

APPENDIX 'A'

GEOTECHNICAL REPORT

CITY OF WINNIPEG

2019 LOCAL STREET RENEWALS -
19-R-03 CONTRACT 2
GEOTECHNICAL REPORT

APRIL 29, 2019

ORIGINAL





2019 LOCAL STREET
RENEWALS - 19-R-03
CONTRACT 2
GEOTECHNICAL REPORT
CITY OF WINNIPEG

ORIGINAL


PROJECT NO.: 18M-01969-00
DATE: APRIL 29, 2019

WSP
1600 BUFFALO PLACE
WINNIPEG (MANITOBA) R3T 6B8
CANADA

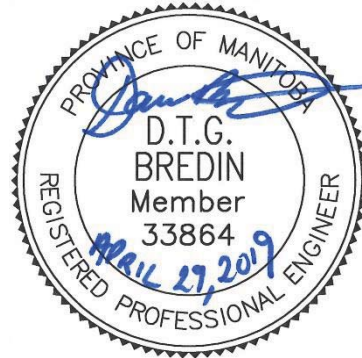
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SIGNATURES

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1 INTRODUCTION

A geotechnical investigation was conducted by WSP Canada Inc. for the proposed 2019 Local Street Renewals – Contract 2 (Project # 19-R-03) 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.

Three (3) streets were cored and one (1) street was cored and drilled, which includes the following:

1. **Strathcona St** from Ellice Ave to Crowson Bay (east leg) – drilled and cored
2. **Ainslie St** from Lodge Ave to Bruce Ave – cored only
3. **Lodge Ave** from Moray St to Davidson St – cored only
4. **Traill Ave** from Mt Royal Rd to Portage Ave – cored only

2 SUB-SURFACE INVESTIGATION AND TESTING

The field investigation commenced on March 18, 2019 and was completed on April 9, 2019. A total of 7 testholes and 24 pavement cores were completed by Maple Leaf Drilling. The testholes were drilled to a depth of 3.05 m below the road surface using a B40 truck-mounted rig equipped with a 125 mm solid stem auger. The pavement was cored using a 150 mm diameter coring press. All testholes were backfilled with auger cuttings and bentonite after the completion of the drilling and patched with hot mix asphalt. All pavement cores were patched with hot mix asphalt. Testhole and pavement core locations are noted on the testhole logs, and within the testhole and pavement core summary tables.

The soils encountered were visually classified to the full extent of the test hole. Representative soil samples were recovered at regular intervals starting from 0.1 m below pavement structure and every 0.3 m thereafter to a maximum depth of approximately 2.4 m below grade (mbg). All of the soil samples were tested for their moisture contents and selected soil samples were submitted for grain size analysis and Atterberg limits (minimum one per street). The pavement cores were measured for their thickness and each core was photographed. Any groundwater seepage or sloughing that was encountered in any of the test holes during drilling was noted.

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

3 TESTHOLE SUMMARY TABLES

Table 3-1 – Strathcona Ave

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)			
TH-05	UTM 14N: 5528074.4 m N, 629952.8 m E Northbound lane in front of 935 Strathcona St, 18.0 m north of St Matthews Ave, 1.7 m west of east curb	Asphalt & Concrete	50 & 70	Granular Fill (Crushed Limestone, 20 mm)	30	Silt, Clay	3.05	8
TH-06	UTM 14N: 5528124.5 m N, 629950.2 m E Southbound lane in front of 958 Strathcona St, 68.1 m north of St Matthews Ave, 5.8 m west of east curb	Concrete	250	None	-	Clay, Fill, Clay	3.05	8
TH-07	UTM 14N: 5528174.4 m N, 629955.5 m E Northbound lane in front of 969 Strathcona St, 118.0 m north of St Matthews Ave, 1.7 m west of east curb	Concrete	75	None	-	Topsoil, Clay, Silt, Clay	3.05	8
TH-08	UTM 14N: 5528224.5 m N, 629952.9 m E Southbound lane in front of 988 Strathcona St, 168.1 m north of St Matthews Ave, 5.6 m west of east curb	Asphalt	25	Granular Fill (Crushed Limestone, 20 mm)	50	Silt, Clay	3.05	8

TH-09	UTM 14N: 5528274.4 m N, 629958.2 m E Northbound lane in front of 1000 Strathcona St, 218.0 m north of St Matthews Ave, 1.6 m west of east curb	Concrete	125	Granular Fill (Crushed Limestone, 20 mm)	20	Silt, Clay	3.05	8
TH-10	UTM 14N: 5528324.5 m N, 629955.5 m E Southbound lane in front of 1018 Strathcona St, 268.1 m north of St Matthews Ave, 5.7 m west of east curb	Asphalt & Concrete	100 & 75	None	-	Silt, Clay	3.05	8
TH-11	UTM 14N: 5528379.3 m N, 629961.0 m E Northbound lane in front of 1031 Strathcona St, 323.0 m north of St Matthews Ave, 1.7 m west of east curb	Asphalt & Concrete	50 & 125	None	-	Silt, Clay, Silt, Clay	3.05	8

Table 3-2 – Ainslie Street

PAVEMENT CORE NO.	PAVEMENT CORE LOCATION	PAVEMENT SURFACE	
		Type	Thickness (mm)
PC-01	UTM 14N: 5527022.9 m N, 624935.2 m E Southbound lane in front of 343 Ainslie St, 80.3 m north of Lodge Ave, 2.1 m west of east curb	Asphalt & Concrete	240 mm (30 mm asphalt, 210 mm broken concrete)
PC-02	UTM 14N: 5526823.0 m N, 624928.6 m E Southbound lane in front of 355 Ainslie St, 80.3 m north of Lodge Ave, 5.2 m west of east curb	Asphalt & Concrete	250 mm (50 mm asphalt, 200 mm broken concrete)
PC-03	UTM 14N: 5526872.9 m N, 624933.3 m E Southbound lane in front of 367 Ainslie St, 130.3 m north of Lodge Ave, 2.5 m west of east curb	Asphalt & Concrete	200 mm (50 mm asphalt, 150 mm concrete)
PC-04	UTM 14N: 5526923.0 m N, 624931.9 m E Southbound lane in front of 379 Ainslie St, 180.3 m north of Lodge Ave, 5.0 m west of east curb	Asphalt & Concrete	215 mm (65 mm asphalt, 150 mm concrete)
PC-05	UTM 14N: 5526972.8 m N, 624936.6 m E Southbound lane in front of 390 Ainslie St, 230.3 m north of Lodge Ave, 2.1 m west of east curb	Asphalt & Concrete	200 mm (25 mm asphalt, 175 mm concrete)
PC-06	UTM 14N: 5527022.9 m N, 624935.2 m E Southbound lane in front of 404 Ainslie St, 280.3 m north of Lodge Ave, 5.1 m west of east curb	Asphalt & Concrete	190 mm (25 mm asphalt, 165 mm concrete)

Table 3-3 – Lodge Avenue

PAVEMENT CORE NO.	PAVEMENT CORE LOCATION	PAVEMENT SURFACE	
		Type	Thickness (mm)
PC-07	UTM 14N: 5526738.2 m N, 624891.5 m E Eastbound lane near 320 Ainslie St, 50.0 m east of Moray St, 1.8 m north of south curb.	Asphalt & Concrete	150 mm (25 mm asphalt, 125 mm concrete)
PC-08	UTM 14N: 5526738.4 m N, 624991.6 m E Westbound lane near 72 Golden Gate Bay, 150.0 m east of Moray St, 5.2 m north of south curb.	Asphalt & Concrete	210 mm (70 mm asphalt, 140 mm concrete)
PC-09	UTM 14N: 5526731.3 m N, 625086.4 m E Eastbound lane near 2 Golden Gate Bay, 245.0 m east of Moray St, 1.7 m north of south curb.	Asphalt & Concrete	200 mm (40 mm asphalt, 160 mm concrete)
PC-10	UTM 14N: 5526731.8 m N, 625181.4 m E Westbound lane in front of 312 Lodge Ave, 340.0 m east of Moray St, 5.2 m north of south curb.	Asphalt & Concrete	175 mm (20 mm asphalt, 155 mm concrete)
PC-11	UTM 14N: 5526724.3 m N, 625276.3 m E Eastbound lane near 310 Olive St, 435.0 m east of Moray St, 1.7 m north of south curb.	Asphalt & Concrete	200 mm (30 mm asphalt, 170 mm concrete)
PC-12	UTM 14N: 5526724.5 N, 625391.3 m E Westbound lane near 320 Whytewold Rd, 550.0 m east of Moray St, 5.1 m north of south curb.	Asphalt & Concrete	200 mm (30 mm intact asphalt, 20 mm broken asphalt, 150 mm broken concrete)
PC-13	UTM 14N: 5526717.0 m N, 625496.1 m E Eastbound lane in front of 226 Lodge Ave, 655.0 m east of Moray St, 1.8 m north of south curb.	Asphalt & Concrete	260 mm (110 mm asphalt, 150 mm concrete)
PC-14	UTM 14N: 5526717.5 m N, 625591.2 m E Westbound lane in front of 207 Lodge Ave, 750.0 m east of Moray St, 5.3 m north of south curb.	Asphalt & Concrete	255 mm (75 mm asphalt, 180 mm concrete)
PC-15	UTM 14N: 5526710.2 m N, 625691.0 m E Eastbound lane near 281 Strathmillan Rd, 850.0 m east of Moray St, 1.7 m north of south curb.	Asphalt & Concrete	190 mm (50 mm asphalt, 140 mm concrete)

