley





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TH10

PAGE 1 OF 1

CLIENT City of Winnipeg PROJECT NAME 2016 Alley Reconstructions
 PROJECT NUMBER 151-13889-00 PROJECT LOCATION Winnipeg, MB
 DATE STARTED 1/12/16 COMPLETED 1/12/16 GROUND ELEVATION 100 m HOLE SIZE 125 mm
 DRILLING CONTRACTOR Maple Leaf Drilling GROUND WATER LEVELS:
 DRILLING METHOD Continuous Auger AT TIME OF DRILLING --
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano AT END OF DRILLING --
 NOTES Grosvenor/Dorchester Alley from Wentworth to Lilac 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	20 40 60 80
		ASPHALT - 37.5 mm thick CONCRETE - 112.5 mm thick GRANULAR FILL - 150 mm thick						
0.5		CLAY FILL - 900 mm thick, mixed, brown and black Frost to 0.61 m	MC = 41%			41		
			MC = 30%			30		
1.0			MC = 27%			27		
		CLAY - stiff, brown, fissured	MC = 29%			29		
1.5			PP = 125 kPa MC = 31%		125	31		
			MC = 42%			42		
2.0			MC = 41%			41		
2.5								
3.0			PP = 125 kPa MC = 46%		125	46		

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP_COW ALLEY RENEWALS.GPJ_GINT STD CANADA_GDT_4/6/16



WSP Canada Inc.
 1600 Buffalo Place
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 Telephone: (204)-477-6650

CLIENT City of Winnipeg PROJECT NAME 2016 Alley Reconstructions
 PROJECT NUMBER 151-13889-00 PROJECT LOCATION Winnipeg, MB
 DATE STARTED 1/12/16 COMPLETED 1/12/16 GROUND ELEVATION 100 m HOLE SIZE 125 mm
 DRILLING CONTRACTOR Maple Leaf Drilling GROUND WATER LEVELS:
 DRILLING METHOD Continuous Auger AT TIME OF DRILLING ---
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano AT END OF DRILLING ---
 NOTES Grosvenor/Dorchester Alley from Wentworth to Lilac 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
0.0 - 0.1		CONCRETE - 137.5 mm thick								
0.1 - 0.61		CLAY FILL - mixed, brown and black Frost to 0.61 m	MC = 30%			30				
0.61 - 0.8			MC = 36%			36				
0.8 - 1.0			MC = 30%			30				
1.0 - 1.3			MC = 31%			31				
1.3 - 1.6			PP = 100 kPa MC = 31%		100	31				
1.6 - 2.0		CLAY - stiff, brown, fissured, trace of silt	MC = 25%			25				
2.0 - 2.4			MC = 24%			24				
2.4 - 3.05			PP = 200 kPa MC = 36%		200	36				

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP COW ALLEY RENEWALS.GPJ GINT STD CANADA.GDT 4/6/16



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TH12

PAGE 1 OF 1

CLIENT City of Winnipeg PROJECT NAME 2016 Alley Reconstructions
 PROJECT NUMBER 151-13889-00 PROJECT LOCATION Winnipeg, MB
 DATE STARTED 1/12/16 COMPLETED 1/12/16 GROUND ELEVATION 100 m HOLE SIZE 125 mm
 DRILLING CONTRACTOR Maple Leaf Drilling GROUND WATER LEVELS:
 DRILLING METHOD Continuous Auger AT TIME OF DRILLING —
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano AT END OF DRILLING —
 NOTES Grosvenor/Dorchester Alley from Wentworth to Lilac 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 - 175 mm thick							
0.1 - 0.61		CLAY FILL - 425 mm thick, mixed, brown and black Frost to 0.61 m	MC = 32%			32			
0.61 - 1.05		CLAY - stiff, brown, fissured, SILTY; clayey below 1.05 m	MC = 22%			22			
1.05 - 1.5			MC = 23%			23			
1.5 - 1.75			MC = 27%			27			
1.75 - 2.0			PP = 175 kPa MC = 29%		175	29			
2.0 - 2.2			MC = 42%			42			
2.2 - 2.4			MC = 42%			42			
2.4 - 3.0			PP = 125 kPa MC = 49%		125	49			