Table 3-4 – Traill Avenue

PAVEMENT CORE NO.	PAVEMENT CORE LOCATION	PAVEMENT SURFACE	
		Type	Thickness (mm)
PC-16	UTM 14N: 5526343.8 m N, 625823.1 m E Southbound lane in front of 155 Traill Ave, 31.0 m north of Portage Ave, 2.3 east of west curb.	Asphalt	125 mm
PC-17	UTM 14N: 5526393.6 m N, 625828.4 m E Northbound lane in front of 149 Traill Ave, 80.2 m north of Portage Ave, 5.8 m east of west curb.	Asphalt	100 mm
PC-18	UTM 14N: 5526411.4 m N, 625864.4 m E Westbound lane in front of 135 Traill Ave, 188.0 m west of Mt Royal Rd, 1.8 m south of north curb.	Asphalt	65 mm
PC-19	UTM 14N: 5526406.1 m N, 625914.2 m E Eastbound lane in front of 126 Traill Ave, 137.8 m west of Mt Royal Rd, 5.4 m south of north curb.	Asphalt	75 mm
PC-20	UTM 14N: 5526407.9 m N, 625969.3 m E Westbound lane in front of 114 Traill Ave, 83.0 m west of Mt Royal Rd, 1.7 m south of north curb.	Asphalt	75 mm
PC-21	UTM 14N: 5526402.4 m N, 626024.2 m E Eastbound lane in front of 102 Traill Ave, 27.7 m west of Mt Royal Rd, 5.4 m south of north curb.	Asphalt & Concrete	240 mm (65 mm asphalt, 175 mm concrete)
PC-22	UTM 14N: 5526349.6 m N, 625826.9 m E Northbound lane beside of 2345 Portage Ave, 36.2 m north of Portage Ave, 1.7 west of east curb.	Asphalt	65 mm
PC-23	UTM 14N: 5526410.1 m N, 625901.1 m E Westbound lane in front of 123 Traill Ave, 151.8 m west of Mt Royal Rd, 1.8 m south of north curb.	Asphalt	75 mm
PC-24	UTM 14N: 5526407.0 m N, 625996.7 m E Westbound lane in front of 114 Traill Ave, 56.1 m west of Mt Royal Rd, 1.7 m south of north curb.	Asphalt	75 mm

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.

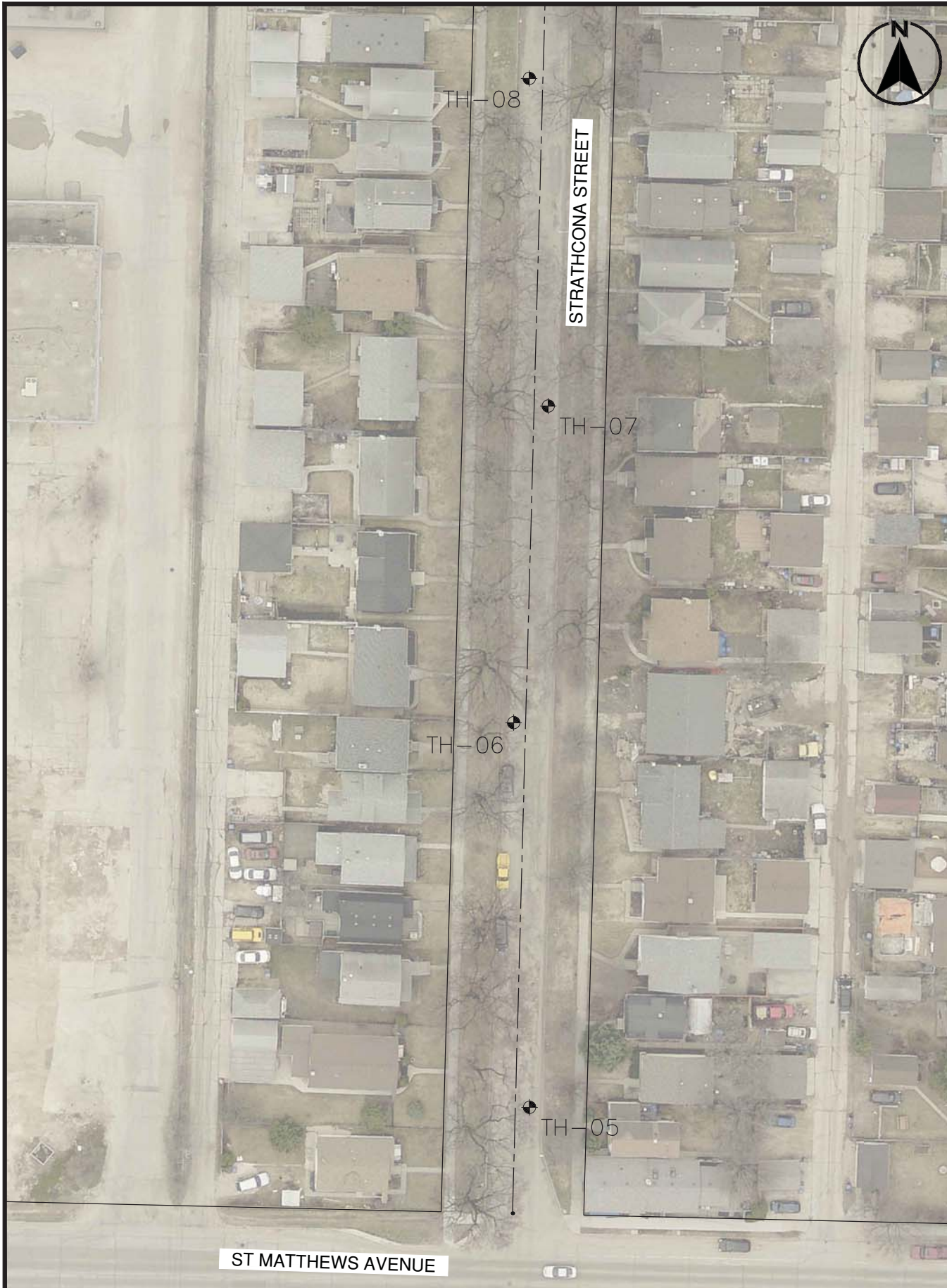
This report and the information and data contained herein are to be treated as confidential and may be used only by the Client and its officers and employees in relation to the specific project that it was prepared for. Any use a third party makes of this report, or any reliance on or decisions to be 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 STRATHCONA AVE



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

TITLE:

19-R-03 LOCAL STREETS
STRATHCONA ST FROM
ELLICE AVE TO ST MATTHEWS AVE

TESTHOLE LOCATIONS

SCALE:

N.T.S.

DATE:

2019/03/14

PROJECT NO:

18M-01969-00

REVISION:

0

DRAWING NO:

B101



ELLICE AVENUE

TH-11

STRATHCONA STREET

TH-10

TH-09



1600 BUFFALO PLACE
WINNIPEG, MANITOBA
CANADA R3T 6B8
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TITLE:

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ELLICE AVE TO ST MATTHEWS AVE

TESTHOLE LOCATIONS

SCALE:

N.T.S.