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP - COW ALLEY RENEWALS.GPJ GINT STD CANADA.GDT 4/6/16



TH 10



TH11

PR. APPD
25410

3
Lufkin

2
GripZit

4
CM



7112

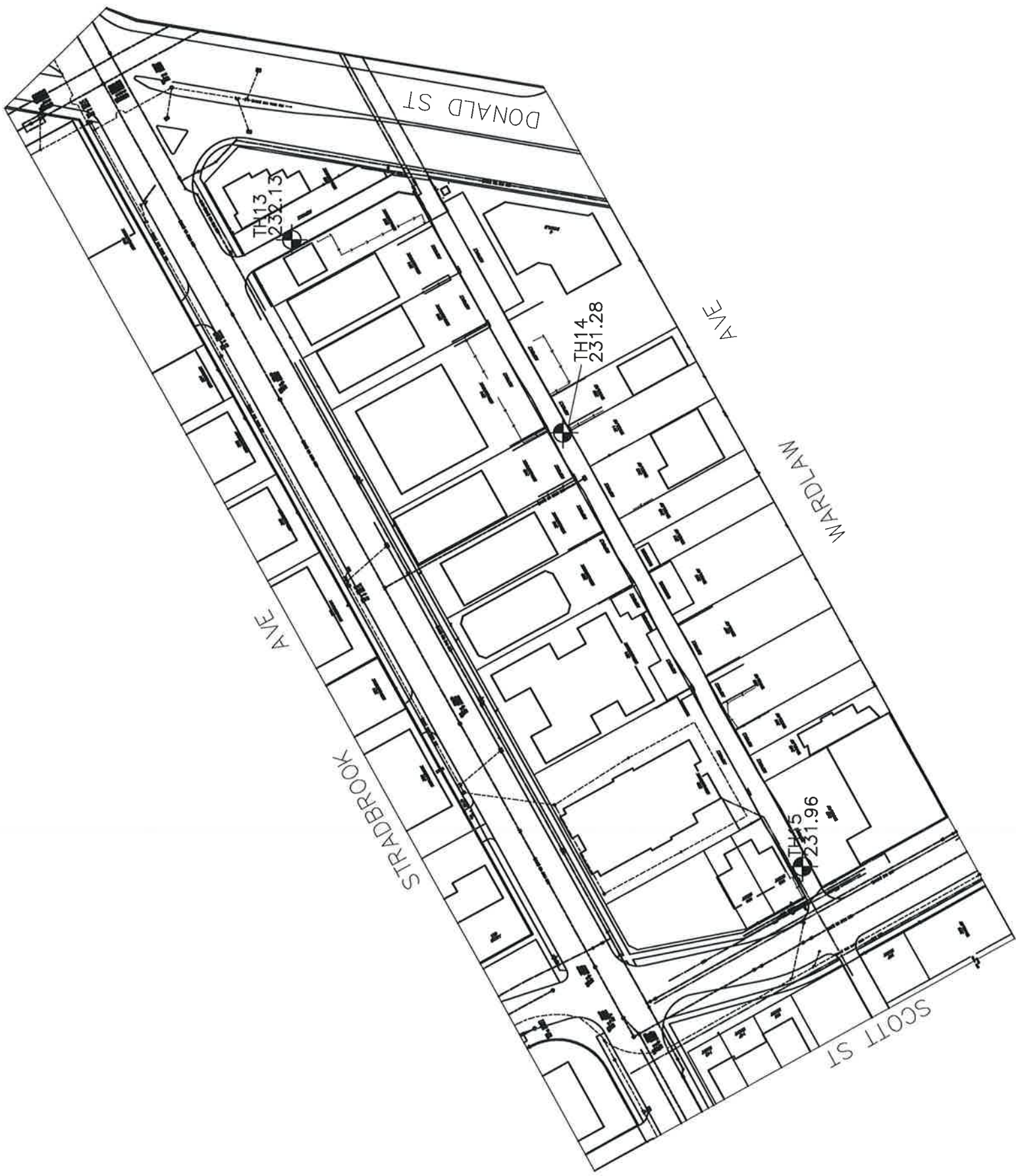
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APPENDIX E

Stradbrook Avenue/ Wardlaw Avenue Alley

Stradbrook Avenue/ Wardlaw Avenue Alley
Scott Street to Donald Street

Testhole ID	Testhole Location	Pavement Surface		Pavement Structure Material		Soil Description	Sample Depth (m)	Moisture Content (%)	Particle Size Analysis				Atterberg Limits			
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index	
TH13	See site plan	Concrete (Intact)	175	Clay Fill	725	Clay Fill, mixed	---	---	---	---	---	---	---	---	---	---
TH14	See site plan	Asphalt (Intact)/ Concrete (Intact)	25/175	Clay Fill	400	Clay Fill, mixed	---	---	---	---	---	---	---	---	---	---
TH15	See site plan	Asphalt (Intact)/ Concrete (Broken)	25/137.5	Clay Fill	437.5	Clay Fill, mixed	1.2	23	---	---	66	34	---	---	---	---



DONALD ST

TH13
232.13

TH14
231.28

AVE

WARDLAW

AVE

STRADBROOK

TH15
231.96

SCOTT ST



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CLIENT City of Winnipeg **PROJECT NAME** 2016 Alley Reconstructions
PROJECT NUMBER 151-13889-00 **PROJECT LOCATION** Winnipeg, MB
DATE STARTED 1/15/16 **COMPLETED** 1/15/16 **GROUND ELEVATION** 100 m **HOLE SIZE** 125 mm
DRILLING CONTRACTOR Maple Leaf Drilling **GROUND WATER LEVELS:**
DRILLING METHOD Continuous Auger **AT TIME OF DRILLING** --
LOGGED BY Dana Bredin **CHECKED BY** Silvestre Urbano **AT END OF DRILLING** --
NOTES Stradbrook/Wardlaw Alley from Scott to Stradbrook **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
0.0 - 0.1		CONCRETE - 175 mm thick								
0.1 - 0.91		CLAY FILL - 725 mm thick, mixed, brown to black Frost to 0.91 m	MC = 40%			40				
0.91 - 1.0		CLAY - stiff, brown, fissured	MC = 40%			40				
1.0 - 1.5		CLAY - stiff, brown, fissured	MC = 37%			37				
1.5 - 2.0		CLAY - stiff, brown, fissured	PP = 225 kPa MC = 34%		225	34				
2.0 - 2.5		SILT - tan-brown, soft, moist to wet	MC = 30%			30				
2.5 - 3.0		CLAY - stiff, brown, fissured	MC = 23%			23				
3.0 - 3.05		CLAY - stiff, brown, fissured	PP = 150 kPa MC = 47%		150	47				
		Bottom of hole at 3.05 m.								

GENERAL BH PLOTS - WSP_COW ALLEY RENEWALS.GPJ GINT STD CANADA.GDT - 4/6/16



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CLIENT City of Winnipeg **PROJECT NAME** 2016 Alley Reconstructions
PROJECT NUMBER 151-13889-00 **PROJECT LOCATION** Winnipeg, MB
DATE STARTED 1/15/16 **COMPLETED** 1/15/16 **GROUND ELEVATION** 100 m **HOLE SIZE** 125 mm
DRILLING CONTRACTOR Maple Leaf Drilling **GROUND WATER LEVELS:**
DRILLING METHOD Continuous Auger **AT TIME OF DRILLING** --
LOGGED BY Dana Bredin **CHECKED BY** Silvestre Urbano **AT END OF DRILLING** --
NOTES Stradbrook/Wardlaw Alley from Scott to Stradbrook **AFTER DRILLING** --

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲	
							PL	LL
		ASPHALT - 25 mm thick CONCRETE - 175 mm thick						
0.5		CLAY FILL - 400 mm thick, mixed, brown and black Frost to 0.91 m	MC = 33%			33		
		CLAY - stiff, brown, fissured	MC = 37%			37		
1.0			MC = 31%			31		
			MC = 30%			30		
1.5			PP = 300 kPa MC = 34%		300	34		
			MC = 34%			34		
2.0			MC = 42%			42		
2.5								
3.0			PP = 125 kPa MC = 51%		125	51		