DATE:

2019/03/14

PROJECT NO:

18M-01969-00

REVISION:

0

DRAWING NO:

B102

XREF

STAMP



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

CLIENT City of Winnipeg
 PROJECT NUMBER 18M-01969-00
 DATE STARTED 4/9/19 COMPLETED 4/9/19
 DRILLING CONTRACTOR Maple Leaf Drilling
 DRILLING METHOD Solid Stem Auger - B40 Truck Rig
 LOGGED BY Jason Dunn CHECKED BY Dana Bredin
 NOTES 629952.8 m E, 5528074.4 m N

PROJECT NAME 19-R-03 - Contract 2 - Street Renewals
 PROJECT LOCATION Strathcona between Ellice/St Matthews
 GROUND ELEVATION 100 m HOLE SIZE 125mm
 GROUND WATER LEVELS:
 AT TIME OF DRILLING ---
 AT END OF DRILLING ---
 AFTER DRILLING ---

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲			
									PL	MC	LL	
0.0		99.95		ASPHALT - 50mm thick, broken.					20	40	60	80
0.0		99.92		GRANULAR FILL - Crushed limestone, 20 mm down. - Mixed with silty clay fill.					20	40	60	80
0.0		99.85		CONCRETE - 70mm thick, broken.	GB S1			33				
0.5				SILT - Tan-brown, frozen, some clay.	GB S2			20				
1.0		99.24		CLAY - Brown, frozen, trace gravel. - Frost penetration to 1.52m below grade. - Moist, stiff below 1.52m.	GB S3			26				
1.5					GB S4			29				
2.0					GB S5			36				
2.5					GB S6			46				
3.0					GB S7			48				
3.0					GB S8			51				
3.0		96.95										

- Testhole ended at 3.05m below grade.
 - No seepage or sloughing encountered.
 - Test hole backfilled with bentonite and auger cuttings.

GENERAL BH PLOTS - WSP - 19-R-03-C2 - STRATHCONA.GPJ_GINT STD CANADA.GDT 4/29/19



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 1600 Buffalo Place
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CLIENT City of Winnipeg
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 DRILLING CONTRACTOR Maple Leaf Drilling
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 LOGGED BY Jason Dunn CHECKED BY Dana Bredin
 NOTES 629950.6 m E, 5528128.6 m N

PROJECT NAME 19-R-03 - Contract 2 - Street Renewals
 PROJECT LOCATION Strathcona between Ellice/St Matthews
 GROUND ELEVATION 100 m HOLE SIZE 125mm
 GROUND WATER LEVELS:
 AT TIME OF DRILLING ---
 AT END OF DRILLING ---
 AFTER DRILLING ---

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲	
									PL	MC
		99.75		CONCRETE - 250mm thick, intact.						
0.5		99.39		SILT - Tan, frozen, some clay.	GB S1			35		
1.0				CLAY - Brown, frozen, trace silt. - Frost penetration to 1.52 m below grade. - Moist, stiff below 1.52 m.	GB S2			22		
1.5					GB S3			28		
2.0					GB S4			28		
2.5					GB S5			40		
3.0					GB S6			24		
					GB S7			10		
					GB S8			51		
		96.95								

- Testhole ended at 3.05m below grade.
 - No seepage or sloughing encountered.
 - Test hole backfilled with bentonite and auger cuttings.

GENERAL BH PLOTS - WSP - 19-R-03-C2 - STRATHCONA.GPJ_GINT STD CANADA.GDT 4/29/19



WSP
 1600 Buffalo Place
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CLIENT City of Winnipeg
PROJECT NUMBER 18M-01969-00
DATE STARTED 4/9/19 **COMPLETED** 4/9/19
DRILLING CONTRACTOR Maple Leaf Drilling
DRILLING METHOD Solid Stem Auger - B40 Truck Rig
LOGGED BY Jason Dunn **CHECKED BY** Dana Bredin
NOTES 629955.6 m E, 5528173.2 m N

PROJECT NAME 19-R-03 - Contract 2 - Street Renewals
PROJECT LOCATION Strathcona between Ellice/St Matthews
GROUND ELEVATION 100 m **HOLE SIZE** 125mm
GROUND WATER LEVELS:
AT TIME OF DRILLING ---
AT END OF DRILLING ---
AFTER DRILLING ---

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲	
									PL	MC
99.92		99.87		CONCRETE - 75mm thick, intact, poor condition.						
99.70				TOPSOIL - Black, moist, some rootlets.						
0.5				CLAY - Brown, moist, stiff, some silt.	GB S1		40			
1.0				CLAYEY SILT - Tan, frozen, some clay, trace sand. - Frost penetration to 1.52m below grade. - 63.6% silt, 27.5% clay, 9.0% sand.	GB S2		28			
1.5					GB S3		24			
1.5		98.48			GB S4		18			
2.0				CLAY - Brown, moist, stiff, some silt.	GB S5		21			
2.5					GB S6		41			
3.0					GB S7		45			
3.0		96.95			GB S8		48			

- Testhole ended at 3.05m below grade.
 - No seepage or sloughing encountered.
 - Test hole backfilled with bentonite and auger cuttings.

GENERAL_BH_PLOTS - WSP - 19-R-03-C2 - STRATHCONA.GPJ_GINT STD CANADA.GDT 4/29/19

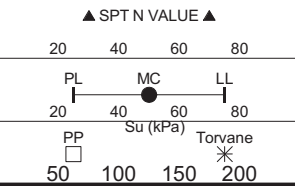


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 GROUND ELEVATION 100 m HOLE SIZE 125mm
 GROUND WATER LEVELS:
 AT TIME OF DRILLING ---
 AT END OF DRILLING ---
 AFTER DRILLING ---

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲					
									20	40	60	80		
0.0		99.97		ASPHALT - 25mm thick, intact.										
0.0		99.92		GRANULAR FILL - Granular fill, 20mm down.										
0.5				SILT - Tan, frozen, some clay. - Frost penetration to 1.68m below grade. - Soft, moist below 1.68m.	Hand GB S1			6						
0.8					Hand GB S2			23						
1.0					Hand GB S3			25						
1.3					Hand GB S4			35						
1.6					Hand GB S5			28						
2.0		98.17		CLAY - Brown, moist, stiff, some silt.	Hand GB S6			24						
2.3					Hand GB S7			40						
2.7					Hand GB S8			34						



GENERAL BH PLOTS - WSP - 19-R-03-C2 - STRATHCONA.GPJ_GINT STD CANADA.GDT 4/29/19

- Testhole ended at 3.05m below grade.
 - No seepage encountered.
 - Hole open to 2.76m below grade.
 - Test hole backfilled with bentonite and auger cuttings.



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 GROUND WATER LEVELS:
 AT TIME OF DRILLING ---
 AT END OF DRILLING ---
 AFTER DRILLING ---

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲				
									20	40	60	80	
0.0		99.87		CONCRETE - 125mm thick, partially intact.									
0.0		99.85		GRANULAR FILL - Granular fill, 20mm down.									
0.5				SILT - Tan-brown, frozen, some clay	GB S1			6					
0.8		99.24		CLAY - Brown, frozen, some silt. - Frost penetration to 1.52m below grade. - Moist, stiff below 1.52m.	GB S2			17					
1.0					GB S3			26					
1.5					GB S4			29					
2.0					GB S5			34					
2.5					GB S6			43					
3.0					GB S7			47					
3.5					GB S8			51					
3.0		96.95											

- Testhole ended at 3.05m below grade.
 - No seepage or sloughing encountered.
 - Test hole backfilled with bentonite and auger cuttings.

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

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲	
									PL	MC
		99.90		ASPHALT - 100mm thick, intact.						
		99.82		CONCRETE - 75mm thick, partially intact.						
0.5				SILT - Tan-brown, frozen, some clay.	GB S1			33		
					GB S2			38		
1.0					GB S3			22		
		98.63		CLAY - Brown, frozen, some silt, trace gravel. - Frost penetration to 1.52m below grade. - Moist, stiff below 1.52m.	GB S4			29		
1.5					GB S5			33		
					GB S6			45		
2.0					GB S7			47		
2.5					GB S8			53		
3.0		96.95								

- Testhole ended at 3.05m below grade.
 - No seepage or sloughing encountered.
 - Test hole backfilled with bentonite and auger cuttings.



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

TH-11

PAGE 1 OF 1

CLIENT City of Winnipeg

PROJECT NAME 19-R-03 - Contract 2 - Street Renewals

PROJECT NUMBER 18M-01969-00

PROJECT LOCATION Strathcona between Ellice/St Matthews

DATE STARTED 4/11/19 COMPLETED 4/11/19

GROUND ELEVATION 100 m HOLE SIZE 125mm

DRILLING CONTRACTOR Maple Leaf Drilling

GROUND WATER LEVELS:

DRILLING METHOD Solid Stem Auger - B40 Truck Rig

AT TIME OF DRILLING ---

LOGGED BY Jason Dunn CHECKED BY Dana Bredin

AT END OF DRILLING ---

NOTES 629961.0 m E, 5528379.3 m N

AFTER DRILLING ---

DEPTH (m)	GRAPHIC LOG	ELEV. (m)	WATER LEVEL	MATERIAL DESCRIPTION	SAMPLE TYPE NUMBER	BLOW COUNTS (N VALUE)	POCKET PEN. (kPa)	MOISTURE CONTENT (%)	▲ SPT N VALUE ▲	
									20	40 60 80
		99.95		ASPHALT - 50mm thick, intact.						
		99.82		CONCRETE - 125mm thick, intact.						
0.5				SILT - Tan-brown, frozen, some clay.	Hand GB S1			27		
					Hand GB S2			23		
1.0					Hand GB S3			19		
		98.63		CLAY - Brown, frozen, some silt, trace gravel. - Frost penetration to 1.52m below grade. - Moist, stiff below 1.52m.	Hand GB S4			24		
1.5					Hand GB S5			26		
		98.02		SILT - Tan-brown, dry, soft, some clay.	Hand GB S6			41		
2.0					Hand GB S7			25		
		97.56		CLAY - Brown, moist, stiff, some silt.	Hand GB S8			45		
2.5										
3.0		96.95								

- Testhole ended at 3.05m below grade.
 - No seepage or sloughing encountered.
 - Test hole backfilled with bentonite and auger cuttings.

GENERAL BH PLOTS - WSP - 19-R-03-C2 - STRATHCONA.GPJ_GINT STD CANADA.GDT 4/29/19



Figure 1 – TH-05 Strathcona Ave (asphalt and broken concrete, actual core depth 120 mm)

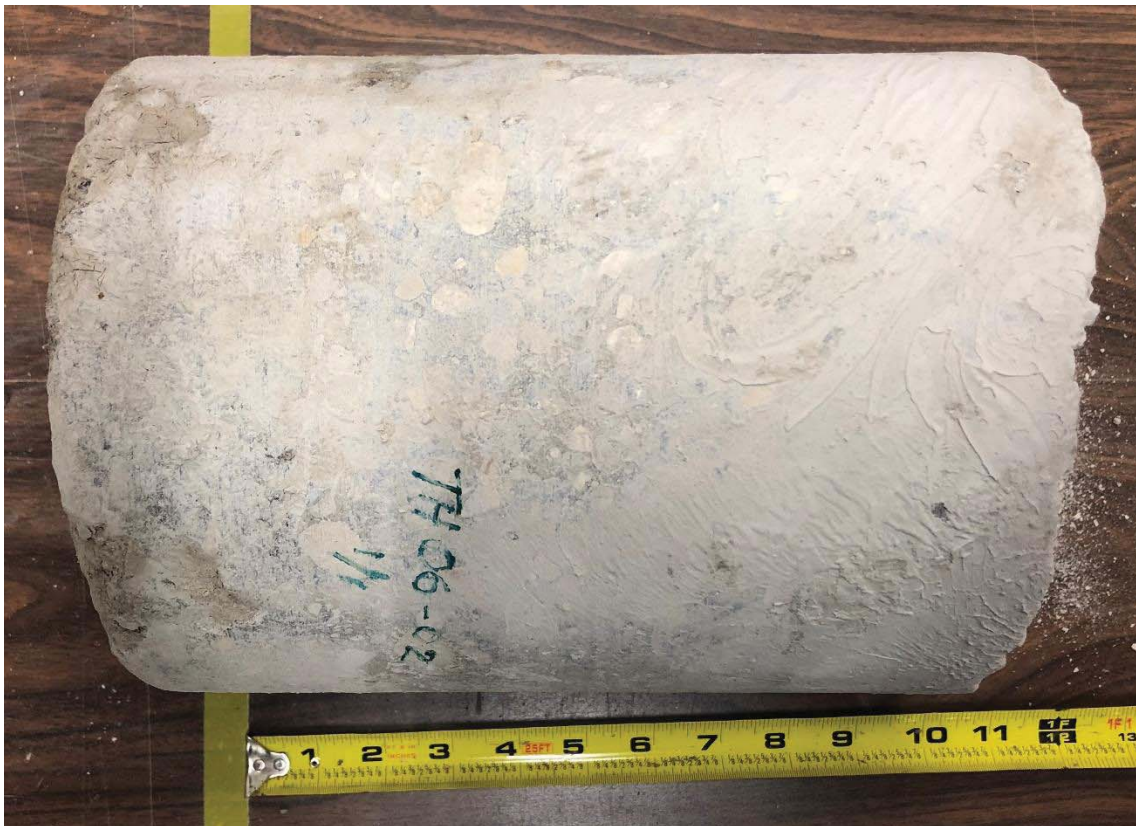


Figure 2 – TH-06 Strathcona Ave



Figure 3 – TH-07 Strathcona Ave



Figure 4 – TH-08 Strathcona Ave (asphalt only)



Figure 5 – TH-09 Strathcona Ave



Figure 6 – TH-10 Strathcona Ave



Figure 7 – TH-11 Strathcona Ave

MOISTURE CONTENT OF SOIL (ASTM D2216)

CLIENT: WSP Canada Group Limited	TEST NO: 19- 002	PROJECT NO: 103-1906
PROJECT: 18M-01969-00 - Phase 802-1	DATE SAMPLED: 8-Apr-2019	SAMPLED BY: Client
PROJECT CONTACT: Dana Bredin	DATE TESTED: 19-Apr-2019	TESTED BY: Viet Linh
TEST LOCATION: Phase 802-1		

Description	TH-05-02	TH-05-02	TH-05-02	TH-05-02	TH-05-02
Sample	S1	S2	S3	S4	S5
Wt Wet Sample + Tare	127.40	123.30	124.70	123.20	123.50
Wt Dry Sample + Tare	97.00	103.80	99.60	96.80	92.20
Wt Water	30.40	19.50	25.10	26.40	31.30
Wt Tare	4.10	4.10	4.20	4.40	4.20
Wt Dry Sample	92.90	99.70	95.40	92.40	88.00
Moisture Content (%)	32.7	19.6	26.3	28.6	35.6

MOISTURE CONTENT OF SOIL (ASTM D2216)

CLIENT: WSP Canada Group Limited	TEST NO: 19- 002	PROJECT NO: 103-1906
PROJECT: 18M-01969-00 - Phase 802-1	DATE SAMPLED: 8-Apr-2019	SAMPLED BY: Client
PROJECT CONTACT: Dana Bredin	DATE TESTED: 19-Apr-2019	TESTED BY: Viet Linh
TEST LOCATION: Phase 802-1		

Description	TH-05-02	TH-05-02	TH-05-02		
Sample	S6	S7	S8		
Wt Wet Sample + Tare	127.60	121.20	123.60		
Wt Dry Sample + Tare	88.60	83.30	83.20		
Wt Water	39.00	37.90	40.40		
Wt Tare	4.20	4.20	4.60		
Wt Dry Sample	84.40	79.10	78.60		
Moisture Content (%)	46.2	47.9	51.4		

Description	TH-06-02	TH-06-02	TH-06-02	TH-06-02	TH-06-02
Sample	S1	S2	S3	S4	S5
Wt Wet Sample + Tare	123.40	121.30	124.20	125.30	124.40
Wt Dry Sample + Tare	92.60	100.00	97.60	98.50	89.90
Wt Water	30.80	21.30	26.60	26.80	34.50
Wt Tare	4.20	4.20	4.10	4.20	4.20
Wt Dry Sample	88.40	95.80	93.50	94.30	85.70
Moisture Content (%)	34.8	22.2	28.4	28.4	40.3

Description	TH-06-02	TH-06-02	TH-06-02		
Sample	S6	S7	S8		
Wt Wet Sample + Tare	126.20	122.70	124.50		
Wt Dry Sample + Tare	103.10	112.30	84.00		
Wt Water	23.10	10.40	40.50		
Wt Tare	4.60	4.20	4.30		
Wt Dry Sample	98.50	108.10	79.70		
Moisture Content (%)	23.5	9.6	50.8		

Description	TH-07-02	TH-07-02	TH-07-02	TH-07-02	TH-07-02
Sample	S1	S2	S3	S4	S5
Wt Wet Sample + Tare	126.30	475.30	194.50	121.60	126.70
Wt Dry Sample + Tare	91.70	375.00	159.40	103.80	105.80
Wt Water	34.60	100.30	35.10	17.80	20.90
Wt Tare	4.20	13.40	14.00	4.10	4.20
Wt Dry Sample	87.40	361.60	145.40	99.70	101.60
Moisture Content (%)	39.5	27.7	24.1	17.9	20.6

MOISTURE CONTENT OF SOIL (ASTM D2216)

CLIENT: WSP Canada Group Limited	TEST NO: 19- 002	PROJECT NO: 103-1906
PROJECT: 18M-01969-00 - Phase 802-1	DATE SAMPLED: 8-Apr-2019	SAMPLED BY: Client
PROJECT CONTACT: Dana Bredin	DATE TESTED: 19-Apr-2019	TESTED BY: Viet Linh
TEST LOCATION: Phase 802-1		

Description	TH-07-02	TH-07-02	TH-07-02		
Sample	S6	S7	S8		
Wt Wet Sample + Tare	123.40	124.90	125.50		
Wt Dry Sample + Tare	89.00	87.50	86.00		
Wt Water	34.40	37.40	39.50		
Wt Tare	5.80	4.10	4.20		
Wt Dry Sample	83.20	83.40	81.80		
Moisture Content (%)	41.3	44.8	48.3		