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP COW ALLEY RENEWALS.GPJ GINT STD CANADA.GDT 4/6/16



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TH15

PAGE 1 OF 1

CLIENT City of Winnipeg PROJECT NAME 2016 Alley Reconstructions
 PROJECT NUMBER 151-13889-00 PROJECT LOCATION Winnipeg, MB
 DATE STARTED 1/15/16 COMPLETED 1/15/16 GROUND ELEVATION 100 m HOLE SIZE 125 mm
 DRILLING CONTRACTOR Maple Leaf Drilling GROUND WATER LEVELS:
 DRILLING METHOD Continuous Auger AT TIME OF DRILLING --
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano AT END OF DRILLING --
 NOTES Stradbrook/Wardlaw Alley from Scott to Stradbrook AFTER DRILLING --

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲	
							PL	LL
0.0 - 0.1	Asphalt	ASPHALT - 25 mm thick						
0.1 - 0.2	Concrete	CONCRETE - 137.5 mm thick						
0.2 - 0.5	Clay Fill	CLAY FILL - 437.5 mm thick, mixed, brown to black	MC = 40%			40		
0.5 - 0.91	Clay	CLAY - brown, fissured Frost to 0.91 m	MC = 41%			41		
0.91 - 1.0	Silt	SILT - tan-brown, soft, moist to wet	MC = 31%			31		
1.0 - 1.5	Silt		MC = 23%			23		
1.5 - 2.0	Silt		PP = 75 kPa MC = 24%		75	24		
2.0 - 2.5	Silt		MC = 24%			24		
2.5 - 3.0	Clay	CLAY - stiff, grey-brown, trace of fine gravel	MC = 25%			25		
3.0 - 3.05	Clay		PP = 125 kPa MC = 50%		125	50		

Bottom of hole at 3.05 m.