Description	TH-08-02	TH-08-02	TH-08-02	TH-08-02	TH-08-02
Sample	S1	S2	S3	S4	S5
Wt Wet Sample + Tare	216.30	164.20	161.60	161.10	162.10
Wt Dry Sample + Tare	205.80	141.00	137.40	130.30	136.00
Wt Water	10.50	23.20	24.20	30.80	26.10
Wt Tare	41.40	40.60	41.10	41.10	41.10
Wt Dry Sample	164.40	100.40	96.30	89.20	94.90
Moisture Content (%)	6.4	23.1	25.1	34.5	27.5

Description	TH-08-02	TH-08-02	TH-08-02		
Sample	S6	S7	S8		
Wt Wet Sample + Tare	166.30	163.70	162.20		
Wt Dry Sample + Tare	142.20	125.20	131.80		
Wt Water	24.10	38.50	30.40		
Wt Tare	41.10	29.10	41.50		
Wt Dry Sample	101.10	96.10	90.30		
Moisture Content (%)	23.8	40.1	33.7		

Description	TH-09-02	TH-09-02	TH-09-02	TH-09-02	TH-09-02
Sample	S1	S2	S3	S4	S5
Wt Wet Sample + Tare	212.20	164.40	161.90	160.40	151.30
Wt Dry Sample + Tare	202.40	146.20	136.90	133.60	120.30
Wt Water	9.80	18.20	25.00	26.80	31.00
Wt Tare	41.00	41.10	40.70	41.30	29.40
Wt Dry Sample	161.40	105.10	96.20	92.30	90.90
Moisture Content (%)	6.1	17.3	26.0	29.0	34.1

MOISTURE CONTENT OF SOIL (ASTM D2216)

CLIENT: WSP Canada Group Limited	TEST NO: 19- 002	PROJECT NO: 103-1906
PROJECT: 18M-01969-00 - Phase 802-1	DATE SAMPLED: 8-Apr-2019	SAMPLED BY: Client
PROJECT CONTACT: Dana Bredin	DATE TESTED: 19-Apr-2019	TESTED BY: Viet Linh
TEST LOCATION: Phase 802-1		

Description	TH-09-02	TH-09-02	TH-09-02		
Sample	S6	S7	S8		
Wt Wet Sample + Tare	161.10	166.20	161.30		
Wt Dry Sample + Tare	125.10	125.90	120.60		
Wt Water	36.00	40.30	40.70		
Wt Tare	41.00	40.90	40.80		
Wt Dry Sample	84.10	85.00	79.80		
Moisture Content (%)	42.8	47.4	51.0		

Description	TH-10-02	TH-10-02	TH-10-02	TH-10-02	TH-10-02
Sample	S1	S2	S3	S4	S5
Wt Wet Sample + Tare	165.10	161.40	162.80	148.80	161.90
Wt Dry Sample + Tare	134.20	128.50	140.90	124.20	132.20
Wt Water	30.90	32.90	21.90	24.60	29.70
Wt Tare	40.60	41.50	41.50	40.60	40.80
Wt Dry Sample	93.60	87.00	99.40	83.60	91.40
Moisture Content (%)	33.0	37.8	22.0	29.4	32.5

Description	TH-10-02	TH-10-02	TH-10-02		
Sample	S6	S7	S8		
Wt Wet Sample + Tare	162.10	167.90	160.30		
Wt Dry Sample + Tare	124.90	127.60	119.10		
Wt Water	37.20	40.30	41.20		
Wt Tare	41.30	41.10	40.80		
Wt Dry Sample	83.60	86.50	78.30		
Moisture Content (%)	44.5	46.6	52.6		

Description	TH-11-02	TH-11-02	TH-11-02	TH-11-02	TH-11-02
Sample	S1	S2	S3	S4	S5
Wt Wet Sample + Tare	125.30	125.80	124.10	163.60	166.00
Wt Dry Sample + Tare	99.80	103.00	105.00	140.00	140.00
Wt Water	25.50	22.80	19.10	23.60	26.00
Wt Tare	4.30	4.60	4.60	41.10	41.10
Wt Dry Sample	95.50	98.40	100.40	98.90	98.90
Moisture Content (%)	26.7	23.2	19.0	23.9	26.3

MOISTURE CONTENT OF SOIL (ASTM D2216)

CLIENT: WSP Canada Group Limited	TEST NO: 19- 002	PROJECT NO: 103-1906
PROJECT: 18M-01969-00 - Phase 802-1	DATE SAMPLED: 8-Apr-2019	SAMPLED BY: Client
PROJECT CONTACT: Dana Bredin	DATE TESTED: 19-Apr-2019	TESTED BY: Viet Linh
TEST LOCATION: Phase 802-1		

Description	TH-11-02	TH-11-02	TH-11-02		
Sample	S6	S7	S8		
Wt Wet Sample + Tare	122.20	126.40	121.80		
Wt Dry Sample + Tare	88.10	102.20	85.20		
Wt Water	34.10	24.20	36.60		
Wt Tare	4.30	4.20	4.40		
Wt Dry Sample	83.80	98.00	80.80		
Moisture Content (%)	40.7	24.7	45.3		

Description					
Sample					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
Moisture Content (%)					

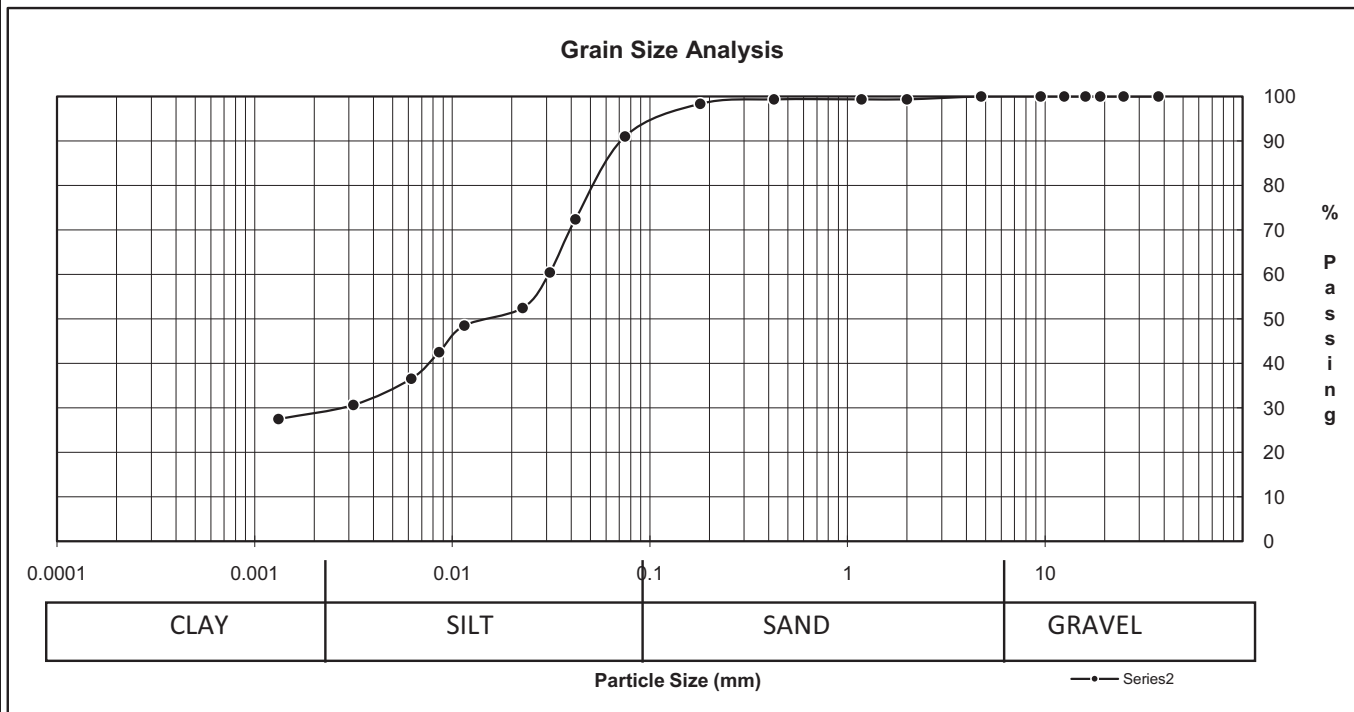
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Sample					
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Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
Moisture Content (%)					

Description					
Sample					
Wt Wet Sample + Tare					
Wt Dry Sample + Tare					
Wt Water					
Wt Tare					
Wt Dry Sample					
Moisture Content (%)					

PARTICLE SIZE ANALYSIS OF SOILS TEST REPORT

CLIENT:	WSP 1600 Buffalo Place Winnipeg, MB R3T 6B8	PROJECT NO.	103-1906
ATTENTION:	Dana Bredin	Test No:	6
PROJECT:	18M-01969-00 Phase 802-1	Lab No:	HM 48-6P

Date Sampled:	17-Apr-19	Date Received:	17-Apr-19	Sieve Analysis	Hydrometer Analysis		
Sampled By:	Client	Date Tested:	18-Apr-19	Sieve (mm) % Passing	Diameter % Finer		
Material Identification B.H./T.H. No. TH 07-02, S3 Sample No. HM 48-6P Sample Source Various City Street 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	0.0420	72.3
				9.50	100.0	0.0312	60.4
				4.75	100.0	0.0227	52.5
				2.00	99.4	0.0115	48.5
				1.18	99.4	0.0086	42.5
0.425	99.4	0.0062	36.6				
0.180	98.4	0.0032	30.6				
0.075	91.0	0.0013	27.5				



SOIL DESCRIPTION	% Composition		D10	
	9.0	Gravel	D30	0.00316
	63.6	Sand	D60	0.03118
	27.5	Silt	Cu	
		Clay	Cc	

Remarks: Test Method: ASTM D422, D2216, D4318

Technician: Navi



Reviewed by: Hermie Manalo

ATTERBERG LIMITS

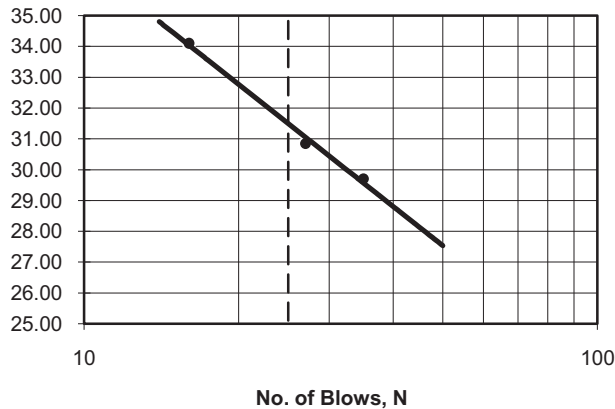
CLIENT: WSP Canada Group Limited
 1600 Buffalo Place
 Winnipeg, MB R3T 6B8
 ATTENTION: Dana Bredin
 PROJECT: 18M-01969-00 Phase 802-1

PROJECT NO.: 103-1906
 TEST NO.: 6
 LAB NO.: HM 48-6

Liquid Limit Determination

Dish No.:	1	2	3		Liquid Limit 25 Blows
Wet Soil + Dish:	11.25	14.77	13.55		
Dry Soil + Dish:	9.64	12.29	11.18		
Moisture:	1.61	2.48	2.37		
Dish:	4.22	4.25	4.23		
Dry Soil:	5.42	8.04	6.95		
% Moisture:	29.70	30.85	34.10		
No. of Blows:	35	27	16		
Liquid Limits:	30.94	31.13	32.31		

Liquid Limit



Material Identification:

T.H. No. **TH 07-02, S3**

Depth: **3'**

Liquid Limit, %: **31**
 Plastic Limit, %: **17**
 Plasticity Index: **15**
 (LL-PL)

Plastic Limit Determination

Dish No.:	1	2	3			
Wet Soil + Dish:	6.5	6.36	6.13			
Dry Soil + Dish:	6.2	6.08	5.91			
Moisture:	0.3	0.28	0.22			
Dish:	4.48	4.38	4.61			
Dry Soil:	1.72	1.7	1.3			
% Moisture:	17.44	16.47	16.92			
Average:						17

Test Method : ASTM: D4318, D2216
 HMCL Tech: Navi
 Date Tested: 23-Apr-19



Reviewed by: Hermie Manalo

APPENDIX

B AINSLIE ST



BRUCE AVENUE

AINSLIE STREET

MORAY STREET

LODGE AVENUE

PC-06

PC-05

PC-04

PC-03

PC-02

PC-01



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

TITLE:

19-R-03 LOCAL STREETS
AINSLIE ST FROM
LODGE AVE TO BRUCE AVE

CORING LOCATIONS

SCALE:

N.T.S.

DATE:

2019/03/14

PROJECT NO:

18M-01969-00

REVISION:

0

DRAWING NO:

B103



Figure 1 – PC-01 Ainslie St (asphalt and broken concrete, actual core depth 240 mm)



Figure 2 – PC-02 Ainslie St (asphalt and broken concrete, actual core depth 250 mm)