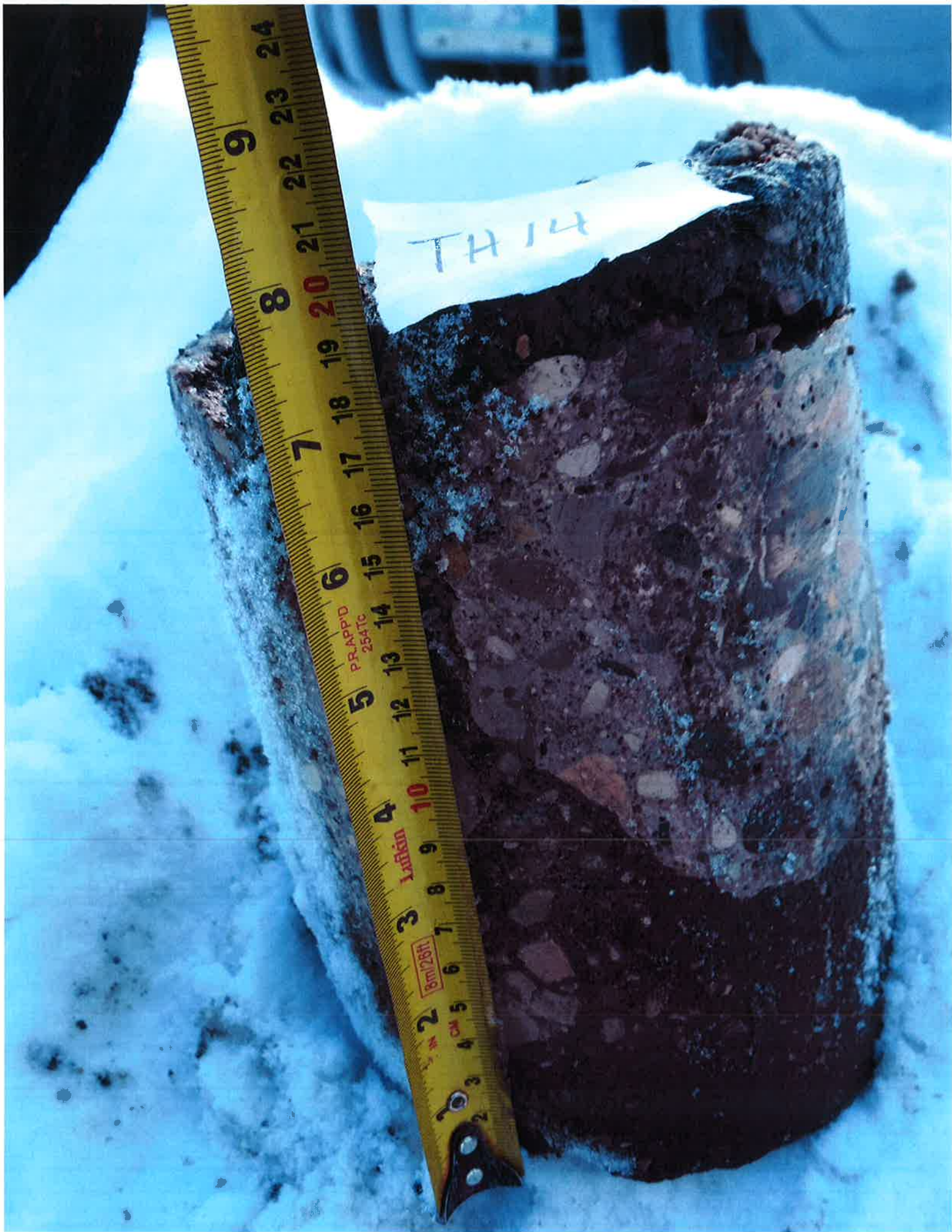
GENERAL BH PLOTS - WSP_COW ALLEY RENEWALS.GPJ GINT STD CANADA.GDT 4/6/16



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68 69 70 71 72 73 74 75 76 77 78 79 80 81 82

8 7 6 5 4 3 2
PRAPPID 254Tc
Lufkin
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T413



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254TC

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1000

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8mi28H

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CM

2



1115

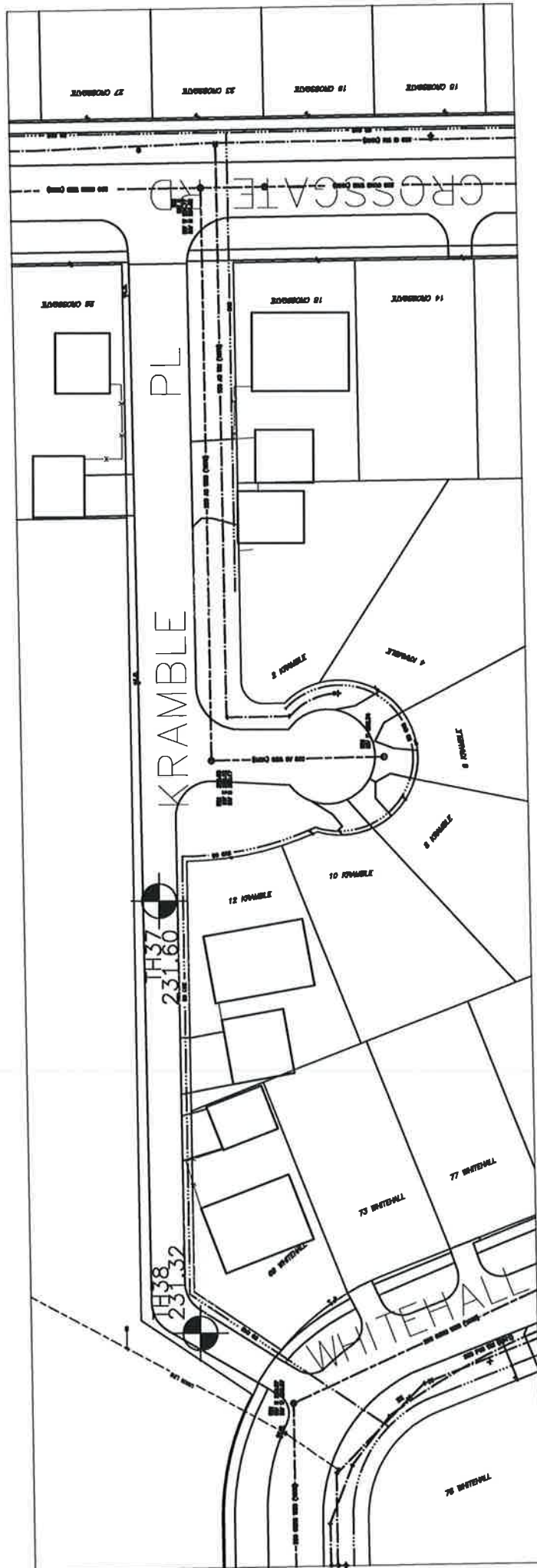
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1 2