Figure 3 – PC-03 Ainslie St

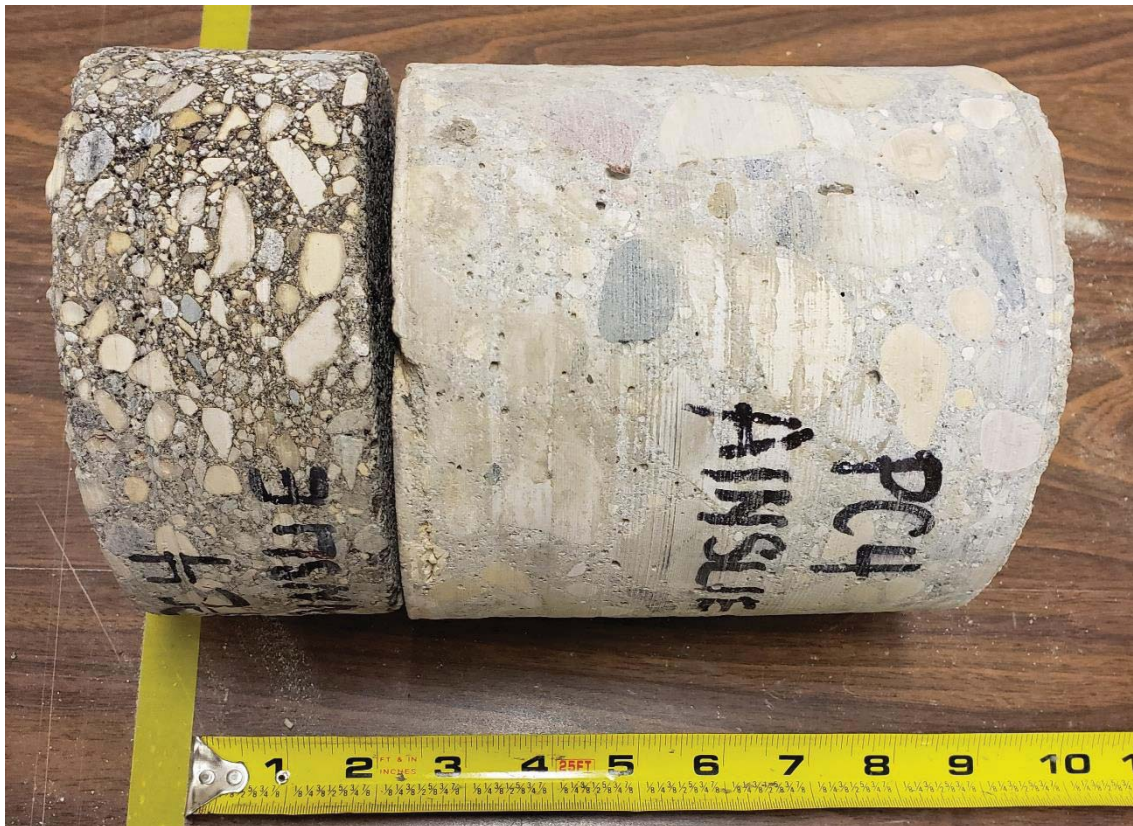


Figure 4 – PC-04 Ainslie St

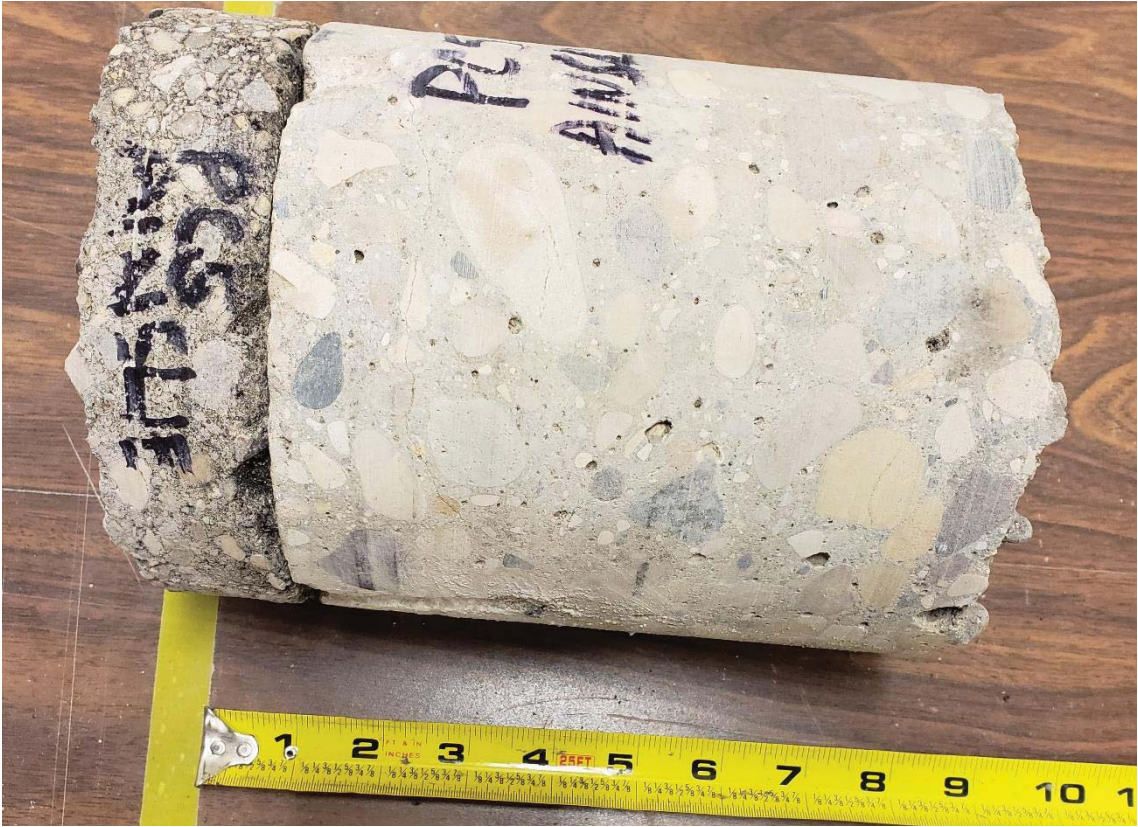


Figure 5 – PC-05 Ainslie St

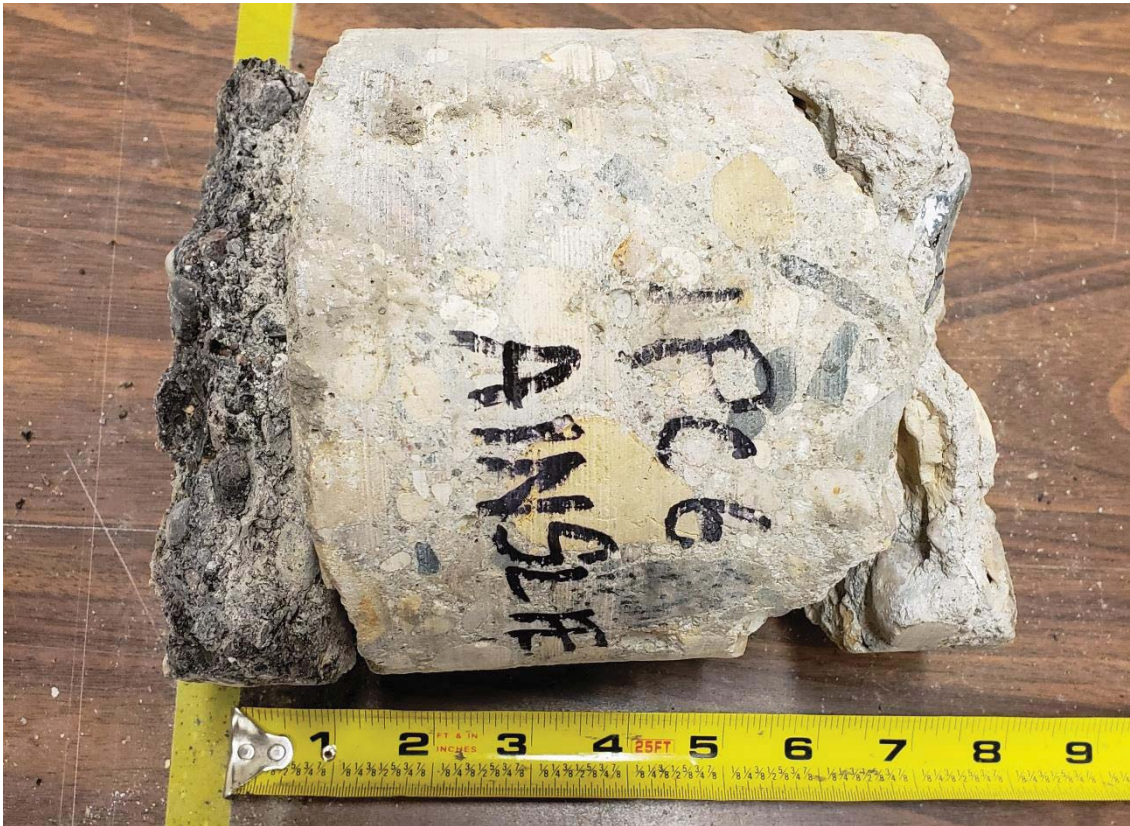


Figure 6 – PC-06 Ainslie St

APPENDIX

C LODGE AVE




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

TITLE:
19-R-03 LOCAL STREETS
AINSLIE ST FROM
LODGE AVE TO BRUCE AVE

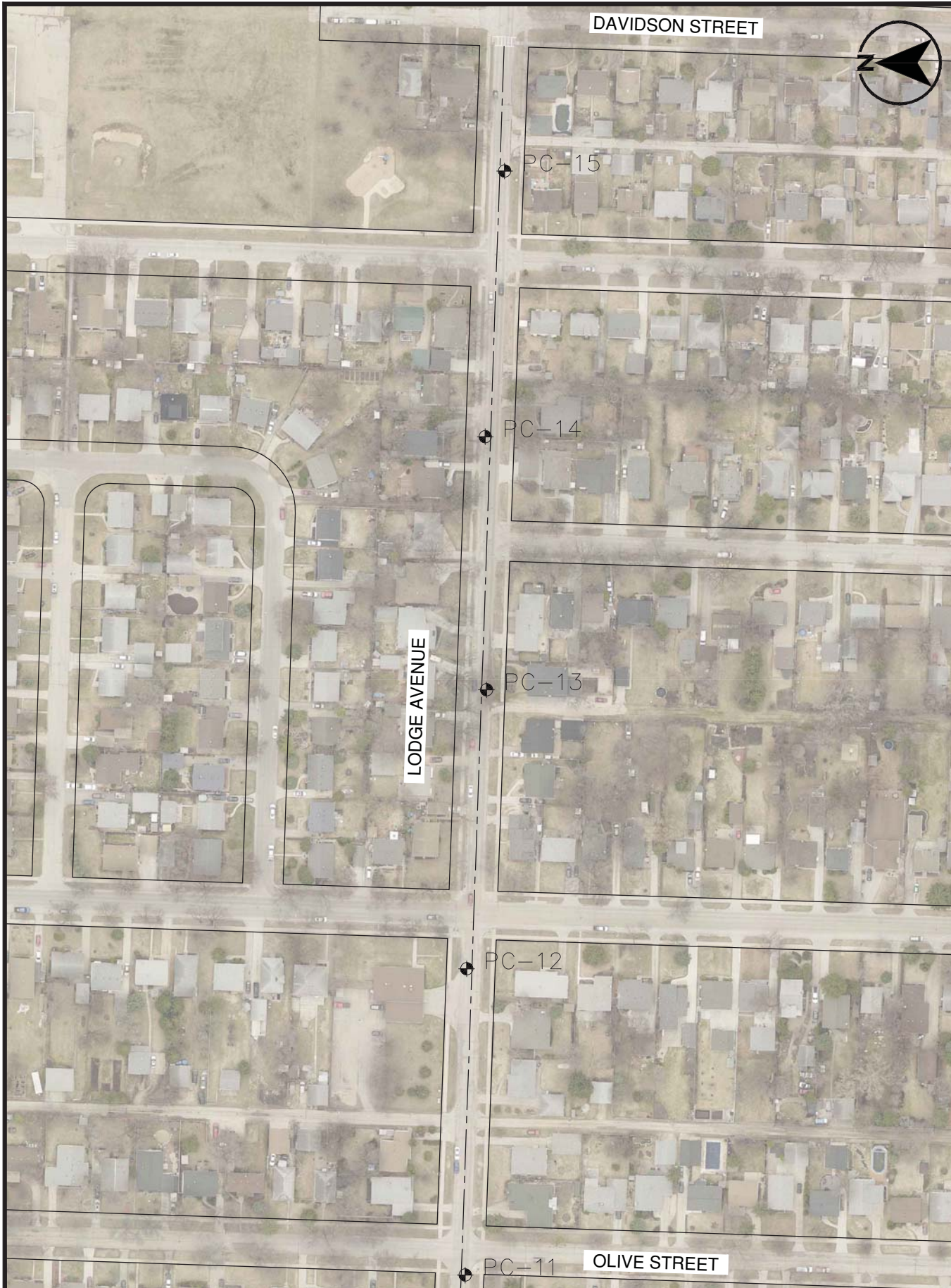
CORING LOCATIONS

SCALE:
N.T.S.
DATE:
2019/03/14
PROJECT NO:
18M-01969-00

REVISION:
0
DRAWING NO:
B104

XREF

STAMP



wsp

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

TITLE:
 19-R-03 LOCAL STREETS
 AINSLIE ST FROM
 LODGE AVE TO BRUCE AVE

CORING LOCATIONS

SCALE:
 N.T.S.

DATE:
 2019/03/14

PROJECT NO:
 18M-01969-00

REVISION:
 0

DRAWING NO:
 B105

XREF

STAMP



Figure 1 – PC-07 Lodge Ave

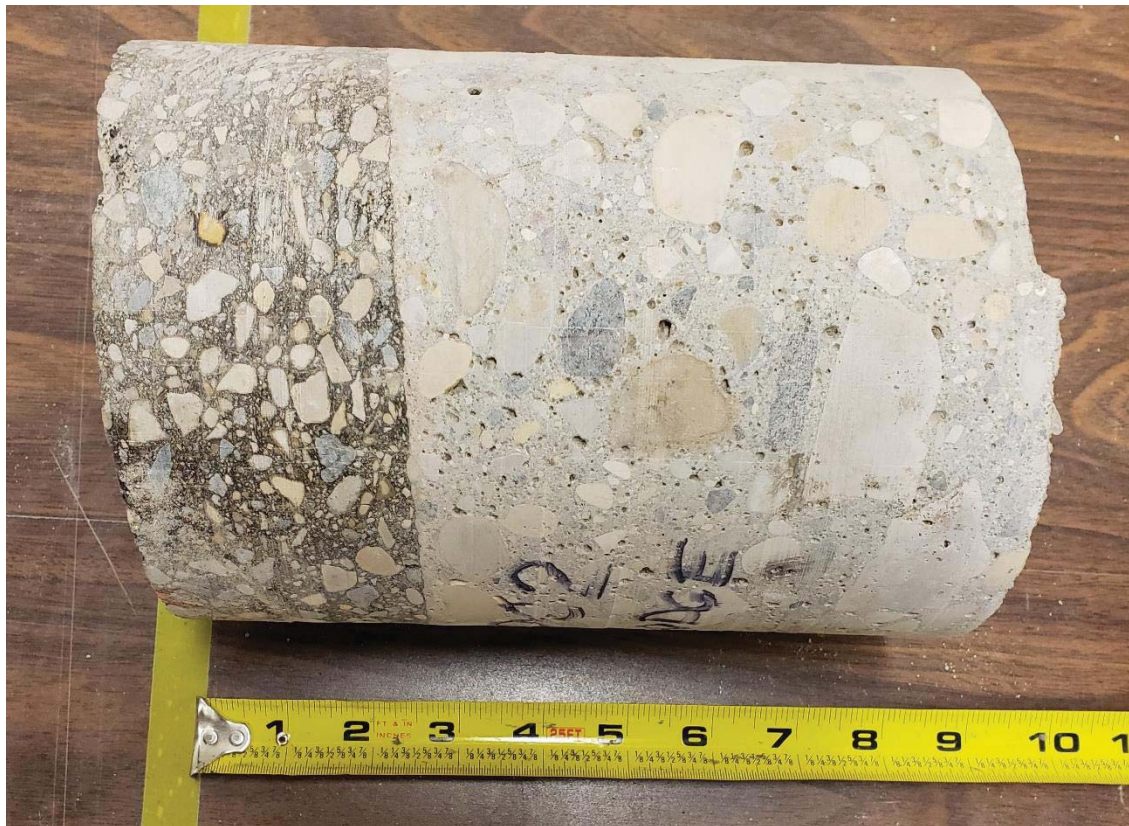


Figure 2 – PC-08 Lodge Ave



Figure 3 – PC-09 Lodge Ave



Figure 4 – PC-10 Lodge Ave



Figure 5 – PC-11 Lodge Ave



Figure 6 – PC-12 Lodge Ave (asphalt and broken asphalt/concrete, actual core depth 225 mm)



Figure 7 – PC-13 Lodge Ave



Figure 8 – PC-14 Lodge Ave

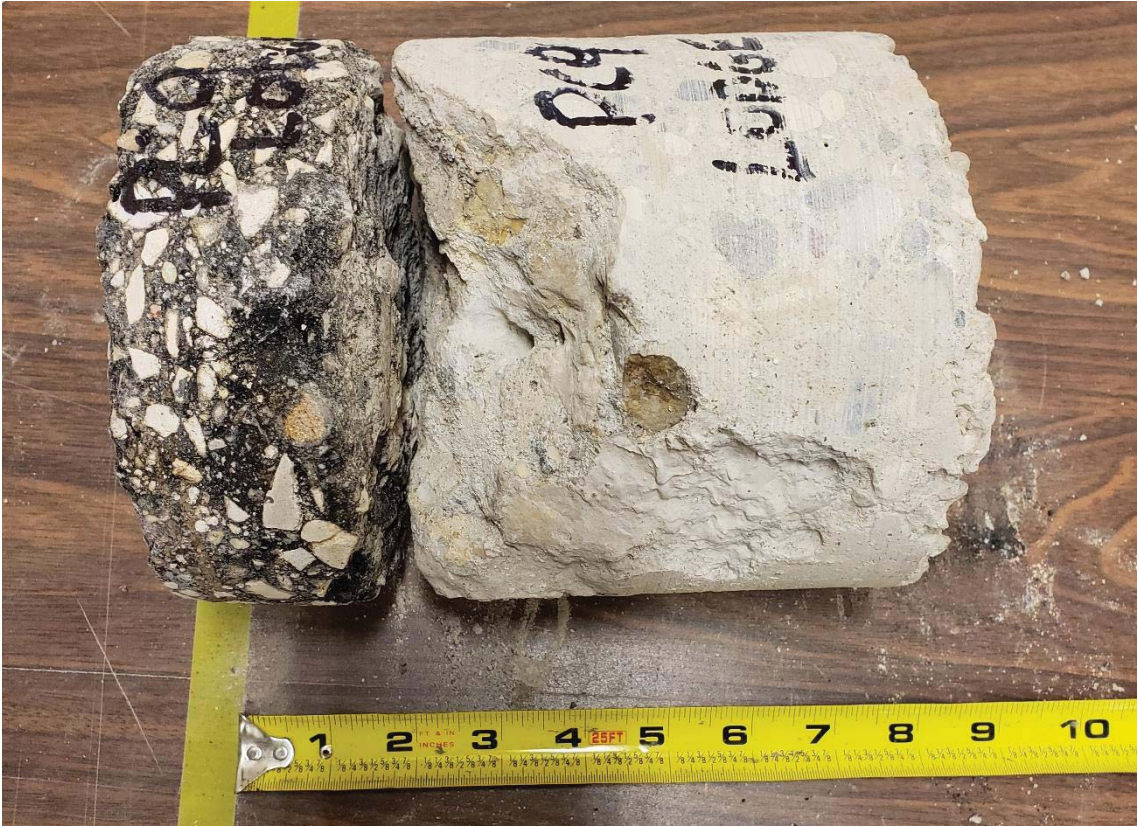


Figure 9 – PC-15 Lodge Ave

APPENDIX

D TRAILL AVE



MT ROYAL ROAD

PORTAGE AVENUE

TRAIL AVENUE

PC-21

PC-24

PC-20

PC-19

PC-23

PC-18

PC-17

PC-22

PC-16



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

TITLE:

19-R-03 LOCAL STREETS
TRAIL AVE FROM
MT ROYAL RD TO PORTAGE AVE

CORING LOCATIONS

SCALE:

N.T.S.

DATE:

2019/03/14

PROJECT NO:

18M-01969-00

REVISION:

0

DRAWING NO:

B106

XREF

STAMP



Figure 1 – PC-16 Trail Ave



Figure 2 – PC-17 Trail Ave



Figure 3 – PC-18 Trall Ave



Figure 4 – PC-19 Trall Ave



Figure 5 – PC-20 Trail Ave



Figure 6 – PC-21 Trail Ave



Figure 7 – PC-22 Trail Ave



Figure 8 – PC-23 Trail Ave



Figure 9 – PC-24 Trail Ave