APPENDIX F

Krambele Place Alley

Krambele Place Alley
 Crossgate Road to Whitehall Boulevard

Testhole ID	Testhole Location	Pavement Surface		Pavement Structure Material		Soil Description	Sample Depth (m)	Moisture Content (%)	Particle Size Analysis				Atterberg Limits			
		Type	Thickness (mm)	Type	Thickness (mm)				Gravel (%)	Sand (%)	Silt (%)	Clay (%)	Liquid Limit	Plastic Limit	Plasticity Index	
TH37	See site plan	Concrete (Intact)	137.5	Clay Fill/ Clay	162.5/ 2700	Clay Fill mixed/ Stiff clay	0.6	36	-----	-----	-----	-----	-----	-----	-----	-----
TH38	See site plan	Concrete (Intact)	150mm (intact)	Clay	2850	Stiff clay	0.6	36	-----	-----	-----	-----	-----	56	22	34



BLVD



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TH37

PAGE 1 OF 1

CLIENT City of Winnipeg PROJECT NAME 2016 Alley Reconstructions
 PROJECT NUMBER 151-13889-00 PROJECT LOCATION Winnipeg, MB
 DATE STARTED 1/28/16 COMPLETED 1/28/16 GROUND ELEVATION 100 m HOLE SIZE 125 mm
 DRILLING CONTRACTOR Maple Leaf Drilling GROUND WATER LEVELS:
 DRILLING METHOD Continuous Auger AT TIME OF DRILLING --
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano AT END OF DRILLING --
 NOTES Alley from Whitewall to Kramble AFTER DRILLING --

DEPTH (m)	GRAPHIC LOG	MATERIAL DESCRIPTION	TESTS AND REMARKS	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲	
							PL	LL
		CONCRETE - 137.5 mm thick						
		CLAY FILL - 162.5 mm thick, mixed, grey and brown						
0.5		CLAY - olive-grey, fissured; stiff below 1.07 m, brown Frost to 1.07 m	MC = 29%			29		
			MC = 36%			36		
1.0			MC = 36%			36		
			MC = 36%			36		
1.5			PP = 125 kPa MC = 37%		125	37		
			MC = 44%			44		
2.0			MC = 54%			54		
2.5								
3.0			PP = 100 kPa MC = 52%		100	52		

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP - COW ALLEY RENEWALS.GPJ - GINT STD CANADA.GDT 4/8/16



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CLIENT City of Winnipeg PROJECT NAME 2016 Alley Reconstructions
 PROJECT NUMBER 151-13889-00 PROJECT LOCATION Winnipeg, MB
 DATE STARTED 1/28/16 COMPLETED 1/28/16 GROUND ELEVATION 100 m HOLE SIZE 125 mm
 DRILLING CONTRACTOR Maple Leaf Drilling GROUND WATER LEVELS:
 DRILLING METHOD Continuous Auger AT TIME OF DRILLING —
 LOGGED BY Dana Bredin CHECKED BY Silvestre Urbano AT END OF DRILLING --
 NOTES Alley from Whitewall to Kramble 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
							PL	MC	LL	
							20	40	60	80
							□ FINES CONTENT (%) □			
							20	40	60	80
		CONCRETE - 150 mm thick								
0.5		CLAY - olive-grey, fissured; brown below 0.91 m, stiff Frost to 0.91 m	MC = 20%			20				
			MC = 36%			36				
1.0			MC = 39%			39				
			MC = 40%			40				
1.5			PP = 100 kPa MC = 46%		100	46				
			MC = 51%			51				
2.0			MC = 39%			39				
2.5										
3.0			PP = 100 kPa MC = 50%		100	50				

Bottom of hole at 3.05 m.

GENERAL BH PLOTS - WSP_COW ALLEY RENEWALS.GPJ_GINT STD CANADA.GDT 4/8/16



TH37

TH38

